Department of Energy
National Nuclear Security Administration
Sandia Field Office
P.O. Box 5400
Albuquerque, NM 87185

JUN 22 2021

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

Subject: Submittal of Annual Groundwater Monitoring Report Calendar Year 2020 for Groundwater Monitoring Program, Sandia National Laboratories, New Mexico, Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Pierard:

The Department of Energy, National Nuclear Security Administration, Sandia Field Office and National Technology and Engineering Solutions of Sandia, LLC submit the Subject report dated June 2021.

This report is comprised of the annual reporting requirement for Chemical Waste Landfill, Mixed Waste Landfill, Technical Area (TA) V Groundwater Area of Concern, Tijeras Arroyo Groundwater Area of Concern, and Burn Site Groundwater Area of Concern investigations for calendar year 2020, in accordance with requirements of Section X.D of the Compliance Order on Consent.

If you have any questions, please contact Dr. Adria Bodour of our staff at (505) 845-5349, or adria.bodour@nnsa.doe.gov.

Sincerely,

Jeffrey P. Harrell
Manager

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Calendar Year 2020 Annual Groundwater Monitoring Report

Sandia National Laboratories
Albuquerque, New Mexico
EPA ID No. NM5890110518
CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Paul E. Shoemaker Digitally signed by Paul E. Shoemaker Date: 2021.06.16 09:49:38 -06'00'

6/16/2021

Paul E. Shoemaker, Senior Manager
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6/22/21

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Date signed

Unlimited Release
Printed June 2021

Calendar Year 2020

Annual Groundwater Monitoring Report

Prepared by
Sandia National Laboratories, Albuquerque, New Mexico

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

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Annual Groundwater Monitoring Report

Calendar Year 2020

Groundwater Monitoring Program

Sandia National Laboratories, New Mexico

June 2021

Prepared by:
Long-Term Stewardship in coordination with
Environmental Restoration Operations

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Acknowledgments

The production of this document is a joint effort between the Sandia National Laboratories, New Mexico Long-Term Stewardship Program and Environmental Restoration Operations.

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Abstract

Sandia National Laboratories, New Mexico (SNL/NM) is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's (DOE) National Nuclear Security Administration (NNSA) under contract DE-NA0003525. The DOE/NNSA Sandia Field Office administers the contract and oversees contractor operations at the site.

This Annual Groundwater Monitoring Report summarizes data through December 31, 2020 from groundwater monitoring samples collected at the Chemical Waste Landfill, Mixed Waste Landfill, and Groundwater Monitoring Program locations, as well as the following SNL/NM Areas of Concern (AOCs): Burn Site Groundwater AOC, Technical Area-V Groundwater AOC, and the Tijeras Arroyo Groundwater AOC. Reporting the results of environmental monitoring and surveillance programs is required by the New Mexico Environment Department and DOE Order 231.1B, *Environment, Safety, and Health Reporting*.

Attachments

Chapter Tables

Chapter Tables (continued)

Chapter Figures

Chapter Figures (concluded)

Tables

Plate

Abbreviations and Acronyms

ABCWUA	Albuquerque Bernalillo County Water Utility Authority
AGMR	Annual Groundwater Monitoring Report
amsl	Above mean sea level
AOC	Area of Concern
AOP	Administrative Operating Procedure
ARG	Ancestral Rio Grande
bgs	Below ground surface
BSG	Burn Site Groundwater
CAC	Corrective Action Complete
CCM	Current Conceptual Model
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
COA	City of Albuquerque
COC	Constituent of concern
Consent Order	Compliance Order on Consent
CSM	Conceptual Site Model
CWL	Chemical Waste Landfill
CY	Calendar Year
DO	Dissolved oxygen
DOE	U.S. Department of Energy
DP	Discharge Permit
DRO	Diesel range organics
EB	Equipment blank
EDMS	Environmental Data Management System
EHD	Environmental Health Department
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERP	Environmental Restoration Program (KAFB)
ET	Evapotranspirative
FB	Field blank
FOP	Filed Operating Procedure
GEL	GEL Laboratories LLC
GMP	Groundwater Monitoring Program
GRO	Gasoline range organics
GWQB	Ground Water Quality Bureau
HE	High explosive
HWB	Hazardous Waste Bureau
IMWP	Interim Measures Work Plan
ISB	In-situ bioremediation
JP-4	Jet propellant, fuel grade 4
KAFB	Kirtland Air Force Base
LTMM	Long-Term Monitoring and Maintenance
LTMMP	Long-Term Monitoring and Maintenance Plan

Abbreviations and Acronyms (concluded)

LWDS	Liquid Waste Disposal System
MAC	Maximum allowable concentrations
MCL	Maximum contaminant level
MDL	Method detection limit
MWL	Mixed Waste Landfill
NMED	New Mexico Environment Department
NMOSE	New Mexico Office of the State Engineer
NNSA	National Nuclear Security Administration
NOD	Notices of Disapproval
NPN	Nitrate plus nitrite
NTU	Nephelometric turbidity units
OB	Oversight Bureau
ORP	Oxidation-reduction potential
PCCP	Post-Closure Care Permit
PCE	Tetrachloroethene
PGWS	Perched Groundwater System
QC	Quality control
PQL	Practical quantitation limit
RCRA	Resource Conservation and Recovery Act
RCRA Permit	*RCRA Facility Operating Permit, NM5890110518*
RFI	RCRA Facility Investigation
RPD	Relative percent difference
SAP	Sampling and analysis plans
SC	Specific conductivity
SFG	Santa Fe Group
SNL/NM	Sandia National Laboratories, New Mexico
SMO	Sample Management Office
SWMU	Solid Waste Management Units
TA	Technical Area
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TAVG	Technical Area-V Groundwater
TB	Trip blank
TCE	Trichloroethene
TOX	Total Organic Halogens
TSWP	Treatability Study Work Plan
USGS	U.S. Geological Survey
VA	Veterans Affairs or Veterans Administration (groundwater well nomenclature only)
VCM	Voluntary corrective measures
VOC	Volatile organic compounds

Units

%	percent
% Sat	percent saturation
°C	degrees Celsius.
µg/L	micrograms per liter (equivalent to ppb)
µmho/cm	micromhos per centimeter
Acre-feet	one Acre-foot = 325,851 gal
ft	foot (feet)
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
gal	gallon(s)
gpm	gallons per minute
Ma	Mega Annum (million years)
mg/L	milligrams per liter (equivalent to ppm)
mrem/yr	millirems per year
mV	millivolts
NTU	nephelometric turbidity units
pCi/L	picocuries per liter
pH	potential of hydrogen (negative logarithm of the hydrogen ion concentration)
ppb	parts per billion
rem	roentgen equivalent man
sq mi	square miles
SU	standard units

Well Location Descriptions

12AUP-#	ER Site 12A Underflow Piezometer
ASL-PD	Albuquerque Seismological Laboratory Production (well)
AVN-#	Area-V (North)
BW	background well
Burn Site Well	Burn Site Well
CCBA-#	Coyote Canyon Blast Area
CTF-#	Coyote Test Field
CWL-#	Chemical Waste Landfill
CYN-#	Canyons (Lurance Canyon area)
Eubank-#	Eubank well
Greystone-#	Greystone well
EX	Well proposed for extraction purposes but used for monitoring purposes only. This applies to the well number for ST105-EX01.
Ext	Extraction well used for remediating groundwater at the BFF and the KAFB Tijeras Arroyo Golf Course.
HERTF	High Energy Research Test Facility
INJ	Injection well
IP-#	Isleta Pueblo
ITRI-MW	Inhalation Toxicology Research Institute
KAFB	Kirtland Air Force Base
LMF-#	Large Melt Facility
LWDS-#	Liquid Waste Disposal System
MRN-#	Magazine Road North
MVMW#	Mountain View Monitoring Well
MW	Monitoring well
MWL-#	Mixed Waste Landfill
NMED-#	New Mexico Environment Department
NWTA3-#	Northwest Technical Area-III
OBS-#	Old Burn Site
P&A	Plugged and abandoned (decommissioned)
PGS-#	Parade Ground South
PL-#	Power Line Road
RG-#	Rio Grande
SFR-#	South Fence Road
ST105-MW	KAFB Project ST-105
STW-#	Solar Tower (West)
SWTA3-#	Southwest Technical Area-III
TA1-W-#	Technical Area-I (Well)
TA2-NW-#	Technical Area-II (Northwest)
TA2-SW-#	Technical Area-II (Southwest)
TA2-W-#	Technical Area-II (Well)
TAV-#	Technical Area-V
TAV-INJ	Technical Area-V Injection Well
TJA-#	Tijeras Arroyo
TRE-#	Thunder Road East
TRN-#	Target Road North
TRS-#	Target Road South
TSA-#	Transportation Safeguards Academy
VA-#	Veterans Administration

WYO-#	Wyoming
YALE-MW	Yale Boulevard area

Meteorological Towers

A21	SNL/NM Meteorological Station in TA-II
A36	SNL/NM Meteorological Station in TA-III/TA-V
KABQ	National Weather Service Meteorological Station at the Albuquerque International Sunport
LC1	SNL/NM Meteorological Station in Lurance Canyon west of Burn Site
SC1	School House - SNL/NM Meteorological Station in the Manzanita Mountains

Annual Groundwater Monitoring Report

Executive Summary

This Annual Groundwater Monitoring Report (AGMR) presents the results of the 2020 groundwater characterization and groundwater surveillance monitoring program performed by Sandia National Laboratories, New Mexico (SNL/NM) personnel for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA). This AGMR fulfills certain reporting requirements set forth in the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (RCRA Permit), the Compliance Order on Consent (Consent Order) and various DOE Directives as detailed in Section 1.2.1. The SNL/NM facility is located on Kirtland Air Force Base (KAFB) in central New Mexico. Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the DOE/NNSA under contract DE-NA0003525.

This AGMR documents the results of the groundwater characterization and monitoring activities at SNL/NM for Calendar Year (CY) 2020. This report has been prepared to meet the environmental reporting requirements for the CY 2020 Annual Site Environmental Report, providing an annual update of groundwater data to regulators, stakeholders, and outside agencies. In addition, it serves as a valuable tool to inform the public about the groundwater quality at SNL/NM. This report includes both water quality sampling results and water level measurements.

Chapter 1.0 provides the general site description for the SNL/NM facility and describes the regulatory criteria and sample collection methods for both SNL/NM site-specific and site-wide groundwater monitoring tasks. The Regional Aquifer supplying the Albuquerque Bernalillo County Water Utility Authority, Veterans Affairs, and KAFB production wells is located within the Albuquerque Basin. The Regional Aquifer is mostly contained within the upper unit and, to some extent, the middle unit of the Santa Fe Group. The edge of the basin on the east side is defined by the Sandia, Manzanita, and Manzano Mountains. KAFB straddles the east side of the basin and is divided approximately in half by basin-bounding faults. On KAFB, the basin margin is primarily defined by the north-south-trending Sandia Fault and the Hubbell Spring Fault. The Tijeras Fault, a strike-slip fault that trends northeast-southwest, intersects the Sandia and Hubbell Spring Faults forming a system of faults collectively referred to as the Tijeras Fault complex. The faults form a distinct hydrogeological boundary between the Regional Aquifer within the basin (approximately 500 feet below ground surface) and the shallower bedrock aquifer systems within the uplifted areas (generally between 45 to 360 feet below ground surface).

The remaining chapters focus on the activities at each of the following monitoring networks maintained at SNL/NM: Groundwater Monitoring Program (GMP) site-wide surveillance (Chapter 2.0), Chemical Waste Landfill (CWL) (Chapter 3.0), Mixed Waste Landfill (MWL) (Chapter 4.0), Technical Area (TA)-V Groundwater (TAVG) Area of Concern (AOC) (Chapter 5.0), Tijeras Arroyo Groundwater (TAG) AOC (Chapter 6.0), and Burn Site Groundwater (BSG) AOC (Chapter 7.0).

At SNL/NM, Solid Waste Management Units (SWMUs) are regulated under the RCRA Permit. In the RCRA Permit, a SWMU is defined as “any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste.” Monitoring and/or corrective action requirements generally are determined on a SWMU-specific basis following a site investigation. A Consent Order governs corrective actions for these sites and, accordingly, monitoring is performed at the TAVG AOC, TAG AOC, and BSG AOC. The MWL is a SWMU that underwent corrective action in accordance with the Consent Order, and in March 2016, the February 2016 New Mexico Environment Department (NMED) Final Order became effective, granting

Corrective Action Complete with Controls status to the MWL. Groundwater monitoring requirements for the MWL are defined in the Long-Term Monitoring and Maintenance Plan (LTMMP). The CWL is a closed, regulated unit undergoing post-closure care in accordance with the CWL Post-Closure Care Permit (PCCP) that became effective on June 2, 2011. The CWL PCCP Attachment 2, Groundwater Sampling and Analysis Plan, details the groundwater monitoring requirements, procedures, and protocols.

Groundwater Quality Monitoring Activities and Results

During CY 2020, groundwater samples were collected from monitoring wells for six networks. The analytical results for samples from all monitoring wells were compared with maximum contaminant levels (MCLs) established by the U.S. Environmental Protection Agency. The results for GMP monitoring wells were also compared with NMED maximum allowable concentrations (MACs) promulgated for groundwater by the State of New Mexico's Water Quality Control Commission. The activities and results are summarized for each location in the following sections and the data are presented in the attachments following each chapter.

In this report, groundwater-monitoring data are presented for both hazardous and radioactive constituents; however, the monitoring data for radionuclides (gamma spectroscopy, gross alpha/beta activity, radon-222, radium-226, and radium-228, and tritium) are provided voluntarily by the DOE/NNSA and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements of the Consent Order, as specified in Section III.A of the Consent Order.

Groundwater Monitoring Program

Chapter 2.0 discusses the annual groundwater surveillance monitoring activities conducted during March and April 2020 at wells that are part of the SNL/NM GMP. The GMP is part of the site-wide Environmental Management System at SNL/NM. GMP well locations are scattered throughout and along the perimeter of the base in areas that are not specifically affiliated with SWMUs or AOCs. During CY 2020, groundwater elevations were measured in 187 wells; groundwater samples were collected from 16 monitoring wells (CCBA-MW2, CTF-MW1, CYN-MW5, Greystone-MW2, MRN-2, MRN-3D, NWTA3-MW3D, OBS-MW1, PL-2, PL-4, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1), and one surface water sample was collected from Coyote Springs. Groundwater samples were analyzed for Safe Drinking Water Act list of volatile organic compounds (VOCs), total organic halogens, total phenols, nitrate plus nitrite (NPN), total alkalinity, general chemistry, Target Analyte List (TAL) metals plus total uranium, mercury, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, radium-226, and radium-228. Additional samples were collected at selected monitoring wells for analysis of high explosive compounds and isotopic uranium. No analytes were detected at concentrations exceeding the associated MCLs or MACs, except for beryllium and fluoride. Beryllium was detected above the MCL of 0.004 milligrams per liter (mg/L) in the environmental surface water sample from Coyote Springs at a concentration of 0.00721 mg/L, which is similar to historical concentrations and is considered to be of natural origin. Fluoride was detected above the MAC of 1.6 mg/L in Coyote Springs and four monitoring wells (OBS-MW1, SFR-2S, SFR-4T, and SWTA3-MW4) at concentrations of 1.63 mg/L, 2.29 mg/L (2.29 mg/L, for the environmental duplicate sample), 1.61 mg/L, 2.70 mg/L, and 1.61 mg/L, respectively. The results are similar to historical concentrations and are also considered to be of natural origin.

Water levels were measured quarterly at monitoring wells by SNL/NM personnel. The water levels were used to construct contours of the potentiometric surface of the Regional Aquifer. The contours display a pattern that reflects the impact of the groundwater withdrawal by production wells located in the northwestern portion of KAFB and within the city.

Chemical Waste Landfill

Chapter 3.0 discusses the semiannual groundwater monitoring activities conducted during January and July 2020 at the CWL. The site is a 1.9-acre former disposal site located in the southeastern corner of TA-III. The site was used for the disposal of chemical, radioactive, and solid waste generated by SNL/NM research activities from 1962 to 1985. Two voluntary corrective measures (VCMs) were performed from 1996 through 2002 to remediate the CWL: the Vapor Extraction VCM, and the Landfill Excavation VCM. Since June 2, 2011, the CWL is a remediated, closed, regulated unit undergoing post-closure care in accordance with the CWL PCCP. During CY 2020, groundwater elevations were measured and groundwater samples were collected from four monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11). Groundwater samples collected during the January sampling event were analyzed for trichloroethene (TCE), 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene (PCE), 1,1-dichloroethene, chloroform, trichlorofluoromethane, nickel, and chromium. Groundwater samples collected during the July sampling event were analyzed for TCE, nickel, and chromium. No analytes were detected at concentrations exceeding the associated MCLs or CWL PCCP-defined hazardous concentration limits, and the analytical results are comparable to historical values. All CY 2020 groundwater samples were also analyzed for 1,4-dioxane as requested by NMED; there were no detections of 1,4-dioxane in the CY 2020 groundwater samples. Other activities conducted at the CWL during CY 2020 include inspections, cover maintenance, and soil-vapor sampling.

Mixed Waste Landfill

Chapter 4.0 discusses the semiannual groundwater monitoring activities conducted in May and November 2020 at the MWL (SWMU 76). The 2.6-acre site is located in the north-central portion of TA-III and was operational from March 1959 through December 1988. The MWL consists of a classified area and an unclassified area that received low-level radioactive, hazardous, and mixed waste. The NMED selected a final remedy, an evapotranspirative vegetative soil cover with a biointrusion barrier, which was installed in 2009. Since January 2014, activities at this site are conducted in accordance with the requirements of the MWL LTMMP. On March 13, 2016, the February 2016 NMED Final Order became effective, granting Corrective Action Complete with Controls status to the MWL and incorporating the MWL LTMMP into the RCRA Permit. During CY 2020, groundwater elevations were measured in seven wells (MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, and MWL-MW9), and groundwater samples were collected from the four compliance monitoring wells (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) and analyzed for VOCs, metals (cadmium, chromium, nickel, and total uranium), radionuclides by gamma spectroscopy, gross alpha/beta activity, radon-222, and tritium. No analytes were detected at concentrations exceeding the associated MCLs or MWL LTMMP-defined trigger levels, and the analytical results are comparable to historical values. All CY 2020 groundwater samples were also analyzed for 1,4-dioxane as requested by NMED; there were no detections of 1,4-dioxane in the CY 2020 groundwater samples. Other activities conducted at the MWL during CY 2020 include cover maintenance, soil-vapor sampling, inspections, and other monitoring required by the MWL LTMMP.

Technical Area-V Groundwater Area of Concern

Chapter 5.0 discusses the quarterly groundwater monitoring activities conducted during February, May/June, August, and November/December 2020 at the TAVG AOC. The site is located at the northeast corner of TA-III. Three wastewater and sanitary waste facilities were used at the site from the 1960s to the early 1990s. Both nitrate and TCE have been identified as constituents of concern in the Regional Aquifer at the TAVG AOC based on detections above the MCLs. Environmental activities at this AOC are regulated under the requirements of the Consent Order. During CY 2020, groundwater elevations were measured and groundwater samples were collected from 17 monitoring wells (AVN-1, LWDS-MW1, LWDS MW2, TAV-MW2, TAV MW3, TAV-MW4, TAV-MW5, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV MW13, TAV-MW14, TAV-MW15, and TAV-MW16). Groundwater samples were analyzed for VOCs, NPN, alkalinity, anions (bromide, chloride, fluoride, and sulfate), dissolved metals (arsenic, iron, and manganese), TAL metals plus total uranium, radionuclides by gamma spectroscopy, gross alpha/beta activity, and tritium. No analytes were detected at concentrations exceeding the associated MCLs except for nitrate and TCE. Nitrate concentrations exceeded the MCL of 10 mg/L in samples from three monitoring wells (AVN-1, LWDS-MW1, and TAV MW10) with a maximum concentration of 14.6 mg/L in the environmental sample from monitoring well LWDS-MW1 collected in August. TCE concentrations exceeded the MCL of 5 micrograms per liter (µg/L) in samples from five monitoring wells (LWDS MW1, TAV-MW4, TAV-MW8, TAV-MW10, and TAV-MW14) with a maximum concentration of 14.8 µg/L in the environmental duplicate sample from monitoring well LWDS-MW1 collected in February. The analytical results of nitrate and TCE in the other monitoring wells are below the MCLs and are consistent with historical trends. NMED also requested 1,4-dioxane to be analyzed for a minimum of two sampling events at TAVG AOC. 1,4-dioxane sampling and results are provided in detail in Chapter 5.0. Other activities conducted at the TAVG AOC during CY 2020 include the groundwater monitoring of wells TAV-INJ1 and TAV-MW6 in the in-situ bioremediation Treatability Study treatment zone.

Tijeras Arroyo Groundwater Area of Concern

Chapter 6.0 discusses the quarterly, semiannual, and annual groundwater monitoring activities conducted during February/March, June, August/September, and December 2020. Two water-bearing units, the Perched Groundwater System (PGWS) and the Regional Aquifer, underlie the TAG AOC. This site is located in the north-central portion of KAFB and includes TA-I, TA-II, and TA-IV. Groundwater in the area may have been impacted since the late 1940s and includes numerous potential SNL/NM and non-SNL/NM wastewater and septic-water sources. All SNL/NM discharges ceased in 1992. Activities at this AOC are regulated under the requirements of the Consent Order. During CY 2020, groundwater elevations were measured in 30 monitoring wells and groundwater samples were collected from 21 monitoring wells (TA1-W-01, TA1-W-02, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-W-01, TA2-W-19, TA2-W-24, TA2-W-25, TA2-W-26, TA2-W-27, TA2-W-28, TJA-2, TJA-3, TJA-4, TJA-5, TJA-6, TJA-7, and WYO-3). Groundwater samples were analyzed for VOCs, NPN, 1,4-dioxane, alkalinity, general chemistry, TAL metals plus total uranium, radionuclides by gamma spectroscopy, gross alpha/beta activity, and tritium. No analytes were detected at concentrations exceeding the associated MCLs except for nitrate, TCE, and PCE. Nitrate concentrations exceeded the MCL of 10 mg/L in samples from five monitoring wells screened in the PGWS (TA2-W-19, TA2-W-28, TJA-2, TJA-5, and TJA-7), with a maximum concentration of 22.7 mg/L. The maximum nitrate concentration for merging-zone well TJA-4 was 31.9 mg/L. None of the samples from the Regional Aquifer wells exceeded the nitrate MCL; the maximum nitrate concentration was 4.03 mg/L. Nitrate concentrations in monitoring wells TA2-W-28, TJA-4, and TJA-7 have generally exceeded the MCL for the life of the wells, whereas nitrate concentrations occasionally have exceeded the MCL in samples from monitoring wells TJA-2, TJA-5, and TA2-W-19. Recent nitrate concentrations across the monitoring well network were consistent with historical trends. TCE and PCE concentrations exceeded the MCLs of 5 µg/L at monitoring well TA2-W-26 at concentrations of 15.7 and 7.59 µg/L, respectively. No other monitoring wells had VOC concentrations that exceeded MCLs. NMED also requested 1,4-dioxane to be analyzed for a minimum of two sampling events at TAG AOC. 1,4-dioxane sampling and results are provided in detail in Chapter 6.0. Other field activities conducted at the TAG AOC during CY 2020 include video logging of monitoring well TA2-W-26 and installation of a BaroBall™ (i.e., passive venting device) after the last sampling event at that well.

Burn Site Groundwater Area of Concern

Chapter 7.0 discusses the quarterly groundwater monitoring activities conducted in January, April, July, and October/November 2020; and the semiannual groundwater monitoring activities conducted in April and October/November 2020 at the BSG AOC. This site is located around the active Lurance Canyon Burn Site facility in the far eastern portion of KAFB. The site was used from the 1960s through 1980s for explosives tests and burn tests, and groundwater investigations were initiated in 1997 at the request of the

NMED after elevated nitrate levels were discovered in the Burn Site Well (production well inactive since 2003). Activities at this AOC are regulated under the requirements of the Consent Order. During CY 2020, groundwater elevations were measured in 17 wells and groundwater samples were collected from 14 wells (CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15, CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19). Samples were analyzed for VOCs, high explosive compounds, total petroleum hydrocarbons - diesel range organics, total petroleum hydrocarbons -gasoline range organics, NPN, alkalinity, general chemistry, TAL metals, perchlorate (at five wells: CYN-MW15, CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19), radionuclides by gamma spectroscopy, gross alpha/beta activity, isotopic uranium, and tritium. No analytes were detected at concentrations exceeding the associated MCLs, except for nitrate. Nitrate concentrations exceeded the MCL of 10 mg/L in samples from 7 monitoring wells (CYN-MW9, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15, and CYN-MW16) with a maximum concentration of 49.6 mg/L in the April environmental sample from monitoring well CYN-MW9. The nitrate concentration trends in these wells are variable within a narrow range over the past year. Other activities conducted at the BSG AOC include submitting a Monitoring Well Installation Report to NMED in May, and NMED approval of the report in July.

Future Groundwater Monitoring Events

The groundwater monitoring events conducted on a site-wide basis as part of the SNL/NM GMP and at CWL, MWL, TAVG AOC, TAG AOC, and BSG AOC will continue during CY 2021, in accordance with regulatory requirements. The results for these monitoring events will be presented in the AGMR for CY 2021.

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1.0 Introduction

General groundwater surveillance monitoring is conducted for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) at Sandia National Laboratories, New Mexico (SNL/NM). The purpose of this document is to report to regulators and other stakeholders the results of the consolidated groundwater monitoring activities at SNL/NM for Calendar Year (CY) 2020.

Separate chapters focus on the investigation activities at each of the following monitoring networks maintained at SNL/NM:

- Groundwater Monitoring Program (GMP) (Chapter 2.0)
- Chemical Waste Landfill (CWL) (Chapter 3.0)
- Mixed Waste Landfill (MWL) (Chapter 4.0)
- Technical Area (TA)-V Groundwater (TAVG) Area of Concern (AOC) (Chapter 5.0)
- Tijeras Arroyo Groundwater (TAG) AOC (Chapter 6.0)
- Burn Site Groundwater (BSG) AOC (Chapter 7.0)

1.1 Site Description

The SNL/NM facility is located on Kirtland Air Force Base (KAFB), New Mexico. KAFB is a 51,559-acre (80.56 square miles [sq mi]) military installation that includes 20,486 acres withdrawn from the Cibola National Forest through an agreement with the U.S. Forest Service. Located at the foot of the Manzanita Mountains, KAFB has an average elevation of 5,384 feet (ft) above mean sea level (amsl). The range of elevations is 5,162 to 7,986 ft amsl. KAFB and SNL/NM are located adjacent to the City of Albuquerque, which borders KAFB on its north and west boundaries (Figure 1-1).

1.1.1 Climate

The Albuquerque area is characterized by low precipitation and wide temperature extremes that are typical of high-altitude, dry, continental climates. The average annual precipitation measured at Albuquerque International Sunport (National Oceanic and Atmospheric Administration National Weather Service station) is 9.48 inches (Chapter 2.6.2.1). Most precipitation falls between July and October, mainly in the form of brief, heavy rain. The evaporation potential is high because of low humidity and generally warm temperatures.

1.1.2 Geologic Setting

SNL/NM is located near the east-central edge of the Albuquerque Basin. The Albuquerque Basin (also known as the Middle Rio Grande Basin) is one of a series of north-south trending basins that was formed during the extension of the Rio Grande Rift. The basin is approximately 3,000 sq mi. Rift formation initiated in the late Oligocene and continued into the early Pleistocene, with the primary period of extension occurring between 30 and 5 Mega Annum (Ma); or million years before present. Tectonic activity, which began uplifting the Sandia, Manzanita, and Manzano Mountains, was most prevalent from about 15 to 5 Ma (Thorn et al. 1993). The rift today extends from south central Colorado across New Mexico, and into northern Mexico. The vertical displacement between the rock units exposed at the top of Sandia Crest and the equivalent units located at the bottom of the buried Albuquerque Basin is more than 6 miles (Lozinsky 1994).

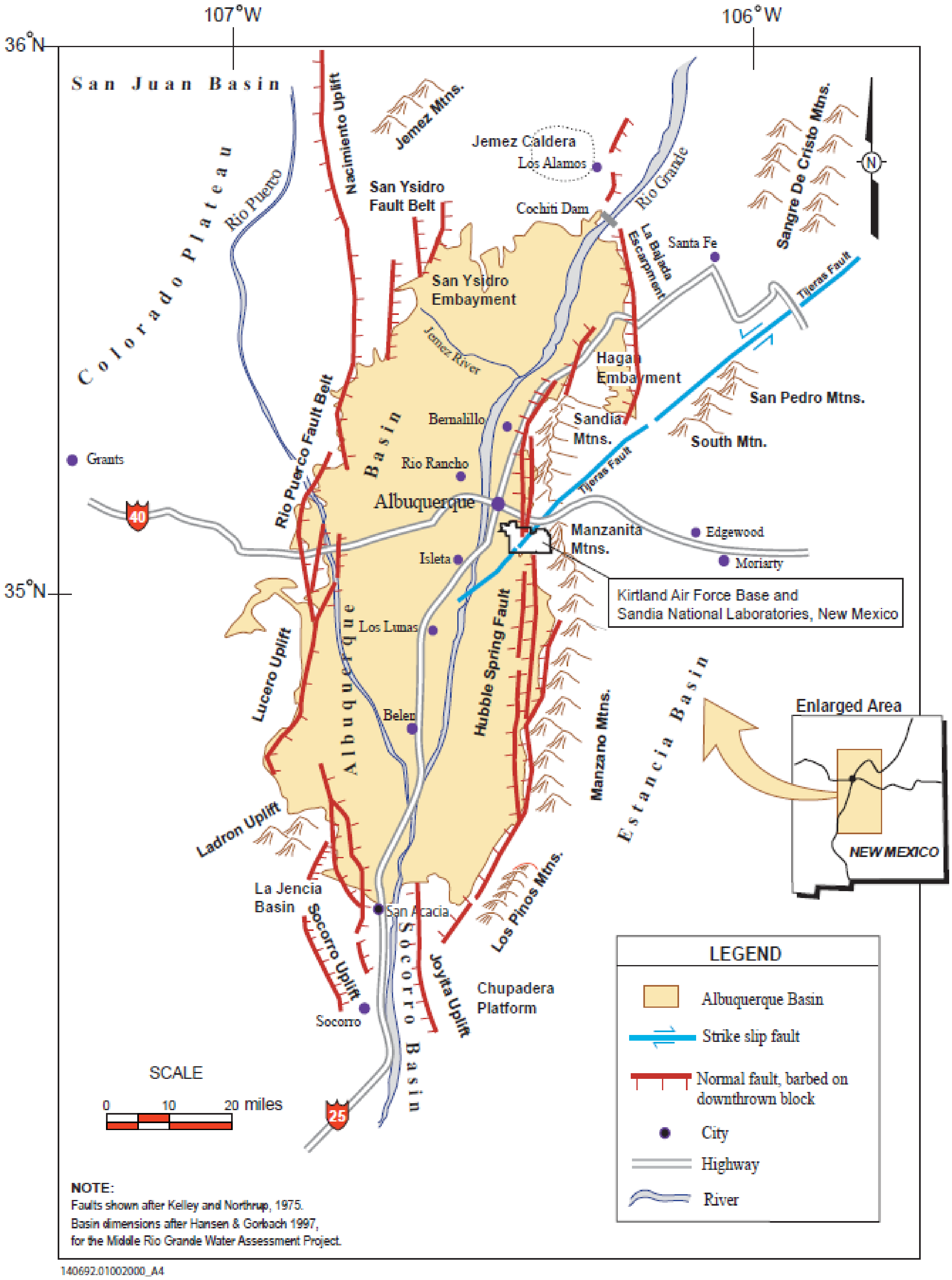

Figure 1-1. Albuquerque Basin, North-Central New Mexico

As shown on Figure 1-1, the structural boundaries of the Albuquerque Basin are as follows:

- Colorado Plateau on the west
- Nacimiento Uplift and the Jemez Mountains to the north
- La Bajada Escarpment to the northeast
- Sandia, Manzanita, Manzano, and Los Pinos Mountains to the east
- Joyita and Socorro uplifts to the south
- Ladron and Lucero uplifts to the southwest

As the Rio Grande Rift continued to expand, the Albuquerque Basin subsided. Over the last 30 Ma, the Ancestral Rio Grande meandered across the valley formed by the subsidence and deposited sediments in broad stream channels and floodplains derived from sources to the north. The basin also filled with aeolian deposits and alluvial materials shed from surrounding uplifts (Hawley and Haase 1992). This sequence of sediments is called the Santa Fe Group (SFG). The thickness of the SFG is up to 16,400 ft at the deepest part of the basin (Lozinsky 1994). The entire sequence consists of unconsolidated sediments, which thin toward the edge of the basin and are truncated by normal faults at the basin-bounding uplifts. Units overlying the SFG include Pliocene Ortiz gravel and Rio Grande fluvial deposits, which are interbedded with Tertiary and Quaternary basaltic and pyroclastic materials. Based on recent geophysical models, the Albuquerque Basin has been further divided into three, 2- to 4-mile deep, interconnected structural depressions from north to south: the Santo Domingo, Calabacillas, and Belen subbasins. KAFB lies near the intersection of the Calabacillas and Belen subbasins along a broad, northwest elongate structural high called the Mountainview prong that separates the two subbasins (Grauch and Connell 2013). These tectonic/sedimentation features contribute greatly to the complex structural setting described below.

Figures 1-2 and 1-3 show four primary faults on the east side of KAFB: (1) the Sandia Fault, (2) the West Sandia Fault, (3) the Hubbell Spring Fault (West, Central, and East fault segments), and (4) the Tijeras Fault. The Sandia Fault is thought to be the primary boundary between the Sandia Mountains and the Albuquerque Basin. The Hubbell Spring Fault extends northward from Socorro County and terminates on KAFB near the Tijeras Fault. The Sandia and the Hubbell Spring Faults are north-south trending structures that bound the east side of the Albuquerque Basin. These two structures are en-echelon normal faults with down to the west displacement.

The Tijeras Fault is an ancient strike-slip fault that developed in the Precambrian or early Paleozoic (approximately 600 Ma) and was reactivated in association with the Laramide Orogeny during the Cretaceous period (Kelley 1977). The fault also demonstrates Quaternary movement at locations northeast of KAFB (Kelson et al. September 1999, GRAM and Lettis December 1995). This fault has been traced as far north as Madrid, New Mexico and continues into the Sangre de Cristo Mountains as the Cañoncito Fault. Preferential erosion along the fault formed Tijeras Canyon, which divides the Sandia and Manzanita Mountains. The fault trends southwest from Tijeras Canyon, intersects the northeast boundary of KAFB, and crosses KAFB to the east and south of Manzano Base. Manzano Base occupies an uplift of four peaks defined by the Tijeras Fault on the east side and the Sandia Fault on the west side. The Sandia, Hubbell Spring, and Tijeras Faults converge near the southeast end of TA-III. This complicated system of faults, defining the east edge of the basin, is referred to collectively as the Tijeras Fault Complex.

Koning, et al. (August 2019) evaluated the suitability for using managed aquifer recharge in the eastern Albuquerque metropolitan area. Weighted overlay analyses were used to evaluate shallow-based recharge and deep-injection recharge. The best locales for shallow-base recharge and deep-injection recharge were most favorable in the central portion of the study area to the northwest of KAFB. Conversely, several

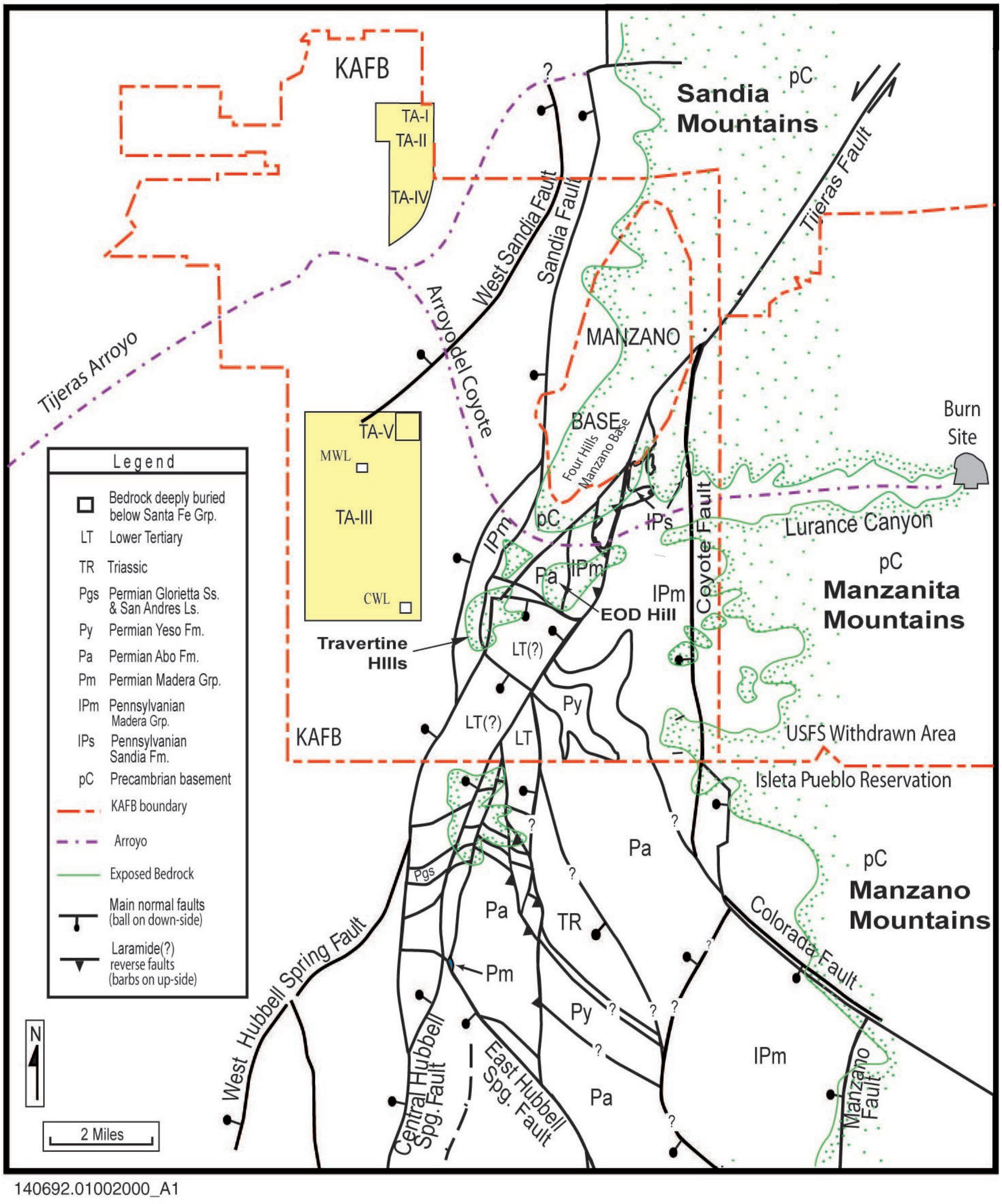

Figure 1-2. Generalized Geology in the Vicinity of Sandia National Laboratories, New Mexico and Kirtland Air Force Base (Van Hart June 2003)

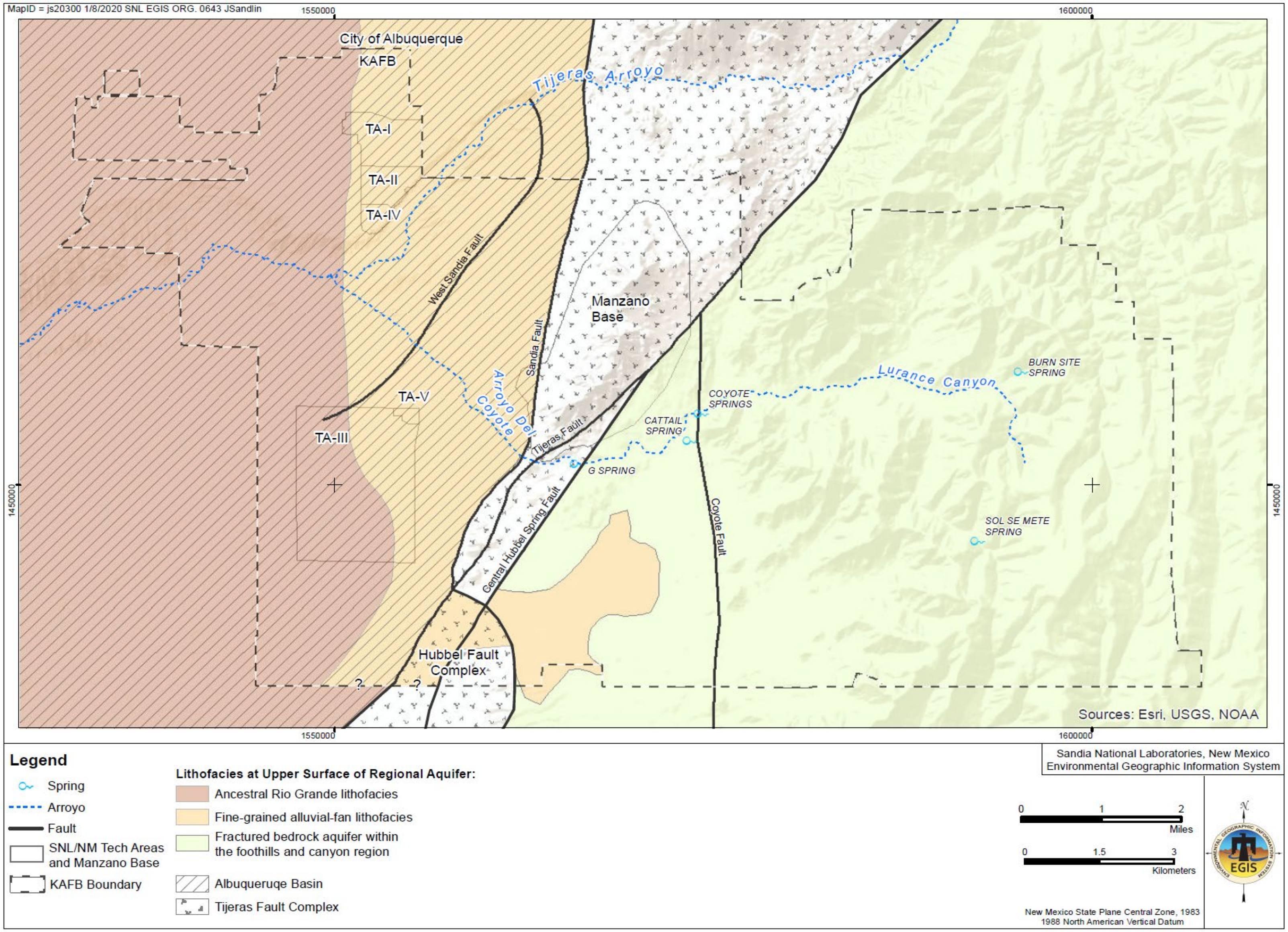

Figure 1-3. Hydrogeologically Distinct Areas Primarily Controlled by Faults (Modified from SNL March 1996)

areas in the north-central portion of KAFB, including the southeastern corner of the TAG AOC, were deemed as unsuitable for shallow-based recharge due to the known extent of groundwater contamination. Deep-injection recharge was also deemed as unsuitable due to groundwater contamination and the presence of fault zones that may act as groundwater barriers in the deeper saturated zone.

1.1.3 Hydrogeology

Figure 1-3 shows three distinct hydrogeologic areas for the KAFB area: (1) the Albuquerque Basin, (2) the Tijeras Fault Complex, and (3) the foothills and canyons region. The primary division is between the east and west sides of the Tijeras Fault Complex, which is the transitional zone. This division marks the boundary between the Regional Aquifer and the fractured bedrock system. It is important to note that the boundaries shown on Figure 1-3 identify the approximate hydrologic settings. A deep aquifer is present within the Albuquerque Basin where the Regional Aquifer lies at approximately 500 ft below ground surface (bgs). A Perched Groundwater System (PGWS) lies above the Regional Aquifer near TA-I, TA-II, and TA-IV in the TAG AOC. Figure 1-3 does not show the PGS, but Chapter 6.0 discusses it in detail. The PGS extends east and southeastward from the former KAFB sewage lagoons to the Tijeras Arroyo Golf Course. The system crosses TA-I, TA-II, and TA-IV where the gradient averages approximately 0.01 ft per ft (ft/ft); ft of vertical change per ft of horizontal distance) in the sediments. Possible recharge sources for the Perched Groundwater System include the former KAFB sewage lagoons, landscape watering, arroyo surface water, wastewater outfalls, buried septic systems, the Tijeras Arroyo Golf Course, and possible leakage from water-distribution and sewer lines (SNL February 2018).

East of the Tijeras Fault Complex, a thin layer of alluvium covers the bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the east side of the Tijeras Fault Complex, the depth-to-groundwater ranges from about 45 to 360 ft bgs. Most non-potable production and monitoring wells east of the faults are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

Groundwater in the fractured bedrock system on the east portion of KAFB generally flows west out of the canyons toward the Tijeras Fault Complex (Plate 1). The groundwater gradient for the bedrock aquifer is relatively steep, 0.03 ft/ft. From the mountain front to Wyoming Boulevard, the gradient averages approximately 0.005 ft/ft in the unconsolidated sediments of the Regional Aquifer, and west of Wyoming Boulevard the gradient flattens to an average of approximately 0.002 ft/ft in coarser-grained facies of the unconsolidated sediments of the Regional Aquifer.

The historic direction of regional groundwater flow within the basin was westward from the mountains toward the Rio Grande. However, due to groundwater pumping at KAFB, Veterans Affairs, and Albuquerque Bernalillo County Water Utility Authority (ABCWUA) production wells, a depression in the Regional Aquifer has been created originating at the well fields near the northwest corner of KAFB. The impact of the seasonal variation in water production by both KAFB and ABCWUA wells can be observed as minor fluctuations in the groundwater elevations of some SNL/NM and KAFB monitoring wells as far to the southeast as TA-III.

1.1.4 Surface Water Hydrology

The Rio Grande, located approximately 3 miles west of KAFB, is the major surface hydrologic feature in central New Mexico. The Rio Grande originates in the San Juan Mountains of Colorado and terminates at the Gulf of Mexico, near Brownsville, Texas. The Rio Grande has a total length of 1,760 miles and is the third longest river system in North America. Surface water (with the exception of several springs) within the boundaries of KAFB is found only as ephemeral streams (arroyos) that flow for short periods from runoff after storm events, or during the spring melt of mountain snowpack. The primary surface water feature that drains the eastern foothills on KAFB is the Tijeras Arroyo. The Arroyo del Coyote intersects Tijeras Arroyo just south of TA-IV (about 1 mile west of the Tijeras Arroyo Golf Course [Figure 1-3]). Both Tijeras Arroyo and Arroyo del Coyote carry significant runoff after heavy thunderstorms that usually occur from June through August. The Tijeras Arroyo, above the confluence with Arroyo del Coyote, drains about 80 sq mi, while Arroyo del Coyote drains about 39 sq mi (USACE 1979). The total watershed for Tijeras Arroyo, which includes the Sandia and Manzanita Mountains and portions of KAFB, is approximately 126 sq mi. All active SNL/NM facilities are located outside the 100-year floodplains of both Tijeras Arroyo and Arroyo del Coyote.

Several springs on KAFB are associated with the uplifts in the Tijeras Fault Complex and in the foothills and canyons hydrogeologic areas (Figure 1-3): (1) Coyote Springs, Cattail Springs, and G Spring within Arroyo del Coyote, (2) Burn Site Spring in Lurance Canyon, and (3) Sol se Mete Spring within the Manzanita Mountains. Coyote Springs and Sol se Mete are perennial springs (continuously flowing), while the others are ephemeral springs. Hubbell Spring (a perennial spring) is located just south of KAFB on Isleta Pueblo. The wetland areas created by these springs, though very limited in extent, provide a unique ecological niche in an otherwise arid habitat.

Groundwater recharge near KAFB is primarily derived from the eastern mountain front and along the major arroyos. However, the amount of recharge occurring in the foothills and canyons is not well characterized. The estimated recharge for that portion of Tijeras Arroyo on KAFB is approximately 2.2 million cubic ft per year (50 acre-ft per year) (SNL February 1998). The best estimate for the groundwater recharge associated with Arroyo del Coyote is 0.4 million cubic ft per year (9.2 acre-ft per year). Infiltration studies conducted by the Site-Wide Hydrogeologic Characterization Project determined that recharge is negligible from direct precipitation due to the high rate of evapotranspiration for most other areas on KAFB, especially on alluvial-fan slopes and other relatively flat areas (SNL February 1998).

1.2 Groundwater Monitoring

Extensive groundwater monitoring is conducted on KAFB by two agencies (Department of Defense through Environmental Restoration Program personnel and DOE through SNL/NM personnel). The KAFB Environmental Restoration Program has a large monitoring well network associated with several closed landfills and a former KAFB sewage lagoon system. Additional KAFB wells are sited to monitor and characterize several nitrate plumes and an extensive aviation gasoline/jet fuel plume associated with the KAFB Bulk Fuels Facility. SNL/NM personnel monitor groundwater on KAFB at locations associated with DOE/NNSA-owned facilities and sites permitted by the U.S. Air Force for DOE/NNSA use. Groundwater monitoring is conducted by SNL/NM personnel on a site-wide and site-specific basis. Figure 1-4 illustrates the extensive monitoring well network at KAFB. Plate 1 more accurately portrays the monitoring well network and is presented after Chapter 7.0 of this Annual Groundwater Monitoring Report (AGMR) along with Tables 1 and 2, which provide construction details and groundwater elevations for the groundwater monitoring, production, and remediation wells. Table 1-1 lists the CY 2020 sampling events conducted for groundwater quality monitoring at SNL/NM.

Table 1-2 summarizes the groundwater analytical results for monitoring activities. Table 1-3 lists detected analytes that exceed the U.S. Environmental Protection Agency (EPA) drinking water regulatory criteria (EPA March 2018) for samples collected by SNL/NM personnel during CY 2020.

Map ID = sc21139 04/05/2021 SNL EGIS 0643

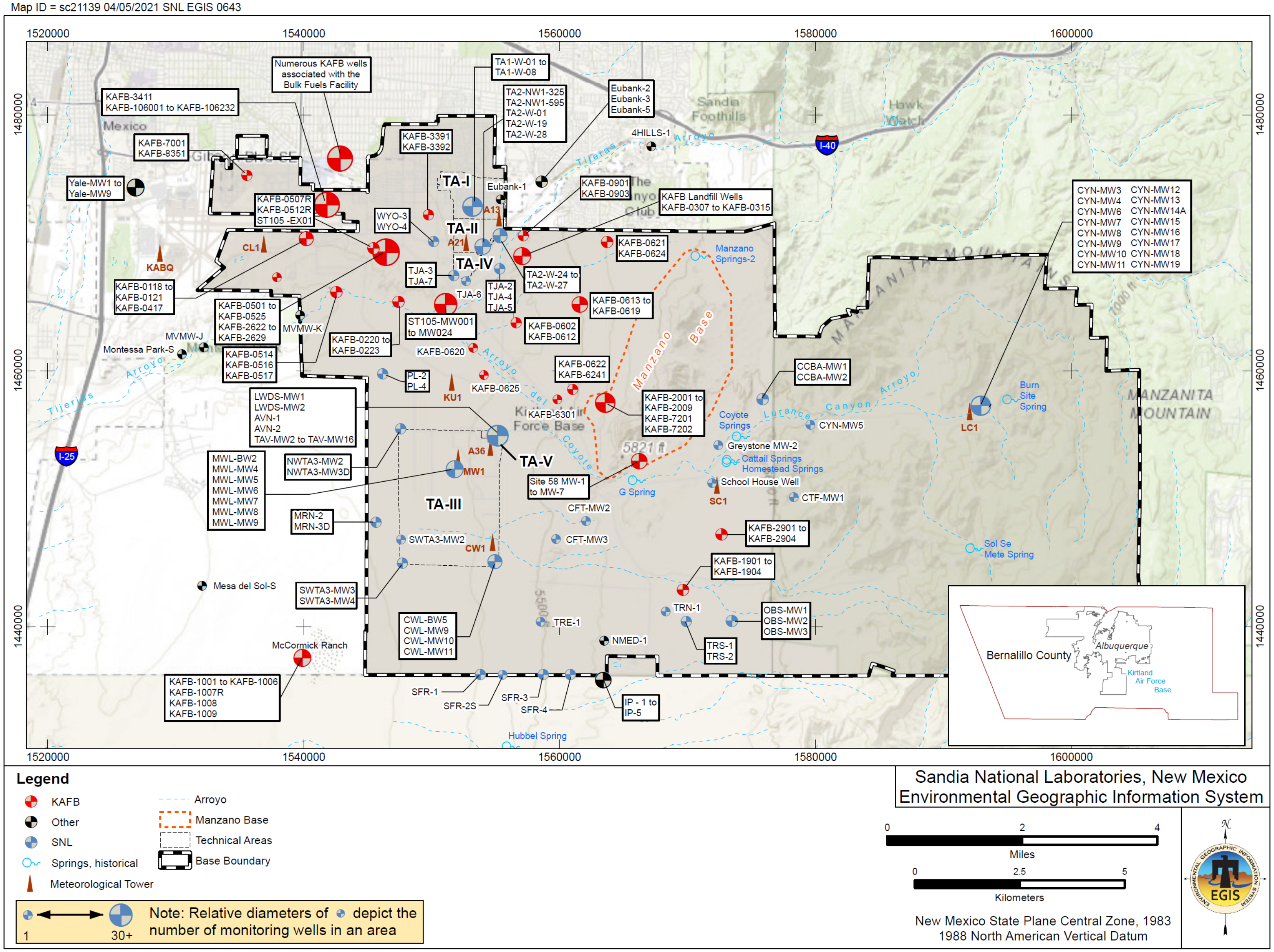

Figure 1-4. Wells and Springs within Sandia National Laboratories, New Mexico and Kirtland Air Force Base

Table 1-1. Sample Collection Dates for Groundwater Quality Monitoring at Sandia National Laboratories, New Mexico for Calendar Year 2020

2020 Sampling Event	GMP	CWL	MWL	TAVG	TAG	BSG
January		✓				✓
February				✓	✓	
March	✓				✓	
April	✓					✓
May			✓	✓		
June				✓	✓	
July		✓				✓
August				✓	✓	
September				✓	✓	
October						✓
November			✓	✓		✓
December				✓	✓	

NOTES:

BSG = Burn Site Groundwater (Area of Concern).
CWL = Chemical Waste Landfill.
GMP = Groundwater Monitoring Program.
MWL = Mixed Waste Landfill.
TAG = Tijeras Arroyo Groundwater (Area of Concern).
TAVG = Technical Area-V Groundwater (Area of Concern).

Table 1-2. Summary of Sandia National Laboratories, New Mexico Groundwater Monitoring Analytical Results for Calendar Year 2020

SNL/NM Groundwater Monitoring	
Number of Active Wells/Springs Monitored	77
Number of Analyses Performed	14,375
Percent of Non-detected Results	84 %

Analyte	Number of Detects	Number of Non-Detects	Minimum Detected Value	Maximum Detected Value	Mean Detected Value	MCL
Summary of Field Water Quality Parameters (units as indicated below)						
pH in SU	166	0	6.10	7.83	7.40	NE
Specific Conductivity in µmho/cm	166	0	320.6	4139.9	715.7	NE
Temperature in °C	166	0	12.57	26.54	19.13	NE
Turbidity in NTU	166	0	0.13	76.3	2.24	NE
Detected Organic Compounds in µg/L						
Chloroform	9	177	0.330	1.01	0.803	80.0[a]
Dichlorobenzene, 1,3-	1	170	0.830	0.830	0.830	NE
Dichloroethane, 1,1-	10	171	0.370	5.06	1.793	NE
Dichloroethene, 1,1-	6	180	0.360	2.26	1.398	7.0
Dichloroethene, cis-1,2-	39	142	0.370	6.76	1.577	70.0
Dichloropropene, trans-1,3-	1	180	0.670	0.670	0.670	NE
Tetrachloroethene	10	176	0.350	7.88	2.764	5.0
Toluene	3	178	0.390	0.640	0.477	1000
Trichloroethene	76	115	0.320	15.9	4.831	5.0
Dioxane, 1,4-	21	79	0.108	1.34	0.576	NE
Diesel Range Organics	2	44	109	373	241	NE
Detected Inorganic Parameters in mg/L						
Nitrate plus nitrite	191	0	0.125	49.6	8.217	10.0
Bromide	89	1	0.144	2.71	0.539	NE
Chloride	90	0	10.4	470	50.6	NE
Fluoride	88	2	0.228	2.70	1.024	4.0
Sulfate	90	0	16.2	2110	117.5	NE
Total Organic Halogens	7	14	0.00386	0.0142	0.00835	NE
Alkalinity as $CaCO_3$	82	0	83.2	1050	211.6	NE

Refer to footnotes on page 1-12.

Table 1-2. Summary of Sandia National Laboratories, New Mexico Groundwater Monitoring Analytical Results for Calendar Year 2020 *(Continued)*

Analyte	Number of Detects	Number of Non-Detects	Minimum Detected Value	Maximum Detected Value	Mean Detected Value	MCL
Detected Metals in mg/L						
Aluminum	20	76	0.0241	0.574	0.146	NE
Antimony	1	95	0.00104	0.00104	0.00104	0.006
Arsenic	116	45	0.00202	0.00957	0.00325	0.010
Barium	96	0	0.00941	0.230	0.07053	2.0
Beryllium	6	96	0.00219	0.00721	0.00315	0.004
Cadmium	2	104	0.000362	0.000370	0.000366	0.005
Calcium	96	0	40.0	343	90.3	NE
Chromium	14	102	0.00320	0.122	0.0294	0.100
Cobalt	8	86	0.000310	0.00967	0.00195	NE
Copper	31	65	0.000305	0.00333	0.00063	NE
Iron	40	121	0.0335	0.696	0.1621	NE
Magnesium	96	0	3.44	66.1	20.5	NE
Manganese	49	105	0.0010	1.57	0.0757	NE
Mercury	2	115	0.000101	0.000106	0.000103	0.002
Molybdenum	16	0	0.00312	0.00679	0.00444	NE
Nickel	36	80	0.000636	0.0236	0.002577	NE
Potassium	96	0	1.40	30.2	3.32	NE
Selenium	67	29	0.00203	0.0282	0.00518	0.050
Silver	2	94	0.000449	0.00120	0.000824	NE
Sodium	96	0	14.1	1120	57.1	NE
Thallium	1	95	0.00131	0.00131	0.00131	0.002
Uranium	76	0	0.000246	0.0173	0.004582	0.030
Vanadium	47	49	0.00397	0.0127	0.00677	NE
Zinc	33	63	0.00340	0.0396	0.00748	NE

Refer to footnotes on page 1-12.

Table 1-2. Summary of Sandia National Laboratories, New Mexico Groundwater Monitoring Analytical Results for Calendar Year 2020 *(Concluded)*

Analyte	Number of Detects	Number of Non-Detects	Minimum Detected Value	Maximum Detected Value	Mean Detected Value	MCL
Detected Radiochemistry Activities in pCi/L (unless noted otherwise)						
Alpha, gross (corrected)	100	0	-5.39	12.90	2.84	15.0[b]
Beta, gross	93	7	1.72	31.0	4.83	4 mrem/yr
Potassium-40	3	91	39.6	89.7	61.4	NE
Radium-226	9	12	0.235	0.913	0.582	5.0[c]
Radium-228	3	18	0.564	1.59	0.941	5.0[c]
Radon-222	10	0	81.1	559	293.2	4000
Tritium	3	76	-44.0	497	153	NE
Uranium-233/234	38	0	0.43	34.8	10.8	NE
Uranium-235/236	34	4	0.0847	0.484	0.1994	NE
Uranium-238	38	0	0.095	6.04	2.255	NE

NOTES:

[a]The 80.0 µg/L MCL is for combined trihalomethanes.

[b]The 15.0 pCi/L MCL is for corrected gross alpha activity.

[c]The 5.0 pCi/L MCL is for combined radium-226 and radium-228.

[d]4 mrem/yr = Any combination of beta- and/or gamma-emitting radionuclides (as dose rate).

°C = Degree Celsius.
% = Percent.
µg/L = Micrograms per liter.
µmho/cm = Micromhos per centimeter.
$CaCO_3$ = Calcium carbonate.
corrected = Gross alpha results reported as corrected values (uranium activities subtracted out).
MCL = Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Drinking Water Regulations (Title 40 Code of Federal Regulations § 141.11[b]), National Primary Drinking Water Standards (EPA March 2018).
mg/L = Milligrams per liter.
mrem/yr = Millirem per year.
N = Nitrogen.
NE = Not established.
NTU = Nephelometric turbidity units.
pCi/L = Picocuries per liter.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
rem = Roentgen equivalent man.
SNL/NM = Sandia National Laboratories, New Mexico.
SU = Standard units.

Table 1-3. Summary of Exceedances for Sandia National Laboratories, New Mexico Groundwater Monitoring Wells and Springs Sampled During Calendar Year 2020

Analyte	Well (Relevant Chapter)	Exceedance	Date
Beryllium MCL = 0.004 mg/L	Coyote Springs (Ch. 2)	0.00721 mg/L[a]	April 2020
Chromium MCL = 0.100 mg/L	AVN-1 (Ch. 5)	0.112 mg/L	May 2020
		0.122 mg/L	September 2020
	AVN-1 (Duplicate) (Ch. 5)	0.115 mg/L	May 2020
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	AVN-1 (Ch. 5)	10.1 mg/L	May 2020
	CYN-MW9 (Ch. 7)	49.6 mg/L	April 2020
		36.6 mg/L	November 2020
	CYN-MW11 (Ch. 7)	11.5 mg/L	April 2020
	CYN-MW12 (Ch. 7)	19.6 mg/L	April 2020
		15.6 mg/L	November 2020
	CYN-MW13 (Ch. 7)	38.4 mg/L	April 2020
		30.2 mg/L	November 2020
	CYN-MW13 (Duplicate) (Ch. 7)	40.0 mg/L	April 2020
	CYN-MW14A (Ch. 7)	14.5 mg/L	April 2020
		12.4 mg/L	October 2020
	CYN-MW14A (Duplicate) (Ch. 7)	12.2 mg/L	October 2020
	CYN-MW15 (Ch. 7)	24.3 mg/L	April 2020
		21.6 mg/L	November 2020
	CYN-MW15 (Duplicate) (Ch. 7)	25.9 mg/L	April 2020
	CYN-MW16 (Ch. 7)	11.7 mg/L	January 2020
	LWDS-MW1 (Ch. 5)	13.7 mg/L	February 2020
		12.8 mg/L	June 2020
		14.6 mg/L	August 2020
		12.2 mg/L	December 2020
	LWDS-MW1 (Duplicate) (Ch. 5)	12.7 mg/L	February 2020
		12.1 mg/L	December 2020
	TA2-W-19 (Ch. 6)	12.1 mg/L	March 2020
		12.0 mg/L	June 2020
		11.5 mg/L	September 2020
		11.8 mg/L	December 2020
	TA2-W-28 (Ch. 6)	16.8 mg/L	March 2020
		17.8 mg/L	June 2020
		17.1 mg/L	September 2020
		17.6 mg/L	December 2020
	TA2-W-28 (Duplicate) (Ch. 6)	17.3 mg/L	March 2020
		16.8 mg/L	September 2020
	TAV-MW10 (Ch. 5)	11.4 mg/L	February 2020
		11.0 mg/L	June 2020
		11.6 mg/L	August 2020
		12.0 mg/L	December 2020
	TAV-MW10 (Duplicate) (Ch. 5)	11.8 mg/L	August 2020
	TJA-2 (Ch. 6)	12.0 mg/L	March 2020
		11.8 mg/L	June 2020
		10.7 mg/L	September 2020
		11.6 mg/L	December 2020
	TJA-2 (Duplicate) (Ch. 6)	11.8 mg/L	June 2020
	TJA-4 (Ch. 6)	31.3 mg/L	March 2020
		31.0 mg/L	June 2020
		29.2 mg/L	September 2020
		31.9 mg/L	December 2020
	TJA-4 (Duplicate) (Ch. 6)	30.6 mg/L	December 2020

Refer to footnotes on page 1-14.

Table 1-3. Summary of Exceedances for Sandia National Laboratories, New Mexico Groundwater Monitoring Wells and Springs Sampled During Calendar Year 2020 *(Concluded)*

Analyte	Well (Relevant Chapter)	Exceedance	Date
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	TJA-5 (Ch. 6)	16.7 mg/L	September 2020
	TJA-7 (Ch. 6)	22.7 mg/L	March 2020
		22.0 mg/L	June 2020
		20.7 mg/L	September 2020
		22.2 mg/L	December 2020
	TJA-7 (Duplicate) (Ch. 6)	22.1 mg/L	June 2020
Tetrachloroethene MCL = 5.0 µg/L	TA2-W-26 (Ch. 6)	7.59 µg/L	December 2020
	TA2-W-26 (Duplicate) (Ch. 6)	7.88 µg/L	December 2020
Trichloroethene MCL = 5.0 µg/L	LWDS-MW1 (Ch. 5)	11.2 µg/L	February 2020
		13.6 µg/L	June 2020
		13.2 µg/L	August 2020
		14.1 µg/L	December 2020
	LWDS-MW1 (Duplicate) (Ch. 5)	14.8 µg/L	February 2020
		13.3 µg/L	December 2020
	TA2-W-26 (Ch. 6)	11.6 µg/L	September 2020
		15.7 µg/L	December 2020
	TA2-W-26 (Duplicate) (Ch. 6)	15.9 µg/L	December 2020
	TAV-MW4 (Ch. 5)	5.18 µg/L	August 2020
		5.08 µg/L	November 2020
	TAV-MW4 (Duplicate) (Ch. 5)	5.03 µg/L	February 2020
	TAV-MW8 (Ch. 5)	5.37 µg/L	November 2020
	TAV-MW10 (Ch. 5)	12.4 µg/L	February 2020
		9.32 µg/L	June 2020
		13.1 µg/L	August 2020
		13.1 µg/L	December 2020
	TAV-MW10 (Duplicate) (Ch. 5)	12.5 µg/L	August 2020
	TAV-MW14 (Ch. 5)	5.31 µg/L	August 2020
		5.35 µg/L	December 2020
	TAV-MW14 (Duplicate) (Ch. 5)	5.22 µg/L	December 2020

NOTES:

[a]Analytical result for filtered water sample. All other analytical results are for unfiltered water samples.

gµg/L = Micrograms per liter.
AVN = Area-V (North) (monitoring well designation only).
Ch. = Chapter.
CYN = Canyons.
LWDS = Liquid Waste Disposal System (monitoring well designation only).
MCL = Maximum contaminant level.
mg/L = Milligrams per liter.
MW = Monitoring well.
TA2-W = Technical Area-II (Well) (monitoring well designation only).
TAV = Technical Area-V (monitoring well designation only).
TJA = Tijeras Arroyo (monitoring well designation only).

In this report, groundwater monitoring data are presented for both hazardous and radioactive constituents; however, the monitoring data for radionuclides are provided voluntarily by the DOE/NNSA and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements of the Compliance Order on Consent (Consent Order) as specified in Section III.A of the Consent Order (New Mexico Environment Department [NMED] April 2004).

1.2.1 SNL/NM Groundwater Monitoring Requirements

Groundwater monitoring performed by SNL/NM personnel is directed based on three broad sets of requirements: the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (RCRA Permit) (NMED January 2015), the Consent Order, and various DOE Directives.

Potential release sites at SNL/NM are identified, characterized, and remediated (if required) under the RCRA regulations. In 1984, RCRA was significantly amended by the Hazardous and Solid Waste Amendments, which specifically addressed remediation of legacy contamination, including groundwater at Solid Waste Management Units (SWMUs). In the RCRA Permit (NMED January 2015), a SWMU is defined as "any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste." At SNL/NM, SWMUs are regulated under the RCRA Permit. Monitoring and/or corrective action requirements generally are determined on a SWMU-specific basis following a site investigation.

The Consent Order became effective in 2004 and specified that corrective actions for releases of hazardous waste or hazardous constituents were to be conducted under the Consent Order rather than under the RCRA Permit, with the exception of new releases from operating units; closure and post-closure at operating units; implementation of controls for any SWMU on the Permit's "Corrective Action Complete with Controls" list; and any releases of hazardous waste or hazardous constituents that occur after the Consent Order is no longer effective.

The GMP sampling complies with the Consent Order requirement for Facility Investigation Background and Periodic Monitoring Reports. Groundwater monitoring results at all sites are compared with federal and state water quality standards and DOE drinking water guidelines, where established. Groundwater surveillance conducted at the GMP network also adheres to DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE June 2011).

Closure of the CWL was approved by the NMED and the CWL Post-Closure Care Permit (PCCP) became effective on June 2, 2011 (Kieling June 2011). All groundwater monitoring at the CWL since June 2011 is performed in accordance with requirements specified in the PCCP (NMED May 2007). Required monitoring (groundwater and soil-gas), inspections, and maintenance activities are comprehensively documented in annual Post-Closure Care Reports submitted to NMED by March 31st of each year.

The MWL is a SWMU that underwent corrective action in accordance with the Consent Order. As of March 13, 2016, the February 2016 NMED Final Order (Flynn February 2016) became effective, granting Corrective Action Complete with Controls status to the MWL. All controls required for the MWL, including groundwater monitoring, are defined in the MWL Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL March 2012) that was approved by NMED on January 8, 2014 (Blaine January 2014). The MWL LTMMP defines all long-term monitoring, inspection, maintenance/repair, and reporting requirements that are applicable to the MWL and is included in the RCRA Permit (Kieling February 2016). Ongoing monitoring, inspection, and maintenance/repair are comprehensively documented in MWL Annual Long-Term Monitoring and Maintenance Reports submitted to NMED by June 30th of each year.

The three groundwater AOCs at SNL/NM (TAVG, TAG, and BSG) are undergoing corrective action in accordance with the Consent Order. Each AOC complies with requirements set forth in the Consent Order for site characterization and the development of a Corrective Measures Evaluation. The NMED is the regulatory agency responsible for enforcing the requirements of the Consent Order for each of the three AOCs (SNL June 2004, July 2004, and December 2004). The Consent Order also includes requirements for the placement and installation of new groundwater monitoring wells and decommissioning of obsolete monitoring wells at SNL/NM. Applicable well installation and well decommissioning permits are obtained from the New Mexico Office of the State Engineer.

In two document approval letters received in September 2019, the NMED Hazardous Waste Bureau (HWB) requested that DOE/NNSA and SNL/NM personnel add 1,4-dioxane to the groundwater monitoring analytical list at the CWL, MWL, TAVG AOC, and TAG AOC (NMED September 2019a and 2019b). Specifically, the NMED HWB requested:

> *The Permittees must add 1,4-dioxane analysis for groundwater monitoring wells included in the periodic monitoring conducted at TA-V, CWL, MWL, and TAG using EPA Method 8270 SIM or equivalent, for a minimum of two quarters, in order to determine the concentration of 1,4-dioxane in groundwater at these sites* (NMED September 2019a).
>
> and,
>
> *The Permittees must add 1,4-dioxane analysis for groundwater monitoring wells in the MWL monitoring network using EPA Method 8270 SIM or equivalent, for a minimum of two quarters, in order to evaluate for the presence of 1,4-dioxane in groundwater at these sites* (NMED September 2019b).

The NMED letters stipulate an action level of 4.59 micrograms per liter (µg/L) for 1,4-dioxane based on the carcinogenic risk-based tap water screening level in the 2018 Risk Assessment Guidance for Site Investigations and Remediation (New Mexico Water Quality Control Commission December 2018). Sampling for 1,4-dioxane at the CWL, MWL, TAVG AOC, and TAG AOC began in the first quarter of CY 2020 and the results are reported in relevant sections of this CY 2020 AGMR.

In addition to groundwater monitoring requirements, the Consent Order has recommendations for public involvement for sites in the corrective action process, such as the BSG, TAG, and TAVG AOCs. Activities to inform the public about the status of these three AOCs in CY 2020 included presentations at DOE/NNSA public meeting held in October. The regularly scheduled April public meeting was cancelled in 2020 due to state-wide pandemic restrictions.

1.3 Field Methods, Analytical Methods, and Quality Control Procedures

The monitoring procedures, as conducted by SNL/NM personnel, are consistent with procedures identified in the EPA's Technical Enforcement Guidance Document (EPA 1986a). This section discusses procedures that apply to all groundwater investigations. Chapters 2.0 through 7.0 present any site-specific variances from the procedures discussed in this section.

1.3.1 Field Methods and Measurements

The following sections provide an overview of the sampling and data collection procedures.

1.3.1.1 Groundwater Elevation

In CY 2020, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and potentiometric surface elevations. Water levels are periodically measured in SNL/NM monitoring wells according to the instructions and requirements specified in SNL/NM Field Operating Procedure (FOP) 03-02, *Groundwater Level Data Acquisition and Management* (SNL April 2016). Chapters 2.0 through 7.0 present the water level information used to create the potentiometric surface maps and hydrographs.

1.3.1.2 Well Purging and Water Quality Measurements

A portable Bennett™ groundwater sampling system was used to collect the groundwater samples from all wells. The minimum purge requirements for a portable piston pump are one saturated screen volume (including annulus). Field water quality parameters measured (Table 1-4) include temperature, specific conductivity (SC), oxidation-reduction potential (ORP), potential of hydrogen (pH), turbidity, and dissolved oxygen (DO). These were recorded for each well during purging and prior to collecting groundwater samples, according to SNL/NM FOP 05-01, *Long-Term Stewardship Program Groundwater Monitoring Well Sampling and Field Analytical Measurements* (SNL January 2018a). Groundwater temperature, SC, ORP, pH, and DO were measured using an In-Situ Incorporated Aqua TROLL® 600 Multiparameter Water Quality Sonde. Turbidity was measured with a HACH™ Model 2100P turbidity meter.

Table 1-4. Field Water Quality Parameters Measured at Monitoring Wells

Field Parameter	Comments
Dissolved Oxygen	Percentage of saturation value and/or measured in mg/L.
Oxidation-Reduction Potential	Measured in mV.
pH	Stability measure: Four consecutive measurements within 0.1 pH units.
Sample Flow Rate	Measured in gpm.
Specific Conductivity (µmho/cm)	Stability measure: Four consecutive measurements within 5 percent.
Temperature (°C)	Stability measure: Four consecutive measurements within 1°C.
Turbidity (NTU)	Stability measure: Four consecutive measurements within 10 percent or less than 5 NTU.

NOTES:
°C = Degrees Celsius.
µmho/cm = Micromhos per centimeter.
gpm = Gallons per minute.
mg/L = Milligrams per liter.
mV = Millivolts.
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

The amount of water required to achieve stabilization of field parameters is fairly consistent for a particular monitoring well. However, the ability of the aquifer to produce water can vary greatly from well to well. In accordance with the site-specific Mini-Sampling and Analysis Plans (SAPs) (as identified in Chapters 2.0 through 7.0), purging continued until four stable measurements for temperature, SC, pH, and turbidity were obtained. Groundwater stability is considered acceptable (stable) when for four consecutive readings temperature is within 1.0 degree Celsius, SC is within 5 percent, pH is within 0.1 units, and turbidity measurements are less than 5 nephelometric turbidity units (NTU) or for final turbidity values greater than 5 NTU, the final four measurements are within 10 percent of each value. Due to severely low hydraulic conductivities, several monitoring wells purge dry prior to removal of the minimum required volume. During the monitoring events, these wells are purged to dryness, allowed to recover, and then sampled to collect the most representative groundwater sample possible given the low yield of the wells. Associated field measurement logs documenting details of well purging and water quality measurements for each sampling event were submitted to the SNL/NM Customer Funded Record Center.

1.3.1.3 Pump Decontamination

The sampling pump and tubing bundle associated with the portable Bennett™ groundwater sampling system were decontaminated prior to insertion into each monitoring well according to procedures described in SNL/NM FOP 05-03, *Long-Term Stewardship Program Groundwater Monitoring Equipment Decontamination* (SNL January 2018b). An equipment blank (EB) is collected to verify the equipment decontamination process.

1.3.1.4 Sample Collection Sampling Procedures

Groundwater samples are collected using a nitrogen gas-powered portable piston pump (Bennett™) in accordance with SNL/NM FOP 05-01, *Long-Term Stewardship Program Groundwater Monitoring Well Sampling and Field Analytical Measurements* (SNL January 2018a). Sample bottles are filled directly from the pump discharge line and water sampling manifold.

1.3.1.5 Sample Handling and Shipment

The SNL/NM Sample Management Office (SMO) processes environmental samples collected by SNL/NM personnel. The SMO staff obtains sample containers, issues sample control and tracking numbers, tracks the chain-of-custody forms, and reviews analytical data packages to determine method, contract, and regulatory project-specific compliance. All groundwater samples are analyzed by off-site laboratories using EPA-specified protocols. Analytical laboratories report associated quality control (QC) data that are reviewed against quality assurance requirements specified in the *Procedure for Completing the Contract Verification Review, SMO-05-03, Revision 07* (SNL April 2019) and Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 5* and *Revision 6* (SNL June 2017 and SNL June 2020).

1.3.1.6 Waste Management

Purge and decontamination wastewater generated from sampling activities were placed into 55-gallon polyethylene drums and stored at the Environmental Resources Field Office waste accumulation area. All waste was managed in accordance with SNL/NM FOP 05-04, *Long-Term Stewardship Program Groundwater Monitoring Waste Management* (SNL January 2018c). All wastewater was discharged to the sanitary sewer in accordance with ABCWUA and project-specific regulatory requirements after waste characterization data were compared to discharge limits and a discharge approval was issued.

1.3.2 Analytical Methods

The groundwater samples are analyzed by off-site laboratories using EPA-specified protocols. Groundwater samples were submitted to GEL Laboratories, LLC for analysis. Samples were analyzed in accordance with applicable EPA and DOE methods (Tables 1-5 and 1-6).

Table 1-5. Chemical Analytical Methods

Analyte	Analytical Method[a]
Alkalinity (total, bicarbonate, carbonate)	SM 2320B
Anions	SW846-9056A
Filtered Metals (including Cations)	SW846-6020B/7470A
HE compounds	SW846-8330B
NPN	EPA 353.2
Perchlorate	EPA 314.0
TAL Metals	SW846-6020B/7470A
Total Cyanide	SW846-9012B
Total Organic Halogens	SW846-9020B
TPH Diesel Range Organics	SW846-8015D
TPH Gasoline Range Organics	SW846-8015A/B
Total Phenol	SW846-9066
VOCs	SW846-8260B
1,4-Dioxane	SW846-8270D SIM

NOTES:

[a]**Analytical Method References**

EPA 1999 (and updates). *Perchlorate in Drinking Water Using Ion Chromatography,* EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.

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EPA = U.S. Environmental Protection Agency.
HE = High explosives.
NPN = Nitrate plus nitrite (reported as nitrogen).
SIM = Selected Ion Monitoring.
SM = Standard Method.
SW = Solid Waste.
TAL = Target Analyte List.
TPH = Total petroleum hydrocarbons.
VOC = Volatile organic compound.

Table 1-6. Radiochemical Analytical Methods

Analyte	Analytical Method[a]
Gamma Spectroscopy (short list[b])	EPA 901.1
Gross Alpha/Beta Activity	EPA 900.0
Isotopic Uranium	HASL-300
Radon-222	SM7500 Rn B
Radium-226	EPA 903.1
Radium-228	EPA 904.0
Tritium	EPA 906.0M

NOTES:

[a]**Analytical Method References**

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[b]Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).

DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
HASL = Health and Safety Laboratory.
SM = Standard Method.

1.3.3 Quality Control Samples

Field and laboratory QC samples were prepared and analyzed along with the environmental samples to determine the accuracy and precision of the analytical methods, and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. Table 1-7 shows the types of QC samples that accompany groundwater quality samples in the sampling and analysis process. Upon receipt at SNL/NM, all chemical and radiochemical data are reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2017 and SNL June 2020). Although some analytical results were qualified during the data validation process, no significant data quality issues were noted. Data validation qualifiers are provided with the analytical results in the data tables attached to Chapters 2.0 through 7.0. The data validation report associated with each sampling event is retained per the SNL/NM Records Retention and Disposition Schedule.

Table 1-7. Quality Control Sample Types for Groundwater Sampling and Analysis

QC Sample Type	Description
Field QC	
Duplicate samples	Establish the precision of the sampling process.
Equipment blanks	Determine the effectiveness of the decontamination process of the sampling pump and system to ensure that cross-contamination did not occur between wells.
Field blanks	Assess whether contamination of the VOC samples had resulted from ambient field conditions.
Trip blanks	Determine whether VOC contamination occurred during sample handling, shipment, storage, or analysis by submitting deionized water samples along with the environmental samples for VOC analysis.
Laboratory QC	
Batch matrix spike and matrix spike duplicate samples	Measure the percent recovery and RPD of chemical spikes added to an existing sample to determine the sample matrix effect. The matrix is groundwater.
LCS	Monitor the accuracy and precision of the laboratory's analytical method using laboratory-prepared samples spiked with a known concentration of an analyte. These samples are analyzed in the same batch with the groundwater samples. LCS results are reported as a percent recovery.
Method blanks	Determine if contaminants were inadvertently introduced during the sample preparation and handling process in the laboratory.
Sample replicate	Used to determine precision for non-organic analyses.
Surrogate spike	Used to demonstrate matrix compatibility with the chosen method of analysis.

NOTES:
LCS = Laboratory control sample.
QC = Quality control.
RPD = Relative percent difference.
VOC = Volatile organic compound.

1.3.4 Field Quality Control Samples

Field QC samples included environmental duplicate, EB, field blank (FB), and trip blank (TB) samples. The field QC samples were submitted for analysis with the groundwater samples in accordance with QC procedures specified in site-specific Mini-SAPs (Chapters 2.0 through 7.0).

1.3.4.1 Environmental Duplicate Samples

Environmental duplicate samples were analyzed to estimate the overall reproducibility of the sampling and analytical process. An environmental duplicate sample is collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. The results for environmental duplicate sample analyses (for concentrations above detection limits only) are used to calculate relative percent difference values. The environmental duplicate results are discussed in Chapters 2.0 through 7.0.

1.3.4.2 Equipment Blank Samples

The portable Bennett™ sampling pump and tubing bundle were decontaminated prior to insertion into each monitoring well according to procedures described in SNL/NM FOP 05-03, *Long-Term Stewardship Program Groundwater Monitoring Equipment Decontamination* (SNL January 2018b). An EB is collected periodically to verify the effectiveness of the equipment decontamination process. The EB samples are analyzed for the same constituents as the groundwater samples, and the results for the EB analyses are discussed in Chapters 2.0 through 7.0.

1.3.4.3 Field Blank Samples

FB samples are submitted to assess whether any contamination of the samples could have resulted from ambient field conditions. FB samples are prepared by pouring deionized water into sample containers at the sample point (i.e., inside the sampling truck at each well location) to simulate the transfer of water from the sampling system to the sample container. The FB samples are contained in 40-milliliter glass vials and are commonly analyzed for volatile organic compounds (VOC) and gasoline range organics analyses. Chapters 2.0 through 7.0 discuss the results for FB analyses.

1.3.4.4 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC and gasoline range organics analyses. These samples are used to determine potential contamination during sampling, transportation, storage, and analysis. The TB samples consist of laboratory reagent-grade water with hydrochloric acid preservative contained in 40-milliliter glass vials. These containers are prepared by the analytical laboratory and accompany the empty sample containers supplied by the laboratory. TB samples accompanied each sample shipment and are analyzed for VOC and/or gasoline range organics samples. Chapters 2.0 through 7.0 discuss the results for TB analyses.

1.3.5 Laboratory Quality Control Samples

Laboratory and method-required batch QC samples are prepared to determine potential contamination introduced by the laboratory processes. These are used to assist with data validation and data defensibility. These samples included laboratory control samples, replicates, matrix spikes, matrix spike duplicates, and surrogate spike samples. Internal laboratory QC samples were analyzed concurrently with all environmental samples. All chemical and radiochemical data are reviewed and qualified in accordance with AOP 00-03 *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2017 and SNL June 2020). Laboratory data qualifiers are provided with the analytical results in the tables attached to Chapters 2.0 through 7.0.

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Introduction
References

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2.0 Groundwater Monitoring Program

2.1 Introduction

This chapter documents the results for the Calendar Year (CY) 2020 monitoring activities conducted as part of the Sandia National Laboratories, New Mexico (SNL/NM) Groundwater Monitoring Program (GMP). The surveillance activities include the annual collection and analysis of groundwater samples from 16 monitoring wells and 1 surface water sample from a perennial spring. As part of the activities, SNL/NM personnel used groundwater elevation data from 187 monitoring wells. Groundwater elevation measurements were obtained either quarterly or annually depending on the response characteristics of the groundwater system at each well location due to climate, aquifer properties, pumping, or other stresses.

The purpose of monitoring the GMP network is:

- To protect groundwater resources at SNL/NM and the surrounding area.
- To establish background quality and understanding of the general hydrogeologic system beneath the facility.
- To identify potential sources of contamination.
- To implement effective groundwater surveillance to detect contamination if it should occur.
- To initiate abatement or remedial action, where necessary.

To accomplish this mission, SNL/NM personnel perform the following tasks:

- Evaluate the potential effects of SNL/NM operations on groundwater through groundwater quality sampling and analysis, and groundwater elevation measurements.
- Record and maintain groundwater information in a digital database.
- Maintain documents and records, and ensure that necessary reports are submitted to the appropriate agencies in a timely manner.
- Prepare and maintain administrative and field operating procedures for groundwater monitoring activities.
- Provide assistance to well owners in the areas of well installation, well inspection and maintenance, and well plugging and abandonment.
- Establish and implement requirements for well registration and well construction data tracking.
- Coordinate with the Surface Water Discharge Program and other SNL/NM organizations to prevent groundwater contamination.

- Develop groundwater education and community outreach programs.

- Provide stakeholders an annual update of SNL/NM groundwater data through this Annual Groundwater Monitoring Report.

The groundwater monitoring involves completing the following objectives:

- Establish baseline water quality and groundwater flow information for the Regional Aquifer, the Perched Groundwater System (PGWS), and the fractured bedrock system at SNL/NM.

- Determine the impact, if any, of operations at SNL/NM on the quality and quantity of groundwater.

- Demonstrate compliance with federal, state, and local groundwater requirements.

The GMP is responsible for tracking information for wells operated by SNL/NM personnel. The GMP Well Registry and Oversight Task was established to ensure that wells operated by SNL/NM personnel are properly constructed and maintained to protect groundwater resources in accordance with guidelines specified by the New Mexico Office of the State Engineer (NMOSE) in Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE August 2005). The GMP lead works with SNL/NM personnel to review new monitoring well installation plans, record construction information, track well ownership and maintenance records, perform annual well inspections, and consult with owners when plugging and abandoning or replacing a monitoring well is required. The goal is to provide full life-cycle management of monitoring wells and boreholes.

2.2 Regulatory Criteria

The following actions ensure implementation of a successful GMP that includes relevant elements of the Environmental Management System at the facility:

- Identify possible sources of current and future groundwater contamination and evaluate the potential for future contamination.

- Meet applicable federal, state, and U.S. Department of Energy (DOE) requirements.

- Establish appropriate groundwater protection goals for current or likely future use.

- Develop strategies for predicting and preventing future contamination and for controlling existing contamination.

- Document the history of GMP activities for future site management.

- Document the quality of baseline groundwater and vadose zone conditions.

- Describe environmental monitoring with surveillance program elements for the groundwater units and the vadose zone, including baseline subsurface conditions.

- Establish a systematic approach for the monitoring program that provides the information needed to predict and respond to potential contamination associated with significant site activities, and to achieve groundwater protection goals.

In April 2004, the Compliance Order on Consent (Consent Order) (New Mexico Environment Department [NMED] April 2004) became effective. Among other sampling requirements, the Consent Order includes a requirement to conduct four continuous quarters of sampling and analysis for perchlorate for newly constructed monitoring wells. The protocol establishes a screening level/laboratory method detection limit (MDL) of 4 micrograms per liter (µg/L). If the sampling results indicate the presence of perchlorate either at or greater than 4 µg/L, then DOE/National Nuclear Security Administration (NNSA) and SNL/NM personnel are required to assess the nature and extent of perchlorate contamination and incorporate the results of this assessment into a Corrective Measures Evaluation (CME). Sampling and analysis at the noncompliant well will continue on a quarterly basis until at least four consecutive non-detections are obtained. Section VII.C of the Consent Order clarifies that the CME process will be initiated where there is a documented release to the environment, and where corrective measures are necessary to protect human health and the environment.

The NMED DOE Oversight Bureau (OB) splits a percentage of groundwater samples collected by the GMP. The samples are analyzed by laboratories under contract to the NMED DOE OB. The NMED DOE OB provides independent verification of environmental monitoring results obtained by SNL/NM personnel on behalf of the DOE/NNSA Sandia Field Office. Table 2-1 presents additional requirements associated with groundwater quality regulations.

Table 2-1. Groundwater Quality Regulations

Regulation/Requirements	Standards and Guides	Regulating Agency
National Primary Drinking Water Regulations (40 CFR 141)	MCL	EPA (EPA March 2018)
NMWQCC [a] Standards for Groundwater (20.6.2.3103A NMAC Human Health Standards)	MAC	NMED (NMWQCC December 2018)

NOTES:

[a] MACs for human health, domestic water supply, and irrigation standards are identified in the analytical results tables in Attachment 2A. Domestic water supply standards and standards for irrigation use are based on aesthetic considerations, not on the direct human health risks used for promulgating MCLs and are not cited in tables.

CFR = Code of Federal Regulations.
EPA = U.S. Environmental Protection Agency.
MAC = Maximum allowable concentration.
MCL = Maximum contaminant level.
NMAC = New Mexico Administrative Code.
NMED = New Mexico Environment Department.
NMWQCC = New Mexico Water Quality Control Commission.

Although radionuclides (gamma spectroscopy, gross alpha/beta activity, radium-226, radium-228, and isotopic uranium) are being monitored, the information related to radionuclides is provided voluntarily by the DOE/NNSA and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement, because such information falls wholly outside the requirements imposed by the NMED, as specified in Section III.A of the Consent Order.

2.3 Scope of Activities

Activities performed during CY 2020 include sampling at designated wells (Figure 2-1), sample analysis, groundwater level measurements, and construction of hydrographs and a potentiometric surface map (Plate 1). Historically, the GMP consisted of sampling 12 monitoring wells and in CY 2019 it was expanded to 16 monitoring wells (Figure 2-1). Existing monitoring wells CCBA-MW2, CTF-MW1,

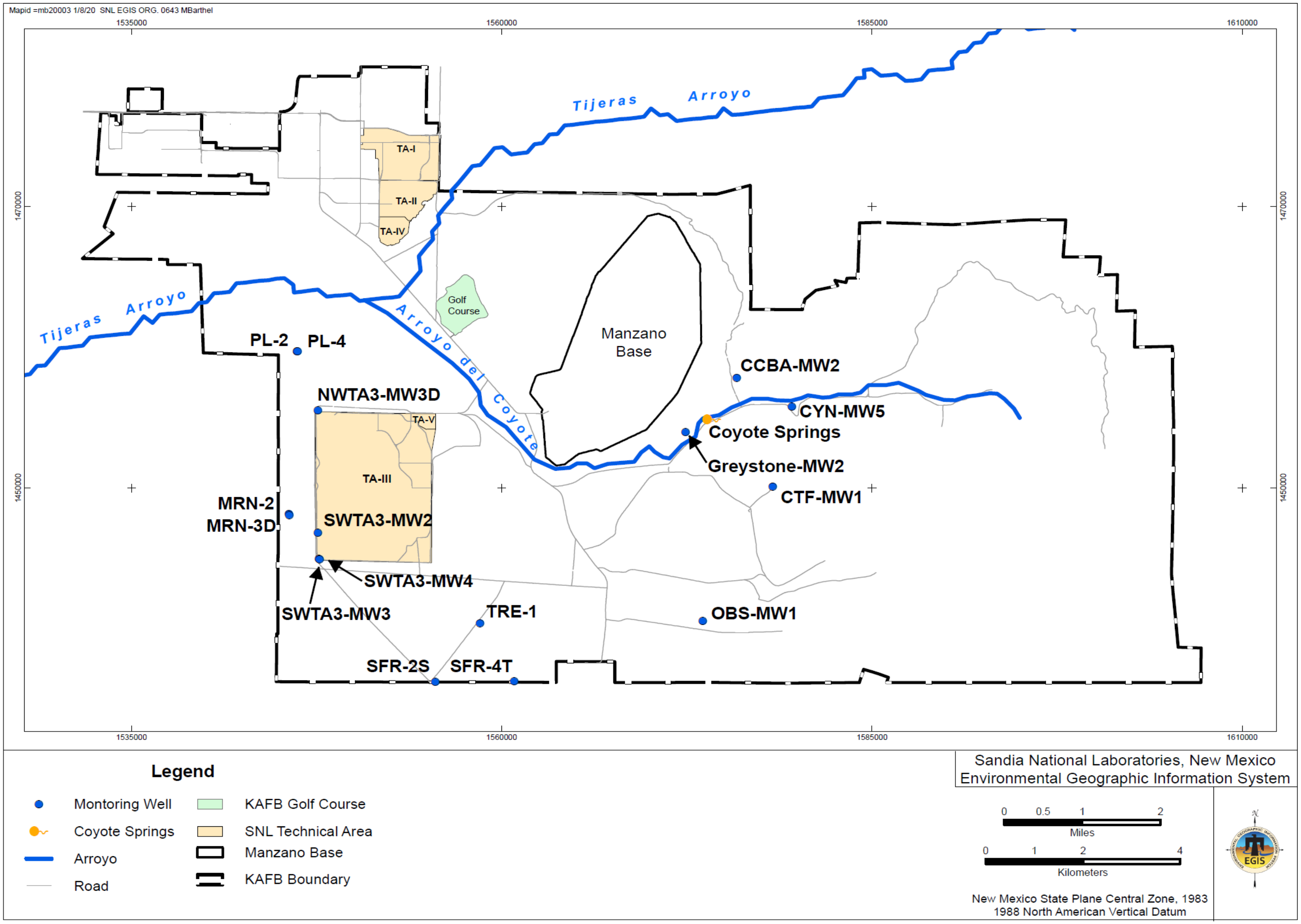

Figure 2-1. Groundwater Monitoring Program Water Quality Monitoring Network

CYN-MW5, and OBS-MW1 were added to the GMP annual groundwater monitoring sampling event in CY 2019. These four wells had been installed for investigations associated with specific Solid Waste Management Units (SWMU) as part of Environmental Restoration Operations. These SWMUs have been granted Corrective Action Complete status. The four monitoring wells were transferred to the GMP in CY 2019 because the location of these wells filled data gaps in the geographic distribution of the GMP well network by adding more locations in the fractured bedrock system in the eastern part of Kirtland Air Force Base (KAFB).

2.3.1 Groundwater Quality Surveillance Monitoring

Annual sampling of groundwater was conducted during the period from March 11 to April 3, 2020. Samples were collected from 16 wells and 1 perennial spring. GMP well locations are scattered throughout and along the perimeter of KAFB in areas that are not necessarily affiliated with SWMUs or Areas of Concern. Groundwater surveillance samples were collected from the following monitoring wells: CCBA-MW2, CTF-MW1, CYN-MW5, Greystone-MW2, MRN-2, MRN-3D, NWTA3-MW3D, OBS-MW1, PL-2, PL-4, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1. A surface water sample was also collected from Coyote Springs using a portable peristaltic pump.

Samples collected from the 17 locations were analyzed for the following analytes:

- Safe Drinking Water Act list of volatile organic compounds (VOCs)
- Total organic halogens (TOX)
- Total phenol
- Total alkalinity as $CaCO_3$
- Nitrate plus nitrite (NPN)
- Total cyanide
- High explosive (HE) compounds, select wells only
- Major anions (chloride, bromide, fluoride, and sulfate)
- Target Analyte List (TAL) metals plus total uranium
- Mercury
- Gamma spectroscopy (short list: americium-241, cesium-137, cobalt-60, and potassium-40)
- Gross Alpha/Beta activity
- Radium-226 and radium-228
- Isotopic uranium (uranium-233/234, uranium-235/236, and uranium-238), select wells only

Samples were filtered at the sampling location using in-line filters of 0.45-micron pore size, except those for VOC, HE, and mercury fractions. Analysis for HE compounds was only conducted on the groundwater samples collected from monitoring wells SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1. These wells are located in or downgradient of the Coyote Canyon Test Field and are associated with the Dynamic Explosives Test Site. Isotopic uranium samples were collected at Coyote Springs, CCBA-MW2, CTF-MW1, CYN-MW5, Greystone-MW2, OBS-MW1, SFR-2S, SFR-4T, and TRE-1 (see discussion in Section 2.6.1). Environmental duplicate samples from monitoring wells CTF-MW1, Greystone-MW2, NWTA3-MW3D, and OBS-MW1 were submitted for analyses for the same parameters as the parent samples.

Groundwater elevation monitoring is a means to assess the physical changes of the groundwater system over time. This includes changes in the potentiometric surface, gradients, the quantity of water available, as well as the direction and velocity of groundwater movement. The GMP gathers groundwater information from a large network of wells within and in the vicinity of KAFB. In addition to wells owned by the DOE/NNSA, data are solicited from the KAFB Environmental Restoration Program, City of Albuquerque (COA) Environmental Health Department (EHD), and U.S. Geological Survey (USGS)

(Figure 1-4 and Plate 1). Groundwater elevations in wells were measured quarterly or annually during CY 2020, depending on the owner's requirements and the well characteristics. Plate 1 depicts groundwater elevations at the wells and presents a base-wide potentiometric surface map of the Regional Aquifer (see discussion in Section 2.6.2.2).

Groundwater pumped from KAFB, Albuquerque Bernalillo County Water Utility Authority (ABCWUA), and Veterans Affairs production wells represent the primary groundwater withdrawal from the Regional Aquifer. From the potentiometric surface map (Plate 1), groundwater flow directions are identified and horizontal gradients are determined. Precipitation measurements are used as an indirect estimate of potential groundwater recharge. Available precipitation also impacts the demand on groundwater withdrawal. Section 2.6.2 discusses the specific results for annual precipitation, water production, and the impact on the groundwater elevations.

2.3.2 Monitoring Well Installation

No new monitoring wells were installed by the GMP during CY 2020.

2.4 Field Methods and Measurements

Section 1.3 describes in detail the monitoring procedures conducted for GMP groundwater monitoring.

2.5 Analytical Methods

Section 1.3.2 describes U.S. Environmental Protection Agency (EPA) specified protocols utilized for groundwater samples analyzed by the off-site laboratories (Tables 1-5 and 1-6).

2.6 Summary of Monitoring Results

Results of the CY 2020 activities are discussed below and are presented in the following attachments. Attachment 2A, Tables 2A-1 through 2A-8, present the analytical results and water quality measurements for the groundwater samples. Attachment 2B, Figures 2B-1 through 2B-10, present the hydrographs that utilize the water level measurements, and Figures 2B-11 through 2B-15 present precipitation and production well data. Attachment 2C, Figures 2C-1 through 2C-6, present the time trend plots for specific parameters exceeding regulatory standards at monitoring wells OBS-MW1, SFR-2S, SFR-4T, and SWTA3-MW4, as well as for Coyote Springs.

2.6.1 Analytical Results

Groundwater and surface water samples were submitted to GEL Laboratories LLC (GEL) for both chemical and radiological analysis. Samples submitted to GEL were analyzed in accordance with applicable EPA analytical methods. Groundwater sampling results are compared with EPA maximum contaminant levels (MCLs) for drinking water supplies (EPA March 2018) and NMED maximum allowable concentrations (MACs) for human health standards of groundwater as promulgated by the New Mexico Water Quality Control Commission (NMWQCC December 2018). Analytical reports from GEL, including certificates of analyses, analytical methods, MDLs, practical quantitation limits, minimum detectable activity values, and critical levels for radiochemistry analyses, dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Customer Funded Record Center and are archived in the Environmental Data Management System (EDMS) electronic database. Analytical results, laboratory QC qualifiers, and third-party data validation qualifiers are also filed in the SNL/NM Customer Funded Record Center and archived in EDMS.

Table 2A-1 summarizes the detected VOC and HE compound results for groundwater samples collected in CY 2020. No HE compounds were detected above MDLs or above established MCLs or MACs. No VOCs were detected at concentrations above established MCLs or MACs from any groundwater sample. Chloroform was detected below the MAC of 100 μg/L in the TRE-1 environmental sample at a concentration of 0.780 μg/L. Toluene was detected below the MCL and MAC of 1,000 μg/L in well SWTA3-MW4 only, at a concentration of 0.400 μg/L. 1,3-Dichlorobenzene was reported in the sample from Coyote Springs at a concentration of 0.830 μg/L. There is no MCL or MAC for this compound. Tetrachloroethene (PCE) was qualified as not detected during data validation in three environmental samples due to associated laboratory method blank contamination. Table 2A-2 lists the MDLs for VOC and HE compounds.

Table 2A-3 summarizes NPN results. NPN was detected in groundwater samples above associated MDLs, and ranged from 0.229 milligrams per liter (mg/L) to 7.75 mg/L. NPN results are below the MCL/MAC of 10 mg/L.

Table 2A-4 summarizes alkalinity, major anions (as bromide, chloride, fluoride, and sulfate), TOX, total phenol, and total cyanide results. No analytes were detected above established MCLs or MACs, except for fluoride. Fluoride was detected above the MAC of 1.6 mg/L in Coyote Springs, and monitoring wells OBS-MW1, SFR-2S, SFR-4T, and SWTA3-MW4 at concentrations ranging from 1.61 mg/L to 2.70 mg/L. Fluoride in groundwater is suspected to be naturally occurring (geogenic). Figures 2C-1 through 2C-5 present the time trend plots for fluoride for Coyote Springs and monitoring wells OBS-MW1, SFR-2S, SFR-4T, and SWTA3-MW4.

Detected concentrations for alkalinity, major anions, TOX, and total phenol are consistent with historical GMP groundwater monitoring data. Only one parameter, total phenol, was qualified as not detected at the laboratory practical quantitation limit during data validation because it was detected in the initial calibration blank sample outside QC acceptance criteria for well SWTA3-MW3.

Table 2A-5 summarizes the mercury results. Mercury was analyzed using unfiltered samples and is reported as total mercury. Mercury was not detected in any groundwater samples. Mercury in samples from Coyote Springs, CCBA-MW2, and Greystone-MW2 was detected by the laboratory but the results were qualified as not detected during data validation, because mercury was detected in associated laboratory method blank samples at similar concentrations.

Table 2A-6 summarizes Target Analyte List metals and total uranium results. No metal parameters, other than beryllium, were detected above established MCLs or MACs in any groundwater samples. Beryllium was detected above the MCL of 0.004 mg/L in the environmental sample from Coyote Springs at a concentration of 0.00721 mg/L. Beryllium in groundwater at Coyote Springs is suspected to be naturally occurring (geogenic). Figure 2C-6 presents the trend plot for beryllium concentrations at Coyote Springs and demonstrates that the CY 2020 beryllium result is consistent with prior years. Copper (in Coyote Springs, CCBA-MW2, and Greystone-MW2) and vanadium (in NWTA3-MW3D, PL-4, and SWTA3-MW3) were qualified as not detected during data validation because copper and vanadium were reported in environmental samples and associated laboratory method blank samples at concentrations below the laboratory practical quantitation limit. Manganese in Greystone-MW2, SFR-2S, and TRE-1 samples were qualified as not usable during data validation, because manganese was detected in the interference check sample outside acceptance criteria.

Table 2A-7 summarizes the radiological analyses results. This includes gamma spectroscopy results for short list gamma radiation-emitting radioisotopes (americium-241, cesium-137, cobalt-60, and potassium-40), and analyses for alpha- and beta-emitting radioisotopes (gross alpha/beta activity), isotopic uranium, radium-226, and radium-228. Reported activities were below established MCLs or MACs. The analytical laboratory rejected the potassium-40 results for the samples reported for Coyote Springs and monitoring wells CCBA-MW2, MRN-2, and PL-2 because the peaks did not meet the minimum peak identification criteria.

Isotopic uranium (uranium-233/234, uranium-235/236, and uranium-238) analyses were conducted on samples from wells that previously had high gross alpha activity, or are located where groundwater is in contact with bedrock that contains minerals high in naturally occurring radioisotopes. Isotopic uranium was analyzed for Coyote Springs and monitoring wells CCBA-MW2, CTF-MW1, CYN-MW5, Greystone-MW2, OBS-MW1, SFR-2S, SFR-4T, and TRE-1.

Gross alpha activity is measured as a radiological screening tool and in accordance with Title 40 of the Code of Federal Regulations Part 141. Naturally occurring uranium is measured independently (i.e., total uranium concentration determined by metals analysis described above) and the gross alpha activity measurements were corrected by subtracting the uranium activity. Radiological results were reviewed by an SNL/NM Health Physicist and were determined to be nonradioactive. The corrected gross alpha activity results were below the MCL of 15 picocuries per liter.

Table 2A-8 summarizes the field water quality measurements collected prior to sampling. These measurements are used to evaluate water chemistry stability and include turbidity, potential of hydrogen, temperature, specific conductivity, oxidation-reduction potential, and dissolved oxygen.

2.6.2 Groundwater Elevation Measurements

Table 1 at the back of this report lists construction details for monitoring wells located on or near KAFB. During CY 2020, SNL/NM personnel measured groundwater elevations in 103 SNL/NM monitoring wells (Table 2). The groundwater elevations were measured with an electric well sounder (water level meter). Data were also available for 84 additional monitoring wells owned by KAFB, COA EHD, USGS, and NMOSE. The groundwater elevation data are maintained in the corporate EDMS. Table 2-2 provides the total number of wells listed by the respective organization. Table 2 at the back of this report provides the groundwater elevation data for CY 2020 that were used to construct Plate 1.

2.6.2.1 Groundwater Recharge and Withdrawal

Factors influencing fluctuations in groundwater elevation primarily include potential recharge from precipitation and groundwater withdrawals by production wells.

Annual Precipitation

The climate of the Albuquerque Basin is semi-arid. Long-term average precipitation ranges from 9.48 inches per year (30-year norm based on 1981-2010 data) at Albuquerque International Sunport up to 35 inches per year at the crest of the Sandia Mountains located approximately 15 miles to the northeast. Most precipitation falls between July and October, mainly in the form of brief, heavy rain. For CY 2020, the wettest month was July.

Table 2-2. Groundwater Elevations Measured in Monitoring Wells by Sandia National Laboratories, New Mexico and Other Organizations during 2020

Total Wells	Measuring Agency	Well Owner	Location
103	SNL/NM GMP	DOE/NNSA	Site-wide surveillance network wells, BSG, CWL, MWL, TAG, and TAVG
76	KAFB	KAFB	ERP Long-term Monitoring Program
5	COA EHD	COA	Eubank Landfill north of KAFB and Yale Avenue Landfill west of KAFB
1	SNL/NM GMP	COA	Eubank-1, west of Eubank Landfill
1	USGS	NMOSE	Mesa Del Sol-S well
1	USGS	COA	Montessa Park-S well

NOTES:
BSG = Burn Site Groundwater.
COA = City of Albuquerque.
CWL = Chemical Waste Landfill.
DOE = U.S. Department of Energy.
EHD = Environmental Health Department.
ERP = Environmental Restoration Program.
GMP = Groundwater Monitoring Program.
KAFB = Kirtland Air Force Base.
MWL = Mixed Waste Landfill.
NMOSE = New Mexico Office of the State Engineer.
NNSA = National Nuclear Security Administration.
SNL/NM = Sandia National Laboratories, New Mexico.
TAG = Tijeras Arroyo Groundwater.
TAVG = Technical Area-V Groundwater.
USGS = U.S. Geological Survey.

Precipitation data relevant to the KAFB hydrogeologic setting are available from five rain gauge locations. Four on-site and one off-site meteorological towers are used to evaluate the precipitation pattern for KAFB:

- A21 tower located in Technical Area (TA)-II (Figure 1-4).
- A36 tower located in TA-III/V (Figure 1-4).
- LC1 tower located in Lurance Canyon west of the Burn Site (Figure 1-4); this location was established in 2019, therefore annual data prior to 2020 is not available.
- SC1 tower located near the Schoolhouse Well in the foothills of the Manzanita Mountains (Figure 1-4).
- National Weather Service meteorological station "KABQ" at the Albuquerque International Sunport located at the northwest corner of KAFB (Figure 1-4).

Table 2-3 shows annual precipitation during CY 2020 at the five locations. Where available, CY 2019 data are also presented for comparison. The differences in precipitation totals from the five locations show the isolated nature of rain showers in the Albuquerque area. The 5.88 inches of precipitation measured at KABQ during CY 2020 is 2.90 inches less than the corresponding period for the previous year; and it is 3.60 inches below the 30-year (1981-2010) norm of 9.48 inches. Figure 2B-11 shows monthly distribution of precipitation during CY 2020 at the five locations along with the 30-year averages. Figure 2B-12 shows the annual distribution of precipitation at four of the five locations for the period from January 2010 to December 2020.

Table 2-3. Precipitation Data for Kirtland Air Force Base, Calendar Years 2019 and 2020

Year	Meteorological Station				
	A21	A36	LC1	SC1	KABQ
CY 2019	9.27	9.08	NA	12.40	8.78
CY 2020	6.01	6.42	6.58	7.82	5.88

NOTES:
Data are in inches of rainfall.
A21 = SNL/NM meteorological station in Technical Area-II.
A36 = SNL/NM meteorological station in Technical Area-III/V.
CY = Calendar Year.
KABQ = National Weather Service meteorological station at the Albuquerque International Sunport.
LC1 = SNL/NM meteorological station in Lurance Canyon west of the Burn Site, installed in 2019.
NA = Not available.
SC1 = SNL/NM meteorological station in the foothills of the Manzanita Mountains.
SNL/NM = Sandia National Laboratories, New Mexico.

Groundwater Withdrawal

The KAFB production wells are screened over a depth from about 500 to 2,000 feet (ft) below ground surface (bgs) and extract groundwater from the Regional Aquifer in the upper and middle unit of the Santa Fe Group (SFG). During CY 2020, KAFB pumped groundwater primarily from three production wells (KAFB-3, KAFB-4, and KAFB-20) for consumptive use.

KAFB supplies the water for SNL/NM and other DOE/NNSA facilities located on KAFB. Figure 2B-13 shows the CY 2020 monthly totals for KAFB production wells. The highest level of production was in July at 104 million gallons (gal); the lowest occurred in December at 36 million gal. The variability in production is in response to demand as reflected in the cyclic fluctuation of groundwater elevations in monitoring wells and is evident on the hydrographs. Figure 2B-14 shows the CY 2020 monthly production for each KAFB production well. Figure 2B-15 shows the trend of total annual groundwater production at KAFB since 2010. Table 2-4 provides a comparison of water pumped during CY 2020 to the previous year.

Table 2-4. Total Kirtland Air Force Base Groundwater Production

Units	CY 2019	CY 2020
Million gal	783	789
Acre-feet	2,403	2,422

NOTES:
Acre-feet = 325,851 gal.
CY = Calendar Year.
gal = gallons.

2.6.2.2 Groundwater Elevations

Groundwater elevations were used for preparing the potentiometric surface maps and hydrographs.

Base-Wide Potentiometric Surface Map

Groundwater elevation data for monitoring wells installed by SNL/NM personnel, KAFB Environmental Restoration Program, COA EHD, USGS, and NMOSE were used to construct the base-wide CY 2020 potentiometric surface map of the Regional Aquifer as shown on Plate 1. Water level measurements for September, October and November 2020 were used for interpreting the groundwater elevation data and constructing the contours (Table 2). Even though various well owners measure water levels on differing schedules, the use of several months of data is considered temporally concordant because water levels are typically not seasonally affected across KAFB.

The base-wide map (Plate 1) represents the potentiometric surface of the Regional Aquifer and incorporates wells completed at the water table west of the Tijeras Fault Zone and wells completed in the fractured bedrock system east of the fault zone (Figure 1-3). West of the Tijeras Fault Zone, the Regional Aquifer is under unconfined (water table) to semiconfined conditions and is present within the SFG, which consists of a fine-grained alluvial-fan lithofacies and the coarser Ancestral Rio Grande (ARG) lithofacies (Figure 1-3). Within and east of the Tijeras Fault Zone, the Regional Aquifer is typically under confined conditions (positive pressure head) and is primarily present within fractured Paleozoic bedrock (primarily limestone and sandstone) and Precambrian bedrock (primarily granite and metamorphic rocks). The fault zone partially restricts groundwater underflow from the bedrock recharging the unconsolidated basin-fill deposits (the SFG) of the Albuquerque Basin.

In general, groundwater flows westward away from the Manzanita Mountains and toward the Rio Grande. An extensive trough in the water table along the western edge of KAFB is due to cumulative drawdown created by KAFB and ABCWUA production wells near the northern boundary of KAFB. As a result, water levels across much of KAFB were steadily declining until 2008. Since 2008, hydrographs for Regional Aquifer wells in the northern part of KAFB show an increasing trend in groundwater elevations. Presumably, this is in response to the ABCWUA transitioning to surface water withdrawals for potable water supplies and decreasing dependence on ABCWUA production wells. The water table trough extends as far south as the Pueblo of Isleta. The flat gradient in the middle of the trough is indicative of flow through the highly permeable sediments of the ARG fluvial deposits, which are the most productive aquifer material in the area.

Relatively steeper gradients in the eastern portion of KAFB are due to less permeable materials, higher ground surface elevations along the eastern mountain front of the Albuquerque Basin, and the presence of various faults (Plate 1).

Perched Groundwater System Potentiometric Surface Map

During the installation of monitoring wells for groundwater characterization at TA-II in 1993, a shallow water-bearing zone was encountered at a depth of 300 ft bgs. This was 200 ft above the Regional Aquifer. The installation of additional wells completed in this PGWS defined the lateral extent of the system, which is approximately 4.4 square miles. The western edge initially trended along the west side of former KAFB sewage lagoons. The northern edge coincides with the northern boundary of TA-I. To the east, the PGWS is defined using KAFB monitoring wells along the west side of the active KAFB Landfill; and the southern tip appears to be south of the Tijeras Arroyo Golf Course along the northeastern side of Pennsylvania Avenue. The area covered by the PGWS comprises much of the Tijeras Arroyo Groundwater Area of Concern, and the elevation data for wells completed in the PGWS were used to construct the potentiometric surface map that is presented and discussed in Chapter 6.0.

Monitoring Well Hydrographs

This section discusses historical and recent trends in groundwater elevations in the vicinity of SNL/NM, as demonstrated in the hydrographs for 16 GMP monitoring wells (Figures 2B-1 through 2B-10). Historical data from quarterly and annual groundwater elevation measurements through CY 2020 were used for plotting the hydrographs. Except for Greystone-MW2, the groundwater elevation data for these wells are representative of groundwater in the Regional Aquifer across KAFB. Specific information gleaned from the hydrographs includes the following:

- **Greystone-MW2 (Figure 2B-1)**—Overall declining trend of approximately 0.25 ft per year (ft/year) with superimposed seasonal effects of 1 to 2 ft that have a maximum water table elevation in the spring; the well is located in Lurance Canyon and has a shallow screen set in alluvium; there are no production wells in the area; however, the well is located 1,600 ft downgradient of the heavily vegetated Coyote Springs and the seasonal effects may reflect evapotranspiration impacts.

- **MRN-2 and MRN-3D (Figure 2B-2)**—Declining trend until early 2011; since then groundwater elevations have stabilized with an increasing trend of approximately 0.5 ft/year since 2014.

- **NWTA3-MW3D, PL-2, and PL-4 (Figure 2B-3)**—Declining trend until late 2010/early 2011; since then, groundwater elevations have stabilized and show an increasing trend of approximately 1 ft/year since 2014.

- **SFR-2S and TRE-1 (Figure 2B-4)**—Slight declining trend of approximately 0.15 to 0.25 ft/year since 2004.

- **SFR-4T (Figure 2B-5)**—Cyclical pattern with artificial yearly fluctuations of 20 to 30 ft since 2001; yearly minimum associated with SNL/NM sampling event and then 3 to 9 months of groundwater level recovery; overall declining trend of peaks of approximately 0.25 ft/year.

- **SWTA3-MW2, SWTA3-MW3, and SWTA3-MW4 (Figure 2B-6)**—Moderate declining trend until late 2011; since then, groundwater elevations have stabilized for several years and show an increasing trend of approximately 0.6 ft/year since 2014.

- **OBS-MW1 (Figure 2B-7)**—Stable groundwater elevations since 2011.

- **CCBA-MW2 (Figure 2B-8)**—Slight declining trend since 2011 of approximately 0.14 ft/year.

- **CTF-MW1 (Figure 2B-9)**—Slight declining trend over the life of the well of approximately 0.31 ft/year.

- **CYN-MW5 (Figure 2B-10)**—Slight declining trend over the life of the well of approximately 0.14 ft/year.

2.7 Quality Control Results

The QC samples are collected in the field at the time of environmental sample collection. Field QC samples are described in Section 1.3 and include environmental duplicate, equipment blank (EB), field blank (FB), and trip blank (TB) samples.

Environmental duplicate samples were collected to estimate the overall reproducibility of the sampling and analytical process. Environmental duplicate samples from monitoring wells CTF-MW1, Greystone-MW2, NWTA3-MW3D, and OBS-MW1 were analyzed for all parameters. Relative percent difference (RPD) calculations of environmental samples and environmental duplicate samples were performed for detected chemical analytes only. The environmental duplicate sample results show good agreement (RPD values less than 35 for inorganic analyses) for calculated parameters, except bromide for Greystone-

MW2. The RPD value for bromide was calculated at 60, and there is no established MCL or MAC for bromide.

EB samples were collected prior to well purging and sampling at monitoring wells CTF-MW1, Greystone-MW2, NWTA3-MW3D, and OBS-MW1 and submitted for all analyses. EB samples contained detectable alkalinity, bromodichloromethane, chloroform, chloride, copper, dibromochloromethane, sodium, TOX, and zinc. No corrective action was required because these parameters were not detected in associated environmental samples or detected in environmental samples at concentrations greater than 5 times the EB result.

Four FB samples were collected for VOCs to assess whether contamination of the samples resulted from ambient conditions during sample collection. FB samples were prepared by pouring deionized water into sample containers at the monitoring wells CCBA-MW2, OBS-MW1, SFR-2S, and SWTA3-MW2 sampling points to simulate the transfer of environmental samples from the sampling system to the sample container. Bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary because these compounds were not detected in associated environmental samples.

The TB samples were submitted whenever samples were collected for VOC analysis to assess whether contamination of the samples had occurred during shipment and storage. A total of 22 TBs were submitted with the CY 2020 samples. No VOCs were detected above associated MDLs in any TB sample, except for PCE. PCE was reported in four TB samples and qualified as not detected during data validation due to associated laboratory method blank contamination.

QC samples are prepared at the laboratory to determine whether contaminant chemicals are inadvertently introduced into laboratory processes and procedures. These include method blanks, laboratory control samples, matrix spike, matrix spike duplicate, and surrogate spike samples. Although some analytical results were qualified during the data validation process, the data were deemed acceptable except for manganese and potassium-40. Manganese in monitoring wells Greystone-MW2, SFR-2S, and TRE-1 were qualified as rejected during data validation because manganese was detected in the interference check sample at a negative value with an absolute value greater than twice the MDL. The potassium-40 activity reported for Coyote Springs and in monitoring wells CCBA-MW2, MRN-2, and PL-2 were rejected by GEL due to the peak not meeting identification criteria.

2.8 Variances and Non-Conformances

No modifications or issues of field activities deviating from requirements in the GMP Mini-Sampling and Analysis Plan (SNL February 2020) were identified during CY 2020 sampling activities.

2.9 Summary and Conclusions

The annual groundwater surveillance monitoring sampling event was conducted between March 11 and April 3, 2020. Groundwater samples were collected from 16 monitoring wells and 1 perennial spring. The analytical results for the groundwater samples are similar to the results reported for previous years:

- No VOCs or HE compounds were detected at concentrations above established MCLs or MACs in any groundwater sample.

- NPN was detected in well samples above associated MDLs and ranged from 0.229 mg/L to 7.75 mg/L. NPN results are below the MCL/MAC of 10 mg/L.

- Fluoride was detected above the MAC of 1.6 mg/L (NMWQCC December 2018) in Coyote Springs and monitoring wells OBS-MW1, SFR-2S, SFR-4T, and SWTA3-MW4 samples at concentrations ranging from 1.63 mg/L to 2.70 mg/L. However, results did not exceed the MCL of 4.0 mg/L. Fluoride in groundwater is suspected to be naturally occurring (geogenic).

- No metals were detected above established MCLs or MACs in any of the groundwater samples. Beryllium was detected above the MCL of 0.004 mg/L in the environmental sample from Coyote Springs at a concentration of 0.00721 mg/L. Beryllium is suspected to be naturally occurring (geogenic) and this analytical result is consistent with prior years.

Groundwater elevations were obtained during CY 2020 at 103 SNL/NM monitoring wells on a quarterly basis. Groundwater elevations from the SNL/NM wells and 84 wells owned by other agencies (Table 2) were used to construct a base-wide potentiometric surface map of the Regional Aquifer (Plate 1). Overall, the contours display a pattern that reflects the (1) impact of the groundwater withdrawal by production wells located in the northwestern portion of KAFB and adjacent parts of Albuquerque, and (2) basin margin topography. Groundwater elevations at monitoring wells over most of the base are declining in a response to regional drought conditions, whereas wells in the northwestern part of the base show aquifer recovery due to decreased pumping at production wells.

Attachment 2A
Groundwater Monitoring Program
Analytical Results Tables

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Attachment 2A Tables

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Table 2A-1
Summary of Detected Volatile Organic Compounds and High Explosive Compounds, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL / MAC[d] (µg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs 03-Apr-20	1,3-Dichlorobenzene	0.830	0.300	1.00	NE	NE	J	J	112558-001	SW846-8260B
NWTA3-MW3D 18-Mar-20	Tetrachloroethene	0.470	0.300	1.00	5.00	5.00	B, J	1.0UJ	112490-001	SW846-8260B
NWTA3-MW3D (Duplicate) 18-Mar-20	Tetrachloroethene	0.460	0.300	1.00	5.00	5.00	B, J	1.0UJ	112491-001	SW846-8260B
SWTA3-MW4 17-Mar-20	Tetrachloroethene	0.560	0.300	1.00	5.00	5.00	B, J	1.0UJ	112484-001	SW846-8260B
	Toluene	0.400	0.300	1.00	1,000	1,000	J	J+	112484-001	SW846-8260B
TRE-1 23-Mar-20	Chloroform	0.780	0.300	1.00	NE	100	J		112501-001	SW846-8260B

Refer to footnotes on page 2A-46.

Table 2A-2
Method Detection Limits for Volatile Organic Compounds and High Explosive Compounds, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]
1,1,1,2-Tetrachloroethane	0.300	SW846 8260B	Ethyl benzene	0.300	SW846 8260B
1,1,1-Trichloroethane	0.300	SW846 8260B	Hexachlorobutadiene	0.300	SW846 8260B
1,1,2,2-Tetrachloroethane	0.300	SW846 8260B	Isopropylbenzene	0.300	SW846 8260B
1,1,2-Trichloroethane	0.300	SW846 8260B	Methylene chloride	1.00	SW846 8260B
1,1-Dichloroethane	0.300	SW846 8260B	Naphthalene	0.300	SW846 8260B
1,1-Dichloroethene	0.300	SW846 8260B	Styrene	0.300	SW846 8260B
1,1-Dichloropropene	0.300	SW846 8260B	Tert-butyl methyl ether	0.300	SW846 8260B
1,2,3-Trichlorobenzene	0.300	SW846 8260B	Tetrachloroethene	0.300	SW846 8260B
1,2,3-Trichloropropane	0.300	SW846 8260B	Toluene	0.300	SW846 8260B
1,2,4-Trichlorobenzene	0.300	SW846 8260B	Trichloroethene	0.300	SW846 8260B
1,2,4-Trimethylbenzene	0.300	SW846 8260B	Trichlorofluoromethane	0.300	SW846 8260B
1,2-Dibromo-3-chloropropane	0.500	SW846 8260B	Vinyl chloride	0.300	SW846 8260B
1,2-Dibromoethane	0.300	SW846 8260B	cis-1,2-Dichloroethene	0.300	SW846 8260B
1,2-Dichlorobenzene	0.300	SW846 8260B	cis-1,3-Dichloropropene	0.300	SW846 8260B
1,2-Dichloroethane	0.300	SW846 8260B	m-, p-Xylene	0.300	SW846 8260B
1,2-Dichloropropane	0.300	SW846 8260B	n-Butylbenzene	0.300	SW846 8260B
1,3,5-Trimethylbenzene	0.300	SW846 8260B	n-Propylbenzene	0.300	SW846 8260B
1,3-Dichlorobenzene	0.300	SW846 8260B	o-Xylene	0.300	SW846 8260B
1,3-Dichloropropane	0.300	SW846 8260B	sec-Butylbenzene	0.300	SW846 8260B
1,4-Dichlorobenzene	0.300	SW846 8260B	tert-Butylbenzene	0.300	SW846 8260B
2,2-Dichloropropane	0.300	SW846 8260B	trans-1,2-Dichloroethene	0.300	SW846 8260B
2-Chlorotoluene	0.300	SW846 8260B	trans-1,3-Dichloropropene	0.300	SW846 8260B
4-Chlorotoluene	0.300	SW846 8260B	1,3,5-Trinitrobenzene	0.0825 – 0.0833	SW846 8330B
4-Isopropyltoluene	0.300	SW846 8260B	1,3-Dinitrobenzene	0.0825 – 0.0833	SW846 8330B
Benzene	0.300	SW846 8260B	2,4,6-Trinitrotoluene	0.0825 – 0.0833	SW846 8330B
Bromobenzene	0.300	SW846 8260B	2,4-Dinitrotoluene	0.0825 – 0.0833	SW846 8330B
Bromochloromethane	0.300	SW846 8260B	2,6-Dinitrotoluene	0.0825 – 0.0833	SW846 8330B
Bromodichloromethane	0.300	SW846 8260B	2-Amino-4,6-dinitrotoluene	0.0825 – 0.0833	SW846 8330B
Bromoform	0.300	SW846 8260B	2-Nitrotoluene	0.0845 – 0.0854	SW846 8330B
Carbon tetrachloride	0.300	SW846 8260B	3-Nitrotoluene	0.0825 – 0.0833	SW846 8330B
Chlorobenzene	0.300	SW846 8260B	4-Amino-2,6-dinitrotoluene	0.0825 – 0.0833	SW846 8330B
Chloroethane	0.300	SW846 8260B	4-Nitrotoluene	0.155 – 0.156	SW846 8330B
Chloroform	0.300	SW846 8260B	HMX	0.0825 – 0.0833	SW846 8330B
Chloromethane	0.300	SW846 8260B	Nitro-benzene	0.0825 – 0.0833	SW846 8330B
Dibromochloromethane	0.300	SW846 8260B	Pentaerythritol tetranitrate	0.103 – 0.104	SW846 8330B
Dibromomethane	0.300	SW846 8260B	RDX	0.0825 – 0.0833	SW846 8330B
Dichlorodifluoromethane	0.300	SW846 8260B	Tetryl	0.0825 – 0.0833	SW846 8330B

Refer to footnotes on page 2A-46.

Table 2A-3
Summary of Nitrate Plus Nitrite Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs 03-Apr-20	Nitrate plus nitrite	0.436	0.085	0.250	10.0			112558-005	EPA 353.2
CCBA-MW2 30-Mar-20	Nitrate plus nitrite	3.25	0.085	0.250	10.0			112526-005	EPA 353.2
CTF-MW1 31-Mar-20	Nitrate plus nitrite	7.72	0.170	0.500	10.0		J	112532-005	EPA 353.2
CTF-MW1 (Duplicate) 31-Mar-20	Nitrate plus nitrite	7.75	0.170	0.500	10.0		J	112533-005	EPA 353.2
CYN-MW5 02-Apr-20	Nitrate plus nitrite	1.91	0.085	0.250	10.0			112555-005	EPA 353.2
Greystone-MW2 27-Mar-20	Nitrate plus nitrite	4.40	0.170	0.500	10.0		J	112520-005	EPA 353.2
Greystone-MW2 (Duplicate) 27-Mar-20	Nitrate plus nitrite	4.47	0.170	0.500	10.0		J	112521-005	EPA 353.2
MRN-2 19-Mar-20	Nitrate plus nitrite	3.53	0.170	0.500	10.0			112495-005	EPA 353.2
MRN-3D 20-Mar-20	Nitrate plus nitrite	2.72	0.170	0.500	10.0			112498-005	EPA 353.2
NWTA3-MW3D 18-Mar-20	Nitrate plus nitrite	0.870	0.085	0.250	10.0			112490-005	EPA 353.2
NWTA3-MW3D (Duplicate) 18-Mar-20	Nitrate plus nitrite	0.870	0.085	0.250	10.0			112491-005	EPA 353.2
OBS-MW1 01-Apr-20	Nitrate plus nitrite	1.67	0.085	0.250	10.0			112544-005	EPA 353.2
OBS-MW1 (Duplicate) 01-Apr-20	Nitrate plus nitrite	1.68	0.170	0.500	10.0			112545-005	EPA 353.2
PL-2 12-Mar-20	Nitrate plus nitrite	2.90	0.085	0.250	10.0			112472-005	EPA 353.2
PL-4 13-Mar-20	Nitrate plus nitrite	4.87	0.170	0.500	10.0			112475-005	EPA 353.2
SFR-2S 25-Mar-20	Nitrate plus nitrite	0.933	0.017	0.050	10.0			112508-006	EPA 353.2
SFR-4T 26-Mar-20	Nitrate plus nitrite	0.229	0.017	0.050	10.0			112511-006	EPA 353.2
SWTA3-MW2 11-Mar-20	Nitrate plus nitrite	0.965	0.017	0.050	10.0			112469-006	EPA 353.2

Refer to footnotes on page 2A-46.

Table 2A-3 *(Concluded)*
Summary of Nitrate Plus Nitrite Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW3 16-Mar-20	Nitrate plus nitrite	0.675	0.085	0.250	10.0			112478-006	EPA 353.2
SWTA3-MW4 17-Mar-20	Nitrate plus nitrite	1.21	0.085	0.250	10.0			112484-006	EPA 353.2
TRE-1 23-Mar-20	Nitrate plus nitrite	2.30	0.170	0.500	10.0			112501-006	EPA 353.2

Refer to footnotes on page 2A-46.

Table 2A-4
Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs	Total Organic Halogens	0.0142	0.00333	0.010	NE	NE			112558-002	SW846 9020
03-Apr-20	Bromide	1.89	0.670	2.00	NE	NE			112558-007	SW846 9056
	Chloride	470	6.70	20.0	NE	NE			112558-007	SW846 9056
	Fluoride	**1.63**	0.033	0.100	4.0	1.60			112558-007	SW846 9056
	Sulfate	124	1.33	4.00	NE	NE			112558-007	SW846 9056
	Alkalinity as $CaCO_3$	1050	1.45	4.00	NE	NE			112558-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112558-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112558-006	SW846 9012
CCBA-MW2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112526-002	SW846 9020
30-Mar-20	Bromide	0.539	0.067	0.200	NE	NE			112526-007	SW846 9056
	Chloride	36.3	0.670	2.00	NE	NE			112526-007	SW846 9056
	Fluoride	1.48	0.033	0.100	4.0	1.60			112526-007	SW846 9056
	Sulfate	90.2	1.33	4.00	NE	NE			112526-007	SW846 9056
	Alkalinity as $CaCO_3$	184	1.45	4.00	NE	NE			112526-004	SM2320B
	Total Phenol	0.00216	0.00167	0.005	NE	NE	J	0.005U	112526-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200		0.005UJ	112526-006	SW846 9012
CTF-MW1	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112532-002	SW846 9020
31-Mar-20	Bromide	0.527	0.067	0.200	NE	NE			112532-007	SW846 9056
	Chloride	37.3	0.670	2.00	NE	NE			112532-007	SW846 9056
	Fluoride	1.38	0.033	0.100	4.0	1.60			112532-007	SW846 9056
	Sulfate	77.9	1.33	4.00	NE	NE			112532-007	SW846 9056
	Alkalinity as $CaCO_3$	205	1.45	4.00	NE	NE			112532-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112532-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112532-006	SW846 9012
CTF-MW1	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112533-002	SW846 9020
(Duplicate)	Bromide	0.532	0.067	0.200	NE	NE			112533-007	SW846 9056
31-Mar-20	Chloride	37.7	0.670	2.00	NE	NE			112533-007	SW846 9056
	Fluoride	1.34	0.033	0.100	4.0	1.60			112533-007	SW846 9056
	Sulfate	79.3	1.33	4.00	NE	NE			112533-007	SW846 9056
	Alkalinity as $CaCO_3$	206	1.45	4.00	NE	NE			112533-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112533-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112533-006	SW846 9012

Refer to footnotes on page 2A-46.

Table 2A-4 *(Continued)*
Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW5	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		112555-002	SW846 9020
02-Apr-20	Bromide	0.177	0.067	0.200	NE	NE	J		112555-007	SW846 9056
	Chloride	13.2	0.134	0.400	NE	NE			112555-007	SW846 9056
	Fluoride	0.358	0.033	0.100	4.0	1.60			112555-007	SW846 9056
	Sulfate	26.9	0.266	0.800	NE	NE			112555-007	SW846 9056
	Alkalinity as $CaCO_3$	138	1.45	4.00	NE	NE			112555-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112555-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112555-006	SW846 9012
Greystone-MW2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112520-002	SW846 9020
27-Mar-20	Bromide	0.247	0.067	0.200	NE	NE			112520-007	SW846 9056
	Chloride	116	1.34	4.00	NE	NE			112520-007	SW846 9056
	Fluoride	0.779	0.033	0.100	4.0	1.60			112520-007	SW846 9056
	Sulfate	51.3	2.66	8.00	NE	NE			112520-007	SW846 9056
	Alkalinity as $CaCO_3$	445	1.45	4.00	NE	NE			112520-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U		112520-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112520-006	SW846 9012
Greystone-MW2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112521-002	SW846 9020
(Duplicate)	Bromide	0.458	0.067	0.200	NE	NE			112521-007	SW846 9056
27-Mar-20	Chloride	116	1.34	4.00	NE	NE			112521-007	SW846 9056
	Fluoride	0.757	0.033	0.100	4.0	1.60			112521-007	SW846 9056
	Sulfate	51.0	2.66	8.00	NE	NE			112521-007	SW846 9056
	Alkalinity as $CaCO_3$	445	1.45	4.00	NE	NE			112521-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U		112521-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112521-006	SW846 9012
MRN-2	Total Organic Halogens	0.00556	0.00333	0.010	NE	NE	J		112495-002	SW846 9020
19-Mar-20	Bromide	0.183	0.067	0.200	NE	NE	J		112495-007	SW846 9056
	Chloride	13.5	0.335	1.00	NE	NE			112495-007	SW846 9056
	Fluoride	0.588	0.033	0.100	4.0	1.60			112495-007	SW846 9056
	Sulfate	51.4	0.665	2.00	NE	NE			112495-007	SW846 9056
	Alkalinity as $CaCO_3$	158	1.45	4.00	NE	NE			112495-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112495-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112495-006	SW846 9012

Refer to footnotes on page 2A-46.

Table 2A-4 *(Continued)*
Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MRN-3D 20-Mar-20	Total Organic Halogens	0.0075	0.00333	0.010	NE	NE	J		112498-002	SW846 9020
	Bromide	0.219	0.067	0.200	NE	NE			112498-007	SW846 9056
	Chloride	14.7	0.335	1.00	NE	NE			112498-007	SW846 9056
	Fluoride	0.428	0.033	0.100	4.0	1.60			112498-007	SW846 9056
	Sulfate	73.8	0.665	2.00	NE	NE			112498-007	SW846 9056
	Alkalinity as $CaCO_3$	161	1.45	4.00	NE	NE			112498-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112498-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112498-006	SW846 9012
NWTA3-MW3D 18-Mar-20	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U		112490-002	SW846 9020
	Bromide	0.174	0.067	0.200	NE	NE	J		112490-007	SW846 9056
	Chloride	11.5	0.335	1.00	NE	NE			112490-007	SW846 9056
	Fluoride	0.748	0.033	0.100	4.0	1.60			112490-007	SW846 9056
	Sulfate	55.5	0.665	2.00	NE	NE			112490-007	SW846 9056
	Alkalinity as $CaCO_3$	142	1.45	4.00	NE	NE			112490-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112490-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112490-006	SW846 9012
NWTA3-MW3D (Duplicate) 18-Mar-20	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U		112491-002	SW846 9020
	Bromide	0.188	0.067	0.200	NE	NE	J		112491-007	SW846 9056
	Chloride	11.6	0.335	1.00	NE	NE			112491-007	SW846 9056
	Fluoride	0.757	0.033	0.100	4.0	1.60			112491-007	SW846 9056
	Sulfate	55.5	0.665	2.00	NE	NE			112491-007	SW846 9056
	Alkalinity as $CaCO_3$	143	1.45	4.00	NE	NE			112491-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112491-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112491-006	SW846 9012
OBS-MW1 01-Apr-20	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		112544-002	SW846 9020
	Bromide	0.400	0.067	0.200	NE	NE			112544-007	SW846 9056
	Chloride	26.5	0.670	2.00	NE	NE			112544-007	SW846 9056
	Fluoride	**2.29**	0.033	0.100	4.0	1.60			112544-007	SW846 9056
	Sulfate	87.1	1.33	4.00	NE	NE			112544-007	SW846 9056
	Alkalinity as $CaCO_3$	184	1.45	4.00	NE	NE			112544-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	H, U	0.005UJ	112544-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112544-006	SW846 9012

Refer to footnotes on page 2A-46.

Table 2A-4 *(Continued)*
Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
OBS-MW1	Total Organic Halogens	0.00764	0.00333	0.010	NE	NE	J		112545-002	SW846 9020
(Duplicate)	Bromide	0.393	0.067	0.200	NE	NE			112545-007	SW846 9056
01-Apr-20	Chloride	26.5	0.670	2.00	NE	NE			112545-007	SW846 9056
	Fluoride	**2.29**	0.033	0.100	4.0	1.60			112545-007	SW846 9056
	Sulfate	87.0	1.33	4.00	NE	NE			112545-007	SW846 9056
	Alkalinity as $CaCO_3$	183	1.45	4.00	NE	NE			112545-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	H, U	0.005UJ	112545-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112545-006	SW846 9012
PL-2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112472-002	SW846 9020
12-Mar-20	Bromide	0.219	0.067	0.200	NE	NE			112472-007	SW846 9056
	Chloride	15.5	0.335	1.00	NE	NE			112472-007	SW846 9056
	Fluoride	0.485	0.033	0.100	4.0	1.60			112472-007	SW846 9056
	Sulfate	77.0	0.665	2.00	NE	NE			112472-007	SW846 9056
	Alkalinity as $CaCO_3$	154	1.45	4.00	NE	NE			112472-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112472-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112472-006	SW846 9012
PL-4	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U		112475-002	SW846 9020
13-Mar-20	Bromide	0.207	0.067	0.200	NE	NE			112475-007	SW846 9056
	Chloride	15.2	0.335	1.00	NE	NE			112475-007	SW846 9056
	Fluoride	0.330	0.033	0.100	4.0	1.60			112475-007	SW846 9056
	Sulfate	69.1	0.665	2.00	NE	NE			112475-007	SW846 9056
	Alkalinity as $CaCO_3$	169	1.45	4.00	NE	NE			112475-004	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112475-003	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112475-006	SW846 9012
SFR-2S	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112508-003	SW846 9020
25-Mar-20	Bromide	0.672	0.067	0.200	NE	NE			112508-008	SW846 9056
	Chloride	132	1.34	4.00	NE	NE			112508-008	SW846 9056
	Fluoride	**1.61**	0.033	0.100	4.0	1.60			112508-008	SW846 9056
	Sulfate	74.1	2.66	8.00	NE	NE			112508-008	SW846 9056
	Alkalinity as $CaCO_3$	390	1.45	4.00	NE	NE			112508-005	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112508-004	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112508-007	SW846 9012

Refer to footnotes on page 2A-46.

Table 2A-4 *(Continued)*
Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SFR-4T	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U	0.01UJ	112511-003	SW846 9020
26-Mar-20	Bromide	1.77	0.670	2.00	NE	NE	J	J	112511-008	SW846 9056
	Chloride	217	13.4	40.0	NE	NE	J	J	112511-008	SW846 9056
	Fluoride	**2.70**	0.330	1.00	4.0	1.60	J	J	112511-008	SW846 9056
	Sulfate	2,110	26.6	80.0	NE	NE	J	J	112511-008	SW846 9056
	Alkalinity as $CaCO_3$	110	1.45	4.00	NE	NE			112511-005	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112511-004	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112511-007	SW846 9012
SWTA3-MW2	Total Organic Halogens	0.00386	0.00333	0.010	NE	NE	J		112469-003	SW846 9020
11-Mar-20	Bromide	0.208	0.067	0.200	NE	NE			112469-008	SW846 9056
	Chloride	17.8	0.335	1.00	NE	NE			112469-008	SW846 9056
	Fluoride	0.992	0.033	0.100	4.0	1.60			112469-008	SW846 9056
	Sulfate	58.8	0.665	2.00	NE	NE			112469-008	SW846 9056
	Alkalinity as $CaCO_3$	174	1.45	4.00	NE	NE			112469-005	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112469-004	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112469-007	SW846 9012
SWTA3-MW3	Total Organic Halogens	ND	0.00333	0.010	NE	NE	N, U		112478-003	SW846 9020
16-Mar-20	Bromide	0.173	0.067	0.200	NE	NE	J		112478-008	SW846 9056
	Chloride	13.7	0.335	1.00	NE	NE			112478-008	SW846 9056
	Fluoride	1.24	0.033	0.100	4.0	1.60			112478-008	SW846 9056
	Sulfate	60.2	0.665	2.00	NE	NE			112478-008	SW846 9056
	Alkalinity as $CaCO_3$	167	1.45	4.00	NE	NE			112478-005	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112478-004	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112478-007	SW846 9012
SWTA3-MW4	Total Organic Halogens	0.00826	0.00333	0.010	NE	NE	J, N	J-	112484-003	SW846 9020
17-Mar-20	Bromide	0.198	0.067	0.200	NE	NE	J		112484-008	SW846 9056
	Chloride	21.8	0.335	1.00	NE	NE			112484-008	SW846 9056
	Fluoride	**1.61**	0.033	0.100	4.0	1.60			112484-008	SW846 9056
	Sulfate	50.6	0.665	2.00	NE	NE			112484-008	SW846 9056
	Alkalinity as $CaCO_3$	183	1.45	4.00	NE	NE			112484-005	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112484-004	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	0.005UJ	112484-007	SW846 9012

Refer to footnotes on page 2A-46.

Table 2A-4 *(Concluded)*
Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TRE-1	Total Organic Halogens	0.0113	0.00333	0.010	NE	NE		J	112501-003	SW846 9020
23-Mar-20	Bromide	0.848	0.067	0.200	NE	NE			112501-008	SW846 9056
	Chloride	141	1.68	5.00	NE	NE			112501-008	SW846 9056
	Fluoride	ND	0.033	0.100	4.0	1.60	U		112501-008	SW846 9056
	Sulfate	112	3.33	10.0	NE	NE			112501-008	SW846 9056
	Alkalinity as $CaCO_3$	491	1.45	4.00	NE	NE			112501-005	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	0.005UJ	112501-004	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		112501-007	SW846 9012

Refer to footnotes on page 2A-46.

Table 2A-5
Summary of Mercury Results,
Groundwater Monitoring Program Groundwater Surveillance Task,
Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs 03-Apr-20	0.000089	0.000067	0.0002	0.002	B, J	0.0002UJ	112558-009	SW846 7470A
CCBA-MW2 30-Mar-20	0.000128	0.000067	0.0002	0.002	B, J	0.0002U	112526-009	SW846 7470A
CTF-MW1 31-Mar-20	ND	0.000067	0.0002	0.002	U		112532-009	SW846 7470A
CTF-MW1 (Duplicate) 31-Mar-20	ND	0.000067	0.0002	0.002	U		112533-009	SW846 7470A
CYN-MW5 02-Apr-20	ND	0.000067	0.0002	0.002	U		112555-009	SW846 7470A
Greystone-MW2 27-Mar-20	0.000169	0.000067	0.0002	0.002	B, J	0.0002U	112520-009	SW846 7470A
Greystone-MW2 (Duplicate) 27-Mar-20	0.000140	0.000067	0.0002	0.002	B, J	0.0002U	112521-009	SW846 7470A
MRN-2 19-Mar-20	ND	0.000067	0.0002	0.002	U		112495-009	SW846 7470A
MRN-3D 20-Mar-20	ND	0.000067	0.0002	0.002	U		112498-009	SW846 7470A
NWTA3-MW3D 18-Mar-20	ND	0.000067	0.0002	0.002	U		112490-009	SW846 7470A
NWTA3-MW3D (Duplicate) 18-Mar-20	ND	0.000067	0.0002	0.002	U		112491-009	SW846 7470A
OBS-MW1 01-Apr-20	ND	0.000067	0.0002	0.002	U		112544-009	SW846 7470A
OBS-MW1 (Duplicate) 01-Apr-20	ND	0.000067	0.0002	0.002	U		112545-009	SW846 7470A
PL-2 12-Mar-20	ND	0.000067	0.0002	0.002	U		112472-009	SW846 7470A
PL-4 13-Mar-20	ND	0.000067	0.0002	0.002	U		112475-009	SW846 7470A
SFR-2S 25-Mar-20	ND	0.000067	0.0002	0.002	U		112508-010	SW846 7470A
SFR-4T 26-Mar-20	ND	0.000067	0.0002	0.002	U		112508-010	SW846 7470A
SWTA3-MW2 11-Mar-20	ND	0.000067	0.0002	0.002	U		112469-010	SW846 7470A

Refer to footnotes on page 2A-46.

Table 2A-5 *(Concluded)*
Summary of Mercury Results,
Groundwater Monitoring Program Groundwater Surveillance Task,
Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW3 16-Mar-20	ND	0.000067	0.0002	0.002	U		112478-010	SW846 7470A
SWTA3-MW4 17-Mar-20	ND	0.000067	0.0002	0.002	U		112484-010	SW846 7470A
TRE-1 23-Mar-20	ND	0.000067	0.0002	0.002	U		112501-010	SW846 7470A

Refer to footnotes on page 2A-46.

Table 2A-6
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs	Aluminum	0.209	0.0193	0.050	NE	NE			112558-008	SW846 6020B
03-Apr-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112558-008	SW846 6020B
	Arsenic	0.00957	0.002	0.005	0.010	0.010			112558-008	SW846 6020B
	Barium	0.0439	0.00067	0.004	2.00	2.00		J+	112558-008	SW846 6020B
	Beryllium	**0.00721**	0.0002	0.0005	0.004	0.004			112558-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112558-008	SW846 6020B
	Calcium	297	0.800	2.00	NE	NE			112558-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112558-008	SW846 6020B
	Cobalt	0.00967	0.0003	0.001	NE	NE		J+	112558-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112558-008	SW846 6020B
	Iron	0.199	0.033	0.100	NE	NE			112558-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112558-008	SW846 6020B
	Magnesium	66.1	0.100	0.300	NE	NE			112558-008	SW846 6020B
	Manganese	1.57	0.010	0.050	NE	NE		J	112558-008	SW846 6020B
	Mercury	0.000071	0.000067	0.0002	0.002	0.002	B, J	0.0002UJ	112558-008	SW846 7470A
	Nickel	0.0236	0.0006	0.002	NE	NE			112558-008	SW846 6020B
	Potassium	30.2	0.080	0.300	NE	NE			112558-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112558-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112558-008	SW846 6020B
	Sodium	437	0.800	2.50	NE	NE			112558-008	SW846 6020B
	Thallium	0.00131	0.0006	0.002	0.002	0.002	J		112558-008	SW846 6020B
	Uranium	0.00709	0.000067	0.0002	0.03	0.03			112558-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112558-008	SW846 6020B
	Zinc	0.0396	0.0033	0.020	NE	NE			112558-008	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CCBA-MW2	Aluminum	ND	0.0193	0.050	NE	NE	U		112526-008	SW846 6020B
30-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112526-008	SW846 6020B
	Arsenic	0.0032	0.002	0.005	0.010	0.010	J		112526-008	SW846 6020B
	Barium	0.0487	0.00067	0.004	2.00	2.00			112526-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112526-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112526-008	SW846 6020B
	Calcium	78.4	0.400	1.00	NE	NE			112526-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112526-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112526-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112526-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112526-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112526-008	SW846 6020B
	Magnesium	16.6	0.010	0.030	NE	NE			112526-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112526-008	SW846 6020B
	Mercury	0.000139	0.000067	0.0002	0.002	0.002	B, J	0.0002UJ	112526-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112526-008	SW846 6020B
	Potassium	1.40	0.080	0.300	NE	NE			112526-008	SW846 6020B
	Selenium	0.00352	0.002	0.005	0.050	0.050	J		112526-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112526-008	SW846 6020B
	Sodium	51.7	0.400	1.25	NE	NE			112526-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112526-008	SW846 6020B
	Uranium	0.00504	0.000067	0.0002	0.03	0.03			112526-008	SW846 6020B
	Vanadium	0.0127	0.0033	0.020	NE	NE	J		112526-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112526-008	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW1	Aluminum	ND	0.0193	0.050	NE	NE	U		112532-008	SW846 6020B
31-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112532-008	SW846 6020B
	Arsenic	0.00356	0.002	0.005	0.010	0.010	J		112532-008	SW846 6020B
	Barium	0.0510	0.00067	0.004	2.00	2.00			112532-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112532-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112532-008	SW846 6020B
	Calcium	92.5	0.400	1.00	NE	NE			112532-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112532-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112532-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112532-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112532-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112532-008	SW846 6020B
	Magnesium	20.7	0.010	0.030	NE	NE			112532-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112532-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112532-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112532-008	SW846 6020B
	Potassium	1.88	0.080	0.300	NE	NE			112532-008	SW846 6020B
	Selenium	0.00489	0.002	0.005	0.050	0.050	J		112532-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112532-008	SW846 6020B
	Sodium	35.3	0.080	0.250	NE	NE			112532-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112532-008	SW846 6020B
	Uranium	0.0105	0.000067	0.0002	0.03	0.03			112532-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112532-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112532-008	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW1 (Duplicate)	Aluminum	ND	0.0193	0.050	NE	NE	U		112533-008	SW846 6020B
31-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112533-008	SW846 6020B
	Arsenic	0.00377	0.002	0.005	0.010	0.010	J		112533-008	SW846 6020B
	Barium	0.0514	0.00067	0.004	2.00	2.00			112533-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112533-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112533-008	SW846 6020B
	Calcium	93.8	0.400	1.00	NE	NE			112533-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112533-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112533-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112533-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112533-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112533-008	SW846 6020B
	Magnesium	20.7	0.010	0.030	NE	NE			112533-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112533-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112533-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112533-008	SW846 6020B
	Potassium	1.87	0.080	0.300	NE	NE			112533-008	SW846 6020B
	Selenium	0.00484	0.002	0.005	0.050	0.050	J		112533-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112533-008	SW846 6020B
	Sodium	35.6	0.080	0.250	NE	NE			112533-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112533-008	SW846 6020B
	Uranium	0.0106	0.000067	0.0002	0.03	0.03			112533-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112533-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112533-008	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW5	Aluminum	ND	0.0193	0.050	NE	NE	U		112555-008	SW846 6020B
02-Apr-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112555-008	SW846 6020B
	Arsenic	0.00608	0.002	0.005	0.010	0.010			112555-008	SW846 6020B
	Barium	0.162	0.00067	0.004	2.00	2.00			112555-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112555-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112555-008	SW846 6020B
	Calcium	47.1	0.080	0.200	NE	NE			112555-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112555-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112555-008	SW846 6020B
	Copper	0.000454	0.0003	0.002	NE	NE	J		112555-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112555-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112555-008	SW846 6020B
	Magnesium	8.72	0.010	0.030	NE	NE			112555-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112555-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112555-008	SW846 7470A
	Nickel	0.00108	0.0006	0.002	NE	NE	J		112555-008	SW846 6020B
	Potassium	2.13	0.080	0.300	NE	NE			112555-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112555-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112555-008	SW846 6020B
	Sodium	14.1	0.080	0.250	NE	NE			112555-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112555-008	SW846 6020B
	Uranium	0.000554	0.000067	0.0002	0.03	0.03			112555-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112555-008	SW846 6020B
	Zinc	0.00423	0.0033	0.020	NE	NE	J		112555-008	SW846 6020B

Refer to footnotes on page 2A-46.

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Groundwater Monitoring Program Groundwater Surveillance Task,
Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Greystone-MW2	Aluminum	ND	0.0193	0.050	NE	NE	U		112520-008	SW846 6020B
27-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112520-008	SW846 6020B
	Arsenic	0.00559	0.002	0.005	0.010	0.010			112520-008	SW846 6020B
	Barium	0.153	0.00067	0.004	2.00	2.00			112520-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112520-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112520-008	SW846 6020B
	Calcium	149	0.400	1.00	NE	NE			112520-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112520-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112520-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112520-008	SW846 6020B
	Iron	0.0463	0.033	0.100	NE	NE	J		112520-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112520-008	SW846 6020B
	Magnesium	30.6	0.010	0.030	NE	NE			112520-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U	R	112520-008	SW846 6020B
	Mercury	0.000166	0.000067	0.0002	0.002	0.002	B, J	0.0002UJ	112520-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112520-008	SW846 6020B
	Potassium	5.43	0.080	0.300	NE	NE			112520-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112520-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112520-008	SW846 6020B
	Sodium	97.8	0.400	1.25	NE	NE			112520-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112520-008	SW846 6020B
	Uranium	0.00703	0.000067	0.0002	0.03	0.03			112520-008	SW846 6020B
	Vanadium	0.00555	0.0033	0.020	NE	NE	J		112520-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112520-008	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Greystone-MW2	Aluminum	ND	0.0193	0.050	NE	NE	U		112521-008	SW846 6020B
(Duplicate)	Antimony	ND	0.001	0.003	0.006	0.006	U		112521-008	SW846 6020B
27-Mar-20	Arsenic	0.00627	0.002	0.005	0.010	0.010			112521-008	SW846 6020B
	Barium	0.149	0.00067	0.004	2.00	2.00			112521-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112521-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112521-008	SW846 6020B
	Calcium	148	0.400	1.00	NE	NE			112521-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112521-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112521-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112521-008	SW846 6020B
	Iron	0.0421	0.033	0.100	NE	NE	J		112521-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112521-008	SW846 6020B
	Magnesium	30.4	0.010	0.030	NE	NE			112521-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U	R	112521-008	SW846 6020B
	Mercury	0.000165	0.000067	0.0002	0.002	0.002	B, J	0.0002UJ	112521-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112521-008	SW846 6020B
	Potassium	5.42	0.080	0.300	NE	NE			112521-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112521-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112521-008	SW846 6020B
	Sodium	98.9	0.400	1.25	NE	NE			112521-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112521-008	SW846 6020B
	Uranium	0.00701	0.000067	0.0002	0.03	0.03			112521-008	SW846 6020B
	Vanadium	0.00571	0.0033	0.020	NE	NE	J		112521-008	SW846 6020B
	Zinc	0.00405	0.0033	0.020	NE	NE	J		112521-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MRN-2	Aluminum	ND	0.001	0.003	0.006	0.006	U		112495-008	SW846 6020B
19-Mar-20	Antimony	0.00278	0.002	0.005	0.010	0.010	J		112495-008	SW846 6020B
	Arsenic	0.0592	0.00067	0.004	2.00	2.00			112495-008	SW846 6020B
	Barium	ND	0.0002	0.0005	0.004	0.004	U		112495-008	SW846 6020B
	Beryllium	ND	0.0003	0.001	0.005	0.005	U		112495-008	SW846 6020B
	Cadmium	50.4	0.800	2.00	NE	NE			112495-008	SW846 6020B
	Calcium	ND	0.003	0.010	0.100	0.050	U		112495-008	SW846 6020B
	Chromium	ND	0.0003	0.001	NE	NE	U		112495-008	SW846 6020B
	Cobalt	ND	0.0003	0.002	NE	NE	U		112495-008	SW846 6020B
	Copper	ND	0.033	0.100	NE	NE	U		112495-008	SW846 6020B
	Iron	ND	0.0005	0.002	NE	0.015	U		112495-008	SW846 6020B
	Lead	15.2	0.010	0.030	NE	NE			112495-008	SW846 6020B
	Magnesium	ND	0.001	0.005	NE	NE	U		112495-008	SW846 6020B
	Manganese	ND	0.000067	0.0002	0.002	0.002	U		112495-008	SW846 7470A
	Mercury	ND	0.0006	0.002	NE	NE	U		112495-008	SW846 6020B
	Nickel	3.44	0.080	0.300	NE	NE			112495-008	SW846 6020B
	Potassium	ND	0.002	0.005	0.050	0.050	U		112495-008	SW846 6020B
	Selenium	ND	0.0003	0.001	NE	0.050	U		112495-008	SW846 6020B
	Silver	23.8	0.080	0.250	NE	NE			112495-008	SW846 6020B
	Sodium	ND	0.0006	0.002	0.002	0.002	U		112495-008	SW846 6020B
	Thallium	0.00303	0.000067	0.0002	0.03	0.03			112495-008	SW846 6020B
	Uranium	0.00948	0.0033	0.020	NE	NE	J		112495-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112495-008	SW846 6020B
	Zinc	ND	0.001	0.003	0.006	0.006	U		112495-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MRN-3D	Aluminum	ND	0.0193	0.050	NE	NE	U		112498-008	SW846 6020B
20-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112498-008	SW846 6020B
	Arsenic	0.00279	0.002	0.005	0.010	0.010	J		112498-008	SW846 6020B
	Barium	0.110	0.00067	0.004	2.00	2.00			112498-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112498-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112498-008	SW846 6020B
	Calcium	60.0	0.800	2.00	NE	NE			112498-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112498-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112498-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112498-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112498-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112498-008	SW846 6020B
	Magnesium	14.4	0.010	0.030	NE	NE			112498-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112498-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112498-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112498-008	SW846 6020B
	Potassium	4.32	0.080	0.300	NE	NE			112498-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112498-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112498-008	SW846 6020B
	Sodium	28.0	0.080	0.250	NE	NE			112498-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112498-008	SW846 6020B
	Uranium	0.00339	0.000067	0.0002	0.03	0.03			112498-008	SW846 6020B
	Vanadium	0.00832	0.0033	0.020	NE	NE	J		112498-008	SW846 6020B
	Zinc	0.0194	0.0033	0.020	NE	NE	J		112498-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
NWTA3-MW3D	Aluminum	ND	0.0193	0.050	NE	NE	U		112490-008	SW846 6020B
18-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112490-008	SW846 6020B
	Arsenic	0.00371	0.002	0.005	0.010	0.010	J		112490-008	SW846 6020B
	Barium	0.0935	0.00067	0.004	2.00	2.00			112490-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112490-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112490-008	SW846 6020B
	Calcium	42.0	0.080	0.200	NE	NE			112490-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112490-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112490-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112490-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112490-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112490-008	SW846 6020B
	Magnesium	8.76	0.010	0.030	NE	NE			112490-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112490-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112490-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112490-008	SW846 6020B
	Potassium	3.92	0.080	0.300	NE	NE			112490-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112490-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112490-008	SW846 6020B
	Sodium	39.8	0.080	0.250	NE	NE			112490-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112490-008	SW846 6020B
	Uranium	0.00360	0.000067	0.0002	0.03	0.03			112490-008	SW846 6020B
	Vanadium	0.0127	0.0033	0.020	NE	NE	B, J	0.02U	112490-008	SW846 6020B
	Zinc	0.00349	0.0033	0.020	NE	NE	J		112490-008	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
NWTA3-MW3D	Aluminum	ND	0.0193	0.050	NE	NE	U		112491-008	SW846 6020B
(Duplicate)	Antimony	ND	0.001	0.003	0.006	0.006	U		112491-008	SW846 6020B
18-Mar-20	Arsenic	0.00356	0.002	0.005	0.010	0.010	J		112491-008	SW846 6020B
	Barium	0.0890	0.00067	0.004	2.00	2.00			112491-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112491-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112491-008	SW846 6020B
	Calcium	40.1	0.080	0.200	NE	NE			112491-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112491-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112491-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112491-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112491-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112491-008	SW846 6020B
	Magnesium	8.49	0.010	0.030	NE	NE			112491-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112491-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112491-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112491-008	SW846 6020B
	Potassium	3.78	0.080	0.300	NE	NE			112491-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112491-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112491-008	SW846 6020B
	Sodium	37.6	0.080	0.250	NE	NE			112491-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112491-008	SW846 6020B
	Uranium	0.00347	0.000067	0.0002	0.03	0.03			112491-008	SW846 6020B
	Vanadium	0.0124	0.0033	0.020	NE	NE	B, J	0.02U	112491-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112491-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
OBS-MW1	Aluminum	ND	0.0193	0.050	NE	NE	U		112544-008	SW846 6020B
01-Apr-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112544-008	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	0.010	U		112544-008	SW846 6020B
	Barium	0.0201	0.00067	0.004	2.00	2.00			112544-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112544-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112544-008	SW846 6020B
	Calcium	83.4	0.400	1.00	NE	NE			112544-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112544-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112544-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112544-008	SW846 6020B
	Iron	0.0419	0.033	0.100	NE	NE	J		112544-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112544-008	SW846 6020B
	Magnesium	18.4	0.010	0.030	NE	NE			112544-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112544-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112544-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112544-008	SW846 6020B
	Potassium	1.79	0.080	0.300	NE	NE			112544-008	SW846 6020B
	Selenium	0.00260	0.002	0.005	0.050	0.050	J		112544-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112544-008	SW846 6020B
	Sodium	26.3	0.080	0.250	NE	NE			112544-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112544-008	SW846 6020B
	Uranium	0.00960	0.000067	0.0002	0.03	0.03			112544-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112544-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112544-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
OBS-MW1	Aluminum	ND	0.0193	0.050	NE	NE	U		112545-008	SW846 6020B
(Duplicate)	Antimony	ND	0.001	0.003	0.006	0.006	U		112545-008	SW846 6020B
01-Apr-20	Arsenic	ND	0.002	0.005	0.010	0.010	U		112545-008	SW846 6020B
	Barium	0.0202	0.00067	0.004	2.00	2.00			112545-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112545-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112545-008	SW846 6020B
	Calcium	82.8	0.400	1.00	NE	NE			112545-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112545-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112545-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112545-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112545-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112545-008	SW846 6020B
	Magnesium	18.5	0.010	0.030	NE	NE			112545-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112545-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112545-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112545-008	SW846 6020B
	Potassium	1.81	0.080	0.300	NE	NE			112545-008	SW846 6020B
	Selenium	0.00283	0.002	0.005	0.050	0.050	J		112545-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112545-008	SW846 6020B
	Sodium	26.3	0.080	0.250	NE	NE			112545-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112545-008	SW846 6020B
	Uranium	0.00960	0.000067	0.0002	0.03	0.03			112545-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112545-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112545-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
PL-2	Aluminum	ND	0.0193	0.050	NE	NE	U		112472-008	SW846 6020B
12-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112472-008	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	0.010	U		112472-008	SW846 6020B
	Barium	0.0820	0.00067	0.004	2.00	2.00			112472-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112472-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112472-008	SW846 6020B
	Calcium	68.5	0.800	2.00	NE	NE			112472-008	SW846 6020B
	Chromium	0.00432	0.003	0.010	0.100	0.050	J		112472-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112472-008	SW846 6020B
	Copper	0.000649	0.0003	0.002	NE	NE	J		112472-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112472-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112472-008	SW846 6020B
	Magnesium	10.7	0.010	0.030	NE	NE			112472-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112472-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112472-008	SW846 7470A
	Nickel	0.0026	0.0006	0.002	NE	NE			112472-008	SW846 6020B
	Potassium	3.91	0.080	0.300	NE	NE			112472-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112472-008	SW846 6020B
	Silver	0.000449	0.0003	0.001	NE	0.050	J		112472-008	SW846 6020B
	Sodium	31.9	0.080	0.250	NE	NE			112472-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112472-008	SW846 6020B
	Uranium	0.00383	0.000067	0.0002	0.03	0.03			112472-008	SW846 6020B
	Vanadium	0.00653	0.0033	0.020	NE	NE	J		112472-008	SW846 6020B
	Zinc	0.0138	0.0033	0.020	NE	NE	J		112472-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
PL-4	Aluminum	ND	0.0193	0.050	NE	NE	U		112475-008	SW846 6020B
13-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112475-008	SW846 6020B
	Arsenic	0.00308	0.002	0.005	0.010	0.010	J		112475-008	SW846 6020B
	Barium	0.0788	0.00067	0.004	2.00	2.00			112475-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112475-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112475-008	SW846 6020B
	Calcium	71.9	0.400	1.00	NE	NE			112475-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112475-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112475-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112475-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112475-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112475-008	SW846 6020B
	Magnesium	13.2	0.010	0.030	NE	NE			112475-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112475-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112475-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112475-008	SW846 6020B
	Potassium	5.26	0.080	0.300	NE	NE			112475-008	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112475-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112475-008	SW846 6020B
	Sodium	27.2	0.080	0.250	NE	NE			112475-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112475-008	SW846 6020B
	Uranium	0.00364	0.000067	0.0002	0.03	0.03			112475-008	SW846 6020B
	Vanadium	0.00826	0.0033	0.020	NE	NE	B, J	0.02U	112475-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112475-008	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SFR-2S	Aluminum	ND	0.0193	0.050	NE	NE	U		112508-009	SW846 6020B
25-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112508-009	SW846 6020B
	Arsenic	0.00294	0.002	0.005	0.010	0.010	J		112508-009	SW846 6020B
	Barium	0.0589	0.00067	0.004	2.00	2.00		J+	112508-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112508-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112508-009	SW846 6020B
	Calcium	131	0.400	1.00	NE	NE			112508-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112508-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112508-009	SW846 6020B
	Copper	0.000851	0.0003	0.002	NE	NE	J	J+	112508-009	SW846 6020B
	Iron	0.0378	0.033	0.100	NE	NE	J		112508-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112508-009	SW846 6020B
	Magnesium	37.7	0.010	0.030	NE	NE			112508-009	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U	R	112508-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112508-009	SW846 7470A
	Nickel	0.00150	0.0006	0.002	NE	NE	J		112508-009	SW846 6020B
	Potassium	7.65	0.080	0.300	NE	NE			112508-009	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112508-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112508-009	SW846 6020B
	Sodium	85.6	0.400	1.25	NE	NE			112508-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112508-009	SW846 6020B
	Uranium	0.0161	0.000067	0.0002	0.03	0.03			112508-009	SW846 6020B
	Vanadium	0.00624	0.0033	0.020	NE	NE	J		112508-009	SW846 6020B
	Zinc	0.00474	0.0033	0.020	NE	NE	J		112508-009	SW846 6020B

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Table 2A-6 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SFR-4T	Aluminum	ND	0.0193	0.050	NE	NE	U		112511-009	SW846 6020B
26-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112511-009	SW846 6020B
	Arsenic	0.00339	0.002	0.005	0.010	0.010	J		112511-009	SW846 6020B
	Barium	0.00941	0.00067	0.004	2.00	2.00			112511-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112511-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112511-009	SW846 6020B
	Calcium	65.7	0.400	1.00	NE	NE			112511-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112511-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112511-009	SW846 6020B
	Copper	0.000318	0.0003	0.002	NE	NE	J		112511-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112511-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112511-009	SW846 6020B
	Magnesium	3.44	0.010	0.030	NE	NE			112511-009	SW846 6020B
	Manganese	0.00101	0.001	0.005	NE	NE	J		112511-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112511-009	SW846 7470A
	Nickel	0.00135	0.0006	0.002	NE	NE	J		112511-009	SW846 6020B
	Potassium	2.53	0.080	0.300	NE	NE			112511-009	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112511-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112511-009	SW846 6020B
	Sodium	1,120	4.00	12.5	NE	NE			112511-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112511-009	SW846 6020B
	Uranium	0.000246	0.000067	0.0002	0.03	0.03			112511-009	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	NE	U		112511-009	SW846 6020B
	Zinc	0.018	0.0033	0.020	NE	NE	J		112511-009	SW846 6020B

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Table 2A-6 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW2	Aluminum	ND	0.0193	0.050	NE	NE	U		112469-009	SW846 6020B
11-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112469-009	SW846 6020B
	Arsenic	0.00207	0.002	0.005	0.010	0.010	J		112469-009	SW846 6020B
	Barium	0.0737	0.00067	0.004	2.00	2.00			112469-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112469-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112469-009	SW846 6020B
	Calcium	45.7	0.080	0.200	NE	NE			112469-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112469-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112469-009	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112469-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112469-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112469-009	SW846 6020B
	Magnesium	13.9	0.010	0.030	NE	NE			112469-009	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112469-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112469-009	SW846 7470A
	Nickel	0.000938	0.0006	0.002	NE	NE	J		112469-009	SW846 6020B
	Potassium	4.29	0.080	0.300	NE	NE			112469-009	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112469-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112469-009	SW846 6020B
	Sodium	40.1	0.080	0.250	NE	NE			112469-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112469-009	SW846 6020B
	Uranium	0.00315	0.000067	0.0002	0.03	0.03	B		112469-009	SW846 6020B
	Vanadium	0.00797	0.0033	0.020	NE	NE	J		112469-009	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112469-009	SW846 6020B

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW3	Aluminum	ND	0.0193	0.050	NE	NE	U		112478-009	SW846 6020B
16-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112478-009	SW846 6020B
	Arsenic	0.00349	0.002	0.005	0.010	0.010	J		112478-009	SW846 6020B
	Barium	0.0603	0.00067	0.004	2.00	2.00			112478-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112478-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112478-009	SW846 6020B
	Calcium	41.1	0.080	0.200	NE	NE			112478-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112478-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112478-009	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112478-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112478-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112478-009	SW846 6020B
	Magnesium	11.3	0.010	0.030	NE	NE			112478-009	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112478-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112478-009	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112478-009	SW846 6020B
	Potassium	4.96	0.080	0.300	NE	NE			112478-009	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112478-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112478-009	SW846 6020B
	Sodium	53.7	0.400	1.25	NE	NE			112478-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112478-009	SW846 6020B
	Uranium	0.00241	0.000067	0.0002	0.03	0.03			112478-009	SW846 6020B
	Vanadium	0.0129	0.0033	0.020	NE	NE	B, J	0.02U	112478-009	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112478-009	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW4	Aluminum	ND	0.0193	0.050	NE	NE	U		112484-009	SW846 6020B
17-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112484-009	SW846 6020B
	Arsenic	0.00204	0.002	0.005	0.010	0.010	J		112484-009	SW846 6020B
	Barium	0.0572	0.00067	0.004	2.00	2.00			112484-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U		112484-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112484-009	SW846 6020B
	Calcium	40.0	0.800	2.00	NE	NE			112484-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U		112484-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U		112484-009	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U		112484-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	NE	U		112484-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112484-009	SW846 6020B
	Magnesium	11.2	0.100	0.300	NE	NE			112484-009	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U		112484-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112484-009	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U		112484-009	SW846 6020B
	Potassium	4.78	0.080	0.300	NE	NE			112484-009	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112484-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112484-009	SW846 6020B
	Sodium	62.5	0.800	2.50	NE	NE			112484-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112484-009	SW846 6020B
	Uranium	0.00243	0.000067	0.0002	0.03	0.03			112484-009	SW846 6020B
	Vanadium	0.0107	0.0033	0.020	NE	NE	J		112484-009	SW846 6020B
	Zinc	0.00344	0.0033	0.020	NE	NE	J		112484-009	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-6 *(Concluded)*
Summary of Target Analyte List Metals and Uranium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TRE-1	Aluminum	ND	0.0193	0.050	NE	NE	U	0.05UJ	112501-009	SW846 6020B
23-Mar-20	Antimony	ND	0.001	0.003	0.006	0.006	U		112501-009	SW846 6020B
	Arsenic	0.00351	0.002	0.005	0.010	0.010	J		112501-009	SW846 6020B
	Barium	0.0459	0.00067	0.004	2.00	2.00		J+	112501-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	0.004	U	0.0005UJ	112501-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	0.005	U		112501-009	SW846 6020B
	Calcium	166	0.800	2.00	NE	NE			112501-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	0.050	U	0.01UJ	112501-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	NE	U	0.001UJ	112501-009	SW846 6020B
	Copper	ND	0.0003	0.002	NE	NE	U	0.002UJ	112501-009	SW846 6020B
	Iron	0.0586	0.033	0.100	NE	NE	J	J-	112501-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	0.015	U		112501-009	SW846 6020B
	Magnesium	38.0	0.010	0.030	NE	NE			112501-009	SW846 6020B
	Manganese	ND	0.001	0.005	NE	NE	U	R	112501-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		112501-009	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	NE	U	0.002UJ	112501-009	SW846 6020B
	Potassium	7.20	0.080	0.300	NE	NE		J-	112501-009	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	0.050	U		112501-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	0.050	U		112501-009	SW846 6020B
	Sodium	107	0.800	2.50	NE	NE			112501-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	0.002	U		112501-009	SW846 6020B
	Uranium	0.0173	0.000067	0.0002	0.03	0.03			112501-009	SW846 6020B
	Vanadium	0.00532	0.0033	0.020	NE	NE	J	J-	112501-009	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	NE	U		112501-009	SW846 6020B

Refer to footnotes on page 2A-46.

Table 2A-7
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d]		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs	Americium-241	0.238 ± 3.09	5.23	2.54	NE	NE	U	BD	112558-010	EPA 901.1
03-Apr-20	Cesium-137	-2.00 ± 2.47	3.95	1.86	NE	NE	U	BD	112558-010	EPA 901.1
	Cobalt-60	-1.04 ± 2.47	4.15	1.88	NE	NE	U	BD	112558-010	EPA 901.1
	Potassium-40	56.2 ± 60.5	37.7	16.9	NE	NE	X	R	112558-010	EPA 901.1
	Gross Alpha	-0.50	NA	NA	15 pCi/L	NE	NA	None	112558-011	EPA 900.0
	Gross Beta	31.0 ± 5.12	6.73	3.25	4 mrem/yr	NE	*		112558-011	EPA 900.0
	Uranium-233/234	11.2 ± 1.06	0.0489	0.0211	NE	NE			112560-002	HASL-300
	Uranium-235/236	0.188 ± 0.0512	0.0468	0.0193	NE	NE			112560-002	HASL-300
	Uranium-238	2.21 ± 0.246	0.0452	0.0193	NE	NE			112560-002	HASL-300
	Radium-226	0.235 ± 0.178	0.225	0.0772	5 pCi/L	5 pCi/L		J	112558-012	EPA 903.1M
	Radium-228	0.208 ± 0.249	0.410	0.178	5 pCi/L	5 pCi/L	U	BD	112560-001	EPA 904.0
CCBA-MW2	Americium-241	0.238 ± 3.09	5.23	2.54	NE	NE	U	BD	112558-010	EPA 901.1
30-Mar-20	Cesium-137	-2.00 ± 2.47	3.95	1.86	NE	NE	U	BD	112558-010	EPA 901.1
	Cobalt-60	-1.04 ± 2.47	4.15	1.88	NE	NE	U	BD	112558-010	EPA 901.1
	Potassium-40	56.2 ± 60.5	37.7	16.9	NE	NE	X	R	112558-010	EPA 901.1
	Gross Alpha	-0.50	NA	NA	15 pCi/L	NE	NA	None	112558-011	EPA 900.0
	Gross Beta	31.0 ± 5.12	6.73	3.25	4 mrem/yr	NE	*		112558-011	EPA 900.0
	Uranium-233/234	11.2 ± 1.06	0.0489	0.0211	NE	NE			112560-002	HASL-300
	Uranium-235/236	0.188 ± 0.0512	0.0468	0.0193	NE	NE			112560-002	HASL-300
	Uranium-238	2.21 ± 0.246	0.0452	0.0193	NE	NE			112560-002	HASL-300
	Radium-226	0.235 ± 0.178	0.225	0.0772	5 pCi/L	5 pCi/L		J	112558-012	EPA 903.1M
	Radium-228	0.208 ± 0.249	0.410	0.178	5 pCi/L	5 pCi/L	U	BD	112560-001	EPA 904.0
CTF-MW1	Americium-241	7.21 ± 17.9	29.0	14.1	NE	NE	U	BD	112532-010	EPA 901.1
31-Mar-20	Cesium-137	-0.809 ± 2.37	3.68	1.75	NE	NE	U	BD	112532-010	EPA 901.1
	Cobalt-60	-0.721 ± 2.28	3.96	1.84	NE	NE	U	BD	112532-010	EPA 901.1
	Potassium-40	-16.2 ± 47.4	53.3	25.2	NE	NE	U	BD	112532-010	EPA 901.1
	Gross Alpha	1.80	NA	NA	15 pCi/L	NE	NA	None	112532-011	EPA 900.0
	Gross Beta	4.71 ± 0.995	1.45	0.70	4 mrem/yr	NE	*		112532-011	EPA 900.0
	Uranium-233/234	24.2 ± 2.25	0.0499	0.0216	NE	NE			112535-002	HASL-300
	Uranium-235/236	0.279 ± 0.0635	0.0477	0.0197	NE	NE			112535-002	HASL-300
	Uranium-238	3.62 ± 0.378	0.0461	0.0197	NE	NE			112535-002	HASL-300
	Radium-226	0.245 ± 0.201	0.261	0.0895	5 pCi/L	5 pCi/L	U	BD	112532-012	EPA 903.1M
	Radium-228	0.411 ± 0.307	0.456	0.206	5 pCi/L	5 pCi/L	U	BD	112535-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d]		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW1 (Duplicate) 31-Mar-20	Americium-241	0.912 ± 9.83	17.2	8.37	NE	NE	U	BD	112533-010	EPA 901.1
	Cesium-137	1.42 ± 2.29	3.55	1.69	NE	NE	U	BD	112533-010	EPA 901.1
	Cobalt-60	-0.221 ± 2.06	3.65	1.69	NE	NE	U	BD	112533-010	EPA 901.1
	Potassium-40	-18.4 ± 45.1	49.6	23.4	NE	NE	U	BD	112533-010	EPA 901.1
	Gross Alpha	12.9	NA	NA	15 pCi/L	NE	NA	None	112533-011	EPA 900.0
	Gross Beta	8.95 ± 1.19	1.49	0.724	4 mrem/yr	NE	*		112533-011	EPA 900.0
	Uranium-233/234	24.8 ± 2.37	0.0562	0.0243	NE	NE			112536-002	HASL-300
	Uranium-235/236	0.307 ± 0.0715	0.0538	0.0222	NE	NE			112536-002	HASL-300
	Uranium-238	3.59 ± 0.388	0.0520	0.0222	NE	NE			112536-002	HASL-300
	Radium-226	0.240 ± 0.203	0.295	0.112	5 pCi/L	5 pCi/L	U	BD	112533-012	EPA 903.1M
	Radium-228	0.363 ± 0.279	0.405	0.174	5 pCi/L	5 pCi/L	U	BD	112536-001	EPA 904.0
CYN-MW5 02-APR-20	Americium-241	18.2 ± 19.6	30.8	15.1	NE	NE	U	BD	112555-010	EPA 901.1
	Cesium-137	1.32 ± 2.50	3.86	1.86	NE	NE	U	BD	112555-010	EPA 901.1
	Cobalt-60	-0.717 ± 2.48	4.27	2.01	NE	NE	U	BD	112555-010	EPA 901.1
	Potassium-40	3.03 ± 39.5	56.0	26.7	NE	NE	U	BD	112555-010	EPA 901.1
	Gross Alpha	1.80	NA	NA	15 pCi/L	NE	NA	None	112555-011	EPA 900.0
	Gross Beta	4.36 ± 0.832	1.22	0.597	4 mrem/yr	NE	*		112555-011	EPA 900.0
	Uranium-233/234	0.857 ± 0.128	0.0576	0.0249	NE	NE			112557-002	HASL-300
	Uranium-235/236	0.0358 ± 0.0264	0.0552	0.0227	NE	NE	U	BD	112557-002	HASL-300
	Uranium-238	0.200 ± 0.0531	0.0533	0.0227	NE	NE			112557-002	HASL-300
	Radium-226	0.796 ± 0.300	0.174	0.0529	5 pCi/L	5 pCi/L	J	J	112555-012	EPA 903.1M
	Radium-228	0.670 ± 0.368	0.470	0.209	5 pCi/L	5 pCi/L	J	J	112557-001	EPA 904.0
Greystone-MW2 27-Mar-20	Americium-241	1.78 ± 10.9	17.4	8.48	NE	NE	U	BD	112520-010	EPA 901.1
	Cesium-137	0.140 ± 2.25	3.55	1.68	NE	NE	U	BD	112520-010	EPA 901.1
	Cobalt-60	1.25 ± 2.26	4.20	1.95	NE	NE	U	BD	112520-010	EPA 901.1
	Potassium-40	-45.5 ± 46.9	52.8	24.9	NE	NE	U	BD	112520-010	EPA 901.1
	Gross Alpha	3.72	NA	NA	15 pCi/L	NE	NA	None	112520-011	EPA 900.0
	Gross Beta	14.4 ± 2.21	3.09	1.50	4 mrem/yr	NE			112520-011	EPA 900.0
	Uranium-233/234	9.51 ± 0.944	0.0571	0.0247	NE	NE			112523-002	HASL-300
	Uranium-235/236	0.152 ± 0.0496	0.0546	0.0225	NE	NE		J	112523-002	HASL-300
	Uranium-238	2.12 ± 0.250	0.0528	0.0225	NE	NE			112523-002	HASL-300
	Radium-226	0.913 ± 0.439	0.487	0.193	5 pCi/L	5 pCi/L		J	112520-012	EPA 903.1M
	Radium-228	0.0623 ± 0.240	0.440	0.194	5 pCi/L	5 pCi/L	U	BD	112523-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d]		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Greystone-MW2 (Duplicate) 27-Mar-20	Americium-241	-15.8 ± 18.2	26.9	13.1	NE	NE	U	BD	112521-010	EPA 901.1
	Cesium-137	0.948 ± 2.72	4.34	2.07	NE	NE	U	BD	112521-010	EPA 901.1
	Cobalt-60	-0.348 ± 2.60	4.71	2.19	NE	NE	U	BD	112521-010	EPA 901.1
	Potassium-40	-35.2 ± 45.9	58.6	27.7	NE	NE	U	BD	112521-010	EPA 901.1
	Gross Alpha	-2.78	NA	NA	15 pCi/L	NE	NA	None	112521-011	EPA 900.0
	Gross Beta	11.3 ± 1.94	2.75	1.34	4 mrem/yr	NE			112521-011	EPA 900.0
	Uranium-233/234	9.36 ± 0.893	0.0484	0.0209	NE	NE			112524-002	HASL-300
	Uranium-235/236	0.117 ± 0.040	0.0463	0.0191	NE	NE		J	112524-002	HASL-300
	Uranium-238	2.13 ± 0.238	0.0447	0.0191	NE	NE			112524-002	HASL-300
	Radium-226	0.799 ± 0.395	0.428	0.166	5 pCi/L	5 pCi/L		J	112521-012	EPA 903.1M
	Radium-228	0.158 ± 0.269	0.464	0.205	5 pCi/L	5 pCi/L	U	BD	112524-001	EPA 904.0
MRN-2 19-Mar-20	Americium-241	-0.428 ± 10.7	16.6	8.05	NE	NE	U	BD	112495-010	EPA 901.1
	Cesium-137	-4.08 ± 4.60	3.66	1.75	NE	NE	U	BD	112495-010	EPA 901.1
	Cobalt-60	0.232 ± 2.12	3.81	1.77	NE	NE	U	BD	112495-010	EPA 901.1
	Potassium-40	47.4 ± 49.1	32.1	14.7	NE	NE	X	R	112495-010	EPA 901.1
	Gross Alpha	3.87	NA	NA	15 pCi/L	NE	NA	None	112495-011	EPA 900.0
	Gross Beta	4.08 ± 0.856	1.23	0.596	4 mrem/yr	NE			112495-011	EPA 900.0
	Radium-226	0.300 ± 0.238	0.335	0.130	5 pCi/L	5 pCi/L	U	BD	112495-012	EPA 903.1M
	Radium-228	0.323 ± 0.303	0.475	0.212	5 pCi/L	5 pCi/L	U	BD	112497-001	EPA 904.0
MRN-3D 20-Mar-20	Americium-241	-15.4 ± 13.4	15.3	7.43	NE	NE	U	BD	112498-010	EPA 901.1
	Cesium-137	1.25 ± 2.26	3.83	1.83	NE	NE	U	BD	112498-010	EPA 901.1
	Cobalt-60	1.39 ± 2.16	3.91	1.82	NE	NE	U	BD	112498-010	EPA 901.1
	Potassium-40	-49.8 ± 48.3	49.0	23.1	NE	NE	U	BD	112498-010	EPA 901.1
	Gross Alpha	3.75	NA	NA	15 pCi/L	NE	NA	None	112498-011	EPA 900.0
	Gross Beta	5.48 ± 1.40	2.16	1.06	4 mrem/yr	NE		J	112498-011	EPA 900.0
	Radium-226	0.335 ± 0.283	0.412	0.156	5 pCi/L	5 pCi/L	U	BD	112498-012	EPA 903.1M
	Radium-228	0.222 ± 0.285	0.473	0.210	5 pCi/L	5 pCi/L	U	BD	112500-001	EPA 904.0
NWTA3-MW3D 18-Mar-20	Americium-241	0.0437 ± 3.58	6.03	2.94	NE	NE	U	BD	112490-010	EPA 901.1
	Cesium-137	2.15 ± 1.78	3.98	1.87	NE	NE	U	BD	112490-010	EPA 901.1
	Cobalt-60	0.0869 ± 2.58	4.63	2.12	NE	NE	U	BD	112490-010	EPA 901.1
	Potassium-40	-27.4 ± 46.9	57.2	26.7	NE	NE	U	BD	112490-010	EPA 901.1
	Gross Alpha	1.62	NA	NA	15 pCi/L	NE	NA	None	112490-011	EPA 900.0
	Gross Beta	3.43 ± 0.597	0.868	0.423	4mrem/yr	NE			112490-011	EPA 900.0
	Radium-226	0.0658 ± 0.130	0.252	0.0765	5 pCi/L	5 pCi/L	U	BD	112490-012	EPA 903.1M
	Radium-228	0.264 ± 0.307	0.503	0.225	5 pCi/L	5 pCi/L	U	BD	112493-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
NWTA3-MW3D	Americium-241	0.214 ± 3.03	4.95	2.41	NE	NE	U	BD	112491-010	EPA 901.1
(Duplicate)	Cesium-137	0.401 ± 2.19	3.46	1.64	NE	NE	U	BD	112491-010	EPA 901.1
18-Mar-20	Cobalt-60	0.831 ± 2.14	3.96	1.84	NE	NE	U	BD	112491-010	EPA 901.1
	Potassium-40	-36.8 ± 44.8	49.1	23.1	NE	NE	U	BD	112491-010	EPA 901.1
	Gross Alpha	1.47	NA	NA	15 pCi/L	NE	NA	None	112491-011	EPA 900.0
	Gross Beta	3.68 ± 0.522	0.646	0.312	4 mrem/yr	NE			112491-011	EPA 900.0
	Radium-226	0.511 ± 0.266	0.245	0.0840	5 pCi/L	5 pCi/L		NJ+	112491-012	EPA 903.1M
	Radium-228	0.176 ± 0.279	0.476	0.213	5 pCi/L	5 pCi/L	U	BD	112494-001	EPA 904.0
OBS-MW1	Americium-241	7.41 ± 7.15	9.91	4.88	NE	NE	U	BD	112544-010	EPA 901.1
01-Apr-20	Cesium-137	-1.10 ± 3.68	5.69	2.73	NE	NE	U	BD	112544-010	EPA 901.1
	Cobalt-60	-0.705 ± 3.74	6.40	3.01	NE	NE	U	BD	112544-010	EPA 901.1
	Potassium-40	1.84 ± 51.1	76.3	36.2	NE	NE	U	BD	112544-010	EPA 901.1
	Gross Alpha	1.61	NA	NA	15 pCi/L	NE	NA	None	112544-011	EPA 900.0
	Gross Beta	5.32 ± 0.906	1.21	0.587	4 mrem/yr	NE	*		112544-011	EPA 900.0
	Uranium-233/234	17.7 ± 1.69	0.0556	0.0240	NE	NE			112547-002	HASL-300
	Uranium-235/236	0.186 ± 0.0552	0.0532	0.0219	NE	NE			112547-002	HASL-300
	Uranium-238	3.40 ± 0.369	0.0514	0.0219	NE	NE			112547-002	HASL-300
	Radium-226	0.402 ± 0.220	0.226	0.0777	5 pCi/L	5 pCi/L		J	112544-012	EPA 903.1M
	Radium-228	0.186 ± 0.279	0.475	0.211	5 pCi/L	5 pCi/L	U	BD	112547-001	EPA 904.0
OBS-MW1	Americium-241	4.73 ± 5.34	8.61	4.24	NE	NE	U	BD	112545-010	EPA 901.1
(Duplicate)	Cesium-137	1.22 ± 2.96	4.59	2.20	NE	NE	U	BD	112545-010	EPA 901.1
01-Apr-20	Cobalt-60	0.423 ± 2.87	5.15	2.43	NE	NE	U	BD	112545-010	EPA 901.1
	Potassium-40	-72.6 ± 60.6	61.6	29.4	NE	NE	U	BD	112545-010	EPA 901.1
	Gross Alpha	7.81	NA	NA	15 pCi/L	NE	NA	None	112545-011	EPA 900.0
	Gross Beta	5.15 ± 0.950	1.34	0.649	4 mrem/yr	NE	*		112545-011	EPA 900.0
	Uranium-233/234	16.6 ± 1.53	0.0457	0.0197	NE	NE			112548-002	HASL-300
	Uranium-235/236	0.241 ± 0.0577	0.0437	0.0180	NE	NE			112548-002	HASL-300
	Uranium-238	3.05 ± 0.318	0.0422	0.0180	NE	NE			112548-002	HASL-300
	Radium-226	0.306 ± 0.229	0.293	0.101	5 pCi/L	5 pCi/L		J	112545-012	EPA 903.1M
	Radium-228	0.0631 ± 0.252	0.461	0.203	5 pCi/L	5 pCi/L	U	BD	112548-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
PL-2 12-Mar-20	Americium-241	-6.12 ± 10.6	15.5	7.51	NE	NE	U	BD	112472-010	EPA 901.1
	Cesium-137	-2.32 ± 4.38	3.61	1.72	NE	NE	U	BD	112472-010	EPA 901.1
	Cobalt-60	2.93 ± 2.46	4.14	1.93	NE	NE	U	BD	112472-010	EPA 901.1
	Potassium-40	34.2 ± 59.0	30.4	13.8	NE	NE	X	R	112472-010	EPA 901.1
	Gross Alpha	1.84	NA	NA	15 pCi/L	NE	NA	None	112472-011	EPA 900.0
	Gross Beta	2.93 ± 1.10	1.76	0.860	4 mrem/yr	NE		J	112472-011	EPA 900.0
	Radium-226	0.235 ± 0.202	0.289	0.109	5 pCi/L	5 pCi/L	U	BD	112472-012	EPA 903.1M
	Radium-228	-0.0872 ± 0.251	0.493	0.220	5 pCi/L	5 pCi/L	U	BD	112474-001	EPA 904.0
PL-4 13-Mar-20	Americium-241	-0.828 ± 8.05	13.9	6.71	NE	NE	U	BD	112475-010	EPA 901.1
	Cesium-137	0.684 ± 1.82	3.26	1.53	NE	NE	U	BD	112475-010	EPA 901.1
	Cobalt-60	0.725 ± 1.72	3.32	1.51	NE	NE	U	BD	112475-010	EPA 901.1
	Potassium-40	0.0769 ± 46.9	31.7	14.3	NE	NE	U	BD	112475-010	EPA 901.1
	Gross Alpha	2.73	NA	NA	15 pCi/L	NE	NA	None	112475-011	EPA 900.0
	Gross Beta	5.63 ± 0.813	1.12	0.544	4 mrem/yr	NE			112475-011	EPA 900.0
	Radium-226	0.713 ± 0.382	0.461	0.188	5 pCi/L	5 pCi/L		J	112475-012	EPA 903.1M
	Radium-228	1.59 ± 0.593	0.489	0.214	5 pCi/L	5 pCi/L		J	112477-001	EPA 904.0
SFR-2S 25-Mar-20	Americium-241	15.3 ± 19.5	30.0	14.5	NE	NE	U	BD	112508-011	EPA 901.1
	Cesium-137	-0.373 ± 2.52	3.87	1.83	NE	NE	U	BD	112508-011	EPA 901.1
	Cobalt-60	1.54 ± 2.55	4.70	2.17	NE	NE	U	BD	112508-011	EPA 901.1
	Potassium-40	-49.5 ± 50.9	59.8	28.1	NE	NE	U	BD	112508-011	EPA 901.1
	Gross Alpha	3.86	NA	NA	15 pCi/L	NE	NA	None	112508-012	EPA 900.0
	Gross Beta	8.83 ± 2.23	3.33	1.62	4 mrem/yr	NE		J	112508-012	EPA 900.0
	Uranium-233/234	20.4 ± 2.08	0.0753	0.0325	NE	NE			112510-002	HASL-300
	Uranium-235/236	0.407 ± 0.097	0.0721	0.0297	NE	NE			112510-002	HASL-300
	Uranium-238	6.03 ± 0.664	0.0696	0.0297	NE	NE			112510-002	HASL-300
	Radium-226	0.222 ± 0.203	0.304	0.115	5 pCi/L	5 pCi/L	U	BD	112508-013	EPA 903.1M
	Radium-228	0.0712 ± 0.247	0.441	0.201	5 pCi/L	5 pCi/L	U	BD	112510-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SFR-4T	Americium-241	0.289 ± 6.77	11.3	5.44	NE	NE	U	BD	112511-011	EPA 901.1
26-Mar-20	Cesium-137	-2.78 ± 3.45	3.76	1.79	NE	NE	U	BD	112511-011	EPA 901.1
	Cobalt-60	-1.28 ± 1.87	3.00	1.37	NE	NE	U	BD	112511-011	EPA 901.1
	Potassium-40	13.1 ± 56.6	27.6	12.5	NE	NE	U	BD	112511-011	EPA 901.1
	Gross Alpha	-5.39	NA	NA	15 pCi/L	NE	NA	None	112511-012	EPA 900.0
	Gross Beta	-1.10 ± 5.06	8.82	4.26	4 mrem/yr	NE	U	BD	112511-012	EPA 900.0
	Uranium-233/234	0.434 ± 0.0827	0.0525	0.0227	NE	NE			112513-002	HASL-300
	Uranium-235/236	0.00652 ± 0.0157	0.0502	0.0207	NE	NE	U	BD	112513-002	HASL-300
	Uranium-238	0.0949 ± 0.0353	0.0485	0.0207	NE	NE		J	112513-002	HASL-300
	Radium-226	0.279 ± 0.224	0.297	0.102	5 pCi/L	5 pCi/L	U	BD	112511-013	EPA 903.1M
	Radium-228	0.146 ± 0.271	0.470	0.210	5 pCi/L	5 pCi/L	U	BD	112513-001	EPA 904.0
SWTA3-MW2	Americium-241	-6.69 ± 16.8	27.3	12.8	NE	NE	U	BD	112469-011	EPA 901.1
11-Mar-20	Cesium-137	-2.12 ± 5.08	8.52	3.92	NE	NE	U	BD	112469-011	EPA 901.1
	Cobalt-60	2.17 ± 3.40	7.30	3.12	NE	NE	U	BD	112469-011	EPA 901.1
	Potassium-40	11.0 ± 45.5	76.0	32.7	NE	NE	U	BD	112469-011	EPA 901.1
	Gross Alpha	4.88	NA	NA	15 pCi/L	NE	NA	None	112469-012	EPA 900.0
	Gross Beta	5.38 ± 1.03	1.51	0.733	4 mrem/yr	NE			112469-012	EPA 900.0
	Radium-226	0.183 ± 0.182	0.281	0.106	5 pCi/L	5 pCi/L	U	BD	112469-013	EPA 903.1M
	Radium-228	0.450 ± 0.332	0.487	0.217	5 pCi/L	5 pCi/L	U	BD	112471-001	EPA 904.0
SWTA3-MW3	Americium-241	-0.791 ± 9.09	15.9	7.69	NE	NE	U	BD	112478-011	EPA 901.1
16-Mar-20	Cesium-137	0.452 ± 1.81	3.17	1.50	NE	NE	U	BD	112478-011	EPA 901.1
	Cobalt-60	-2.76 ± 3.29	3.44	1.59	NE	NE	U	BD	112478-011	EPA 901.1
	Potassium-40	21.4 ± 56.0	37.3	17.3	NE	NE	U	BD	112478-011	EPA 901.1
	Gross Alpha	3.76	NA	NA	15 pCi/L	NE	NA	None	112478-012	EPA 900.0
	Gross Beta	4.09 ± 1.00	1.52	0.743	4 mrem/yr	NE		J	112478-012	EPA 900.0
	Radium-226	0.255 ± 0.233	0.348	0.132	5 pCi/L	5 pCi/L	U	BD	112478-013	EPA 903.1M
	Radium-228	0.154 ± 0.270	0.469	0.204	5 pCi/L	5 pCi/L	U	BD	112480-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-7 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Radium Results, Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL / MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW4	Americium-241	0.763 ± 8.95	14.9	7.17	NE	NE	U	BD	112484-011	EPA 901.1
17-Mar-20	Cesium-137	-0.162 ± 1.54	2.69	1.26	NE	NE	U	BD	112484-011	EPA 901.1
	Cobalt-60	-0.0481 ± 1.63	2.99	1.37	NE	NE	U	BD	112484-011	EPA 901.1
	Potassium-40	-6.96 ± 34.1	44.6	21.1	NE	NE	U	BD	112484-011	EPA 901.1
	Gross Alpha	4.25	NA	NA	15 pCi/L	NE	NA	None	112484-012	EPA 900.0
	Gross Beta	4.81 ± 0.983	1.46	0.711	4 mrem/yr	NE			112484-012	EPA 900.0
	Radium-226	0.0912 ± 0.191	0.349	0.140	5 pCi/L	5 pCi/L	U	BD	112484-013	EPA 903.1M
	Radium-228	0.267 ± 0.294	0.476	0.208	5 pCi/L	5 pCi/L	U	BD	112486-001	EPA 904.0
TRE-1	Americium-241	2.68 ± 7.61	11.7	5.71	NE	NE	U	BD	112501-011	EPA 901.1
23-Mar-20	Cesium-137	2.16 ± 2.26	3.39	1.62	NE	NE	U	BD	112501-011	EPA 901.1
	Cobalt-60	-0.274 ± 1.77	3.15	1.45	NE	NE	U	BD	112501-011	EPA 901.1
	Potassium-40	-19.5 ± 40.7	43.6	20.6	NE	NE	U	BD	112501-011	EPA 901.1
	Gross Alpha	10.5	NA	NA	15 pCi/L	NE	NA	None	112501-012	EPA 900.0
	Gross Beta	11.4 ± 2.96	4.47	2.18	4 mrem/yr	NE		J	112501-012	EPA 900.0
	Uranium-233/234	23.6 ± 2.18	0.0488	0.0211	NE	NE			112503-002	HASL-300
	Uranium-235/236	0.463 ± 0.0865	0.0467	0.0192	NE	NE			112503-002	HASL-300
	Uranium-238	6.04 ± 0.596	0.0451	0.0192	NE	NE			112503-002	HASL-300
	Radium-226	0.561 ± 0.324	0.365	0.133	5 pCi/L	5 pCi/L		J	112501-013	EPA 903.1M
	Radium-228	0.130 ± 0.277	0.485	0.218	5 pCi/L	5 pCi/L	U	BD	112503-001	EPA 904.0

Refer to footnotes on page 2A-46.

Table 2A-8
Summary of Field Water Quality Measurements[h], Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
Coyote Springs	03-Apr-20	12.88	2788.4	227.1	6.10	0.44	26.01	2.16
CCBA-MW2	30-Mar-20	15.10	556.33	123.6	7.55	0.30	66.03	5.53
CTF-MW1	31-Mar-20	17.12	629.94	152.8	7.36	0.38	82.85	6.33
CYN-MW5	02-Apr-20	16.64	320.58	187.5	6.14	0.72	53.50	4.33
Greystone-MW2	27-Mar-20	14.64	1049.9	175.9	6.98	0.60	73.61	6.20
MRN-2	19-Mar-20	15.00	365.98	155.8	7.46	0.33	70.05	5.89
MRN-3D	20-Mar-20	18.93	452.13	91.2	7.52	1.25	58.78	4.55
NWTA3-MW3D	18-Mar-20	19.23	420.79	98.3	7.66	0.62	48.08	3.60
OBS-MW1	01-Apr-20	17.45	530.41	128.4	7.38	0.34	37.52	2.99
PL-2	12-Mar-20	18.81	437.78	154.5	7.74	0.31	68.46	5.28
PL-4	13-Mar-20	17.75	482.13	198.4	7.42	0.64	73.10	6.13
SFR-2S	25-Mar-20	17.20	1080.6	143.9	6.83	2.54	85.50	6.84
SFR-4T	26-Mar-20	17.30	4139.9	-24.3	7.83	0.59	4.99	0.40
SWTA3-MW2	11-Mar-20	19.04	447.57	159.6	7.61	0.41	47.00	3.90
SWTA3-MW3	16-Mar-20	20.41	468.91	108.3	7.74	1.00	48.90	3.85
SWTA3-MW4	17-Mar-20	18.25	473.76	89.5	7.79	0.30	50.26	4.19
TRE-1	23-Mar-20	17.70	1331.4	161.6	6.68	0.26	80.43	6.32

Refer to footnotes on page 2A-46.

Footnotes for Groundwater Monitoring Program Groundwater Surveillance Task Analytical Results Tables

%	= Percent.
$CaCO_3$	= Calcium carbonate.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
HMX	= Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	= Identifier.
µg/L	= Micrograms per liter.
mg/L	= Milligrams per liter.
mrem/yr	= Millirem per year.
No.	= Number.
pCi/L	= Picocuries per liter.
RDX	= Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Tetryl	= Methyl-2,4,6-trinitrophenylnitramine.

[a]Result or Activity

Result applies to Tables 2A-1 and 2A-3 through 2A-6. Activity applies to Table 2A-7.

Activity	= Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Part 141). Activities of zero or less are considered not detected.
Bold	= Value exceeds the established MCL or MAC.
ND	= Not detected (at method detection limit).

[b]MDL or MDA

The MDL applies to Tables 2A-1 through 2A-6. MDA applies to Table 2A-7.

MDA	= The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.
MDL	= Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix specific.
NA	= Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level

The PQL applies to Tables 2A-1 and 2A-3 through 2A-6. Critical Level applies to Table 2A-7.

Critical Level	= The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix specific.
NA	= Not applicable for gross alpha activities. The critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.
PQL	= Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.

[d]MCL or MAC

Regulatory limits: The MCL is listed first, followed by the MAC. A single value is listed when the MCL and MAC are equal (for example, nitrate plus nitrite). If no value exists, NE is used.

MAC = Maximum allowable concentration. MACs were established for groundwater for the contaminants specified in 20 NMAC 6.2, Sec 3103A, Human Health Standards, December 2018.

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards, (EPA March 2018).
The following are the MCLs for gross alpha particles, beta particles, and radium in community water systems:

- 15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table 1-4).
- 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).
- 5 pCi/L = combined radium-226 and radium-228.

NE = Not established.

Footnotes for Groundwater Monitoring Program Groundwater Surveillance Task Analytical Results Tables *(Continued)*

[e]Laboratory Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

B	=	The analyte was detected in the blank above the effective method detection limit (MDL).
H	=	Analytical holding time was exceeded.
J	=	Estimated value; the analyte concentration fell above the effective MDL and below the effective PQL.
N	=	Results associated with a spike analysis that was outside control limits.
NA	=	Not applicable.
U	=	Analyte is absent or below the method detection limit.
X	=	Data rejected due to peak not meeting identification criteria.
*	=	Recovery or relative percent difference (RPD) not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.

[f]Validation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

BD	=	Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J	=	The associated value is an estimated quantity.
J+	=	The associated numerical value is an estimated quantity with a suspected positive bias.
J-	=	The associated numerical value is an estimated quantity with a suspected negative bias.
NJ+	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
None	=	No data validation for corrected gross alpha activity.
U	=	The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable, and resampling or reanalysis are necessary for verification.

[g]Analytical Method

Standard Methods for the Examination of Water and Wastewater, 23rd ed., 2017, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1997, *EML [Environmental Measurements Laboratory] Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300.

EPA, 1986, (and updates), *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1984, *Methods for Chemical Analysis of Water and Wastes*" EPA 600-4-79-020, U.S. Environmental Protection Agency, Cincinnati, Ohio.

EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.

DOE	=	U.S. Department of Energy.
EPA	=	U.S. Environmental Protection Agency.
HASL	=	Health and Safety Laboratory.
SW	=	Solid Waste.

Footnotes for Groundwater Monitoring Program Groundwater Surveillance Task Analytical Results Tables *(Concluded)*

[h]**Field Water Quality Measurements**

Field measurements were collected prior to sampling.

°C	=	Degrees Celsius.
% Sat	=	Percent saturation.
μmho/cm	=	Micromhos per centimeter.
mg/L	=	Milligrams per liter.
mV	=	Millivolts.
NTU	=	Nephelometric turbidity units.
pH	=	Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 2B
Groundwater Monitoring Program
Hydrographs and Charts

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Attachment 2B Hydrographs and Charts

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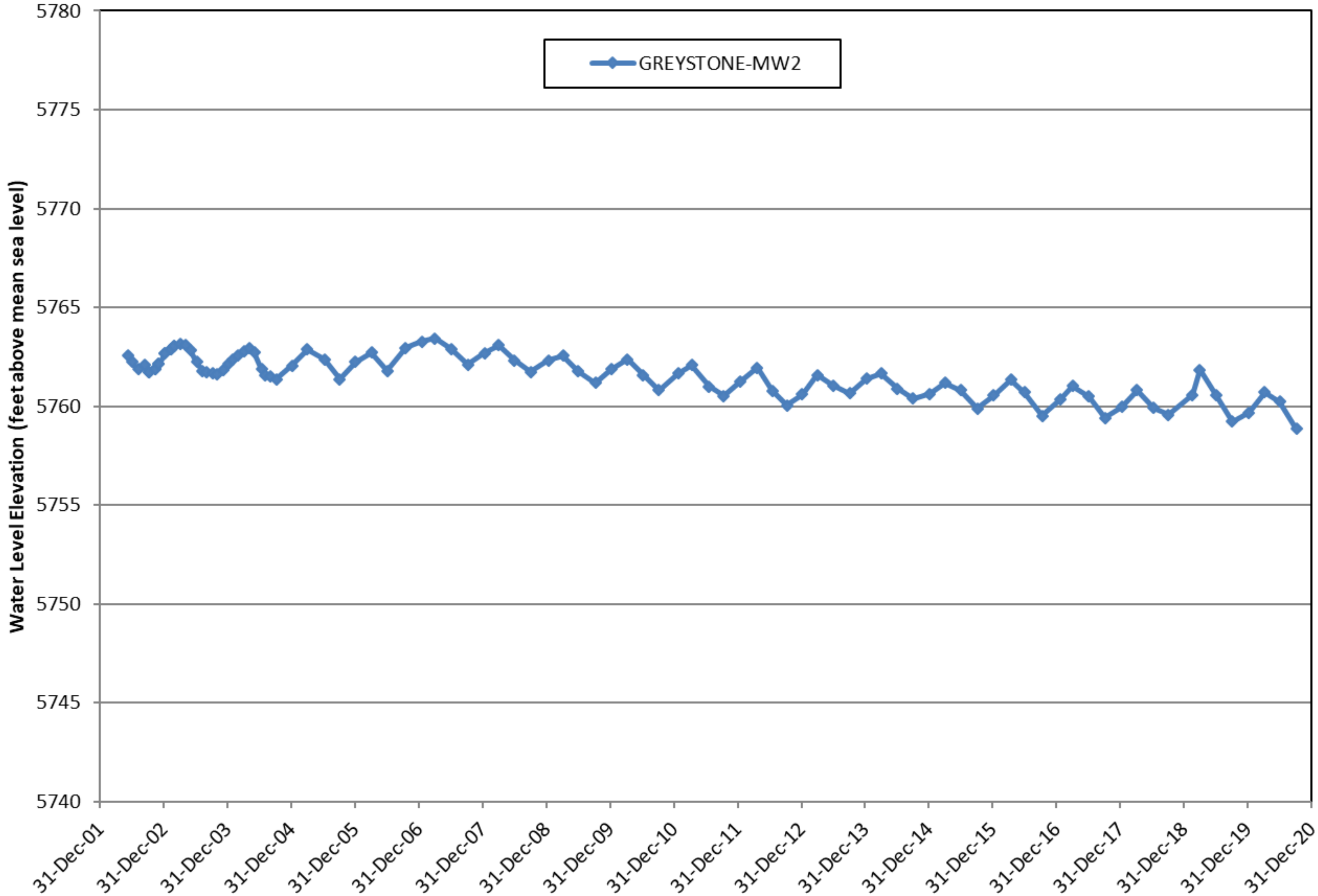

Figure 2B-1. Groundwater Monitoring Program Study Wells (1 of 10)

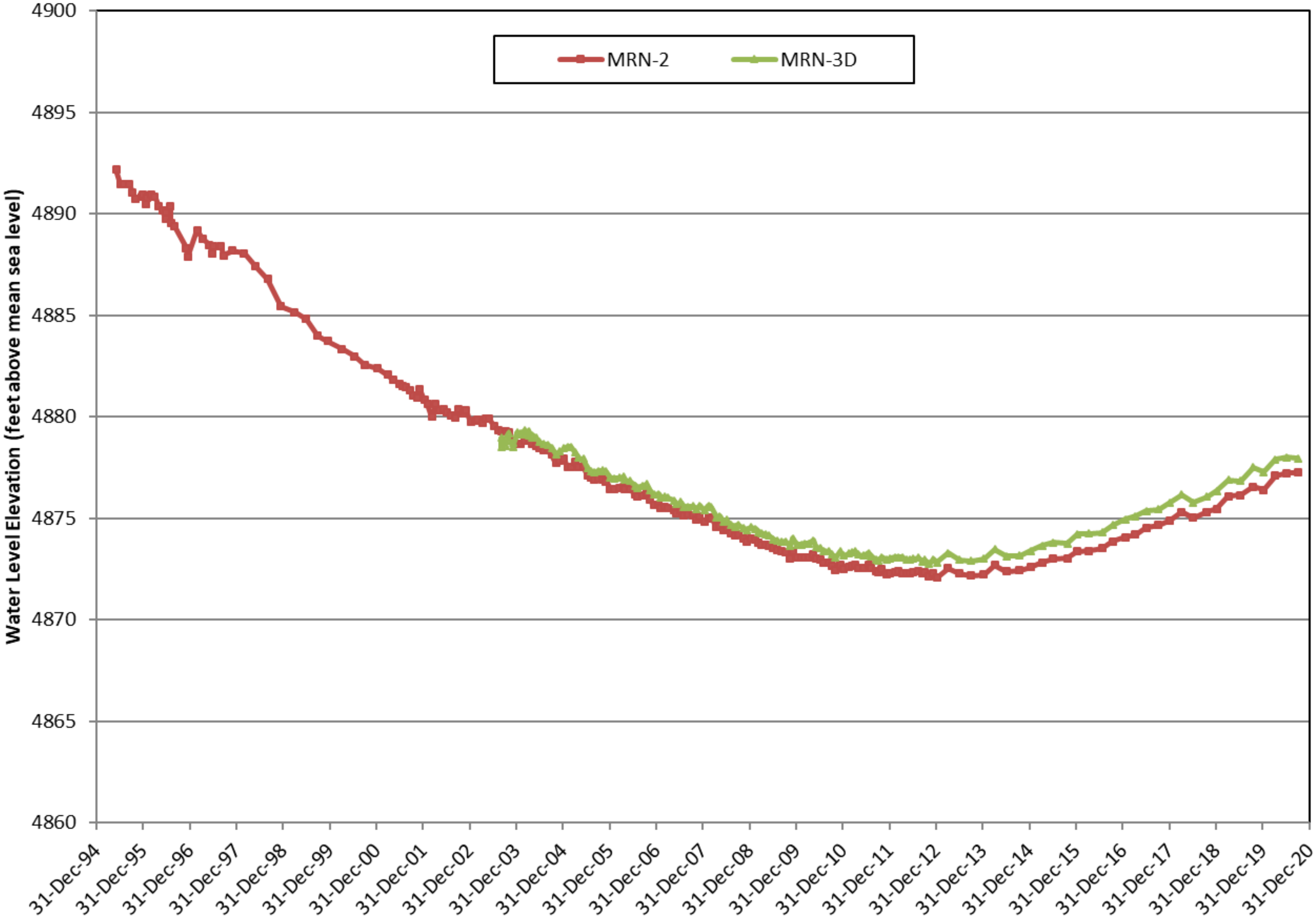

Figure 2B-2. Groundwater Monitoring Program Study Wells (2 of 10)

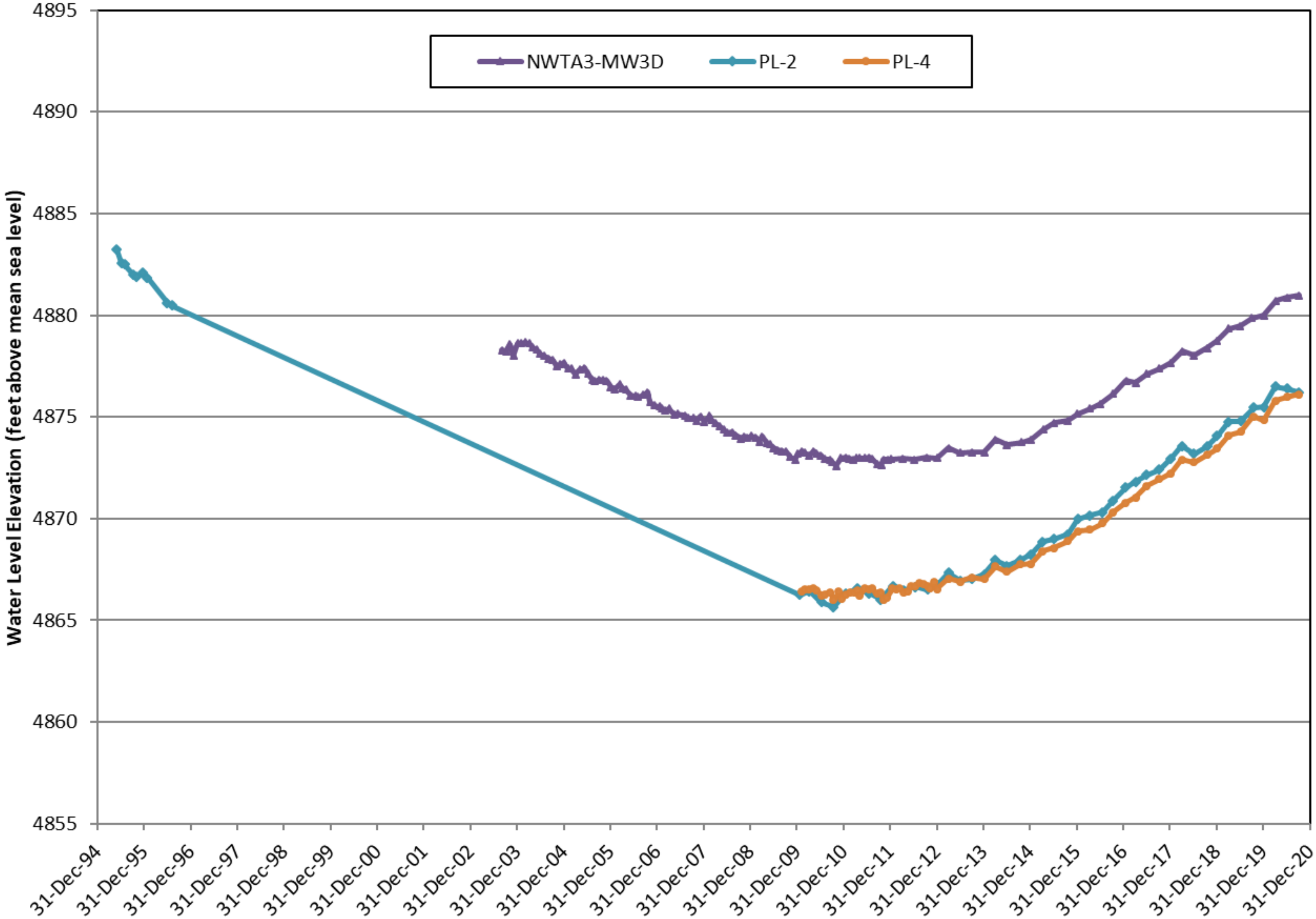

Figure 2B-3. Groundwater Monitoring Program Study Wells (3 of 10)

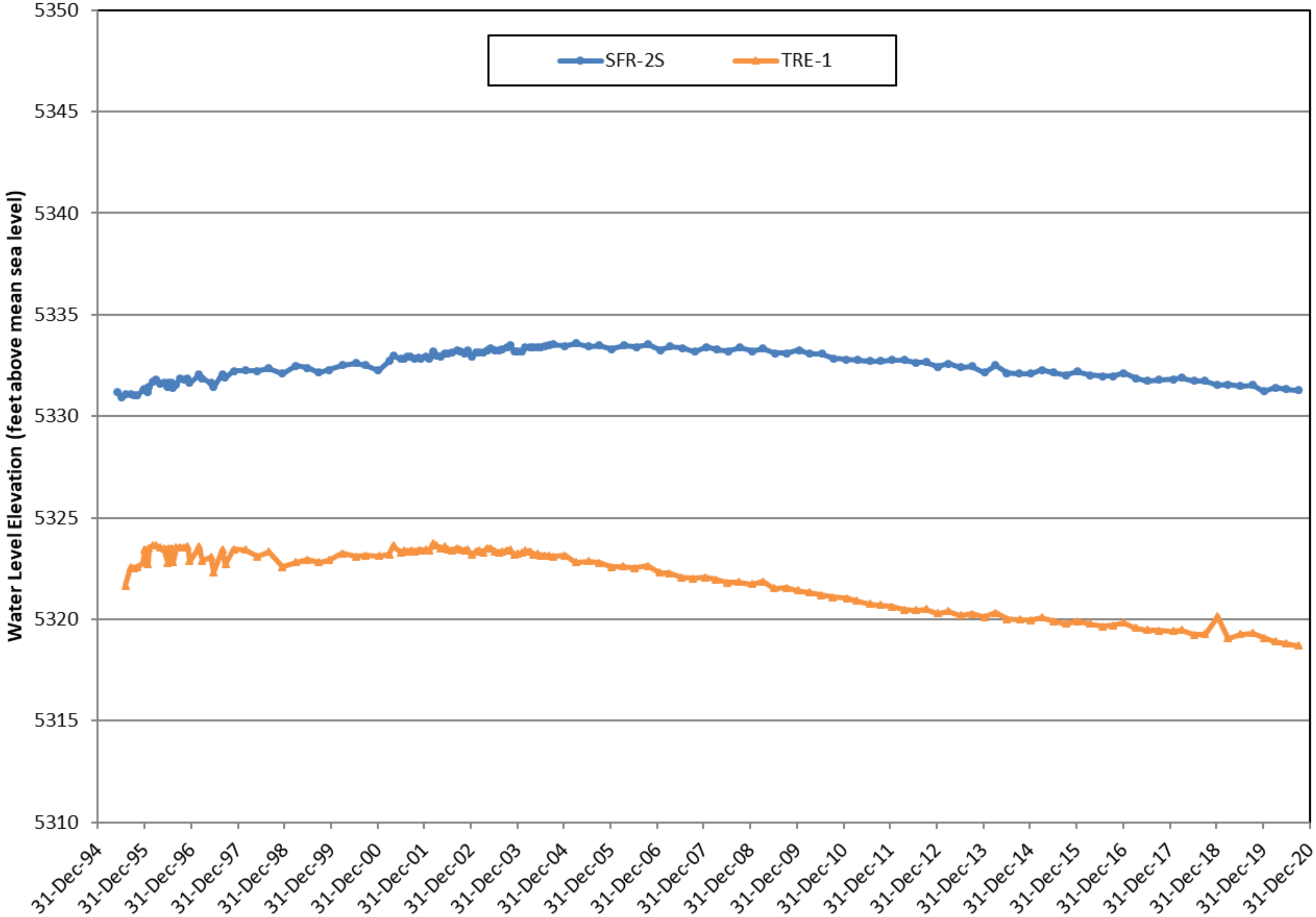

Figure 2B-4. Groundwater Monitoring Program Study Wells (4 of 10)

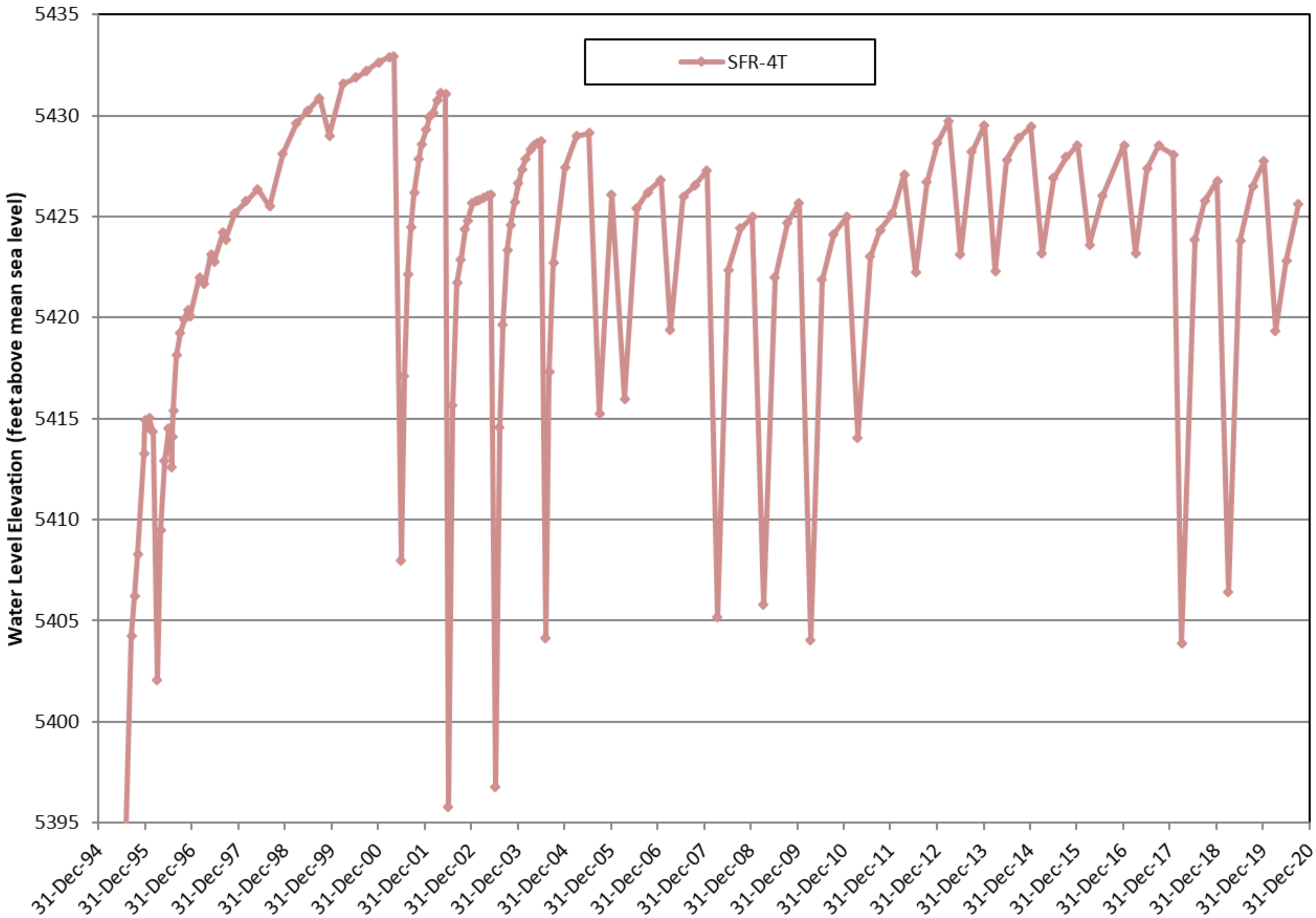

Figure 2B-5. Groundwater Monitoring Program Study Wells (5 of 10)

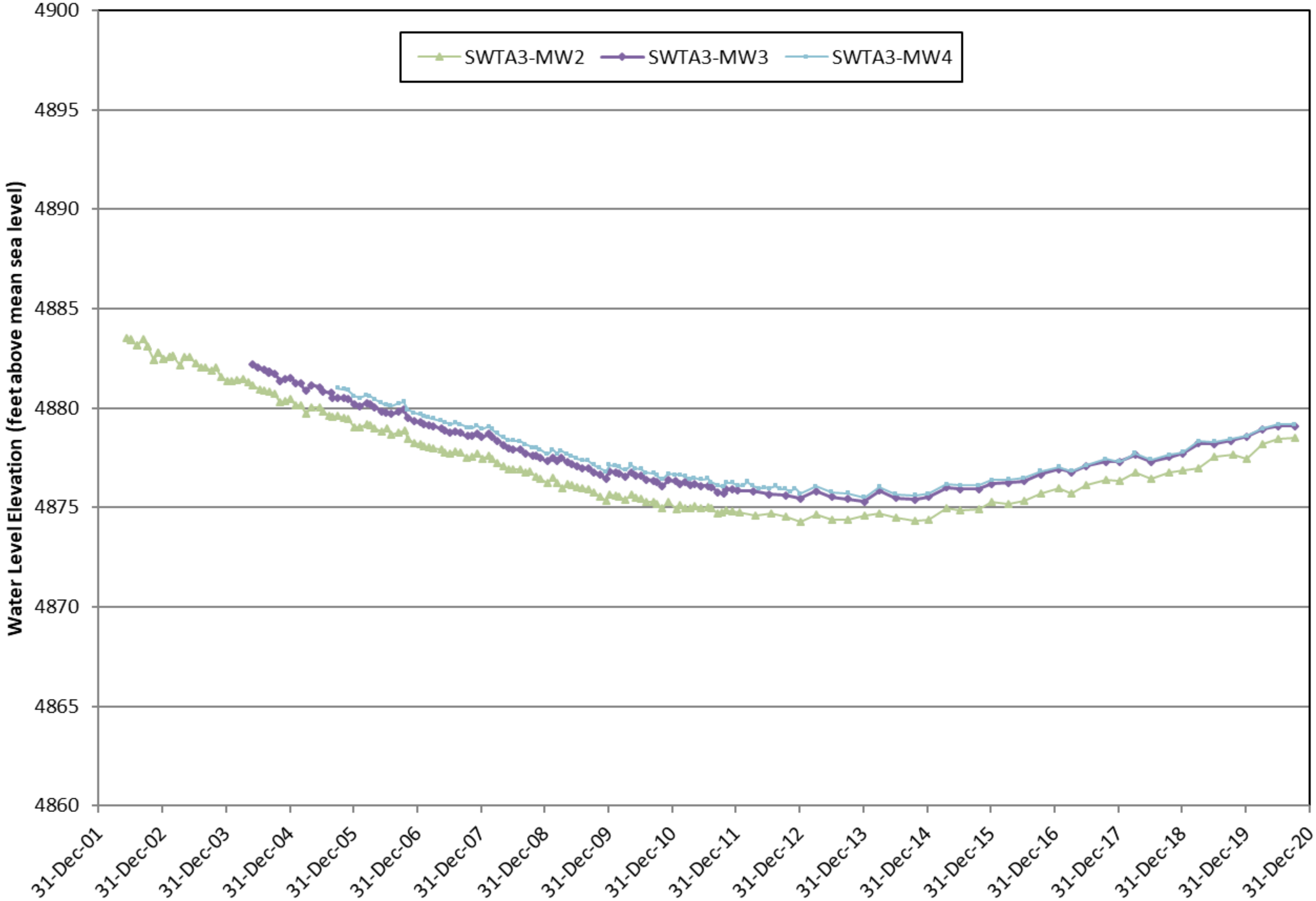

Figure 2B-6. Groundwater Monitoring Program Study Wells (6 of 10)

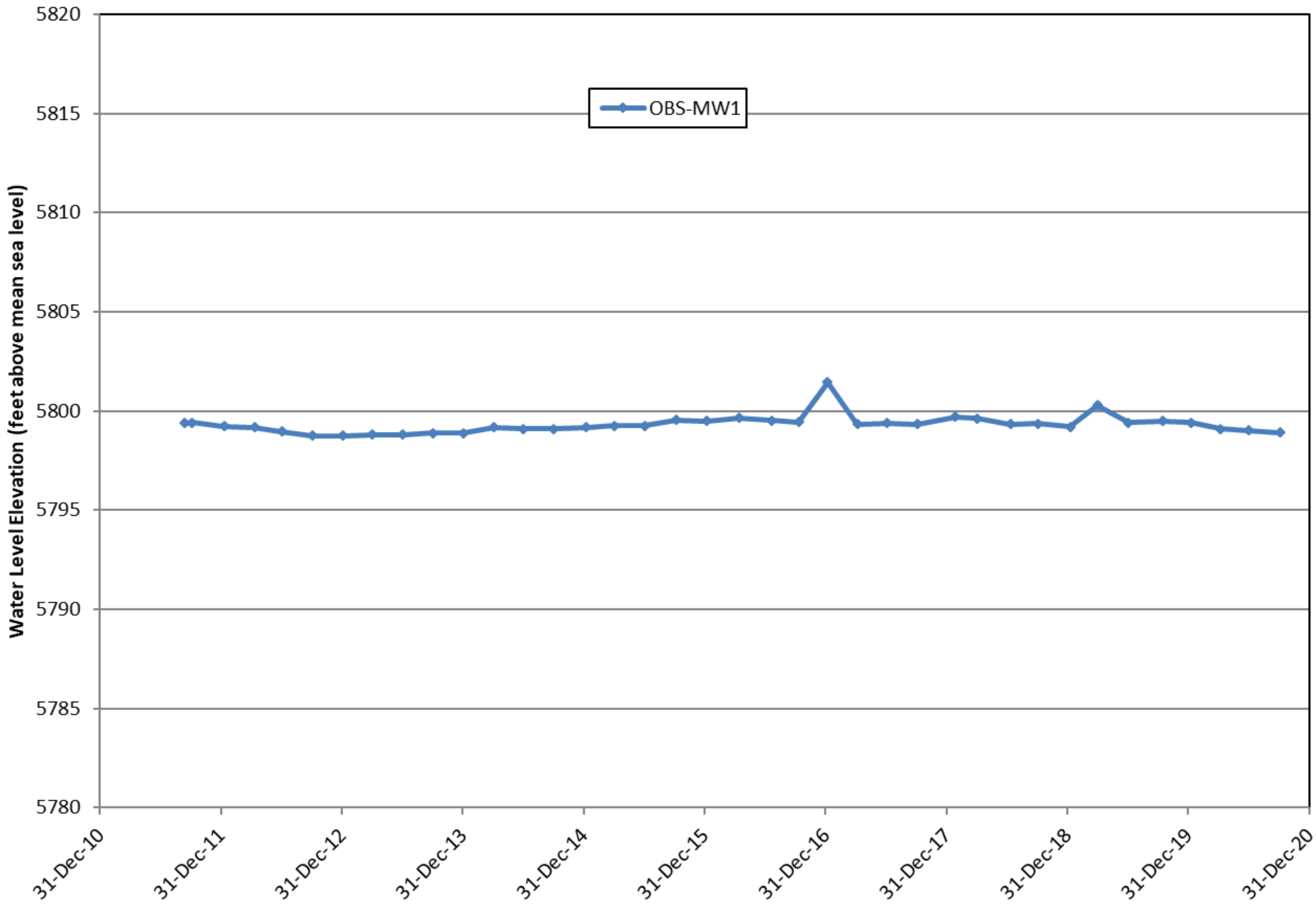

Figure 2B-7. Groundwater Monitoring Program Study Wells (7 of 10)

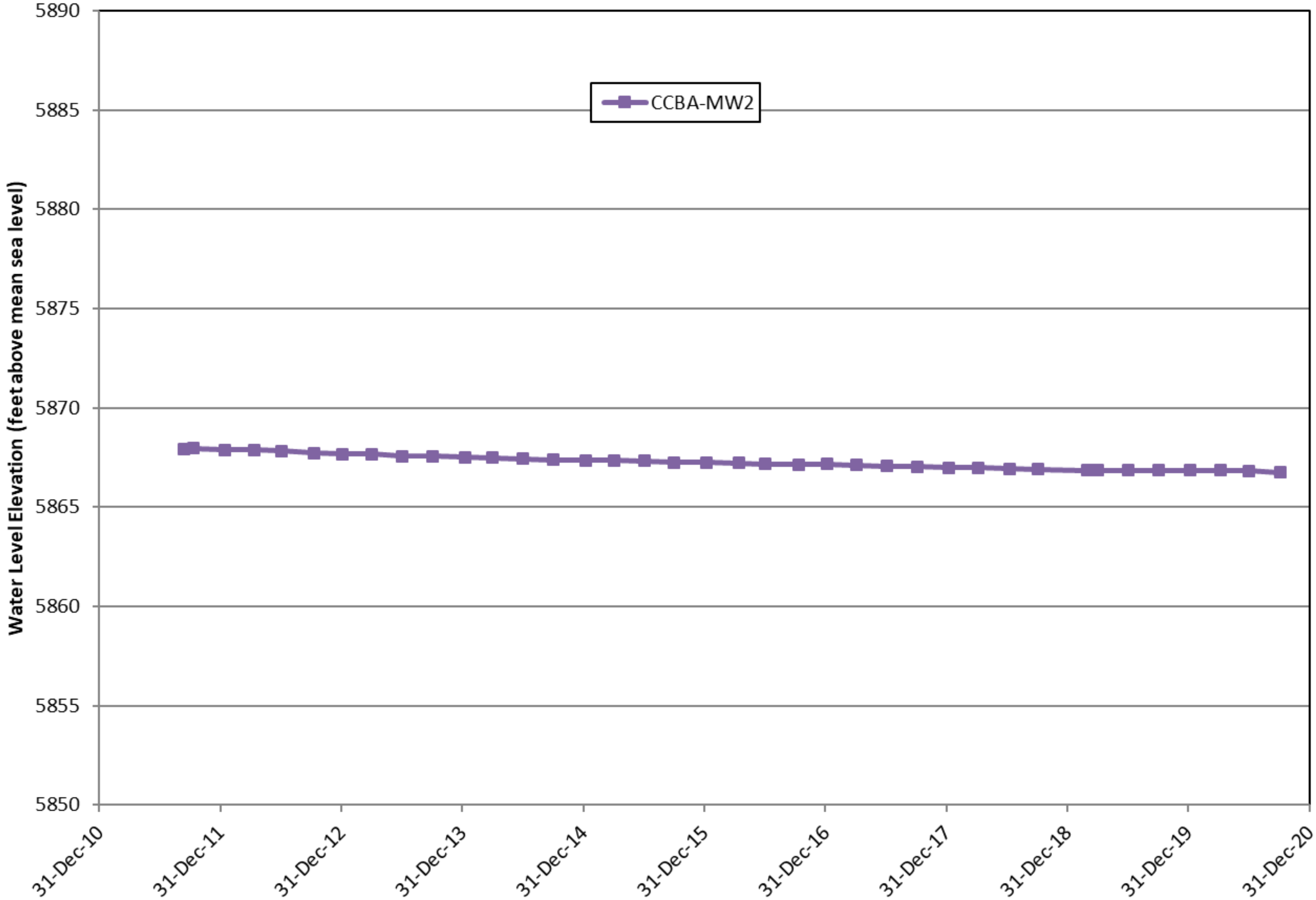

Figure 2B-8. Groundwater Monitoring Program Study Wells (8 of 10)

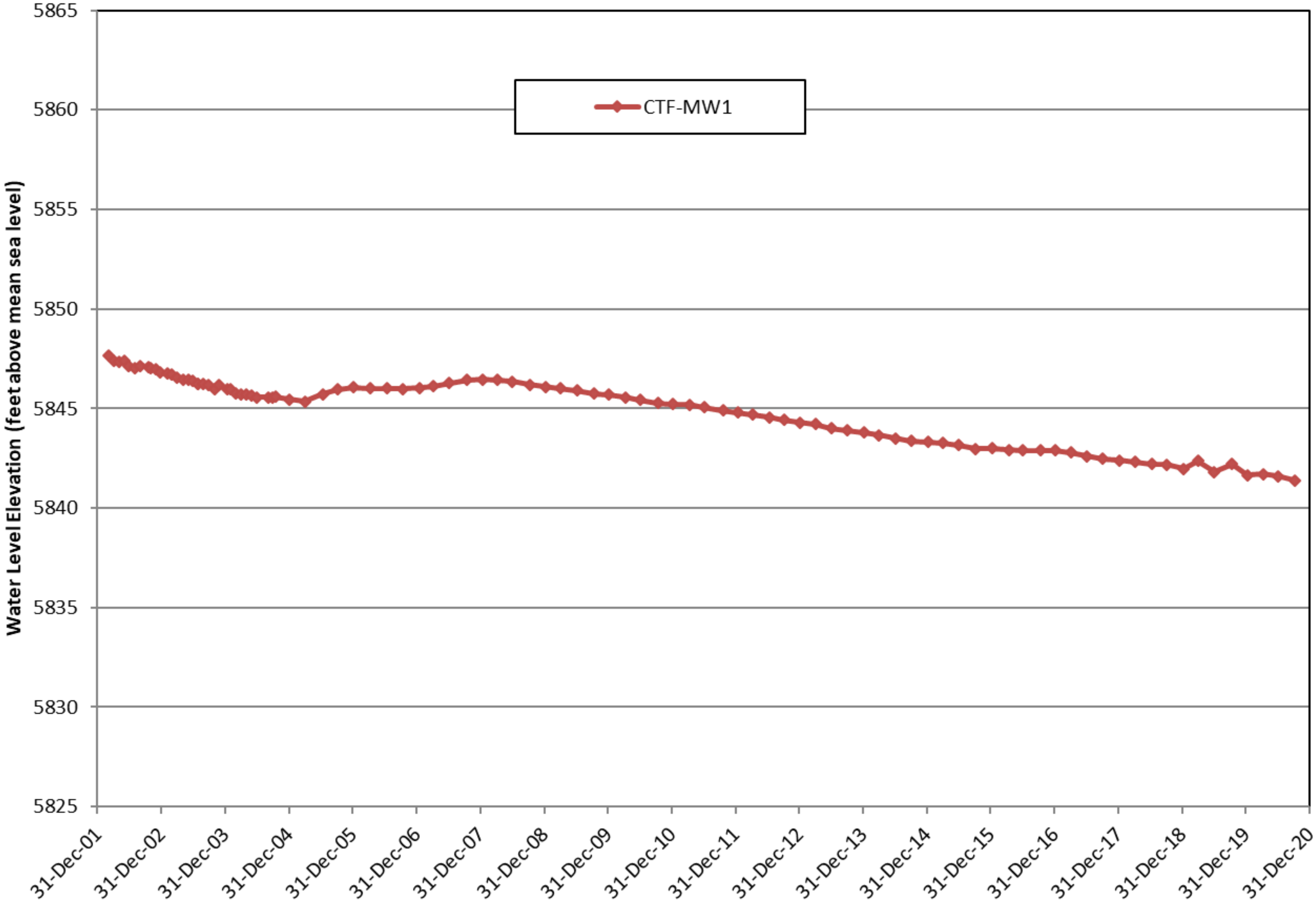

Figure 2B-9. Groundwater Monitoring Program Study Wells (9 of 10)

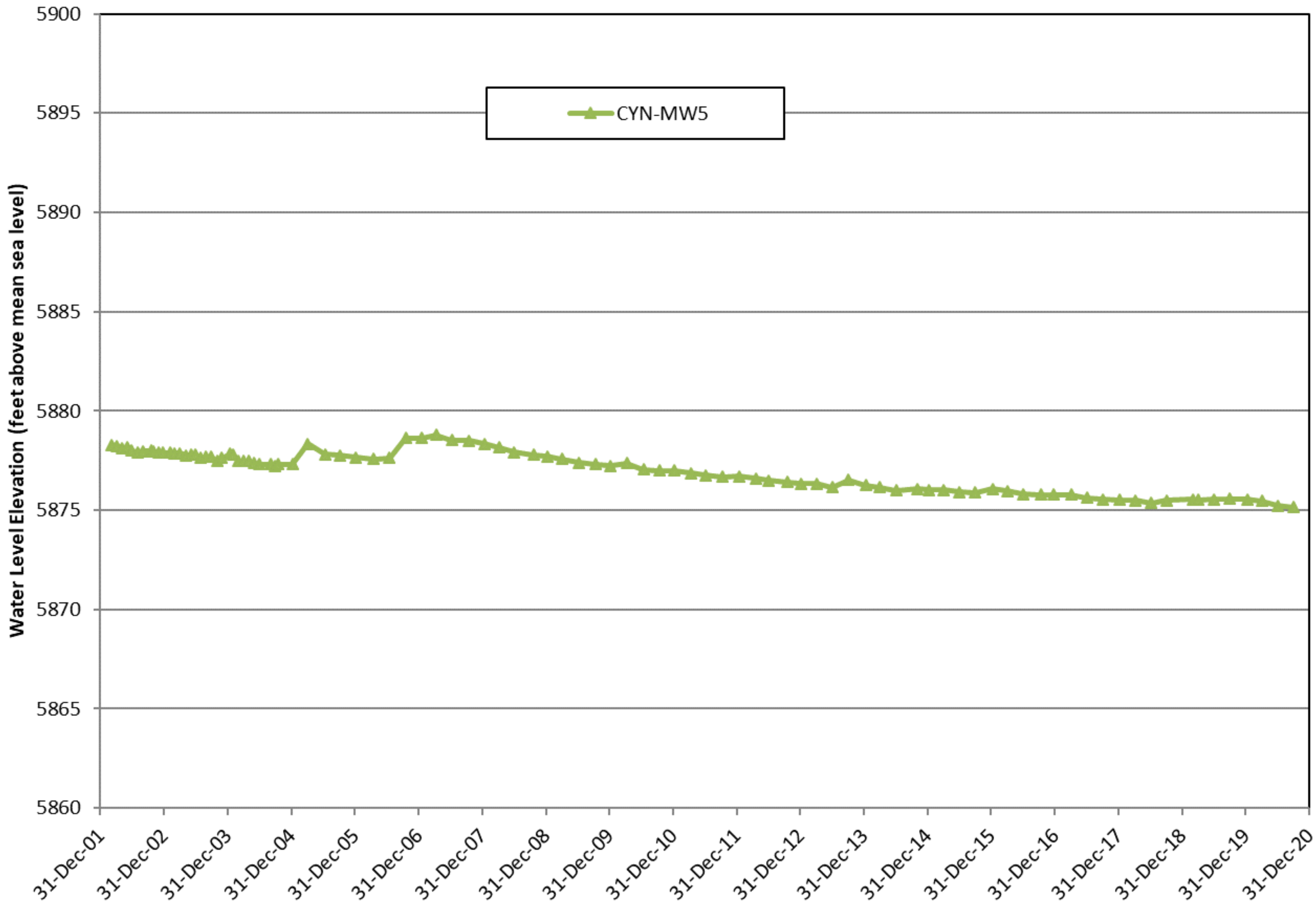

Figure 2B-10. Groundwater Monitoring Program Study Wells (10 of 10)

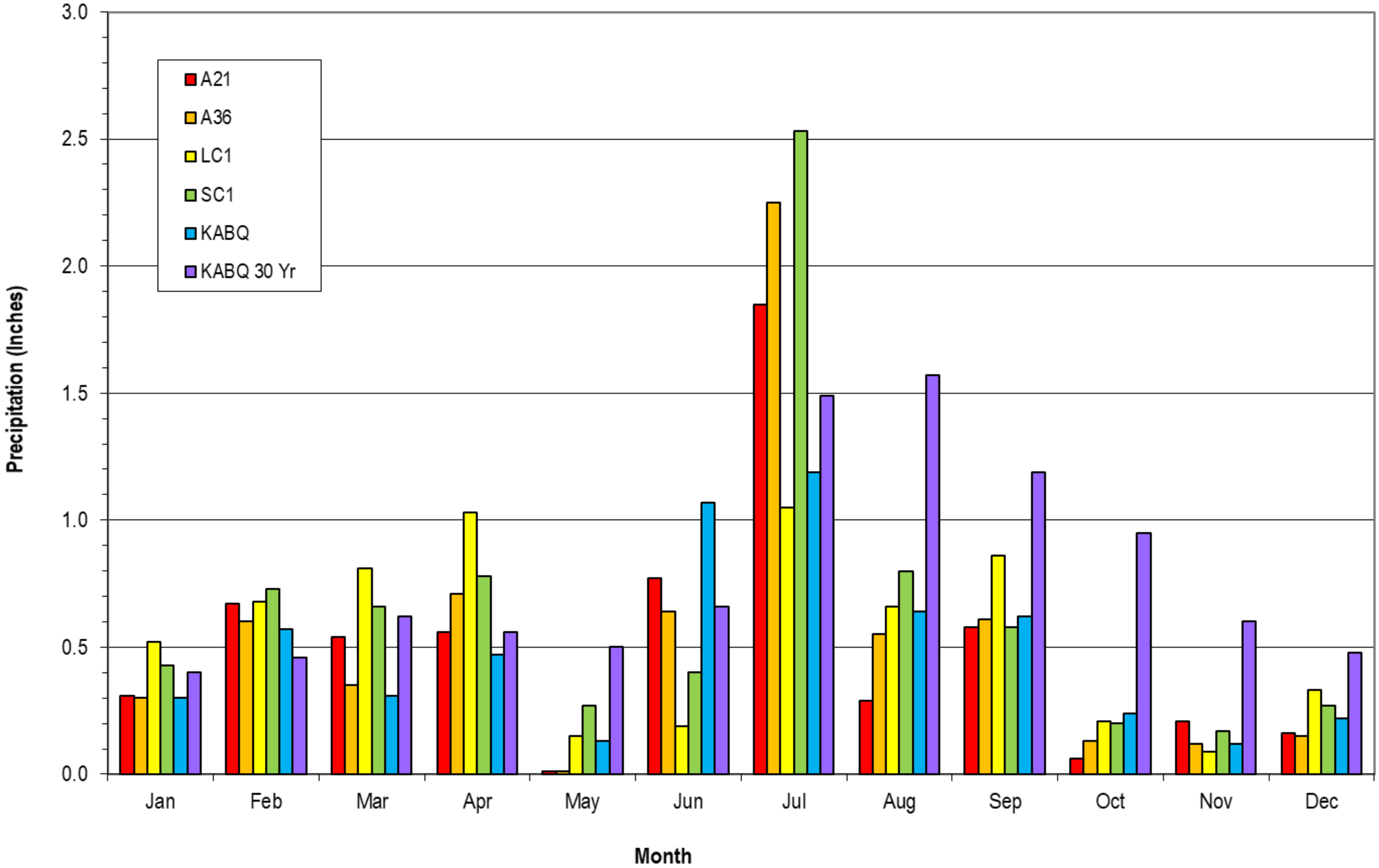

Figure 2B-11. Precipitation Data for Sandia National Laboratories, New Mexico, Calendar Year 2020

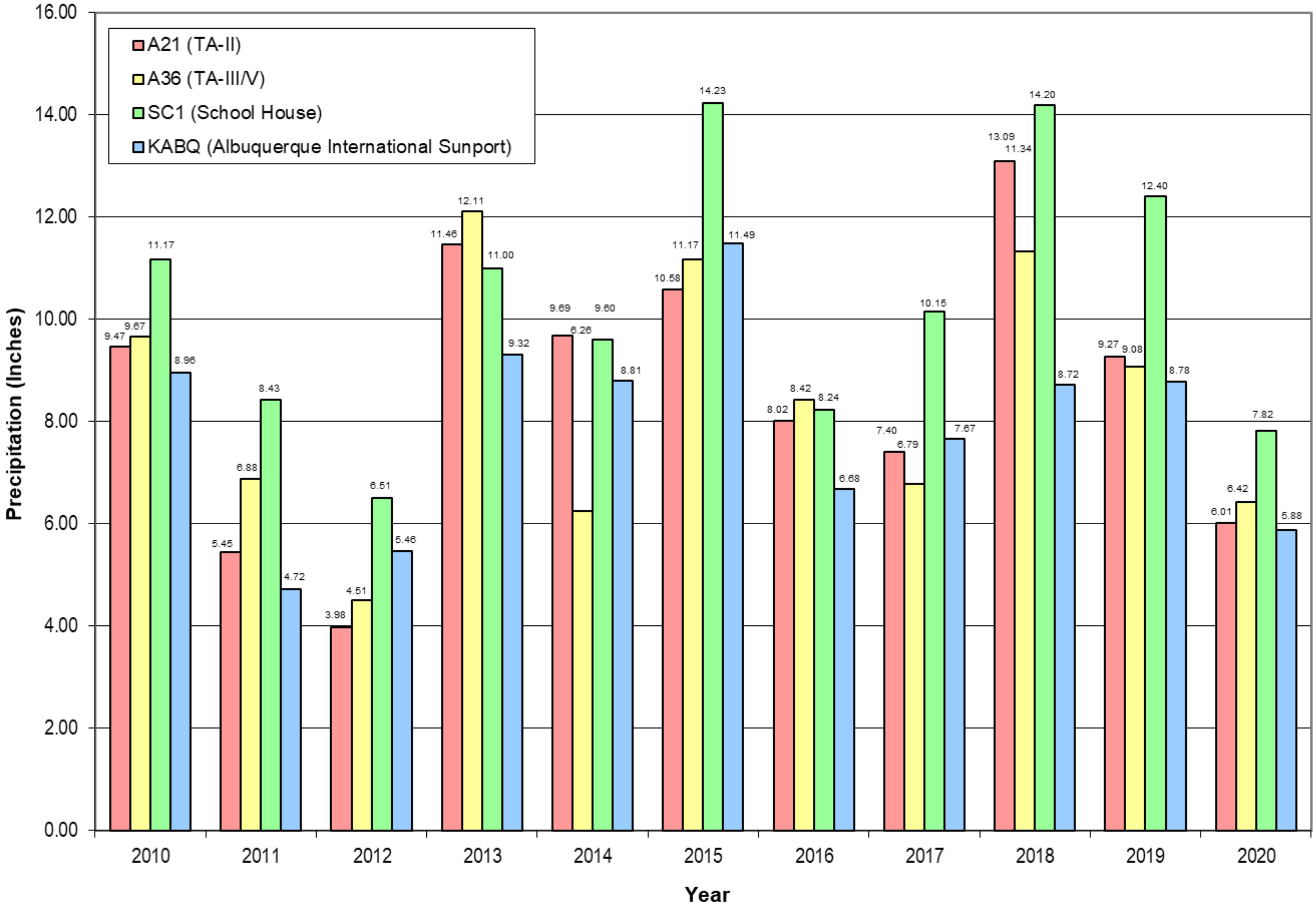

Figure 2B-12. Annual Precipitation Data for Sandia National Laboratories, New Mexico, January 2010 to December 2020

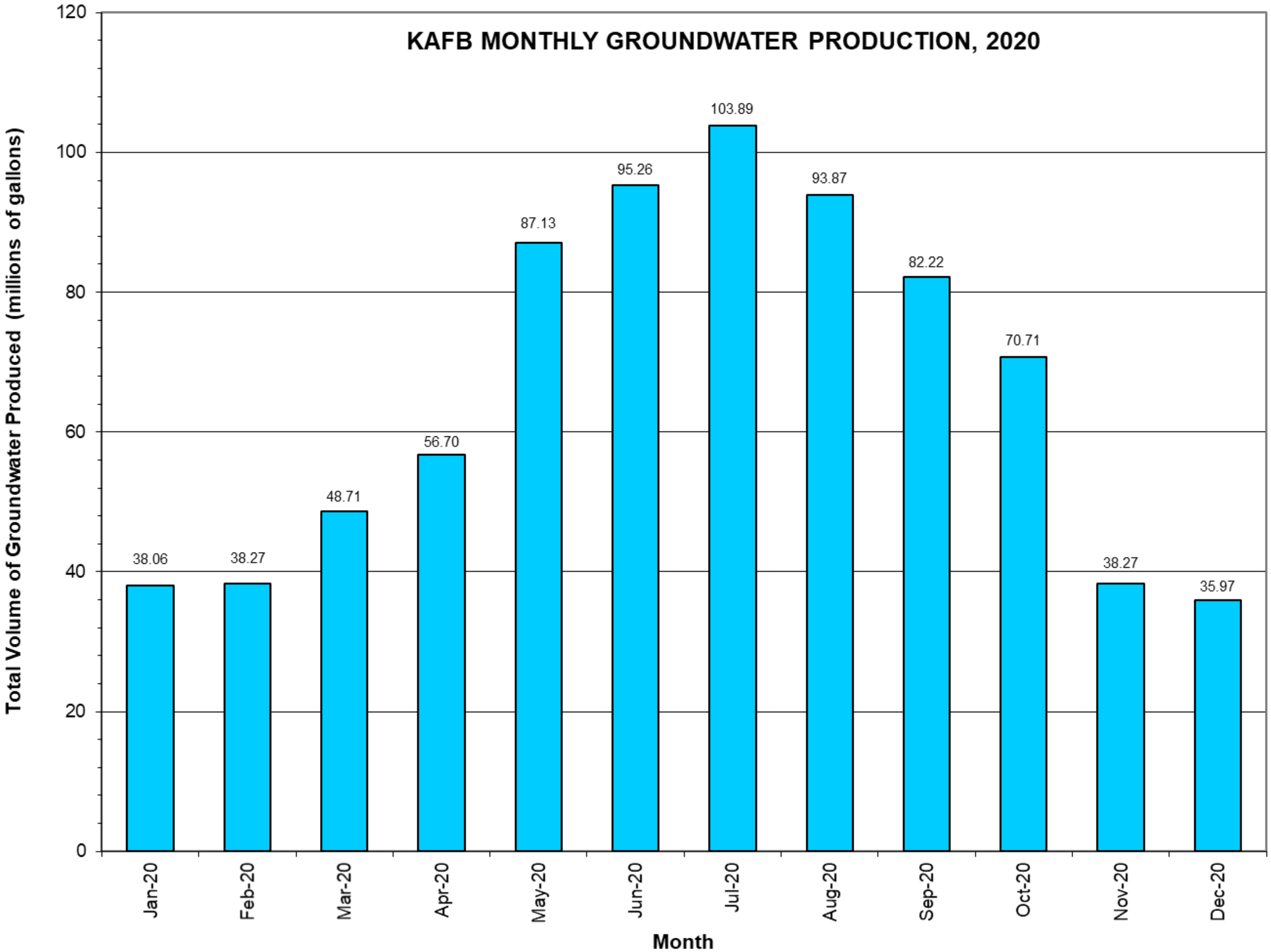

Figure 2B-13. Monthly Groundwater Pumped by Kirtland Air Force Base Production Wells, Calendar Year 2020

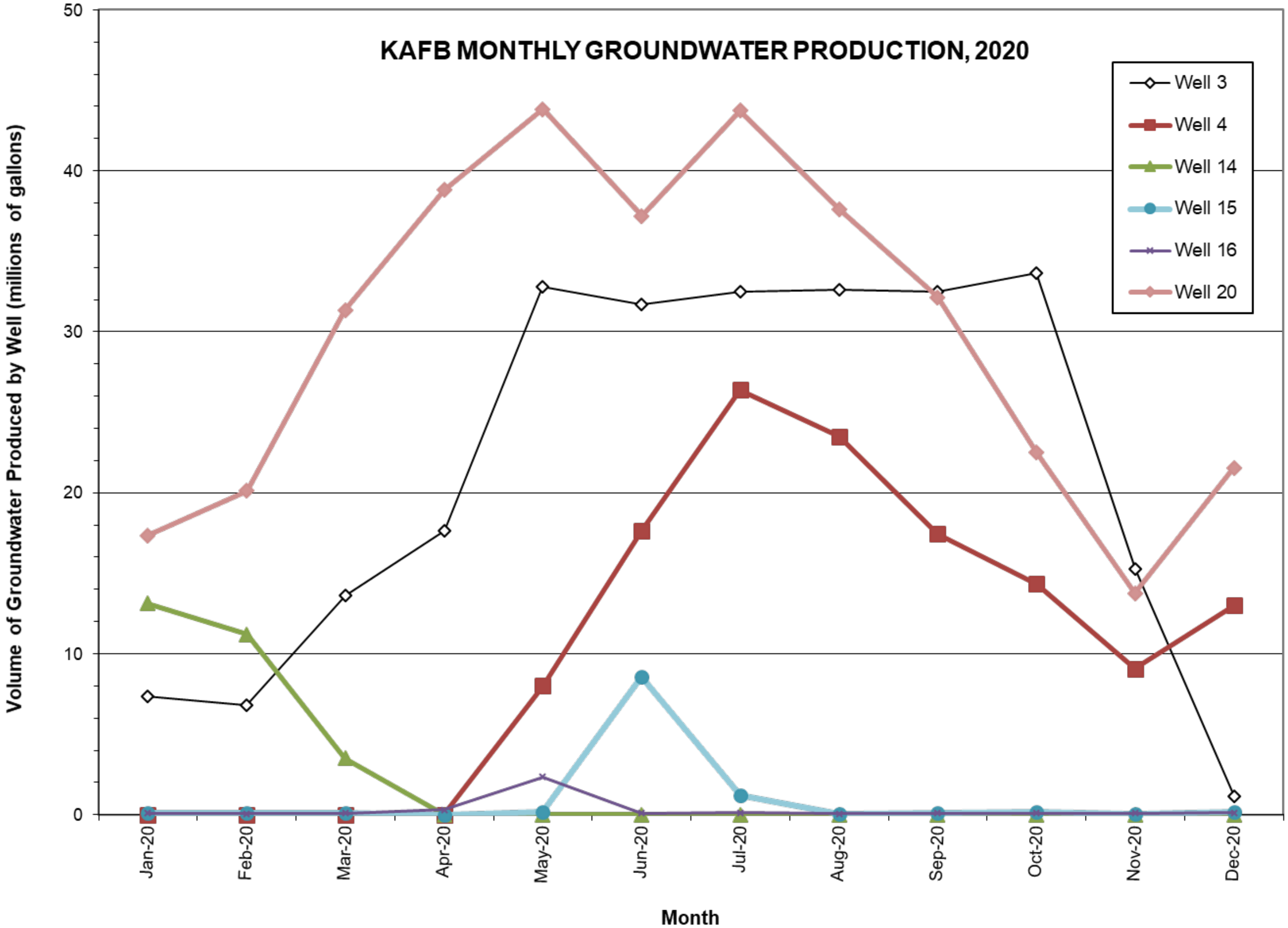

Figure 2B-14. Groundwater Pumped by Kirtland Air Force Base Production Wells, Calendar Year 2020

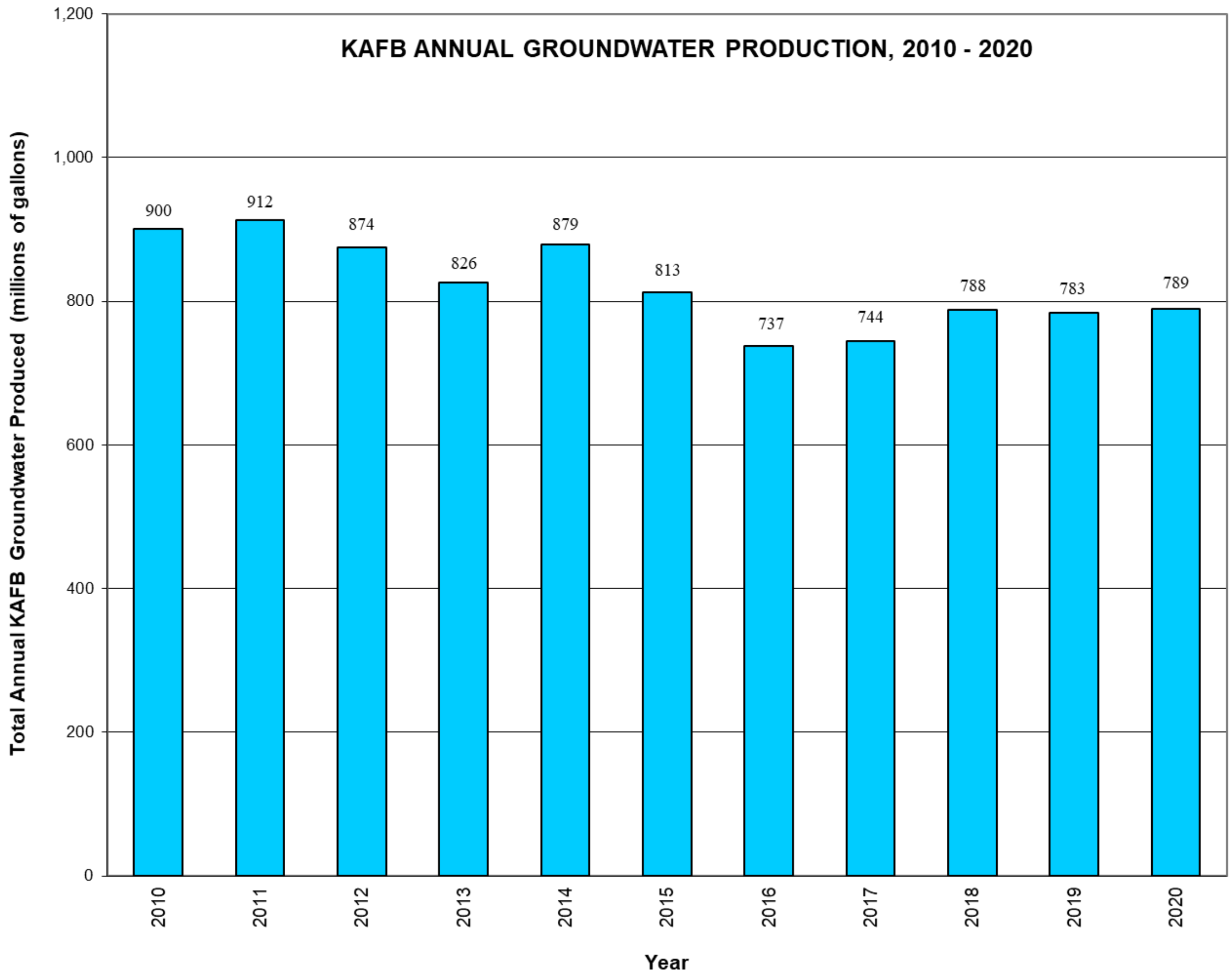

Figure 2B-15. Annual Groundwater Pumped by Kirtland Air Force Base Production Wells, 2010 to 2020

Attachment 2C
Groundwater Monitoring Program
Plots

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Attachment 2C Plots

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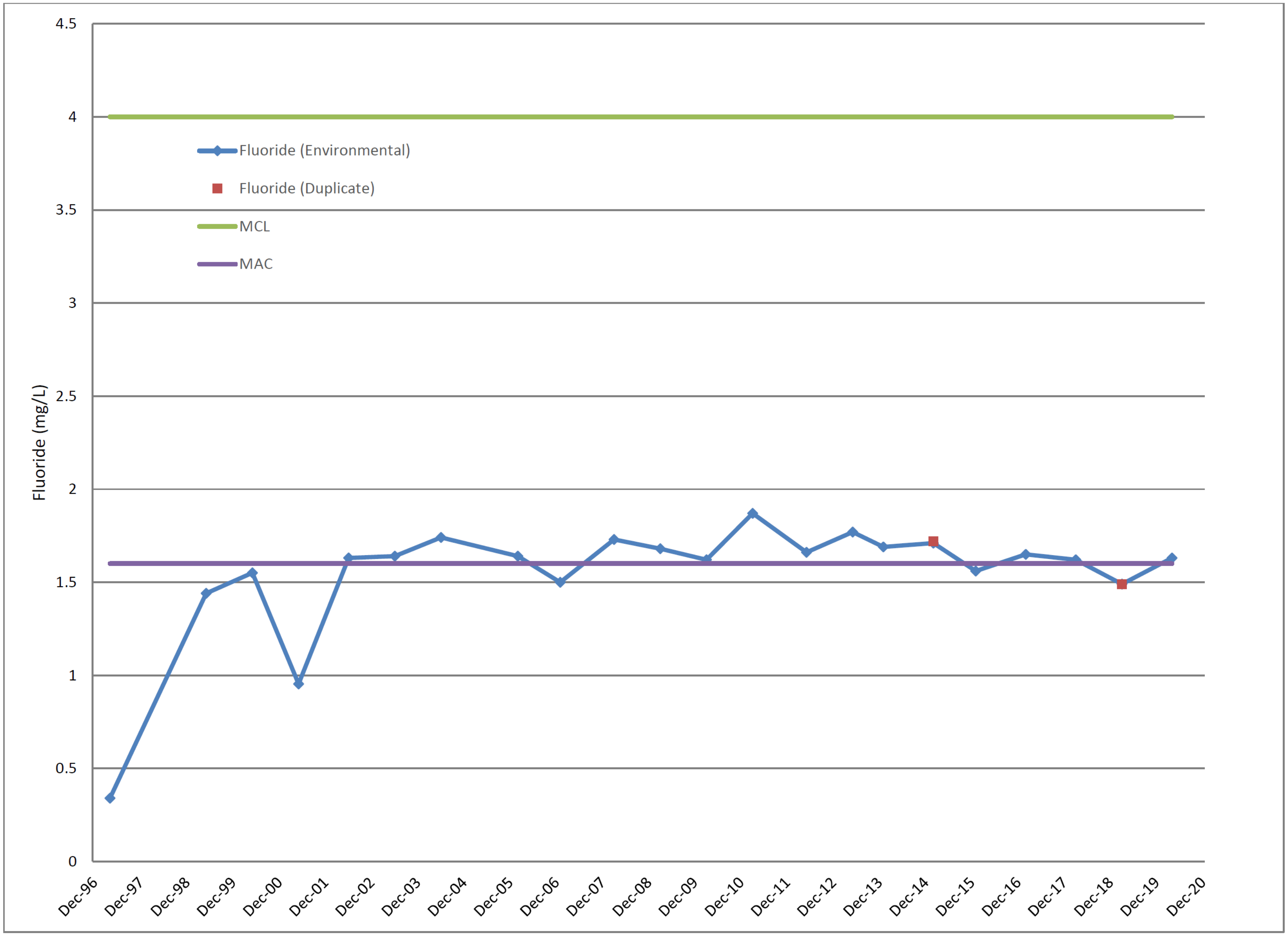

Figure 2C-1. Fluoride Concentrations, Coyote Springs

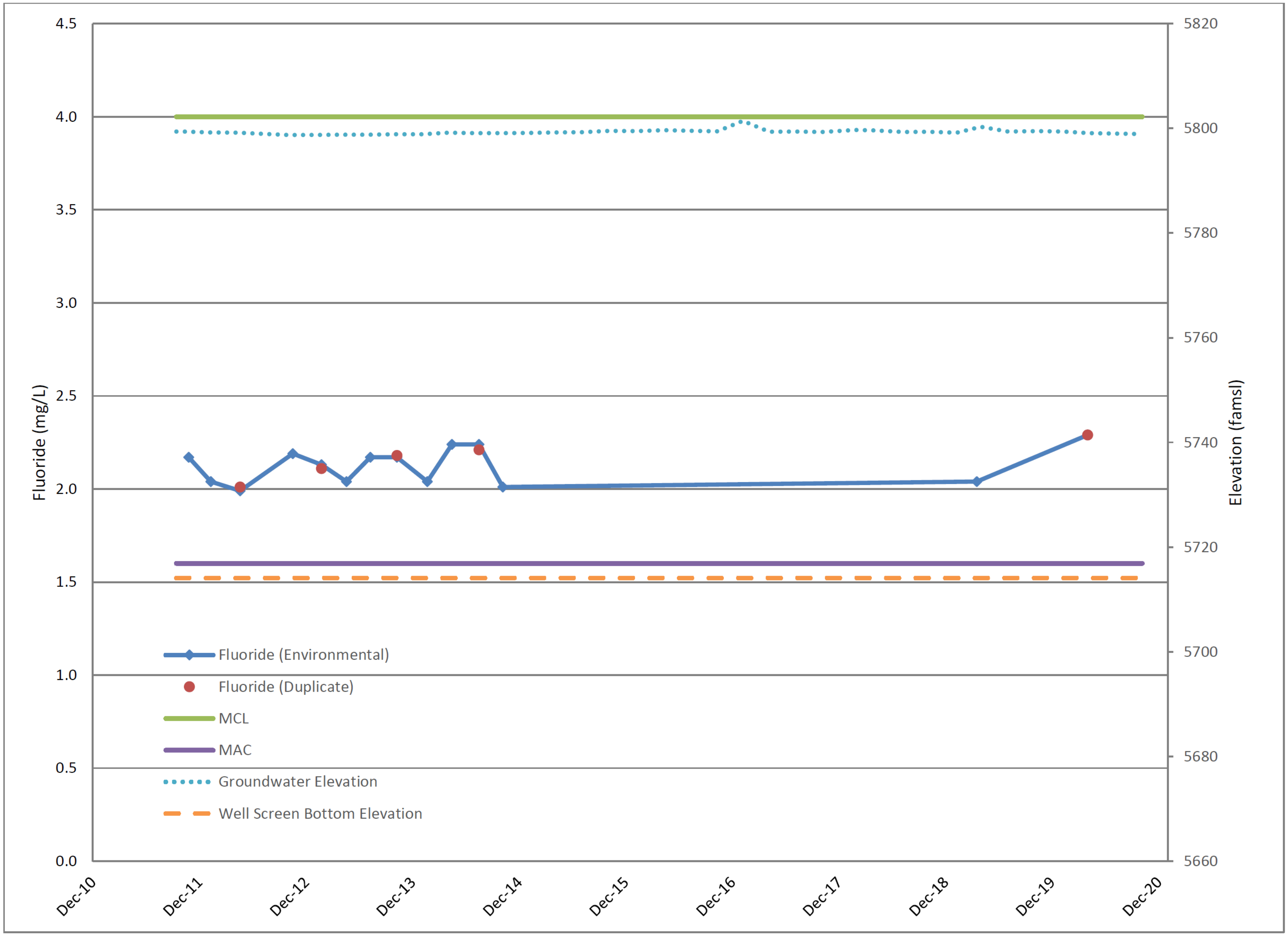

Figure 2C-2. Fluoride Concentrations, OBS-MW1

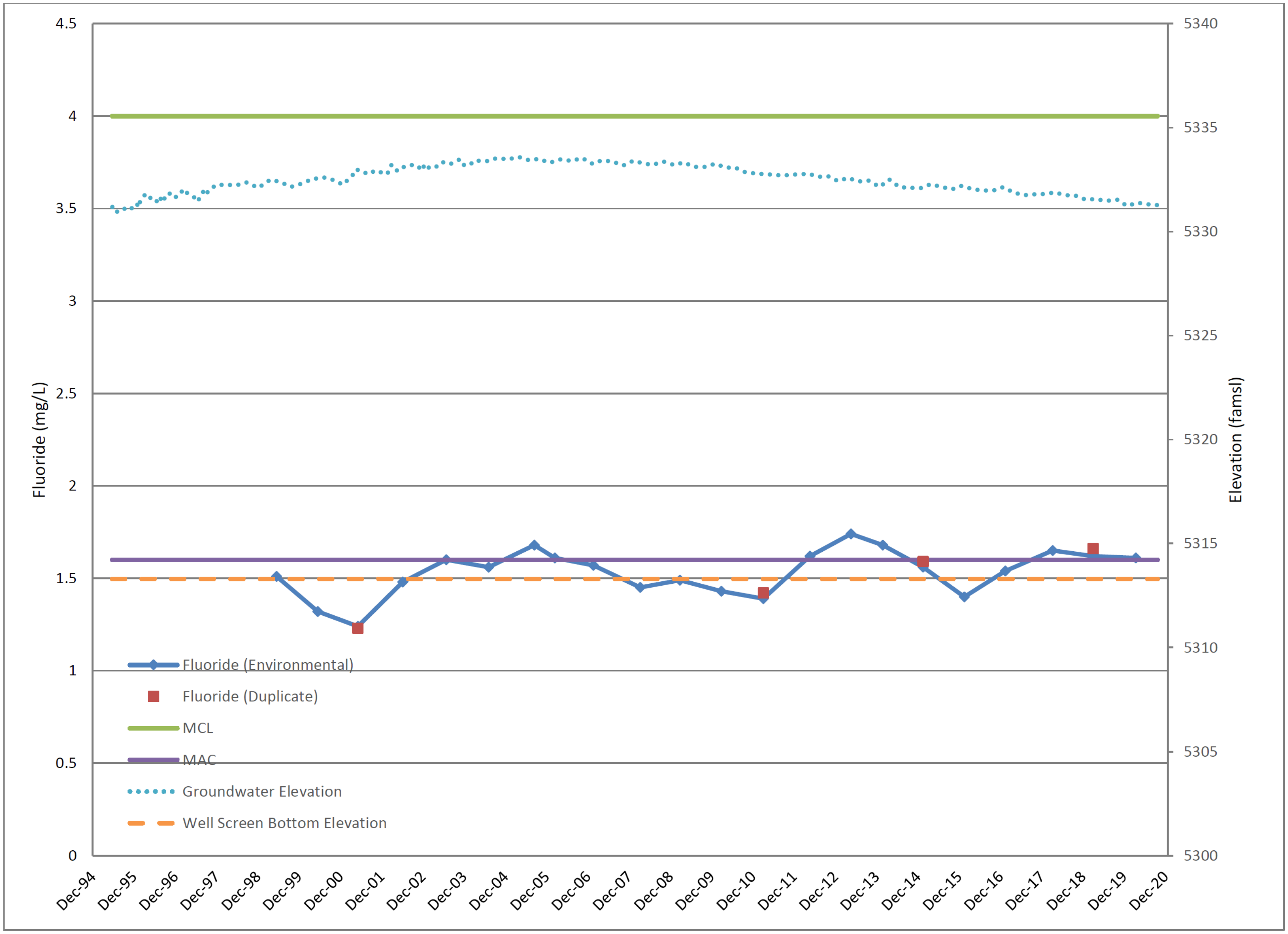

Figure 2C-3. Fluoride Concentrations, SFR-2S

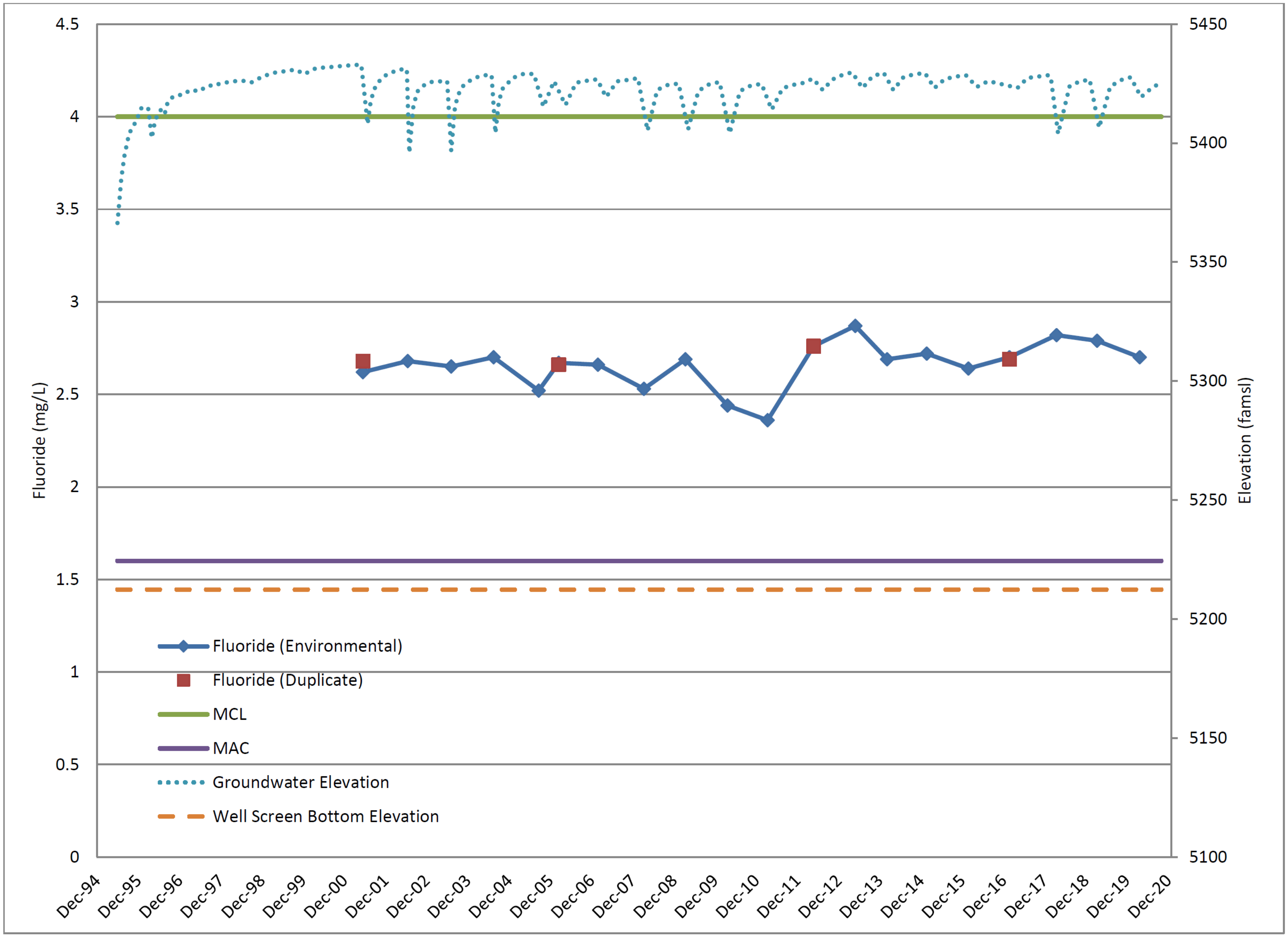

Figure 2C-4. Fluoride Concentrations, SFR-4T

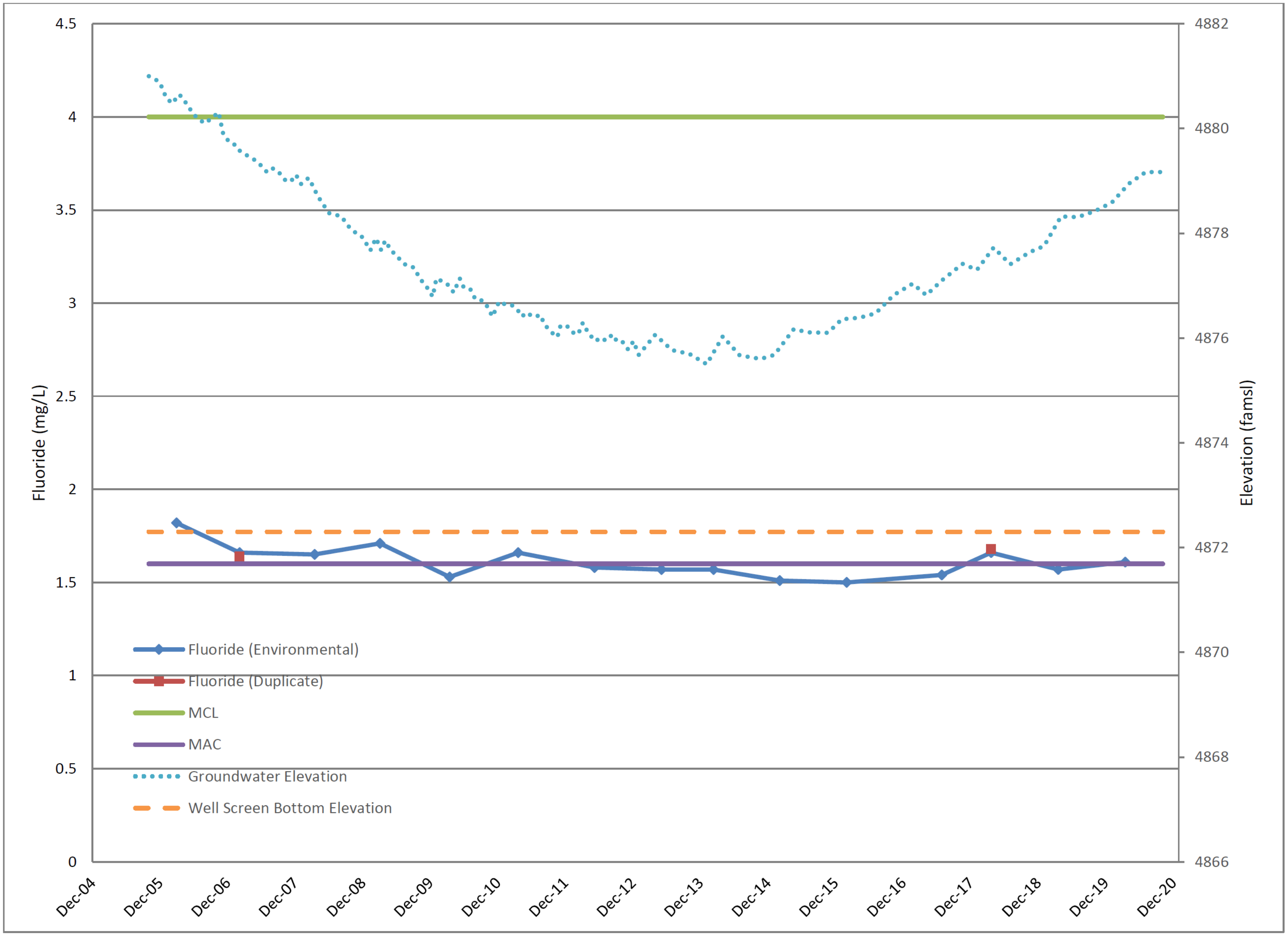

Figure 2C-5. Fluoride Concentrations, SWTA3-MW4

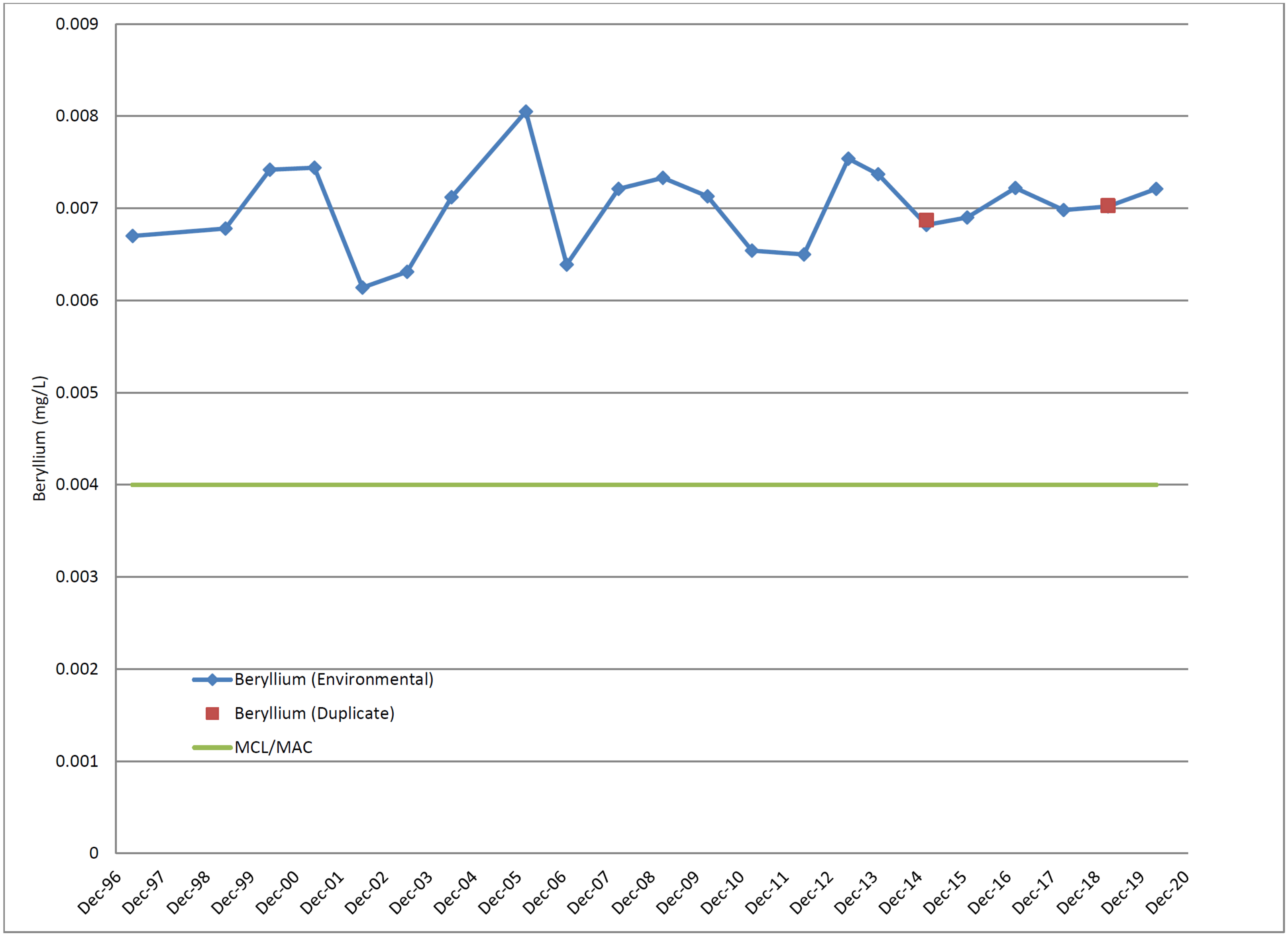

Figure 2C-6. Beryllium Concentrations, Coyote Springs

Chapter 2
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3.0 Chemical Waste Landfill

3.1 Introduction

The Chemical Waste Landfill (CWL) is a 1.9-acre former disposal site located in the southeastern corner of Technical Area (TA)-III at Sandia National Laboratories, New Mexico (SNL/NM) (Figure 3-1). From 1962 until 1981, the CWL was used for the disposal of chemical, radioactive, and solid waste generated by SNL/NM research activities. From 1982 through 1985, only solid waste was disposed of at the CWL. Additionally, the CWL was used as an above ground, hazardous waste drum storage facility from 1981 to 1989.

In 1990, trichloroethene (TCE) was identified in groundwater at a concentration exceeding the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 5 micrograms per liter (µg/L). This finding led to the development and incorporation of a corrective action program into the *Chemical Waste Landfill Final Closure Plan and Postclosure Permit Application,* hereafter referred to as the *Final Closure Plan* (SNL December 1992). The SNL/NM Environmental Restoration Project implemented two voluntary corrective measures (VCMs); the Vapor Extraction and the Landfill Excavation VCMs. As part of the Vapor Extraction VCM conducted from 1996 through 1998, the volatile organic compound (VOC) soil-gas plume was reduced and controlled, further degradation of groundwater beneath the CWL was prevented, and TCE concentrations in groundwater were reduced to levels below the MCL. As part of the Landfill Excavation VCM, the CWL was excavated from September 1998 through February 2002. The removal of all former disposal areas was confirmed by geophysical surveys and the results of final verification soil samples demonstrated that end-state conditions met industrial risk-based standards approved by the New Mexico Environment Department (NMED). More than 52,000 cubic yards of contaminated soil and debris were removed from this former disposal area (SNL April 2003).

In April 2004 after completion of backfilling activities, the U.S. Department of Energy/National Nuclear Security Administration and SNL/NM personnel requested approval to install an at-grade vegetative soil cover as an interim measure (Wagner April 2004) while NMED comments on the May 2003 CWL Corrective Measures Study (CMS) Report (SNL December 2004) were being resolved. In September 2004, the NMED approved this request (Kieling September 2004) and construction of the at-grade evapotranspirative (ET) cover (i.e., vegetative soil cover) was completed in September 2005.

In May 2007, the NMED issued a Notice of Public Comment Period (Kieling May 2007) for three documents: the CWL CMS Report, the Post-Closure Care Permit (PCCP) (NMED May 2007), and the Closure Plan Amendment (SNL February 2006). In 2009, the NMED issued the final CWL PCCP (NMED October 2009a), approved the CWL CMS Report, and approved the Closure Plan Amendment (NMED October 2009b).

In 2010, monitoring wells CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, CWL-MW6U, and CWL-BW4A were decommissioned, and new monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11 were installed. The new monitoring wells became the groundwater monitoring network for the CWL in accordance with the approved Closure Plan Amendment. The *Chemical Waste Landfill Final Resource Conservation and Recovery Act Closure Report* (SNL September 2010) documenting closure in accordance with all CWL Closure Plan requirements was submitted to the NMED after completion of well installation and decommissioning activities.

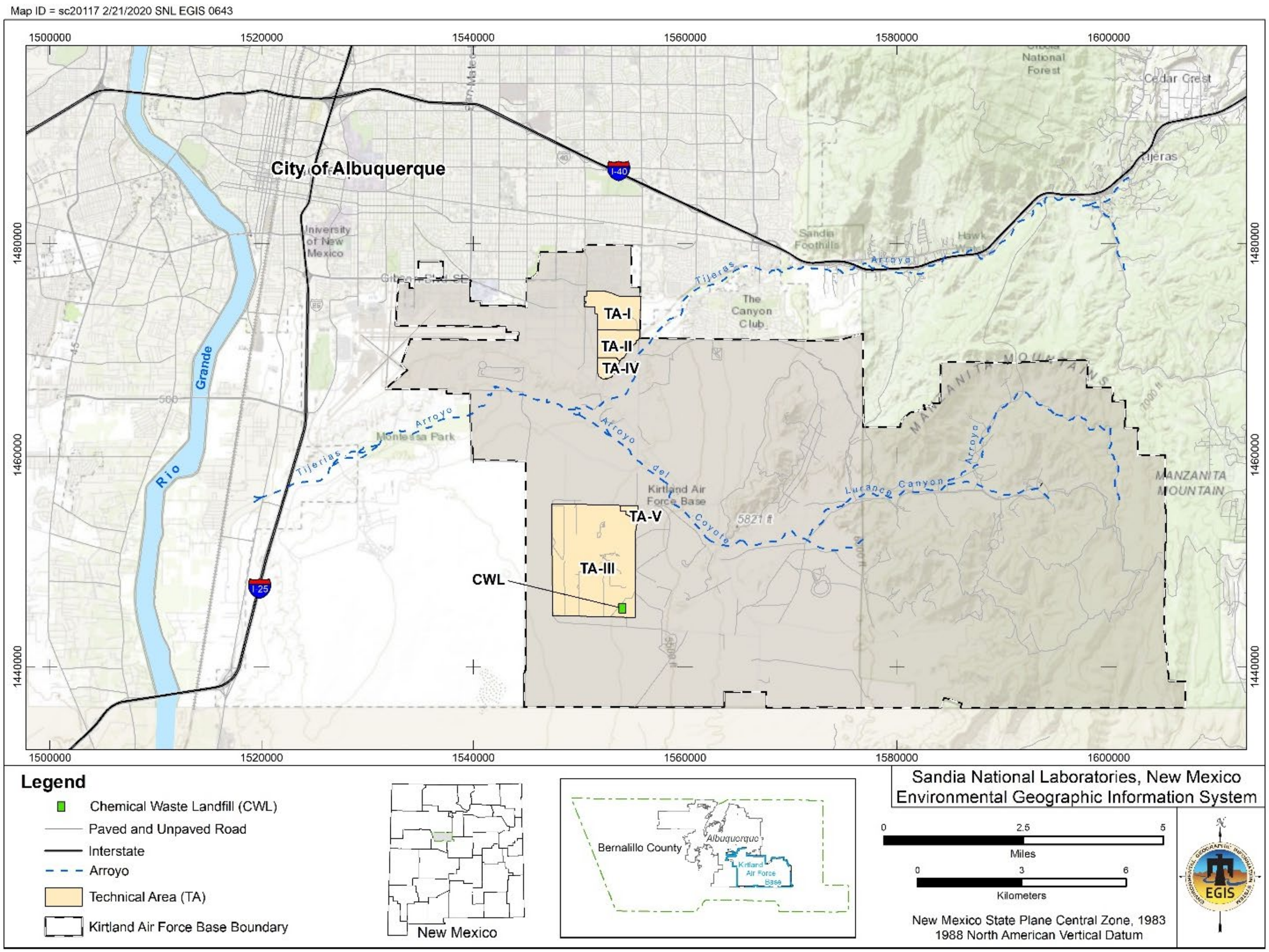

Figure 3-1. Location of the Chemical Waste Landfill with Respect to Kirtland Air Force Base and the City of Albuquerque

Upon NMED approval of CWL closure (Kieling June 2011), the CWL PCCP became the enforceable regulatory document. All groundwater monitoring activities at the CWL since June 2011 are performed in accordance with requirements specified in the CWL PCCP. Required monitoring (groundwater and soil-gas), inspections, and maintenance activities are comprehensively documented in annual Post-Closure Care Reports submitted to NMED in March of each year. During Calendar Year (CY) 2020, the *Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2019* (SNL March 2020) was submitted to NMED and approved (Pierard May 2020). The *Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2020* will be submitted to NMED in March 2021.

As stipulated in the CWL PCCP, the only regulatory standards that apply to CWL groundwater monitoring results are the PCCP-defined hazardous constituent concentration limits. These NMED-defined regulatory standards apply only to a statistical evaluation of the constituent data set from a given monitoring well (i.e., the 95th percentile lower confidence limit of the mean for a particular constituent), not to individual results. The *Chemical Waste Landfill Annual Post-Closure Care Report for Calendar Year 2020* will present a comprehensive statistical evaluation of CWL CY 2020 groundwater monitoring results.

3.1.1 Monitoring History

Groundwater monitoring began in 1985 at the CWL (IT December 1985) as required by Section 20.4.1.600 of the New Mexico Administrative Code, incorporating Title 40, Code of Federal Regulations, Part 265, Subpart F. Monitoring under the *Final Closure Plan* was conducted until June 2, 2011; since then, groundwater monitoring has been performed in accordance with the CWL PCCP.

3.1.2 Monitoring Network

The CWL compliance groundwater monitoring network includes monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11. These four wells are listed in Table 3-1 and shown on Figure 3-2.

Table 3-1. Chemical Waste Landfill Post-Closure Care Permit Monitoring Well Network and Calendar Year 2020 Compliance Activities

Well ID	WQ	WL	Comment
CWL-BW5	✓	✓	Upgradient well, sampled semiannually
CWL-MW9	✓	✓	Downgradient well, sampled semiannually
CWL-MW10	✓	✓	Downgradient well, sampled semiannually
CWL-MW11	✓	✓	Downgradient well, sampled semiannually
Total	4	4	Total for AGMR reporting

NOTES:
Check marks indicate WQ sampling and WL measurements were completed.
AGMR = Annual Groundwater Monitoring Report.
BW = Background Well.
CWL = Chemical Waste Landfill.
ID = Identifier.
MW = Monitoring Well.
WL = Water level.
WQ = Water quality.

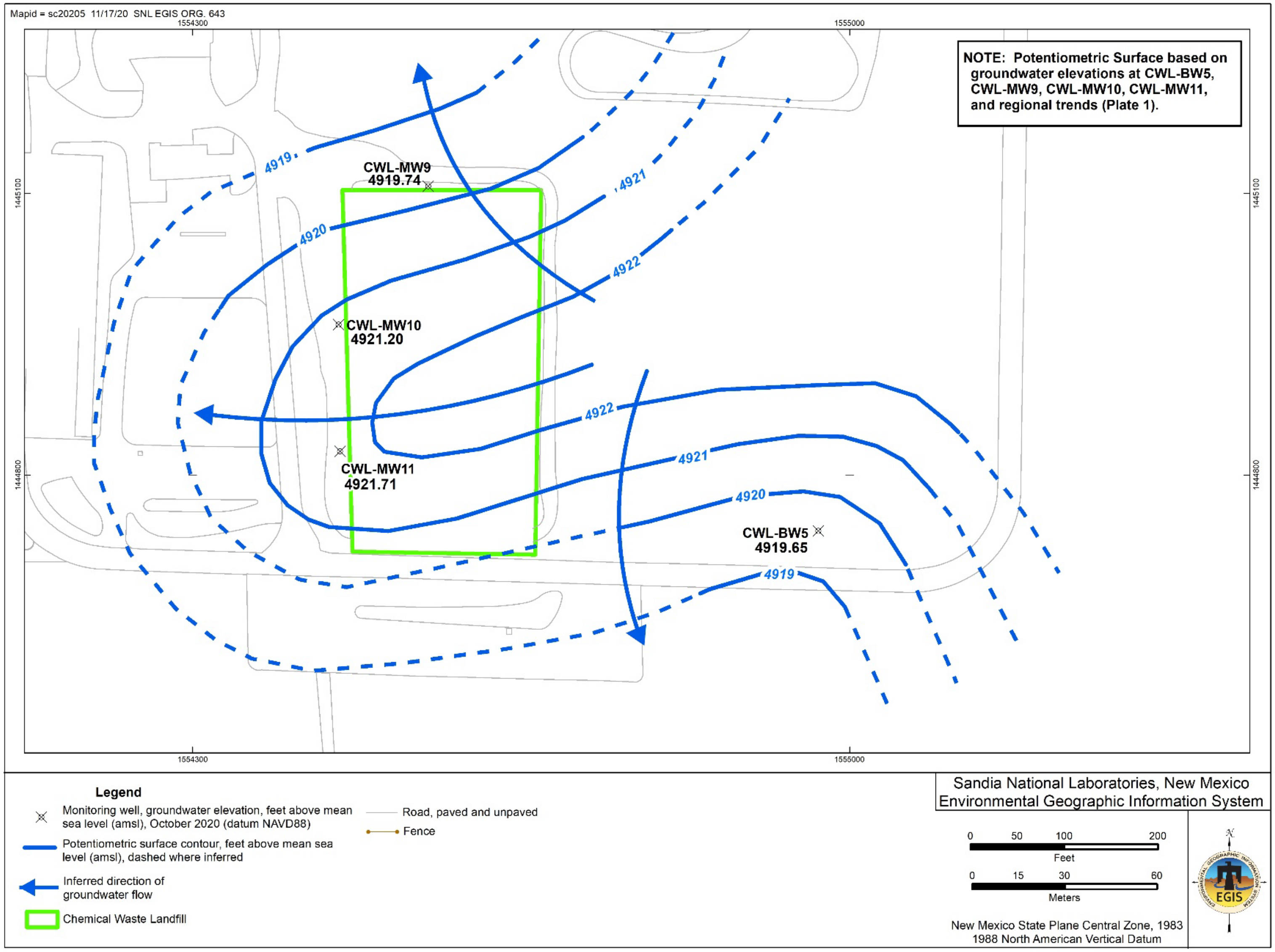

Figure 3-2. Localized Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2020

3.1.3 Conceptual Site Model

The constituents of concern in groundwater at the CWL are TCE, chromium, and nickel. A detailed Conceptual Site Model (CSM) is provided in Annex E of the CWL CMS Report. The current CSM is summarized as follows.

The upper surface of the Regional Aquifer (i.e., water table) beneath the CWL occurs within unconsolidated Santa Fe Group (SFG) deposits (i.e., fine-grained alluvial-fan deposits). The depth to water is approximately 500 feet (ft) below ground surface. Groundwater flows generally westward, away from the Manzanita Mountains and toward the Rio Grande. Several production wells operated by Kirtland Air Force Base (KAFB) and the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) have profoundly modified the natural groundwater flow regime to the west and north of the CWL by creating a trough in the water table in the western and northern portions of KAFB. As a result, water levels at the CWL have been steadily declining since monitoring began in 1985.

In Attachment 3A, Figure 3A-1 (hydrographs) shows the rate of groundwater elevation decline from 2009 to 2020 at the existing CWL monitoring wells. Since groundwater monitoring began at the CWL in 1985, the average rate of water table decline has been somewhat variable, but typically in the range of 0.4 to 0.8 ft per year. The groundwater elevation decline between October 2019 and October 2020 ranged from 0.19 (CWL-MW11) to 0.30 (CWL-BW5) ft. This annual decline was lower than the average change from 2018 to 2019, which was 0.64 ft. This is likely due to decreased pumping of ABCWUA production wells to the north. Recharge from the infiltration of direct precipitation at the CWL is negligible due to high evapotranspiration, low precipitation, the thick sequence of unsaturated SFG deposits above the water table, and the ET cover that was installed in 2005. Groundwater recharge of the Regional Aquifer primarily occurs by the infiltration of precipitation in the Manzanita Mountains located approximately 5 miles to the east.

Table 3-2 presents the data used to construct the CY 2020 potentiometric surface map shown in Figure 3-2 for the CWL groundwater monitoring network.

Table 3-2. Groundwater Elevations Measured in October 2020 at Monitoring Wells Completed in the Regional Aquifer at the Chemical Waste Landfill

Well ID	Measurement Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
CWL-BW5	5,434.79	6-Oct-2020	515.14	4,919.65
CWL-MW9	5,426.12	6-Oct-2020	506.38	4,919.74
CWL-MW10	5,424.58	6-Oct-2020	503.38	4,921.20
CWL-MW11	5,423.24	6-Oct-2020	501.53	4,921.71

NOTES:

amsl = Above mean sea level.
btoc = Below top of casing.
BW = Background Well.
CWL = Chemical Waste Landfill.
ft = Feet.
ID = Identifier.
MW = Monitoring Well.
NAVD 88 = North American Vertical Datum of 1988.

Figure 3-2 is consistent with the CSM and the base-wide potentiometric surface map (Plate 1). As shown on Plate 1, the potentiometric surface contours beneath TA-III generally trend north to south with the inferred groundwater flow direction being generally westward. The westward deflection of the potentiometric surface is a localized salient (i.e., a very gentle ridge or localized high) of the Regional Aquifer beneath the CWL (Figure 3-2) that reflects site-specific geologic controls. These controls are related to lateral and vertical changes in the hydraulic conductivity of the saturated, anisotropic, SFG alluvial-fan sediments that were predominantly deposited in an east to west direction. The nearest production well, KAFB-4, is located approximately 4.3 miles north-northwest of the CWL.

Measured orthogonally from the potentiometric surface contours on Figure 3-2 across the site, the horizontal gradient at the CWL did not change significantly from previous years and was approximately 0.013 ft per ft. Groundwater velocities in the alluvial-fan sediments were calculated using the current potentiometric surface gradient, the hydraulic conductivity range (i.e., high and low values) from slug tests conducted in 2012 on the four groundwater monitoring wells, and a porosity of 29 percent as determined from the laboratory analyses of CWL sediment samples (SNL October 1995). The CY 2020 calculated velocities ranged from approximately 1.8×10^{-4} to 2.8×10^{-3} ft per day. This is equivalent to approximately 0.07 to 1.02 ft per year. These very low values are consistent with previous estimates for horizontal groundwater flow at the water table in the CWL vicinity. Estimated groundwater travel times from the CWL to the KAFB/U.S. Air Force and ABCWUA production wells are on the order of hundreds to thousands of years (SNL February 2001).

3.2 Regulatory Criteria

The CWL is a remediated, closed, regulated unit undergoing post-closure care in accordance with the CWL PCCP that became effective on June 2, 2011. Groundwater monitoring requirements, procedures, and protocols are detailed in the CWL PCCP, Attachment 1, Section 1.8.1 and Attachment 2, Groundwater Sampling and Analysis Plan (SAP).

3.3 Scope of Activities

Semiannual groundwater sampling activities were conducted in January and July 2020 at the CWL in accordance with Attachment 2 of the CWL PCCP. In January 2020, groundwater samples were analyzed for TCE, chromium, nickel, and the enhanced list of VOCs. The enhanced list of VOCs includes 1,1-dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane; chloroform; tetrachloroethene; and trichlorofluoromethane. In July 2020, groundwater samples were analyzed for TCE, chromium, and nickel. Per the request of NMED (Kieling September 2019), groundwater samples were collected and analyzed during both events for 1,4-dioxane in addition to CWL PCCP-required analytes described above. The required two 1,4-dixoane sampling events were completed in CY 2020.

Table 3-3 lists the analytical parameters and CWL monitoring wells sampled. Attachment 3B contains the analytical results (Tables 3B-1 through 3B-3). In January and July 2020, groundwater sampling activities were conducted in accordance with the CWL PCCP and procedures outlined in the *Chemical Waste Landfill Groundwater Monitoring, Mini-SAP for Fiscal Year 2020, 2nd Quarter Sampling* (SNL December 2019) and the *Chemical Waste Landfill Groundwater Monitoring, Mini-SAP for Fiscal Year 2020, 4th Quarter Sampling* (SNL June 2020a).

The CWL groundwater samples were submitted for analysis to GEL Laboratories, LLC in Charleston, South Carolina. All groundwater sampling results are compared with EPA MCLs for drinking water (EPA March 2018).

Table 3-3. Analytical Parameters for the Chemical Waste Landfill Monitoring Wells, Calendar Year 2020

Analytical Parameters	Semiannual Event	Monitoring Wells
VOCs: TCE 1,1,2-Trichloro-1,2,2-trifluoroethane Tetrachloroethene 1,1-Dichloroethene Chloroform Trichlorofluoromethane SVOCs: 1,4-dioxane	January	CWL-BW5 CWL-BW5 (Duplicate) CWL-MW9 CWL-MW10 CWL-MW11
Metals: Chromium Nickel		
VOCs: TCE SVOCs: 1,4-dioxane	July	CWL-BW5 CWL-MW9 CWL-MW9 (Duplicate) CWL-MW10 CWL-MW11
Metals: Chromium Nickel		

NOTES:
BW = Background Well.
CWL = Chemical Waste Landfill.
MW = Monitoring Well.
SVOC = Semivolatile organic compound.
TCE = Trichloroethene.
VOC = Volatile organic compound.

Field and laboratory quality control (QC) samples are discussed in Section 1.3.3. Field QC samples included environmental duplicate, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Laboratory QC samples included method blank, laboratory control, matrix spike, matrix spike duplicate, and surrogate spike samples.

3.4 Field Methods and Measurements

Groundwater sampling and depth-to-groundwater measurements were conducted in accordance with the CWL PCCP and procedures specified in the *Chemical Waste Landfill Groundwater Monitoring, Mini-SAPs*, which are consistent with the methods described in Section 1.3. Water quality parameters measured in the field during the purging process included temperature, specific conductivity (SC), oxidation-reduction potential (ORP), potential of hydrogen (pH), and dissolved oxygen (DO) using an In-Situ Incorporated Aqua TROLL® 600 Multiparameter Water Quality Sonde. Turbidity measurements were made with a HACH™ Model 2100Q turbidity meter. Attachment 3B, Table 3B-4 presents field water quality parameters and Attachment 3A, Figure 3A-1 (hydrographs) presents groundwater elevation measurements at the CWL monitoring wells.

As specified in CWL PCCP Attachment 2, Section 2.12, purging requirements at the CWL include specifications for making a "best faith effort" to decrease flow rates such that low yield wells do not purge dry. These specifications include equipping the portable Bennett™ groundwater sampling system with small diameter tubing and a flow meter valve located along the discharge line. In addition, during the purging process at wells prone to purging dry, the flow rate is continually adjusted to achieve as low a flow rate as possible without causing the pump to be damaged or fail due to overheating. This represents a "best faith effort" to purge the wells at the slowest rate possible given equipment limitations.

The minimum purging volume requirement was satisfied at three of the four monitoring wells (CWL-BW5, CWL-MW9, and CWL-MW11). Monitoring well CWL-MW10 purged dry prior to removal of the minimum volume. This well was purged to dryness during both the January and July monitoring events, allowed to recover, and then sampled to collect the most representative groundwater sample possible given the low yield of this well. During January, approximately 13.0 gallons (gal) were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 22 gal). The average flow rate for the entire purging event was 0.104 gal per minute (gpm), and the estimated flow rate during the final three gal was 0.125 gpm (equivalent to 0.394 and 0.473 liters per minute, respectively). During July, approximately 13.0 gal were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 22 gal). The average flow rate for the entire purging event was 0.130 gpm, and the estimated flow rate during the final three gal was 0.115 gpm (equivalent to 0.492 and 0.435 liters per minute, respectively).

3.5 Analytical Methods

All groundwater samples were analyzed by the off-site laboratory using EPA-specified protocols described in Section 1.3.2.

3.6 Summary of Analytical Results

The analytical results and water quality parameters are presented in Attachment 3B, Tables 3B-1 through 3B-4. Data qualifiers assigned by the analytical laboratory and the data validation process (SNL June 2017 and June 2020b) are presented with the associated results in Tables 3B-1 through 3B-3.

For the purposes of this report, the CY 2020 analytical results were compared with established EPA MCLs where applicable. No detected constituents exceeded the respective EPA MCLs or the CWL PCCP-defined hazardous concentration limits. The analytical results are discussed in detail in the following sections.

3.6.1 Volatile and Semivolatile Organic Compounds

Table 3B-1 summarizes the CY 2020 analytical results for TCE and the enhanced list of VOCs (January) and TCE (July). TCE was detected above the laboratory method detection limit (MDL) in the January and July 2020 environmental samples from monitoring well CWL-MW10 at a concentration of 0.650 and 0.750 µg/L, respectively. These TCE results are below the practical quantitation limit of 1.0 µg/L (i.e., J-qualified estimated values) and the EPA MCL of 5.0 µg/L. No other VOCs were detected above the MDL in the January or July 2020 samples. TCE has only been detected in samples from CWL-MW10 since implementation of the CWL PCCP in June 2011 and concentrations have shown a declining trend since January 2013, indicating the two CWL VCMs completed from 1996 through 2002 were effective.

Table 3B-2 summarizes the January and July 2020 1,4-dioxane results; this compound was not detected above the MDL in any of the environmental samples.

3.6.2 Metals

Table 3B-3 summarizes the CY 2020 analytical results for chromium and nickel. Chromium and nickel were not detected above the MDL in any of the CY 2020 samples.

3.6.3 Water Quality Parameters

Table 3B-4 lists the water quality parameters measured immediately prior to sample collection at each well. These field parameters consist of temperature, SC, ORP, pH, turbidity, and DO.

3.7 Quality Control Results

Section 1.3.3 presents the purpose of each field and laboratory QC sample type. Field and laboratory QC sample results for the CWL are discussed in the following sections.

3.7.1 Field Quality Control Samples

The QC samples collected in the field included environmental duplicate, EB, FB, and TB samples. Analytical results for each QC sample type are discussed in the following sections.

3.7.1.1 Environmental Duplicate Samples

One environmental duplicate sample was collected from monitoring well CWL-BW5 in January 2020 and one environmental duplicate sample was collected from monitoring well CWL-MW9 in July 2020. For both the January and July 2020 sample pairs (environmental sample and environmental duplicate sample), no constituents were detected in the sample pairs so a relative percent difference could not be calculated.

3.7.1.2 Equipment Blank Samples

One EB sample was collected in January 2020 and analyzed for TCE, chromium, nickel, and the enhanced list of VOCs. Chloroform and 1,4-dioxane were detected above MDLs in the EB sample. No corrective action was necessary since these compounds were not detected in associated environmental samples. No analysis was performed for the chromium and nickel sample fraction because it was collected in a sample container that did not contain the appropriate preservative. No corrective action was required as chromium and nickel were not detected in the associated environmental samples. One EB sample was collected in July 2020 and analyzed for TCE, chromium, and nickel. No constituents were detected in the July 2020 EB sample.

3.7.1.3 Field Blank Samples

Three FB samples were collected in January 2020 and analyzed for TCE and the enhanced list of VOCs. Chloroform was detected above the associated MDL in the three FB samples associated with the January 2020 sampling event. No corrective action was necessary since chloroform was not reported in the associated environmental samples. Three FB samples were collected in July 2020 and analyzed for TCE only. There were no TCE detections above the MDL in the July 2020 FB samples.

3.7.1.4 Trip Blank Samples

Six TB samples were submitted with the January 2020 samples and analyzed for TCE and the enhanced list of VOCs and six TB samples were submitted with the July 2020 samples and analyzed for TCE. No VOCs were detected above the MDL in the January and July 2020 TB samples.

3.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples were analyzed concurrently with the groundwater samples and included laboratory control samples, matrix spike and matrix spike duplicate samples, surrogate spike samples, and replicate samples. There were no significant issues identified with the laboratory QC sample results associated with the January and July 2020 sampling events; all results met the laboratory control sample requirements in Attachment 2 of the CWL PCCP.

3.8 Variances and Non-Conformances

All analytical and field methods were performed according to the requirements specified in the CWL PCCP and associated *Chemical Waste Landfill Groundwater Monitoring, Mini-SAPs*. Variances and non-conformances are defined in the CWL PCCP Attachment 2, Section 2.22 for groundwater monitoring. There were no variances or non-conformances during the CY 2020 sampling activities.

All environmental sample, field QC sample, and laboratory QC sample results were reviewed and qualified in accordance with Administrative Operating Procedure AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2017 and June 2020b). The data were in compliance with analytical methods and laboratory procedures.

3.9 Summary and Conclusions

During CY 2020, groundwater samples were collected from the four CWL monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11) in January and July 2020 and analyzed for TCE, chromium, nickel, and the enhanced list of VOCs (January); and TCE, nickel, and chromium (July). Per the request of NMED (Kieling September 2019), groundwater samples were collected and analyzed during both CY 2020 sampling events for 1,4-dioxane. Based on field and laboratory QC sample and data validation results, the CY 2020 groundwater monitoring data meet data quality objectives and are in compliance with analytical methods and laboratory procedures. No analytes were detected at concentrations exceeding established EPA MCLs or CWL PCCP hazardous constituent concentration limits. The required two 1,4-dioxane sampling events were completed in CY 2020 and all results were non detect.

3.10 Summary of Future Activities

As defined in the CWL PCCP, the post-closure care period for the CWL is 30 years and the compliance period for which the groundwater protection standard applies is 47 years; both periods began on June 2, 2011 when NMED approved closure (Kieling June 2011). An application for renewal of the PCCP was submitted to the NMED in November 2020 (Harrell November 2020); no operational changes to the existing PCCP were included in the application. The NMED may shorten or extend the post-closure care period under 20.4.1.500 New Mexico Administrative Code, incorporating Title 40, Code of Federal Regulations, Part 264.117(a)(2).

In accordance with the CWL PCCP, groundwater monitoring will continue on a semiannual basis. Ongoing CWL groundwater monitoring results will be documented in both the comprehensive CWL Annual Post-Closure Care Reports (submitted to NMED in March of each year) and in future Annual Groundwater Monitoring Reports.

Attachment 3A
Chemical Waste Landfill
Hydrographs

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Attachment 3A Hydrographs

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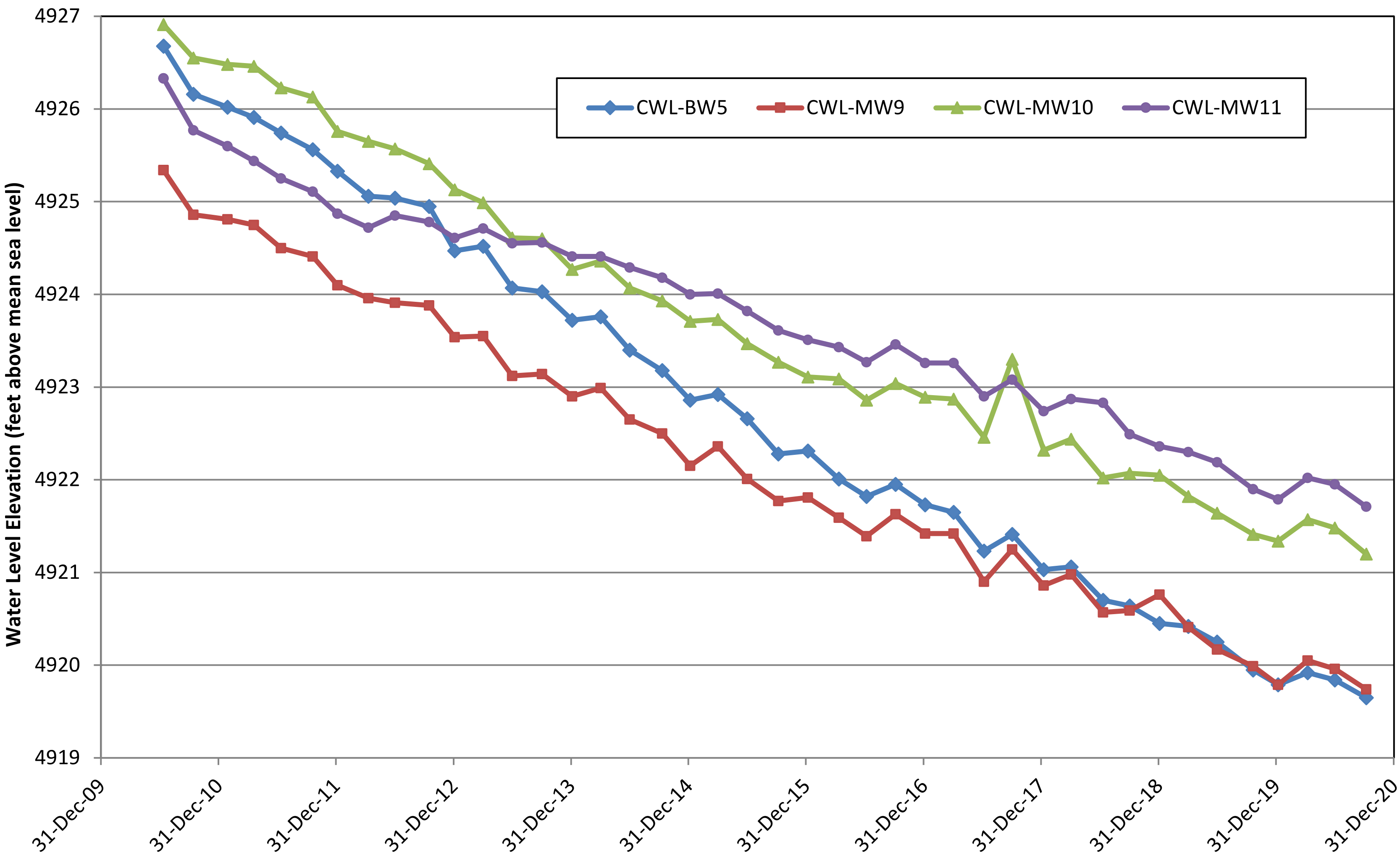

Figure 3A-1. Chemical Waste Landfill Groundwater Monitoring Wells

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Attachment 3B
Chemical Waste Landfill
Analytical Results Tables

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Attachment 3B Tables

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Table 3B-1
Summary of Volatile Organic Compound Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CWL-BW5	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		112204-001	SW846-8260B
20-Jan-20	Chloroform	ND	0.300	1.00	80.0	U		112204-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		112204-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		112204-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		112204-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		112204-001	SW846-8260B
CWL-BW5 (Duplicate)	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		112205-001	SW846-8260B
20-Jan-20	Chloroform	ND	0.300	1.00	80.0	U		112205-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		112205-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		112205-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		112205-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		112205-001	SW846-8260B
CWL-MW9	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		112210-001	SW846-8260B
21-Jan-20	Chloroform	ND	0.300	1.00	80.0	U		112210-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		112210-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		112210-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		112210-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		112210-001	SW846-8260B
CWL-MW10	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		112221-001	SW846-8260B
27-Jan-20	Chloroform	ND	0.300	1.00	80.0	U		112221-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		112221-001	SW846-8260B
	Trichloroethene	0.650	0.300	1.00	5.00	J		112221-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		112221-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		112221-001	SW846-8260B
CWL-MW11	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		112215-001	SW846-8260B
22-Jan-20	Chloroform	ND	0.300	1.00	80.0	U		112215-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		112215-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		112215-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		112215-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		112215-001	SW846-8260B

Refer to footnotes on page 3B-10.

Table 3B-1 *(Concluded)*
Summary of Volatile Organic Compound Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CWL-BW5 20-Jul-20	Trichloroethene	ND	0.300	1.00	5.00	U		113377-001	SW846-8260B
CWL-MW9 21-Jul-20	Trichloroethene	ND	0.300	1.00	5.00	U		113357-001	SW846-8260B
CWL-MW9 (Duplicate) 21-Jul-20	Trichloroethene	ND	0.300	1.00	5.00	U		113358-001	SW846-8260B
CWL-MW10 27-Jul-20	Trichloroethene	0.750	0.300	1.00	5.00	J		113369-001	SW846-8260B
CWL-MW11 22-Jul-20	Trichloroethene	ND	0.300	1.00	5.00	U		113362-001	SW846-8260B

Refer to footnotes on page 3B-10.

Table 3B-2
Summary of 1,4-Dioxane Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CWL-BW5 20-Jan-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112204-002	SW846-8270D
CWL-BW5 (Duplicate) 20-Jan-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112205-002	SW846-8270D
CWL-MW9 21-Jan-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112210-002	SW846-8270D
CWL-MW10 27-Jan-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112221-002	SW846-8270D
CWL-MW11 22-Jan-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112215-002	SW846-8270D
CWL-BW5 20-Jul-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113377-002	SW846-8270D
CWL-MW9 21-Jul-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113357-002	SW846-8270D
CWL-MW9 (Duplicate) 21-Jul-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113358-002	SW846-8270D
CWL-MW10 27-Jul-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113369-002	SW846-8270D
CWL-MW11 22-Jul-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113362-002	SW846-8270D

Refer to footnotes on page 3B-10.

Table 3B-3
Summary of Chromium and Nickel Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CWL-BW5	Chromium	ND	0.00300	0.0100	0.100	U		112204-003	SW846-6020B
20-Jan-20	Nickel	ND	0.000600	0.00200	NE	U		112204-003	SW846-6020B
CWL-BW5 (Duplicate)	Chromium	ND	0.00300	0.0100	0.100	U		112205-003	SW846-6020B
20-Jan-20	Nickel	ND	0.000600	0.00200	NE	U		112205-003	SW846-6020B
CWL-MW9	Chromium	ND	0.00300	0.0100	0.100	U		112210-003	SW846-6020B
21-Jan-20	Nickel	ND	0.000600	0.00200	NE	U		112210-003	SW846-6020B
CWL-MW10	Chromium	ND	0.00300	0.0100	0.100	U		112221-003	SW846-6020B
27-Jan-20	Nickel	ND	0.000600	0.00200	NE	U		112221-003	SW846-6020B
CWL-MW11	Chromium	ND	0.00300	0.0100	0.100	U		112215-003	SW846-6020B
22-Jan-20	Nickel	ND	0.000600	0.00200	NE	U		112215-003	SW846-6020B
CWL-BW5	Chromium	ND	0.003	0.010	0.100	U		113377-003	SW846-6020B
20-Jul-20	Nickel	ND	0.0006	0.002	NE	U		113377-003	SW846-6020B
CWL-MW9	Chromium	ND	0.003	0.010	0.100	U		113357-003	SW846-6020B
21-Jul-20	Nickel	ND	0.0006	0.002	NE	U		113357-003	SW846-6020B
CWL-MW9 (Duplicate)	Chromium	ND	0.003	0.010	0.100	U		113358-003	SW846-6020B
21-Jul-20	Nickel	ND	0.0006	0.002	NE	U		113358-003	SW846-6020B
CWL-MW10	Chromium	ND	0.003	0.010	0.100	U		113369-003	SW846-6020B
27-Jul-20	Nickel	ND	0.0006	0.002	NE	U		113369-003	SW846-6020B
CWL-MW11	Chromium	ND	0.003	0.010	0.100	U		113362-003	SW846-6020B
22-Jul-20	Nickel	ND	0.0006	0.002	NE	U		113362-003	SW846-6020B

Refer to footnotes on page 3B-10.

Table 3B-4
Summary of Field Water Quality Measurements[h], Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CWL-BW5	20-Jan-20	16.92	1065.7	142.4	6.94	0.23	88.1	7.23
CWL-MW9	21-Jan-20	16.31	925.7	160.3	7.03	0.25	55.2	4.59
CWL-MW10	27-Jan-20	13.14	857.6	73.4	6.97	2.49	37.7	3.25
CWL-MW11	22-Jan-20	17.26	1001.0	39.0	7.01	0.30	68.2	5.67
CWL-BW5	20-Jul-20	22.66	1141.0	252.7	7.05	0.87	92.95	6.08
CWL-MW9	21-Jul-20	23.00	958.38	272.7	7.07	0.19	62.52	4.05
CWL-MW10	27-Jul-20	18.65	937.35	91.1	6.83	2.90	35.96	2.62
CWL-MW11	22-Jul-20	26.54	1140.0	145.7	7.01	0.19	80.26	4.91

Refer to footnotes on page 3B-10.

Footnotes for Chemical Waste Landfill Groundwater Analytical Results Tables

% = Percent.
CFR = Code of Federal Regulations.
EPA = U.S. Environmental Protection Agency.
ID = Identifier.
μg/L = Micrograms per liter.
mg/L = Milligrams per liter.
No. = Number.

[a]Result
ND = not detected (at method detection limit).

[b]MDL
Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

[c]PQL
Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.

[d]MCL
MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards, (EPA March 2018).
- The total for trihalomethanes (including chloroform) is 80 μg/L.

NE = Not established.

[e]Lab Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = Amount detected is below the practical quantitation limit (PQL).
U = Analyte is absent or below the method detection limit.

[f]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

[g]Analytical Method
EPA, 1986, (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

SW = Solid Waste.

[h]Field Water Quality Measurements
Field measurements collected prior to sampling.
°C = Degrees Celsius
% Sat = Percent saturation
μmho/cm = Micromhos per centimeter
mg/L = Milligrams per liter
mV = Millivolts
NTU = Nephelometric turbidity units
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration)

Chapter 3
Chemical Waste Landfill
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Pierard May 2020 Pierard, K. (New Mexico Environment Department), May 2020. Letter to J. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and P. Shoemaker (National Technology & Engineering Solutions of Sandia, LLC), *Approval, Chemical Waste Landfill Post-Closure Care Report, Calendar Year 2019, March 2020, Sandia National Laboratories, EPA ID No. NM5890110518, HWB-SNL-20-005*, May 18, 2020.

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SNL June 2020b Sandia National Laboratories, New Mexico (SNL/NM), June 2020. *Data Validation Procedure for Chemical and Radiochemical Data,* AOP 00-03, Revision 6, Sandia National Laboratories, Albuquerque, New Mexico.

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4.0 Mixed Waste Landfill

4.1 Introduction

The Mixed Waste Landfill (MWL) is a 2.6-acre Solid Waste Management Unit (SWMU) in the north-central portion of Technical Area-III at Sandia National Laboratories, New Mexico (SNL/NM) (Figure 4-1). The MWL consists of two distinct disposal areas: the classified area (occupying 0.6 acres) and the unclassified area (occupying 2.0 acres). Low-level radioactive, hazardous, and mixed waste was disposed in the MWL from March 1959 through December 1988.

The Phase 1 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was completed in 1990 (SNL September 1990), and the Phase 2 RFI was completed in 1995 (Peace et al. 2002). The Phase 2 RFI confirmed tritium as the primary constituent of concern at the MWL. As directed by the New Mexico Environment Department (NMED), the MWL Corrective Measures Study (SNL May 2003) was submitted to the NMED. The NMED Secretary selected a vegetative cover with a biointrusion barrier (i.e., evapotranspirative [ET] cover) as the final remedy (NMED May 2005); construction of the MWL ET cover was completed in 2009 in accordance with the NMED-approved Corrective Measures Implementation (CMI) Plan (SNL November 2005; Bearzi December 2008). The MWL CMI Report documenting cover construction was submitted to the NMED (SNL January 2010) and approved (Bearzi October 2011).

As required by the NMED Final Order (NMED May 2005), the MWL Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL March 2012) was submitted to the NMED and approved (Blaine January 2014). All LTMMP monitoring, maintenance, and reporting requirements were implemented upon NMED approval, including the installation of three multi-port soil-vapor monitoring wells (SNL January 2014) required to complete the LTMMP monitoring systems. After the Soil-Vapor Monitoring Well Installation Report (SNL September 2014) was approved by NMED (Kieling September 2014), the U.S. Department of Energy (DOE) and SNL/NM personnel requested a Certification of Completion for the MWL (Beausoleil September 2014) that was granted by the NMED (Cobrain October 2014).

In October 2014, DOE and SNL/NM personnel submitted a request to NMED for a Class 3 Permit Modification for Corrective Action Complete (CAC) with Controls at the MWL (Beausoleil October 2014). The associated regulatory process included two public comment periods, a public meeting held by DOE and SNL/NM personnel in November 2014, and a four-day public hearing held by NMED in July 2015. On March 13, 2016, the February 2016 NMED Final Order became effective (NMED February 2016; Kieling February 2016), granting CAC with Controls status to the MWL and incorporating the MWL LTMMP into the RCRA Operating Permit (RCRA Permit), (NMED January 2015). All controls required for the MWL, including groundwater monitoring, are defined in the MWL LTMMP and are comprehensively documented in MWL Annual Long-Term Monitoring and Maintenance (LTMM) Reports submitted to the NMED in June of each year. In Calendar Year (CY) 2020, the seventh MWL Annual LTMM Report (SNL June 2020a) was submitted to the NMED and approved (Pierard July 2020).

MWL groundwater monitoring results are directly compared to trigger levels and subject to the trigger evaluation process defined in Table 5.2.4-1 and Figure 5.1-1 of the MWL LTMMP, respectively. The evaluation of MWL CY 2020 groundwater monitoring results will be presented in the *Mixed Waste Landfill Annual LTMM Report, April 2020 – March 2021*, which will be submitted to the NMED in June 2021.

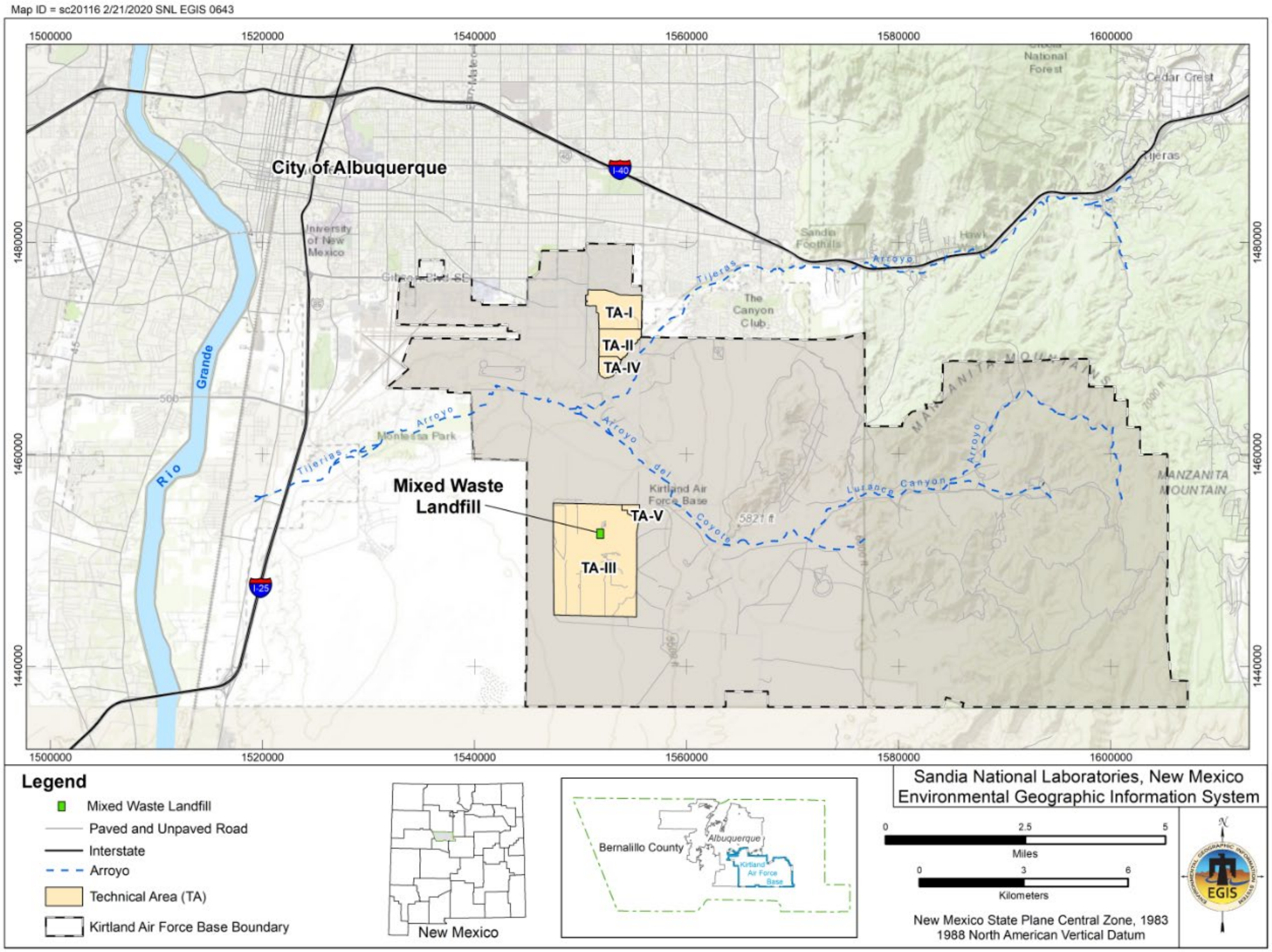

Figure 4-1. Location of the Mixed Waste Landfill with Respect to Kirtland Air Force Base and the City of Albuquerque

4.1.1 Monitoring History

Groundwater monitoring has been conducted at the MWL since 1990. The original MWL groundwater monitoring network was modified in 2008 due to the declining water table and corrosion of stainless-steel well screens. Four original monitoring wells were plugged and abandoned (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3), and four monitoring wells were installed (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9). The 2008 wells were constructed with Schedule 80 polyvinyl chloride screens set across the water table of the Regional Aquifer and represent the NMED-approved groundwater monitoring network under the MWL LTMMP. Well MWL-MW4 was part of the original monitoring network, was completed at an angle of approximately six degrees from vertical, and has two discrete screened intervals isolated by an inflatable packer. Wells MWL-MW5 and MWL-MW6 were also part of the original monitoring well network; they are located to the west of the site and their screen intervals are below the top of the Regional Aquifer.

Groundwater at the MWL has been extensively characterized and monitored for major ion chemistry, volatile organic compounds (VOCs), semivolatile organic compounds, nitrate, metals, radionuclides, and perchlorate. Thirty years of analytical data indicate that groundwater has not been impacted by the MWL.

4.1.2 Monitoring Network

The current groundwater monitoring network at the MWL consists of seven wells listed in Table 4-1 and shown on Figure 4-2. In accordance with the MWL LTMMP, four of these wells comprise the MWL compliance groundwater monitoring network for the uppermost part of the Regional Aquifer (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9), and are sampled semiannually for various constituents. The remaining groundwater monitoring wells (MWL-MW4, MWL-MW5, and MWL-MW6) are retained for monitoring groundwater elevations; sampling of these deeper wells is not required under the MWL LTMMP.

Table 4-1. Mixed Waste Landfill Monitoring Well Network and Calendar Year 2020 Compliance Activities

Well ID	Installation Year	WQ[a]	WL[a]	Comment[b]
MWL-BW2	2008	✓	✓	Compliance well, sampled semiannually
MWL-MW4 [c]	1993		✓	Groundwater elevation only
MWL-MW5	2000		✓	Groundwater elevation only
MWL-MW6	2000		✓	Groundwater elevation only
MWL-MW7	2008	✓	✓	Compliance well, sampled semiannually
MWL-MW8	2008	✓	✓	Compliance well, sampled semiannually
MWL-MW9	2008	✓	✓	Compliance well, sampled semiannually
Total	--	4	7	Total for AGMR reporting

NOTES:

[a]Check marks indicate WQ sampling and WL measurements were completed.

[b]Requirements defined in the MWL LTMMP (SNL March 2012). Semiannual groundwater monitoring of compliance wells was conducted in May and November 2020.

[c]Upper screen of monitoring well MWL-MW4 is monitored and is across the uppermost portion of Regional Aquifer.

AGMR = Annual Groundwater Monitoring Report.
BW = Background Well.
ID = Identifier.
LTMMP = Long-Term Monitoring and Maintenance Plan.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
SNL = Sandia National Laboratories.
WL = Water level.
WQ = Water quality.

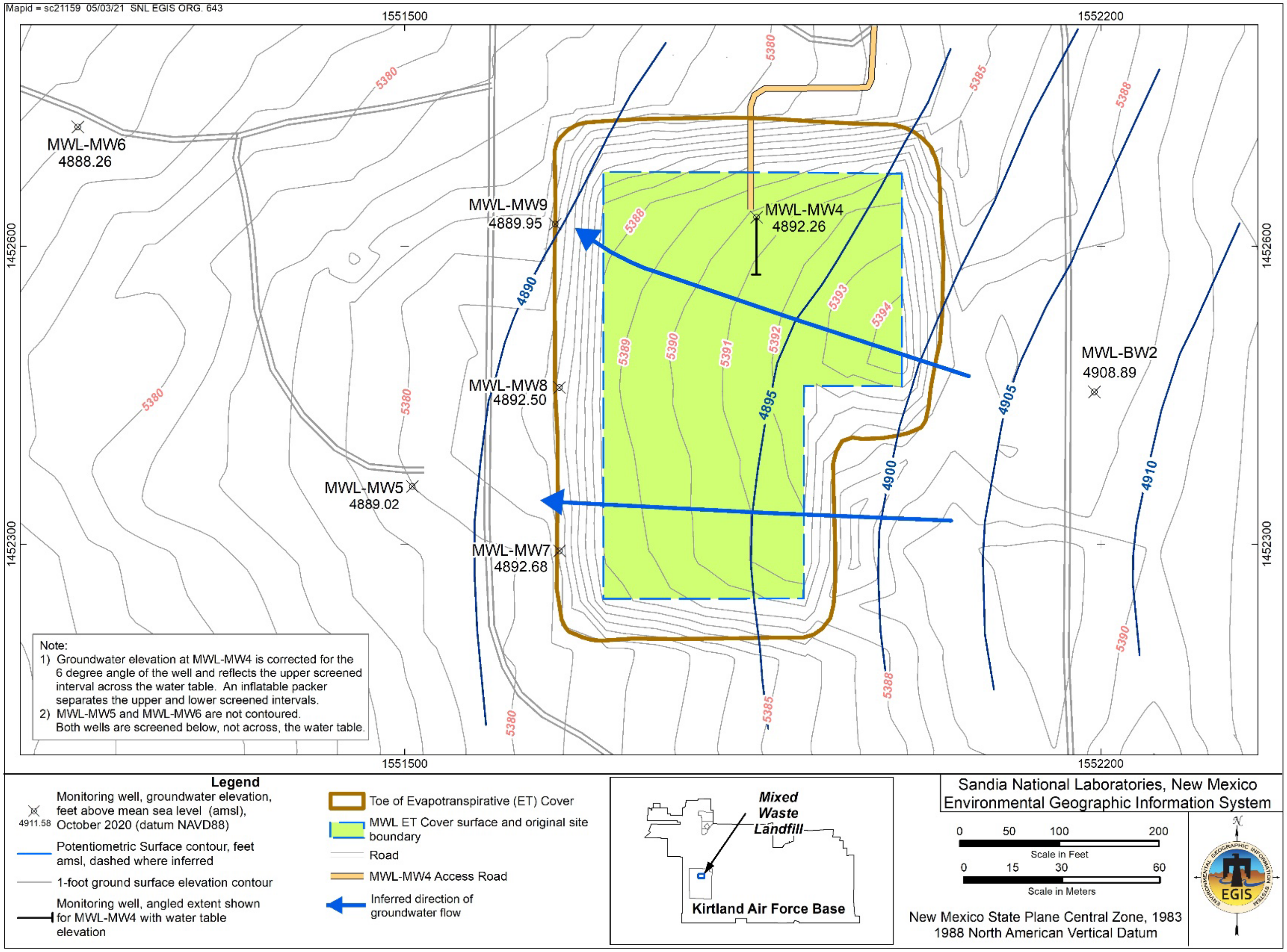

Figure 4-2. Localized Potentiometric Surface of the Regional Aquifer at the Mixed Waste Landfill, October 2020

4.1.3 Conceptual Site Model

A detailed Conceptual Site Model (CSM) is provided in the MWL Phase 2 RFI Report (Peace et al. 2002) and the *Mixed Waste Landfill Groundwater Report, 1990 through 2001* (Goering et al. 2002). An update to the CSM integrating the findings from the four monitoring wells installed in 2008 is presented in the *Mixed Waste Landfill Annual Groundwater Monitoring Report, Calendar Year 2009* (SNL June 2010).

The upper surface of the Regional Aquifer (i.e., water table) at the MWL is contained within the interfingering, unconsolidated, fine-grained alluvial-fan deposits of the Santa Fe Group (SFG). The depth to water is approximately 500 feet (ft) below ground surface. The more transmissive, coarser-grained Ancestral Rio Grande sediments underlie the fine-grained alluvial-fan deposits beneath the MWL.

In Attachment 4A, Figures 4A-1 and 4A-2 (hydrographs) show the rate of groundwater elevation change at the existing MWL monitoring wells. Over the past five years the rate of decline has significantly slowed, and between 2015 and 2017, wells located west of the MWL showed a small increase ranging from 0.11 to 0.53 ft for the two-year period. From October 2019 to October 2020, the groundwater elevation declined in MWL-BW2 (0.19 ft) and rose in the other three compliance monitoring wells. The range in elevation rise was 0.02 ft (MWL-MW7) to 0.21 ft (MWL-MW9). Changes were similar for the other three monitoring wells; MWL-MW4 showed a slight decline (0.02 ft) whereas MWL-MW5 and MWL-MW6 showed a rise of 0.08 ft and 0.37 ft, respectively. This is likely due to decreased pumping of Albuquerque Bernalillo County Water Utility Authority production wells to the north. Recharge from infiltration of direct precipitation at the MWL is negligible due to high evapotranspiration, low precipitation, the thick sequence of unsaturated SFG deposits above the water table, and the presence of the MWL ET Cover. Groundwater recharge of the Regional Aquifer occurs by the infiltration of precipitation in the Manzanita Mountains located approximately 5 miles to the east.

Table 4-2 presents the data used to construct the October 2020 potentiometric surface map shown in Figure 4-2 for the MWL groundwater monitoring network. The groundwater elevation used for monitoring well MWL-MW4 is measured within the upper screen interval.

Table 4-2. Groundwater Elevations Measured in October 2020 at Monitoring Wells Completed in the Regional Aquifer at the Mixed Waste Landfill

Well ID	Measurement Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
MWL-BW2	5,391.02	5-Oct-2020	482.13	4,908.89
MWL-MW4[a]	5,391.70	5-Oct-2020	502.19	4,892.26[b]
MWL-MW5[c]	5,382.56	5-Oct-2020	493.54	4,889.02
MWL-MW6[c]	5,375.31	5-Oct-2020	487.05	4,888.26
MWL-MW7	5,383.30	5-Oct-2020	490.62	4,892.68
MWL-MW8	5,384.67	5-Oct-2020	492.17	4,892.50
MWL-MW9	5,381.91	5-Oct-2020	491.96	4,889.95

NOTES:

[a]Upper screen of monitoring well MWL-MW4 is monitored and represents the uppermost portion of Regional Aquifer.
[b]The groundwater elevation is calculated using a correction for the 6-degree angle of the well casing.
[c]MWL-MW5 and MWL-MW6 are screened below the water table and are not used for contouring.

amsl = Above mean sea level.
btoc = Below top of casing.
BW = Background Well.
ft = Feet.
ID = Identifier.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
NAVD 88 = North American Vertical Datum of 1988.

The general direction of groundwater flow beneath the MWL is to the west and northwest, towards the Rio Grande and away from the Manzanita Mountains. Figure 4-2 is consistent with the base-wide potentiometric surface map (Plate 1), which shows the potentiometric surface contours beneath Technical Area-III generally trend north to south with the inferred groundwater flow direction being generally westward. Several production wells operated by Kirtland Air Force Base (KAFB) and the Albuquerque Bernalillo County Water Utility Authority have profoundly modified the natural groundwater flow regime near the MWL by creating a trough in the water table in the western and northern portions of KAFB (Plate 1). As a result, water levels at the MWL have historically declined as shown in Attachment 4A, Figures 4A-1 and 4A-2. However, more recently the rate of decline has slowed and in some wells the groundwater elevation has risen. The nearest production well, KAFB-4, is located approximately 3 miles north-northwest of the MWL.

Measured orthogonally from the potentiometric surface contours, the horizontal gradient for October 2020 ranges from approximately 0.03 to 0.08 ft per ft. Groundwater velocities in the alluvial-fan sediments were calculated using the current potentiometric surface gradient, the average hydraulic conductivity obtained from slug testing of the four compliance monitoring wells, and an effective porosity of 25 percent. The calculated 2020 groundwater velocity ranges from 0.02 to 0.06 ft per day; the average is 0.04 ft per day. These very low values and the general position of the groundwater elevation contours are consistent with past years and previous estimates for horizontal groundwater flow at the water table in the MWL vicinity.

4.2 Regulatory Criteria

The MWL is regulated as SWMU 76 under the RCRA Permit, and corrective action at the MWL has been performed in accordance with the Compliance Order on Consent ([Consent Order] NMED April 2004), NMED Final Order on remedy selection (NMED May 2005), and New Mexico Administrative Code , Title 20, Chapter 4, Part 1, Section 500 (20.4.1.500 NMAC) incorporating Title 40 of the Code of Federal Regulations (CFR), Part 264.101 (40 CFR 264.101). On March 13, 2016, the MWL corrective action process under the Consent Order was completed (i.e., the February 2016 NMED Final Order granting CAC with Controls status to the MWL became effective). All controls applicable to the MWL, including groundwater monitoring, are documented in the MWL LTMMP of the RCRA Permit.

Although radionuclides are being monitored and screened at the MWL, the information related to radionuclides is provided voluntarily by the DOE/National Nuclear Security Administration and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements imposed by the NMED, as specified in Section III.A of the Consent Order.

4.3 Scope of Activities

Semiannual groundwater sampling was conducted in May and November 2020 at the MWL. Groundwater samples were collected from four monitoring wells (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) and analyzed for VOCs; metals including cadmium, chromium, nickel, and total uranium; specific radionuclides by gamma spectroscopy; gross alpha/beta activity; radon-222; and tritium. Per the request of NMED (Kieling September 2019), groundwater samples were collected and analyzed during both events for 1,4-dioxane in addition to LTMMP-required analytes described above. The required two 1,4-dioxane sampling events were completed in CY 2020.

Table 4-3 lists the analytical parameters and the MWL monitoring wells sampled. The CY 2020 sampling was conducted in accordance with MWL LTMMP requirements and procedures outlined in the *Mixed*

Table 4-3. Analytical Parameters for the Mixed Waste Landfill Monitoring Wells, Calendar Year 2020

Analytical Parameters	Semiannual Event	
	May	November
VOCs	MWL-BW2 MWL-MW7 MWL-MW7 (Duplicate) MWL-MW8 MWL-MW9	MWL-BW2 MWL-MW7 MWL-MW8 MWL-MW8 (Duplicate) MWL-MW9
SVOCs: 1,4-dioxane		
Metals: Cadmium Chromium Nickel Uranium, total		
Radionuclides: Gamma Spectroscopy (short list[a]) Gross Alpha/Beta Activity Radon-222 Tritium		

NOTES:
[a]Gamma spectroscopy short list for the MWL includes americium-241, cesium-137, and cobalt-60.
BW = Background Well.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
SVOC = Semivolatile organic compound.
VOC = Volatile organic compound.

Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2020, 3rd Quarter Sampling (SNL April 2020) and the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2021, 1st Quarter Sampling* (SNL October 2020).

The MWL groundwater samples were submitted for analysis to GEL Laboratories, LLC in Charleston, South Carolina. All groundwater sampling results are compared with U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA March 2018).

Field and laboratory quality control (QC) samples are discussed in Section 1.3.3. Field QC samples included duplicate environmental, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Laboratory QC analyses included method blank, laboratory control sample, matrix spike, matrix spike duplicate, and surrogate spike analyses.

4.4 Field Methods and Measurements

Groundwater sampling and depth-to-groundwater measurements were conducted in accordance with the MWL LTMMP and procedures specified in the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plans* (SNL April 2020 and SNL October 2020), which are consistent with the methods described in Section 1.3. Water quality parameters measured in the field during the purging process include temperature, specific conductivity (SC), oxidation-reduction potential (ORP), potential for hydrogen (pH), and dissolved oxygen (DO) using an In-Situ Incorporated Aqua TROLL® 600 Multiparameter Water Quality Sonde. Turbidity was measured with a Hach™ Model 2100Q turbidity meter. Attachment 4A, Figures 4A-1 and 4A-2 (hydrographs) present groundwater elevation measurements at the MWL monitoring wells.

As specified in MWL LTMMP, Appendix F, Section 3.4, purging requirements at the MWL include specifications for making a "best faith effort" to decrease flow rates such that low yield wells do not purge dry. These specifications include equipping the portable Bennett™ groundwater sampling system with small diameter tubing and a flow meter valve located along the discharge line. In addition, during the purging process at wells with slow recharge rates, the flow rate is continually adjusted to achieve as low a flow rate as possible without causing the pump to be damaged or fail due to overheating. The purging volume requirement was achieved for all monitoring wells during CY 2020 sampling activities; no wells purged dry.

4.5 Analytical Methods

All groundwater samples were analyzed by the off-site laboratory using EPA-specified protocols as described in Section 1.3.2.

4.6 Summary of Analytical Results

Attachment 4B, Table 4B-1 presents the laboratory method detection limits (MDLs) for VOCs. Tables 4B-2, 4B-3, and 4B-4, present the analytical results for 1,4-dioxane, metals, and radiological constituents, respectively. Field water quality measurements are presented in Table 4B-5. Data qualifiers assigned by the analytical laboratory and the data validation process (SNL June 2017 and June 2020b) are presented with the associated results in Tables 4B-2, 4B-3, and 4B-4.

For the purposes of this report, the CY 2020 analytical results were compared with established EPA MCLs where applicable. No detected constituents exceeded the respective EPA MCLs. In addition, no results exceeded respective MWL trigger levels defined in Table 5.2.4-1 of the MWL LTMMP. The analytical results are discussed in detail in the following sections.

4.6.1 Volatile and Semivolatile Organic Compounds

Table 4B-1 summarizes the VOC MDLs; no VOCs were detected in any of the CY 2020 groundwater samples. Table 4B-2 presents the 1,4-dioxane analytical results; there were no detections above the MDL for 1,4-dioxane in the CY 2020 groundwater samples.

4.6.2 Metals

Table 4B-3 summarizes the CY 2020 analytical results for cadmium, chromium, nickel, and total uranium. Nickel and uranium were the only metal analytes detected above the MDL. No metal concentrations were reported above established EPA MCLs and all results are consistent with historical ranges.

4.6.3 Radiological Parameters

Table 4B-4 summarizes the CY 2020 analytical results for gamma-emitting radionuclides, gross alpha/beta activity, radon-222, and tritium. No radiological activities were reported above established EPA MCLs and all results are consistent with historical ranges.

Gross alpha activity is measured in accordance with 40 CFR Part 141 and used as a radiological screening tool. Naturally occurring uranium is measured independently (i.e., total uranium concentration determined by metals analysis described above) and the gross alpha activity measurements are corrected by subtracting the total uranium activity from the uncorrected gross alpha activity results. MWL radiological results are further reviewed by an SNL/NM Health Physicist to screen results for radiological anomalies that could indicate potential contamination and to confirm the samples are nonradioactive prior to offsite shipment. Corrected gross alpha activity results are below the EPA MCL of 15 picocuries per liter. Gross beta results are used as a radiological screening tool; results do not indicate the presence of a beta-emitting radionuclide that would exceed the established EPA MCL of 4 millirems per year. Tritium and gamma spectroscopy radionuclide activities were below the laboratory minimum detectable activity levels in all groundwater samples. All CY 2020 samples were determined as nonradioactive.

4.6.4 Water Quality Parameters

Table 4B-5 presents the field water quality parameters measured immediately before sampling at each well. These field parameters consist of temperature, SC, ORP, pH, turbidity, and DO.

4.7 Quality Control Results

Section 1.3.3 presents the purpose of each field and laboratory QC sample type. Field and laboratory QC sample results for MWL wells are discussed in the following sections.

4.7.1 Field Quality Control Samples

The QC samples collected in the field included environmental duplicate, EB, FB, and TB samples. Analytical results are discussed for each QC sample type in the following sections.

4.7.1.1 Environmental Duplicate Samples

Environmental duplicate samples were collected from monitoring wells MWL-MW7 (May) and MWL-MW8 (November) and analyzed for all constituents. The results for the environmental sample were compared to the results for the corresponding environmental duplicate sample. The relative percent difference (RPD) was calculated for constituents that were detected above the MDL in both samples.

CY 2020 sample pair (environmental sample and environmental duplicate sample) results show good correlation, with calculated RPD values ranging from less than 1 to 24. Nickel and uranium were the only constituents detected above the MDL in both sample pairs. Calculated RPD values are within the acceptable range of less than or equal to 35 for metals as defined in Appendix F of the MWL LTMMP.

4.7.1.2 Equipment Blank Samples

One EB sample (also referred to as a rinsate blank) associated with monitoring well MWL-MW7 (May) and one EB sample associated with monitoring well MWL-MW8 (November) were collected during the CY 2020 sampling events and submitted for all analyses.

2-butanone, acetone, bromodichloromethane, and chloroform were detected above MDLs in the May 2020 EB sample. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above MDLs in the November 2020 EB sample. No corrective action was required because these compounds were not detected in the associated environmental samples.

4.7.1.3 Field Blank Samples

Eight FB samples (four in May, four in November) were collected during the CY 2020 sampling events and submitted for VOC analysis. Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected in the May 2020 FB samples. Compounds detected in the November 2020 FB samples included acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was necessary because these compounds were not detected in the associated environmental samples.

4.7.1.4 Trip Blank Samples

Ten TB samples (five in May, five in November) were submitted with the CY 2020 environmental samples for analysis of VOCs. No VOCs were detected above MDLs in the CY 2020 TB samples.

4.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples were analyzed concurrently with the groundwater samples and included laboratory control samples, matrix spike and matrix spike duplicate samples, surrogate spike samples, and replicates samples. There were no data quality issues identified with the laboratory QC sample results associated with the May and November 2020 sampling events. All laboratory control sample results met the accuracy (i.e., percent recovery) requirement of 50 to 130 percent for VOCs and 75 to 125 percent for metals (Section 2.1 of LTMMP Appendix F), except for acetone, 2-butanone, and vinyl chloride in the November 2020 laboratory QC samples. These compounds recovered outside LTMMP limits but within laboratory and analytical method acceptance limits. Internal laboratory QC sample results were within laboratory and analytical method acceptance limits.

4.8 Variances and Non-Conformances

All analytical and field methods were performed according to the requirements specified in the MWL LTMMP and associated *Mixed Waste Landfill, Mini-Sampling and Analysis Plans*. There were no variances and/or nonconformances from requirements during CY 2020 sampling activities as defined in the MWL LTMMP, Appendix F, Section 6.

All environmental sample, field QC sample, and laboratory QC sample results were reviewed and qualified in accordance with Administrative Operating Procedure AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2017 and June 2020b). All data were in compliance with analytical methods and laboratory procedures.

4.9 Summary and Conclusions

During CY 2020, groundwater samples were collected from the MWL compliance monitoring wells (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) in May and November 2020 in accordance with the MWL LTMMP. Groundwater samples were analyzed for VOCs; metals including cadmium, chromium, nickel, and total uranium; specific radionuclides by gamma spectroscopy; gross alpha/beta activity; radon-222; and tritium. Per the request of NMED (Kieling September 2019), groundwater samples were collected and analyzed during both CY 2020 sampling events for 1,4-dioxane. Based on the field and laboratory QC sample and data validation results, the CY 2020 groundwater monitoring data meet data quality objectives and are in compliance with analytical methods and laboratory procedures. No analytes were detected at concentrations exceeding established EPA MCLs or MWL trigger levels defined in Table 5.2.4-1 of the MWL LTMMP. The required two 1,4-dixoane sampling events were completed in CY 2020 and all results were non detect.

4.10 Summary of Future Activities

All monitoring, inspection, and maintenance requirements will continue to be performed and documented as required by the MWL LTMMP. Groundwater monitoring of the four compliance monitoring wells will continue on a semiannual basis and results will be documented in both comprehensive MWL Annual LTMM Reports (submitted to NMED in June of each year) and in future Annual Groundwater Monitoring Reports.

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Attachment 4A
Mixed Waste Landfill
Hydrographs

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Attachment 4A Hydrographs

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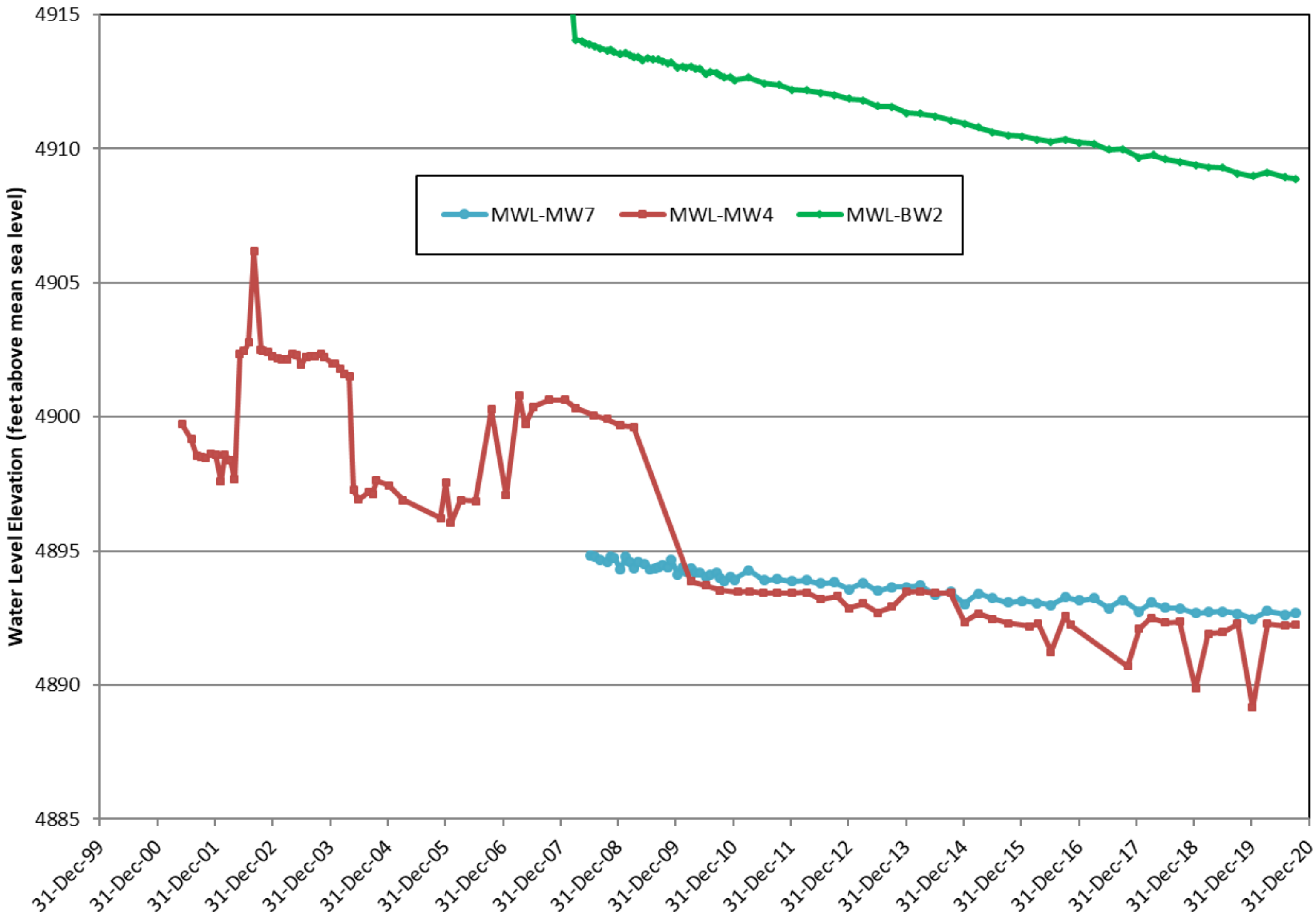

Note: GW Elevation corrected for 6°angle for MWL-MW4

Figure 4A-1. Mixed Waste Landfill Groundwater Monitoring Wells (1 of 2)

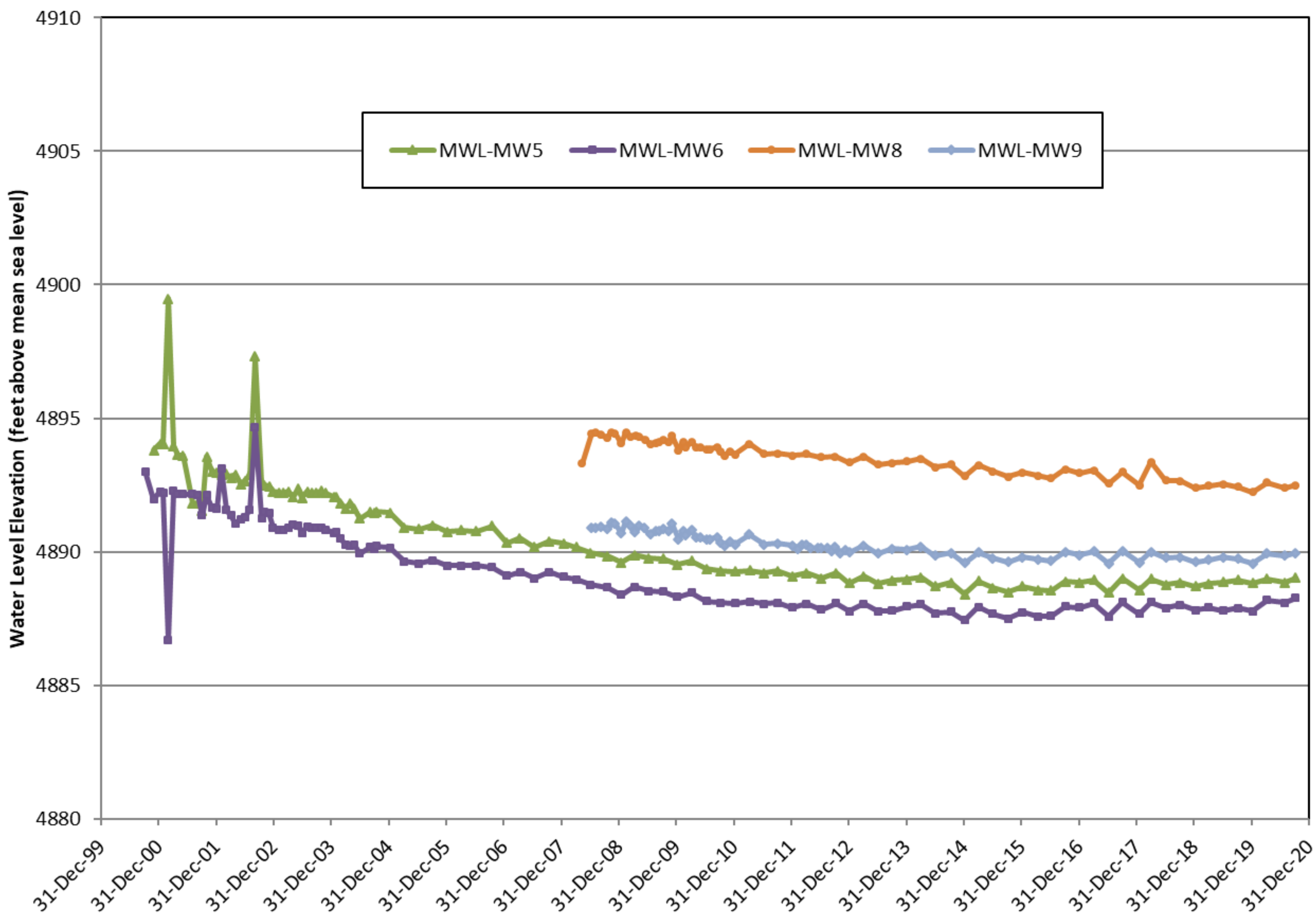

Figure 4A-2. Mixed Waste Landfill Groundwater Monitoring Wells (2 of 2)

Attachment 4B
Mixed Waste Landfill
Analytical Results Tables

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Attachment 4B Tables

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Table 4B-1
Method Detection Limits for Volatile Organic Compounds (Method[g] SW846-8260B), Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300
1,1,2,2-Tetrachloroethane	0.300
1,1,2-Trichloroethane	0.300
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.300
1,2-Dichloropropane	0.300
2-Butanone	1.50
2-Hexanone	1.50
4-Methyl-2-pentanone	1.50
Acetone	1.50
Benzene	0.300
Bromodichloromethane	0.300
Bromoform	0.300
Bromomethane	0.300
Carbon disulfide	1.50
Carbon tetrachloride	0.300
Chlorobenzene	0.300
Chloroethane	0.300
Chloroform	0.300
Chloromethane	0.300
Dibromochloromethane	0.300
Dichlorodifluoromethane	0.300
Ethyl benzene	0.300
Methylene chloride	1.00
Styrene	0.300
Tetrachloroethene	0.300
Toluene	0.300
Trichloroethene	0.300
Vinyl acetate	1.50
Vinyl chloride	0.300
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.300
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.300

Refer to footnotes on page 4B-13.

Table 4B-2
Summary of 1,4-Dioxane Results,
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (μg/L)	MDL[b] (μg/L)	PQL[c] (μg/L)	MCL[d] (μg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2 04-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112847-007	SW846-8270D
MWL-MW7 05-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112861-007	SW846-8270D
MWL-MW7 (Duplicate) 05-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112862-007	SW846-8270D
MWL-MW8 07-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112868-007	SW846-8270D
MWL-MW9 06-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112865-007	SW846-8270D
MWL-BW2 09-Nov-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113952-002	SW846-8270D
MWL-MW7 10-Nov-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113955-002	SW846-8270D
MWL-MW8 12-Nov-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113961-002	SW846-8270D
MWL-MW8 (Duplicate) 12-Nov-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113962-002	SW846-8270D
MWL-MW9 11-Nov-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	UJ	113958-002	SW846-8270D

Refer to footnotes on page 4B-13.

Table 4B-3
Summary of Cadmium, Chromium, Nickel, and Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2	Cadmium	ND	0.0003	0.001	0.005	U		112847-002	SW846-6020B
04-May-20	Chromium	ND	0.003	0.010	0.100	U		112847-002	SW846-6020B
	Nickel	0.00202	0.0006	0.002	NE			112847-002	SW846-6020B
	Uranium	0.00747	0.000067	0.0002	0.030			112847-002	SW846-6020B
MWL-MW7	Cadmium	ND	0.0003	0.001	0.005	U		112861-002	SW846-6020B
05-May-20	Chromium	ND	0.003	0.010	0.10	U		112861-002	SW846-6020B
	Nickel	0.00126	0.0006	0.002	NE	J		112861-002	SW846-6020B
	Uranium	0.00797	0.000067	0.0002	0.030			112861-002	SW846-6020B
MWL-MW7 (Duplicate)	Cadmium	ND	0.0003	0.001	0.005	U		112862-002	SW846-6020B
05-May-20	Chromium	ND	0.003	0.010	0.100	U		112862-002	SW846-6020B
	Nickel	0.00099	0.0006	0.002	NE	J		112862-002	SW846-6020B
	Uranium	0.00781	0.000067	0.0002	0.030			112862-002	SW846-6020B
MWL-MW8	Cadmium	ND	0.0003	0.001	0.005	U		112868-002	SW846-6020B
07-May-20	Chromium	ND	0.003	0.010	0.10	U		112868-002	SW846-6020B
	Nickel	ND	0.0006	0.002	NE	U		112868-002	SW846-6020B
	Uranium	0.00815	0.000067	0.0002	0.030			112868-002	SW846-6020B
MWL-MW9	Cadmium	ND	0.0003	0.001	0.005	U		112865-002	SW846-6020B
06-May-20	Chromium	ND	0.003	0.010	0.10	U		112865-002	SW846-6020B
	Nickel	ND	0.0006	0.002	NE	U		112865-002	SW846-6020B
	Uranium	0.00890	0.000067	0.0002	0.030			112865-002	SW846-6020B
MWL-BW2	Cadmium	ND	0.0003	0.001	0.005	U		113952-003	SW846-6020B
09-Nov-20	Chromium	ND	0.003	0.010	0.100	U		113952-003	SW846-6020B
	Nickel	0.000781	0.0006	0.002	NE	J		113952-003	SW846-6020B
	Uranium	0.00659	0.000067	0.0002	0.030			113952-003	SW846-6020B
MWL-MW7	Cadmium	ND	0.0003	0.001	0.005	U		113955-003	SW846-6020B
10-Nov-20	Chromium	ND	0.003	0.010	0.10	U		113955-003	SW846-6020B
	Nickel	0.000666	0.0006	0.002	NE	J		113955-003	SW846-6020B
	Uranium	0.00771	0.000067	0.0002	0.030			113955-003	SW846-6020B
MWL-MW8	Cadmium	ND	0.0003	0.001	0.005	U		113961-003	SW846-6020B
12-Nov-20	Chromium	ND	0.003	0.010	0.10	U		113961-003	SW846-6020B
	Nickel	0.000731	0.0006	0.002	NE	J		113961-003	SW846-6020B
	Uranium	0.00755	0.000067	0.0002	0.030	B		113961-003	SW846-6020B

Refer to footnotes on page 4B-13.

Table 4B-3 *(Concluded)*
Summary of Cadmium, Chromium, Nickel, and Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW8 (Duplicate) 12-Nov-20	Cadmium	ND	0.0003	0.001	0.005	U		113962-003	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113962-003	SW846-6020B
	Nickel	0.000730	0.0006	0.002	NE	J		113962-003	SW846-6020B
	Uranium	0.00757	0.000067	0.0002	0.030	B		113962-003	SW846-6020B
MWL-MW9 11-Nov-20	Cadmium	ND	0.0003	0.001	0.005	U		113958-003	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113958-003	SW846-6020B
	Nickel	0.000693	0.0006	0.002	NE	J		113958-003	SW846-6020B
	Uranium	0.00901	0.000067	0.0002	0.030			113958-003	SW846-6020B

Refer to footnotes on page 4B-13.

Table 4B-4
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Radon, and Tritium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2	Americium-241	14.0 ± 16.7	25.6	12.4	NE	U	BD	112847-003	EPA 901.1
04-May-20	Cesium-137	1.56 ± 2.25	3.62	1.70	NE	U	BD	112847-003	EPA 901.1
	Cobalt-60	0.459 ± 2.54	4.52	2.09	NE	U	BD	112847-003	EPA 901.1
	Gross Alpha	2.40	NA	NA	15 pCi/L	NA	None	112847-004	EPA 900.0
	Gross Beta	5.12 ± 1.02	1.48	0.721	4 mrem/yr			112847-004	EPA 900.0
	Tritium	16.4 ± 97.7	176	80.5	4 mrem/yr	U	BD	112847-005	EPA 906.0M
	Radon-222	559 ± 139	69.7	32.9	4000 pCi/L			112847-006	SM7500 Rn B
MWL-MW7	Americium-241	1.62 ± 6.97	10.8	5.25	NE	U	BD	112861-003	EPA 901.1
05-May-20	Cesium-137	-1.68 ± 3.37	3.17	1.50	NE	U	BD	112861-003	EPA 901.1
	Cobalt-60	0.201 ± 2.07	3.32	1.54	NE	U	BD	112861-003	EPA 901.1
	Gross Alpha	3.82	NA	NA	15 pCi/L	NA	None	112861-004	EPA 900.0
	Gross Beta	5.51 ± 0.851	1.12	0.541	4 mrem/yr			112861-004	EPA 900.0
	Tritium	5.83 ± 101	184	84.0	4 mrem/yr	U	BD	112861-005	EPA 906.0M
	Radon-222	123 ± 48.6	59.3	28.0	4000 pCi/L		J	112861-006	SM7500 Rn B
MWL-MW7 (Duplicate)	Americium-241	0.369 ± 5.61	8.97	4.36	NE	U	BD	112862-003	EPA 901.1
05-May-20	Cesium-137	-1.26 ± 2.55	3.02	1.43	NE	U	BD	112862-003	EPA 901.1
	Cobalt-60	1.09 ± 1.86	3.39	1.58	NE	U	BD	112862-003	EPA 901.1
	Gross Alpha	4.97	NA	NA	15 pCi/L	NA	None	112862-004	EPA 900.0
	Gross Beta	5.92 ± 0.952	1.33	0.644	4 mrem/yr			112862-004	EPA 900.0
	Tritium	-34.9 ± 91.2	174	79.5	4 mrem/yr	U	BD	112862-005	EPA 906.0M
	Radon-222	174 ± 57.4	59.4	28.0	4000 pCi/L		J	112862-006	SM7500 Rn B
MWL-MW8	Americium-241	10.5 ± 18.3	29.2	14.1	NE	U	BD	112868-003	EPA 901.1
07-May-20	Cesium-137	2.04 ± 2.25	3.81	1.82	NE	U	BD	112868-003	EPA 901.1
	Cobalt-60	0.965 ± 2.03	3.83	1.77	NE	U	BD	112868-003	EPA 901.1
	Gross Alpha	3.70	NA	NA	15 pCi/L	NA	None	112868-004	EPA 900.0
	Gross Beta	5.31 ± 0.899	1.25	0.604	4 mrem/yr			112868-004	EPA 900.0
	Tritium	108 ± 109	177	80.9	4 mrem/yr	U	BD	112868-005	EPA 906.0M
	Radon-222	160 ± 60.3	70.3	33.0	4000 pCi/L		J	112868-006	SM7500 Rn B

Refer to footnotes on page 4B-13.

Table 4B-4 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Radon, and Tritium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW9	Americium-241	17.1 ± 18.0	26.8	13.1	NE	U	BD	112865-003	EPA 901.1
06-May-20	Cesium-137	-0.00552 ± 2.23	3.91	1.85	NE	U	BD	112865-003	EPA 901.1
	Cobalt-60	-0.237 ± 2.59	4.48	2.07	NE	U	BD	112865-003	EPA 901.1
	Gross Alpha	3.46	NA	NA	15 pCi/L	NA	None	112865-004	EPA 900.0
	Gross Beta	6.33 ± 0.758	0.862	0.411	4 mrem/yr			112865-004	EPA 900.0
	Tritium	-54.6 ± 93.2	181	82.9	4 mrem/yr	U	BD	112865-005	EPA 906.0M
	Radon-222	550 ± 142	83.9	39.4	4000 pCi/L			112865-006	SM7500 Rn B
MWL-BW2	Americium-241	0.367 ± 3.87	6.93	3.36	NE	U	BD	113952-004	EPA 901.1
09-Nov-20	Cesium-137	-1.03 ± 1.73	2.69	1.26	NE	U	BD	113952-004	EPA 901.1
	Cobalt-60	0.111 ± 1.58	2.96	1.36	NE	U	BD	113952-004	EPA 901.1
	Gross Alpha	2.34	NA	NA	15 pCi/L	NA	None	113952-005	EPA 900.0
	Gross Beta	4.39 ± 1.21	1.88	0.920	4 mrem/yr		J	113952-005	EPA 900.0
	Tritium	11.5 ± 80.3	145	66.4	4 mrem/yr	U	BD	113952-006	EPA 906.0M
	Radon-222	509 ± 125	59.2	28.0	4000 pCi/L			113952-007	SM7500 Rn B
MWL-MW7	Americium-241	3.43 ± 6.75	10.5	5.09	NE	U	BD	113955-004	EPA 901.1
10-Nov-20	Cesium-137	0.284 ± 1.79	3.13	1.48	NE	U	BD	113955-004	EPA 901.1
	Cobalt-60	2.56 ± 2.09	3.36	1.54	NE	U	BD	113955-004	EPA 901.1
	Gross Alpha	7.43	NA	NA	15 pCi/L	NA	None	113955-005	EPA 900.0
	Gross Beta	5.73 ± 1.10	1.61	0.784	4 mrem/yr			113955-005	EPA 900.0
	Tritium	-19.8 ± 80.1	151	68.9	4 mrem/yr	U	BD	113955-006	EPA 906.0M
	Radon-222	81.1 ± 47.1	69.5	33.0	4000 pCi/L		J	113955-007	SM7500 Rn B
MWL-MW8	Americium-241	3.03 ± 17.6	20.3	9.69	NE	U	BD	113961-004	EPA 901.1
12-Nov-20	Cesium-137	1.31 ± 1.95	3.62	1.68	NE	U	BD	113961-004	EPA 901.1
	Cobalt-60	0.660 ± 2.03	4.03	1.80	NE	U	BD	113961-004	EPA 901.1
	Gross Alpha	4.52	NA	NA	15 pCi/L	NA	None	113961-005	EPA 900.0
	Gross Beta	5.28 ± 0.824	1.08	0.520	4 mrem/yr			113961-005	EPA 900.0
	Tritium	-65.3 ± 77.6	155	70.8	4 mrem/yr	U	BD	113961-006	EPA 906.0M
	Radon-222	170 ± 68.1	83.3	39.2	4000 pCi/L		J	113961-007	SM7500 Rn B

Refer to footnotes on page 4B-13.

Table 4B-4 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Radon, and Tritium Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW8 (Duplicate)	Americium-241	3.98 ± 7.41	12.2	5.92	NE	U	BD	113962-004	EPA 901.1
12-Nov-20	Cesium-137	-0.320 ± 2.05	3.69	1.73	NE	U	BD	113962-004	EPA 901.1
	Cobalt-60	0.0368 ± 2.29	4.08	1.87	NE	U	BD	113962-004	EPA 901.1
	Gross Alpha	6.83	NA	NA	15 pCi/L	NA	None	113962-005	EPA 900.0
	Gross Beta	5.68 ± 1.00	1.44	0.697	4 mrem/yr			113962-005	EPA 900.0
	Tritium	-33.7 ± 73.8	142	65.0	4 mrem/yr	U	BD	113962-006	EPA 906.0M
	Radon-222	157 ± 66.1	83.5	39.3	4000 pCi/L		J	113962-007	SM7500 Rn B
MWL-MW9	Americium-241	6.88 ± 7.53	11.6	5.61	NE	U	BD	113958-004	EPA 901.1
11-Nov-20	Cesium-137	-1.13 ± 1.83	2.62	1.23	NE	U	BD	113958-004	EPA 901.1
	Cobalt-60	0.952 ± 1.66	3.15	1.45	NE	U	BD	113958-004	EPA 901.1
	Gross Alpha	3.77	NA	NA	15 pCi/L	NA	None	113958-005	EPA 900.0
	Gross Beta	4.72 ± 0.942	1.33	0.646	4 mrem/yr			113958-005	EPA 900.0
	Tritium	-54.2 ± 78.1	153	70.2	4 mrem/yr	U	BD	113958-006	EPA 906.0M
	Radon-222	449 ± 112	60.2	28.5	4000 pCi/L			113958-007	SM7500 Rn B

Refer to footnotes on page 4B-13.

Table 4B-5
Summary of Field Water Quality Measurements[h]
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
MWL-BW2	04-May-20	22.38	715.59	95.0	7.29	2.07	24.98	2.02
MWL-MW7	05-May-20	20.47	631.27	136.0	7.51	0.33	69.10	5.81
MWL-MW8	07-May-20	22.34	618.43	155.9	7.43	0.32	36.77	3.87
MWL-MW9	06-May-20	22.98	619.58	169.3	7.40	1.00	14.30	1.12
MWL-BW2	09-Nov-20	18.71	661.65	121.6	7.35	2.48	36.38	2.77
MWL-MW7	10-Nov-20	16.57	524.80	228.6	7.59	1.15	74.85	6.38
MWL-MW8	12-Nov-20	18.63	545.13	230.6	7.50	1.93	39.47	3.23
MWL-MW9	11-Nov-20	17.72	544.13	181.5	7.48	2.91	18.59	1.44

Refer to footnotes on page 4B-13.

Footnotes for Mixed Waste Landfill Groundwater Analytical Results Tables

% = Percent.
BW = Background well.
CFR = Code of Federal Regulations.
EPA = U.S. Environmental Protection Agency.
GWM = Groundwater Monitoring.
ID = Identifier.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
mrem/yr = Millirem per year.
MW = Monitoring well.
MWL = Mixed Waste Landfill.
No. = Number.
pCi/L = Picocuries per liter.

[a]Result or Activity
Result applies to Table 4B-2 and 4B-3. Activity applies to Table 4B-4.
Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR 141).
Activities of zero or less are considered not detected.

Bold = Value exceed the established MCL.
ND = not detected (at method detection limit).
Activities of zero or less are considered to be not detected.

[b]MDL or MDA
The MDL applies to Table 4B-1 through 4B-3. MDA applies to Table 4B-4.

MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.
MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.
NA = Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level
The PQL applies to Table 4A-2 and 4A-3. Critical Level applies to Table 4A-4.

Critical Level = The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
NA = Not applicable for gross alpha activities. The critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[d]MCL

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards, (EPA March 2018).
The following are the MCLs for gross alpha particles and beta particles in community water systems:

- 15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table 1-4).
- 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

NE = Not established.

Footnotes for Mixed Waste Landfill Groundwater Analytical Results Tables (Concluded)

[e]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

B	= The analyte was detected in the blank above the effective MDL.
J	= Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N	= Results associated with a spike analysis that was outside control limits.
NA	= Not applicable.
U	= Analyte is absent or below the method detection limit.

[f]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

BD	= Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J	= The associated value is an estimated quantity.
None	= No data validation for corrected gross alpha activity.
UJ	= The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method
Standard Methods for the Examination of Water and Wastewater, 23rd ed., 2017, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

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SM	= Standard Method.
SW	= Solid Waste.

[h]Field Water Quality Measurements
Field measurements collected prior to sampling.

°C	= Degrees Celsius
% Sat	= Percent saturation
µmho/cm	= Micromhos per centimeter
mg/L	= Milligrams per liter
mV	= Millivolts
NTU	= Nephelometric turbidity units
pH	= Potential of hydrogen (negative logarithm of the hydrogen ion concentration)

Chapter 4
Mixed Waste Landfill
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5.0 Technical Area-V Groundwater Area of Concern

5.1 Introduction

Trichloroethene (TCE) and nitrate have been identified as constituents of concern (COCs) in groundwater at the Technical Area (TA)-V Groundwater (TAVG) Area of Concern (AOC) based on detections above the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs). Low concentrations of TCE and nitrate have consistently been detected in the Regional Aquifer that is present at approximately 500 feet (ft) below ground surface (bgs). The EPA MCLs and State of New Mexico drinking water standards for TCE and nitrate (as nitrogen) are 5 micrograms per liter (µg/L) and 10 milligrams per liter (mg/L), respectively. Since 1993, the maximum concentrations detected in groundwater at the TAVG AOC have been 26 µg/L of TCE and 19 mg/L of nitrate (as nitrogen). In 2017, a Treatability Study of in-situ bioremediation (ISB) was implemented to evaluate the effectiveness of using ISB as a potential technology to treat the groundwater contamination at the TAVG AOC (Section 5.1.7).

5.1.1 Location

TA-V is located in the west-central portion of Kirtland Air Force Base (KAFB), south of the City of Albuquerque (Figure 5-1 and Plate 1). TA-V occupies approximately 35 acres (of which 26 acres are Limited Area accessible to authorized personnel only) at the northeast corner of TA-III at Sandia National Laboratories, New Mexico (SNL/NM).

The vadose zone at TA-V is approximately 500 ft thick and consists of heterogeneous, lenticular, coarse- to fine-grained deposits. The underlying aquifer consists of unconsolidated fine-grained, clay-rich, alluvial fan sediments. Groundwater flows predominantly from east to west. To the west of TA-V, groundwater flow becomes more northerly in response to pumping from the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) production wells located north of KAFB, and from the production wells located in the northern portion of KAFB.

5.1.2 Site History

TA-V was established in 1961 to test radiation effects on components and has hosted multiple generations of research reactors, the Gamma Irradiation Facility, the Low-Dose-Rate Irradiation Facility, and the Hot Cell Facilities. Historically, wastewater derived from TA-V facilities was disposed of at the Liquid Waste Disposal System (LWDS) Drain Field, the two unlined LWDS Surface Impoundments, and the TA-V Seepage Pits.

Since 1992, SNL/NM Environmental Restoration (ER) Operations personnel have conducted numerous investigations in the TAVG AOC. Table 5A-1 in Attachment 5A provides the historic timeline for the TAVG AOC investigations. Many of these investigations (soil and soil vapor) were site-specific and were conducted for supporting various Solid Waste Management Unit (SWMU) assessments. The majority of the SWMU investigations involved shallow soil contamination. Where required, contaminated soil was excavated and removed. The New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) has granted Corrective Action Complete status to all 21-soil site SWMUs in the TAVG AOC (SNL September 2015). Only the groundwater issue remains.

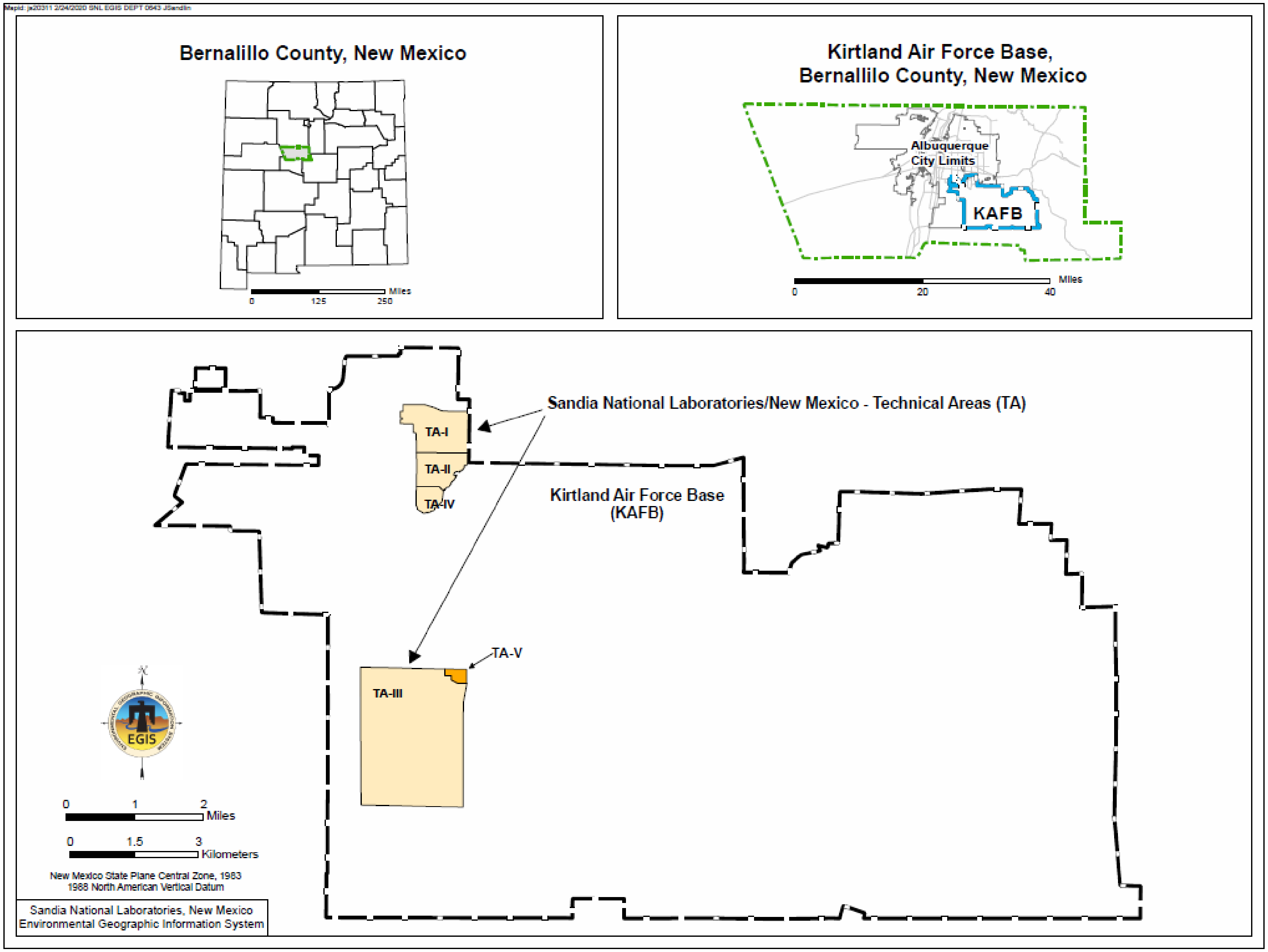

Figure 5-1. Location of Sandia National Laboratories, New Mexico and Technical Area-V

5.1.3 Monitoring History

Early groundwater investigations relevant to the TAVG AOC were typically regional in scope and were conducted by the SNL/NM Site-Wide Hydrogeologic Characterization Project (SNL February 1998).

Groundwater monitoring at TA-V began in October 1992. TCE was first detected in monitoring well LWDS-MW1 in November 1993 and was first detected above the MCL of 5 µg/L in the same well in September 1995. Since then, low concentrations of TCE have been consistently detected at several monitoring wells. Nitrate was first detected above the MCL of 10 mg/L in monitoring well LWDS-MW1 in December 1995. Since 1992, 20 groundwater monitoring wells have been installed and two of the 20 have gone dry (Table 5-1). Groundwater monitoring results for the TAVG AOC monitoring network continue to be summarized in the Annual Groundwater Monitoring Reports (AGMRs).

Three soil-vapor monitoring wells were installed at the TAVG AOC in 2011. Soil-vapor samples were collected for eight consecutive quarters starting in April 2011 and concluding in March 2013. Samples were analyzed for volatile organic compounds (VOCs), including TCE. The analytical results were reported in Attachment 5D of the Calendar Year (CY) 2013 AGMR (SNL June 2014), and are summarized in Section 5.1.6.5.

5.1.4 Current Monitoring Network

In CY 2020, all 18 active monitoring wells in the TAVG AOC were sampled and measured for water levels for site-characterization purposes (Figure 5-2; Table 5-1). Table XI-1 of the Compliance Order on Consent (Consent Order) specified a quarterly sampling frequency for groundwater monitoring at TA-V (NMED April 2004). However, the sampling frequency was revised in accordance with the Revised Treatability Study Work Plan (TSWP) (SNL March 2016) as approved by NMED HWB (NMED HWB May 2016a). The new sampling protocol started in CY 2017.

Monitoring well TAV-MW6 and injection well TAV-INJ1 (Table 5-1) are part of an on-going ISB Treatability Study conducted at the TAVG AOC and follow a separate monitoring plan in accordance with the Revised TSWP (SNL March 2016). Monitoring for the ISB Treatability Study is discussed in Section 5.1.7.

5.1.5 Summary of Calendar Year 2020 Activities

The following activities were conducted for the TAVG AOC during CY 2020:

- Obtained quarterly water level measurements.

- Prepared mini-sampling and analysis plans (SAPs) using a combination of quarterly and annual frequencies. The sampling events were conducted in February, May/June, August, and November/December 2020.

- Prepared a set of summary tables for the analytical results (Attachment 5B), concentration versus time plots (Attachment 5C), and hydrographs (Attachment 5D).

- Per request of NMED HWB, groundwater samples were collected and analyzed for 1,4-dioxane (NMED HWB September 2019). The 1,4-dixoane sampling events and results are discussed in Section 5.6.

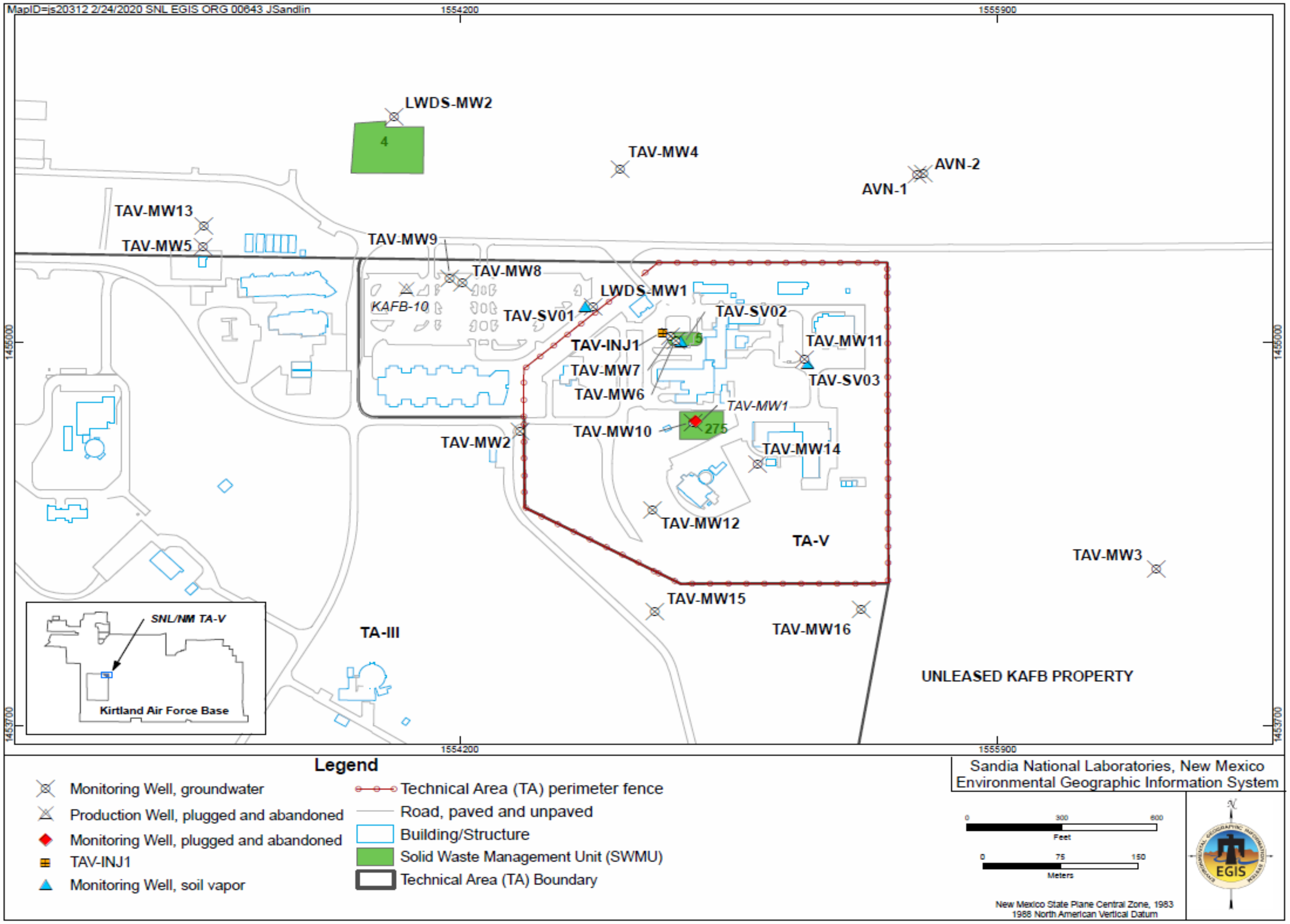

Figure 5-2. Technical Area-V Groundwater Area of Concern Monitoring Well Locations

Table 5-1. Groundwater Monitoring and Injection Wells Screened in the Regional Aquifer at the Technical Area-V Groundwater Area of Concern

Well ID	Installation Year	WQ[a]	WL[a]	Comments
AVN-1	1995	✓	✓	Deeper completion (570–590 ft bgs)
AVN-2	1995	NA	NA	Water table completion (492-515 ft bgs), dry since April 2008
LWDS-MW1	1993	✓	✓	Water table completion (495-515 ft bgs)
LWDS-MW2	1992	✓	✓	Water table completion (506-526 ft bgs)
TAV-INJ1[b]	2017	✓*	✓*	Water table completion (509-539 ft bgs)
TAV-MW1	1995	NA	NA	Water table completion (489.5-509.5 ft bgs), P&A in February 2008
TAV-MW2	1995	✓	✓	Water table completion (497-513.5 ft bgs)
TAV-MW3	1997	✓	✓	Water table completion (532-552 ft bgs)
TAV-MW4	1997	✓	✓	Water table completion (495-515 ft bgs)
TAV-MW5	1997	✓	✓	Water table completion (487-507 ft bgs)
TAV-MW6	2001	✓*	✓	Water table completion (507-527 ft bgs)
TAV-MW7	2001	✓	✓	Deeper completion (597–617 ft bgs)
TAV-MW8	2001	✓	✓	Water table completion (491-511 ft bgs)
TAV-MW9	2001	✓	✓	Deeper completion (582–602 ft bgs)
TAV-MW10	2008	✓	✓	Water table completion (508-528 ft bgs), replaced TAV-MW1
TAV-MW11	2010	✓	✓	Water table completion (512-532 ft bgs)
TAV-MW12	2010	✓	✓	Water table completion (507-527 ft bgs)
TAV-MW13	2010	✓	✓	Deeper completion (525–545 ft bgs)
TAV-MW14	2010	✓	✓	Water table completion (512-532 ft bgs)
TAV-MW15	2017	✓	✓	Water table completion (516-541ft bgs)
TAV-MW16	2017	✓	✓	Water table completion (527-552 ft bgs)
Total	NA	17	18	Total for AGMR reporting

NOTES:

[a] Check marks (✓) indicate WQ sampling and WL measurements were obtained during this reporting period. Check marks with an asterisk (✓*) indicate that results are solely presented in the ER Operations Quarterly Reports that are submitted to NMED HWB separately.

[b] Injection well TAV-INJ1 has two screens installed in a single borehole. The 5-inch-diameter monitoring screen extends from 509 to 539 ft bgs. The 1.5-inch diameter injection screen extends from 519 to 539 ft bgs). The primary filter pack (2-millimeter SiLibeads®) extends from 504 to 544.5 ft bgs.

AGMR = Annual Groundwater Monitoring Report.
AVN = Area-V (North).
bgs = Below ground surface.
ER = Environmental Restoration.
ft = Foot (feet).
HWB = Hazardous Waste Bureau.
ID = Identifier.
INJ = Injection Well.
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
NA = Not applicable.
NMED = New Mexico Environment Department.
P&A = Plugged and abandoned (decommissioned).
TAV = Technical Area-V (monitoring well designation).
WL = Water level.
WQ = Water quality.

- Conducted quarterly groundwater sampling to evaluate the performance of the ISB Treatability Study Phase I full-scale test. Collected groundwater samples for the ISB Treatability Study parameters specified in the Revised TSWP (SNL March 2016). The monitoring results are reported in the ER Operations Quarterly Reports that are submitted to NMED HWB.

- Collected groundwater samples for Discharge Permit (DP) 1845 (DP-1845) compliance activities involving the DP-specific analytes. The corresponding analytical results are reported in the DP-1845 Quarterly Reports that are submitted to the NMED Ground Water Quality Bureau (GWQB).

5.1.6 Conceptual Site Model

This section summarizes the Conceptual Site Model (CSM) for the TAVG AOC (Figure 5-3). The CSM was updated in 2015 and illustrates the geological and hydrogeological framework, contaminant sources, and the distribution and migration paths of contaminants in the subsurface at TA-V (SNL September 2015).

5.1.6.1 Regional Hydrogeologic Conditions

TA-V is located within the Albuquerque Basin of the Rio Grande Rift in north-central New Mexico. The Rio Grande Rift is marked by a series of sediment-filled structural basins and adjoining uplifted mountain ranges. One of these basins, the Albuquerque Basin (also known as the Middle Rio Grande Basin), covers about 3,060 square miles in central New Mexico and extends from Cochiti Reservoir on the north to San Acacia, New Mexico on the south. The Albuquerque Basin includes TA-V and the western portion of KAFB.

The sedimentary deposits of the Santa Fe Group (SFG) and overlying alluvium that fill the Albuquerque Basin contain the regional SFG aquifer system. This aquifer system provides the primary source of municipal, domestic, and industrial water in the Albuquerque area. The structure of the aquifer system within the Middle Rio Grande Basin is complex (Bartolino and Cole 2002). The major hydrostratigraphic units in the aquifer are tabular and wedge-shaped bodies that are truncated and displaced by numerous faults. Few of the major units are present continuously throughout the basin, and most “pinch out” against the subsurface basement blocks. These major units are hundreds to thousands of ft thick, extend over tens of square miles, and primarily consist of unconsolidated and partially cemented deposits that interfinger in complex arrangements.

TA-V is largely underlain by a thick section of alluvial fan deposits. The alluvial fan lithofacies are subdivided into lower and upper sections. The lower section consists of a fine-grained, clay-rich unit. This unit has been identified as low-energy piedmont deposits derived from upland soil that developed during a preglacial humid climate. The upper section consists of relatively coarse-grained sediments deposited in a higher-energy environment. The total thickness of the alluvial fan deposits are typically thousands of ft thick. The water table of the SFG aquifer is located in the fine-grained lower unit of alluvial fan deposits. The post-SFG alluvial fan deposits blanket the area around TA-V and compose the upper few tens of feet of the vadose zone. These deposits were derived primarily from alluvial fans that developed from Coyote Canyon to the east.

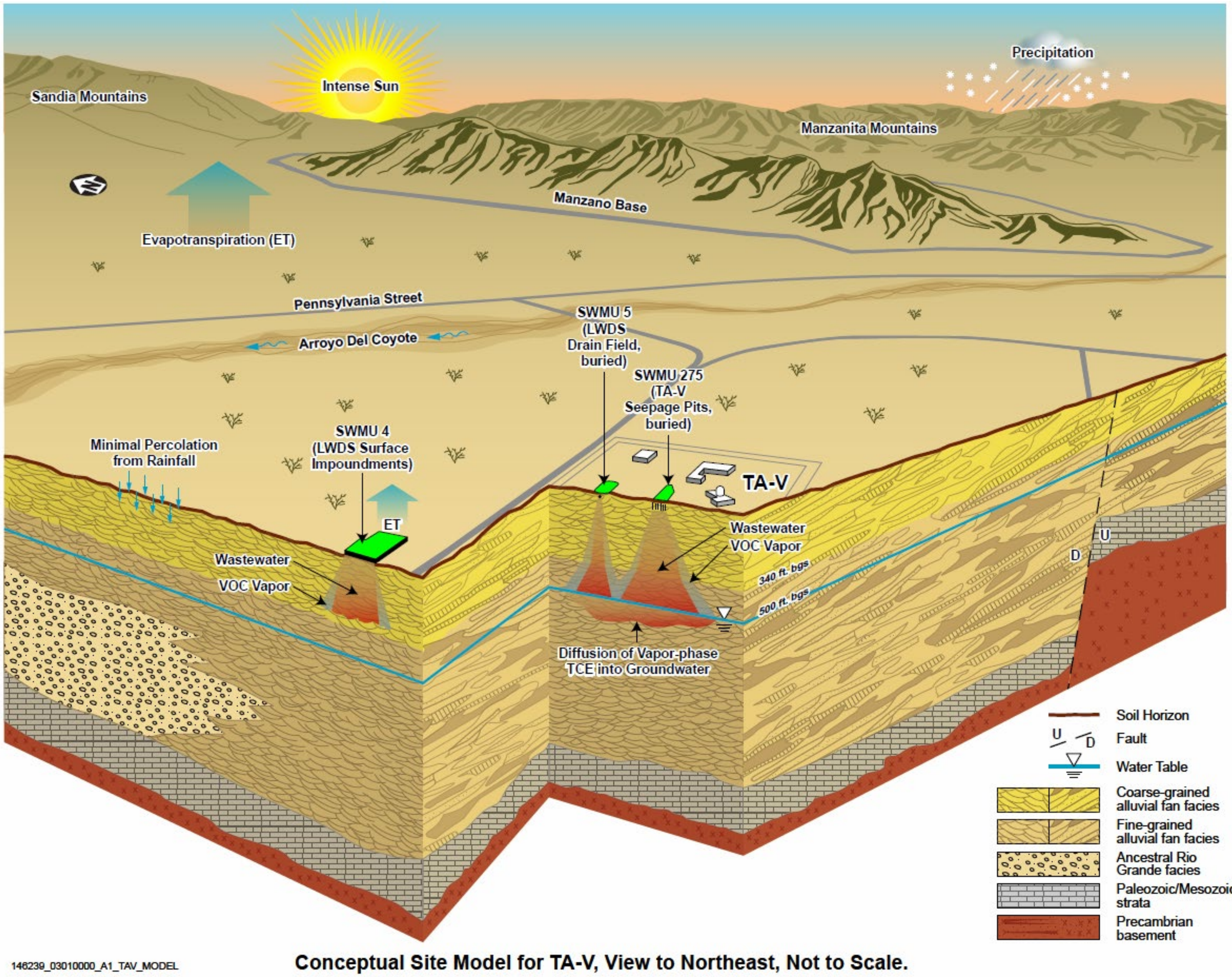

Figure 5-3. Conceptual Site Model for the Technical Area-V Groundwater Area of Concern (SNL September 2015)

Prior to development of water resources in the Albuquerque area, the groundwater flow direction in the Albuquerque Basin was generally from the north to the south, with a westward component of flow from recharge areas along mountain-front boundaries to the east (Bartolino and Cole 2002). As the SFG – Regional Aquifer was developed as a source for municipal and industrial water supplies, groundwater flow directions were altered toward production wells to the north of TA-V. A minor amount of discharge occurs as groundwater moves out of the Albuquerque Basin into downgradient basins along the Rio Grande Rift as underflow or through discharge to the Rio Grande.

5.1.6.2 Hydrologic Conditions at the TAVG AOC

Average annual precipitation is approximately 9.48 inches for the Albuquerque area (Chapter 2.6.2.1). Most precipitation falls between July and October, mainly in the form of brief, heavy rains associated with thunderstorms. Potential evapotranspiration in the Albuquerque area greatly exceeds precipitation. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall. Precipitation as a source of aquifer recharge is considered minimal and is unlikely to be a mechanism for transporting contaminants through the approximately 500-ft thick vadose zone.

Tijeras Arroyo and Arroyo del Coyote are located to the north and northeast of TA-V, respectively. The flow of surface water in the arroyos consists of brief ephemeral flows from mountainous drainages located to the east. Part of the recharge derived from infiltration of these flows is returned to the atmosphere through evapotranspiration. Some water that infiltrates the arroyo channels may move past the root zone and provide some local recharge. However, the distance between these ephemeral channels and TA-V precludes a significant effect on the local groundwater flow and contaminant transport. The active channels for Tijeras Arroyo and Arroyo del Coyote are located approximately 1.7 and 0.6 miles, respectively, from TA-V.

The vadose zone, consisting of approximately 500 ft of unconsolidated to semiconsolidated alluvial fan sediments, forms the potential pathway for COC transport from surface and shallow subsurface contaminant sources to the aquifer. The upper section of the alluvial fan sediments is relatively coarse-grained, becoming fine-grained and clay-rich at depths ranging from approximately 320 to 360 ft bgs across TA-V. The hydraulic properties of the vadose zone are highly variable and anisotropic because of the heterogeneous textures, lenticularity, layering, and variations in carbonate cementation. Disposal of large volumes of wastewater from the LWDS Drain Field (SWMU 5), the LWDS Surface Impoundments (SWMU 4), and the TA-V Seepage Pits (SWMU 275) may have occurred along preferential pathways through the thick vadose zone to the aquifer. Vertical flow through the discontinuous, layered, lenticular sediments in the vadose zone was most likely attenuated or diverted at horizons of varying hydraulic properties.

No evidence of groundwater perching above the Regional Aquifer has been observed at TA-V. Based on moisture content measurements of vadose zone sediment samples, minimal moisture remains in the vadose zone from historical wastewater disposal at TA-V (SNL September 2015).

Values of horizontal hydraulic conductivity for the alluvial fan sediments were determined using aquifer pumping tests and slug tests. Aquifer pumping (and recovery) data were collected at two monitoring wells, AVN-1 and TAV-MW2, and the hydraulic conductivities were 38.3 and 0.09 ft per day (ft/day), respectively. Slug tests were conducted at the 18 monitoring wells that were installed prior to 2017. The estimates of horizontal hydraulic conductivities ranged from 0.04 to 30.82 ft/day. The wide range of hydraulic conductivities is attributed to the textural heterogeneities associated with the alluvial fan lithofacies. To reduce the bias of a few higher values, a geometric mean was calculated using the data from all 18 wells. The geometric mean hydraulic conductivity was 1.25 ft/day (SNL September 2015).

Vertical hydraulic conductivity is typically estimated to be one-tenth to one-hundredth the horizontal hydraulic conductivity. For the TA-V Current Conceptual Model (CCM), vertical hydraulic gradients were calculated using three well pairs (SNL September 2015). Between monitoring well pairs TAV-MW5 and TAV-MW13, the hydraulic gradient was downward at 0.12 ft per ft (ft/ft). Between TAV-MW6 and TAV-MW7, the hydraulic gradient was downward at 0.04 ft/ft. Between TAV-MW8 and TAV-MW9, the hydraulic gradient was similarly downward at 0.05 ft/ft.

The geochemical signatures (cations and anions) for groundwater samples collected at all the TA-V monitoring wells are similar and groundwater in the TAVG AOC is classified as a calcium-bicarbonate type (SNL September 2015).

5.1.6.3 Direction of Groundwater Flow

Table 5-2 lists the water levels measured in the current network of 18 monitoring wells that were used to construct the CY 2020 potentiometric surface for the TAVG AOC (Figure 5-4). The general orientation of the localized potentiometric surface contours shown in Figure 5-4 is consistent with the base-wide potentiometric surface map (Plate 1). The potentiometric surface indicates that the groundwater flow at TA-V is generally to the west, with localized flow to the south and southwest. The Regional Aquifer exhibits unconfined conditions. The horizontal gradient ranges from approximately 0.004 to 0.01 ft/ft. The horizontal groundwater flow velocity at TA-V was calculated from the range of horizontal hydraulic conductivities (0.04 to 30.82 ft/day), a representative horizontal hydraulic gradient of 0.005 ft/ft, and an assumed effective porosity of 0.25. The estimates for linear groundwater flow velocity range greatly (approximately three orders of magnitude) from 0.29 to 225 ft per year (ft/yr) (SNL September 2015).

A subtle mound in the water table near monitoring wells LWDS-MW1 and TAV-MW8 has persisted for several decades, as shown by the quarterly potentiometric surfaces in the second and third quarter of CY 2020 (SNL October 2020a and SNL January 2021). However, this subtle mound is not evident in the fourth quarter of CY 2020 (Figure 5-4). The groundwater mound is most likely an artifact of laterally variable water-level declines within the heterogeneous and anisotropic aquifer that is undergoing regional drainage due to the combined effect of pumping at the KAFB and ABCWUA production wells. Mounding occurs where the sediments have lesser degrees of hydraulic conductivity than the surroundings and thus drain relatively slower.

Figures 5D-1 through 5D-3 (Attachment 5D) present the groundwater level fluctuations on a series of hydrographs for the 18 monitoring wells in the TA-V monitoring network. Groundwater elevations have steadily declined at all TA-V groundwater monitoring wells. The declines are due to the combined pumping of the Regional Aquifer by the KAFB and ABCWUA production wells. The rates of decline range from 0.44 to 0.84 ft/yr with an average decline rate of 0.7 ft/yr. In general, the rates of decline are higher to the east than to the west, with the groundwater elevation declining fastest in monitoring well TAV-MW3 and slowest in monitoring wells TAV-MW5 and TAV-MW13. The dewatering of the aquifer is expected to continue as long as pumping of production wells in the region continues.

Since late 2008, groundwater levels for Regional Aquifer wells in the northern part of KAFB have shown an increasing trend. Presumably, this is in response to the ABCWUA transitioning to surface water for potable water supplies and the decreased dependence on production wells immediately north of KAFB. However, this trend has not been seen as far south as TA-V.

Table 5-2. Groundwater Elevations Measured in October/November 2020 at Technical Area-V Groundwater Area of Concern

Well ID	Measuring Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
AVN-1	5443.00	6-Oct-2020	527.99	4915.01
LWDS-MW1	5423.83	7-Oct-2020	506.19	4917.64
LWDS-MW2	5412.41	7-Oct-2020	494.92	4917.49
TAV-INJ1	5429.70	9-Nov-2020	512.49	4917.21
TAV-MW2	5427.33	7-Oct-2020	510.44	4916.89
TAV-MW3	5464.30	6-Oct-2020	548.66	4915.64
TAV-MW4	5427.89	6-Oct-2020	510.40	4917.49
TAV-MW5	5408.71	7-Oct-2020	493.89	4914.82
TAV-MW6	5431.17	7-Oct-2020	513.85	4917.32
TAV-MW7	5430.40	7-Oct-2020	516.03	4914.37
TAV-MW8	5417.00	7-Oct-2020	499.06	4917.94
TAV-MW9	5416.27	7-Oct-2020	502.13	4914.14
TAV-MW10	5437.03	7-Oct-2020	520.19	4916.84
TAV-MW11	5440.12	7-Oct-2020	522.87	4917.25
TAV-MW12	5435.72	7-Oct-2020	519.57	4916.15
TAV-MW13	5409.02	7-Oct-2020	498.40	4910.62
TAV-MW14	5441.52	7-Oct-2020	526.65	4914.87
TAV-MW15	5437.32	7-Oct-2020	521.49	4915.83
TAV-MW16	5448.34	6-Oct-2020	532.89	4915.45

NOTES:

amsl = Above mean sea level.
AVN = Area-V (North).
btoc = Below top of casing (the measuring point).
ft = Foot or feet.
ID = Identifier.
INJ = Injection well.
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
NAVD 88 = North American Vertical Datum of 1988.
TAV = Technical Area-V.

5.1.6.4 Contaminant Sources

The groundwater contamination at TAVG AOC is not associated with a single SWMU at the surface. Contaminant migration in the subsurface is primarily controlled by infiltration of wastewater historically disposed of at TA-V and by the low permeability of the sedimentary units in the vadose zone and the Regional Aquifer. Limited amounts of natural recharge are a minor factor, with possible sources including precipitation and ephemeral flows in nearby arroyos.

Prior to 1993, the majority of wastewater disposed at TA-V occurred at SWMUs 4, 5, and 275 (Figures 5-2 and 5-4). Table 5-3 lists the dates of disposal and the estimated volumes. Small volumes of TCE and other organic solvents were presumably present in wastewater that was disposed to the LWDS Drain Field (SWMU 5) from 1962 to 1967, to the LWDS Surface Impoundments (SWMU 4) from 1967 to 1972, and to the TA-V Seepage Pits (SWMU 275) from the 1960s until the early 1980s, when disposal practices were modified to protect the environment. Wastewater continued to be disposed at the seepage pits from the early 1980s until 1992 but contained no organic solvents such as TCE. This continued discharge of wastewater likely flushed residual contaminants to the aquifer. After 1992, the sanitary waste and wastewater piping were connected to the base-wide KAFB sanitary sewer system that drains to the ABCWUA interceptor line.

Upon cessation of wastewater disposal to the subsurface, vertical pathways to the aquifer were drained by gravity.

Table 5-3 presents the disposal periods, estimated disposal volumes, types of wastewater, and design characteristics for the three high-discharge SWMUs. The total discharge volume is estimated to range from 48.5 to 68.5 million gallons (gal). SWMU 275 had the greatest discharge volume, accounting for up to 73 percent of the total discharge at TA-V. The average disposal rate for the three SWMUs ranged from approximately 1 to 2.4 million gal per year. The types of wastewater consisted of reactor cooling water, industrial water (from sinks and drains in radiochemistry laboratories and assembly shops), and septic (sanitary sewer) water.

Table 5-3. Wastewater and Septic Water Disposal History at Technical Area-V

Disposal Site	Dates	Estimated Volume (gal)	Percentage of the Estimated Total Volume[a]	Average Disposal Volume in Million gal per Year	Primary Types of Wastewater	Design Characteristics
SWMU 4 - LWDS Surface Impoundments	1967–1972[b]	12 million	18 – 25	2.4	Reactor cooling water and industrial water	Two unlined impoundments, total 0.4 acres
SWMU 5 - LWDS Drain Field	1962–1967	6.5 million	9 – 13	1.3	Reactor cooling water and industrial water	One buried, perforated horizontal pipe, 60-ft long, 36-ft deep, 3-ft diameter
SWMU 275 - TA-V Seepage Pits	1960s–1992	30 to 50 million	62 – 73	1 to 1.6[c]	Septic water and industrial water	Six buried, open-bottomed cylinders, 20-ft deep, 6.5-ft diameter
Total Range for Three Sites	1962–1992	48.5 to 68.5 million				

NOTES:
[a] Percentage calculated using the range of volumes for total discharge (48.5 to 68.5 million gal).
[b] Used intermittently for discharge of local surface water runoff and wastewater from sinks and floor drains until 1992. The unmonitored volume is assumed to be negligible.
[c] Assumes 30 years of discharge at seepage pits.

ft = Foot or feet.
gal = Gallon.
LWDS = Liquid Waste Disposal System.
SWMU = Solid Waste Management Unit.
TA-V = Technical Area-V.

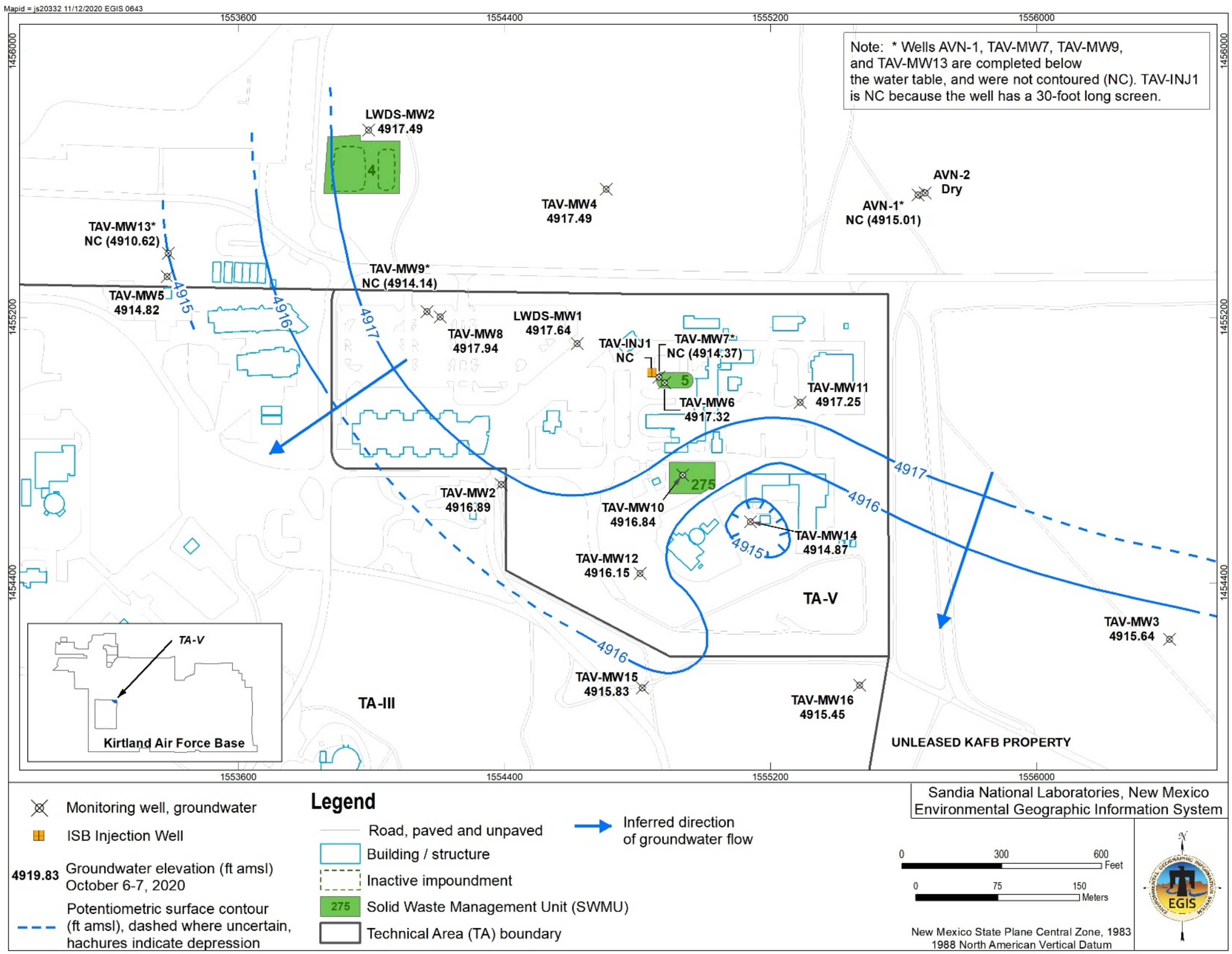

Figure 5-4. Potentiometric Surface of the Regional Aquifer at the Technical Area-V Groundwater Area of Concern (October 2020)

The large surface area of the impoundments (approximately 0.4 acres) could have facilitated significant evaporation of wastewater and VOCs. This likely minimized the depth of percolation. Historical groundwater sampling results from monitoring well LWDS-MW2, located to the immediate north of the surface impoundments, indicate that wastewater disposed at the surface impoundments did not impact groundwater. TCE has never been detected in groundwater samples from monitoring well LWDS-MW2, and nitrate concentrations have never exceeded the MCL except for one anomalous occurrence in May 2019 (SNL June 2020).

Elevated nitrate concentrations in groundwater at TA-V are likely derived from sanitary waste disposals to the subsurface. Sanitary waste disposals continued until 1992 when the disposals were routed to the base-wide sanitary sewer system. Nitrate is considered a conservative constituent with regard to transport because it is highly soluble in water, is not typically sorbed to sediments, and is not bio-transformed under the aerobic groundwater conditions like those exhibited at TA-V. Therefore, any locally derived, elevated concentrations of nitrate were most likely transported through the vadose zone along with the wastewater and sanitary discharges.

The NMED-specified background concentration for nitrate in groundwater is 4 mg/L (Dinwiddie September 1997). Nitrate concentrations that may be naturally higher than 4 mg/L have been reported for two monitoring wells located upgradient of TA-V. Monitoring wells AVN-1 and AVN-2 are co-located approximately 310 ft northeast of TA-V. These two wells have historically showed similar nitrate plus nitrite (NPN) concentrations. The maximum NPN concentration for well AVN-1 was 11.8 mg/L in June 2009. The maximum NPN concentration for well AVN-2 was 10.7 mg/L in December 2004. Monitoring well AVN-2 has been dry since April 2008 and has a screen approximately 75 ft shallower than well AVN-1. Elevated nitrate concentrations at these two wells may be related to the leaching of naturally occurring nitrate in the vadose zone by the infiltration of surface water through nitrate-bearing soils along Arroyo del Coyote. Examples of such occurrences have been documented at several locations in the arid southwest United States (Walvoord et al., November 2003). Naturally occurring nitrate source is also discussed in the Tijeras Arroyo Groundwater AOC (Chapter 6.0).

5.1.6.5 Contaminant Distribution and Transport in Groundwater

Vapor migration of VOCs in the vadose zone is a possible transport mechanism contributing to the distribution and transport of COCs in groundwater. Within the LWDS Drain Field (SWMU 5), trace quantities of TCE, tetrachloroethene, and benzene were detected in shallow soil-vapor samples collected during 1994 (SNL March 1999a). The possibility of vadose zone contamination was further investigated with the installation of groundwater monitoring wells TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9 in March and April 2001. The results of soil-core and soil-vapor samples collected during well installation showed no significant residual VOCs in the vadose zone. Also, there was no evidence of excessive moisture in the vadose zone sediments; therefore, no significant residual wastewater was present in the vadose zone beneath the LWDS Drain Field (SNL October 2001). In the vicinity of the TA-V Seepage Pits (SWMU 275), trace quantities of TCE, tetrachloroethene, benzene, toluene, and total xylene were detected in soil-vapor samples collected during passive, surficial characterization studies conducted in 1994 and 1995 (SNL March 1999a).

To characterize the vertical extent of VOCs in the vadose zone at SWMUs 5 and 275, three soil-vapor monitoring wells (TAV-SV01, TAV-SV02, and TAV-SV03) were installed in 2011 (Figure 5-2). Each well was constructed with a series of ten 1-foot long stainless-steel screens set at 50-ft intervals from 50 to 500 ft bgs. The three soil-vapor monitoring wells were sampled for eight consecutive quarters (April 2011 through March 2013). The samples were analyzed for VOCs, including TCE. The analytical results were previously reported in the CY 2013 AGMR (SNL June 2014). TCE was the most prevalent VOC in the vadose zone. Trend analysis for the eight quarters strongly indicates that soil-vapor concentrations have stabilized in the vadose zone (SNL September 2015). Without an active driving force (such as wastewater disposal), it is unlikely for the TCE in the vadose zone to act as an ongoing contaminant source to groundwater. TCE is hydrophobic with a water solubility of 1,100 mg/L at 20 degrees Celsius. Some TCE will be retained in the vadose zone due to sorption to fine-grained materials, as well as dissolution in pore water.

The concentrations of TCE and nitrate in groundwater are above the MCLs at the locations where up to 86 percent of the TA-V wastewater and sanitary waste was disposed (SWMUs 5 and 275). Contaminant transport mechanisms in groundwater potentially include advection, dispersion, diffusion, biodegradation, and sorption (SNL September 2015). Groundwater monitoring results over the past two decades indicate that advection is not the main force driving contamination migration, most likely because of the low localized groundwater flow velocities. With limited advection, dispersion and diffusion become important transport mechanisms. While nitrate does not tend to sorb to sediments, TCE is a hydrophobic organic compound and sorbs to the organic matter in the aquifer matrix. Sorption is also a reversible process. As the dissolved contaminant concentration in groundwater decreases due to advection (although limited), the initial sorbed TCE portion will tend to desorb and reenter groundwater through equilibration processes. The relatively stable TCE and nitrate concentrations in TA-V groundwater can be attributed to the relatively slow processes of dispersion and diffusion, and specifically for TCE the reversible sorption process. The CY 2020 analytical results for TCE and nitrate are discussed in Section 5.6.

5.1.6.6 Biodegradation and Stable Isotope Studies

The potential for natural (intrinsic) biodegradation to occur at TA-V was evaluated in two assessments (SNL July 2004 and SNL April 2005). The anaerobic biodegradation assessment involved the collection of groundwater samples from 10 monitoring wells and analyses for dissolved gases and dechlorination products (SNL July 2004; Appendix E in SNL September 2015). The assessment quantitatively scored 18 parameters and concluded that anaerobic reductive dechlorination was not a significant process contributing to the natural attenuation of VOCs. Nitrate was qualitatively assessed; biologically mediated transformation of nitrate was not likely to occur. To summarize, natural attenuation was not viable for the anaerobic degradation of TCE nor for the denitrification of TA-V groundwater.

The second assessment evaluated aerobic biodegradation. Groundwater samples were collected from 10 monitoring wells (SNL April 2005; Appendix G in SNL September 2015). The study coupled enzymatic probes with DNA analyses of the native groundwater. Aerobic TCE cometabolism by the indigenous microbial population was determined to be an existing mechanism for natural attenuation at TA-V. Denitrification was not evaluated in this study.

A study of denitrification parameters and isotopic signatures was conducted in 2013. Groundwater samples were collected from eight monitoring wells (LWDS-MW1, TAV-MW2, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, and TAV-MW10) and analyzed for stable isotopes (nitrogen-14/nitrogen-15 and oxygen-16/oxygen-18), dissolved gases (nitrogen and argon), and total organic carbon. The study concluded that natural denitrification was not apparent in TA-V groundwater (Madrid et al. June 2013; Appendix F in SNL September 2015).

5.1.6.7 Potential Receptors of TA-V Groundwater Contamination

The potential for groundwater to reach receptor wells was evaluated in the TA-V CCM Report (SNL September 2015). Production wells completed in the Regional Aquifer are the only potential exposure points for the COCs in TA-V groundwater to reach human receptors. However, no consumptive use of groundwater currently occurs within 2.8 miles of TA-V. Production well KAFB-4, the nearest downgradient production well, is located approximately 2.8 miles north-northwest of TA-V. Additional production wells are located farther north near the northern boundary of KAFB and are operated by KAFB, the Veterans Affairs, and the ABCWUA. The results of MODFLOW modeling (SNL July 2005) demonstrated that contaminants in TA-V groundwater do not pose a threat to those production wells. The proposed Mesa del Sol well field, located approximately 3 miles west of TA-V, is unlikely to be a receptor in the foreseeable future. It is improbable that KAFB and ABCWUA pumping will be discontinued and the groundwater flow path would revert to a westward direction.

In summary, the potential for adverse impacts on human health or environmental receptors is considered very low from the groundwater contamination currently present at the TAVG AOC. There is no current or anticipated use of groundwater in the immediate vicinity of TA-V. Thus, there is no foreseeable risk to human health or a threat to the beneficial use of groundwater downgradient of TA-V.

5.1.7 Treatability Study of In-Situ Bioremediation

In 2015, personnel from the Department of Energy (DOE)/National Nuclear Security Administration (NNSA), DOE Headquarters Office of Environmental Management, SNL/NM, and NMED HWB worked together to address the groundwater contamination at the TAVG AOC. All parties agreed on a two-phase Treatability Study to evaluate the effectiveness of ISB as a potential technology to treat groundwater contamination at the TAVG AOC.

5.1.7.1 In-Situ Bioremediation

The technical approach for the ISB Treatability Study is to induce biodegradation of TCE and nitrate by gravity injecting a nutrient-amended treatment solution containing dechlorinating bacteria into the Regional Aquifer. Aquifer conditions near the injection well are modified from aerobic to anaerobic conditions so that biodegradation is enhanced. The intent of this action is to reduce nitrate concentrations through denitrification followed by reductive dechlorination of TCE that is dissolved in groundwater and sorbed to solids (primarily the clay fractions). Biodegradation will ultimately convert these contaminants into innocuous breakdown products.

5.1.7.2 Treatability Study Work Plan

DOE/NNSA and SNL/NM personnel submitted a TSWP to NMED HWB on October 20, 2015 (DOE October 2015) but it was disapproved on December 3, 2015 (NMED HWB December 2015). A Revised TSWP and response to the disapproval letter was submitted to NMED HWB in March 2016 (DOE March 2016a). NMED HWB approved the Revised TSWP on May 20, 2016 (NMED HWB May 2016a).

Per the Revised TSWP, up to three injection wells (TAV-INJ1, TAV-INJ2, and TAV-INJ3) would be installed in the vicinity of monitoring wells TAV-MW6, TAV-MW10, and LWDS-MW1, respectively, where the highest contaminant concentrations in groundwater have been detected. A treatment solution containing essential food and nutrients for biostimulation would be prepared in aboveground tanks. This treatment solution, along with the dechlorinating bacteria, would be gravity-injected into the Regional Aquifer via the injection wells.

The ISB Treatability Study would be conducted in two phases. Phase I includes a pilot test followed by full-scale test at the first injection well (TAV-INJ1) for an approximate six-month injection period followed by two years of performance monitoring. Phase II involves the installation of two additional injection wells (TAV-INJ2 and TAV-INJ3) and conducting full-scale tests. The Phase I injection well (TAV-INJ1) was installed in November 2017. A decision to install the Phase II injection wells is dependent upon the findings of the Phase I full-scale test. Approximately 530,000 gal of treatment solution would be discharged at each injection well during full-scale test. The 530,000-gal goal was selected to treat a cylindrical portion of the aquifer that is 25-ft thick and has a radius of 60 ft; assuming homogeneous aquifer properties.

The treatment solution is designed to enhance the degradation of nitrate and TCE. The mixing ratio for the treatment solution consists of approximately 99.85 percent potable water and 0.15 percent amendments by weight. The amendments consist of:

- Potassium Bicarbonate (potential of hydrogen [pH] buffer),
- Sodium Sulfite (deoxygenator),
- Accelerite® (blend of yeast and nutrients),
- Diammonium Phosphate (nutrient and pH buffer),
- Sodium Bromide (inert tracer),
- Ethyl Lactate (electron donor substrate), and
- SiREM KB-1 (the bioaugmentation culture *dehalococcoides*).

5.1.7.3 Discharge Permit

The NMED GWQB required a DP for DOE/NNSA and SNL/NM personnel to install and operate the ISB Treatability Study injection wells (NMED GWQB June 2016). The DP Application was submitted in July 2016 (DOE July 2016a). NMED GWQB approved the DP Application in May 2017 and assigned the permit number DP-1845 (NMED GWQB May 2017). The DP-1845 term started on May 30, 2017 and will end on May 30, 2022. As required by DP-1845, DOE/NNSA and SNL/NM personnel submit quarterly reports to the NMED GWQB responding to the terms and conditions stipulated in DP-1845.

5.1.7.4 Treatability Study Phase I Pilot Test

The pilot test for the ISB Treatability Study started in November 2017 at injection well TAV-INJ1. Two injections of approximately 4,500 gal each were discharged through injection well TAV-INJ1, with the first injection conducted over the course of two days (November 21 and 22, 2017) and the second injection conducted on November 27, 2017. The first injection consisted of treatment solution without the dechlorinating bacteria; the second injection consisted of treatment solution combined with six liters of bioaugmentation culture. Performance monitoring during the pilot test involved the measurement of in-situ water quality parameters using down-hole sondes and the collection of groundwater samples at the injection well and two nearby monitoring wells, TAV-MW6, and TAV-MW7. Performance monitoring of the three wells began on November 28, 2017 and concluded in June 2018. A summary of the pilot test operation activities and analytical results are provided in Section III of the October 2018 ER Operations Quarterly Report (SNL October 2018).

The results of the pilot test showed that the treatment solution injected at the injection well was able to maintain the anaerobic and reduced conditions in the aquifer near the injection well for seven months after the treatment solution was injected. The aboveground injection system functioned as designed and discharges occurred without sustained mounding at the injection well. Based on these results, DOE/NNSA and SNL/NM personnel submitted the decision to proceed to the full-scale test to the NMED HWB, along with several modifications to the full-scale test in July 2018 (DOE July 2018). The NMED HWB approved the modifications and concurred with the decision to proceed with the full-scale test at injection well TAV-INJ1 in August 2018 (NMED HWB August 2018).

As originally planned in the Revised TSWP, wells TAV-MW6 and TAV-MW7 were categorized as performance monitoring wells for the Phase I of the ISB Treatability Study and were sampled for analytes and at frequencies specifically designed for the Treatability Study (SNL March 2016). The results of the pilot test showed that the injections at well TAV-INJ1 had no impact on either the water level or the groundwater quality in well TAV-MW7. This is because well TAV-MW7 is a deep well with the midpoint of the well screen at approximately 90 ft below the water table, while the screens of wells TAV-INJ1 and TAV-MW6 are across the water table. Therefore, DOE/NNSA and SNL/NM proposed to revert well TAV-MW7 back to the TA-V groundwater monitoring network starting in the fourth quarter of CY 2018 (DOE July 2018), which was subsequently approved (NMED HWB August 2018). Well TAV-MW6 remains as the performance monitoring well for the Phase I Treatability Study, and therefore, it is currently excluded from the TA-V groundwater monitoring network.

5.1.7.5 Treatability Study Phase I Full-Scale Test

SNL/NM personnel started the Phase I full-scale test in October 2018 and completed the six-month injection period in April 2019. A series of 110 injections totaling 531,516 gal of treatment solution were discharged to the Regional Aquifer through injection well TAV-INJ1. A total of 122.8 liters (32.4 gal) of dechlorinating bacteria were injected along with the treatment solution. Details on the six-month injection activities are provided in Section III of the October 2019 ER Operations Quarterly Report (SNL October 2019). The injection period is followed by two years of groundwater monitoring to evaluate the performance of the ISB. The two-year performance monitoring includes three monthly sampling events followed by quarterly sampling events for the remainder of the two-year period, as planned in the Revised TSWP (SNL March 2016). The three monthly sampling events were completed in July 2019. The Phase I full-scale test performance monitoring is currently on a quarterly schedule until May 2021.

Phase I full-scale test activities and analytical results including those for injection well TAV-INJ1 and monitoring well TAV-MW6 for CY 2020 were presented in the ER Operations Quarterly Reports that were submitted to the NMED HWB, and are not repeated in this AGMR. In addition, the analytical results for DP-specific requirements are presented in DP-1845 Quarterly Reports that are submitted to the NMED GWQB and are not repeated in the AGMR.

5.2 Regulatory Criteria

The NMED HWB provides regulatory oversight of SNL/NM ER Operations, as well as implements and enforces regulatory standards mandated by the Resource Conservation and Recovery Act (RCRA). All SWMUs and AOCs are listed in the *RCRA Facility Operating Permit, NM5890110518* (RCRA Permit) (NMED HWB January 2015a).

In April 2004, the Consent Order became effective (NMED April 2004). The Consent Order transferred regulatory authority for corrective action requirements from the RCRA Permit to the Consent Order. The Consent Order identified TA-V as a groundwater AOC. The TAVG AOC investigation must comply with requirements set forth in the Consent Order for site characterization and development of a Corrective Measures Evaluation (CME).

DOE/NNSA and SNL/NM personnel submitted the CCM and the CME Work Plan to the NMED HWB in April 2004 (SNL April 2004a and April 2004b). After fulfilling the requirements of the CME Work Plan, a CME Report was submitted to the NMED HWB in July 2005 (SNL July 2005). NMED HWB subsequently issued three Notices of Disapproval (NODs) for the CME Report in July 2008, August 2009, and December 2009, respectively (NMED HWB July 2008, August 2009, and December 2009). Responses were submitted to the three NODs in April 2009, November 2009, and February 2010, respectively (SNL April 2009, November 2009, and February 2010). These NOD responses contained an attachment entitled "Technical Area-V Groundwater Investigation Work Plan," which proposed the installation of four additional groundwater monitoring wells and three soil-vapor monitoring wells to meet NMED HWB's characterization requirements (see Section 5.1.3). In May 2010, the NMED HWB issued a notice of conditional approval for the TA-V Groundwater Investigation Work Plan (NMED HWB May 2010).

Since the 2005 CME Report, a substantial body of information has become available with more groundwater monitoring wells and soil-vapor monitoring wells being installed. Accordingly, in 2013 DOE/NNSA and SNL/NM personnel requested that the 2005 CME Report be withdrawn from review and replaced with an updated CCM and CME Report (DOE December 2013). NMED HWB approved the request (NMED HWB December 2013). Thereafter, a Treatability Study of ISB to address the groundwater contamination at TA-V was agreed upon (see Section 5.1.7). In order to allow development of the technical approach and preparation of the associated work plan, a two-year extension of the due date for the CME Report and CCM were requested (DOE November 2014a). NMED HWB approved the request (NMED HWB January 2015b). An updated CCM was submitted to NMED HWB on October 20, 2015 (DOE October 2015) and was approved by NMED HWB on November 30, 2015 (NMED HWB November 2015).

Following the approval of the Revised TSWP in May 2016, DOE/NNSA and SNL/NM personnel requested, and NMED HWB subsequently agreed to, a milestone extension for the CME Report (DOE March 2016b; NMED HWB April 2016). The results of the ISB Treatability Study will be used to refine the CCM and CME reports for TAVG AOC, which are due by May 20, 2022 to NMED HWB and are intended to replace all previous CCM and CME reports.

DOE/NNSA and SNL/NM personnel continue to present the TA-V groundwater monitoring data, along with data from other groundwater sites, in this AGMR. The outline of this chapter is based on the required elements of a "Periodic Monitoring Report" described in Section X.D. of the Consent Order.

In this report, TA-V groundwater monitoring data are presented for both hazardous and radioactive constituents; however, the analytical data for radionuclides (gamma spectroscopy short list, gross alpha/beta activity, and tritium) are provided voluntarily by the DOE/NNSA and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements of the Consent Order. Additional information on radionuclides and the scope of the Consent Order is available in Section III.A of the Consent Order.

5.3 Scope of Activities

Section 5.1.5 describes the activities for the TA-V groundwater monitoring in CY 2020, including plans and reports. The field activities included groundwater level measurements and groundwater sampling. Table 5-4 summarizes the CY 2020 groundwater sampling events. Table 5-5 lists the analytes and parameters for each well in each of the sampling events. Tables 5-4 and 5-5 are consistent with the revised sampling protocol specified in the Revised TSWP (SNL March 2016).

Quality control (QC) samples are collected in the field at the time of sample collection. Field QC samples are used to monitor the sampling process and include environmental duplicate, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Section 1.3.4 discusses the methodology for the QC samples.

5.4 Field Methods and Measurements

Section 1.3 details the monitoring procedures conducted for the TAVG groundwater monitoring. The water level measurements obtained in CY 2020 were used to develop the potentiometric surface map presented in Figure 5-4 and the hydrographs presented in Figures 5D-1 through 5D-3 (Attachment 5D).

5.5 Analytical Methods

Section 1.3.2 (Tables 1-5 and 1-6) describes the EPA-specified protocols used by the off-site laboratories for groundwater samples.

5.6 Summary of Analytical Results for CY 2020

This section discusses the CY 2020 monitoring results, exceedance of standards, and pertinent trends in COC concentrations for the TAVG AOC. Tables 5B-1 through 5B-10 (Attachment 5B) present the analytical results and field measurements for all TAVG sampling events. Figures 5C-1 through 5C-8 (Attachment 5C) present concentration trend plots for the two COCs (TCE and nitrate) that exceeded the corresponding MCLs. As shown in Table 5-5, the second quarter of CY 2020 was the most comprehensive sampling event for the TAVG AOC, when 17 wells (all 18 active monitoring wells minus TAV-MW6; see Section 5.1.7.4) were sampled and the annual waste characterization parameters were analyzed.

Table 5-4. Groundwater Monitoring Well Network and Sampling Dates for the Technical Area-V Groundwater Area of Concern, Calendar Year 2020

Date of Sampling Event	Wells Sampled	SAP
February 2020	LWDS-MW1, TAV-MW2, TAV-MW4, TAV-MW7, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW14, TAV-MW15, and TAV-MW16	*TA-V Groundwater Monitoring Mini-SAP for Second Quarter, Fiscal Year 2020* (SNL January 2020)
May/June 2020	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14, TAV-MW15, and TAV-MW16	*TA-V Groundwater Monitoring Mini-SAP for Third Quarter, Fiscal Year 2020* (SNL April 2020)
August 2020	LWDS-MW1, TAV-MW2, TAV-MW4, TAV-MW7, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW14, TAV-MW15, and TAV-MW16	*TA-V Groundwater Monitoring Mini-SAP for Fourth Quarter, Fiscal Year 2020* (SNL July 2020)
November/December 2020	LWDS-MW1, TAV-MW2, TAV-MW4, TAV-MW7, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW14, TAV-MW15, and TAV-MW16	*TA-V Groundwater Monitoring Mini-SAP for First Quarter, Fiscal Year 2021* (SNL October 2020b)

NOTES:

AVN = Area-V (North).
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
TAV = Technical Area-V (monitoring well designation).

Table 5-5. Parameters Sampled at Technical Area-V Groundwater Area of Concern Monitoring Wells for Each Sampling Event, Calendar Year 2020

February 2020		May/June 2020	
Parameter	**Well ID**	**Parameter**	**Well ID**
Arsenic, dissolved Iron, dissolved Manganese, dissolved NPN VOCs 1,4-Dioxane	LWDS-MW1 LWDS-MW1 (Duplicate) TAV-MW2 TAV-MW4 TAV-MW4 (Duplicate) TAV-MW6[c] TAV-MW7 TAV-MW8 TAV-MW10 TAV-MW11 TAV-MW12 TAV-MW12 (Duplicate) TAV-MW14 TAV-MW15 TAV-MW15 (Duplicate) TAV-MW16	Alkalinity[a] Anions (Bromide, Chloride, Fluoride, Sulfate)[a] Arsenic, dissolved Gamma Spectroscopy (short list[b]) Gross Alpha/Beta Activity[a] Iron, dissolved Manganese, dissolved NPN TAL Metals plus Total Uranium Tritium[a] VOCs 1,4-Dioxane	AVN-1 AVN-1 (Duplicate) LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW4 TAV-MW5 TAV-MW5 (Duplicate) TAV-MW7 TAV-MW7 (Duplicate) TAV-MW8 TAV-MW8 (Duplicate) TAV-MW9 TAV-MW10 TAV-MW11 TAV-MW12 TAV-MW13 TAV-MW13 (Duplicate) TAV-MW14 TAV-MW15 TAV-MW16
August 2020		**November/December 2020**	
Parameter	**Well ID**	**Parameter**	**Well ID**
Arsenic, dissolved Iron, dissolved Manganese, dissolved NPN VOCs 1,4-Dioxane[e] Total and Dissolved TAL Metals plus Total Uranium[f]	AVN-1[d] LWDS-MW1 TAV-MW2 TAV-MW2 (Duplicate) TAV-MW4 TAV-MW6[c] TAV-MW7 TAV-MW8 TAV-MW10 TAV-MW10 (Duplicate) TAV-MW11 TAV-MW12 TAV-MW14 TAV-MW15 TAV-MW16 TAV-MW16 (Duplicate)	Arsenic, dissolved Iron, dissolved Manganese, dissolved NPN VOCs	LWDS-MW1 LWDS-MW1 (Duplicate) TAV-MW2 TAV-MW4 TAV-MW7 TAV-MW8 TAV-MW10 TAV-MW11 TAV-MW11 (Duplicate) TAV-MW12 TAV-MW14 TAV-MW14 (Duplicate) TAV-MW15 TAV-MW16

NOTES:

[a]Analyses performed for waste characterization purposes.
[b]Gamma spectroscopy short list includes americium-241, cesium-137, cobalt-60, and potassium-40.
[c]TAV-MW6 is a performance monitoring well for Treatability Study and associated results are presented in the ER Operations Quarterly Reports. Only 1,4-dioxane results at well TAV-MW6 are presented in this AGMR.
[d,f]AVN-1 was sampled for total and dissolved metals in September 2021.
[e]1,4-Dioxane is analyzed for samples collected in July 2021 from well TAV-MW6 only.

AGMR = Annual Groundwater Monitoring Report.
AVN = Area-V (North).
ER = Environmental Restoration.
ID = Identifier.
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
NPN = Nitrate plus nitrite (as nitrogen).
TAL = Target Analyte List.
TAV = Technical Area-V (monitoring well designation).
VOC = Volatile organic compound.

Table 5B-1, Attachment 5B presents a summary of the detected-VOC results and Table 5B-2 lists the laboratory method detection limits (MDLs). Five VOCs were detected at concentrations above the MDLs in groundwater samples from TAVG AOC monitoring wells in CY 2020:

- Chloroform,
- cis-1,2-Dichloroethene,
- Dibromochloromethane,
- TCE, and
- Toluene.

In May/June 2020 sampling event, acetone in the environmental and environmental duplicate samples collected at monitoring well TAV-MW7 and methylene chloride in the environmental and environmental duplicate samples collected at monitoring well TAV-MW13 were qualified as not detected during data validation due to method blank contamination at the analytical laboratory.

In August sampling event, acetone in the environmental duplicate sample collected at monitoring well TAV-MW2 and methylene chloride in the environmental samples collected at monitoring wells TAV-MW2, TAV-MW7, TAV-MW15, and TAV-MW16 (also in the environmental duplicate sample at this well) were qualified as not detected during data validation due to method blank contamination at the analytical laboratory.

No data were qualified due to analytical laboratory's quality control procedures for the February 2020 and November/December 2020 sampling events. Data qualification as a result of the filed QC samples (environmental duplicates, EB samples, FB samples, and TB samples) are discussed in Section 5.7.

TCE was the only VOC that exceeded an MCL in CY 2020 (Table 5B-1, Attachment 5B). TCE was detected above the MCL (5 μg/L) in samples from five monitoring wells: LWDS-MW1, TAV-MW4, TAV-MW8, TAV-MW10, and TAV-MW14. The maximum TCE concentration was 14.8 μg/L in the environmental duplicate sample collected from monitoring well LWDS-MW1 in February 2020. Historically, the highest TCE concentrations at TA-V have been consistently detected at monitoring well LWDS-MW1. Figures 5C-1 through 5C-5 (Attachment 5C) present the TCE concentration trend plots for monitoring wells LWDS-MW1, TAV-MW4, TAV-MW8, TAV-MW10, and TAV-MW14. Figures 5C-1 through 5C-5 show that:

- LWDS-MW1 (Figure 5C-1, Attachment 5C). In CY 2020, the maximum TCE concentration was 14.8 μg/L (February 2020). The overall TCE trend is stable.

- TAV-MW4 (Figure 5C-2, Attachment 5C). In CY 2020, the maximum TCE concentration was 5.18 μg/L (August 2020). The overall TCE trend is increasing. The TCE concentration exceeded the MCL for the first time in May 2019. Since then, the TCE concentrations at monitoring well TAV-MW4 have fluctuated around the MCL.

- TAV-MW8 (Figure 5C-3, Attachment 5C). In CY 2020, the maximum TCE concentration was 5.37 μg/L (November 2020). The overall TCE trend is increasing. The TCE concentrations at monitoring well TAV-MW8 have fluctuated around the MCL since 2019.

- TAV-MW10 (Figure 5C-4, Attachment 5C). In CY 2020, the maximum TCE concentration was 13.1 μg/L (both August 2020 and December 2020). The overall TCE trend is slightly decreasing.

- TAV-MW14 (Figure 5C-5, Attachment 5C). In CY 2020, the maximum TCE concentration was 5.35 µg/L (December 2020). The overall TCE trend is slightly decreasing.

TCE has also been consistently detected above the MCL of 5 µg/L at monitoring well TAV-MW6 since August 2006. This well is currently part of the ISB Treatability Study discussed in Section 5.1.7. TCE has been detected below the MCL at four other monitoring wells (TAV-MW2, TAV-MW11, TAV-MW12, and TAV-MW16). TCE has never been detected in the remaining eight monitoring wells (AVN-1, LWDS-MW2, TAV-MW3, TAV-MW5, TAV-MW7, TAV-MW9, TAV-MW13, and TAV-MW15), among which TAV-MW7, TAV-MW9, and TAV-MW13 are deep wells; AVN-1, TAV-MW3, TAV-MW15, TAV-MW5, and LWDS-MW2, in a clockwise direction, are background wells surrounding TA-V. Figure 5-5 shows the TCE isoconcentration contours for the second quarter of CY 2020. The general location and shape of the contours have not changed significantly over the past several years.

Monitoring wells TAV-MW7 and TAV-MW9 are co-located with TAV-MW6 and TAV-MW8, respectively, but are screened approximately 90 ft deeper based on the mid-point of the screens. TCE has not been detected in these two deeper wells (TAV-MW7 and TAV-MW9). The lack of deep detections near the contaminant sources (SWMUs 5 and 275) strongly indicates that VOCs have not migrated deeper into the Regional Aquifer. Farther west, well TAV-MW5 is co-located with well TAV-MW13. TAV-MW13 is screened approximately 40 ft deeper than TAV-MW5. TCE has not been detected at either well.

Table 5B-3, Attachment 5B presents the analytical results for NPN (reported as nitrogen) for CY 2020. NPN concentrations exceeded the MCL (10 mg/L) in samples from three monitoring wells: AVN-1, LWDS-MW1, and TAV-MW10. The maximum NPN concentration was 14.6 mg/L in the environmental sample collected from monitoring well LWDS-MW1 in August 2020. The NPN concentrations in monitoring wells LWDS-MW1 and TAV-MW10 have typically exceeded the MCL. Figures 5C-6 through 5C-8 (Attachment 5C) present the NPN concentration trend plots for monitoring wells AVN-1, LWDS-MW1, and TAV-MW10. Figures 5C-6 through 5C-8 show that:

- AVN-1 (Figure 5C-6, Attachment 5C). Well AVN-1 is sampled annually. In CY 2020, the NPN concentration was 10.1 mg/L (May 2020). The overall NPN trend is slightly increasing.

- LWDS-MW1 (Figure 5C-7, Attachment 5C). In CY 2020, the maximum NPN concentration was 14.6 mg/L (August 2020). The overall NPN trend is stable.

- TAV-MW10 (Figure 5C-8, Attachment 5C). In CY 2020, the maximum NPN concentration was 12.0 mg/L (December 2020). The overall NPN trend is stable.

Figure 5-6 shows the NPN isoconcentration contour for the second quarter of CY 2020. The general location of the 10 mg/L NPN contour has not changed significantly over the past several years and typically encloses wells LWDS-MW1 and TAV-MW10. NPN is reported at low concentrations at each of the monitoring wells at TA-V, generally at concentrations ranging from less than 5 mg/L to slightly more than the 10 mg/L MCL. Historically, nitrate concentrations have exceeded the MCL in samples from monitoring wells AVN-1, AVN-2 (dry since April 2008), LWDS-MW1, TAV-MW6, TAV-MW10, and TAV-MW14. Nitrate was also detected once above the MCL at monitoring well TAV-MW5 in a split sample collected in November 1998 (soon after well installation) and has not been detected above the MCL since then. As discussed earlier, historical NPN detections above the NMED-specified background (4 mg/L) and the MCL (10 mg/L) at monitoring wells AVN-1 and AVN-2 are interpreted as not being associated with TA-V operations. NPN concentrations exceeding the MCL have been noted at several locations on KAFB and likely reflect naturally occurring nitrate (Chapter 6.0).

The TCE and NPN plumes for CY 2020 (Figures 5-5 and 5-6, respectively) are roughly co-located with a generally northwest to southeast orientation. The contaminants are present at low concentrations in the Regional Aquifer in the vicinity of the LWDS Drain Field (SWMU 5) and the TA-V Seepage Pits (SWMU 275). The maximum concentrations of TCE and NPN at monitoring well LWDS-MW1 are slightly offset from SWMU 5, suggesting that localized stratigraphic controls influence contaminant migration in the 500-ft thick vadose zone above the water table. The variability in hydraulic conductivities in saturated sediments has also likely influenced the distribution of contaminants in groundwater. The hydraulic conductivities measured by slug tests at monitoring wells TAV-MW6 and TAV-MW10 were 1.14 and 4.12 ft/day, respectively. The lowest hydraulic conductivity (0.04 ft/day) was measured at monitoring well LWDS-MW1, where the highest contaminant concentrations were detected in groundwater. It is possible that a localized low conductivity zone near well LWDS-MW1 has acted as a barrier for contaminant migration.

Table 5B-4 (Attachment 5B) presents the analytical results for three filtered metals (arsenic, iron, and manganese). None of the filtered metals exceeded respective MCLs.

The NMED HWB requested groundwater samples at the TAVG AOC to be analyzed for 1,4-dioxane for a minimum of two sampling events (NMED HWB September 2019). Two 1,4-dixoane sampling events were completed for 12 monitoring wells in CY 2020 (Table 5-5). Six monitoring wells are sampled annually; the first 1,4-dioxane sampling event was conducted in the second quarter of CY 2020 and the second 1,4-dioxane sampling event will be conducted in the second quarter of CY 2021. Although well TAV-MW6 currently is not part of the TA-V groundwater monitoring network, SNL/NM personnel voluntarily sampled this well for 1,4-dixoane in January and July 2020, completing the requirement for two sampling events.

Table 5B-5 (Attachment 5B) presents the analytical results for 1,4-dioxane for CY 2020. 1,4-Dioxane was not detected above the MDL at any of the monitoring wells, except at wells LWDS-MW1 and TAV-MW4. The 1,4-dioxane concentration was estimated (J-qualified) at 0.108 µg/L in the environmental duplicate sample collected from monitoring well LWDS-MW1 in February 2020 and 1,4-dioxane was not detected in the sample collected from the same well in June 2020. The 1,4-dioxane concentrations were 0.515 and 0.580 µg/L in the environmental and environmental duplicate samples, respectively, collected from monitoring well TAV-MW4 in February 2020 and was 0.459 µg/L in the environmental sample collected from the same well in June 2020. The NMED HWB risk-based action level for 1,4-dioxane is 4.59 µg/L (NMED HWB September 2019) and none of the TA-V groundwater sample results exceeded this action level.

Table 5B-6 (Attachment 5B) presents the analytical results for anions (bromide, chloride, fluoride, and sulfate) and for alkalinity (bicarbonate and carbonate). Fluoride is the only analyte with an established MCL. None of the fluoride results exceeded the MCL of 4.0 mg/L.

Table 5B-7 (Attachment 5B) presents the analytical results for the 23 Target Analyte List (TAL) metals and uranium. None of these analytes exceeded the MCLs except for chromium at monitoring well AVN-1. The chromium concentrations in the environmental and environmental duplicate samples collected in May 2020 were 0.112 and 0.115 mg/L, respectively, exceeded the MCL of 0.1 mg/L for the first time. Well AVN-1 is sampled annually (Table 5-5). SNL/NM personnel voluntarily sampled this well for TAL and filtered metals plus uranium on September 30, 2020. The chromium concentration was 0.122 mg/L (Table 5B-7, Attachment 5B), again exceeding the MCL of 0.1 mg/L. Figure 5C-9 (Attachment 5C) presents the increasing trend of chromium concentration for monitoring well AVN-1. Table 5B-8 (Attachment 5B) presents the filtered TAL metals plus uranium results for the sample collected from monitoring well AVN-1 on September 30, 2020. None of the filtered metals at well AVN-1 exceeded respective MCLs.

Monitoring well AVN-1 was installed in May 1995. It is the only well constructed with both stainless-steel casing and stainless-steel screen within the TA-V groundwater monitoring network. The elevated chromium concentrations are likely associated with corrosion of the stainless-steel well construction materials. DOE/NNSA and SNL/NM personnel requested NMED HWB's approval to plug, abandon, and replace this well, and NMED HWB subsequently agreed (NMED HWB December 2020). The new well will be designated TAV-MW17 and will be constructed with polyvinyl chloride well screen and casing materials.

DOE/NNSA and SNL/NM personnel also requested NMED HWB's approval to plug and abandon monitoring wells AVN-2 and LWDS-MW2. Well AVN-2, located in the vicinity of well AVN-1, has been dry since 2008. The proposed new monitoring well TAV-MW17 will serve the role of AVN-1/AVN-2 as the upgradient background well at the TAVG AOC. Monitoring well LWDS-MW2 is constructed with stainless-steel screen which is also deteriorating. The original purpose of this well was to determine if any deep groundwater contamination was occurring from former discharges at the surface impoundments (SWMU 4). TCE has never been detected at this well. In October 2020, the water level at monitoring well LWDS-MW2 was approximately 12 ft above top of the screen. Because of its deep completion, it does not serve to delineate groundwater contamination at the TAVG AOC. NMED HWB has concurred with the plan to decommission monitoring wells AVN-2 and LWDS-MW2 (NMED HWB December 2020).

Table 5B-9 (Attachment 5B) presents the gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40), gross alpha/beta activity, and tritium results; all radionuclide results were below established MCLs. Gross alpha activity is measured as a radiological screening tool in accordance with 40 Code of Federal Regulations Part 141. Naturally occurring uranium is measured independently (i.e., total uranium concentration determined by metals analysis described above) and the gross alpha activity measurements are corrected by subtracting the total uranium activity from the uncorrected gross alpha activity results. Radiological results are further reviewed by an SNL/NM Health Physicist to assure that the samples are nonradioactive. No gross alpha/beta activity exceeded MCLs. Potassium-40 in the environmental samples collected at monitoring wells TAV-MW9, TAV-MW10, and TAV-MW13 and americium-241 in the environmental duplicate sample collected at monitoring well TAV-MW13 did not meet identification criteria at analytical laboratory and were qualified as rejected during data validation.

Table 5B-10 (Attachment 5B) presents the water quality parameters that were measured in the field during the purging of each monitoring well immediately prior to sampling. These parameters consist of temperature, specific conductivity, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. The parameters were measured for evaluating stabilization and determining that representative groundwater samples could be collected.

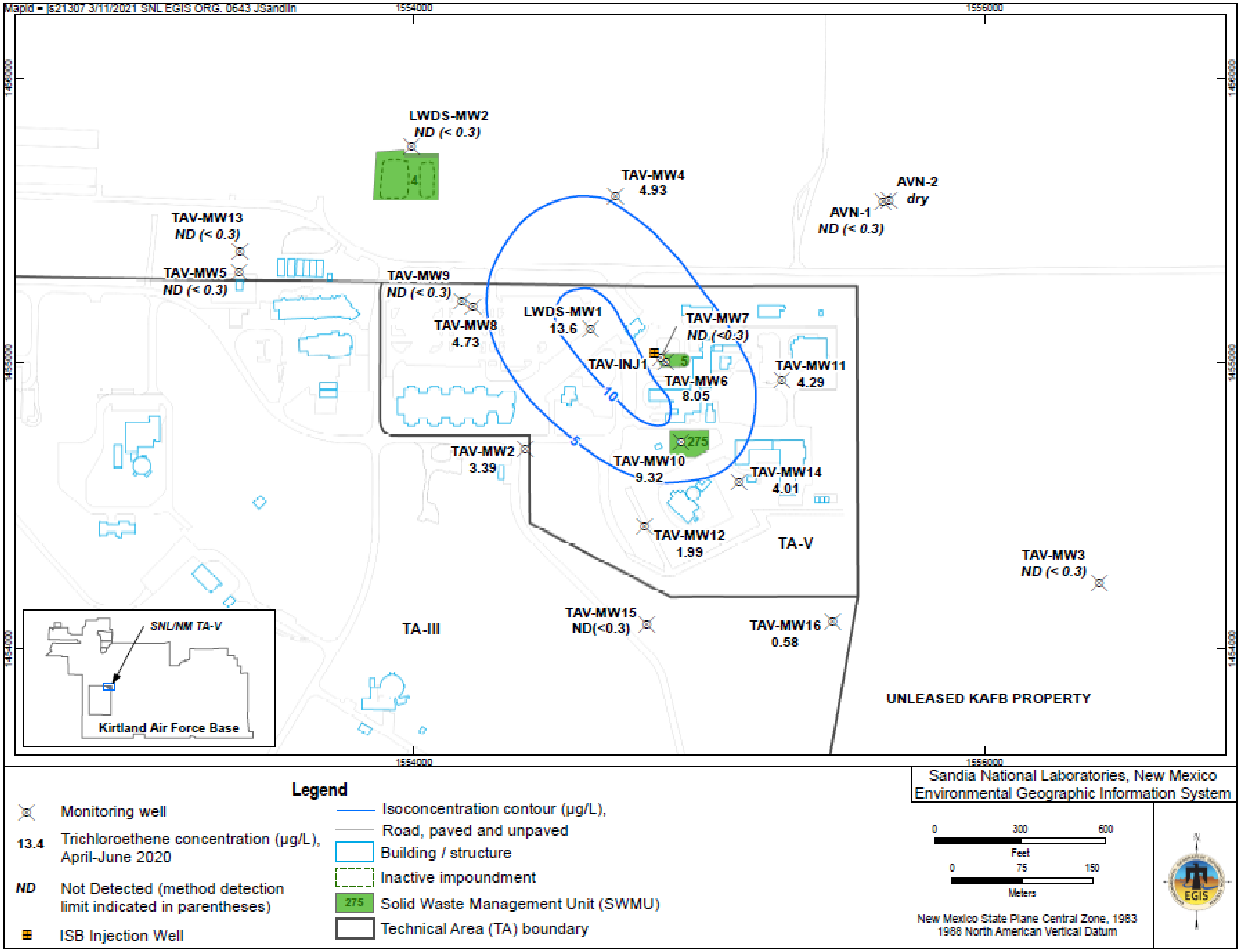

Figure 5-5. Distribution of TCE in Groundwater at Technical Area-V Groundwater Area of Concern, April – June 2020

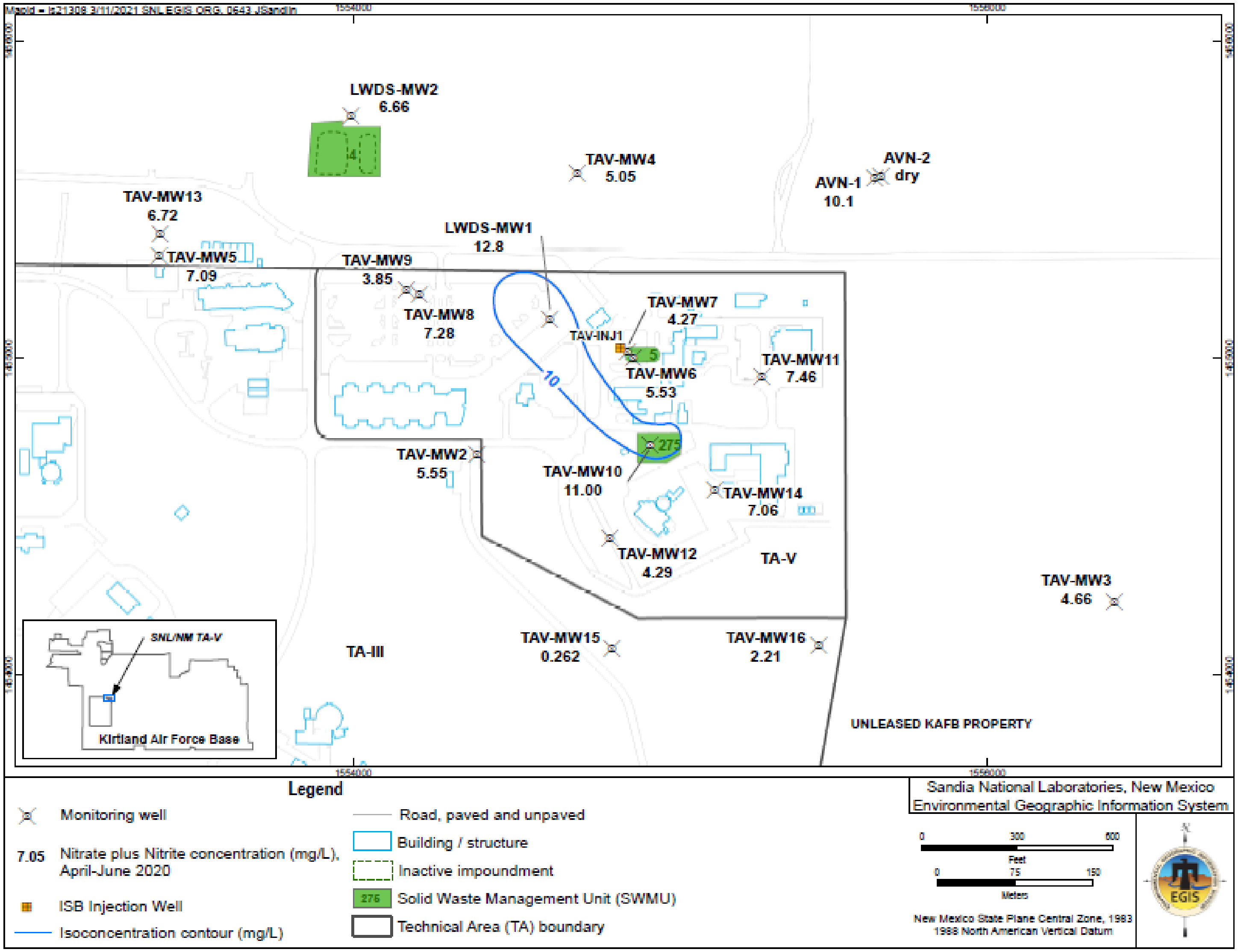

Figure 5-6. Distribution of Nitrate plus Nitrite in Groundwater at Technical Area-V Groundwater Area of Concern, April – June 2020

5.7 Quality Control Results

Section 1.3.3 describes how field and laboratory QC samples were collected and prepared. Tables 5B-1 and 5B-3 through 5B-9 (Attachment 5B) presents data validation qualifiers along with the analytical results for the TAVG AOC. The following paragraphs discuss the results of the QC samples (environmental duplicates, EB samples, FB samples, and TB samples) and their impact on data quality for the sampling events.

Environmental duplicate samples were submitted for all analyses as the environmental samples. For the CY 2020 environmental samples listed in Table 5-5, the corresponding environmental duplicate samples showed good correlation based upon the relative percent difference (RPD) calculations. RPDs are unit-less values calculated for constituents that were detected above the MDL in both samples (environmental versus environmental duplicate). The RPD values for NPN ranged from <1 to 19. These RPD values are within the acceptable range of less than or equal to the RPD goal of 35. The calculated RPD values for the TCE sample pairs ranged from <1 to 38; all are less than the RPD goal of 20 except for the RPD of 28 for the TCE sample pair collected at monitoring well LWDS-MW1 in February 2020 and the RPD of 38 for the TCE sample pair collected at monitoring well TAV-MW2 in August 2020. However, the TCE concentrations are comparable to historical values at both wells. Specific RPD values per quarter are as follows:

- **February 2020 Sampling Event**—Environmental duplicate samples were collected from four monitoring wells (LWDS-MW1, TAV-MW4, TAV-MW12, and TAV-MW15). The NPN RPD values ranged from <1 to 8. The TCE RPD values were 28, 1, and 2 at monitoring wells LWDS-MW1, TAV-MW4 and TAV-MW12, respectively. TCE was not detected at monitoring well TAV-MW15.

- **May/June 2020 Sampling Event—**Environmental duplicate samples were collected from five monitoring wells (AVN-1, TAV-MW5, TAV-MW7, TAV-MW8, and TAV-MW13). The NPN RPD values ranged from 1 to 19. The TCE RPD value was <1 at monitoring well TAV-MW8. TCE was not detected at the other four wells.

- **August 2020 Sampling Event—**Environmental duplicate samples were collected from three monitoring wells (TAV-MW2, TAV-MW10, and TAV-MW16). The NPN RPD values ranged from <1 to 2. The TCE RPD values were 38, 5, and 10 at monitoring wells TAV-MW2, TAV-MW10, and TAV-MW16, respectively.

- **November/December 2020 Sampling Event**—Environmental duplicate samples were collected from three monitoring wells (LWDS-MW1, TAV-MW11, and TAV-MW14). The NPN RPD values ranged from <1 to 1. The TCE RPD values were 6, 14, and 2 at monitoring wells LWDS-MW1, TAV-MW11, and TAV-MW14, respectively.

EB samples were submitted for all analyses. The results for the EB analyses are as follows:

- **February 2020 Sampling Event**—EB samples were collected prior to sampling four monitoring wells (LWDS-MW1, TAV-MW4, TAV-MW12, and TAV-MW15). Acetone, arsenic, bromodichloromethane, chloroform, dibromochloromethane, and NPN were detected above the MDLs. No corrective action was necessary for acetone, bromodichloromethane, chloroform, dibromochloromethane, or NPN, because these compounds were not detected in the associated environmental samples or reported at concentrations less than 10 times the associated environmental sample results. Arsenic in samples collected at monitoring wells LWDS-MW1 and TAV-MW15 were qualified as not detected during data validation

(Table 5B-4, Attachment B), because arsenic was reported at concentrations below the practical quantitation limit (PQL) in both EB and associated environmental samples.

- **May/June 2020 Sampling Event**—EB samples were collected prior to sampling six monitoring wells (AVN-1, TAV-MW2, TAV-MW5, TAV-MW7, TAV-MW8, and TAV-MW13). Acetone, alkalinity, arsenic (filtered fraction), 2-butanone, bromodichloromethane, bromoform, chloroform, chloride, copper, dibromochloromethane, NPN, potassium, sodium, vanadium, and zinc were detected above the MDLs. No corrective action was necessary for acetone, alkalinity, 2-butanone, bromodichloromethane, bromoform, chloroform, chloride, dibromochloromethane, NPN, potassium, or sodium, because these compounds were not detected above the MDLs in the associated environmental samples or the concentrations in environmental samples were five times greater than the associated EB results. Arsenic in samples collected at monitoring well TAV-MW13 (Table 5B-4, Attachment B); copper in samples collected at monitoring wells AVN-1, TAV-MW2, TAV-MW5, and TAV-MW8 (Table 5B-7, Attachment B); vanadium in samples collected at monitoring wells AVN-1, TAV-MW2, TAV-MW7, and TAV-MW13 (Table 5B-7, Attachment B); and zinc in samples collected at monitoring well TAV-MW8 (Table 5B-7, Attachment B) were qualified as not detected during data validation, because these metals were reported at similar concentrations in the associated EB samples.

- **August 2020 Sampling Event**—EB samples were collected prior to sampling three monitoring wells (TAV-MW2, TAV-MW10, and TAV-MW16). Acetone, arsenic, bromodichloromethane, chloroform, dibromochloromethane, and 2-butanone were detected above the MDLs. No corrective action was necessary for acetone, bromodichloromethane, chloroform, dibromochloromethane, or 2-butanone, because these compounds were not detected in the associated environmental samples or reported at concentrations less than 10 times the associated environmental sample results. Arsenic in the environmental sample collected at monitoring well TAV-MW16 was qualified as not detected during data validation (Table 5B-4, Attachment B), because arsenic was reported at concentrations below the PQL in both EB and associated environmental samples.

- **November/December 2020 Sampling Event**—EB samples were collected prior to sampling three monitoring wells (LWDS-MW1, TAV-MW11, and TAV-MW14). Acetone, arsenic, bromodichloromethane, bromoform, chloroform, dibromochloromethane, and NPN were detected above the MDLs. No corrective action was necessary for acetone, arsenic, bromodichloromethane, bromoform, dibromochloromethane, or NPN, because these compounds were not detected in the associated environmental samples or reported at concentrations less than 10 times the associated environmental sample results. Chloroform in samples collected at monitoring well LWDS-MW1 was qualified as not detected during data validation (Table 5B-1, Attachment B), because chloroform was reported at concentrations below the PQL in both EB and associated environmental samples.

FB samples were analyzed for VOCs. The results for the FB analyses are as follows:

- **February 2020 Sampling Event**—FB samples were collected at three monitoring wells (LWDS-MW1, TAV-MW2, and TAV-MW11) for VOCs analysis. Acetone, bromodichloromethane, chloroform, dibromochloromethane, and toluene were detected above the MDLs. No corrective action was necessary for acetone, bromodichloromethane, chloroform, or toluene, because these compounds were not detected in the associated environment samples. Dibromochloromethane in the environmental duplicate sample collected at monitoring well LWDS-MW1 was qualified as not detected during data validation (Table 5B-1, Attachment B), because dibromochloromethane was reported at a concentration less than the FB sample.

- **May/June 2020 Sampling Event**—FB samples were collected at four monitoring wells (LWDS-MW2, TAV-MW9, TAV-MW11, and TAV-MW13). Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above the MDLs. No corrective action was necessary because these compounds were not detected in the associated environmental samples.

- **August 2020 Sampling Event**—FB samples were collected at three monitoring wells (LWDS-MW1, TAV-MW8, and TAV-MW10). Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected above the MDLs. No corrective action was necessary because these compounds were not detected in the associated environment samples.

- **November/December 2020 Sampling Event**—FB samples were collected at three monitoring wells (TAV-MW7, TAV-MW11, and TAV-MW12). Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above the MDLs. No corrective action was necessary because these compounds were not detected in the associated environment samples.

TB samples were analyzed for VOCs. The results for the TB analyses are as follows:

- **February 2020 Sampling Event**—Fifteen TB samples were submitted with the environmental samples for VOCs analysis. No VOCs were detected above the MDLs except for acetone. Acetone was reported in one TB sample. No corrective action was necessary because acetone was not detected in the associated environment sample.

- **May/June 2020 Sampling Event**—Twenty-four TB samples were submitted with the environmental samples. No VOCs were detected above the MDLs except for methylene chloride. Methylene chloride was reported in one TB sample. No corrective action was necessary because methylene chloride was not detected in the associated environmental sample.

- **August 2020 Sampling Event**—Fifteen TB samples were submitted with the environmental samples. No VOCs were detected above the MDLs except for methylene chloride. Methylene chloride was qualified as not detected during data validation in several TB samples because it was reported in associated laboratory method blank samples.

- **November/December 2020 Sampling Event**—Fourteen TB samples were submitted with the environmental samples. No VOCs were detected above the MDLs in the TB samples.

5.8 Variances and Non-Conformances

No variances or non-conformances from requirements specified in the TAVG mini-SAPs were identified for the CY 2020 sampling activities. However, the following observations and activities associated with these sampling events were noted:

- **All Four Sampling Events in CY 2020**—Wells LWDS-MW1 and TAV-MW12 were purged to dryness prior to reaching minimum purge volume requirements. The wells were allowed to recharge and were sampled on the following day.

- **May/June 2020 Sampling Event**—Rust colored fine-grained material was observed on the exterior of the sampling tube after purging of monitoring wells AVN-1 and LWDS-MW2. The casing and screen for monitoring well AVN-1 are both stainless-steel. Well LWDS-MW2 has polyvinyl chloride casing and stainless-steel screen.

- **November/December 2020 Sampling Event**—Additional purge volume was required at monitoring wells TAV-MW8 and TAV-MW14 to meet stability requirements for turbidity.

5.9 Summary and Conclusions

The CSM demonstrates that contaminant releases involving TCE occurred from two primary sources (SWMUs 5 and 275). Wastewater containing the contaminants migrated downward through the vadose zone and into the Regional Aquifer. TCE was present in wastewater that was disposed of at the underground LWDS Drain Field (SWMU 5) during the period from 1962 to 1967, and to the buried TA-V Seepage Pits (SWMU 275) from the 1960s until the early 1980s.

Wastewater devoid of TCE continued to flush through the vadose zone beneath the seepage pits until 1992, which most likely removed a significant portion of a potential secondary contaminant source. Upon cessation of wastewater disposal, drainage diminished through vertical pathways in the vadose zone. Low concentrations of TCE present in the Regional Aquifer today represent the wastewater releases that occurred before 1992. Sanitary waste containing nitrate was also released at SWMU 275 from 1960s to 1992.

The combined effect of several wastewater release locations, various wastewater volumes, variable aquifer lithology, low groundwater velocities, dispersion, diffusion, and sorption are likely responsible for the current distribution of TCE and nitrate in the Regional Aquifer.

TCE results in groundwater samples from five monitoring wells (LWDS-MW1, TAV-MW4, TAV-MW8, TAV-MW10, and TAV-MW14) exceeded the MCL of 5 µg/L in CY 2020. The maximum TCE concentration was 14.8 µg/L in the environmental duplicate sample collected from monitoring well LWDS-MW1 in February 2020.

NPN results in groundwater samples from three monitoring wells (AVN-1, LWDS-MW1, and TAV-MW10) exceeded the MCL of 10 mg/L in CY 2020. The maximum NPN concentration was 14.6 mg/L in the sample collected from monitoring well LWDS-MW1 in August 2020.

The analytical results for CY 2020 are consistent with historical values. The following conclusions are based on a comprehensive review of available information on current groundwater contamination in the TAVG AOC:

- The COCs for the TAVG AOC are TCE and nitrate.
- The primary sources of TCE and nitrate in the TAVG AOC consist of two wastewater disposal systems; the LWDS Drain Field (SWMU 5) and the TA-V Seepage Pits (SWMU 275).
- Based on historical use and disposal of organic solvents at TA-V, the extent of TCE in the Regional Aquifer is attributed to wastewater releases containing TCE and the subsequent transport of TCE through the vadose zone to groundwater.
- The distribution of low concentrations of TCE in the Regional Aquifer has remained relatively stable which is attributed to the combined effect of fine-grained aquifer lithology, low groundwater flow velocities, dispersion, diffusion, and sorption.

- The distribution of nitrate concentrations is laterally widespread in the area, both inside and outside the TA-V boundary. The extent of the 10 mg/L NPN concentration contour has remained relatively stable. An upgradient source and/or elevated background may contribute to the nitrate concentration at monitoring well AVN-1, which is located northeast of TA-V.

- The requirement of sampling for 1,4-dioxane for a minimum of two sampling events at the TAVG AOC was completed for 12 wells in CY 2020. An additional six wells, which are on annual sampling schedule, completed one sampling event for 1,4-dioxane.

Ongoing groundwater monitoring activities in the TAVG AOC include the following:

- Continue obtaining periodic measurements of groundwater elevations at active TA-V groundwater monitoring wells.

- Continue collecting groundwater samples at active TA-V groundwater monitoring wells.

- Complete the second sampling event for 1,4-dioxane at six monitoring wells (AVN-1, LWDS-MW2, TAV-MW3, TAV-MW5, TAV-MW9, and TAV-MW13) in CY 2021.

- Continue reporting the TA-V groundwater monitoring results in future AGMRs for submittal to the NMED HWB.

- Continue implementing the ISB Treatability Study for the purpose of degrading the groundwater contaminants at the TAVG AOC.

- Provide summaries of the ISB Treatability Study results in ER Operations Quarterly Reports for submittal to NMED HWB. Corresponding results for DP-1845 Quarterly Reports will be submitted to NMED GWQB with courtesy copies sent to NMED HWB.

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Attachment 5A
Historical Timeline of the Technical Area-V Groundwater Area of Concern

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Table 5A-1. Historical Timeline of the Technical Area-V Groundwater Area of Concern

Month	Year	Event	Reference
May	1959	Production well KAFB-10 was installed for fire suppression purposes. Water pumped occasionally for maintenance testing.	NMOSE May 1959
	1961	Research buildings were constructed at TA-V.	DOE September 1987
	1962	Discharge of wastewater to the vadose zone began.	DOE September 1987
	1984	DOE created the CEARP to evaluate potential release sites at SNL/NM.	DOE September 1987
	1988	The SNL/NM ER Project was created and began conducting investigations using the CEARP list of sites.	SNL March 1999a
	1992	Wastewater discharges to the vadose zone ceased after the ABCWUA sanitary sewer system was extended to TA-V.	SNL March 1999a
April	1992	The LWDS RFI Work Plan (SWMUs 4, 5, and 52) was submitted.	SNL March 1993
October	1992	Groundwater monitoring well LWDS-MW2 was installed at TA-V for the LWDS investigation.	SNL March 1993
May	1993	Groundwater monitoring well LWDS-MW1 was installed.	SNL September 1995
November	1993	LWDS-MW1 and LWDS-MW2 were sampled. The first sampling event of LWDS-MW1 revealed TCE exceeding the MCL of 5 μg/L.	SNL March 1995
June	1994	Submitted notification letter from DOE to EPA regarding TCE detection in well LWDS-MW1.	DOE June 1994
March	1995	Groundwater sample analytical results for monitoring wells LWDS-MW1 and LWDS-MW2 reported in the CY 1994 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1995
June	1995	Wells AVN-1 and AVN-2 were installed.	SNL 1995
April	1995	Wells TAV-MW1 and TAV-MW2 were installed.	SNL March 1996
	1995	The LWDS RFI report was completed.	SNL September 1995
March	1996	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 1995 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1996
March	1996	Submitted letter to the NMED HWB with notification of elevated nitrate detection for well LWDS-MW1. The result was 10.1 mg/L, exceeding the MCL of 10 mg/L.	DOE March 1996
April	1996	KAFB-10 was plugged and abandoned due to the potential for the annulus of this production well to act as a conduit.	SNL April 1996
March	1997	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 1996 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1997
April	1997	Wells TAV-MW3, TAV-MW4, and TAV-MW5 were installed.	SNL March 1999a
September	1997	NMED HWB issued an RSI stating that additional characterization was needed for each of the LWDS sites (SWMUs 4, 5, and 52).	NMED HWB September 1997
January	1998	RSI Response submitted to the NMED HWB.	SNL January 1998
March	1998	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 1997 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1998
October	1998	Provided cross sections to NMED HWB for the LWDS as required in the September 1997 RSI.	DOE October 1998
March	1999	Submitted a summary report detailing groundwater conditions for the TA-III/V area that included sites from OU 1306 (TA-III) and OU 1307 (LWDS).	SNL March 1999a
March	1999	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 1998 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1999b

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the Technical Area-V Groundwater Area of Concern *(continued)*

Month	Year	Event	Reference
March	2000	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 1999 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2000
April	2001	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2000 SNL/NM Annual Groundwater Monitoring Report.	SNL April 2001
May	2001	Wells TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9 were installed.	SNL October 2001
November	2001	A summary of groundwater sampling results from TAVG monitoring wells for FYs 1999 and 2000 were compiled into one report. This was an update of the March 1999 summary report.	SNL November 2001
March	2002	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2001 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2002
March	2003	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2002 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2003
June	2003	Subsurface geology at KAFB, including the TAVG monitoring area, was updated.	Van Hart June 2003
March	2004	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2003 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2004
April	2004	The NMED issued the Consent Order to the DOE/Sandia, which identified the TAVG as an AOC with groundwater contamination requiring a CME and a CCM.	NMED April 2004
May	2004	Submitted the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Technical Area-V*.	SNL April 2004a
May	2004	Submitted the *Corrective Measures Evaluation Work Plan, Technical Area-V Groundwater*.	SNL April 2004b
July	2004	The potential for natural (intrinsic) anaerobic biodegradation of TCE and nitrate to occur in TA-V groundwater was evaluated.	SNL July 2004
October	2004	The NMED HWB issued an approval with modifications to the TA-V CME Work Plan and the CCM of Groundwater Flow and Contaminant Transport.	NMED HWB October 2004
December	2004	Submitted responses to the NMED HWB approval with modifications of the October 2004 TA-V CME Work Plan. The responses are included in the revised *Corrective Measures Evaluation Work Plan, Technical Area-V Groundwater, Revision 0*.	SNL December 2004
April	2005	The potential for natural (intrinsic) aerobic biodegradation of TCE to occur in TA-V groundwater was evaluated.	SNL April 2005
July	2005	Submitted the *Corrective Measures Evaluation Report for Technical Area-V Groundwater*. The report details the selection of a preferred remedial alternative, cleanup goals, and the Corrective Measures Implementation Plan.	SNL July 2005
October	2005	Submitted request to NMED HWB for change in sampling frequency for TAVG monitoring wells.	DOE October 2005
October	2005	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2004 SNL/NM Annual Groundwater Monitoring Report.	SNL October 2005
March	2006	Requested the removal of well AVN-2 from the TAVG monitoring network due to insufficient water for sampling caused by regional water level declines.	DOE March 2006

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the Technical Area-V Groundwater Area of Concern *(continued)*

Month	Year	Event	Reference
November	2006	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2005 SNL/NM Annual Groundwater Monitoring Report.	SNL November 2006
March	2007	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2006 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2007
March	2008	Well TAV-MW1 plugged and abandoned. Well TAV-MW10 installed as replacement for TAV-MW1.	SNL June 2008
March	2008	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 2007 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2008
July	2008	NMED HWB issued a NOD on the July 2005 CME Report for TAVG AOC.	NMED HWB July 2008
September	2008	The 13 TAVG monitoring wells were resurveyed to establish new northing and easting coordinates and elevations for each well.	SNL October 2008
April	2009	NMED HWB required characterization of perchlorate in groundwater in one well (LWDS-MW1) at TA-V.	NMED HWB April 2009
April	2009	Submitted a response to the NOD on the July 2005 CME Report for TAVG AOC.	SNL April 2009
June	2009	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2008 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2009
August	2009	NMED HWB issued a second NOD on the July 2005 CME Report for TAVG AOC.	NMED HWB August 2009
November	2009	Submitted a response to the second NOD on the July 2005 CME Report for TAVG AOC.	SNL November 2009
December	2009	NMED HWB issued a third NOD on the July 2005 CME Report for TAVG AOC.	NMED HWB December 2009
February	2010	Submitted a response to the third NOD on the July 2005 CME Report for TAVG AOC.	SNL February 2010
May	2010	NMED HWB issued a notice of conditional approval for the TA-V Groundwater Investigation Work Plan associated with the NOD responses.	NMED HWB May 2010
October	2010	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2009 SNL/NM Annual Groundwater Monitoring Report.	SNL October 2010
November	2010	Completed installation of groundwater monitoring wells TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14.	SNL June 2011
November	2010	Submitted a report to the NMED HWB for the geophysical logging and slug test results for the new TAVG monitoring wells.	SNL November 2010
December	2010	NMED HWB issued approval for the modification of soil-vapor monitoring well design.	NMED HWB December 2010
March	2011	Completed installation of soil-vapor monitoring wells TAV-SV01, TAV-SV02, and TAV-SV03.	SNL June 2011
June	2011	Submitted a *Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation*.	SNL June 2011
July	2011	DOE/NNSA and SNL personnel met with NMED HWB to discuss the results from the first quarter of groundwater and soil-vapor monitoring.	SNL July 2011
September	2011	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2010 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2011
June	2012	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2011 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2012

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the Technical Area-V Groundwater Area of Concern *(continued)*

Month	Year	Event	Reference
June	2013	A study of denitrification parameters and isotopic signatures was conducted.	Madrid et al. June 2013
June	2013	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2012 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2013
September	2013	NMED HWB approved the *Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation.*	NMED HWB September 2013
December	2013	Requested that the 2005 CME Report be withdrawn and replaced with an updated CCM and CME Report.	DOE December 2013
December	2013	NMED HWB approved the extension request for an updated CCM and CME report to be submitted by November 21, 2014.	NMED HWB December 2013
June	2014	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2013 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2014
September	2014	DOE Office of Environmental Management issued a memorandum to DOE/NNSA Sandia Field Office providing the IRR team's comments and recommendations on the corrective measures for TAVG AOC based on a multi-agency meeting including NMED HWB on July 17, 2014.	DOE September 2014
November	2014	Submitted a two-year extension request for the CCM and CME Report.	DOE November 2014a
November	2014	DOE/NNSA issued a second IRR memorandum that had been submitted to the Deputy Assistant Secretary of the Office of Environmental Compliance regarding the IRR team's recommendations for TAVG AOC.	DOE November 2014b
January	2015	NMED HWB approved the extension request for an updated CCM and CME Report. Due date revised to November 30, 2016.	NMED HWB January 2015b
May	2015	DOE Office of Environmental Management issued a third IRR memorandum that had been submitted to the Deputy Assistant Secretary of the Office of Environmental Compliance as their final recommendations for TAVG AOC.	DOE May 2015
June	2015	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2014 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2015
October	2015	Submitted the CCM and a Treatability Study Work Plan (TSWP) for In Situ Bioremediation (ISB) at TAVG AOC. Two phases are proposed in the TSWP. One injection well would be installed and operated in Phase I. Dependent of the findings of Phase I, two more injection wells could be installed and operated in phase two.	DOE October 2015
November	2015	NMED HWB approved the CCM for TAVG AOC.	NMED HWB November 2015
December	2015	NMED HWB disapproved the TSWP and requested a revised TSWP and a response letter that addressed the disapproval comments by January 29, 2016.	NMED HWB December 2015
January	2016	Requested a two-month extension for the revised TSWP and the response to NMED HWB disapproval letter.	DOE January 2016
January	2016	NMED HWB approved the extension request for submittal of comments response and the revised TSWP. The new due date was March 31, 2016.	NMED HWB January 2016
March	2016	Submitted the revised TSWP and the response to the NMED HWB disapproval letter.	DOE March 2016a
March	2016	Submitted a summary of agreements and proposed milestones pursuant to a multi-agency meeting including NMED HWB on July 20, 2015. Requested an extension of schedule milestones to update the CCM and CME reports.	DOE March 2016b

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the Technical Area-V Groundwater Area of Concern *(continued)*

Month	Year	Event	Reference
April	2016	NMED HWB approved the extension of milestones and stated the new due date for the updated CCM and CME reports for TAVG AOC are May 20, 2022.	NMED HWB April 2016
May	2016	NMED HWB approved the Revised TSWP.	NMED HWB May 2016a
May	2016	Submitted the Notice of Intent to Discharge to NMED GWQB for the ISB Treatability Study injection wells.	DOE May 2016
May	2016	NMED HWB stated the TA-V Geophysical Logging and Slug Test Results (SNL November 2010) will be superseded by the updated CCM and CME reports.	NMED HWB May 2016b
June	2016	NMED GWQB stated that a Discharge Permit would be required for the ISB Treatability Study injection wells.	NMED GWQB June 2016
June	2016	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2015 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2016
July	2016	Submitted the Discharge Permit Application for the ISB Treatability Study injection wells.	DOE July 2016a
July	2016	Submitted the Permit to Drill applications to NMOSE for installing two groundwater monitoring wells, TAV-MW15 and TAV-MW16, and one injection well TAV-INJ1.	DOE July 2016b
August	2016	NMOSE approved the Permit to Drill applications for wells TAV-MW15, TAV-MW16, and TAV-INJ1.	NMOSE August 2016
September	2016	NMED GWQB determined the Discharge Permit Application is administratively complete.	NMED GWQB September 2016
November	2016	Completed the public notice requirements for the Discharge Permit application.	DOE November 2016
January	2017	Completed installation and development of monitoring wells TAV-MW15 and TAV-MW16.	SNL July 2017
January	2017	Completed the redevelopment of monitoring wells AVN-1, LWDS-MW2, TAV-MW2, TAV-MW9, TAV-MW11, and TAV-MW12.	Lum May 2017
February	2017	Started to implement the new sampling requirements per the NMED HWB-approved Revised TSWP.	DOE March 2016a NMED HWB May 2016a
May	2017	NMED GWQB issued Discharge Permit, DP-1845, for the ISB Treatability Study injection wells.	NMED GWQB May 2017
June	2017	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2016 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2017
July	2017	Well installation report for monitoring wells TAV-MW15 and TAV-MW16 was submitted to NMED HWB.	SNL July 2017
August	2017	NMED HWB approved the well installation report for monitoring wells TAV-MW15 and TAV-MW16.	NMED HWB August 2017
November	2017	Installed injection well TAV-INJ1 for Phase I of the ISB Treatability Study.	SNL June 2018a
November	2017	Notification to NMED GWQB to commence discharge under DP-1845. Pilot Test for Phase I of the ISB Treatability Study was conducted. Approximately 9,000 gallons treatment solution was discharged at injection well TAV-INJ1.	DOE November 2017
June	2018	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2017 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2018b
July	2018	Notification to NMED HWB to proceed to full-scale operation at injection well TAV-INJ1 with modifications.	DOE July 2018
August	2018	NMED HWB approved the modifications and concurred with the decision to proceed to full-scale operation at injection well TAV-INJ1.	NMED HWB August 2018

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the Technical Area-V Groundwater Area of Concern *(concluded)*

Month	Year	Event	Reference
October	2018	Submitted the summary of the ISB Treatability Study Pilot Test operation and results.	SNL October 2018
October	2018	Full-scale operation for the Phase I ISB Treatability Study started at injection well TAV-INJ1.	SNL April 2019
April	2019	Completed six-month injections at well TAV-INJ1. Approximately 530,000 gallons of treatment solution was discharged.	SNL October 2019
May	2019	Started two-year performance monitoring of the Phase I ISB Treatability Study.	SNL October 2019
June	2019	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2018 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2019
September	2019	NMED HWB requested a minimum of two sampling events to be conducted for 1,4-dioxane at TAVG AOC.	NMED HWB September 2019
June	2020	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2019 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2020

NOTES:

ABCWUA	= Albuquerque Bernalillo County Water Utility Authority.
AOC	= Area of concern.
AVN	= Area-V (North).
CEARP	= Comprehensive Environmental Assessment and Response Program.
CCM	= Current Conceptual Model.
CME	= Corrective Measures Evaluation.
Consent Order	= Compliance Order on Consent.
CY	= Calendar Year.
DP	= Discharge Permit.
DOE	= U.S. Department of Energy.
EPA	= U.S. Environmental Protection Agency.
ER	= Environmental Restoration.
FY	= Fiscal Year.
GWQB	= Ground Water Quality Bureau.
HWB	= Hazardous Waste Bureau.
INJ	= Injection well.
IRR	= Internal Remedy Review.
KAFB	= Kirtland Air Force Base.
LWDS	= Liquid Waste Disposal System.
MCL	= Maximum Contaminant Level.
µg/L	= Microgram(s) per liter.
mg/L	= Milligram(s) per liter.
MW	= Monitoring well.
NMED	= New Mexico Environment Department.
NMOSE	= New Mexico Office of the State Engineer.
NNSA	= National Nuclear Security Administration.
NOD	= Notice of Disapproval.
OU	= Operable Unit.
RCRA	= Resource Conservation and Recovery Act.
RFI	= RCRA Facility Investigation.
RSI	= Request for Supplemental Information.
Sandia	= Sandia Corporation.
SNL	= Sandia National Laboratories.
SNL/NM	= Sandia National Laboratories, New Mexico.
SV	= Soil vapor.
SWMU	= Solid Waste Management Unit.
TA	= Technical Area.
TAV	= Technical Area-V (monitoring well designation).
TAVG	= Technical Area-V Groundwater.
TCE	= Trichloroethene.

Attachment 5B
Technical Area-V
Analytical Results Tables

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Attachment 5B Tables

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Table 5B-1
Summary of Detected Volatile Organic Compounds
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Trichloroethene	**11.2**	0.300	1.00	5.00			112287-001	SW846 8260B
17-Feb-20	cis-1,2-Dichloroethene	2.90	0.300	1.00	70.0			112287-001	SW846 8260B
LWDS-MW1 (Duplicate)	Dibromochloromethane	0.800	0.300	1.00	NE	J	1.0UJ	112288-001	SW846 8260B
17-Feb-20	Trichloroethene	**14.8**	0.300	1.00	5.00			112288-001	SW846 8260B
	cis-1,2-Dichloroethene	3.39	0.300	1.00	70.0			112288-001	SW846 8260B
TAV-MW2 06-Feb-20	Trichloroethene	3.65	0.300	1.00	5.00			112267-001	SW846 8260B
TAV-MW4	Chloroform	1.01	0.300	1.00	80.0		J	112271-001	SW846 8260B
07-Feb-20	Trichloroethene	4.99	0.300	1.00	5.00			112271-001	SW846 8260B
	cis-1,2-Dichloroethene	0.490	0.300	1.00	70.0	J		112271-001	SW846 8260B
TAV-MW4 (Duplicate)	Chloroform	0.990	0.300	1.00	80.0	J	J	112272-001	SW846 8260B
07-Feb-20	Trichloroethene	**5.03**	0.300	1.00	5.00			112272-001	SW846 8260B
	cis-1,2-Dichloroethene	0.550	0.300	1.00	70.0	J		112272-001	SW846 8260B
TAV-MW8	Trichloroethene	4.67	0.300	1.00	5.00			112277-001	SW846 8260B
12-Feb-20	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		112277-001	SW846 8260B
TAV-MW10	Trichloroethene	**12.4**	0.300	1.00	5.00			112292-001	SW846 8260B
20-Feb-20	cis-1,2-Dichloroethene	2.08	0.300	1.00	70.0			112292-001	SW846 8260B
TAV-MW11	Trichloroethene	4.72	0.300	1.00	5.00			112275-001	SW846 8260B
10-Feb-20	cis-1,2-Dichloroethene	0.620	0.300	1.00	70.0			112275-001	SW846 8260B
TAV-MW12 19-Feb-20	Trichloroethene	2.26	0.300	1.00	5.00	J		112283-001	SW846 8260B
TAV-MW12 (Duplicate) 19-Feb-20	Trichloroethene	2.22	0.300	1.00	5.00			112284-001	SW846 8260B
TAV-MW14	Trichloroethene	4.55	0.300	1.00	5.00			112290-001	SW846 8260B
13-Feb-20	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		112290-001	SW846 8260B
TAV-MW16 05-Feb-20	Trichloroethene	0.580	0.300	1.00	5.00	J		112264-001	SW846 8260B
LWDS-MW1	Chloroform	0.330	0.300	1.00	80.0	J		112946-001	SW846 8260B
08-Jun-20	Trichloroethene	**13.6**	0.300	1.00	5.00			112946-001	SW846 8260B
	cis-1,2-Dichloroethene	3.52	0.300	1.00	70.0			112946-001	SW846 8260B
TAV-MW2 01-Jun-20	Trichloroethene	3.39	0.300	1.00	5.00			112944-001	SW846 8260B

Refer to footnotes on page 5B-59.

Table 5B-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4 02-Jun-20	Chloroform	0.980	0.300	1.00	80.0	J		112948-001	SW846 8260B
	Trichloroethene	4.93	0.300	1.00	5.00			112948-001	SW846 8260B
	cis-1,2-Dichloroethene	0.490	0.300	1.00	70.0	J		112948-001	SW846 8260B
TAV-MW7 13-May-20	Acetone	3.17	1.50	10.0	NE	B, J	10U	112907-001	SW846 8260B
TAV-MW7 (Duplicate) 13-May-20	Acetone	2.16	1.50	10.0	NE	B, J	10U	112908-001	SW846 8260B
TAV-MW8 04-Jun-20	Trichloroethene	4.73	0.300	1.00	5.00			112950-001	SW846 8260B
	cis-1,2-Dichloroethene	0.530	0.300	1.00	70.0	J		112950-001	SW846 8260B
TAV-MW8 (Duplicate) 04-Jun-20	Trichloroethene	4.73	0.300	1.00	5.00			112951-001	SW846 8260B
	cis-1,2-Dichloroethene	0.510	0.300	1.00	70.0	J		112951-001	SW846 8260B
TAV-MW10 10-Jun-20	Trichloroethene	**9.32**	0.300	1.00	5.00			112953-001	SW846 8260B
	cis-1,2-Dichloroethene	1.83	0.300	1.00	70.0			112953-001	SW846 8260B
TAV-MW11 03-Jun-20	Trichloroethene	4.29	0.300	1.00	5.00			112958-001	SW846 8260B
	cis-1,2-Dichloroethene	0.570	0.300	1.00	70.0	J		112958-001	SW846 8260B
TAV-MW12 29-May-20	Trichloroethene	1.99	0.300	1.00	5.00			112940-001	SW846 8260B
TAV-MW13 18-May-20	Methylene chloride	1.84	1.00	10.0	5.00	J	10U	112918-001	SW846 8260B
TAV-MW13 (Duplicate) 18-May-20	Methylene chloride	1.89	1.00	10.0	5.00	J	10U	112919-001	SW846 8260B
TAV-MW14 09-Jun-20	Trichloroethene	4.01	0.300	1.00	5.00			112960-001	SW846 8260B
	cis-1,2-Dichloroethene	0.390	0.300	1.00	70.0	J		112960-001	SW846 8260B
TAV-MW16 19-May-20	Trichloroethene	0.580	0.300	1.00	5.00	J		112921-001	SW846 8260B
LWDS-MW1 17-Aug-20	Toluene	0.640	0.300	1.00	1000	J		113428-001	SW846 8260B
	Trichloroethene	**13.2**	0.300	1.00	5.00			113428-001	SW846 8260B
	cis-1,2-Dichloroethene	3.20	0.300	1.00	70.0			113428-001	SW846 8260B
TAV-MW2 06-Aug-20	Methylene chloride	4.10	1.00	10.0	5.00	B, J	10U	113414-001	SW846 8260B
	Trichloroethene	3.26	0.300	1.00	5.00			113414-001	SW846 8260B
TAV-MW2 (Duplicate) 06-Aug-20	Acetone	4.30	1.50	10.0	NE	B, J	10U	113415-001	SW846 8260B
	Trichloroethene	2.21	0.300	1.00	5.00			113415-001	SW846 8260B

Refer to footnotes on page 5B-59.

Table 5B-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4 07-Aug-20	Chloroform	0.990	0.300	1.00	80.0	J		113417-001	SW846 8260B
	Trichloroethene	**5.18**	0.300	1.00	5.00			113417-001	SW846 8260B
	cis-1,2-Dichloroethene	0.490	0.300	1.00	70.0	J		113417-001	SW846 8260B
TAV-MW7 03-Aug-20	Methylene chloride	4.39	1.00	10.0	5.00	B, J	10U	113401-001	SW846 8260B
TAV-MW8 11-Aug-20	Trichloroethene	4.64	0.300	1.00	5.00			113424-001	SW846 8260B
	cis-1,2-Dichloroethene	0.480	0.300	1.00	70.0	J		113424-001	SW846 8260B
TAV-MW10 19-Aug-20	Trichloroethene	**13.1**	0.300	1.00	5.00			113435-001	SW846 8260B
	cis-1,2-Dichloroethene	2.24	0.300	1.00	70.0			113435-001	SW846 8260B
TAV-MW10 (Duplicate) 19-Aug-20	Trichloroethene	**12.5**	0.300	1.00	5.00			113436-001	SW846 8260B
	cis-1,2-Dichloroethene	2.16	0.300	1.00	70.0			113436-001	SW846 8260B
TAV-MW11 10-Aug-20	Trichloroethene	4.20	0.300	1.00	5.00			113419-001	SW846 8260B
	cis-1,2-Dichloroethene	0.550	0.300	1.00	70.0	J		113419-001	SW846 8260B
TAV-MW12 13-Aug-20	Trichloroethene	1.74	0.300	1.00	5.00			113426-001	SW846 8260B
TAV-MW14 18-Aug-20	Trichloroethene	**5.31**	0.300	1.00	5.00			113430-001	SW846 8260B
	cis-1,2-Dichloroethene	0.440	0.300	1.00	70.0	J		113430-001	SW846 8260B
TAV-MW15 04-Aug-20	Methylene chloride	4.32	1.00	10.0	5.00	B, J	10U	113404-001	SW846 8260B
TAV-MW16 05-Aug-20	Methylene chloride	4.34	1.00	10.0	5.00	B, J	10U	113408-001	SW846 8260B
	Trichloroethene	0.610	0.300	1.00	5.00	J		113408-001	SW846 8260B
TAV-MW16 (Duplicate) 05-Aug-20	Methylene chloride	4.43	1.00	10.0	5.00	B, J	10U	113409-001	SW846 8260B
	Trichloroethene	0.550	0.300	1.00	5.00	J		113409-001	SW846 8260B
LWDS-MW1 07-Dec-20	Chloroform	0.340	0.300	1.00	80.0	J	1.0U	114058-001	SW846 8260B
	Trichloroethene	**14.1**	0.300	1.00	5.00			114058-001	SW846 8260B
	cis-1,2-Dichloroethene	3.19	0.300	1.00	70.0			114058-001	SW846 8260B
LWDS-MW1 (Duplicate) 07-Dec-20	Chloroform	0.340	0.300	1.00	80.0	J	1.0U	114059-001	SW846 8260B
	Trichloroethene	**13.3**	0.300	1.00	5.00			114059-001	SW846 8260B
	cis-1,2-Dichloroethene	3.22	0.300	1.00	70.0			114059-001	SW846 8260B
TAV-MW2 20-Nov-20	Trichloroethene	3.44	0.300	1.00	5.00			114016-001	SW846 8260B

Refer to footnotes on page 5B-59.

Table 5B-1 *(Concluded)*
Summary of Detected Volatile Organic Compounds
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4	Chloroform	0.930	0.300	1.00	80.0	J		114020-001	SW846 8260B
23-Nov-20	Trichloroethene	**5.08**	0.300	1.00	5.00			114020-001	SW846 8260B
	cis-1,2-Dichloroethene	0.490	0.300	1.00	70.0	J		114020-001	SW846 8260B
TAV-MW8	Trichloroethene	**5.37**	0.300	1.00	5.00			114034-001	SW846 8260B
30-Nov-20	cis-1,2-Dichloroethene	0.500	0.300	1.00	70.0	J		114034-001	SW846 8260B
TAV-MW10	Trichloroethene	**13.1**	0.300	1.00	5.00			114050-001	SW846 8260B
08-Dec-20	cis-1,2-Dichloroethene	2.52	0.300	1.00	70.0			114050-001	SW846 8260B
TAV-MW11 24-Nov-20	Trichloroethene	4.34	0.300	1.00	5.00			114026-001	SW846 8260B
TAV-MW11 (Duplicate) 24-Nov-20	Trichloroethene	3.77	0.300	1.00	5.00			114027-001	SW846 8260B
TAV-MW12 02-Dec-20	Trichloroethene	2.09	0.300	1.00	5.00			114039-001	SW846 8260B
TAV-MW14	Trichloroethene	**5.35**	0.300	1.00	5.00			114045-001	SW846 8260B
03-Dec-20	cis-1,2-Dichloroethene	0.460	0.300	1.00	70.0	J		114045-001	SW846 8260B
TAV-MW14 (Duplicate)	Trichloroethene	**5.22**	0.300	1.00	5.00			114046-001	SW846 8260B
03-Dec-20	cis-1,2-Dichloroethene	0.480	0.300	1.00	70.0	J		114046-001	SW846 8260B
TAV-MW16 19-Nov-20	Trichloroethene	0.650	0.300	1.00	5.00	J		114014-001	SW846 8260B

Refer to footnotes on page 5B-59.

Table 5B-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846 8260B)
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300	Chlorobenzene	0.300
1,1,2,2-Tetrachloroethane	0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.300	Chloroform	0.300
1,1-Dichloroethane	0.300	Chloromethane	0.300
1,1-Dichloroethene	0.300	Cyclohexane	0.300
1,2,3-Trichlorobenzene	0.300	Dibromochloromethane	0.300
1,2,4-Trichlorobenzene	0.300	Dichlorodifluoromethane	0.300
1,2-Dibromo-3-chloropropane	0.500	Ethylbenzene	0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.300	Methylcyclohexane	0.300
1,2-Dichloropropane	0.300	Methylene chloride	1.00
1,3-Dichlorobenzene	0.300	Styrene	0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	2.00	Tetrachloroethene	0.300
2-Butanone	1.50	Toluene	0.300
2-Hexanone	1.50	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	1.50	Vinyl chloride	0.300
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.300	cis-1,3-Dichloropropene	0.300
Bromoform	0.300	m-, p-Xylene	0.300
Bromomethane	0.300	o-Xylene	0.300
Carbon disulfide	1.50	trans-1,2-Dichloroethene	0.300
Carbon tetrachloride	0.300	trans-1,3-Dichloropropene	0.300

Refer to footnotes on page 5B-59.

Table 5B-3
Summary of Nitrate Plus Nitrite Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1 17-Feb-20	Nitrate plus nitrite	**13.7**	0.850	2.50	10.0			112287-003	EPA 353.2
LWDS-MW1 (Duplicate) 17-Feb-20	Nitrate plus nitrite	**12.7**	0.850	2.50	10.0			112288-003	EPA 353.2
TAV-MW2 06-Feb-20	Nitrate plus nitrite	5.42	0.170	0.500	10.0			112267-003	EPA 353.2
TAV-MW4 07-Feb-20	Nitrate plus nitrite	5.31	0.170	0.500	10.0			112271-003	EPA 353.2
TAV-MW4 (Duplicate) 07-Feb-20	Nitrate plus nitrite	5.25	0.170	0.500	10.0			112272-003	EPA 353.2
TAV-MW7 03-Feb-20	Nitrate plus nitrite	4.14	0.085	0.250	10.0			112255-003	EPA 353.2
TAV-MW8 12-Feb-20	Nitrate plus nitrite	7.18	0.170	0.500	10.0			112277-003	EPA 353.2
TAV-MW10 20-Feb-20	Nitrate plus nitrite	**11.4**	0.425	1.25	10.0			112292-003	EPA 353.2
TAV-MW11 10-Feb-20	Nitrate plus nitrite	7.08	0.170	0.500	10.0			112275-003	EPA 353.2
TAV-MW12 19-Feb-20	Nitrate plus nitrite	4.43	0.170	0.500	10.0			112283-003	EPA 353.2
TAV-MW12 (Duplicate) 19-Feb-20	Nitrate plus nitrite	4.41	0.170	0.500	10.0			112284-003	EPA 353.2
TAV-MW14 13-Feb-20	Nitrate plus nitrite	9.01	0.170	0.500	10.0			112290-003	EPA 353.2
TAV-MW15 04-Feb-20	Nitrate plus nitrite	2.00	0.085	0.250	10.0			112260-003	EPA 353.2
TAV-MW15 (Duplicate) 04-Feb-20	Nitrate plus nitrite	1.99	0.085	0.250	10.0			112261-003	EPA 353.2
TAV-MW16 05-Feb-20	Nitrate plus nitrite	2.48	0.085	0.250	10.0			112264-003	EPA 353.2
AVN-1 27-May-20	Nitrate plus nitrite	**10.1**	0.170	0.500	10.0			112937-003	EPA 353.2
AVN-1 (Duplicate) 27-May-20	Nitrate plus nitrite	9.68	0.170	0.500	10.0			112938-003	EPA 353.2

Refer to footnotes on page 5B-59.

Table 5B-3 *(Continued)*
Summary of Nitrate Plus Nitrite Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1 08-Jun-20	Nitrate plus nitrite	**12.8**	0.170	0.500	10.0	N	J-	112946-003	EPA 353.2
LWDS-MW2 26-May-20	Nitrate plus nitrite	6.66	0.170	0.500	10.0			112933-003	EPA 353.2
TAV-MW2 01-Jun-20	Nitrate plus nitrite	5.55	0.085	0.250	10.0			112944-003	EPA 353.2
TAV-MW3 **21-May-20**	Nitrate plus nitrite	4.66	0.170	0.500	10.0			112928-003	EPA 353.2
TAV-MW4 02-Jun-20	Nitrate plus nitrite	5.05	0.085	0.250	10.0			112948-003	EPA 353.2
TAV-MW5 20-May-20	Nitrate plus nitrite	7.09	0.170	0.500	10.0			112925-003	EPA 353.2
TAV-MW5 (Duplicate) 20-May-20	Nitrate plus nitrite	7.03	0.170	0.500	10.0			112926-003	EPA 353.2
TAV-MW7 13-May-20	Nitrate plus nitrite	4.27	0.170	0.500	10.0	B		112907-003	EPA 353.2
TAV-MW7 (Duplicate) 13-May-20	Nitrate plus nitrite	4.35	0.170	0.500	10.0	B		112908-003	EPA 353.2
TAV-MW8 04-Jun-20	Nitrate plus nitrite	7.28	0.170	0.500	10.0	N	J-	112950-003	EPA 353.2
TAV-MW8 (Duplicate) 04-Jun-20	Nitrate plus nitrite	7.77	0.170	0.500	10.0	N	J-	112951-003	EPA 353.2
TAV-MW9 15-May-20	Nitrate plus nitrite	3.85	0.085	0.250	10.0	B		112913-003	EPA 353.2
TAV-MW10 10-Jun-20	Nitrate plus nitrite	**11.0**	0.170	0.500	10.0	N	J-	112953-003	EPA 353.2
TAV-MW11 03-Jun-20	Nitrate plus nitrite	7.46	0.170	0.500	10.0			112958-003	EPA 353.2
TAV-MW12 29-May-20	Nitrate plus nitrite	4.29	0.085	0.250	10.0			112940-003	EPA 353.2
TAV-MW13 18-May-20	Nitrate plus nitrite	6.72	0.170	0.500	10.0			112918-003	EPA 353.2
TAV-MW13 (Duplicate) 18-May-20	Nitrate plus nitrite	5.55	0.170	0.500	10.0			112919-003	EPA 353.2

Refer to footnotes on page 5B-59.

Table 5B-3 *(Continued)*
Summary of Nitrate Plus Nitrite Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW14 09-Jun-20	Nitrate plus nitrite	7.06	0.170	0.500	10.0	N	J-	112960-003	EPA 353.2
TAV-MW15 14-May-20	Nitrate plus nitrite	0.262	0.0170	0.0500	10.0	B	J	112910-003	EPA 353.2
TAV-MW16 19-May-20	Nitrate plus nitrite	2.21	0.170	0.500	10.0			112921-003	EPA 353.2
LWDS-MW1 17-Aug-20	Nitrate plus nitrite	**14.6**	0.425	1.25	10.0			113428-002	EPA 353.2
TAV-MW2 06-Aug-20	Nitrate plus nitrite	4.93	0.170	0.500	10.0			113414-002	EPA 353.2
TAV-MW2 (Duplicate) 06-Aug-20	Nitrate plus nitrite	4.88	0.170	0.500	10.0			113454-002	EPA 353.2
TAV-MW4 07-Aug-20	Nitrate plus nitrite	4.23	0.170	0.500	10.0			113417-002	EPA 353.2
TAV-MW7 03-Aug-20	Nitrate plus nitrite	4.11	0.085	0.250	10.0			113401-002	EPA 353.2
TAV-MW8 11-Aug-20	Nitrate plus nitrite	6.23	0.170	0.500	10.0			113424-002	EPA 353.2
TAV-MW10 19-Aug-20	Nitrate plus nitrite	**11.6**	0.425	1.25	10.0			113435-002	EPA 353.2
TAV-MW10 (Duplicate) 19-Aug-20	Nitrate plus nitrite	**11.8**	0.425	1.25	10.0			113436-002	EPA 353.2
TAV-MW11 10-Aug-20	Nitrate plus nitrite	6.56	0.170	0.500	10.0			113419-002	EPA 353.2
TAV-MW12 13-Aug-20	Nitrate plus nitrite	4.09	0.170	0.500	10.0			113426-002	EPA 353.2
TAV-MW14 18-Aug-20	Nitrate plus nitrite	7.38	0.425	1.25	10.0			113430-002	EPA 353.2
TAV-MW15 04-Aug-20	Nitrate plus nitrite	1.88	0.085	0.250	10.0			113404-002	EPA 353.2
TAV-MW16 05-Aug-20	Nitrate plus nitrite	2.35	0.085	0.250	10.0			113408-002	EPA 353.2
TAV-MW16 (Duplicate) 05-Aug-20	Nitrate plus nitrite	2.35	0.085	0.250	10.0			113409-002	EPA 353.2

Refer to footnotes on page 5B-59.

Table 5B-3 *(Concluded)*
Summary of Nitrate Plus Nitrite Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1 07-Dec-20	Nitrate plus nitrite	**12.2**	0.170	0.500	10.0			114058-002	EPA 353.2
LWDS-MW1 (Duplicate) 07-Dec-20	Nitrate plus nitrite	**12.1**	0.170	0.500	10.0			114059-002	EPA 353.2
TAV-MW2 20-Nov-20	Nitrate plus nitrite	5.11	0.170	0.500	10.0			114016-002	EPA 353.2
TAV-MW4 23-Nov-20	Nitrate plus nitrite	4.52	0.170	0.500	10.0			114020-002	EPA 353.2
TAV-MW7 17-Nov-20	Nitrate plus nitrite	4.37	0.170	0.500	10.0			114010-002	EPA 353.2
TAV-MW8 30-Nov-20	Nitrate plus nitrite	7.50	0.170	0.500	10.0			114034-002	EPA 353.2
TAV-MW10 08-Dec-20	Nitrate plus nitrite	**12.0**	0.425	1.25	10.0			114050-002	EPA 353.2
TAV-MW11 24-Nov-20	Nitrate plus nitrite	6.95	0.170	0.500	10.0			114026-002	EPA 353.2
TAV-MW11 (Duplicate) 24-Nov-20	Nitrate plus nitrite	6.93	0.170	0.500	10.0			114027-002	EPA 353.2
TAV-MW12 02-Dec-20	Nitrate plus nitrite	4.39	0.170	0.500	10.0			114039-002	EPA 353.2
TAV-MW14 03-Dec-20	Nitrate plus nitrite	7.88	0.425	1.25	10.0			114045-002	EPA 353.2
TAV-MW14 (Duplicate) 03-Dec-20	Nitrate plus nitrite	7.80	0.425	1.25	10.0			114046-002	EPA 353.2
TAV-MW15 18-Nov-20	Nitrate plus nitrite	1.98	0.085	0.250	10.0			114012-002	EPA 353.2
TAV-MW16 19-Nov-20	Nitrate plus nitrite	2.56	0.170	0.500	10.0			114014-002	EPA 353.2

Refer to footnotes on page 5B-59.

Table 5B-4
Summary of Filtered Metal Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Arsenic	0.00366	0.002	0.005	0.010	J	0.005U	112287-003	SW846 6020B
17-Feb-20	Iron	ND	0.033	0.100	NE	U		112287-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112287-003	SW846 6020B
LWDS-MW1 (Duplicate)	Arsenic	0.00369	0.002	0.005	0.010	J	0.005U	112288-003	SW846 6020B
17-Feb-20	Iron	ND	0.033	0.100	NE	U		112288-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112288-003	SW846 6020B
TAV-MW2	Arsenic	ND	0.002	0.005	0.010	U		112267-003	SW846 6020B
06-Feb-20	Iron	ND	0.033	0.100	NE	U		112267-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112267-003	SW846 6020B
TAV-MW4	Arsenic	ND	0.002	0.005	0.010	U		112271-003	SW846 6020B
07-Feb-20	Iron	ND	0.033	0.100	NE	U		112271-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112271-003	SW846 6020B
TAV-MW4 (Duplicate)	Arsenic	ND	0.002	0.005	0.010	U		112272-003	SW846 6020B
07-Feb-20	Iron	ND	0.033	0.100	NE	U		112272-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112272-003	SW846 6020B
TAV-MW7	Arsenic	0.00307	0.002	0.005	0.010	J		112255-003	SW846 6020B
03-Feb-20	Iron	ND	0.033	0.100	NE	U		112255-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112255-003	SW846 6020B
TAV-MW8	Arsenic	0.00345	0.002	0.005	0.010	J		112277-003	SW846 6020B
12-Feb-20	Iron	ND	0.033	0.100	NE	U		112277-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112277-003	SW846 6020B
TAV-MW10	Arsenic	0.00253	0.002	0.005	0.010	J		112292-003	SW846 6020B
20-Feb-20	Iron	ND	0.033	0.100	NE	U		112292-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112292-003	SW846 6020B
TAV-MW11	Arsenic	0.00321	0.002	0.005	0.010	J		112275-003	SW846 6020B
10-Feb-20	Iron	ND	0.033	0.100	NE	U		112275-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112275-003	SW846 6020B
TAV-MW12	Arsenic	0.00216	0.002	0.005	0.010	J		112283-003	SW846 6020B
19-Feb-20	Iron	ND	0.033	0.100	NE	U		112283-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112283-003	SW846 6020B
TAV-MW12 (Duplicate)	Arsenic	0.00214	0.002	0.005	0.010	J		112284-003	SW846 6020B
19-Feb-20	Iron	ND	0.033	0.100	NE	U		112284-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112284-003	SW846 6020B
TAV-MW14	Arsenic	0.00309	0.002	0.005	0.010	J		112290-003	SW846 6020B
13-Feb-20	Iron	ND	0.033	0.100	NE	U		112290-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112290-003	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-4 *(Continued)*
Summary of Filtered Metal Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW15	Arsenic	0.00236	0.002	0.005	0.010	J	0.005U	112260-003	SW846 6020B
04-Feb-20	Iron	ND	0.033	0.100	NE	U		112260-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112260-003	SW846 6020B
TAV-MW15 (Duplicate)	Arsenic	0.00263	0.002	0.005	0.010	J	0.005U	112261-003	SW846 6020B
04-Feb-20	Iron	ND	0.033	0.100	NE	U		112261-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112261-003	SW846 6020B
TAV-MW16	Arsenic	0.00269	0.002	0.005	0.010	J		112264-003	SW846 6020B
05-Feb-20	Iron	ND	0.033	0.100	NE	U		112264-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112264-003	SW846 6020B
AVN-1	Arsenic	0.00265	0.002	0.005	0.010	J		112937-004	SW846 6020B
27-May-20	Iron	ND	0.033	0.100	NE	U		112937-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112937-004	SW846 6020B
AVN-1 (Duplicate)	Arsenic	0.00272	0.002	0.005	0.010	J		112938-004	SW846 6020B
27-May-20	Iron	ND	0.033	0.100	NE	U		112938-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112938-004	SW846 6020B
LWDS-MW1	Arsenic	0.00312	0.002	0.005	0.010	J		112946-004	SW846 6020B
08-Jun-20	Iron	ND	0.033	0.100	NE	U		112946-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112946-004	SW846 6020B
LWDS-MW2	Arsenic	0.00213	0.002	0.005	0.010	J		112933-004	SW846 6020B
26-May-20	Iron	ND	0.033	0.100	NE	U		112933-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112933-004	SW846 6020B
TAV-MW2	Arsenic	ND	0.002	0.005	0.010	U		112944-004	SW846 6020B
01-Jun-20	Iron	ND	0.033	0.100	NE	U		112944-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112944-004	SW846 6020B
TAV-MW3	Arsenic	0.00213	0.002	0.005	0.010	J		112928-004	SW846 6020B
21-May-20	Iron	ND	0.033	0.100	NE	U		112928-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112928-004	SW846 6020B
TAV-MW4	Arsenic	0.00308	0.002	0.005	0.010	J		112948-004	SW846 6020B
02-Jun-20	Iron	ND	0.033	0.100	NE	U		112948-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U	0.005UJ	112948-004	SW846 6020B
TAV-MW5	Arsenic	0.00205	0.002	0.005	0.010	J		112925-004	SW846 6020B
20-May-20	Iron	ND	0.033	0.100	NE	U		112925-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112925-004	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-4 *(Continued))*
Summary of Filtered Metal Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5 (Duplicate)	Arsenic	ND	0.002	0.005	0.010	U		112926-004	SW846 6020B
20-May-20	Iron	ND	0.033	0.100	NE	U		112926-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112926-004	SW846 6020B
TAV-MW7	Arsenic	0.00383	0.002	0.005	0.010	J		112907-004	SW846 6020B
13-May-20	Iron	ND	0.033	0.100	NE	U		112907-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112907-004	SW846 6020B
TAV-MW7 (Duplicate)	Arsenic	0.00334	0.002	0.005	0.010	J		112908-004	SW846 6020B
13-May-20	Iron	ND	0.033	0.100	NE	U		112908-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112908-004	SW846 6020B
TAV-MW8	Arsenic	0.00329	0.002	0.005	0.010	J		112950-004	SW846 6020B
04-Jun-20	Iron	ND	0.033	0.100	NE	U		112950-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112950-004	SW846 6020B
TAV-MW8 (Duplicate)	Arsenic	0.00322	0.002	0.005	0.010	J		112951-004	SW846 6020B
04-Jun-20	Iron	ND	0.033	0.100	NE	U		112951-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112951-004	SW846 6020B
TAV-MW9	Arsenic	0.00367	0.002	0.005	0.010	J		112913-004	SW846 6020B
15-May-20	Iron	ND	0.033	0.100	NE	U		112913-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112913-004	SW846 6020B
TAV-MW10	Arsenic	ND	0.002	0.005	0.010	U		112953-004	SW846 6020B
10-Jun-20	Iron	ND	0.033	0.100	NE	U		112953-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112953-004	SW846 6020B
TAV-MW11	Arsenic	0.00318	0.002	0.005	0.010	J		112958-004	SW846 6020B
03-Jun-20	Iron	ND	0.033	0.100	NE	U		112958-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U	0.005UJ	112958-004	SW846 6020B
TAV-MW12	Arsenic	ND	0.002	0.005	0.010	U		112940-004	SW846 6020B
29-May-20	Iron	ND	0.033	0.100	NE	U		112940-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112940-004	SW846 6020B
TAV-MW13	Arsenic	0.00379	0.002	0.005	0.010	J	0.005U	112918-004	SW846 6020B
18-May-20	Iron	ND	0.033	0.100	NE	U		112918-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112918-004	SW846 6020B
TAV-MW13 (Duplicate)	Arsenic	0.00365	0.002	0.005	0.010	J	0.005U	112919-004	SW846 6020B
18-May-20	Iron	ND	0.033	0.100	NE	U		112919-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112919-004	SW846 6020B
TAV-MW14	Arsenic	ND	0.002	0.005	0.010	U		112960-004	SW846 6020B
09-Jun-20	Iron	ND	0.033	0.100	NE	U		112960-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112960-004	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-4 *(Continued)*
Summary of Filtered Metal Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW15	Arsenic	ND	0.002	0.005	0.010	U		112910-004	SW846 6020B
14-May-20	Iron	ND	0.033	0.100	NE	U		112910-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112910-004	SW846 6020B
TAV-MW16	Arsenic	ND	0.002	0.005	0.010	U		112921-004	SW846 6020B
19-May-20	Iron	ND	0.033	0.100	NE	U		112921-004	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112921-004	SW846 6020B
LWDS-MW1	Arsenic	0.00311	0.002	0.005	0.010	J		113428-003	SW846 6020B
17-Aug-20	Iron	ND	0.033	0.100	NE	U		113428-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113428-003	SW846 6020B
TAV-MW2	Arsenic	0.00516	0.002	0.005	0.010		J+	113414-003	SW846 6020B
06-Aug-20	Iron	ND	0.033	0.100	NE	U		113414-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113414-003	SW846 6020B
TAV-MW2 (Duplicate)	Arsenic	0.00504	0.002	0.005	0.010		J+	113415-003	SW846 6020B
06-Aug-20	Iron	ND	0.033	0.100	NE	U		113415-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113415-003	SW846 6020B
TAV-MW4	Arsenic	0.00492	0.002	0.005	0.010	J		113417-003	SW846 6020B
07-Aug-20	Iron	ND	0.033	0.100	NE	U		113417-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113417-003	SW846 6020B
TAV-MW7	Arsenic	0.00379	0.002	0.005	0.010	J		113401-003	SW846 6020B
03-Aug-20	Iron	ND	0.033	0.100	NE	U		113401-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113401-003	SW846 6020B
TAV-MW8	Arsenic	0.00536	0.002	0.005	0.010			113424-003	SW846 6020B
11-Aug-20	Iron	ND	0.033	0.100	NE	U		113424-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113424-003	SW846 6020B
TAV-MW10	Arsenic	0.00236	0.002	0.005	0.010	J		113435-003	SW846 6020B
19-Aug-20	Iron	ND	0.033	0.100	NE	U		113435-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113435-003	SW846 6020B
TAV-MW10 (Duplicate)	Arsenic	0.00228	0.002	0.005	0.010	J		113436-003	SW846 6020B
19-Aug-20	Iron	ND	0.033	0.100	NE	U		113436-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113436-003	SW846 6020B
TAV-MW11	Arsenic	0.00483	0.002	0.005	0.010	J		113419-003	SW846 6020B
10-Aug-20	Iron	ND	0.033	0.100	NE	U		113419-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113419-003	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-4 *(Continued)*
Summary of Filtered Metal Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW12	Arsenic	ND	0.002	0.005	0.010	U		113426-003	SW846 6020B
13-Aug-20	Iron	ND	0.033	0.100	NE	U		113426-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113426-003	SW846 6020B
TAV-MW14	Arsenic	ND	0.002	0.005	0.010	U		113430-003	SW846 6020B
18-Aug-20	Iron	ND	0.033	0.100	NE	U		113430-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113430-003	SW846 6020B
TAV-MW15	Arsenic	0.00417	0.002	0.005	0.010	J		113404-003	SW846 6020B
04-Aug-20	Iron	ND	0.033	0.100	NE	U		113404-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113404-003	SW846 6020B
TAV-MW16	Arsenic	0.00466	0.002	0.005	0.010	J	0.005U	113408-003	SW846 6020B
05-Aug-20	Iron	ND	0.033	0.100	NE	U		113408-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113408-003	SW846 6020B
TAV-MW16 (Duplicate)	Arsenic	0.00555	0.002	0.005	0.010		J+	113409-003	SW846 6020B
05-Aug-20	Iron	ND	0.033	0.100	NE	U		113409-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113409-003	SW846 6020B
LWDS-MW1	Arsenic	0.00371	0.002	0.005	0.010	J		114058-003	SW846 6020B
07-Dec-20	Iron	0.0379	0.033	0.100	NE	J		114058-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114058-003	SW846 6020B
LWDS-MW1 (Duplicate)	Arsenic	0.00385	0.002	0.005	0.010	J		114059-003	SW846 6020B
07-Dec-20	Iron	ND	0.033	0.100	NE	U		114059-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114059-003	SW846 6020B
TAV-MW2	Arsenic	0.00261	0.002	0.005	0.010	J		114016-003	SW846 6020B
20-Nov-20	Iron	ND	0.033	0.100	NE	U		114016-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114016-003	SW846 6020B
TAV-MW4	Arsenic	0.00274	0.002	0.005	0.010	J		114020-003	SW846 6020B
23-Nov-20	Iron	ND	0.033	0.100	NE	U		114020-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114020-003	SW846 6020B
TAV-MW7	Arsenic	0.00276	0.002	0.005	0.010	J		114010-003	SW846 6020B
17-Nov-20	Iron	ND	0.033	0.100	NE	U		114010-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114010-003	SW846 6020B
TAV-MW8	Arsenic	0.00274	0.002	0.005	0.010	J		114034-003	SW846 6020B
30-Nov-20	Iron	ND	0.033	0.100	NE	U		114034-003	SW846 6020B
	Manganese	0.00302	0.001	0.005	NE	J		114034-003	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-4 *(Concluded)*
Summary of Filtered Metal Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW10	Arsenic	0.00288	0.002	0.005	0.010	J		114050-003	SW846 6020B
08-Dec-20	Iron	ND	0.033	0.100	NE	U		114050-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114050-003	SW846 6020B
TAV-MW11	Arsenic	0.00280	0.002	0.005	0.010	J		114026-003	SW846 6020B
24-Nov-20	Iron	ND	0.033	0.100	NE	U		114026-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114026-003	SW846 6020B
TAV-MW11 (Duplicate)	Arsenic	0.00272	0.002	0.005	0.010	J		114027-003	SW846 6020B
24-Nov-20	Iron	ND	0.033	0.100	NE	U		114027-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114027-003	SW846 6020B
TAV-MW12	Arsenic	0.00238	0.002	0.005	0.010	J		114039-003	SW846 6020B
02-Dec-20	Iron	ND	0.033	0.100	NE	U		114039-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114039-003	SW846 6020B
TAV-MW14	Arsenic	0.00266	0.002	0.005	0.010	J	0.005U	114045-003	SW846 6020B
03-Dec-20	Iron	ND	0.033	0.100	NE	U		114045-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114045-003	SW846 6020B
TAV-MW14 (Duplicate)	Arsenic	0.00241	0.002	0.005	0.010	J	0.005U	114046-003	SW846 6020B
03-Dec-20	Iron	ND	0.033	0.100	NE	U		114046-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114046-003	SW846 6020B
TAV-MW15	Arsenic	0.00213	0.002	0.005	0.010	J		114012-003	SW846 6020B
18-Nov-20	Iron	ND	0.033	0.100	NE	U		114012-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114012-003	SW846 6020B
TAV-MW16	Arsenic	0.00252	0.002	0.005	0.010	J		114014-003	SW846 6020B
19-Nov-20	Iron	ND	0.033	0.100	NE	U		114014-003	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		114014-003	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-5
Summary of 1,4-Dioxane Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1 17-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112287-002	SW846 8270D SIM
LWDS-MW1 (Duplicate) 17-Feb-20	1,4-Dioxane	0.108	0.100	0.400	NE	J		112288-002	SW846 8270D SIM
TAV-MW2 06-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112267-002	SW846 8270D SIM
TAV-MW4 07-Feb-20	1,4-Dioxane	0.515	0.100	0.400	NE			112271-002	SW846 8270D SIM
TAV-MW4 (Duplicate) 07-Feb-20	1,4-Dioxane	0.580	0.100	0.400	NE			112272-002	SW846 8270D SIM
TAV-MW6 27-Jan-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112194-002	SW846 8270D SIM
TAV-MW7 03-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112255-002	SW846 8270D SIM
TAV-MW8 12-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112277-002	SW846 8270D SIM
TAV-MW10 20-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U	0.4UJ	112292-002	SW846 8270D SIM
TAV-MW11 10-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112275-002	SW846 8270D SIM
TAV-MW12 19-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112283-002	SW846 8270D SIM
TAV-MW12 (Duplicate) 19-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112284-002	SW846 8270D SIM
TAV-MW14 13-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112290-002	SW846 8270D SIM
TAV-MW15 04-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112260-002	SW846 8270D SIM
TAV-MW15 (Duplicate) 04-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112261-002	SW846 8270D SIM
TAV-MW16 05-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112264-002	SW846 8270D SIM

Refer to footnotes on page 5B-59.

Table 5B-5 *(Continued)*
Summary of 1,4-Dioxane Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1 27-May-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112937-002	SW846 8270D SIM
AVN-1 (Duplicate) 27-May-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112938-002	SW846 8270D SIM
LWDS-MW1 08-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	0.4UJ	112946-002	SW846 8270D SIM
LWDS-MW2 26-May-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112933-002	SW846 8270D SIM
TAV-MW2 01-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112944-002	SW846 8270D SIM
TAV-MW3 21-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112928-002	SW846 8270D SIM
TAV-MW4 02-Jun-20	1,4-Dioxane	0.459	0.100	0.400	NE			112948-002	SW846 8270D SIM
TAV-MW5 20-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112925-002	SW846 8270D SIM
TAV-MW5 (Duplicate) 20-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112926-002	SW846 8270D SIM
TAV-MW6 28-Jul-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		113397-002	SW846 8270D SIM
TAV-MW7 13-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	*, U		112907-002	SW846 8270D SIM
TAV-MW7 (Duplicate) 13-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	*, U		112908-002	SW846 8270D SIM
TAV-MW8 04-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112950-002	SW846 8270D SIM
TAV-MW8 (Duplicate) 04-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112951-002	SW846 8270D SIM
TAV-MW9 15-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	*, U		112913-002	SW846 8270D SIM
TAV-MW10 10-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	0.4UJ	112953-002	SW846 8270D SIM
TAV-MW11 03-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112958-002	SW846 8270D SIM
TAV-MW12 29-May-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112940-002	SW846 8270D SIM

Refer to footnotes on page 5B-59.

Table 5B-5 *(Concluded)*
Summary of 1,4-Dioxane Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW13 18-Jun-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112918-002	SW846 8270D SIM
TAV-MW13 (Duplicate) 18-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112919-002	SW846 8270D SIM
TAV-MW14 09-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	0.4UJ	112960-002	SW846 8270D SIM
TAV-MW15 14-Jun-20	1,4-Dioxane	ND	0.0400	0.400	NE	*, U		112910-002	SW846 8270D SIM
TAV-MW16 19-May-20	1,4-Dioxane	ND	0.0400	0.400	NE	U		112921-002	SW846 8270D SIM

Refer to footnotes on page 5B-59.

Table 5B-6
Summary of Anions and Alkalinity Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Bromide	0.146	0.067	0.200	NE	J		112937-006	SW846 9056A
27-May-20	Chloride	10.4	0.134	0.400	NE			112937-006	SW846 9056A
	Fluoride	1.34	0.033	0.100	4.0			112937-006	SW846 9056A
	Sulfate	32.3	0.266	0.800	NE			112937-006	SW846 9056A
	Bicarbonate Alkalinity	158	1.45	4.00	NE			112937-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112937-007	SM 2320B
AVN-1 (Duplicate)	Bromide	0.151	0.067	0.200	NE	J		112938-006	SW846 9056A
27-May-20	Chloride	10.4	0.134	0.400	NE			112938-006	SW846 9056A
	Fluoride	1.33	0.033	0.100	4.0			112938-006	SW846 9056A
	Sulfate	32.3	0.266	0.800	NE			112938-006	SW846 9056A
	Bicarbonate Alkalinity	157	1.45	4.00	NE			112938-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112938-007	SM 2320B
LWDS-MW1	Bromide	0.840	0.067	0.200	NE			112946-006	SW846 9056A
08-Jun-20	Chloride	76.6	1.34	4.00	NE			112946-006	SW846 9056A
	Fluoride	0.589	0.033	0.100	4.0			112946-006	SW846 9056A
	Sulfate	37.2	2.66	8.00	NE			112946-006	SW846 9056A
	Bicarbonate Alkalinity	205	1.45	4.00	NE			112946-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112946-007	SM 2320B
LWDS-MW2	Bromide	ND	0.067	0.200	NE	U		112933-006	SW846 9056A
26-May-20	Chloride	12.6	0.268	0.800	NE			112933-006	SW846 9056A
	Fluoride	1.28	0.033	0.100	4.0			112933-006	SW846 9056A
	Sulfate	39.9	0.532	1.60	NE			112933-006	SW846 9056A
	Bicarbonate Alkalinity	181	1.45	4.00	NE			112933-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112933-006	SM 2320B
TAV-MW2	Bromide	0.331	0.067	0.200	NE			112944-006	SW846 9056A
01-Jun-20	Chloride	50.4	0.670	2.00	NE			112944-006	SW846 9056A
	Fluoride	0.975	0.033	0.100	4.0			112944-006	SW846 9056A
	Sulfate	55.0	1.33	4.00	NE			112944-006	SW846 9056A
	Bicarbonate Alkalinity	254	1.45	4.00	NE			112944-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112944-007	SM 2320B
TAV-MW3	Bromide	0.241	0.067	0.200	NE			112928-006	SW846 9056A
21-May-20	Chloride	29.0	0.335	1.00	NE			112928-006	SW846 9056A
	Fluoride	1.52	0.033	0.100	4.0			112928-006	SW846 9056A
	Sulfate	66.6	0.665	2.00	NE			112928-006	SW846 9056A
	Bicarbonate Alkalinity	192	1.45	4.00	NE			112928-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112928-007	SM 2320B

Refer to footnotes on page 5B-59.

Table 5B-6 *(Continued)*
Summary of Anions and Alkalinity Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4 02-Jun-20	Bromide	0.398	0.067	0.200	NE			112948-006	SW846 9056A
	Chloride	38.0	0.335	1.00	NE			112948-006	SW846 9056A
	Fluoride	1.20	0.033	0.100	4.0			112948-006	SW846 9056A
	Sulfate	34.7	0.665	2.00	NE			112948-006	SW846 9056A
	Bicarbonate Alkalinity	180	1.45	4.00	NE			112948-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112948-007	SM 2320B
TAV-MW5 20-May-20	Bromide	0.174	0.067	0.200	NE	J		112925-006	SW846 9056A
	Chloride	18.0	0.335	1.00	NE			112925-006	SW846 9056A
	Fluoride	1.20	0.033	0.100	4.0			112925-006	SW846 9056A
	Sulfate	42.0	0.665	2.00	NE			112925-006	SW846 9056A
	Bicarbonate Alkalinity	192	1.45	4.00	NE			112925-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112925-007	SM 2320B
TAV-MW5 (Duplicate) 20-May-20	Bromide	0.170	0.067	0.200	NE	J		112926-006	SW846 9056A
	Chloride	17.9	0.335	1.00	NE			112926-006	SW846 9056A
	Fluoride	1.21	0.033	0.100	4.0			112926-006	SW846 9056A
	Sulfate	41.8	0.665	2.00	NE			112926-006	SW846 9056A
	Bicarbonate Alkalinity	194	1.45	4.00	NE			112926-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112926-007	SM 2320B
TAV-MW7 13-May-20	Bromide	0.265	0.067	0.200	NE			112907-006	SW846 9056A
	Chloride	29.7	0.335	1.00	NE			112907-006	SW846 9056A
	Fluoride	1.04	0.033	0.100	4.0			112907-006	SW846 9056A
	Sulfate	66.6	0.665	2.00	NE			112907-006	SW846 9056A
	Bicarbonate Alkalinity	232	1.45	4.00	NE			112907-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112907-007	SM 2320B
TAV-MW7 (Duplicate) 13-May-20	Bromide	0.269	0.067	0.200	NE			112908-006	SW846 9056A
	Chloride	29.9	0.335	1.00	NE			112908-006	SW846 9056A
	Fluoride	1.06	0.033	0.100	4.0			112908-006	SW846 9056A
	Sulfate	67.0	0.665	2.00	NE			112908-006	SW846 9056A
	Bicarbonate Alkalinity	232	1.45	4.00	NE			112908-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112908-007	SM 2320B
TAV-MW8 04-Jun-20	Bromide	0.367	0.067	0.200	NE			112950-006	SW846 9056A
	Chloride	46.3	0.670	2.00	NE			112950-006	SW846 9056A
	Fluoride	1.39	0.033	0.100	4.0			112950-006	SW846 9056A
	Sulfate	51.7	1.33	4.00	NE			112950-006	SW846 9056A
	Bicarbonate Alkalinity	202	1.45	4.00	NE			112950-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112950-007	SM 2320B

Refer to footnotes on page 5B-59.

Table 5B-6 *(Continued)*
Summary of Anions and Alkalinity Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8 (Duplicate)	Bromide	0.375	0.067	0.200	NE		J+	112951-006	SW846 9056A
04-Jun-20	Chloride	46.5	0.670	2.00	NE			112951-006	SW846 9056A
	Fluoride	1.39	0.033	0.100	4.0			112951-006	SW846 9056A
	Sulfate	51.8	1.33	4.00	NE			112951-006	SW846 9056A
	Bicarbonate Alkalinity	209	1.45	4.00	NE			112951-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112951-007	SM 2320B
TAV-MW9	Bromide	0.281	0.067	0.200	NE			112913-006	SW846 9056A
15-May-20	Chloride	35.8	0.335	1.00	NE			112913-006	SW846 9056A
	Fluoride	0.953	0.033	0.100	4.0			112913-006	SW846 9056A
	Sulfate	63.7	0.665	2.00	NE			112913-006	SW846 9056A
	Bicarbonate Alkalinity	254	1.45	4.00	NE			112913-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112913-007	SM 2320B
TAV-MW10	Bromide	0.343	0.067	0.200	NE			112953-006	SW846 9056A
10-Jun-20	Chloride	47.7	0.670	2.00	NE			112953-006	SW846 9056A
	Fluoride	1.45	0.033	0.100	4.0			112953-006	SW846 9056A
	Sulfate	45.6	1.33	4.00	NE			112953-006	SW846 9056A
	Bicarbonate Alkalinity	187	1.45	4.00	NE			112953-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112953-007	SM 2320B
TAV-MW11	Bromide	0.520	0.067	0.200	NE			112958-006	SW846 9056A
03-Jun-20	Chloride	50.6	0.670	2.00	NE			112958-006	SW846 9056A
	Fluoride	1.37	0.033	0.100	4.0			112958-006	SW846 9056A
	Sulfate	41.7	1.33	4.00	NE			112958-006	SW846 9056A
	Bicarbonate Alkalinity	185	1.45	4.00	NE			112958-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112958-007	SM 2320B
TAV-MW12	Bromide	0.331	0.067	0.200	NE			112940-006	SW846 9056A
29-May-20	Chloride	50.1	0.670	2.00	NE			112940-006	SW846 9056A
	Fluoride	1.22	0.033	0.100	4.0			112940-006	SW846 9056A
	Sulfate	57.6	1.33	4.00	NE			112940-006	SW846 9056A
	Bicarbonate Alkalinity	235	1.45	4.00	NE			112940-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112940-007	SM 2320B
TAV-MW13	Bromide	0.189	0.067	0.200	NE	J		112918-006	SW846 9056A
18-May-20	Chloride	17.5	0.335	1.00	NE			112918-006	SW846 9056A
	Fluoride	1.15	0.033	0.100	4.0			112918-006	SW846 9056A
	Sulfate	48.3	0.665	2.00	NE			112918-006	SW846 9056A
	Bicarbonate Alkalinity	202	1.45	4.00	NE			112918-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112918-007	SM 2320B

Refer to footnotes on page 5B-59.

Table 5B-6 *(Concluded)*
Summary of Anions and Alkalinity Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW13 (Duplicate) 18-May-20	Bromide	0.187	0.067	0.200	NE	J		112919-006	SW846 9056A
	Chloride	17.5	0.335	1.00	NE			112919-006	SW846 9056A
	Fluoride	1.12	0.033	0.100	4.0			112919-006	SW846 9056A
	Sulfate	48.6	0.665	2.00	NE			112919-006	SW846 9056A
	Bicarbonate Alkalinity	204	1.45	4.00	NE			112919-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112919-007	SM 2320B
TAV-MW14 09-Jun-20	Bromide	0.353	0.067	0.200	NE			112960-006	SW846 9056A
	Chloride	53.1	0.670	2.00	NE			112960-006	SW846 9056A
	Fluoride	1.34	0.033	0.100	4.0			112960-006	SW846 9056A
	Sulfate	56.8	1.33	4.00	NE			112960-006	SW846 9056A
	Bicarbonate Alkalinity	207	1.45	4.00	NE			112960-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112960-007	SM 2320B
TAV-MW15 14-May-20	Bromide	0.419	0.067	0.200	NE			112910-006	SW846 9056A
	Chloride	75.0	1.34	4.00	NE			112910-006	SW846 9056A
	Fluoride	0.986	0.033	0.100	4.0			112910-006	SW846 9056A
	Sulfate	56.9	2.66	8.00	NE			112910-006	SW846 9056A
	Bicarbonate Alkalinity	267	1.45	4.00	NE			112910-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112910-007	SM 2320B
TAV-MW16 19-May-20	Bromide	0.475	0.067	0.200	NE			112921-006	SW846 9056A
	Chloride	84.4	1.34	4.00	NE			112921-006	SW846 9056A
	Fluoride	0.859	0.033	0.100	4.0			112921-006	SW846 9056A
	Sulfate	58.2	2.66	8.00	NE			112921-006	SW846 9056A
	Bicarbonate Alkalinity	288	1.45	4.00	NE			112921-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112921-007	SM 2320B

Refer to footnotes on page 5B-59.

Table 5B-7
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Aluminum	0.293	0.0193	0.050	NE			112937-005	SW846 6020B
27-May-20	Antimony	ND	0.001	0.003	0.006	U		112937-005	SW846 6020B
	Arsenic	0.00323	0.002	0.005	0.010	J		112937-005	SW846 6020B
	Barium	0.0841	0.00067	0.004	2.00			112937-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112937-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112937-005	SW846 6020B
	Calcium	46.1	0.080	0.200	NE			112937-005	SW846 6020B
	Chromium	**0.112**	0.003	0.010	0.100			112937-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112937-005	SW846 6020B
	Copper	0.00164	0.0003	0.002	NE	J	0.002U	112937-005	SW846 6020B
	Iron	0.666	0.033	0.100	NE			112937-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112937-005	SW846 6020B
	Magnesium	10.8	0.010	0.030	NE			112937-005	SW846 6020B
	Manganese	0.00742	0.001	0.005	NE			112937-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112937-005	SW846 7470A
	Nickel	0.00807	0.0006	0.002	NE			112937-005	SW846 6020B
	Potassium	3.46	0.080	0.300	NE			112937-005	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	U		112937-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112937-005	SW846 6020B
	Sodium	45.1	0.080	0.250	NE			112937-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112937-005	SW846 6020B
	Uranium	0.00209	0.000067	0.0002	0.030			112937-005	SW846 6020B
	Vanadium	0.0106	0.0033	0.020	NE	J	0.02U	112937-005	SW846 6020B
	Zinc	0.00629	0.0033	0.020	NE	J		112937-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1 (Duplicate)	Aluminum	0.305	0.0193	0.050	NE			112938-005	SW846 6020B
27-May-20	Antimony	ND	0.001	0.003	0.006	U		112938-005	SW846 6020B
	Arsenic	0.00305	0.002	0.005	0.010	J		112938-005	SW846 6020B
	Barium	0.0838	0.00067	0.004	2.00			112938-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112938-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112938-005	SW846 6020B
	Calcium	45.7	0.080	0.200	NE			112938-005	SW846 6020B
	Chromium	**0.115**	0.003	0.010	0.100			112938-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112938-005	SW846 6020B
	Copper	0.00166	0.0003	0.002	NE	J	0.002U	112938-005	SW846 6020B
	Iron	0.696	0.033	0.100	NE			112938-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112938-005	SW846 6020B
	Magnesium	10.6	0.010	0.030	NE			112938-005	SW846 6020B
	Manganese	0.00772	0.001	0.005	NE			112938-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112938-005	SW846 7470A
	Nickel	0.00790	0.0006	0.002	NE			112938-005	SW846 6020B
	Potassium	3.49	0.080	0.300	NE			112938-005	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	U		112938-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112938-005	SW846 6020B
	Sodium	44.3	0.080	0.250	NE			112938-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112938-005	SW846 6020B
	Uranium	0.00202	0.000067	0.0002	0.030			112938-005	SW846 6020B
	Vanadium	0.0108	0.0033	0.020	NE	J	0.02U	112938-005	SW846 6020B
	Zinc	0.00624	0.0033	0.020	NE	J		112938-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Aluminum	ND	0.0193	0.050	NE	U		112946-005	SW846 6020B
08-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112946-005	SW846 6020B
	Arsenic	0.00336	0.002	0.005	0.010	J		112946-005	SW846 6020B
	Barium	0.0955	0.00067	0.004	2.00			112946-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112946-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112946-005	SW846 6020B
	Calcium	73.2	0.400	1.00	NE			112946-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112946-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112946-005	SW846 6020B
	Copper	0.000639	0.0003	0.002	NE	J		112946-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112946-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112946-005	SW846 6020B
	Magnesium	22.7	0.010	0.030	NE			112946-005	SW846 6020B
	Manganese	0.00115	0.001	0.005	NE	J		112946-005	SW846 6020B
	Mercury	0.000077	0.000067	0.0002	0.002	B, J	0.0002UJ	112946-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112946-005	SW846 6020B
	Potassium	3.49	0.080	0.300	NE			112946-005	SW846 6020B
	Selenium	0.00498	0.002	0.005	0.050	J		112946-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112946-005	SW846 6020B
	Sodium	71.4	0.400	1.25	NE			112946-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112946-005	SW846 6020B
	Uranium	0.00301	0.000067	0.0002	0.030	B		112946-005	SW846 6020B
	Vanadium	0.00690	0.0033	0.020	NE	J		112946-005	SW846 6020B
	Zinc	0.00566	0.0033	0.020	NE	J		112946-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW2	Aluminum	0.0515	0.0193	0.050	NE			112933-005	SW846 6020B
26-May-20	Antimony	ND	0.001	0.003	0.006	U		112933-005	SW846 6020B
	Arsenic	0.00231	0.002	0.005	0.010	J		112933-005	SW846 6020B
	Barium	0.0750	0.00067	0.004	2.00			112933-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112933-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112933-005	SW846 6020B
	Calcium	45.2	0.080	0.200	NE			112933-005	SW846 6020B
	Chromium	0.00359	0.003	0.010	0.100	J		112933-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112933-005	SW846 6020B
	Copper	0.000485	0.0003	0.002	NE	J		112933-005	SW846 6020B
	Iron	0.0503	0.033	0.100	NE	J		112933-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112933-005	SW846 6020B
	Magnesium	13.2	0.010	0.030	NE			112933-005	SW846 6020B
	Manganese	0.00123	0.001	0.005	NE	J		112933-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112933-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112933-005	SW846 6020B
	Potassium	2.85	0.080	0.300	NE			112933-005	SW846 6020B
	Selenium	0.00265	0.002	0.005	0.050	J		112933-005	SW846 6020B
	Silver	0.00120	0.0003	0.001	NE			112933-005	SW846 6020B
	Sodium	43.0	0.080	0.250	NE			112933-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112933-005	SW846 6020B
	Uranium	0.00297	0.000067	0.0002	0.030			112933-005	SW846 6020B
	Vanadium	0.00723	0.0033	0.020	NE	J		112933-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112933-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW2	Aluminum	0.116	0.0193	0.050	NE			112944-005	SW846 6020B
01-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112944-005	SW846 6020B
	Arsenic	0.00216	0.002	0.005	0.010	J		112944-005	SW846 6020B
	Barium	0.0619	0.00067	0.004	2.00			112944-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112944-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112944-005	SW846 6020B
	Calcium	72.2	0.400	1.00	NE			112944-005	SW846 6020B
	Chromium	0.00329	0.003	0.010	0.100	J		112944-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112944-005	SW846 6020B
	Copper	0.000530	0.0003	0.002	NE	J	0.002U	112944-005	SW846 6020B
	Iron	0.108	0.033	0.100	NE			112944-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112944-005	SW846 6020B
	Magnesium	22.7	0.010	0.030	NE			112944-005	SW846 6020B
	Manganese	0.00279	0.001	0.005	NE	J		112944-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112944-005	SW846 7470A
	Nickel	0.000863	0.0006	0.002	NE	J		112944-005	SW846 6020B
	Potassium	3.65	0.080	0.300	NE			112944-005	SW846 6020B
	Selenium	0.00203	0.002	0.005	0.050	J		112944-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112944-005	SW846 6020B
	Sodium	66.8	0.400	1.25	NE			112944-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112944-005	SW846 6020B
	Uranium	0.00594	0.000067	0.0002	0.030			112944-005	SW846 6020B
	Vanadium	0.00720	0.0033	0.020	NE	J	0.02U	112944-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112944-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW3	Aluminum	0.0345	0.0193	0.050	NE	J		112928-004	SW846 6020B
21-May-20	Antimony	ND	0.001	0.003	0.006	U		112928-004	SW846 6020B
	Arsenic	0.00216	0.002	0.005	0.010	J		112928-004	SW846 6020B
	Barium	0.0487	0.00067	0.004	2.00			112928-004	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112928-004	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112928-004	SW846 6020B
	Calcium	56.3	0.800	2.00	NE			112928-004	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112928-004	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112928-004	SW846 6020B
	Copper	0.000361	0.0003	0.002	NE	J		112928-004	SW846 6020B
	Iron	0.0352	0.033	0.100	NE	J		112928-004	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112928-004	SW846 6020B
	Magnesium	14.8	0.010	0.030	NE			112928-004	SW846 6020B
	Manganese	0.00350	0.001	0.005	NE	J		112928-004	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112928-004	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112928-004	SW846 6020B
	Potassium	4.67	0.080	0.300	NE			112928-004	SW846 6020B
	Selenium	0.00239	0.002	0.005	0.050	J		112928-004	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112928-004	SW846 6020B
	Sodium	54.9	0.800	2.50	NE			112928-004	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112928-004	SW846 6020B
	Uranium	0.00349	0.000067	0.0002	0.030			112928-004	SW846 6020B
	Vanadium	0.00557	0.0033	0.020	NE	J		112928-004	SW846 6020B
	Zinc	0.00348	0.0033	0.020	NE	J		112928-004	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4	Aluminum	ND	0.0193	0.050	NE	U		112948-005	SW846 6020B
02-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112948-005	SW846 6020B
	Arsenic	0.00276	0.002	0.005	0.010	J		112948-005	SW846 6020B
	Barium	0.0865	0.00067	0.004	2.00			112948-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112948-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112948-005	SW846 6020B
	Calcium	48.9	0.080	0.200	NE			112948-005	SW846 6020B
	Chromium	0.0276	0.003	0.010	0.100			112948-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112948-005	SW846 6020B
	Copper	0.000305	0.0003	0.002	NE	J		112948-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112948-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112948-005	SW846 6020B
	Magnesium	14.8	0.010	0.030	NE			112948-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U	0.005UJ	112948-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112948-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112948-005	SW846 6020B
	Potassium	3.26	0.080	0.300	NE			112948-005	SW846 6020B
	Selenium	0.00306	0.002	0.005	0.050	J		112948-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112948-005	SW846 6020B
	Sodium	45.7	0.800	2.50	NE			112948-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112948-005	SW846 6020B
	Uranium	0.00272	0.000067	0.0002	0.030			112948-005	SW846 6020B
	Vanadium	0.00775	0.0033	0.020	NE	J		112948-005	SW846 6020B
	Zinc	0.00437	0.0033	0.020	NE	J		112948-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5	Aluminum	0.574	0.0193	0.050	NE			112925-005	SW846 6020B
20-May-20	Antimony	ND	0.001	0.003	0.006	U		112925-005	SW846 6020B
	Arsenic	0.00221	0.002	0.005	0.010	J		112925-005	SW846 6020B
	Barium	0.0684	0.00067	0.004	2.00			112925-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112925-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112925-005	SW846 6020B
	Calcium	49.3	0.080	0.200	NE			112925-005	SW846 6020B
	Chromium	0.00357	0.003	0.010	0.100	J		112925-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112925-005	SW846 6020B
	Copper	0.000541	0.0003	0.002	NE	J	0.002U	112925-005	SW846 6020B
	Iron	0.477	0.033	0.100	NE			112925-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112925-005	SW846 6020B
	Magnesium	15.2	0.010	0.030	NE			112925-005	SW846 6020B
	Manganese	0.00954	0.001	0.005	NE			112925-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112925-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112925-005	SW846 6020B
	Potassium	3.04	0.080	0.300	NE			112925-005	SW846 6020B
	Selenium	0.00247	0.002	0.005	0.050	J		112925-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112925-005	SW846 6020B
	Sodium	50.3	0.400	1.25	NE			112925-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112925-005	SW846 6020B
	Uranium	0.00353	0.000067	0.0002	0.030			112925-005	SW846 6020B
	Vanadium	0.00890	0.0033	0.020	NE	J		112925-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112925-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5 (Duplicate)	Aluminum	0.404	0.0193	0.050	NE			112926-005	SW846 6020B
20-May-20	Antimony	ND	0.001	0.003	0.006	U		112926-005	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112926-005	SW846 6020B
	Barium	0.0699	0.00067	0.004	2.00			112926-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112926-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112926-005	SW846 6020B
	Calcium	53.4	0.400	1.00	NE			112926-005	SW846 6020B
	Chromium	0.00321	0.003	0.010	0.100	J		112926-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112926-005	SW846 6020B
	Copper	0.000484	0.0003	0.002	NE	J	0.002U	112926-005	SW846 6020B
	Iron	0.336	0.033	0.100	NE			112926-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112926-005	SW846 6020B
	Magnesium	15.6	0.010	0.030	NE			112926-005	SW846 6020B
	Manganese	0.00728	0.001	0.005	NE			112926-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112926-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112926-005	SW846 6020B
	Potassium	3.06	0.080	0.300	NE			112926-005	SW846 6020B
	Selenium	0.00231	0.002	0.005	0.050	J		112926-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112926-005	SW846 6020B
	Sodium	50.5	0.400	1.25	NE			112926-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112926-005	SW846 6020B
	Uranium	0.00357	0.000067	0.0002	0.030			112926-005	SW846 6020B
	Vanadium	0.00850	0.0033	0.020	NE	J		112926-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112926-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW7	Aluminum	0.0299	0.0193	0.050	NE	J		112907-005	SW846 6020B
13-May-20	Antimony	ND	0.001	0.003	0.006	U		112907-005	SW846 6020B
	Arsenic	0.00353	0.002	0.005	0.010	J		112907-005	SW846 6020B
	Barium	0.0560	0.00067	0.004	2.00			112907-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112907-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112907-005	SW846 6020B
	Calcium	60.2	0.800	2.00	NE			112907-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112907-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112907-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112907-005	SW846 6020B
	Iron	0.0455	0.033	0.100	NE	J		112907-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112907-005	SW846 6020B
	Magnesium	19.5	0.010	0.030	NE			112907-005	SW846 6020B
	Manganese	0.00355	0.001	0.005	NE	J		112907-005	SW846 6020B
	Mercury	0.0000760	0.000067	0.0002	0.002	B, H, J	0.0002UJ	112907-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112907-005	SW846 6020B
	Potassium	4.26	0.080	0.300	NE			112907-005	SW846 6020B
	Selenium	0.00258	0.002	0.005	0.050	J		112907-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112907-005	SW846 6020B
	Sodium	57.6	0.800	2.50	NE			112907-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112907-005	SW846 6020B
	Uranium	0.00451	0.000067	0.0002	0.030			112907-005	SW846 6020B
	Vanadium	0.00946	0.0033	0.020	NE	J	0.02U	112907-005	SW846 6020B
	Zinc	0.00411	0.0033	0.020	NE	J		112907-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW7 (Duplicate) 13-May-20	Aluminum	0.0278	0.0193	0.050	NE	J		112908-005	SW846 6020B
	Antimony	ND	0.001	0.003	0.006	U		112908-005	SW846 6020B
	Arsenic	0.00366	0.002	0.005	0.010	J		112908-005	SW846 6020B
	Barium	0.0574	0.00067	0.004	2.00			112908-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112908-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112908-005	SW846 6020B
	Calcium	60.0	0.800	2.00	NE			112908-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112908-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112908-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112908-005	SW846 6020B
	Iron	0.0406	0.033	0.100	NE	J		112908-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112908-005	SW846 6020B
	Magnesium	19.7	0.010	0.030	NE			112908-005	SW846 6020B
	Manganese	0.00298	0.001	0.005	NE	J		112908-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	H, U	0.0002UJ	112908-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112908-005	SW846 6020B
	Potassium	4.42	0.080	0.300	NE			112908-005	SW846 6020B
	Selenium	0.00229	0.002	0.005	0.050	J		112908-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112908-005	SW846 6020B
	Sodium	57.7	0.800	2.50	NE			112908-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112908-005	SW846 6020B
	Uranium	0.00463	0.000067	0.0002	0.030			112908-005	SW846 6020B
	Vanadium	0.00994	0.0033	0.020	NE	J	0.02U	112908-005	SW846 6020B
	Zinc	0.00341	0.0033	0.020	NE	J		112908-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8	Aluminum	0.0497	0.0193	0.050	NE	J		112950-005	SW846 6020B
04-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112950-005	SW846 6020B
	Arsenic	0.00306	0.002	0.005	0.010	J		112950-005	SW846 6020B
	Barium	0.0576	0.00067	0.004	2.00			112950-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112950-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112950-005	SW846 6020B
	Calcium	58.8	0.800	2.00	NE			112950-005	SW846 6020B
	Chromium	0.00322	0.003	0.010	0.100	J		112950-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112950-005	SW846 6020B
	Copper	0.000369	0.0003	0.002	NE	J	0.002U	112950-005	SW846 6020B
	Iron	0.0460	0.033	0.100	NE	J		112950-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112950-005	SW846 6020B
	Magnesium	17.4	0.010	0.030	NE			112950-005	SW846 6020B
	Manganese	0.00104	0.001	0.005	NE	J		112950-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112950-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112950-005	SW846 6020B
	Potassium	3.82	0.080	0.300	NE			112950-005	SW846 6020B
	Selenium	0.00312	0.002	0.005	0.050	J		112950-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112950-005	SW846 6020B
	Sodium	60.7	0.800	2.50	NE			112950-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112950-005	SW846 6020B
	Uranium	0.00351	0.000067	0.0002	0.030			112950-005	SW846 6020B
	Vanadium	0.00739	0.0033	0.020	NE	J		112950-005	SW846 6020B
	Zinc	0.00698	0.0033	0.020	NE	B, J	0.02U	112950-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8 (Duplicate) 04-Jun-20	Aluminum	0.0411	0.0193	0.050	NE	J		112951-005	SW846 6020B
	Antimony	ND	0.001	0.003	0.006	U		112951-005	SW846 6020B
	Arsenic	0.00309	0.002	0.005	0.010	J		112951-005	SW846 6020B
	Barium	0.0595	0.00067	0.004	2.00			112951-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112951-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112951-005	SW846 6020B
	Calcium	58.7	0.800	2.00	NE			112951-005	SW846 6020B
	Chromium	0.00322	0.003	0.010	0.100	J		112951-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112951-005	SW846 6020B
	Copper	0.000308	0.0003	0.002	NE	J	0.002U	112951-005	SW846 6020B
	Iron	0.0425	0.033	0.100	NE	J		112951-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112951-005	SW846 6020B
	Magnesium	18.0	0.010	0.030	NE			112951-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112951-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112951-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112951-005	SW846 6020B
	Potassium	3.93	0.080	0.300	NE			112951-005	SW846 6020B
	Selenium	0.00340	0.002	0.005	0.050	J		112951-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112951-005	SW846 6020B
	Sodium	60.6	0.800	2.50	NE			112951-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112951-005	SW846 6020B
	Uranium	0.00362	0.000067	0.0002	0.030			112951-005	SW846 6020B
	Vanadium	0.00810	0.0033	0.020	NE	J		112951-005	SW846 6020B
	Zinc	0.00680	0.0033	0.020	NE	B, J	0.02U	112951-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW9	Aluminum	ND	0.0193	0.050	NE	U		112913-005	SW846 6020B
15-May-20	Antimony	ND	0.001	0.003	0.006	U		112913-005	SW846 6020B
	Arsenic	0.00387	0.002	0.005	0.010	J		112913-005	SW846 6020B
	Barium	0.0692	0.00067	0.004	2.00			112913-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112913-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112913-005	SW846 6020B
	Calcium	61.8	0.800	2.00	NE			112913-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112913-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112913-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112913-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112913-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112913-005	SW846 6020B
	Magnesium	20.4	0.010	0.030	NE			112913-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112913-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112913-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112913-005	SW846 6020B
	Potassium	4.46	0.080	0.300	NE			112913-005	SW846 6020B
	Selenium	0.00272	0.002	0.005	0.050	J		112913-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112913-005	SW846 6020B
	Sodium	63.0	0.800	2.50	NE			112913-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112913-005	SW846 6020B
	Uranium	0.00516	0.000067	0.0002	0.030			112913-005	SW846 6020B
	Vanadium	0.0100	0.0033	0.020	NE	J		112913-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112913-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW10	Aluminum	ND	0.0193	0.050	NE	U		112953-005	SW846 6020B
10-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112953-005	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112953-005	SW846 6020B
	Barium	0.0636	0.00067	0.004	2.00			112953-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112953-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112953-005	SW846 6020B
	Calcium	62.2	0.400	1.00	NE			112953-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112953-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112953-005	SW846 6020B
	Copper	0.000306	0.0003	0.002	NE	J		112953-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112953-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112953-005	SW846 6020B
	Magnesium	17.3	0.010	0.030	NE			112953-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112953-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U	0.0002UJ	112953-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112953-005	SW846 6020B
	Potassium	4.48	0.080	0.300	NE			112953-005	SW846 6020B
	Selenium	0.00203	0.002	0.005	0.050	J		112953-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112953-005	SW846 6020B
	Sodium	59.9	0.400	1.25	NE			112953-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112953-005	SW846 6020B
	Uranium	0.00319	0.000067	0.0002	0.030			112953-005	SW846 6020B
	Vanadium	0.00728	0.0033	0.020	NE	J		112953-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112953-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW11	Aluminum	ND	0.0193	0.050	NE	U		112958-005	SW846 6020B
03-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112958-005	SW846 6020B
	Arsenic	0.00294	0.002	0.005	0.010	J		112958-005	SW846 6020B
	Barium	0.0782	0.00067	0.004	2.00			112958-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112958-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112958-005	SW846 6020B
	Calcium	55.8	0.800	2.00	NE			112958-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112958-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112958-005	SW846 6020B
	Copper	0.000333	0.0003	0.002	NE	J		112958-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112958-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112958-005	SW846 6020B
	Magnesium	16.7	0.010	0.030	NE			112958-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U	0.005UJ	112958-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112958-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112958-005	SW846 6020B
	Potassium	4.01	0.080	0.300	NE			112958-005	SW846 6020B
	Selenium	0.00368	0.002	0.005	0.050	J		112958-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112958-005	SW846 6020B
	Sodium	56.6	0.800	2.50	NE			112958-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112958-005	SW846 6020B
	Uranium	0.00264	0.000067	0.0002	0.030			112958-005	SW846 6020B
	Vanadium	0.00768	0.0033	0.020	NE	J		112958-005	SW846 6020B
	Zinc	0.00392	0.0033	0.020	NE	J		112958-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW12	Aluminum	0.0390	0.0193	0.050	NE	J		112940-005	SW846 6020B
29-May-20	Antimony	ND	0.001	0.003	0.006	U		112940-005	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112940-005	SW846 6020B
	Barium	0.0781	0.00067	0.004	2.00			112940-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112940-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112940-005	SW846 6020B
	Calcium	70.5	0.800	2.00	NE		J	112940-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112940-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112940-005	SW846 6020B
	Copper	0.000441	0.0003	0.002	NE	J		112940-005	SW846 6020B
	Iron	0.0439	0.033	0.100	NE	J		112940-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112940-005	SW846 6020B
	Magnesium	22.1	0.010	0.030	NE			112940-005	SW846 6020B
	Manganese	0.00179	0.001	0.005	NE	J		112940-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112940-005	SW846 7470A
	Nickel	0.000986	0.0006	0.002	NE	J		112940-005	SW846 6020B
	Potassium	3.83	0.080	0.300	NE			112940-005	SW846 6020B
	Selenium	0.00254	0.002	0.005	0.050	J		112940-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112940-005	SW846 6020B
	Sodium	67.4	0.800	2.50	NE		J	112940-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112940-005	SW846 6020B
	Uranium	0.00556	0.000067	0.0002	0.030		J	112940-005	SW846 6020B
	Vanadium	0.00541	0.0033	0.020	NE	J		112940-005	SW846 6020B
	Zinc	0.00507	0.0033	0.020	NE	J		112940-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW13	Aluminum	ND	0.0193	0.050	NE	U		112918-005	SW846 6020B
18-May-20	Antimony	ND	0.001	0.003	0.006	U		112918-005	SW846 6020B
	Arsenic	0.00357	0.002	0.005	0.010	J		112918-005	SW846 6020B
	Barium	0.0591	0.00067	0.004	2.00			112918-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112918-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112918-005	SW846 6020B
	Calcium	50.1	0.800	2.00	NE			112918-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112918-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112918-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112918-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112918-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112918-005	SW846 6020B
	Magnesium	15.6	0.010	0.030	NE			112918-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112918-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112918-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112918-005	SW846 6020B
	Potassium	3.62	0.080	0.300	NE			112918-005	SW846 6020B
	Selenium	0.00205	0.002	0.005	0.050	J		112918-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112918-005	SW846 6020B
	Sodium	48.3	0.800	2.50	NE			112918-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112918-005	SW846 6020B
	Uranium	0.00346	0.000067	0.0002	0.030			112918-005	SW846 6020B
	Vanadium	0.00948	0.0033	0.020	NE	B, J	0.02U	112918-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112918-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW13 (Duplicate) 18-May-20	Aluminum	ND	0.0193	0.050	NE	U		112919-005	SW846 6020B
	Antimony	ND	0.001	0.003	0.006	U		112919-005	SW846 6020B
	Arsenic	0.00396	0.002	0.005	0.010	J		112919-005	SW846 6020B
	Barium	0.0601	0.00067	0.004	2.00			112919-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112919-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112919-005	SW846 6020B
	Calcium	52.0	0.800	2.00	NE			112919-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112919-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112919-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112919-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112919-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112919-005	SW846 6020B
	Magnesium	15.9	0.010	0.030	NE			112919-005	SW846 6020B
	Manganese	0.00105	0.001	0.005	NE	J		112919-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112919-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112919-005	SW846 6020B
	Potassium	3.74	0.080	0.300	NE			112919-005	SW846 6020B
	Selenium	0.00215	0.002	0.005	0.050	J		112919-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112919-005	SW846 6020B
	Sodium	50.1	0.800	2.50	NE			112919-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112919-005	SW846 6020B
	Uranium	0.00356	0.000067	0.0002	0.030			112919-005	SW846 6020B
	Vanadium	0.0105	0.0033	0.020	NE	B, J	0.02U	112919-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112919-005	SW846 6020B

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Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW14	Aluminum	0.0973	0.0193	0.050	NE			112960-005	SW846 6020B
09-Jun-20	Antimony	ND	0.001	0.003	0.006	U		112960-005	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112960-005	SW846 6020B
	Barium	0.0662	0.00067	0.004	2.00			112960-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112960-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112960-005	SW846 6020B
	Calcium	64.5	0.400	1.00	NE			112960-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112960-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112960-005	SW846 6020B
	Copper	0.000663	0.0003	0.002	NE	J		112960-005	SW846 6020B
	Iron	0.115	0.033	0.100	NE			112960-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112960-005	SW846 6020B
	Magnesium	20.5	0.010	0.030	NE			112960-005	SW846 6020B
	Manganese	0.00287	0.001	0.005	NE	J		112960-005	SW846 6020B
	Mercury	0.000079	0.000067	0.0002	0.002	B, J	0.0002UJ	112960-005	SW846 7470A
	Nickel	0.000725	0.0006	0.002	NE	J		112960-005	SW846 6020B
	Potassium	4.65	0.080	0.300	NE			112960-005	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	U		112960-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112960-005	SW846 6020B
	Sodium	65.0	0.400	1.25	NE			112960-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112960-005	SW846 6020B
	Uranium	0.00450	0.000067	0.0002	0.030	B		112960-005	SW846 6020B
	Vanadium	0.00686	0.0033	0.020	NE	J		112960-005	SW846 6020B
	Zinc	0.00340	0.0033	0.020	NE	J		112960-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW15	Aluminum	ND	0.0193	0.050	NE	U		112910-005	SW846 6020B
14-May-20	Antimony	ND	0.001	0.003	0.006	U		112910-005	SW846 6020B
	Arsenic	0.00334	0.002	0.005	0.010	J		112910-005	SW846 6020B
	Barium	0.0718	0.00067	0.004	2.00			112910-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112910-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112910-005	SW846 6020B
	Calcium	67.9	0.800	2.00	NE			112910-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112910-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112910-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112910-005	SW846 6020B
	Iron	0.0367	0.033	0.100	NE	J		112910-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112910-005	SW846 6020B
	Magnesium	24.9	0.010	0.030	NE			112910-005	SW846 6020B
	Manganese	0.00121	0.001	0.005	NE	J		112910-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112910-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112910-005	SW846 6020B
	Potassium	4.35	0.080	0.300	NE			112910-005	SW846 6020B
	Selenium	0.00267	0.002	0.005	0.050	J		112910-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112910-005	SW846 6020B
	Sodium	69.0	0.800	2.50	NE			112910-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112910-005	SW846 6020B
	Uranium	0.00684	0.000067	0.0002	0.030			112910-005	SW846 6020B
	Vanadium	0.00668	0.0033	0.020	NE	J		112910-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112910-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Continued)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW16	Aluminum	ND	0.0193	0.050	NE	U		112921-005	SW846 6020B
19-May-20	Antimony	ND	0.001	0.003	0.006	U		112921-005	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112921-005	SW846 6020B
	Barium	0.0693	0.00067	0.004	2.00			112921-005	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112921-005	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112921-005	SW846 6020B
	Calcium	97.4	0.800	2.00	NE			112921-005	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112921-005	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112921-005	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112921-005	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112921-005	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112921-005	SW846 6020B
	Magnesium	27.6	0.010	0.030	NE			112921-005	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112921-005	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112921-005	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112921-005	SW846 6020B
	Potassium	4.78	0.080	0.300	NE			112921-005	SW846 6020B
	Selenium	0.00278	0.002	0.005	0.050	J		112921-005	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112921-005	SW846 6020B
	Sodium	90.2	0.800	2.50	NE			112921-005	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112921-005	SW846 6020B
	Uranium	0.00645	0.000067	0.0002	0.030			112921-005	SW846 6020B
	Vanadium	0.00768	0.0033	0.020	NE	B, J	0.02U	112921-005	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112921-005	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-7 *(Concluded)*
Summary of TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Aluminum	0.0969	0.0193	0.050	NE			113733-001	SW846 6020B
30-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113733-001	SW846 6020B
	Arsenic	0.00334	0.002	0.005	0.010	J		113733-001	SW846 6020B
	Barium	0.0874	0.00067	0.004	2.00			113733-001	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113733-001	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113733-001	SW846 6020B
	Calcium	45.6	0.080	0.200	NE			113733-001	SW846 6020B
	Chromium	**0.122**	0.003	0.010	0.100			113733-001	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113733-001	SW846 6020B
	Copper	0.00333	0.0003	0.002	NE			113733-001	SW846 6020B
	Iron	0.556	0.033	0.100	NE			113733-001	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113733-001	SW846 6020B
	Magnesium	9.92	0.010	0.030	NE			113733-001	SW846 6020B
	Manganese	0.00453	0.001	0.005	NE	J		113733-001	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113733-001	SW846 7470A
	Nickel	0.0138	0.0006	0.002	NE			113733-001	SW846 6020B
	Potassium	3.47	0.080	0.300	NE			113733-001	SW846 6020B
	Selenium	ND	0.002	0.005	0.050	U		113733-001	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113733-001	SW846 6020B
	Sodium	39.6	0.080	0.250	NE			113733-001	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113733-001	SW846 6020B
	Uranium	0.00222	0.000067	0.0002	0.030			113733-001	SW846 6020B
	Vanadium	0.0109	0.0033	0.020	NE	J		113733-001	SW846 6020B
	Zinc	0.00646	0.0033	0.020	NE	J		113733-001	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-8
Summary of Filtered TAL Metals plus Uranium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Aluminum	ND	0.0193	0.050	NE	U		113733-002	SW846 6020B
30-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113733-002	SW846 6020B
	Arsenic	0.00247	0.002	0.005	0.010	J		113733-002	SW846 6020B
	Barium	0.0862	0.00067	0.004	2.00			113733-002	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113733-002	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113733-002	SW846 6020B
	Calcium	46.1	0.080	0.200	NE			113733-002	SW846 6020B
	Chromium	0.00359	0.003	0.010	0.100	J		113733-002	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113733-002	SW846 6020B
	Copper	0.00176	0.0003	0.002	NE	J		113733-002	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		113733-002	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113733-002	SW846 6020B
	Magnesium	9.96	0.010	0.030	NE			113733-002	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		113733-002	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113733-002	SW846 7470A
	Nickel	0.00677	0.0006	0.002	NE			113733-002	SW846 6020B
	Potassium	3.44	0.080	0.300	NE			113733-002	SW846 6020B
	Selenium	0.00219	0.002	0.005	0.050	J		113733-002	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113733-002	SW846 6020B
	Sodium	39.8	0.080	0.250	NE			113733-002	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113733-002	SW846 6020B
	Uranium	0.00197	0.000067	0.0002	0.030			113733-002	SW846 6020B
	Vanadium	0.00684	0.0033	0.020	NE	J		113733-002	SW846 6020B
	Zinc	0.00370	0.0033	0.020	NE	J		113733-002	SW846 6020B

Refer to footnotes on page 5B-59.

Table 5B-9
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1 27-May-20	Americium-241	4.69 ± 14.8	24.9	12.1	NE	U	BD	112937-008	EPA 901.1
	Cesium-137	-1.45 ± 2.57	3.72	1.76	NE	U	BD	112937-008	EPA 901.1
	Cobalt-60	1.26 ± 2.52	4.23	1.95	NE	U	BD	112937-008	EPA 901.1
	Potassium-40	-19.8 ± 42.1	57.4	27.1	NE	U	BD	112937-008	EPA 901.1
	Gross Alpha	2.34	NA	NA	15 pCi/L	NA	None	112937-009	EPA 900.0
	Gross Beta	3.48 ± 0.637	0.860	0.413	4 mrem/yr			112937-009	EPA 900.0
	Tritium	95.3 ± 100	164	74.1	NE	U	BD	112937-010	EPA 906.0M
AVN-1 (Duplicate) 27-May-20	Americium-241	-9.99 ± 13.4	15.3	7.41	NE	U	BD	112938-008	EPA 901.1
	Cesium-137	-0.202 ± 1.69	2.97	1.39	NE	U	BD	112938-008	EPA 901.1
	Cobalt-60	1.64 ± 2.12	3.95	1.82	NE	U	BD	112938-008	EPA 901.1
	Potassium-40	4.09 ± 49.8	40.1	18.5	NE	U	BD	112938-008	EPA 901.1
	Gross Alpha	2.80	NA	NA	15 pCi/L	NA	None	112938-009	EPA 900.0
	Gross Beta	4.22 ± 0.716	0.986	0.477	4 mrem/yr			112938-009	EPA 900.0
	Tritium	42.1 ± 92.4	162	73.4	NE	U	BD	112938-010	EPA 906.0M
LWDS-MW1 08-Jun-20	Americium-241	0.217 ± 6.46	10.8	5.26	NE	U	BD	112946-008	EPA 901.1
	Cesium-137	0.243 ± 3.17	3.27	1.56	NE	U	BD	112946-008	EPA 901.1
	Cobalt-60	-0.245 ± 1.73	3.09	1.42	NE	U	BD	112946-008	EPA 901.1
	Potassium-40	10.6 ± 52.5	30.0	13.8	NE	U	BD	112946-008	EPA 901.1
	Gross Alpha	0.67	NA	NA	15 pCi/L	NA	None	112946-009	EPA 900.0
	Gross Beta	1.87 ± 0.890	1.42	0.686	4 mrem/yr		J	112946-009	EPA 900.0
	Tritium	88.0 ± 97.0	160	72.4	NE	U	BD	112946-R10	EPA 906.0M
LWDS-MW2 26-May-20	Americium-241	-11.0 ± 17.3	27.0	13.1	NE	U	BD	112933-008	EPA 901.1
	Cesium-137	1.94 ± 2.36	3.75	1.78	NE	U	BD	112933-008	EPA 901.1
	Cobalt-60	-0.127 ± 2.07	3.83	1.77	NE	U	BD	112933-008	EPA 901.1
	Potassium-40	-14.5 ± 41.4	51.4	24.2	NE	U	BD	112933-008	EPA 901.1
	Gross Alpha	2.06	NA	NA	15 pCi/L	NA	None	112933-009	EPA 900.0
	Gross Beta	2.84 ± 0.635	0.928	0.449	4 mrem/yr			112933-009	EPA 900.0
	Tritium	16.9 ± 89.8	163	73.7	NE	U	BD	112933-010	EPA 906.0M

Refer to footnotes on page 5B-59.

Table 5B-9 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW2	Americium-241	3.99 ± 6.06	10.2	4.97	NE	U	BD	112944-008	EPA 901.1
01-Jun-20	Cesium-137	-0.187 ± 2.08	3.29	1.57	NE	U	BD	112944-008	EPA 901.1
	Cobalt-60	-0.132 ± 1.86	3.41	1.59	NE	U	BD	112944-008	EPA 901.1
	Potassium-40	17.1 ± 55.1	35.6	16.7	NE	U	BD	112944-00	EPA 901.1
	Gross Alpha	6.72	NA	NA	15 pCi/L	NA	None	112944-009	EPA 900.0
	Gross Beta	3.91 ± 1.19	1.81	0.875	4 mrem/yr		J	112944-009	EPA 900.0
	Tritium	-41.1 ± 89.2	172	78.5	NE	U	BD	112944-010	EPA 906.0M
TAV-MW3	Americium-241	-3.29 ± 14.2	25.1	12.2	NE	U	BD	112928-008	EPA 901.1
21-May-20	Cesium-137	-0.771 ± 2.47	3.73	1.76	NE	U	BD	112928-008	EPA 901.1
	Cobalt-60	2.84 ± 4.16	4.57	2.11	NE	U	BD	112928-008	EPA 901.1
	Potassium-40	-41.4 ± 45.8	56.5	26.5	NE	U	BD	112928-008	EPA 901.1
	Gross Alpha	5.75	NA	NA	15 pCi/L	NA	None	112928-009	EPA 900.0
	Gross Beta	4.82 ± 0.766	1.01	0.483	4 mrem/yr	*		112928-009	EPA 900.0
	Tritium	80.7 ± 100	167	78.9	NE	U	BD	112928-010	EPA 906.0M
TAV-MW4	Americium-241	10.2 ± 15.7	27.1	13.2	NE	U	BD	112948-008	EPA 901.1
02-Jun-20	Cesium-137	0.454 ± 2.51	3.98	1.89	NE	U	BD	112948-008	EPA 901.1
	Cobalt-60	0.992 ± 2.47	4.44	2.05	NE	U	BD	112948-008	EPA 901.1
	Potassium-40	-44.3 ± 56.9	56.7	26.6	NE	U	BD	112948-008	EPA 901.1
	Gross Alpha	3.88	NA	NA	15 pCi/L	NA	None	112948-009	EPA 900.0
	Gross Beta	3.03 ± 1.26	2.03	0.993	4 mrem/yr		J	112948-009	EPA 900.0
	Tritium	19.8 ± 104	188	85.7	NE	U	BD	112948-010	EPA 906.0M
TAV-MW5	Americium-241	-1.66 ± 15.9	25.6	12.5	NE	U	BD	112925-008	EPA 901.1
20-May-20	Cesium-137	-0.759 ± 2.62	3.95	1.87	NE	U	BD	112925-008	EPA 901.1
	Cobalt-60	0.885 ± 2.38	4.30	1.98	NE	U	BD	112925-008	EPA 901.1
	Potassium-40	-36.5 ± 46.9	57.9	27.2	NE	U	BD	112925-008	EPA 901.1
	Gross Alpha	5.53	NA	NA	15 pCi/L	NA	None	112925-009	EPA 900.0
	Gross Beta	2.53 ± 0.747	1.12	0.539	4 mrem/yr	*	J	112925-009	EPA 900.0
	Tritium	-3.88 ± 101	185	85.3	NE	U	BD	112925-010	EPA 906.0M

Refer to footnotes on page 5B-59.

Table 5B-9 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5 (Duplicate) 20-May-20	Americium-241	-1.72 ± 7.19	11.8	5.76	NE	U	BD	112926-008	EPA 901.1
	Cesium-137	1.78 ± 2.13	3.25	1.55	NE	U	BD	112926-008	EPA 901.1
	Cobalt-60	-0.103 ± 2.05	3.66	1.71	NE	U	BD	112926-008	EPA 901.1
	Potassium-40	-19.6 ± 40.9	47.4	22.4	NE	U	BD	112926-008	EPA 901.1
	Gross Alpha	6.63	NA	NA	15 pCi/L	NA	None	112926-009	EPA 900.0
	Gross Beta	3.48 ± 0.736	1.10	0.530	4 mrem/yr	*		112926-009	EPA 900.0
	Tritium	47.2 ± 104	182	83.4	NE	U	BD	112926-010	EPA 906.0M
TAV-MW7 13-May-20	Americium-241	2.16 ± 3.14	5.32	2.60	NE	U	BD	112907-008	EPA 901.1
	Cesium-137	1.66 ± 1.98	3.44	1.63	NE	U	BD	112907-008	EPA 901.1
	Cobalt-60	1.66 ± 2.31	4.21	1.96	NE	U	BD	112907-008	EPA 901.1
	Potassium-40	-37.4 ± 43.8	51.1	24.1	NE	U	BD	112907-008	EPA 901.1
	Gross Alpha	3.15	NA	NA	15 pCi/L	NA	None	112907-009	EPA 900.0
	Gross Beta	5.16 ± 0.854	1.11	0.536	4 mrem/yr	*		112907-009	EPA 900.0
	Tritium	-34.3 ± 94.5	180	82.3	NE	U	BD	112907-010	EPA 906.0M
TAV-MW7 (Duplicate) 13-May-20	Americium-241	4.97 ± 14.7	25.6	12.4	NE	U	BD	112908-008	EPA 901.1
	Cesium-137	0.826 ± 2.24	3.56	1.69	NE	U	BD	112908-008	EPA 901.1
	Cobalt-60	-1.17 ± 3.28	3.97	1.84	NE	U	BD	112908-008	EPA 901.1
	Potassium-40	-43.2 ± 46.4	48.2	22.7	NE	U	BD	112908-008	EPA 901.1
	Gross Alpha	3.50	NA	NA	15 pCi/L	NA	None	112908-009	EPA 900.0
	Gross Beta	4.53 ± 0.864	1.20	0.579	4 mrem/yr	*		112908-009	EPA 900.0
	Tritium	26.3 ± 97.8	175	79.7	NE	U	BD	112908-010	EPA 906.0M
TAV-MW8 04-Jun-20	Americium-241	-4.63 ± 14.7	25.8	12.6	NE	U	BD	112950-008	EPA 901.1
	Cesium-137	2.62 ± 2.69	4.14	1.96	NE	U	BD	112950-008	EPA 901.1
	Cobalt-60	4.91 ± 4.56	5.37	2.51	NE	U	BD	112950-008	EPA 901.1
	Potassium-40	8.42 ± 74.7	44.0	20.3	NE	U	BD	112950-008	EPA 901.1
	Gross Alpha	3.76	NA	NA	15 pCi/L	NA	None	112950-009	EPA 900.0
	Gross Beta	0.0485 ± 1.46	2.50	1.22	4 mrem/yr	U	BD	112950-009	EPA 900.0
	Tritium	36.0 ± 102	181	82.7	NE	U	BD	112950-010	EPA 906.0M

Refer to footnotes on page 5B-59.

Table 5B-9 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8 (Duplicate)	Americium-241	0.432 ± 9.51	16.4	7.98	NE	U	BD	112951-008	EPA 901.1
04-Jun-20	Cesium-137	0.292 ± 2.03	3.24	1.53	NE	U	BD	112951-008	EPA 901.1
	Cobalt-60	1.45 ± 2.33	4.31	2.01	NE	U	BD	112951-008	EPA 901.1
	Potassium-40	3.50 ± 50.8	38.3	17.6	NE	U	BD	112951-008	EPA 901.1
	Gross Alpha	1.61	NA	NA	15 pCi/L	NA	None	112951-009	EPA 900.0
	Gross Beta	2.65 ± 1.29	2.09	1.02	4 mrem/yr		J	112951-009	EPA 900.0
	Tritium	497 ± 167	176	80.9	NE		J	112951-010	EPA 906.0M
TAV-MW9	Americium-241	-3.84 ± 6.42	9.25	4.52	NE	U	BD	112913-008	EPA 901.1
15-May-20	Cesium-137	0.918 ± 1.63	2.51	1.20	NE	U	BD	112913-008	EPA 901.1
	Cobalt-60	1.22 ± 1.65	2.94	1.38	NE	U	BD	112913-008	EPA 901.1
	Potassium-40	41.8 ± 36.3	25.0	11.6	NE	X	R	112913-008	EPA 901.1
	Gross Alpha	3.78	NA	NA	15 pCi/L	NA	None	112913-009	EPA 900.0
	Gross Beta	4.71 ± 0.775	1.03	0.493	4 mrem/yr	*		112913-009	EPA 900.0
	Tritium	-55.5 ± 95.4	185	84.8	NE	U	BD	112913-010	EPA 906.0M
TAV-MW10	Americium-241	3.40 ± 7.27	11.2	5.44	NE	U	BD	112953-008	EPA 901.1
10-Jun-20	Cesium-137	-1.64 ± 3.28	3.10	1.47	NE	U	BD	112953-008	EPA 901.1
	Cobalt-60	3.63 ± 3.47	4.14	1.95	NE	U	BD	112953-008	EPA 901.1
	Potassium-40	33.4 ± 37.9	27.1	12.3	NE	X	R	112953-008	EPA 901.1
	Gross Alpha	2.25	NA	NA	15 pCi/L	NA	None	112953-009	EPA 900.0
	Gross Beta	4.86 ± 0.918	1.32	0.641	4 mrem/yr			112953-009	EPA 900.0
	Tritium	-15.8 ± 89.6	168	76.5	NE	U	BD	112953-010	EPA 906.0M
TAV-MW11	Americium-241	-1.98 ± 10.3	16.2	7.88	NE	U	BD	112958-008	EPA 901.1
03-Jun-20	Cesium-137	0.407 ± 2.07	3.65	1.73	NE	U	BD	112958-008	EPA 901.1
	Cobalt-60	-0.591 ± 1.92	3.42	1.56	NE	U	BD	112958-008	EPA 901.1
	Potassium-40	-17.3 ± 40.6	53.3	25.1	NE	U	BD	112958-008	EPA 901.1
	Gross Alpha	3.15	NA	NA	15 pCi/L	NA	None	112958-009	EPA 900.0
	Gross Beta	3.55 ± 0.710	0.989	0.475	4 mrem/yr			112958-009	EPA 900.0
	Tritium	37.4 ± 101	178	81.2	NE	U	BD	112958-010	EPA 906.0M

Refer to footnotes on page 5B-59.

Table 5B-9 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW12	Americium-241	-6.97 ± 14.0	24.0	11.6	NE	U	BD	112940-008	EPA 901.1
29-May-20	Cesium-137	-0.933 ± 2.15	3.60	1.70	NE	U	BD	112940-008	EPA 901.1
	Cobalt-60	1.02 ± 2.24	4.09	1.87	NE	U	BD	112940-008	EPA 901.1
	Potassium-40	-36.2 ± 55.0	55.8	26.2	NE	U	BD	112940-008	EPA 901.1
	Gross Alpha	4.43	NA	NA	15 pCi/L	NA	None	112940-009	EPA 900.0
	Gross Beta	5.14 ± 1.04	1.52	0.741	4 mrem/yr			112940-009	EPA 900.0
	Tritium	-40.0 ± 97.5	187	85.3	NE	U	BD	112940-010	EPA 906.0M
TAV-MW13	Americium-241	0.942 ± 16.8	26.4	12.9	NE	U	BD	112918-008	EPA 901.1
18-May-20	Cesium-137	-1.32 ± 2.01	3.33	1.60	NE	U	BD	112918-008	EPA 901.1
	Cobalt-60	-1.12 ± 1.91	3.13	1.46	NE	U	BD	112918-008	EPA 901.1
	Potassium-40	36.6 ± 54.9	33.2	15.6	NE	X	R	112918-008	EPA 901.1
	Gross Alpha	3.18	NA	NA	15 pCi/L	NA	None	112918-009	EPA 900.0
	Gross Beta	2.80 ± 1.11	1.77	0.863	4 mrem/yr		J	112918-009	EPA 900.0
	Tritium	-74.5 ± 94.0	186	85.3	NE	U	BD	112918-010	EPA 906.0M
TAV-MW13 (Duplicate)	Americium-241	18.3 ± 14.0	17.3	8.39	NE	X	R	112919-008	EPA 901.1
18-May-20	Cesium-137	0.615 ± 2.21	3.45	1.64	NE	U	BD	112919-008	EPA 901.1
	Cobalt-60	-0.201 ± 1.91	3.41	1.57	NE	U	BD	112919-008	EPA 901.1
	Potassium-40	-3.77 ± 38.4	55.3	26.3	NE	U	BD	112919-008	EPA 901.1
	Gross Alpha	5.24	NA	NA	15 pCi/L	NA	None	112919-009	EPA 900.0
	Gross Beta	3.51 ± 0.966	1.46	0.712	4 mrem/yr		J	112919-009	EPA 900.0
	Tritium	-53.0 ± 96.5	187	85.5	NE	U	BD	112919-010	EPA 906.0M
TAV-MW14	Americium-241	4.04 ± 7.58	11.6	5.64	NE	U	BD	112960-008	EPA 901.1
09-Jun-20	Cesium-137	-3.53 ± 3.67	3.18	1.51	NE	U	BD	112960-008	EPA 901.1
	Cobalt-60	0.980 ± 1.85	3.41	1.58	NE	U	BD	112960-008	EPA 901.1
	Potassium-40	28.0 ± 39.9	30.4	13.9	NE	U	BD	112960-008	EPA 901.1
	Gross Alpha	1.45	NA	NA	15 pCi/L	NA	None	112960-009	EPA 900.0
	Gross Beta	3.68 ± 0.681	0.912	0.436	4 mrem/yr			112960-009	EPA 900.0
	Tritium	-15.2 ± 98.0	182	83.5	NE	U	BD	112960-010	EPA 906.0M

Refer to footnotes on page 5B-59.

Table 5B-9 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW15	Americium-241	-2.31 ± 16.8	28.8	14.0	NE	U	BD	112910-008	EPA 901.1
14-May-20	Cesium-137	-0.445 ± 1.83	3.14	1.49	NE	U	BD	112910-008	EPA 901.1
	Cobalt-60	2.47 ± 2.07	3.60	1.67	NE	U	BD	112910-008	EPA 901.1
	Potassium-40	32.3 ± 63.5	32.7	15.1	NE	U	BD	112910-008	EPA 901.1
	Gross Alpha	5.72	NA	NA	15 pCi/L	NA	None	112910-009	EPA 900.0
	Gross Beta	6.18 ± 1.18	1.65	0.798	4 mrem/yr	*		112910-009	EPA 900.0
	Tritium	3.62 ± 105	192	88.2	NE	U	BD	112910-010	EPA 906.0
TAV-MW16	Americium-241	10.1 ± 13.7	22.3	10.8	NE	U	BD	112921-008	EPA 901.1
19-May-20	Cesium-137	1.01 ± 3.94	4.83	2.29	NE	U	BD	112921-008	EPA 901.1
	Cobalt-60	-0.327 ± 2.60	4.64	2.12	NE	U	BD	112921-008	EPA 901.1
	Potassium-40	89.7 ± 77.9	33.4	14.7	NE		J	112921-008	EPA 901.1
	Gross Alpha	11.88	NA	NA	15 pCi/L	NA	None	112921-009	EPA 900.0
	Gross Beta	5.75 ± 1.09	1.49	0.713	4 mrem/yr			112921-009	EPA 900.0
	Tritium	31.2 ± 105	187	85.8	NE	U	BD	112921-010	EPA 906.0

Refer to footnotes on page 5B-59.

Table 5B-10
Summary of Field Water Quality Measurements[h]
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^0C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
LWDS-MW1	17-Feb-20	19.13	730.04	144.7	7.44	0.48	98.45	7.58
TAV-MW2	06-Feb-20	15.91	647.50	155.4	7.34	4.59	77.30	6.24
TAV-MW4	07-Feb-20	19.39	512.18	132.2	7.56	0.78	91.82	7.00
TAV-MW7	03-Feb-20	19.17	684.20	-92.8	7.45	1.69	7.86	0.68
TAV-MW8	12-Feb-20	18.07	560.11	88.6	7.48	2.60	84.51	6.65
TAV-MW10	20-Feb-20	17.18	704.12	129.9	7.55	0.27	88.40	7.12
TAV-MW11	10-Feb-20	18.63	654.92	110.2	7.53	0.20	86.99	6.79
TAV-MW12	19-Feb-20	17.72	735.85	131.8	7.40	1.19	80.41	6.11
TAV-MW14	13-Feb-20	18.18	638.17	123.3	7.43	1.87	89.89	7.03
TAV-MW15	04-Feb-20	16.93	733.70	140.2	7.29	2.40	65.30	5.23
TAV-MW16	05-Feb-20	18.09	819.50	115.0	7.24	0.87	49.90	3.91
AVN-1	27-May-20	21.83	450.30	153.3	7.61	8.41	45.34	3.29
LWDS-MW1	08-Jun-20	23.89	806.57	109.2	7.49	0.93	100.31	7.11
LWDS-MW2	26-May-20	20.85	487.45	173.5	7.52	4.64	60.28	4.47
TAV-MW2	01-Jun-20	21.94	753.80	173.6	7.31	3.74	73.59	5.39
TAV-MW3	21-May-20	20.67	595.22	174.2	7.51	1.81	67.03	5.00
TAV-MW4	02-Jun-20	20.50	559.25	177.5	7.55	0.49	78.54	5.95
TAV-MW5	20-May-20	21.75	536.54	144.7	7.52	18.8	72.83	5.35
TAV-MW7	13-May-20	21.43	684.44	119.2	7.36	2.18	3.99	0.46
TAV-MW8	04-Jun-20	23.15	709.49	156.8	7.48	1.39	79.50	5.71
TAV-MW9	15-May-20	20.94	691.17	126.3	7.30	0.45	12.75	0.95
TAV-MW10	10-Jun-20	22.15	659.90	179.1	7.42	0.41	85.80	6.20
TAV-MW11	03-Jun-20	22.40	668.44	160.7	7.52	0.45	76.17	5.55
TAV-MW12	29-May-20	23.60	753.34	178.7	7.36	0.83	73.23	5.22
TAV-MW13	18-May-20	22.36	578.92	168.7	7.47	0.31	27.16	1.97
TAV-MW14	09-Jun-20	20.08	653.80	137.2	7.42	2.20	76.28	5.80
TAV-MW15	14-May-20	21.41	513.72	140.8	7.24	1.16	61.98	4.56
TAV-MW16	19-May-20	22.06	906.77	144.0	7.22	0.91	44.73	3.27

Refer to footnotes on page 5B-59.

Table 5B-10 *(Concluded)*
Summary of Field Water Quality Measurements[h]
Technical Area-V Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
AVN-1	30-Sep-20	21.80	427.46	208.9	7.77	3.91	41.29	3.37
LWDS-MW1	17-Aug-20	24.36	766.68	210.3	7.50	0.39	91.46	6.65
TAV-MW2	06-Aug-20	22.93	690.67	318.2	7.46	2.76	82.75	5.60
TAV-MW4	07-Aug-20	21.05	500.38	236.8	7.70	3.61	86.96	6.22
TAV-MW7	03-Aug-20	21.40	604.40	186.2	7.47	1.60	4.54	0.30
TAV-MW8	11-Aug-20	23.12	604.21	241.0	7.65	1.12	81.79	6.00
TAV-MW10	19-Aug-20	21.59	631.60	213.2	7.53	0.61	87.78	6.60
TAV-MW11	10-Aug-20	22.66	608.80	242.2	7.68	0.28	91.62	6.20
TAV-MW12	13-Aug-20	24.29	683.00	236.7	7.39	2.97	78.24	5.50
TAV-MW14	18-Aug-20	23.44	699.90	248.4	7.49	2.94	85.81	6.20
TAV-MW15	04-Aug-20	21.70	786.83	260.3	7.40	0.54	71.86	4.94
TAV-MW16	05-Aug-20	21.55	840.30	257.4	7.34	0.63	54.23	3.75
LWDS-MW1	07-Dec-20	18.75	704.96	182.1	7.59	0.92	103.72	8.32
TAV-MW2	20-Nov-20	19.72	684.91	193.9	7.39	0.82	71.81	5.85
TAV-MW4	23-Nov-20	18.41	484.14	194.8	7.58	0.84	78.85	6.49
TAV-MW7	17-Nov-20	20.94	609.69	157.8	7.41	1.21	2.94	0.23
TAV-MW8	30-Nov-20	19.01	569.65	189.9	7.51	12.9	71.78	5.90
TAV-MW10	08-Dec-20	18.45	611.27	213.2	7.37	0.53	82.12	6.80
TAV-MW11	24-Nov-20	18.65	556.96	242.9	7.58	0.48	76.18	6.31
TAV-MW12	02-Dec-20	14.93	592.64	172.1	7.42	0.83	67.48	5.97
TAV-MW14	03-Dec-20	18.45	620.36	178.1	7.53	2.84	77.36	6.40
TAV-MW15	18-Nov-20	20.70	773.09	186.8	7.29	0.60	67.73	5.37
TAV-MW16	19-Nov-20	21.10	844.25	191.4	7.23	0.61	49.08	3.80

Refer to footnotes on page 5B-59.

Footnotes for Technical Area-V Groundwater Analytical Results Tables

%	= Percent.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
ID	= Identifier.
μg/L	= Micrograms per liter.
mg/L	= Milligrams per liter.
mrem/yr	= Millirem per year.
No.	= Number.
pCi/L	= Picocuries per liter.
RPD	= Relative percent difference.

[a]Result orActivity

Result applies to Tables 5B-1 and 5b-3 through 5B-8. Activity applies to Table 5B-9.

Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Parts 9, 141, and 142, Table 1-4).

Bold = Value exceed the established MCL. Activities of zero or less are considered to be not detected.

ND = not detected (at method detection limit).

Activities of zero or less are considered to be not detected.

[b]MDL or MDA

The MDL applies to Tables 5B-1 through 5B-8. MDA applies to Table 5B-9.

MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.

MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

NA = Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level

The PQL applies to Tables 5B-1 and 5b-3 through 5B-8. Critical Level applies to Table 5B-9.

Critical Level = The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.

NA = Not applicable for gross alpha activities. The critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[d]MCL

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards, (EPA March 2018).

- The total for trihalomethanes (including chloroform) is 80 mg/L.

  The following are the MCLs for gross alpha particles and beta particles in community water systems:
- 15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table 1-4).
- 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

NE = Not established.

Footnotes for Technical Area-V Groundwater Analytical Results Tables (Concluded)

[e]Laboratory Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

B	= The analyte was found in the blank above the effective MDL.
H	= Analytical holding time was exceeded.
J	= Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N	= Results associated with a spike analysis that was outside control limits.
NA	= Not applicable.
U	= Analyte is absent or below the MDL.
X	= Uncertain identification for gamma spectroscopy.
*	= Recovery or percent recover not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.

[f]Validation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

BD	= Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J	= The associated value is an estimated quantity.
J+	= The associated numerical value is an estimated quantity with a suspected positive bias.
J-	= The associated numerical value is an estimated quantity with a suspected negative bias.
None	= No data validation for corrected gross alpha activity.
U	= The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	= The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	= The data are unusable, and resampling or reanalysis are necessary for verification.

[g]Analytical Method

Rice, E.W., R.B. Baird, A.D. Eaton, and L.S. Clesceri 2012, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

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EPA, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.

SIM	= Selected Ion Monitoring.
SM	= Standard Method.
SW	= Solid Waste.

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

˚C	= Degrees Celsius.
% Sat	= Percent saturation.
µmho/cm	= Micromhos per centimeter.
mg/L	= Milligrams per liter.
mV	= Millivolts.
NTU	= Nephelometric turbidity units.
pH	= Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 5C
Technical Area-V
Plots

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Attachment 5C Plots

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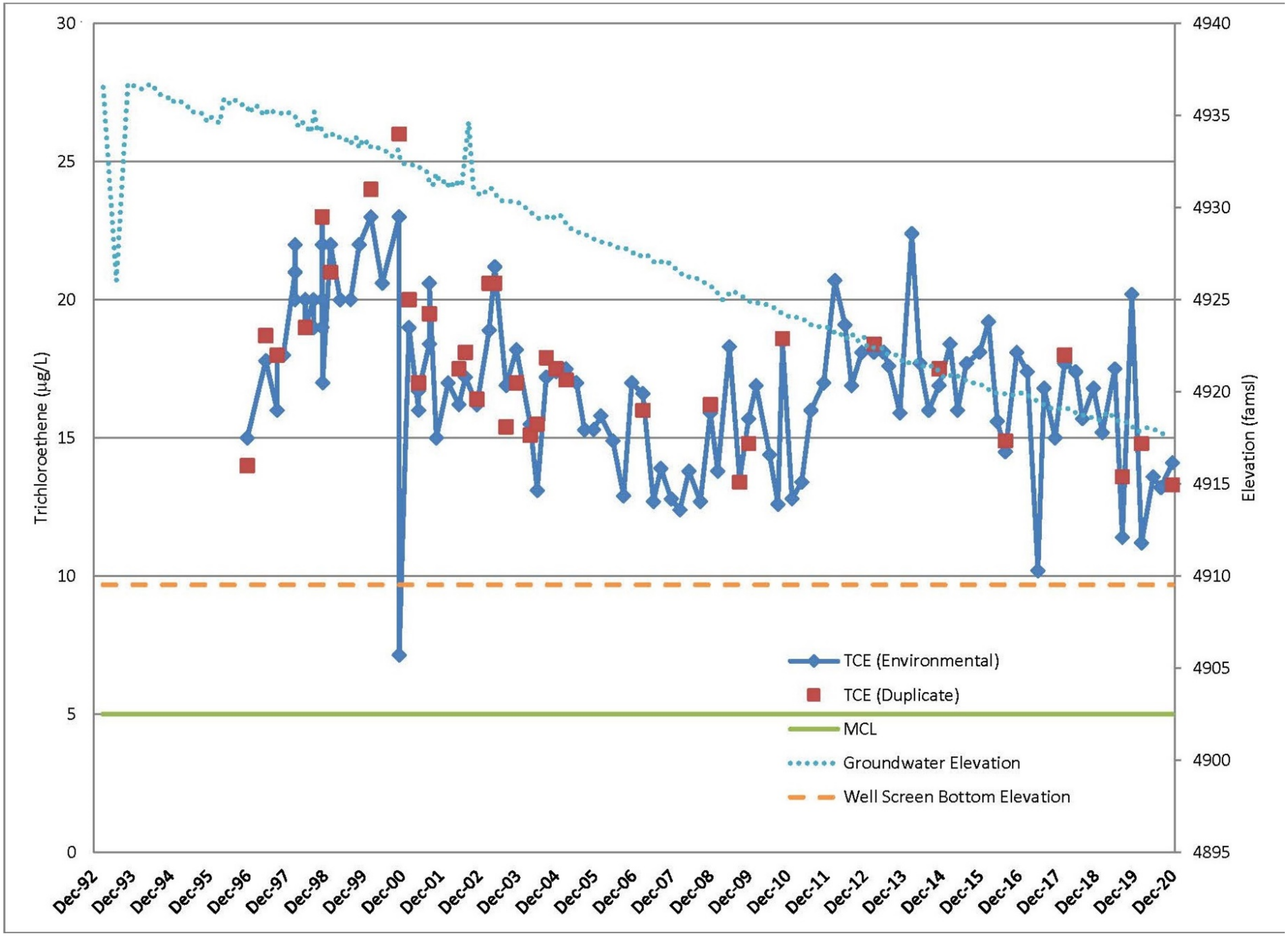
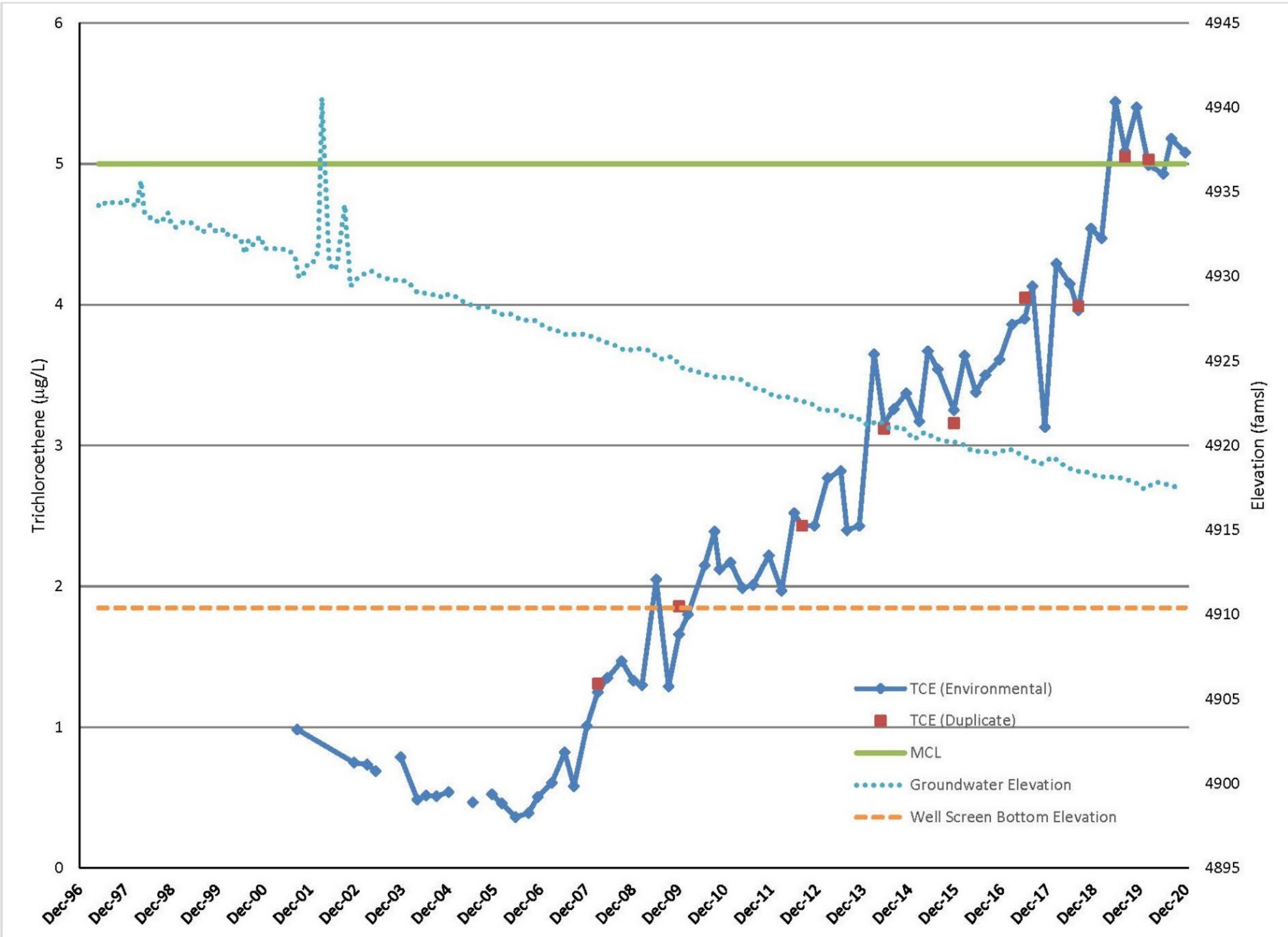


Figure 5C-1.Trichloroethene Concentrations, LWDS-MW1



The gap displayed in figure is associated with value(s) that were qualified as non-detect due to laboratory method blank contamination.

Figure 5C-2. Trichloroethene Concentrations, TAV-MW4

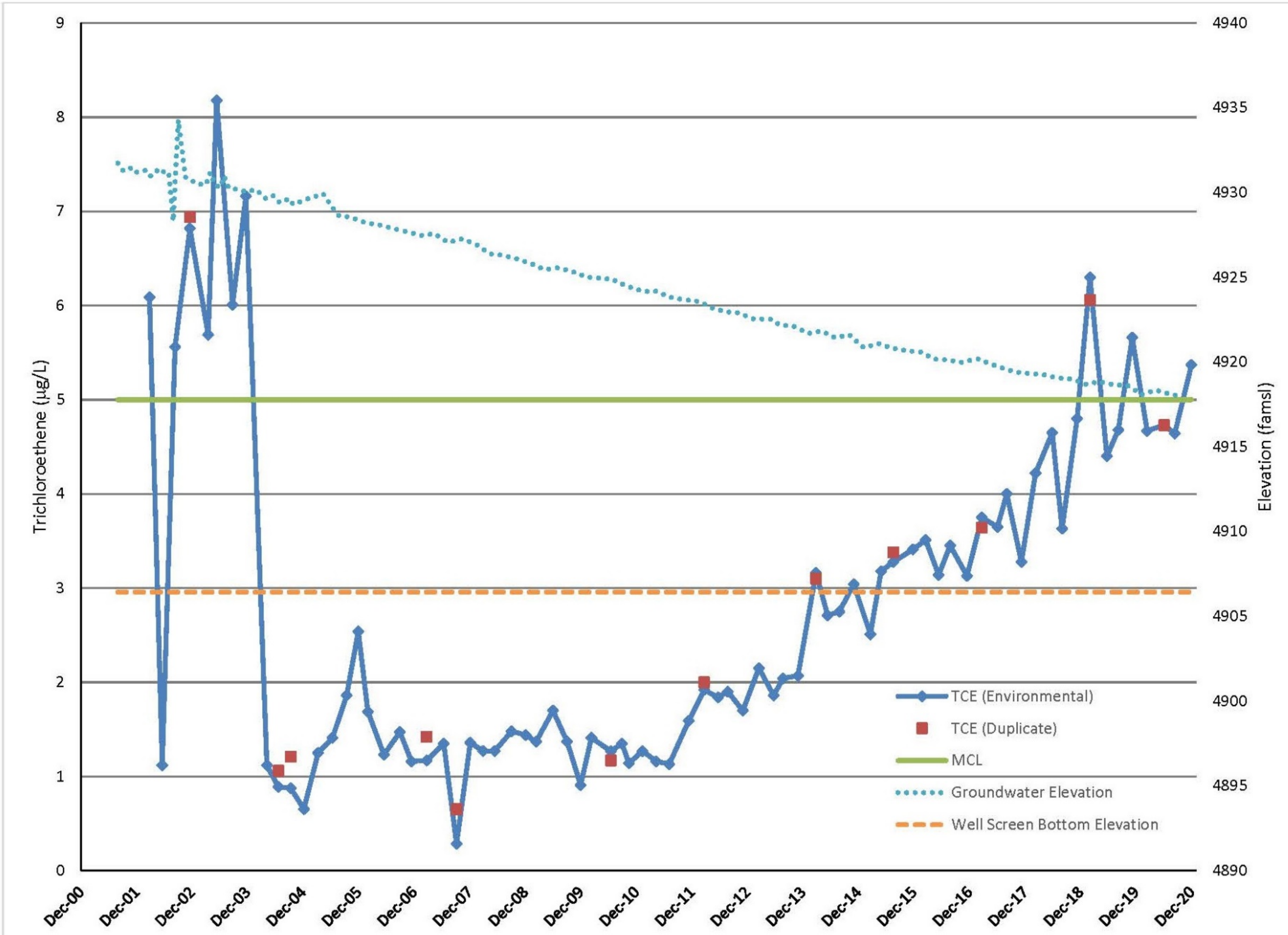


Figure 5C-3. Trichloroethene Concentrations, TAV-MW8

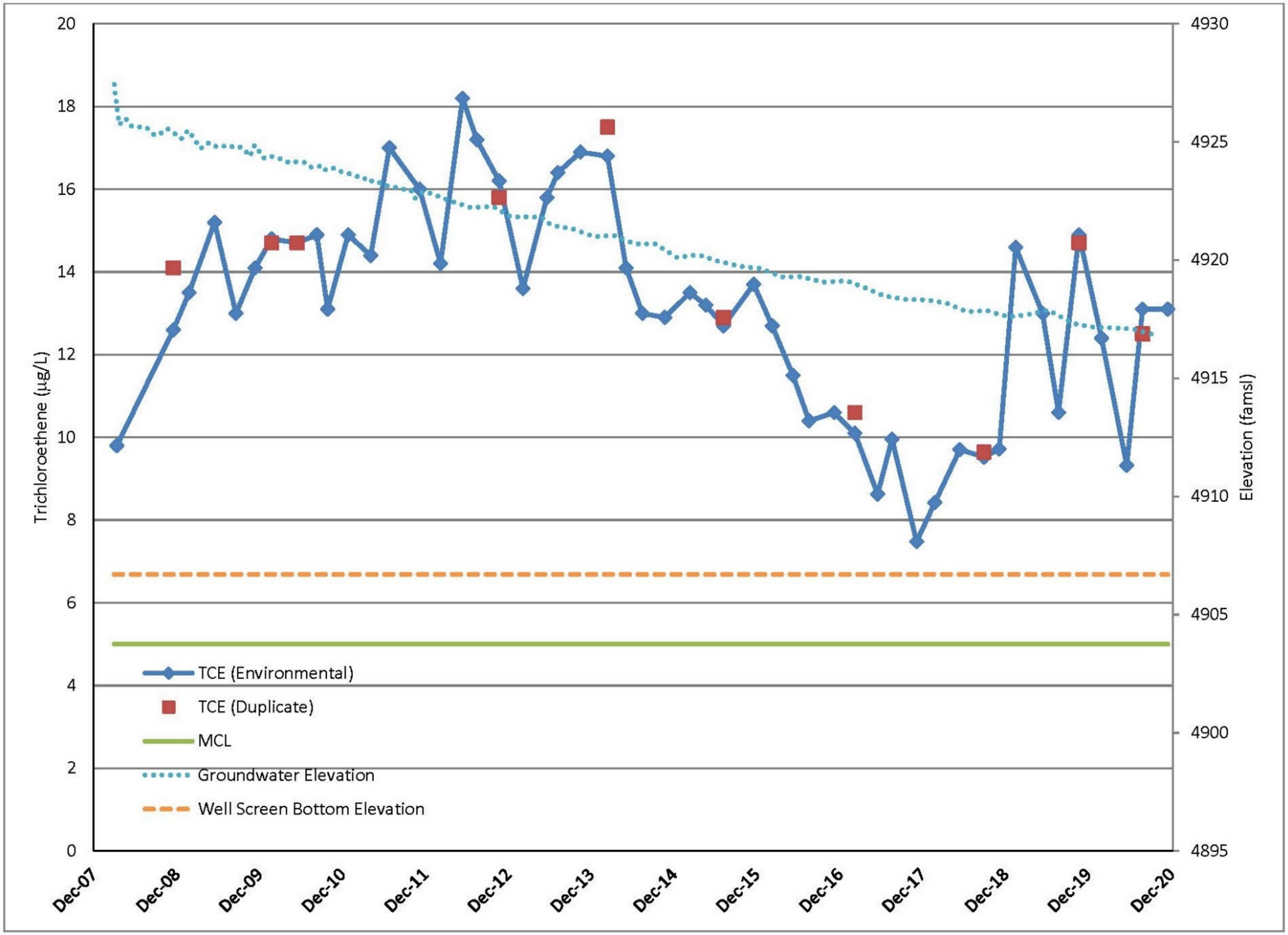


Figure 5C-4. Trichloroethene Concentrations, TAV-MW10

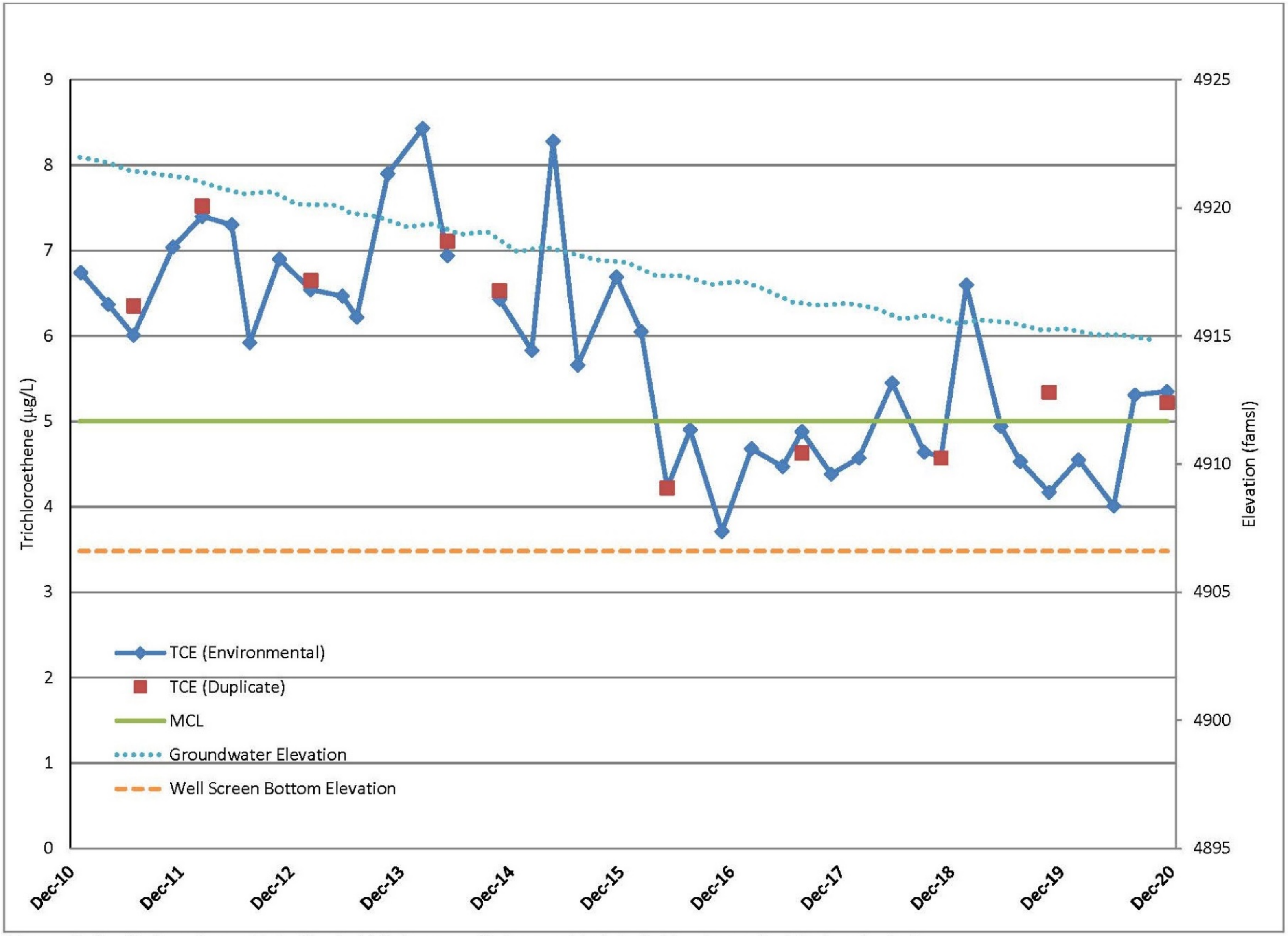


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Figure 5C-5. Trichloroethene Concentrations, TAV-MW14

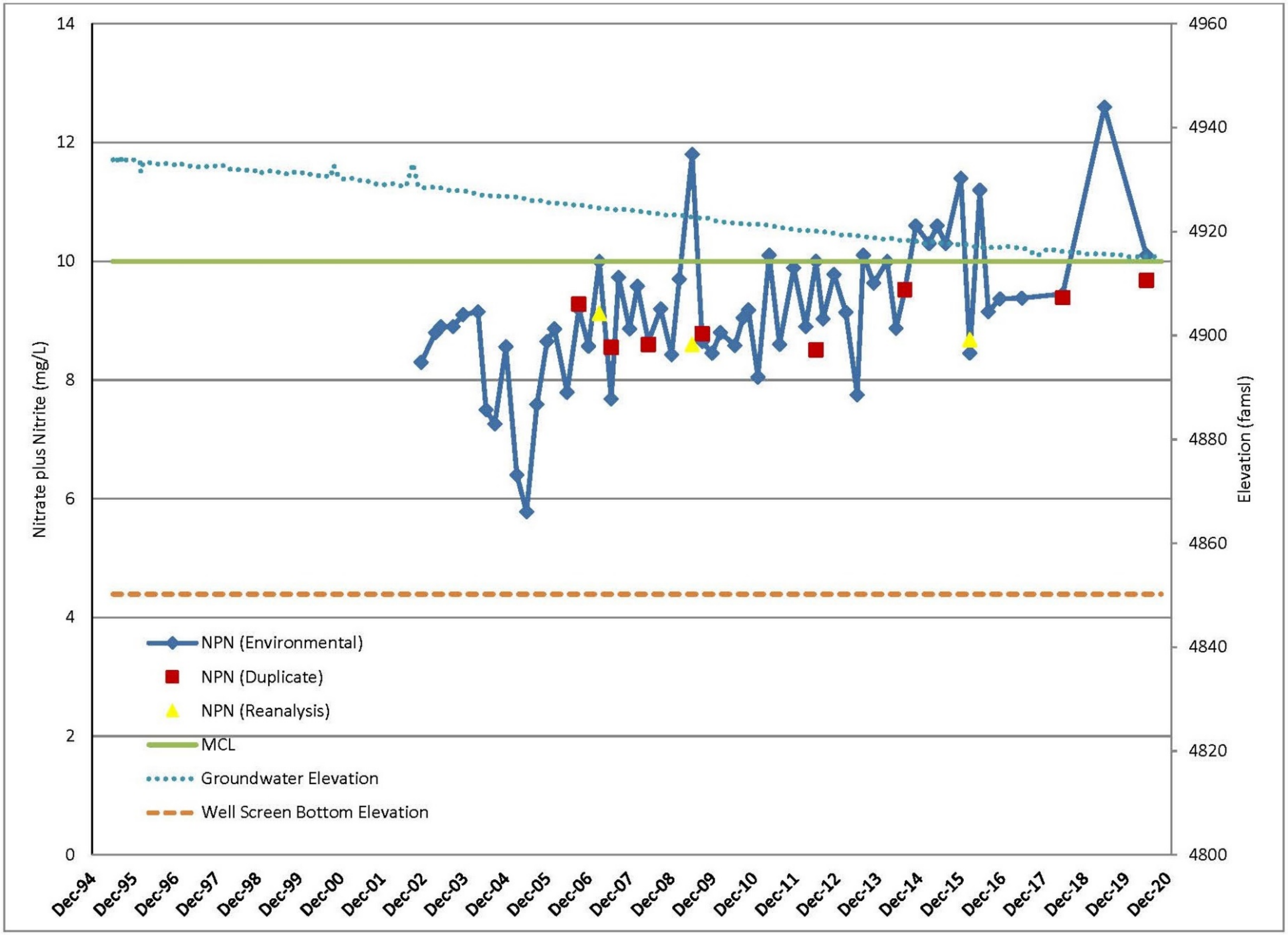


Figure 5C-6. Nitrate Plus Nitrite Concentrations, AVN-1

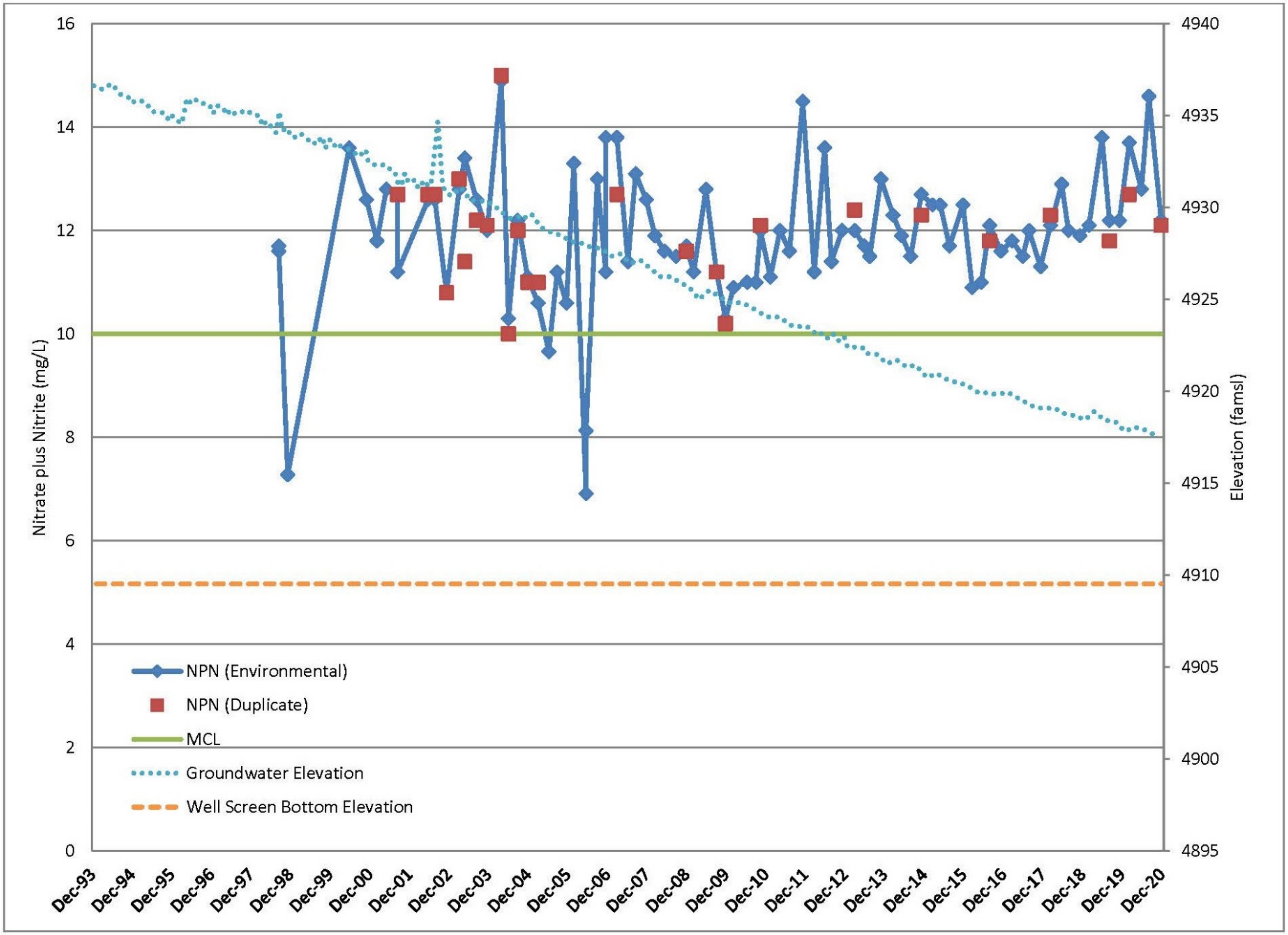


Figure 5C-7. Nitrate Plus Nitrite Concentrations, LWDS-MW1

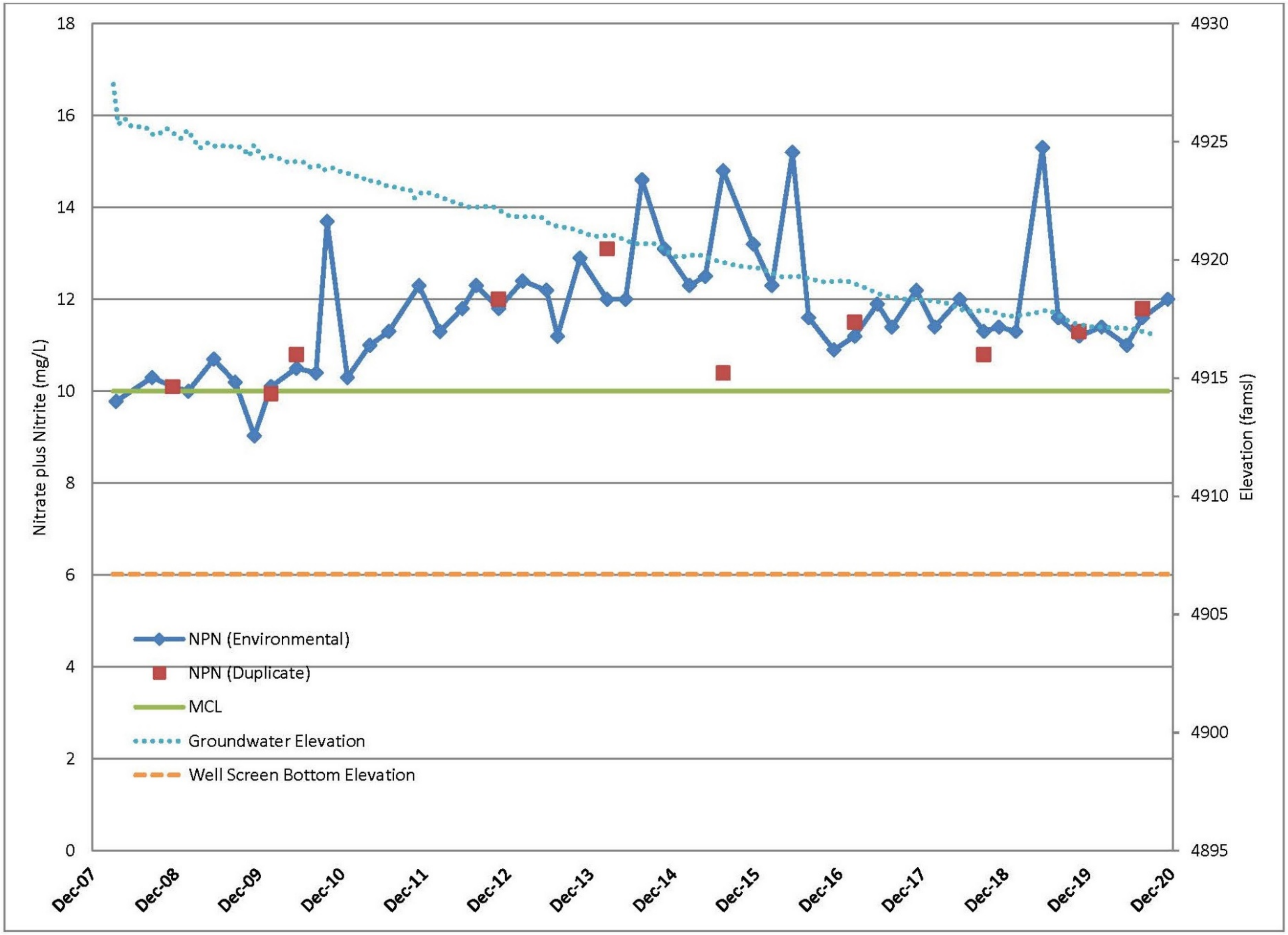
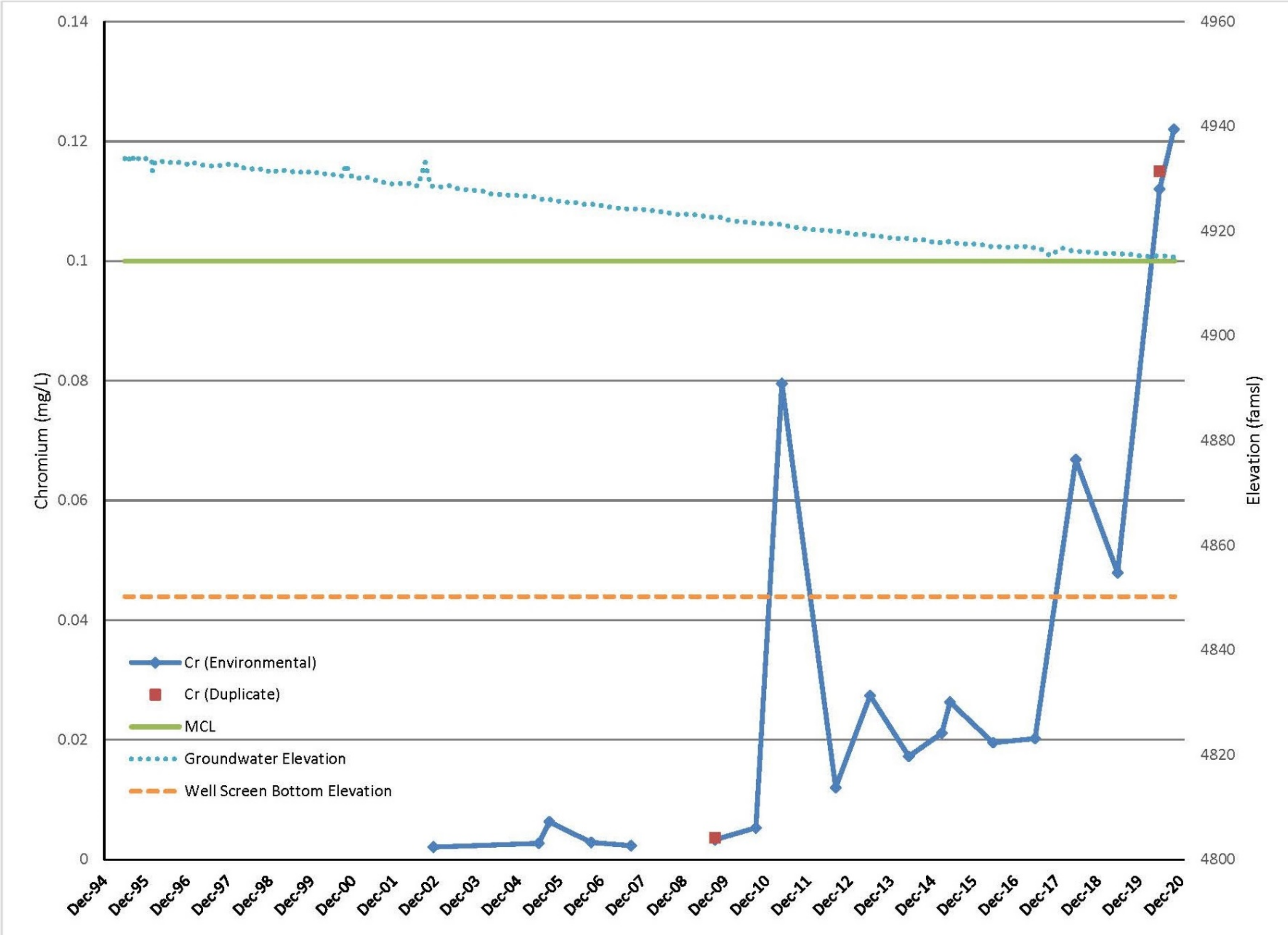


Figure 5C-8. Nitrate Plus Nitrite Concentrations, TAV-MW10



The gap displayed in figure is associated with value(s) that were qualified as non-detect due to laboratory method blank contamination.

Figure 5C-9. Chromium Concentrations, AVN-1

Attachment 5D
Technical Area-V
Hydrographs

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Attachment 5D Hydrographs

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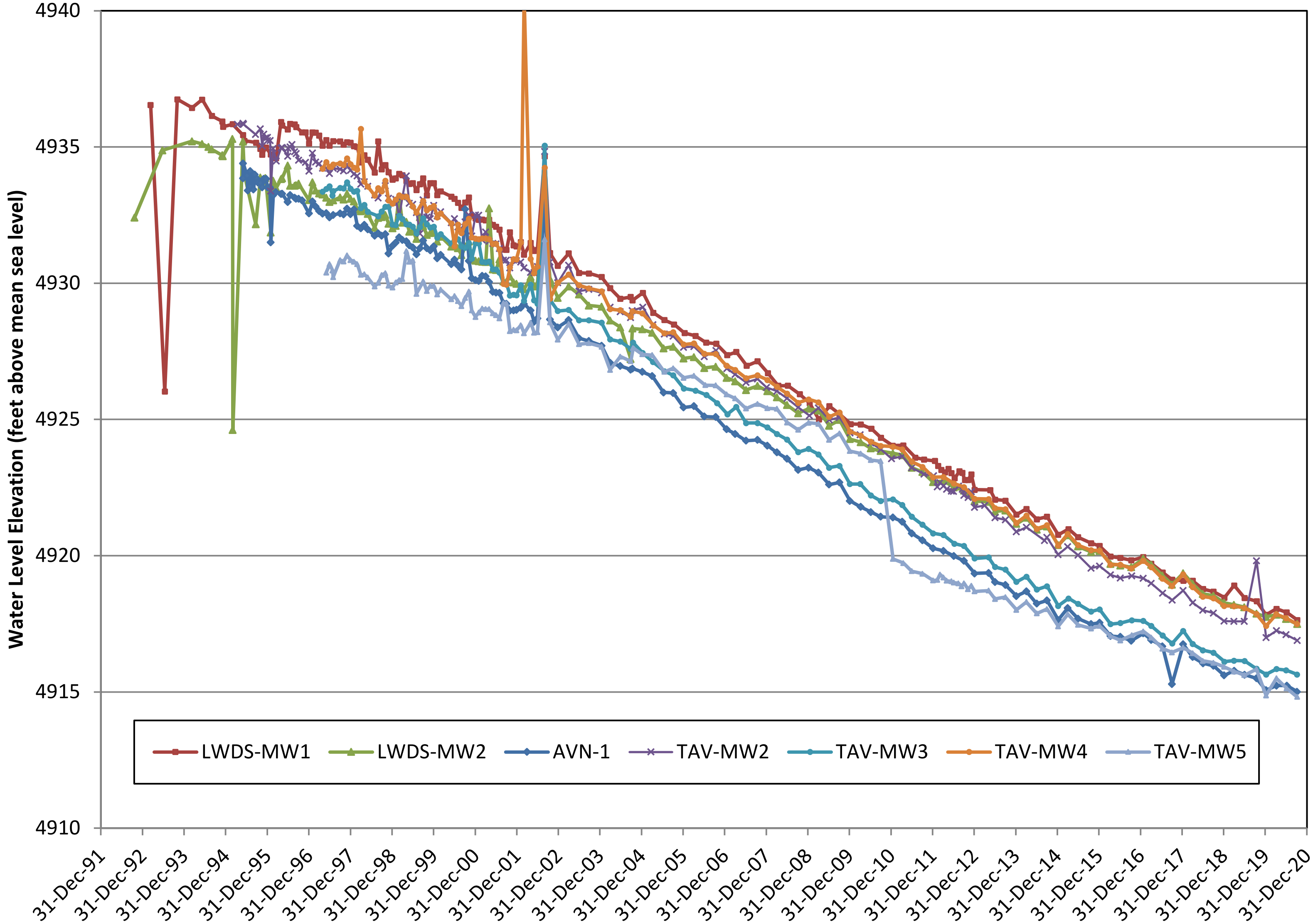

Figure 5D-1. Technical Area-V Groundwater Area of Concern Wells (1 of 3)

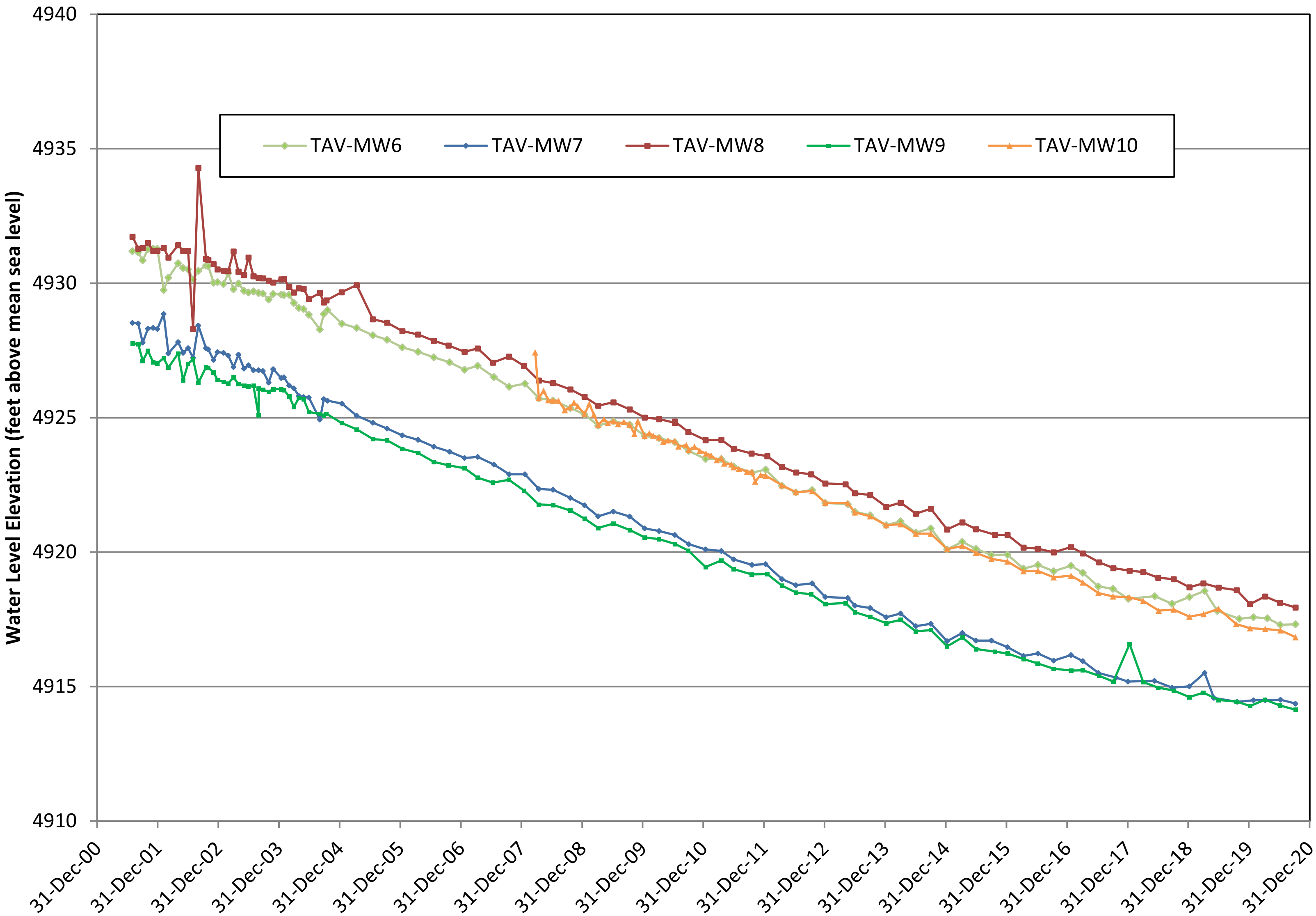

Figure 5D-2. Technical Area-V Groundwater Area of Concern Wells (2 of 3)

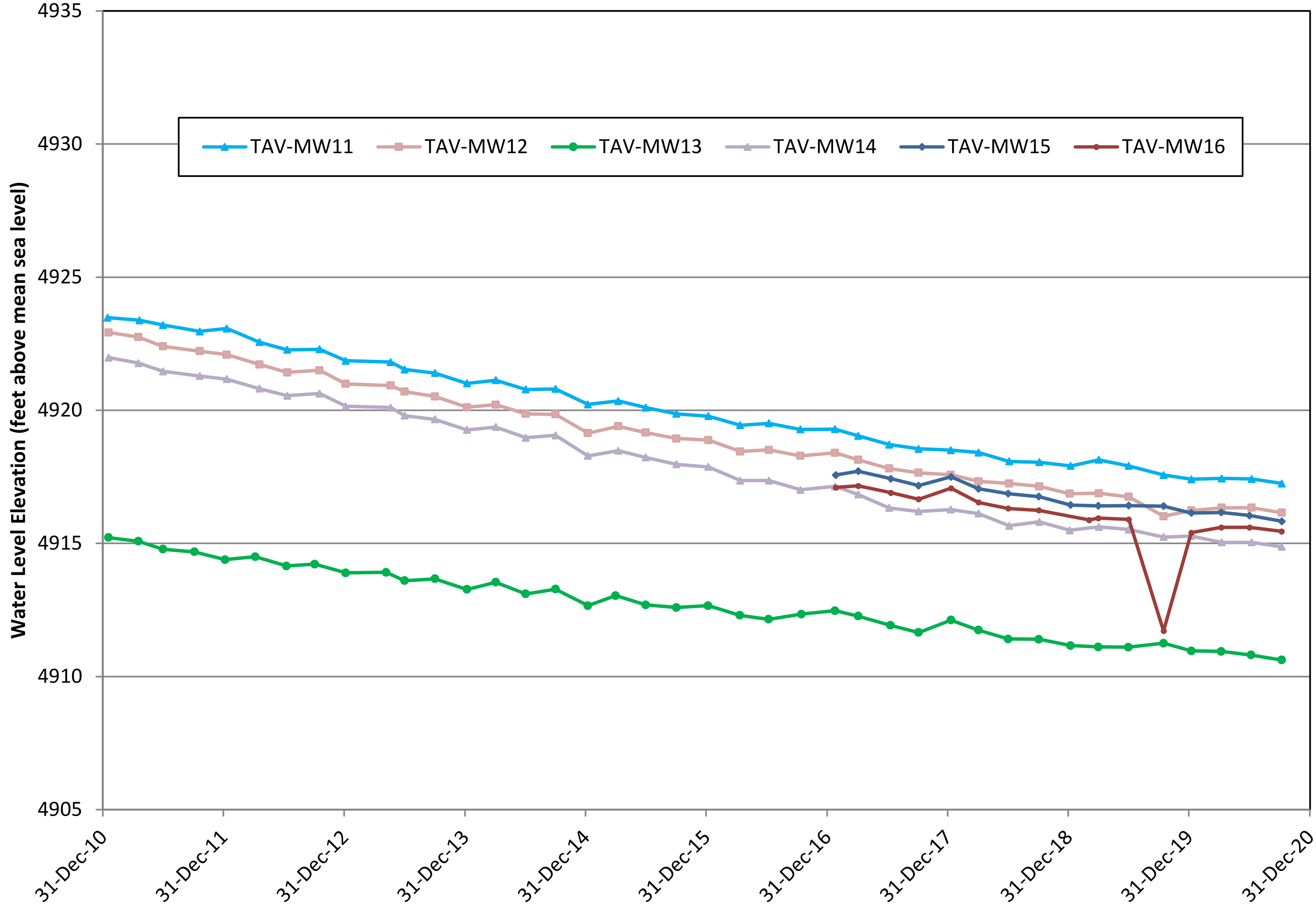

Figure 5D-3. Technical Area-V Groundwater Area of Concern Wells (3 of 3)

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Chapter 5
Technical Area-V
References

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DOE May 2016	U.S. Department of Energy (DOE), May 2016. Letter to S. Huddleson (New Mexico Environment Department), "Notice of Intent to Discharge for Sandia National Laboratories/New Mexico Technical Area-V Groundwater Remediation Treatability Study Injection Wells," U.S. Department of Energy, National Nuclear Security Administration, Sandia Field Office, Albuquerque, New Mexico, May 16, 2016.

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Walvoord et al., November 2003	Walvoord, M.A., F.M. Phillips, D.A. Stonestrom, R.D. Evans, P.C. Hartsough, B.D. Newman, and R.G. Striegl, November 2003. "A Reservoir of Nitrate Beneath Desert Soils," *Science,* Vol. 302. November 7, 2003.

6.0 Tijeras Arroyo Groundwater Area of Concern

6.1 Introduction

The Tijeras Arroyo Groundwater (TAG) Area of Concern (AOC) was identified by the New Mexico Environment Department (NMED) in the Compliance Order on Consent (Consent Order) (NMED April 2004) because two chemicals, nitrate and trichloroethene (TCE), had groundwater concentrations that exceeded the respective U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs). Groundwater monitoring in the TAG AOC has been conducted since 1992. Figure 6-1 shows the TAG AOC at Sandia National Laboratories, New Mexico (SNL/NM). When the Consent Order was issued, nitrate and TCE were specified as constituents of concern (COCs) because (1) the Perched Groundwater System (PGWS) contained concentrations of nitrate and TCE that exceeded the corresponding EPA MCLs, and (2) the Regional Aquifer contained nitrate concentrations that exceeded the EPA MCL.

In the TAG AOC, the historical maximum nitrate concentration has been 38.5 milligrams per liter (mg/L) and the historical maximum TCE concentration has been 15.9 micrograms per liter (µg/L). The EPA MCLs and State of New Mexico drinking water standards for nitrate (as nitrogen) and TCE are 10 mg/L and 5 µg/L, respectively. In Calendar Year (CY) 2020, the maximum nitrate concentration in the PGWS was 22.7 mg/L. The maximum nitrate concentration in the Regional Aquifer exclusive of the merging zone was 4.03 mg/L. In the merging zone above the Regional Aquifer, the maximum nitrate concentration was 31.9 mg/L. In CY 2020, the maximum TCE concentration in the PGWS was 15.9 µg/L. The maximum TCE concentration in the Regional Aquifer exclusive of the merging zone was 0.380 (J-qualified) µg/L. In the merging zone above the Regional Aquifer, TCE was not detected (<0.300 µg/L).

In response to the Consent Order, the TAG Corrective Measures Evaluation (CME) Work Plan was submitted to the NMED Hazardous Waste Bureau (HWB) in July 2004 (SNL July 2004). In April 2005, U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and SNL/NM personnel submitted a CME Report, but the NMED HWB did not finalize its review of that document. In December 2016, DOE and SNL/NM personnel submitted a combined TAG Current Conceptual Model (CCM) and CME Report, referred to hereafter as the TAG CCM/CME Report. NMED HWB issued a disapproval letter in May 2017 (NMED HWB May 2017). In August 2017, a meeting was held between NMED HWB, DOE, and SNL/NM personnel to discuss the outstanding issues for preparing a report revision. The Revised TAG CCM/CME Report was submitted to NMED HWB in February 2018 (SNL February 2018). The revised report addressed (1) the issues presented in the NMED HWB May 2017 disapproval letter, (2) findings from the August 2017 meeting, and (3) proposed remedial alternatives for the elevated nitrate concentrations in the PGWS. Personnel from DOE/NNSA, SNL/NM, and NMED HWB met on September 23, 2020 to discuss NMED's ongoing review of the SNL/NM (February 2018) report. No significant concerns were identified in the meeting.

6.1.1 Location

The TAG AOC covers approximately 1.82 square miles (sq mi) and three Technical Areas (TAs) (TA-I, TA-II, and TA-IV). The TAG AOC is analogous with the previously used term TAG Area of Responsibility as discussed in the TAG CME Work Plan (SNL August 2005). Figure 6-1 shows the surrounding TAG Study Area of approximately 40 sq mi that is situated in the north-central portion of Kirtland Air Force Base (KAFB) and the southern portion of the City of Albuquerque (COA). From October 2000 to October 2003, the NMED HWB directed a series of twenty High Performing Team meetings that served as a forum for discussing groundwater issues for the study area. The facilities identified then as potentially responsible for groundwater contamination within the TAG Study Area included the DOE/ NNSA, SNL/NM, KAFB, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), and the COA.

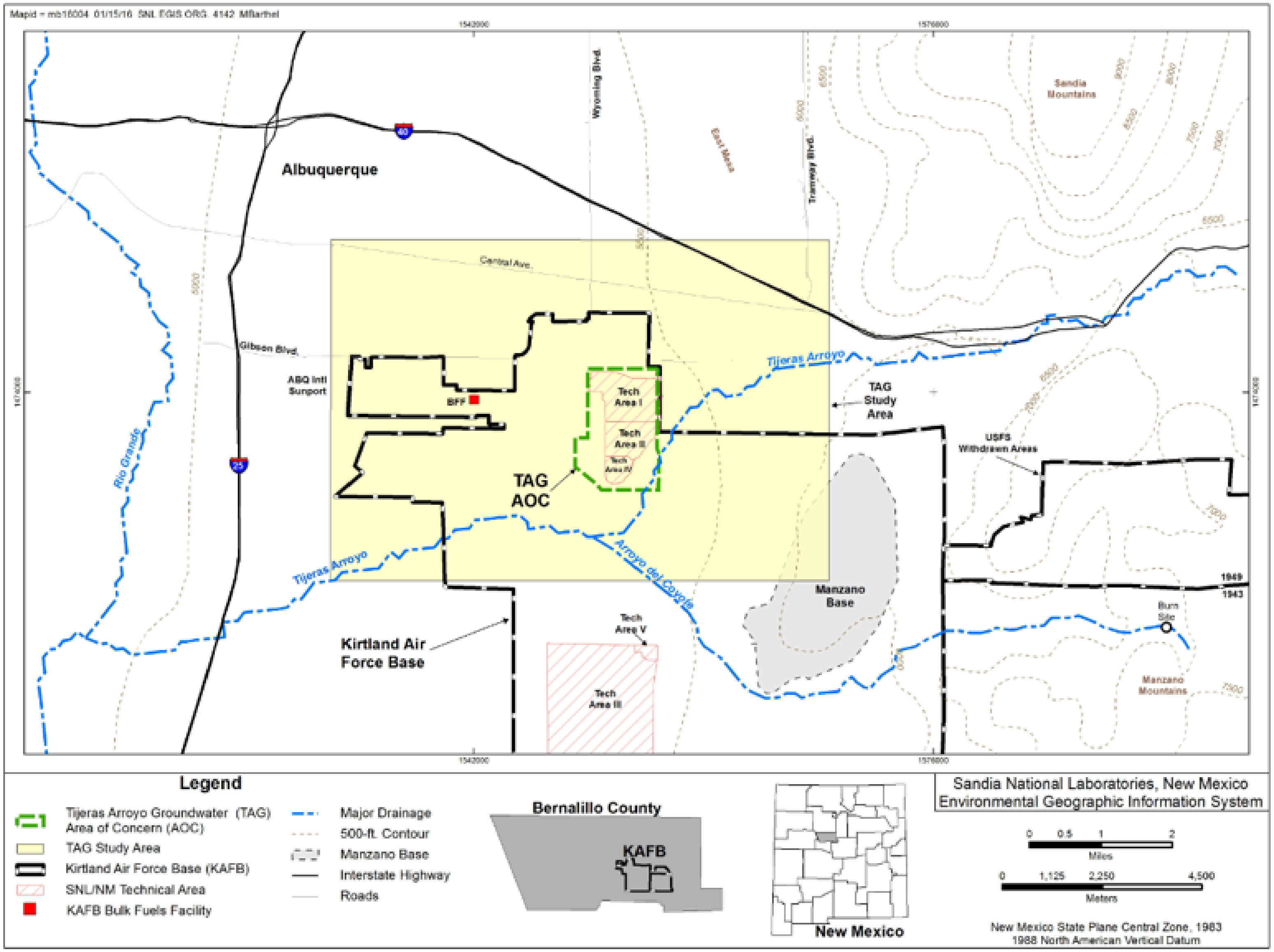


Figure 6-1. Location of the Tijeras Arroyo Groundwater Area of Concern

KAFB operations utilize numerous facilities and properties with a variety of land uses along the north, west, south, and southeast boundaries of TA-I, TA-II, and TA-IV. The area located along the northern and western boundaries of the three TAs contains KAFB facilities consisting of base housing, office buildings, a fire station, training schools, machine workshops, storage yards, a detention facility, an electromagnetic research facility, and the former KAFB Sewage Lagoons. Bordering the southern and southeastern edges of the three TAs are KAFB undeveloped open spaces, an active landfill, closed landfills, emergency response training areas, and the Tijeras Arroyo Golf Course. COA residential areas are located along the northern boundary of KAFB.

6.1.2 Site History

The facilities at TA-I, TA-II, and TA-IV were built on land that had been previously developed by commercial airline operators and to a much larger degree by the military. Land use development began in 1928 when the public Albuquerque Airport was built on the East Mesa. Renamed Oxnard Field in 1929, the airport was used until late 1939 when the vicinity of Oxnard Field was purchased by the federal government for use as an Army Air Depot Training Station, later to be known as Sandia Base. After World War II, the old Oxnard Field runways and an extensive grid of taxiways were used for parking aircraft. Starting in 1946, the War Assets Administration managed the sale or dismantlement of approximately 2,250 surplus military aircraft. Approximately 1,500 planes were dismantled and smelted down adjacent to the Oxnard taxiways. In addition to the smelter, numerous maintenance and machine shops were operated for several years.

In 1939, public airline service was moved approximately four miles to the west of Oxnard Field where the Albuquerque Municipal Airport was built. Using the municipal set of runways, the Albuquerque Army Air Base began operations in 1941. The air base was later dedicated as Kirtland Army Air Field and subsequently renamed as KAFB. In 1971, the operations of KAFB, Sandia Base, and Manzano Base were combined under the Air Force Materiel Command (KAFB March 2013). The municipal airfield is now identified as the Albuquerque International Sunport.

In July 1945, the "Z Division" of the Manhattan Engineers District, an extension of the original Los Alamos Laboratory, was established at Sandia Base in the area that would become known as TA-I (Furman April 1990). The primary mission of the Z Division was to provide engineering, production, stockpiling, and testing support for nuclear weapon systems. In 1949, the independent Sandia Laboratory was established at TA-I and TA-II. The primary management and administrative operations have historically been conducted at several TA-I office buildings. Construction of TA-IV began in 1977. Over the years, operations at the three TAs have evolved to include a wide variety of research and development activities including weapons design, component production, high-performance computing, and energy research programs.

6.1.3 Monitoring History

Since 1992, SNL/NM Environmental Restoration (ER) Operations has conducted numerous environmental and groundwater investigations in the TAG AOC. The historic timeline (Attachment 6A, Table 6A-1) lists the field investigations concerning groundwater quality in the TAG AOC. The majority of the SNL/NM ER Operations efforts have consisted of site-specific investigations that were conducted in support of Solid Waste Management Unit (SWMU) assessments involving potential soil contamination. Where required, contaminated soil and debris were excavated and removed. The NMED HWB has granted Corrective Action Complete status to all SWMUs in the TAG AOC. Only the groundwater issue remains.

Both KAFB and COA have also completed numerous groundwater investigations near the TAG AOC. Their initial findings were incorporated in the TAG Investigation Report (SNL November 2005). KAFB has issued a nitrate abatement report (KAFB December 2015) describing potential nitrate release sites and recent groundwater monitoring data. As a separate endeavor, KAFB is remediating the Bulk Fuels Facility that is located approximately 1.6 miles west of the TAG AOC (Figure 6-1). Petroleum hydrocarbons (primarily aviation gasoline and jet fuel), associated with the Bulk Fuels Facility do not affect groundwater quality beneath the TAG AOC.

Beginning in 1992, groundwater quality has been evaluated as part of the TA-II investigation with the installation of groundwater monitoring wells in the central portion of the TAG AOC. During this initial investigation, the PGWS was discovered at a depth of approximately 320 feet (ft) below ground surface (bgs). The Regional Aquifer was present at approximately 500 ft bgs. In October 1994, the first detection of TCE in a groundwater sample from an SNL/NM well near Tijeras Arroyo was reported at monitoring well TA2-W-01, which is screened in the PGWS. Subsequent drilling activities identified that a merging zone of limited lateral extent was present between the PGWS and the Regional Aquifer. The Conceptual Site Model (CSM) in Section 6.1.7 describes the hydrogeologic setting in greater detail.

To date (end of CY 2020), the maximum nitrate plus nitrite (NPN) concentration for the PGWS has been 27.8 mg/L and corresponds to the sample collected in November 2015 from replacement well TA2-W-28. Coincidentally, the initial well (TA2-SW1-320) contained 27.8 (J-qualified) mg/L NPN for the January 2007 sample. The maximum NPN concentration for the merging zone was 38.4 mg/L at well TJA-4 when sampled in November 2013; the environmental duplicate contained NPN at 38.5 mg/L. The maximum NPN concentration for the Regional Aquifer occurred in September 2020 at 4.03 mg/L and corresponded to the environmental sample from well TA2-NW1-595; the environmental duplicate contained NPN at 3.99 mg/L.

To date (end of CY 2020), the maximum TCE concentration for the PGWS has been 15.7 µg/L and corresponded to the environmental sample collected in December 2020 from monitoring well TA2-W-26; the environmental duplicate contained a TCE concentration of 15.9 µg/L. The re-occurrence of TCE above the MCL at well TA2-W-26 is discussed in Section 6.6.

TCE has historically not been reported above the laboratory detection limits (0.25 - 0.5 µg/L) at merging zone well TJA-4. Likewise, TCE has not exceeded the MCL in the Regional Aquifer. The maximum TCE concentration of 4.27 µg/L for the Regional Aquifer corresponds to the August 2013 sample collected from monitoring well TJA-3.

6.1.4 Current Monitoring Network

During CY 2020, SNL/NM personnel collected groundwater samples at 21 monitoring wells (Table 6-1). Variances from the sampling frequency are discussed in Section 6.8. As shown on Figure 6-2, water levels are measured at 30 monitoring wells located within and adjacent to the TAG AOC in CY 2020. Additional monitoring wells owned by KAFB and the COA are utilized by the TAG investigation for understanding the hydrogeologic setting.

Table 6-1. Groundwater Monitoring Conducted by Sandia National Laboratories, New Mexico and the City of Albuquerque near the Tijeras Arroyo Groundwater Area of Concern during Calendar Year 2020

Well ID	Installation Year	Sampling Frequency	WQ	WL	Comments
Eubank-1	1988			✓	Regional Aquifer (COA well)
Eubank-2	1996			✓	Regional Aquifer (COA well)
Eubank-3	1996			✓	Regional Aquifer (COA well)
Eubank-5	1996			✓	Regional Aquifer (COA well)
PGS-2	1995	A	n.s.	✓	Regional Aquifer
TA1-W-01	1997	A	✓	✓	Regional Aquifer
TA1-W-02	1998	A	✓	✓	Regional Aquifer
TA1-W-03	1998	A	n.s.	✓	Perched Groundwater System
TA1-W-04	1998	A	✓	✓	Regional Aquifer
TA1-W-05	1998	A	✓	✓	Regional Aquifer
TA1-W-06	1998	SA	✓	✓	Perched Groundwater System
TA1-W-07	1998			✓	Perched Groundwater System
TA1-W-08	2001	A	✓	✓	Perched Groundwater System
TA2-NW1-325	1993			✓	Perched Groundwater System
TA2-NW1-595	1993	A	✓	✓	Regional Aquifer
TA2-W-01	1994	SA	✓	✓	Perched Groundwater System
TA2-W-19	1995	Q	✓	✓	Perched Groundwater System
TA2-W-24	1998	spec.	✓	✓	Regional Aquifer
TA2-W-25	1997	spec.	✓	✓	Regional Aquifer
TA2-W-26	1998	Q	✓	✓	Perched Groundwater System
TA2-W-27	1998	SA	✓	✓	Perched Groundwater System
TA2-W-28	2014	Q	✓	✓	Perched Groundwater System, replaced TA2-SW1-320
TJA-2	1994	Q	✓	✓	Perched Groundwater System
TJA-3	1998	Q	✓	✓	Regional Aquifer
TJA-4	1998	Q	✓	✓	Regional Aquifer – merging (intermediate) zone
TJA-5	1998	spec.	✓	✓	Perched Groundwater System
TJA-6	2001	SA	✓	✓	Regional Aquifer
TJA-7	2001	Q	✓	✓	Perched Groundwater System
WYO-3	2001	A	✓	✓	Regional Aquifer, replaced WYO-1
WYO-4	2001	Q	n.s.	✓	Perched Groundwater System, replaced WYO-2
Total	----	21	21	30	Both water-bearing units

NOTES:
(1) Check mark indicates WQ sample or WL measurement was obtained.
(2) The special (spec.) wells were sampled voluntarily.
(3) Sampling frequency used by SNL/NM: Q = Quarterly, SA = Semiannual, A = annual.
(4) Green shading indicates the well is completed in the PGWS.

COA = City of Albuquerque ownership.
ID = Identifier.
n.s. = Not sampled (variance from a work plan).
PGS = Parade Ground South.
PGWS = Perched Groundwater System.
SNL/NM = Sandia National Laboratories, New Mexico.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-SW = Technical Area-II (Southwest).
TA2-W = Technical Area-II (Well).
TJA = Tijeras Arroyo.
WL = Water level.
WQ = Water quality.
WYO = Wyoming.

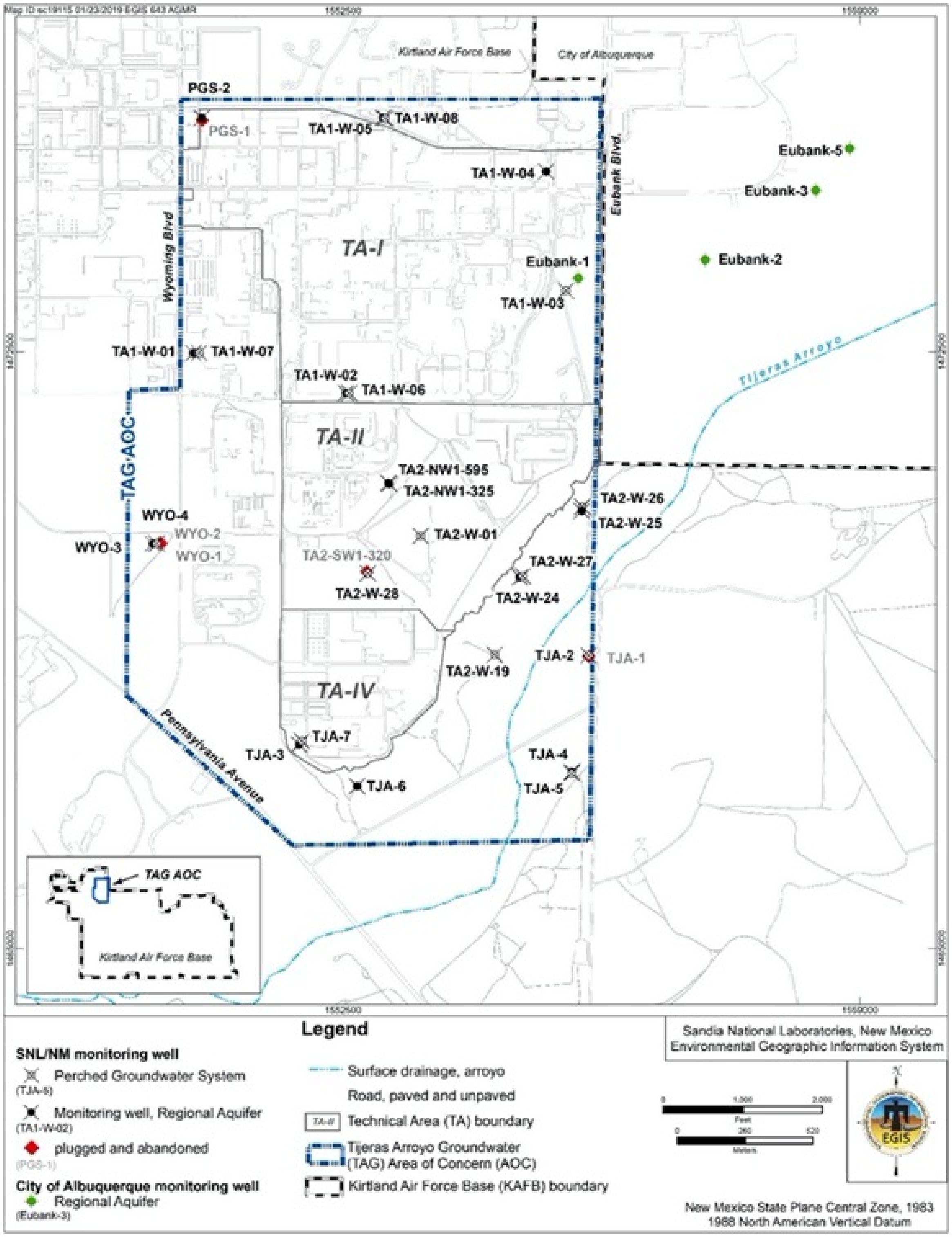


Figure 6-2. Groundwater Monitoring Wells Maintained by Sandia National Laboratories, New Mexico near the Tijeras Arroyo Groundwater Area of Concern.

6.1.5 Summary of Calendar Year 2020 Activities

The following activities were conducted for the TAG AOC during CY 2020:

- Quarterly water level measurements were obtained from the TAG monitoring wells. Hydrographs are presented in Attachment 6B.
- Quarterly groundwater samples were collected at seven wells (TA2-W-19, TA2-W-26, TA2-W-28, TJA-2, TJA-3, TJA-4, and TJA-7) in February/March 2020, June 2020, August/September 2020, and December 2020. Water sample collection at well WYO-4 was not conducted because responsibility for the well was transferred to the KAFB Environmental Restoration Program (ERP) in 2018 (Section 6.2).
- Semiannual groundwater samples were collected at four wells (TA1-W-06, TA2-W-01, TA2-W-27, and TJA-6) in February/March 2020 and August/September 2020.
- Annual groundwater samples were collected at seven wells (TA1-W-01, TA1-W-02, TA1-W-04, TA1-W-05, TA1-W-08, TA2-NW1-595, and WYO-3) in August/September 2020. The collection of groundwater samples at wells TA1-W-03 (dry) and PGS-2 (grout intrusion) was not attempted (Section 6.8).
- Analytical results for groundwater samples were validated and summarized (Attachment 6C).
- Concentration trend plots for groundwater samples were prepared (Attachment 6D).
- In anticipation of NMED HWB reviewing the sampling protocol in the Revised TAG CCM/CME Report (SNL February 2018), groundwater samples were collected at three monitoring wells that had been infrequently sampled. This voluntary sampling was conducted at wells TA2-W-24, TA2-W-25, and TJA-5 in August/September 2020.
- Updating began for the Technical Memorandum (SNL December 2019) concerning the occurrence and sources of nitrate in the north-central portion of KAFB including the TAG AOC. Section 6.1.7.5 discusses the study.
- In response to recent exceedances of the TCE MCL at well TA2-W-26, several tasks were conducted. These tasks are discussed in Section 6.6.

6.1.6 Summary of Future Activities

The following activities are anticipated for the TAG AOC during the next reporting period (CY 2021) unless the NMED HWB requests otherwise after reviewing the Revised TAG CCM/CME Report that was submitted in February 2018:

- Measurement of water levels on a quarterly schedule at 30 wells in and near the TAG AOC.
- Collection of groundwater samples using the frequency listed in Table 6-1.
- In response to recent exceedances of the TCE MCL at well TA2-W-26, additional tasks will be undertaken. These additional tasks are discussed in Section 6.9.

6.1.7 Conceptual Site Model

The Revised TAG CCM/CME Report (SNL February 2018) presented a CSM for the vicinity of the TAG AOC that describes the contaminant release sites, the geological and hydrogeological setting, and the distribution and migration of contaminants in the subsurface. The CSM incorporated previous studies conducted by Van Hart (June 2001 and June 2003). Revisions to the CCM/CME focused on the inclusion of stratigraphic cross-sections, geophysical logs, and lithologic descriptions for cores and cuttings obtained from boreholes associated with well installations. The TAG AOC is underlain by two primary water-bearing units of interest: (1) a PGWS, and (2) the underlying Regional Aquifer. Figure 6-3 presents an updated CSM that depicts several lenses of residual saturation present above and below the PGWS that are evident in several KAFB-owned monitoring wells. Table 6-2 summarizes the hydrogeologic characteristics of the two water-bearing units. A merging zone that partially extends under the southeast corner of the TAG AOC appears to connect these two units.

The PGWS has a limited lateral extent that encompasses approximately 4.43 sq mi across the TAG AOC and adjacent north-central KAFB. Across the TAG AOC, the saturated thickness of the PGWS ranges from approximately 7 to 20 ft across the northern and central portions on the TAG AOC. In the far southeast corner, the saturated thickness reaches approximately 40 ft. The thickness values are based upon October 2015 water levels and the interpretation of downhole geophysical logs.

Across the TAG AOC, the estimated thickness of the Perching Horizon ranges from 4 to 11 ft based upon correlation of downhole geophysical logs and lithologic descriptions (SNL February 2018). The average thickness is approximately 7 ft. The Perching Horizon is composed of a layer of low permeability sediments (mostly clay) that dips to the southeast at approximately one degree.

Balleau Groundwater Inc. (BGW September 2002) used a 3-dimensional, numerical, variably saturated flow model (FEMWATER) of the PGWS to study recharge in the TAG AOC vicinity. Various simulations were applied to determine the rate and volumes for several potential sources of recharge to the PGWS over the 12.5-sq mi modeling grid. The most significant recharge sources were the former KAFB Sewage Lagoons, leaking water lines, ancestral arroyos, and the Tijeras Arroyo Golf Course. The modeling also demonstrated that the PGWS has a net discharge (drains and merges) to the Regional Aquifer. The lateral extent of the PGWS is shrinking due to the former KAFB Sewage Lagoons and other water sources being taken out of service.

A useful analogy for determining recharge rates through the vadose zone was studied for the COA (DBS & Associates, Inc. April 2010). At the Bear Canyon Arroyo recharge project located 5 miles north of the KAFB Wyoming Gate, surface water reached the Regional Aquifer (at approximately 500 ft bgs) in approximately 50 days (Ewing November 2019).

Considering that the sediments beneath both arroyos are typically near saturation, it can be inferred that a portion of significant surface-water flows in Tijeras Arroyo could migrate downward and impact the PGWS in about 30 days. In stretches of Tijeras Arroyo where the PGWS is not present, surface water could possibly reach the Regional Aquifer in about 40 to 50 days. Principal hydrogeologic controls on the direction of groundwater flow in the PGWS consist of: (1) the stratigraphic dip of the Perching Horizon to the southeast, (2) lesser effect of the complex depositional fabric with braided paleochannels trending westward from the mountain flank, and (3) former multiple recharge locations in the northwestern and central parts of the TAG AOC.

The PGWS is not used for any type of water production in the TAG AOC. The PGWS is a thin, dissipating water-bearing unit that mostly formed as a result of historical anthropogenic discharges of wastewater and septic water. Groundwater in the PGWS migrates toward the southeast and merges with the underlying

Regional Aquifer southeast of Tijeras Arroyo near Powerline Road. Based upon MODFLOW mass-balance modeling, approximately 25 percent of the total groundwater loss from the PGWS is estimated to result from lateral flow toward the southeast where it merges with the underlying Regional Aquifer (SNL February 2018). The remaining 75 percent likely flows vertically downward through the Perching Horizon and dissipates in the upper portion of over 200 ft of unsaturated sediments present between the PGWS and the Regional Aquifer. There is no geochemical indication that groundwater flowing downward through the Perching Horizon has reached the Regional Aquifer, except in the merging zone southeast of the TAG AOC. Declining water level trends indicate that nearly the entire extent of the PGWS will naturally dewater in the TAG AOC by the year 2059. Some portions of the PGWS in the TAG AOC have already dewatered. Nitrate concentrations in the PGWS are expected to decrease to background concentrations and below regulatory standards due to natural groundwater transport mechanisms such as advection, dispersion, and diffusion.

The original sources of nitrate from historical SNL/NM operations (wastewater outfall ditches and sanitary waste leach fields/seepage pits) are no longer in operation (the greatest discharge ceased in 1974 and all discharges ceased as of 1992). Artificial driving forces for downward migration of nitrate through the vadose zone to groundwater no longer exist. There is no current or anticipated use of groundwater from the PGWS near the TAG AOC.

Figure 6-4 shows the variety of recharge sources (active and inactive) that are located near the TAG AOC. These recharge sources likely impacted the PGWS:

- Landscape watering of grassy areas such as the Parade Ground north of TA-I (active),
- Ongoing surface water and base flow along Tijeras Arroyo (active),
- Possible leaking water lines and sewer lines (active),
- Wastewater outfalls (inactive),
- Buried septic systems (active and inactive),
- The former KAFB Sewage Lagoons (inactive), and
- The Tijeras Arroyo Golf Course operated by KAFB (active).

The Regional Aquifer is more laterally extensive than the PGWS, underlying the entire TAG AOC as well as the Albuquerque Basin. The Regional Aquifer is composed of both the Ancestral Rio Grande (ARG) fluvial lithofacies and the alluvial fan lithofacies. Locally, groundwater in the Regional Aquifer flows to the northwest, in a nearly opposite direction to that of the PGWS. The gradient in the Regional Aquifer averages approximately 0.018 ft per ft (ft/ft) across the TAG AOC but is steeper near production wells operated by KAFB, the ABCWUA, and the Veterans Affairs (VA). The Regional Aquifer is recharged on the eastern side of the study area by natural sources including mountain front recharge, Tijeras Arroyo, and the PGWS. The principal hydrogeologic control upon groundwater flow direction in the Regional Aquifer is the combined drawdown effect of the KAFB, ABCWUA, and VA production wells.

The geochemical signatures of the PGWS and the Regional Aquifer are distinctive. Figure 6-5 presents two Piper diagrams depicting the most comprehensive set of geochemical data for the PGWS and the Regional Aquifer. The geochemical signature of the PGWS exhibits a wide range of geochemistry that as a group does not correspond to a dominant type. This variability appears to indicate several sources of recharge.

The PGWS exhibits relatively higher concentrations of chloride and sulfate than the Regional Aquifer. Groundwater samples from the Regional Aquifer exhibit a more consistent chemistry that is classified as a calcium bicarbonate type. The Regional Aquifer also exhibits higher bicarbonate concentrations. The tight group of the Regional Aquifer data points indicates that the wells are screened in the same hydrostratigraphic interval (groundwater from all wells is chemically similar; therefore, in direct hydraulic communication). This water appears to have a single source such as mountain front recharge.

6.1.7.1 Regional Hydrogeologic Conditions

Tijeras Arroyo is the most significant surface water drainage feature on KAFB and trends westward across the northern portion of KAFB and eventually drains into the Rio Grande, approximately 5.6 miles west of KAFB. Water flows in the arroyo several times per year as a result of significant thunderstorms. The average annual precipitation for the area, as measured at Albuquerque International Sunport, is 9.48 inches (Chapter 2.6.2.1). During most rainfall events, rainfall quickly infiltrates into the soil. However, virtually all of the moisture subsequently undergoes evapotranspiration. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

The TAG AOC overlies the eastern margin of the Albuquerque Basin where the basin-bounding faults mostly trend parallel to the Sandia-Manzanita-Manzano mountain front. The stratigraphic unit of greatest interest is the Upper Santa Fe Group, which is primarily composed of two interfingering lithofacies: alluvial fan lithofacies and the ARG fluvial lithofacies. Both lithofacies are less than 5 Mega Annum (millions of years) and are composed of unconsolidated to poorly cemented gravel, sand, silt, and clay (Stone et al. February 2000). The alluvial fan lithofacies consist of poorly sorted piedmont-slope deposits derived from the Sandia, Manzanita, and Manzano Mountains east of the study area. Fine-grained units within the alluvial fan lithofacies produce low-permeability zones that are capable of perching groundwater. The ARG fluvial lithofacies are derived from northern sources and are typically composed of well sorted, medium- to coarse-grained sands with higher hydraulic conductivities.

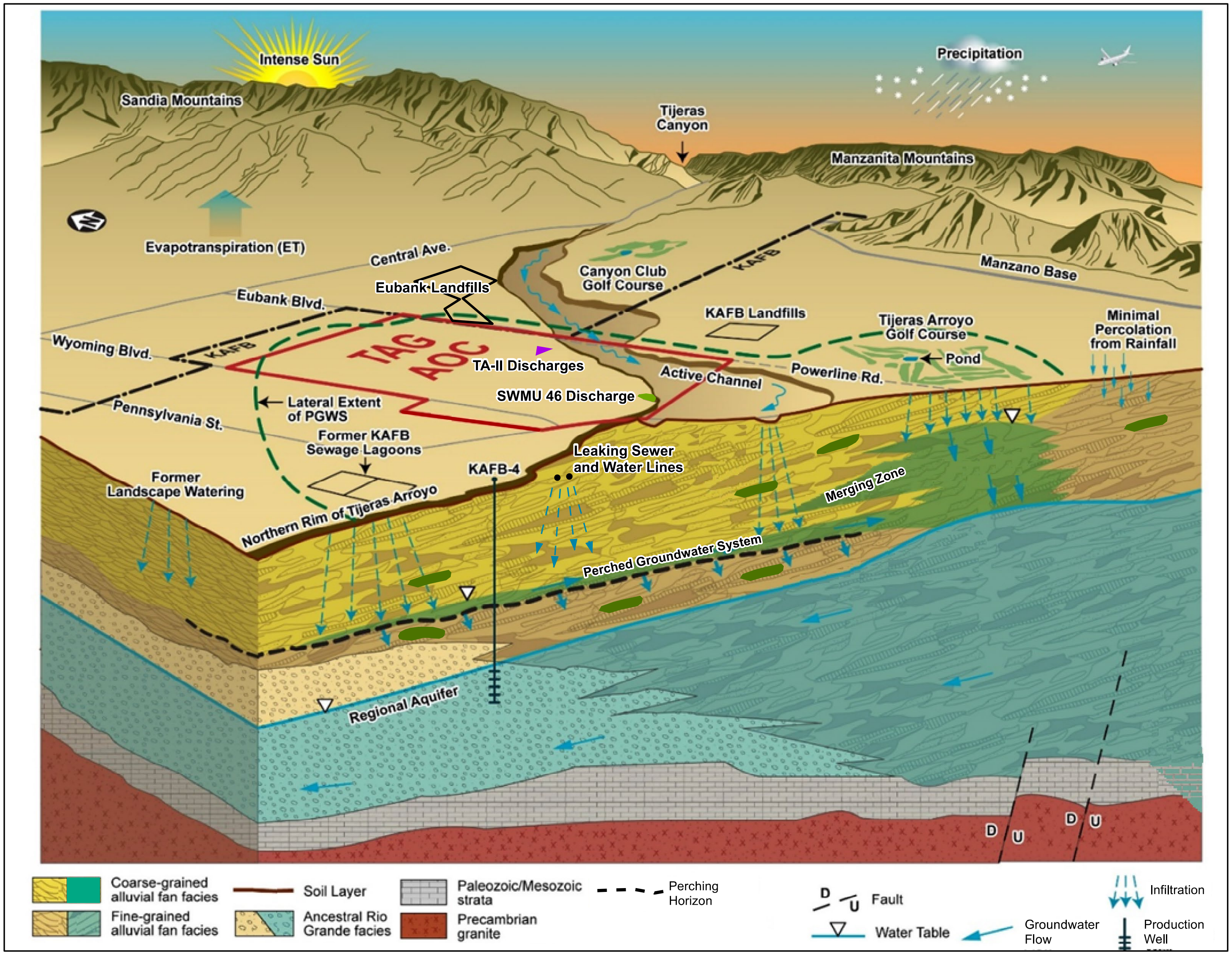


Figure 6-3. Tijeras Arroyo Groundwater Conceptual Site Model

Table 6-2. Comparison of Hydrogeologic Characteristics for the Perched Groundwater System and the Regional Aquifer in the Tijeras Arroyo Groundwater Area of Concern

Characteristic	Perched Groundwater System	Regional Aquifer
Potentiometric Surface	Surface is inferred to slope primarily to the southeast.	Surface is inferred to slope primarily to the west and northwest.
Pressure Head	Unconfined (water table) conditions.	Unconfined to semi-confined conditions.
Lithofacies Distribution	Restricted to the alluvial fan lithofacies.	Contained within both the alluvial fan lithofacies and the ARG fluvial lithofacies.
Flow Direction	Primarily to the east and southeast.	Primarily to the west and northwest.
Horizontal Gradient	Varies from approximately 0.004 to 0.0125 ft/ft across the TAG AOC with an average of 0.01 ft/ft.	Varies from approximately 0.006 to 0.0125 ft/ft across the TAG AOC with an average of 0.018 ft/ft. Much steeper east of Powerline Road at 0.03 to 0.045 ft/ft. Nearly flat to the west of Wyoming Boulevard.
Horizontal Hydraulic Conductivity (Kh)	A wide range from 0.0532 ft/day to 3.06 ft/day, with an average of 1.63 ft/day.	A narrow range of 1.66 to 7.75 ft/day, with an average of 3.77 ft/day.
Vertical Hydraulic Conductivity (Kv)	0.0163 ft/day.	0.0377 ft/day.
Effective Porosity	0.25 (25 percent), based upon studies at TA-V (SNL September 2015)	0.25 (25 percent), based upon studies at TA-V (SNL September 2015)
Groundwater Velocity, Horizontal	0.002 to 0.122 ft/day. Equivalent to 0.778 to 44.68 ft/yr.	0.066 to 0.310 ft/day. Equivalent to 24.24 to 113.15 ft/yr.
Groundwater Velocity, Horizontal Average	Approximately 24 ft/yr, based on five monitoring wells screened in the Perched Groundwater System.	Approximately 55 ft/yr, based on five monitoring wells screened in the Regional Aquifer.
Usage	Not used for water production purposes.	Utilized for water production by KAFB, ABCWUA, and VA.
Lateral extent	Approximately 4.43 sq mi across north-central KAFB.	Laterally extensive across the Albuquerque Basin.
Saturated Thickness	Estimated from geophysical logs to range from approximately 7 to 20 ft across the northern and central portions of the TAG AOC. In the far southeast corner, the saturated thickness reaches approximately 40 ft.	In excess of 1,000 ft in thickness across much of the TAG AOC vicinity.
Geochemical Variability	Geochemical signatures variable between monitoring wells.	Geochemical signatures consistent between monitoring wells.
Geochemical Uniqueness	High chloride, nitrate, and sulfate concentrations.	Low calcium concentrations, but high bicarbonate/alkalinity concentrations.

Refer to footnotes on page 6-13.

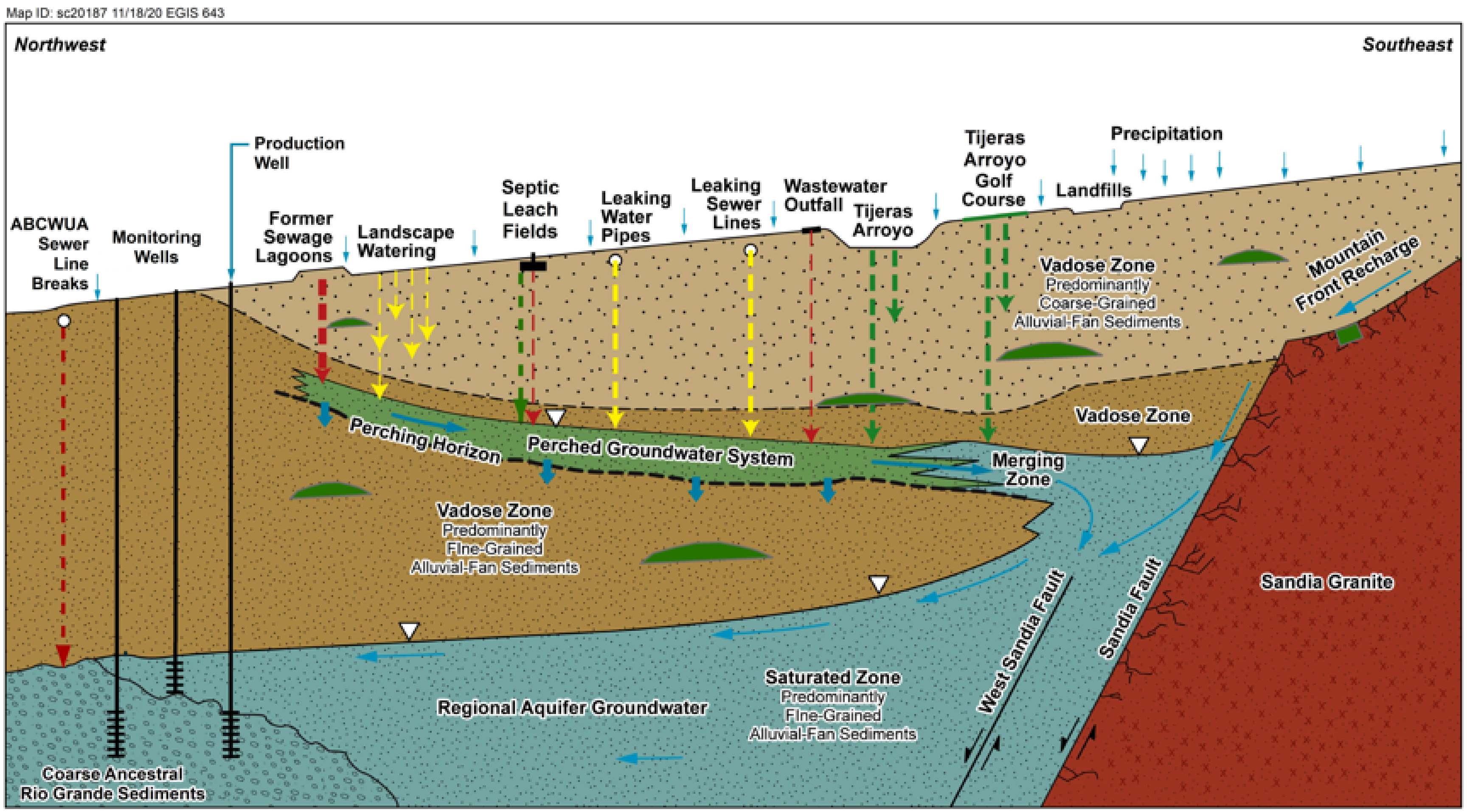
Table 6-2. Comparison of Hydrogeologic Characteristics for the Perched Groundwater System and the Regional Aquifer in the Tijeras Arroyo Groundwater Area of Concern *(Concluded)*

Characteristic	Perched Groundwater System	Regional Aquifer
Water Levels	Steadily declining groundwater elevations across the entire TAG AOC ranging from 0.06 to 1.17 ft/yr, except in southeast corner at well TJA-5.	Increasing groundwater elevations across the entire TAG AOC, except at the southwest corner. Variable rate ranges from a declining 0.07 to an increasing 2.65 ft/yr.
Recharge Sources	Historically recharged by anthropogenic sources (leaking water supply/sewer lines, landscape watering, the Tijeras Arroyo Golf Course, former outfalls, the former KAFB Sewage Lagoons), and ongoing natural sources such as Tijeras Arroyo.	Historically recharged by anthropogenic sources (leaking water supply/sewer lines, irrigated lawns, the Tijeras Arroyo Golf Course, the former KAFB Sewage Lagoons), and natural sources such as Tijeras Arroyo.
Principal Hydrologic Controls	Stratigraphic dip of Perching Horizon to the southeast coupled with lesser effect of the depositional fabric trending westward from mountain front.	Combined drawdown of KAFB, ABCWUA, and VA production wells. North to south trending paleochannels with high conductivities to the west of Wyoming Boulevard. Low conductivity east to west trending alluvial fan deposits east of Wyoming Boulevard.

NOTES:

Table was updated using the Revised TAG CCM/CME Report (SNL February 2018). All characteristics, except for effective porosity, were derirved from studies conducted in the TAG AOC.

ABCWUA = Albuquerque Bernalillo County Water Utility Authority.
AOC = Area of Concern.
ARG = Ancestral Rio Grande (lithofacies).
CCM = Current Conceptual Model.
CME = Corrective Measures Evaluation.
ft = Foot (feet).
ft/day = Feet per day.
ft/ft = Feet per foot.
ft/yr = Feet per year.
KAFB = Kirtland Air Force Base.
SNL = Sandia National Laboratories.
sq mi = Square mile(s).
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.
TJA = Tijeras Arroyo.
VA = Veterans Administration (Veterans Affairs).



Recharge Schematic for TAG Area Showing Principal Recharge and Discharge Features, View to Northeast, Not to Scale. Width of recharge arrow signifies relative volume. Color signifies the duration: green arrow denotes ongoing recharge, yellow arrow denotes a reduced rate of discharge, red arrow signifies that recharge was eliminated. (Precipitation and groundwater arrows are not scaled.)

Figure 6-4. Recharge Features near the Tijeras Arroyo Groundwater Area of Concern

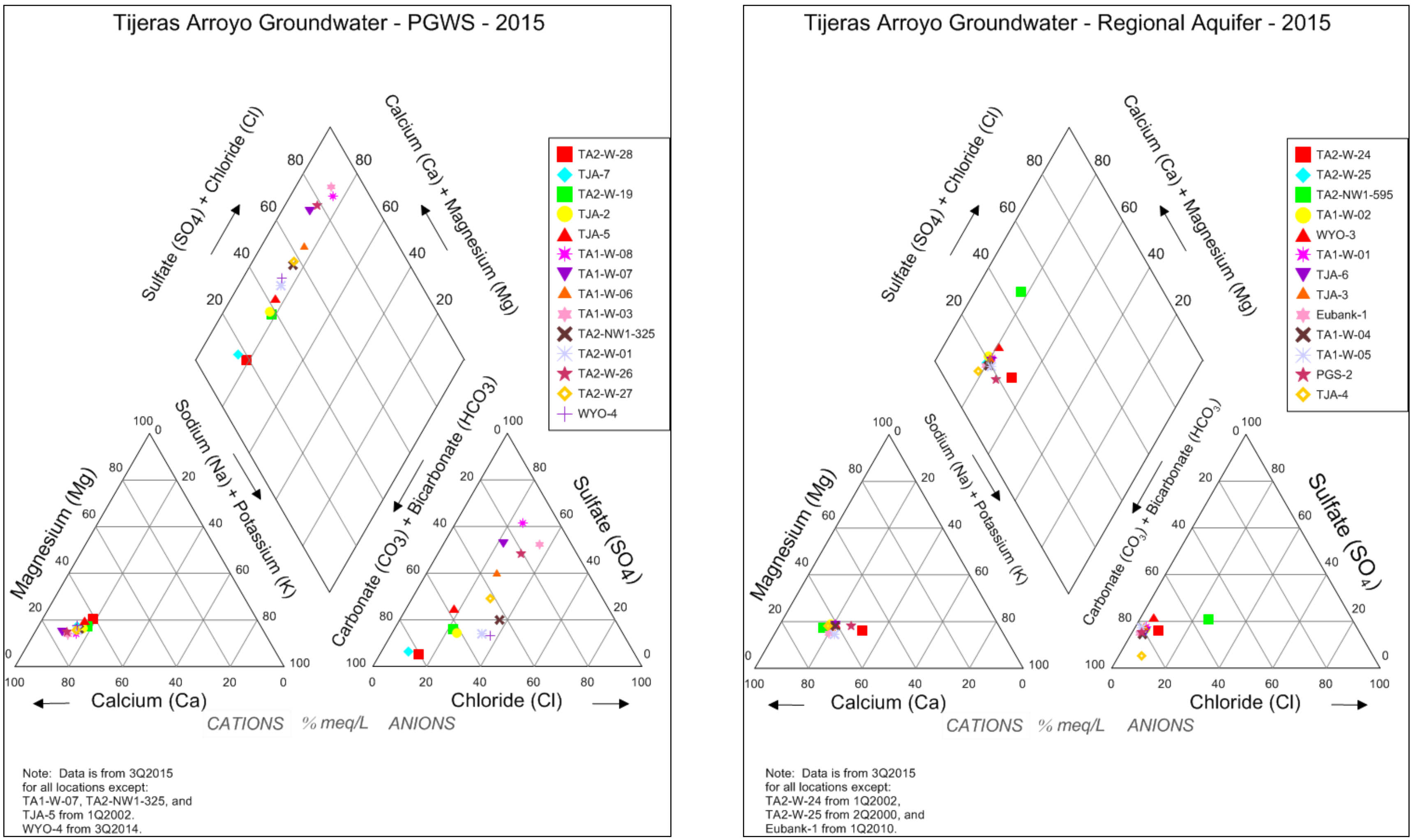


Figure 6-5. Piper Diagrams for Groundwater Samples Collected from Monitoring Wells Screened in the Perched Groundwater System and the Regional Aquifer

6.1.7.2 Hydrogeologic Conditions at the TAG AOC

Across the TAG AOC, the PGWS is encountered at approximately 270 to 340 ft bgs, and the Regional Aquifer system is encountered at approximately 440 to 570 ft bgs. A review of lithologic borehole descriptions and geophysical logs indicates that the sediments sandwiched between the base of the Perching Horizon and the Regional Aquifer are mostly composed of moist sediments that will not yield groundwater to a well. Based on data collected in October 2015, this unsaturated thickness of sediments below the Perching Horizon averaged approximately 202 ft thick, decreasing from approximately 258 ft in the northwest corner of the TAG AOC to 177 ft in the southeast corner near the merging zone. Groundwater in the PGWS mixes with the Regional Aquifer southeast of Tijeras Arroyo in a merging zone where the anastomosing set of alluvial fan sediments are slightly more permeable, and/or a fault is present. As noted earlier, Table 6-2 presents a comparison of the hydrogeologic characteristics for the two water-bearing units.

6.1.7.3 Local Direction of Groundwater Flow

Figure 6-6 presents the October/November 2020 potentiometric surface for the PGWS, which has an estimated lateral extent of approximately 4.43 sq mi (SNL February 2018). Table 6-3 lists the October/November 2020 groundwater elevations. The direction of groundwater flow in the PGWS is inferred from the potentiometric surface to be principally to the east and southeast, with an average horizontal gradient of approximately 0.01 ft/ft. The horizontal gradient of the PGWS is variable across the TAG AOC. Beneath TA-I, TA-II, and TA-IV, the horizontal gradient varies from 0.004 to 0.0125 ft/ft, with an average of approximately 0.01 ft/ft. The vertical gradient is downward as indicated by the merging of the two water-bearing units near the southeast corner of the TAG AOC.

Figure 6-7 presents the October/November 2020 potentiometric surface for the Regional Aquifer. The direction of groundwater flow in the Regional Aquifer is inferred from the potentiometric surface to be principally to the west and northwest toward the KAFB, ABCWUA, and VA production wells. The horizontal gradient of the Regional Aquifer beneath the TAG AOC varies from approximately 0.006 to 0.0125 ft/ft, with an average of approximately 0.018 ft/ft. The horizontal gradient is steeper to the east of the TAG AOC at 0.03 to 0.045 ft/ft. Vertical flow gradients in the Regional Aquifer are inferred to be mostly downward in response to pumping of the production wells.

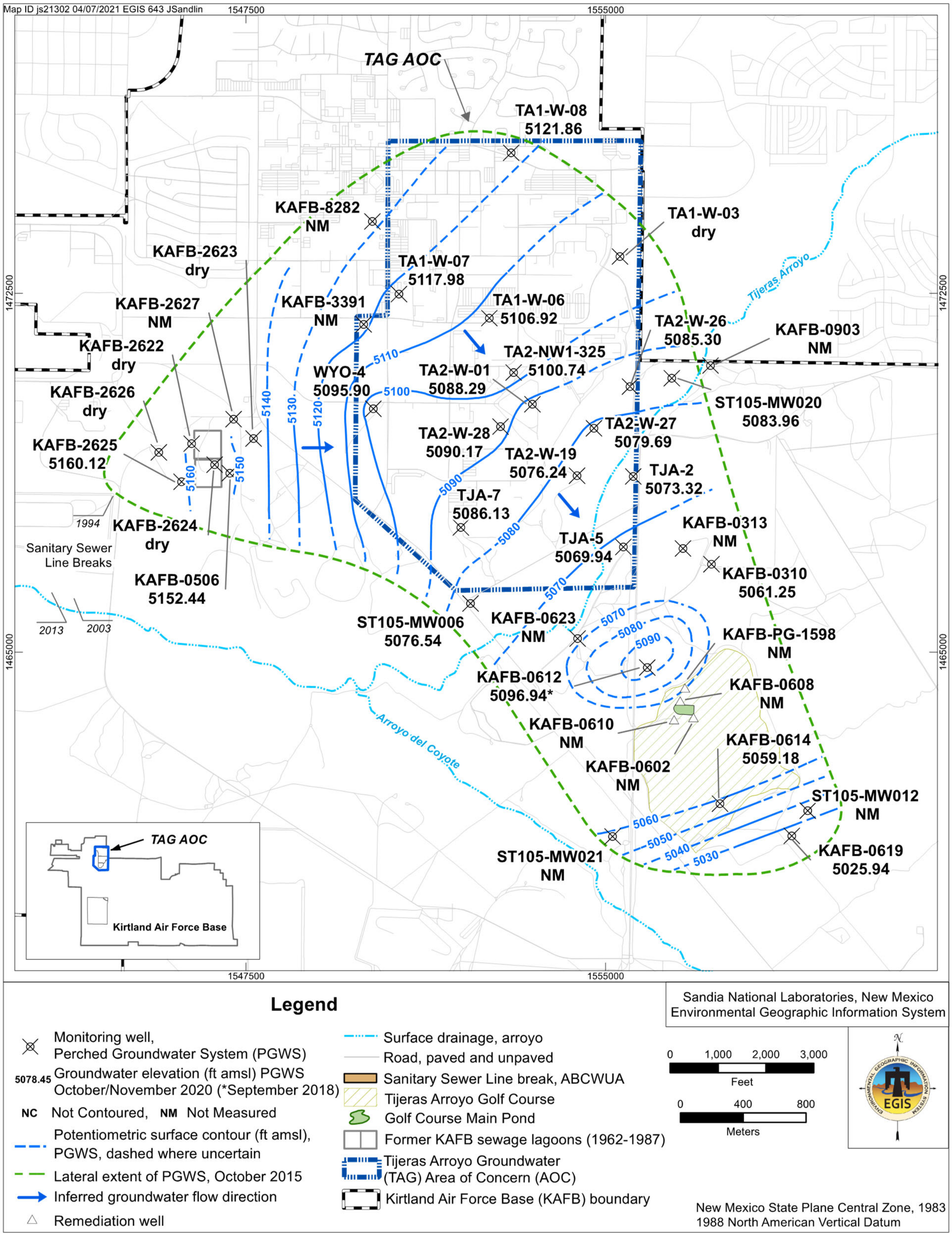


Figure 6-6. Potentiometric Surface Map for the Perched Groundwater System at the Tijeras Arroyo Groundwater Area of Concern (October/November 2020)

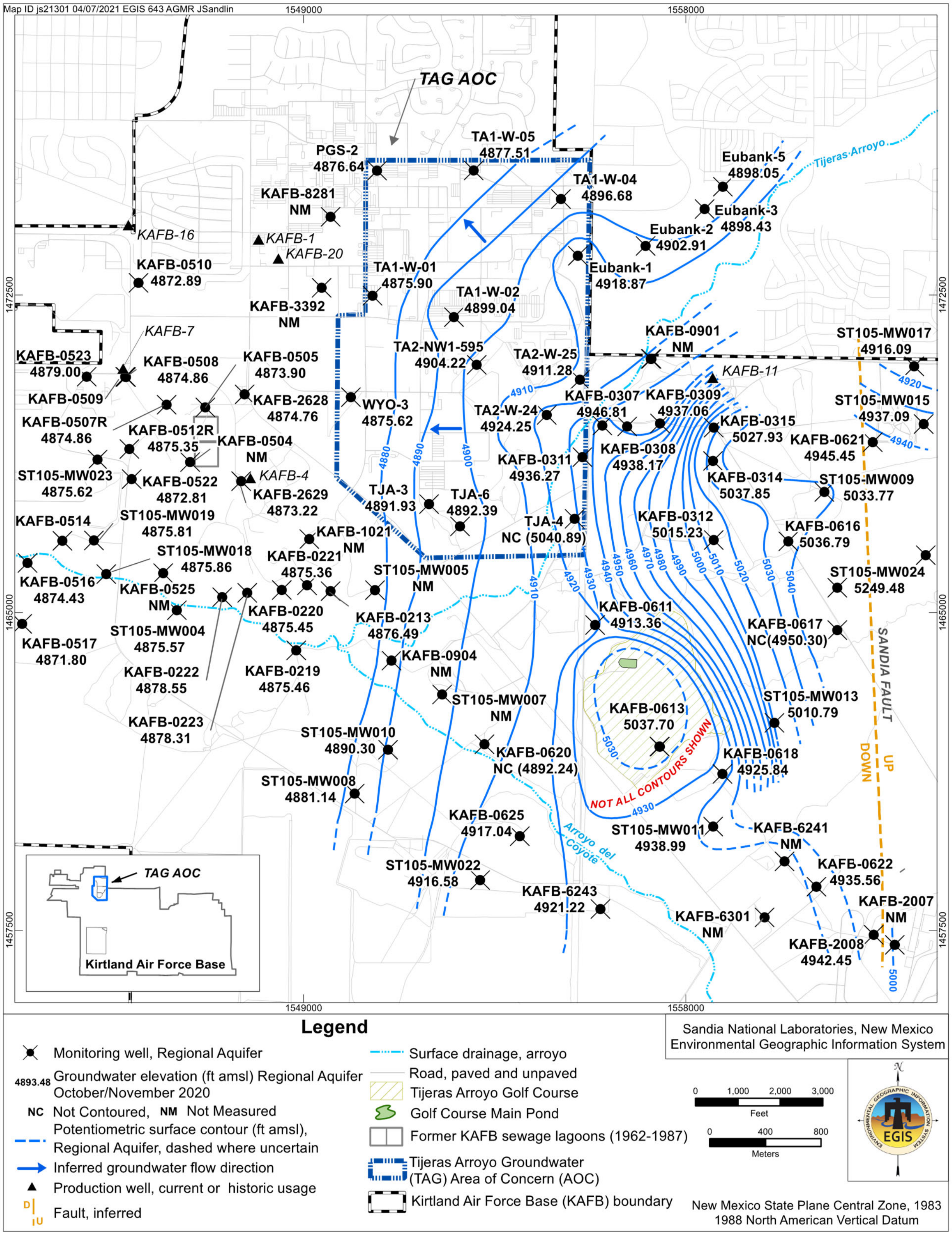


Figure 6-7. Potentiometric Surface Map of the Regional Aquifer at the Tijeras Arroyo Groundwater Area of Concern (October/November 2020)

Table 6-3. Groundwater Elevations Measured in Calendar Year 2020 at Monitoring and Remediation Wells near the Tijeras Arroyo Groundwater Area of Concern

Well ID	Measuring Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)	Screened Unit in SFG sediments
Eubank-1	5460.02	19-Oct-20	541.15	4918.87	Regional Aquifer
Eubank-2	5474.39	3-Sep-20	571.48	4902.91	Regional Aquifer
Eubank-3	5498.73	3-Sep-20	600.30	4898.43	Regional Aquifer
Eubank-5	5507.40	3-Sep-20	609.35	4898.05	Regional Aquifer
PGS-2	5408.29	3-Nov-20	531.65	4876.64	Regional Aquifer
TA1-W-01	5403.82	3-Nov-20	527.92	4875.90	Regional Aquifer
TA1-W-02	5416.62	3-Nov-20	517.58	4899.04	Regional Aquifer
TA1-W-03	5457.03	4-Nov-20	dry	dry	PGWS
TA1-W-04	5460.98	4-Nov-20	564.30	4896.68	Regional Aquifer
TA1-W-05	5433.84	3-Nov-20	556.33	4877.51	Regional Aquifer
TA1-W-06	5417.10	3-Nov-20	310.18	5106.92	PGWS
TA1-W-07	5404.92	3-Nov-20	286.94	5117.98	PGWS
TA1-W-08	5434.19	3-Nov-20	312.33	5121.86	PGWS
TA2-NW1-325	5421.94	4-Nov-20	321.20	5100.74	PGWS
TA2-NW1-595	5421.26	4-Nov-20	517.04	4904.22	Regional Aquifer
TA2-W-01	5419.99	4-Nov-20	331.70	5088.29	PGWS
TA2-W-19	5351.21	7-Oct-20	274.97	5076.24	PGWS
TA2-W-24	5363.66	7-Oct-20	439.41	4924.25	Regional Aquifer
TA2-W-25	5374.86	7-Oct-20	463.58	4911.28	Regional Aquifer
TA2-W-26	5375.77	7-Oct-20	290.47	5085.30	PGWS
TA2-W-27	5362.85	7-Oct-20	283.16	5079.69	PGWS
TA2-W-28	5412.41	7-Oct-20	322.24	5090.17	PGWS
TJA-2	5353.20	7-Oct-20	279.88	5073.32	PGWS
TJA-3	5390.56	7-Oct-20	498.63	4891.93	Regional Aquifer
TJA-4	5341.16	7-Oct-20	300.27	5040.89	Merging zone
TJA-5	5341.33	7-Oct-20	271.39	5069.94	PGWS
TJA-6	5343.16	7-Oct-20	450.77	4892.39	Regional Aquifer
TJA-7	5391.27	7-Oct-20	305.14	5086.13	PGWS
WYO-3	5392.09	3-Nov-20	516.47	4875.62	Regional Aquifer
WYO-4	5392.57	3-Nov-20	296.67	5095.90	PGWS
KAFB-0213	5283.29	13-Oct-20	406.80	4876.49	Regional Aquifer
KAFB-0219	5263.69	13-Oct-20	388.23	4875.46	Regional Aquifer
KAFB-0220	5265.10	13-Oct-20	389.65	4875.45	Regional Aquifer
KAFB-0221	5274.36	13-Oct-20	399.00	4875.36	Regional Aquifer
KAFB-0222	5247.65	13-Oct-20	369.10	4878.55	Regional Aquifer
KAFB-0223	5254.49	13-Oct-20	376.18	4878.31	Regional Aquifer
KAFB-0307	5364.53	14-Oct-20	417.72	4946.81	Regional Aquifer
KAFB-0308	5381.65	14-Oct-20	443.48	4938.17	Regional Aquifer
KAFB-0309	5411.80	14-Oct-20	474.74	4937.06	Regional Aquifer
KAFB-0310	5416.48	14-Oct-20	355.23	5061.25	PGWS
KAFB-0311	5353.29	14-Oct-20	417.02	4936.27	Regional Aquifer
KAFB-0312	5432.17	14-Oct-20	416.94	5015.23	Regional Aquifer
KAFB-0313	5418.98	n.m.	n.m.	n.m.	PGWS
KAFB-0314	5455.75	14-Oct-20	417.90	5037.85	Regional Aquifer
KAFB-0315	5466.11	14-Oct-20	438.18	5027.93	Regional Aquifer
KAFB-0504	5357.87	n.m.	n.m.	n.m.	Regional Aquifer

Refer to footnotes on page 6-21.

Table 6-3. Groundwater Elevations Measured in Calendar Year 2020 at Monitoring and Remediation Wells near the Tijeras Arroyo Groundwater Area of Concern *(Continued)*

Well ID	Measuring Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)	Screened Unit in SFG sediments
KAFB-0505	5362.81	13-Oct-20	488.91	4873.90	Regional Aquifer
KAFB-0506	5363.47	13-Oct-20	211.03	5152.44	PGWS
KAFB-0507R	5358.21	19-Oct-20	483.35	4874.86	Regional Aquifer
KAFB-0508	5351.88	15-Oct-20	477.02	4874.86	Regional Aquifer
KAFB-0509	5441.56	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-0510	5367.10	15-Oct-20	494.21	4872.89	Regional Aquifer
KAFB-0512R	5302.73	19-Oct-20	427.38	4875.35	Regional Aquifer
KAFB-0514	5206.41	19-Oct-20	331.85	4874.56	Regional Aquifer
KAFB-0516	5205.64	19-Oct-20	331.21	4874.43	Regional Aquifer
KAFB-0517	5197.10	19-Oct-20	325.30	4871.80	Regional Aquifer
KAFB-0522	5267.48	15-Oct-20	394.67	4872.81	Regional Aquifer
KAFB-0523	5352.62	15-Oct-20	473.62	4879.00	Regional Aquifer
KAFB-0525	5229.75	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-0602	5365.47	n.m.	n.m.	n.m.	PGWS
KAFB-0608	5361.17	n.m.	n.m.	n.m.	PGWS
KAFB-0610	5359.47	n.m.	n.m.	n.m.	PGWS
KAFB-0611	5386.09	19-Oct-20	472.73	4913.36	Regional Aquifer
KAFB-0612	5385.45	26-Sep-18	288.51	5096.94	PGWS
KAFB-0613	5390.78	19-Oct-20	353.08	5037.70	Regional Aquifer
KAFB-0614	5390.89	2-Nov-20	331.71	5059.18	PGWS
KAFB-0616	5481.07	19-Oct-20	444.28	5036.79	Regional Aquifer
KAFB-0617	5505.78	19-Oct-20	555.48	4950.30	Regional Aquifer
KAFB-0618	5410.05	19-Oct-20	484.21	4925.84	Regional Aquifer
KAFB-0619	5410.78	19-Oct-20	384.84	5025.94	PGWS
KAFB-0620	5334.64	19-Oct-20	442.40	4892.24	Regional Aquifer
KAFB-0621	5569.89	19-Oct-20	624.44	4945.45	Regional Aquifer
KAFB-0622	5488.64	19-Oct-20	553.08	4935.56	Regional Aquifer
KAFB-0623	5328.94	n.m.	n.m.	n.m.	PGWS
KAFB-0625	5390.23	19-Oct-20	473.19	4917.04	Regional Aquifer
KAFB-0901	5390.07	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-0903	5391.63	n.m.	n.m.	n.m.	Above PGWS
KAFB-0904	5291.75	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-1021	5348.02	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-2007	5564.48	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-2008	5541.74	2-Nov-20	599.29	4942.45	Regional Aquifer
KAFB-2622	5358.14	13-Oct-20	dry	dry	PGWS
KAFB-2623	5367.48	13-Oct-20	dry	dry	PGWS
KAFB-2624	5362.27	13-Oct-20	dry	dry	PGWS
KAFB-2625	5359.26	13-Oct-20	199.14	5160.12	PGWS
KAFB-2626	5357.51	13-Oct-20	dry	dry	PGWS
KAFB-2627	5367.47	n.m.	n.m.	n.m.	PGWS
KAFB-2628	5369.64	19-Oct-20	494.88	4874.76	Regional Aquifer
KAFB-2629	5361.53	19-Oct-20	488.31	4873.22	Regional Aquifer
KAFB-3391	5396.60	n.m.	n.m.	n.m.	PGWS
KAFB-3392	5394.51	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-6241	5466.50	n.m.	n.m.	n.m.	Regional Aquifer

Refer to footnotes on page 6-21.

Table 6-3. Groundwater Elevations Measured in Calendar Year 2020 at Monitoring and Remediation Wells near the Tijeras Arroyo Groundwater Area of Concern *(Concluded)*

Well ID	Measuring Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)	Screened Unit in SFG sediments
KAFB-6243	5423.48	2-Nov-20	502.26	4921.22	Regional Aquifer
KAFB-6301	5459.64	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-8281	5401.03	n.m.	n.m.	n.m.	Regional Aquifer
KAFB-8282	5402.92	n.m.	n.m.	n.m.	PGWS
KAFB-PG-1598	5369.90	n.m.	n.m.	n.m.	PGWS
ST105-MW004	5234.61	19-Oct-20	359.04	4875.57	Regional Aquifer
ST105-MW005	5287.57	n.m.	n.m.	n.m.	Regional Aquifer
ST105-MW006	5313.26	19-Oct-20	236.72	5076.54	PGWS
ST105-MW007	5311.18	n.m.	n.m.	n.m.	Regional Aquifer
ST105-MW008	5358.94	19-Oct-20	477.80	4881.14	Regional Aquifer
ST105-MW009	5519.71	19-Oct-20	485.94	5033.77	Regional Aquifer
ST105-MW010	5334.70	19-Oct-20	444.40	4890.30	Regional Aquifer
ST105-MW011	5422.66	15-Oct-20	483.67	4938.99	Regional Aquifer
ST105-MW012	5419.90	n.m.	n.m.	n.m.	PGWS
ST105-MW013	5447.27	19-Oct-20	436.48	5010.79	Regional Aquifer
ST105-MW015	5623.95	19-Oct-20	686.86	4937.09	Regional Aquifer
ST105-MW017	5621.97	19-Oct-20	705.88	4916.09	Regional Aquifer
ST105-MW018	5221.68	19-Oct-20	345.82	4875.86	Regional Aquifer
ST105-MW019	5217.94	19-Oct-20	342.13	4875.81	Regional Aquifer
ST105-MW020	5383.72	29-Oct-20	299.76	5083.96	PGWS
ST105-MW021	5390.90	n.m.	n.m.	n.m.	PGWS
ST105-MW022	5386.66	19-Oct-20	470.08	4916.58	Regional Aquifer
ST105-MW023	5275.86	19-Oct-20	400.24	4875.62	Regional Aquifer
ST105-MW024	5595.67	19-Oct-20	346.19	5249.48	Regional Aquifer

NOTES:

amsl = Above mean sea level.
btoc = Below top of casing (the measuring point).
ft = Foot (feet).
ID = Identifier.
KAFB = Kirtland Air Force Base.
NAVD 88 = North American Vertical Datum of 1988.
n.m. = Not measured.
PGS = Parade Ground South.
PGWS = Perched Groundwater System.
SFG = Santa Fe Group
ST105-MW = KAFB project ST-105 Monitoring Well.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-W = Technical Area-II (Well).
TJA = Tijeras Arroyo.
WYO = Wyoming.

6.1.7.4 Groundwater Elevations

The series of hydrographs (Attachment 6B, Figures 6B-1 through 6B-10) depict the historical trends of groundwater elevations in the TAG AOC. No seasonality such as a response to the summer monsoon season is apparent for either the PGWS or the Regional Aquifer.

Historically, water levels in the PGWS have fluctuated across the TAG AOC. Near the former KAFB Sewage Lagoons, water levels have been declining since 1987, apparently in response to the lagoons being removed from service. Within the TAG AOC, recharge to the PGWS has been nearly eliminated; SNL/NM wastewater outfall ditches and sanitary waste leach fields/seepage pits are no longer in operation (the greatest discharge ceased in 1974 and all discharges ceased as of 1992). Only minor amounts of landscaping water and precipitation persist. The hydrographs on Figure 6-8 illustrate the consistently declining water levels for eight wells in the central and southeast portion of the TAG AOC. Declining water level trends indicate that nearly the entire extent of the PGWS will naturally dewater in the TAG AOC in approximately 2059 (SNL February 2018). Some areas in the TAG AOC will dewater much sooner. Since 2010, the greatest decline in groundwater elevations occurred in the northern and central parts of the TAG AOC at approximately 0.4 to 1.2 ft per year (ft/yr). Figure 6-9 shows that monitoring wells located near the center of the TAG AOC have the shortest expected remaining lifespans (SNL February 2018).

Some Regional Aquifer monitoring wells such as TA1-W-05 and PGS-2 show a cycle related to the pumping of production wells operated by KAFB and ABCWUA because of increased demand in the summer months. Since late 2008, hydrographs for the Regional Aquifer wells in the TAG AOC show an increasing trend in groundwater elevations (Attachment 6B). Presumably, this is in response to the ABCWUA transitioning to surface water withdrawals for potable water supplies and a decreasing dependence on production wells immediately north of KAFB. Since 2010, the overall trend in groundwater elevations in the northern and central parts of the TAG AOC increased at approximately 0.5 to 2.7 ft/yr. The hydrographs for TA1-W-04 and TA1-W-05 have differing slopes indicating a possible impermeable barrier between the two wells. Water levels at the southwest corner of the TAG AOC at monitoring wells TJA-3 and TJA-6 have been stable since 2000. Increases southeast of Tijeras Arroyo in some Regional Aquifer monitoring wells owned by KAFB may result from golf course watering (BGW February 2001).

6.1.7.5 Contaminant Sources

Environmental investigations for potential release sites were summarized in the TAG Continuing Investigation Report (SNL November 2002). The potential release sites were again evaluated in the Revised TAG CCM/CME Report (SNL February 2018). Historical discharges of wastewater and septic waters from SWMU 46 (Old Acid Waste Line Outfall) and nine SWMUs at TA-II with lesser discharges are the most likely sites to have impacted groundwater in the TAG AOC. As shown in Table 6-4, discharges at SWMU 46 were curtailed in 1974. Discharges at the TA-II SWMUs were curtailed in 1992 (SNL February 2018). The nine SWMUs at TA-II are contained within the purple triangle shown on the CSM (Figure 6-3).

Stable (nonradioactive) isotopes for nitrogen (N) and oxygen (O) were used to evaluate the genesis of nitrate in groundwater for the TAG AOC. In 2004, $\delta^{15}N$ analyses were conducted for five PGWS monitoring wells. The $\delta^{15}N$ values in water ranged from 3.6 to 7.0 (SNL November 2004), which is indicative of natural soil and septic waste. In 2012, groundwater samples for dual isotopes analyses ($\delta^{15}N$ versus $\delta^{18}O$) were collected from five Regional Aquifer monitoring wells. The isotopic results predominantly indicated that the nitrate in the Regional Aquifer was likely derived from natural (unfertilized) soil and/or manure/septic waste; denitrification was not evident (Madrid et al. June 2013).

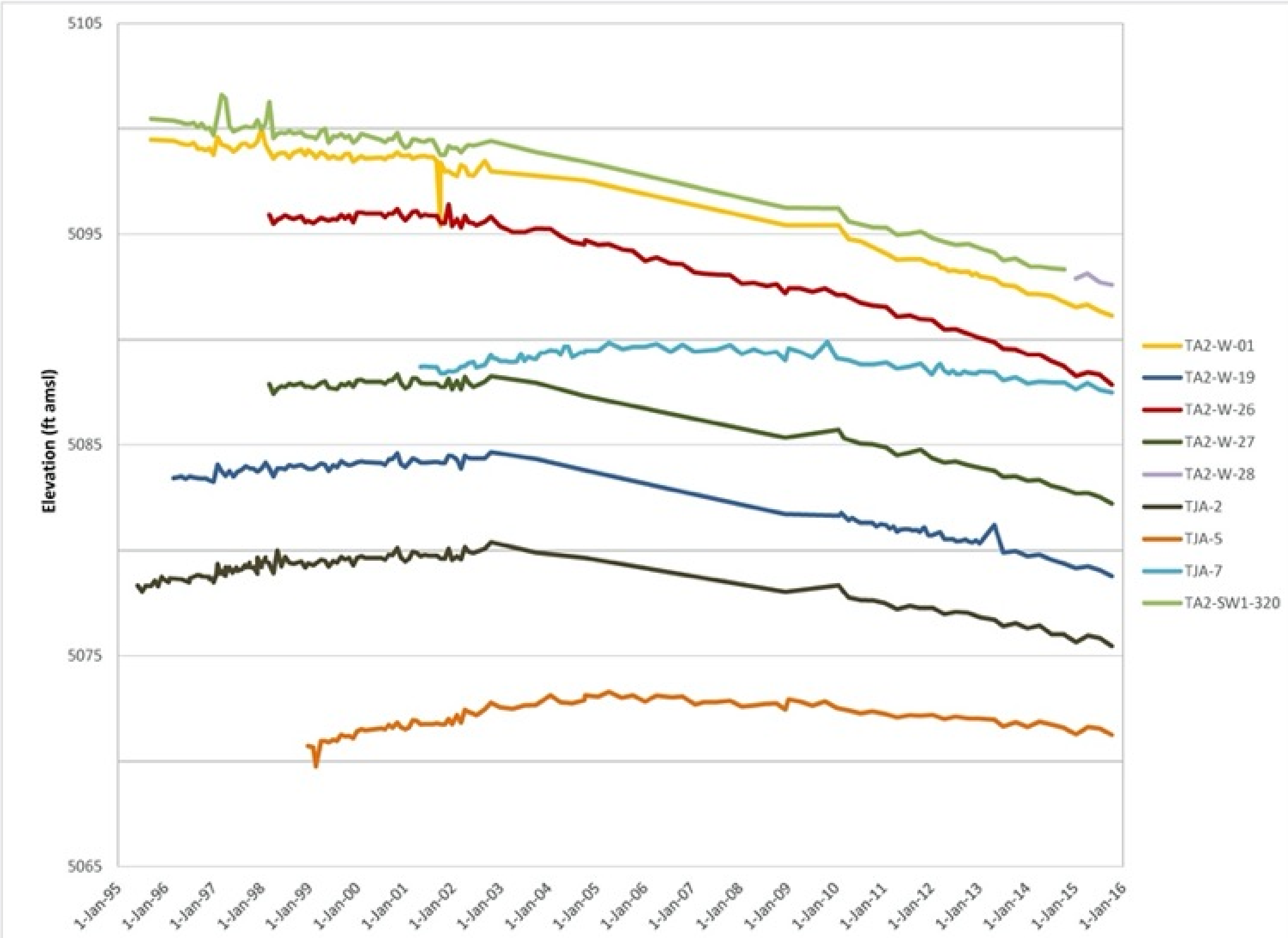


Figure 6-8. Hydrographs for Perched Groundwater System Monitoring Wells Located in the Central and Southern Portion of the Tijeras Arroyo Groundwater Area of Concern through 2015 (SNL February 2018)

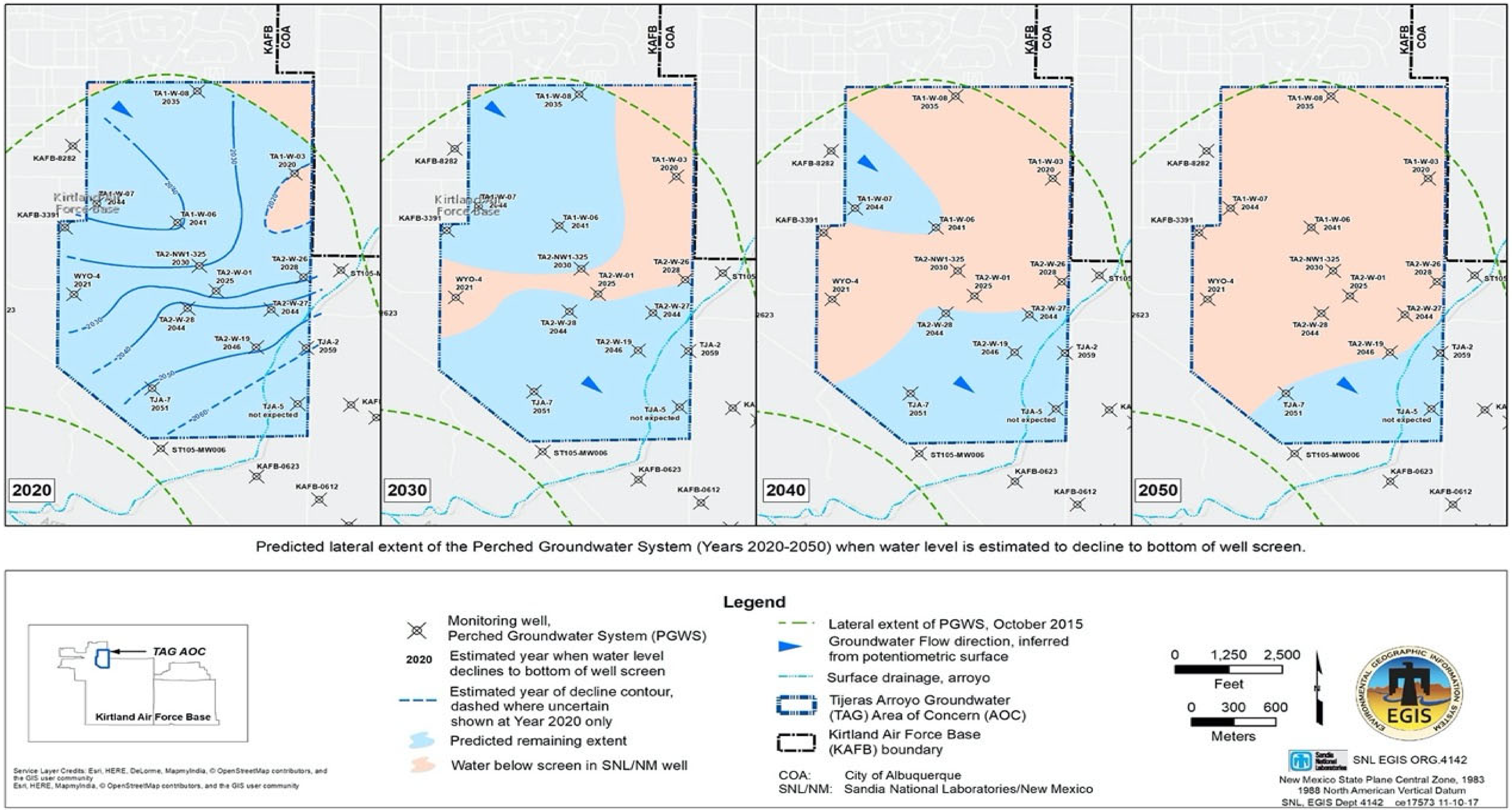


Figure 6-9. Estimated Years When Groundwater Elevations Will Decline to the Lowest Slots at Monitoring Wells Screened in the Perched Groundwater System in the Tijeras Arroyo Groundwater Area of Concern (SNL February 2018).

Table 6-4. Sandia National Laboratories, New Mexico Solid Waste Management Units in the Tijeras Arroyo Groundwater Area of Concern with the Greatest Potential for Having Impacted Groundwater

SWMU	SWMU Name	Years of Discharge	Wastewater Source	Septic Water Source
46	SWMU 46, Old Acid Waste Line Outfall	1948–1974	TA-I	TA-I, possibly
48	SWMU 48, Building 904 Septic System	1947–1992	TA-II	TA-II
135	SWMU 135, Building 906 Septic System	1950–1992	TA-II	TA-II
136	SWMU 136, Building 907 Septic System	1948–1992	TA-II	TA-II
159	SWMU 159, Building 935 Septic System	1963–1991	TA-II	TA-II
165	SWMU 165, Building 901 Septic System	1948–1992	TA-II	TA-II
166	SWMU 166, Building 919 Septic System	1969–1990	TA-II	TA-II
167	SWMU 167, Building 940 Septic System	1965–1990	TA-II	TA-II
227	SWMU 227, Building 904 Outfall	1947–1992	TA-II	None
229	SWMU 229, Storm Drain System Outfall (Building 904)	1947–1992	TA-II	None

NOTES:
SWMU = Solid Waste Management Unit.
TA = Technical Area.

A comprehensive study of potential nitrate release sites was conducted for the north-central portion of KAFB including the TAG AOC (SNL December 2019). The study included the preparation of a detailed large-scale figure (Plate A) with an extent of 23 sq mi. The study summarizes the operational years and types of water associated with natural sources and anthropogenic sites owned by DOE, KAFB, ABCWUA, COA, and private entities. Historical maximum NPN concentrations for 150 wells are shown. Several septic systems located within and outside of DOE property were depicted for the first time on a SNL/NM-produced figure. Also depicted are off-base features near Tijeras Arroyo such as the Canyon Club (formerly Four Hills) Golf Course, the Shaw Mobile Home Park, and a circa 1930s cultivated area.

In 2019, SNL/NM ER Operations personnel continued to participate in a multi-agency study of regional nitrate groundwater contamination with the United States Geological Survey (USGS) Water Science Center and the KAFB ERP. In 2017, the USGS had collected groundwater samples at 33 wells on KAFB including seven wells at the TAG AOC. They also sampled wells, springs, and stock tanks located outside the base boundary. The samples were analyzed for a diverse set of analytes including artificial sweeteners, stable isotopes (^{14}C, ^{15}N, and ^{18}O), tritium, dissolved noble gases, major ions, pharmaceuticals and personal care products, and various wastewater indicators. Interpretation of the results by USGS geoscientists is ongoing.

One preliminary finding of the USGS effort is that the artificial sweetener neotame appears useful as groundwater tracer on KAFB. At wells where neotame was detected, Linhoff (December 2019) argued that neotame and associated nitrate contamination is likely from recent ABCWUA sewer-line releases rather than from the decades-old (1962-1987) discharges from the former KAFB Sewage Lagoons. However, neotame is not consistently detected at all well locations on KAFB where sewage releases are suspected.

Additional USGS interpretations for the KAFB vicinity build on the ground-breaking study by Walvoord et al. (November 2003). In the southwestern U.S., the accumulation of naturally occurring nitrate in desert-soil profiles was identified by Walvoord et al. (November 2003). Based on chloride and nitrate analysis of soil profiles, Walvoord et al. (November 2003) proposed that ‘subsoil nitrate reservoirs’ contain significant concentrations of nitrate that can be readily mobilized to groundwater when desert lands are converted by irrigation, dam construction, or by changes in climatic precipitation patterns. Such accumulations of nitrate are below the biologically active zone (below the maximum depth of most plant roots at approximately 5 meters [16.4 ft]) in desert soils. To test this hypothesis on KAFB, the USGS collected soil cores to a depth of 50 ft at 13 Geoprobe® locations along the Tijeras Arroyo floodplain and the nearby mesa tops (Linhoff July 2019). Interpretation of chloride pulses and age dating in the vadose-zone samples indicate that a large mass of nitrate has accumulated beneath the floodplain over the last several hundred years. The elevated nitrate concentrations in groundwater samples are likely the result of where the Tijeras Arroyo channel starts to meander in response to large precipitation events; this spreads water over relatively undisturbed areas on the floodplain and flushes nitrate downward. The width of the 500-year floodplain varies from approximately 1,400 to 2,200 ft in the TAG AOC (FEMA September 2010). For purposes of discussion, Linhoff (July 2019) refers to these naturally occurring accumulations as “geologic nitrate.” Mechanisms resulting in transport of naturally occurring nitrates from decomposed vegetation along ephemeral streams (arroyos) in arid environments have been described by Walvoord, et al, (November 2003). Periods of increased precipitation result in abundant vegetation along ephemeral streams. The vegetation decays and nitrates are released and subsequently leached downward. The nitrates become concentrated by evapotranspiration during long dry periods. Thus, greater amounts of nitrate accumulate below ephemeral channels. Linhoff (July 2019) noted that the vadose-zone samples collected from the nearby mesa tops did not contain significant nitrate concentrations.

SNL/NM personnel postulate that construction of a large storm-water diversion on the northern rim of Tijeras Arroyo could have similarly flushed geologic nitrate from the vadose zone to groundwater. In 1999, a concrete storm-water channel was constructed at the south end of the Ninth Street Channel storm-water dissipator. The watershed that drains to the Ninth Street Channel covers 475 acres. The new concrete channel has a length of approximately 720 ft. This new discharge point is located near the northwest corner of the Pennsylvania Boulevard bridge and approximately 500 ft west of an earthen channel where the stormwater previously infiltrated. Stormwater discharging at the new discharge point may have flushed previously undisturbed accumulations of nitrate downward.

Elevated NPN concentrations at some KAFB wells along the southern edge of the TAG AOC could be related to geologic nitrate. For example, monitoring well ST105-MW006, which is located approximately 200 ft south of the TAG AOC, has yielded a maximum NPN concentration of 77 mg/L (October 2018). The well is located 500 ft southeast of the new discharge point. Also, the pair of Pennsylvania Boulevard bridge abutment berms (constructed in 2004) have occasionally allowed ponding in relatively new locations that may have driven geologic nitrate through the vadose zone.

6.1.7.6 Contaminant Behavior

Soil and soil-vapor samples collected from the vadose zone (land surface to the PGWS) during drilling operations and from the soil-vapor monitoring network have indicated evidence of vapor-phase volatile organic compounds (VOCs). Fourteen soil-vapor monitoring wells were installed in the TAG AOC. However, no free-phase TCE and no water-saturated core samples were encountered in any of the soil samples collected from the boreholes. The original source of the TCE was from former wastewater outfalls. All anthropogenic sources of SNL/NM recharge (wastewater and septic water) have been removed from service and no longer contribute water to the vadose zone.

Based on soil-vapor data, the residual mass of TCE that may reside in the overlying unsaturated sediments is minimal and is not a continuing source of groundwater contamination. Therefore, the only significant potential mechanism for transporting TCE to groundwater would be through partitioning back into the aqueous phase if additional recharge occurred. Given that both current anthropogenic and natural recharge to the PGWS is minimal, it is unlikely that significant transport of TCE in the vadose zone to groundwater could occur. Therefore, the vapor-phase TCE in the vadose zone is not considered a continuing source of potential contamination to groundwater.

Nitrate was present in septic waters discharged at SNL/NM, KAFB, and ABCWUA septic systems and sanitary sewer lines in the area. The nitrate was transported to the PGWS by the high volumes of septic water and wastewater disposed of at various locations. Nitrate is extremely soluble in water. Absence of water saturation in core samples collected in the vadose zone above the PGWS coupled with cessation of significant recharge activities indicates there are no significant amounts of residual anthropogenic nitrate contamination in the vadose zone.

6.1.7.7 Contaminant Distribution and Transport in Groundwater

The distribution of low nitrate concentrations is discontinuous in the PGWS and does not indicate a single contaminant release site. Based on the historic disposal of septic wastewaters at SNL/NM, the occurrence of nitrate is most likely associated with multiple release sites. The maximum historical concentration of NPN in the PGWS within the TAG AOC is 27.8 (J-qualified) mg/L and corresponds to monitoring well TA2-SW1-320, which is located in the central part of TA-II. Due to declining groundwater levels and a damaged well casing, this well was replaced by well TA2-W-28 in December 2014. The replacement well is screened approximately 10 ft deeper (Table 1) and coincidentally had a maximum NPN concentration of 27.8 mg/L occurring in November 2015.

Historically, only four PGWS monitoring wells (WYO-4, TA2-W-19, TA2-W-26, and TJA-2) have yielded groundwater samples that exceeded the TCE MCL. The maximum TCE concentration at well WYO-4 was 10.5 µg/L, which corresponds to a sample collected in November 2014. However, responsibility for well WYO-4 was transferred to the KAFB ERP in 2018 (Section 6.2).

Monitoring wells TA2-W-19, TA2-W-26, and TJA-2 are located on the Tijeras Arroyo floodplain in the south-central portion of the TAG AOC. The historical maximum TCE concentration for well TA2-W-19 was 6.23 µg/L, occurring in October 2007. This is the last exceedance of the TCE MCL at well TA2-W-19. At well TA2-W-26, the historical maximum TCE concentration prior to CY 2020 was 9.6 µg/L, occurring in March 1998. More details for the CY 2020 exceedances of TCE at well TA2-W-26 are discussed in Section 6.6. In CY 2020, TCE concentrations at well TJA-2 remained below the MCL (Section 6.6).

For the Regional Aquifer in the TAG AOC, the historical maximum NPN concentration of 38.5 mg/L is associated with monitoring well TJA-4. This well is located in the extreme southeast corner of the TAG AOC and is screened in the merging zone. Because groundwater migrates to the northwest in the Regional Aquifer, the occurrence of nitrate at this well is likely associated with geologic nitrate or KAFB operations such as the Tijeras Arroyo Golf Course and landfills.

Potential downgradient receptors in the Regional Aquifer are production wells operated by KAFB, ABCWUA, and the VA. These wells are located to the north and northwest of the TAG AOC. Three numerical modeling efforts have been conducted for the vicinity of the TAG AOC:

- Capture zone analysis for production wells (SNL February 2001),
- Contaminant transport modeling (SNL August 2005), and
- Conceptual groundwater modeling incorporating recharge features and stratigraphic controls (BGW September 2002).

The nearest receptor for the potential contaminants in the Regional Aquifer is the ABCWUA Ridgecrest Well Field. The computer modeling predicts that elevated nitrate in the TAG AOC could potentially reach the well field after a travel time of 130 years and would be attenuated to 0.24 µg/L, which is well below the MCL of 10 mg/L. Thus, there is no foreseeable risk to human health or a threat to beneficial use of groundwater from historic SNL/NM operations.

6.2 Regulatory Criteria

The NMED HWB provides regulatory oversight of SNL/NM ER Operations, as well as implements and enforces regulations mandated by the Resource Conservation and Recovery Act (RCRA). All SWMUs and AOCs are listed in the *RCRA Facility Operating Permit, NM5890110518* (NMED HWB January 2015).

All corrective action requirements pertaining to the TAG AOC are contained in the Consent Order. Groundwater monitoring has been conducted in the TAG AOC since 1992. NMED identified the TAG AOC in the Consent Order because nitrate and TCE concentrations in groundwater had exceeded the respective MCLs. When the Consent Order was issued, nitrate and TCE were specified as COCs because (1) the PGWS contained concentrations of nitrate and TCE that exceeded the corresponding MCLs, and (2) the Regional Aquifer contained nitrate concentrations that exceeded the MCL. TCE did not exceed the MCL in the Regional Aquifer when the Consent Order was issued and has not exceeded the MCL since then.

The groundwater monitoring activities for the TAG AOC are not associated with a single SWMU but have a broader scope. Groundwater characterization activities for TAG were originally conducted voluntarily as proposed in the Groundwater Investigation Plan (SNL March 1996a). During the TAG High Performing Team meetings, participants (staff from SNL/NM, KAFB, COA, the NMED HWB, and the EPA) debated the validity of using groundwater analytical results previously collected using low-flow sampling devices. Based on the perceived inadequacy of the sampling method, TAG quarterly groundwater sampling was temporarily suspended until an alternative sampling method could be implemented. In June 2003, DOE/ NNSA and SNL/NM personnel submitted the TAG Investigation Work Plan (SNL June 2003) to the NMED HWB. The work plan presented a comprehensive scope of work for groundwater investigations that would be jointly conducted by SNL/NM, KAFB, and the COA. Based on the requirements of the work plan, groundwater sampling at SNL/NM resumed in July 2003 using conventional low-flow groundwater purging/sampling techniques.

As mentioned above, the Consent Order became effective in April 2004. The six quarterly sampling events required by the TAG CME Work Plan (SNL August 2005) were completed in Fiscal Year 2005. Since then, groundwater sampling has continued using a variety of frequencies (quarterly, semiannually, and annually) according to the NMED HWB approved work plans. The TAG Investigation Report specified that data would continue to be presented in annual reports, such as this Annual Groundwater Monitoring Report (AGMR). The outline of this chapter for the TAG AOC is based on the required elements of a "Periodic Monitoring Report" as described in Section X.D of the Consent Order.

Prior to 2018, groundwater monitoring at well WYO-4 was conducted by SNL/NM personnel. Monitoring well WYO-4 is located west of Wyoming Boulevard on land managed by the KAFB (not leased or owned by DOE). The well was not installed for investigating any of the SNL/NM SWMUs. Personnel from DOE, SNL/NM, and NMED HWB discussed the status of monitoring well WYO-4 in an August 2017 meeting. NMED HWB verbally stated that the well no longer needs to be considered the responsibility of DOE and SNL/NM personnel for groundwater sampling or remedial purposes. Responsibility for well WYO-4 was transferred to the KAFB ERP in 2018. SNL/NM personnel have not collected groundwater samples at well WYO-4 since then, but water levels are measured. The discontinuance of sampling at the well is tracked as a variance in this report because formal correspondence concerning the transfer of responsibility has not been received from NMED HWB.

As mentioned above in Section 6.1, the Revised TAG CCM/CME Report (SNL February 2018) was submitted in response to a NMED HWB disapproval letter (NMED HWB May 2017). The revised report utilized the understanding reached in an August 2017 meeting with NMED HWB, DOE, and SNL/NM personnel. The revised report contained a series of new attachments for borehole lithologic logs, geophysical logs, well diagrams, and stratigraphic cross-sections. These materials were used for updating the body of the revised report concerning the interpretation and mapping of the structural dip and thickness of the Perching Horizon that underlies the PGWS. Accordingly, the discussion of the hydrogeologic setting and CSM were updated. Also, a more rigorous identification and screening of potential remedial technologies was conducted for addressing the elevated nitrate concentrations in the PGWS. Three remedial alternatives (monitored natural attenuation, in-situ bioremediation, and groundwater extraction and treatment) were evaluated in detail for issues such as modeling optimal well locations, sampling frequency, reporting, and cost estimates for installing additional wells and associated infrastructure.

In accordance with a NMED HWB request (NMED HWB September 2019), sampling for 1,4-dioxane at the TAG AOC began in CY 2020 using the current TAG sampling schedule. The monitoring wells are to be sampled for a minimum of two sampling events each and evaluated using the NMED risk-based level of 4.59 µg/L (NMED HWB September 2019). The 1,4-dioxane results are discussed in Section 6.6.

In this AGMR, the TAG analytical data include both hazardous and radioactive constituents; however, the analytical data for radionuclides (gamma spectroscopy, gross alpha/beta activity, and tritium) are provided voluntarily by the DOE and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements of the Consent Order. Additional information on radionuclides, and the scope of the Consent Order, is available in Section III.A of the Consent Order.

6.3 Scope of Activities

Section 6.1.5 lists the CY 2020 activities for the TAG AOC including the measurement of groundwater levels and the collection of groundwater samples. Table 6-5 summarizes the four groundwater sampling events with the corresponding analytical parameters for each well, which are listed in Table 6-6. During CY 2020, a total of 21 monitoring wells were sampled. These wells consisted of 10 PGWS wells and 11 Regional Aquifer wells. The list of wells sampled in CY 2020 was previously summarized in Table 6-1. Monitoring wells PGS-2, TA1-W-03, and WYO-4 were not sampled; Section 6.8 discusses these variances.

Quality control (QC) samples were collected in the field at the time of environmental sample collection. Field QC samples include environmental duplicate, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Section 1.3 discusses the utility of QC samples.

6.4 Field Methods and Measurements

Section 1.3 describes in detail the procedures used for groundwater monitoring. Specific information is discussed below. Sampling and analyses plans are listed in Table 6-5.

6.5 Analytical Methods

Section 1.3.2 describes EPA-specified protocols utilized for groundwater samples analyzed by the offsite laboratory (Tables 1-5 and 1-6).

6.6 Summary of Analytical Results for CY 2020

This section discusses the CY 2020 analytical results and pertinent trends in COC concentrations in the TAG AOC. Attachment 6C (Tables 6C-1 through 6C-8) presents the analytical results and field measurements for all TAG sampling events; Attachment 6D (Figures 6D-1 through 6D-6) presents the NPN concentration trend plots for six wells (TA2-W-19, TA2-W-28, TJA-2, TJA-4, TJA-5, and TJA-7). Attachment 6D (Figure 6D-7) presents a TCE concentration trend plot for TA2-W-26.

Table 6-5. Groundwater Monitoring Well Network and Sampling Dates for the Tijeras Arroyo Groundwater Area of Concern in Calendar Year 2020

Date of Sampling Event	Wells Sampled		SAP
February/March 2020	TA1-W-06 TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27 TA2-W-28	TJA-2 TJA-3 TJA-4 TJA-6 TJA-7	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY20, 2nd Quarter Sampling* (SNL January 2020)
June 2020	TA2-W-19 TA2-W-26 TA2-W-28 TJA-2	TJA-3 TJA-4 TJA-7	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY20, 3rd Quarter Sampling* (SNL May 2020)
August/September 2020	TA1-W-01 TA1-W-02 TA1-W-04 TA1-W-05 TA1-W-06 TA1-W-08 TA2-NW1-595 TA2-W-01 TA2-W-19 TA2-W-24 TA2-W-25	TA2-W-26 TA2-W-27 TA2-W-28 TJA-2 TJA-3 TJA-4 TJA-5 TJA-6 TJA-7 WYO-3	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY20, 4th Quarter Sampling* (SNL July 2020)
December 2020	TA2-W-19 TA2-W-26 TA2-W-28 TJA-2	TJA-3 TJA-4 TJA-7	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY21, 1st Quarter Sampling* (SNL October 2020)

NOTES:

Wells screened in the Perched Groundwater System are highlighted with green shading.

FY = Fiscal Year.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-W = Technical Area-II (Well).
TJA = Tijeras Arroyo.
WYO = Wyoming.

Table 6-6. Analytes and Parameters for Tijeras Arroyo Groundwater Area of Concern Monitoring Wells per Sampling Event in Calendar Year 2020

Parameter	February/March 2020	
NPN VOCs 1,4-Dioxane	TA1-W-06 TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27 TA2-W-28 TA2-W-28 (Duplicate)	TJA-2 TJA-3 TJA-3 (Duplicate) TJA-4 TJA-6 TJA-6 (Duplicate) TJA-7
Parameter	**June 2020**	
NPN VOCs 1,4-Dioxane	TA2-W-19 TA2-W-26 TA2-W-28 TJA-2 TJA-2 (Duplicate)	TJA-3 TJA-4 TJA-7 TJA-7 (Duplicate)
Parameter	**August/September 2020**	
Alkalinity Anions Gamma Spectroscopy (short list[a]) Gross Alpha/Beta Activity NPN TAL Metals, plus Total Uranium Tritium VOCs 1,4-Dioxane	TA1-W-01 TA1-W-01 (Duplicate) TA1-W-02 TA1-W-04 TA1-W-05 TA1-W-05 (Duplicate) TA1-W-06 TA1-W-08 TA2-NW1-595 TA2-NW1-595 (Duplicate) TA2-W-01 TA2-W-01 (Duplicate) TA2-W-19 TA2-W-24	TA2-W-25 TA2-W-25 (Duplicate) TA2-W-26 TA2-W-27 TA2-W-28 TA2-W-28 (Duplicate) TJA-2 TJA-3 TJA-4 TJA-5 TJA-6 TJA-7 WYO-3
Parameter	**December 2020**	
NPN VOCs	TA2-W-19 TA2-W-26 TA2-W-26 (Duplicate) TA2-W-28 TJA-2	TJA-3 TJA-4 TJA-4 (Duplicate) TJA-7

NOTES:

Wells screened in the Perched Groundwater System are highlighted with green shading.

[a] Gamma spectroscopy shortlist (americium-241, cesium-137, cobalt-60, and potassium-40).

NPN = Nitrate plus nitrite (reported as nitrogen).
TAL = Target Analyte List.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-W = Technical Area-II (Well).
TJA = Tijeras Arroyo.
VOC = Volatile organic compound.
WYO = Wyoming.

Table 6C-1 presents a summary of detected VOC results and Table 6C-2 lists the laboratory method detection limits (MDLs). Nine VOCs were reported in groundwater samples collected during CY 2020 in the TAG AOC:

- 1,1-Dichloroethane
- 1,1-Dichloroethene
- Acetone
- Chloroform
- cis-1,2-Dichloroethene
- Methylene chloride
- Tetrachloroethene (PCE)
- Toluene
- TCE

Figure 6-10 shows the monitoring well locations with the corresponding maximum TCE concentrations in CY 2020 environmental samples for the PGWS and the Regional Aquifer. Figure 6-11 shows the monitoring well locations with the corresponding maximum NPN concentrations in CY 2020 environmental samples for the PGWS and the Regional Aquifer.

Table 6-7 lists the monitoring wells where MCLs for TCE and NPN were exceeded in CY 2020. For the PGWS, five monitoring wells exceeded the MCL for nitrate (measured as NPN) and one of the monitoring wells exceeded the TCE MCL. For the merging zone, one monitoring well exceeded the MCL for nitrate, but did not exceed the TCE MCL. None of the Regional Aquifer wells exceeded MCLs. Additional details for contaminant values and trends are discussed below.

Table 6-7. Matrix Summarizing the Monitoring Wells where Contaminant Concentrations in Groundwater Samples Exceeded the Respective Maximum Contaminant Levels for TCE and NPN in Calendar Year 2020

Aquifer	Number of Monitoring Wells Exceeding the TCE MCL of 5 µg/L in CY 2020	Maximum TCE Concentration in CY 2020 (µg/L)	Number of Monitoring Wells Exceeding the Nitrate MCL of 10 mg/L in CY 2020	Maximum NPN Concentration in CY 2020 (mg/L)
Perched Groundwater System	1 (TA2-W-26)	15.7 (15.9 duplicate)	5 wells (TA2-W-19, TA2-W-28, TJA-2, TJA-5, and TJA-7)	22.7
Merging Zone	None	ND (<0.300)	1 well (TJA-4)	31.9
Regional Aquifer	None	0.380J (TJA-3)	None	4.03

NOTES:
< = Less than.
µg/L = Microgram(s) per liter.
CY = Calendar Year.
J = The associated value is an estimated quantity (J-qualified).
MCL = Maximum contaminant level.
mg/L = Milligram(s) per liter.
ND = Not detected.
NPN = Nitrate plus nitrite (reported as nitrogen).
TA2-W = Technical Area-II (Well).
TCE = Trichloroethene.
TJA = Tijeras Arroyo.

TCE concentrations at well TJA-2 remained below the MCL in CY 2020. In response to the February 2019 sample that contained TCE at 5.71 µg/L, a BaroBall™ (passive venting device) was installed on top of the TJA-2 well casing in April 2019. Subsequent groundwater samples have not exceeded the MCL. Samples from the last three quarters of 2019 contained TCE concentrations ranging from 3.48 to 4.00 (J-qualified). Table 6C-1 presents the CY 2020 sampling results; TCE concentrations at well TJA-2 ranged from 3.68 to 4.19 µg/L. The BaroBall™ is likely reducing the accumulation of VOCs in the well casing above the water column. VOCs in soil vapor higher up in the vadose zone are suspected of having entered the well through casing joints and subsequently diffused into the water column.

Monitoring well TA2-W-26 is the only well that exceeded the TCE MCL in CY 2020. In September 2020, TCE concentrations at well TA2-W-26 increased above the MCL to 11.6 µg/L after nearly 17 years (October 2003 through March 2020) of TCE concentrations below 2 µg/L (Figure 6D-1). The September 2020 concentration was confirmed by the December 2020 sample that contained TCE at 15.7 µg/L, while the environmental duplicate was 15.9 µg/L. One other VOC has recently exceeded its MCL at TA2-W-26, as PCE was reported at 7.59 µg/L for the December 2020 sample. The corresponding duplicate sample had a PCE concentration of 7.88 µg/L. The MCL for PCE is 5 µg/L.

Several tasks were undertaken at well TA2-W-26 in CY 2020:

- A BaroBall™ was installed on the well casing at TA2-W-26 following the December 2020 sampling event. This should reduce the possible accumulation of VOCs in the well casing above the water column. VOCs in soil vapor higher up in the vadose zone are suspected of entering the well through casing joints and partioning into the water column. The impact of soil vapor upon water quality has been previously noted at the Chemical Waste Landfill and the Mixed Waste Landfill. It is also possible that due to declining groundwater elevations in the TAG AOC, less water is available to dilute VOCs desorbing from saturated sediments adjacent to the well.

- Because of increased turbidity while purging TA2-W-26 in June 2020, video logging was conducted at well TA2-W-26 in July 2020. The casing and screen were in good condition. No significant damage was noted; however, the water was slightly cloudy. A detailed view of the screen slots using the pivoting camera showed that only a minor amount of fine-grained material was present in the slots. Increased turbidity starting in June 2020 appears to coincide with the onset of increasing TCE. The June 2020 TCE concentration at TA2-W-26 was 3.68 µg/L. The well has less than one foot of silt in the sump.

- A review of the geophysical log for nearby well TA2-W-25 (the well pair for TA2-W-26, located 50 ft apart) indicates that as the water level declines, the recent water samples from TA2-W-26 are likely derived from more clayey sediments than when the water level was higher and more permeable sediments were contributing water to the well. Based upon video logging, redevelopment of well TA2-W-26 is not recommended. Based upon recent redevelopment work at TA-V, redevelopment of TAG wells is not expected to be beneficial. Instead, the sampling method for well TA2-W-26 was adjusted to reduce turbidity. When turbidity exceeds 100 nephelometric turbidity units (NTU) during the purging process, the well is then purged dry. The water level is allowed to recover overnight and then sampled the next day with the sampling pump set higher in the water column.

- A review of nearby KAFB monitoring wells was conducted. The nearest KAFB-owned well (ST105-MW020) is located approximately 890 ft east and hydraulically crossgradient from well TA2-W-26. Monitoring well ST105-MW020 is screened in the PGWS and used for nitrate abatement studies. The well has not been sampled for VOCs. However, KAFB ERP management is receptive to SNL/NM personnel’s request that VOCs be added to future sampling events at well ST105-MW020.

- Potential release sites in the vicinity of well TA2-W-26 were reviewed. No current or historical SNL/NM wastewater outfall or septic leach fields are located upgradient of well TA2-W-26. No nearby KAFB facilities are suspected of releasing VOCs to groundwater. The Revised TAG CCM/CME Report (SNL February 2018) discusses SNL/NM, KAFB, and COA environmental sites.

- Publicly available documents for the nearby COA-owned closed Eubank Landfill were reviewed. Over 2 million cubic yards of residential and industrial waste was disposed of in unlined trenches from 1963 to 1984. Disposal of chlorinated solvents from a large electronic manufacturing plant is suspected. The landfill consists of a Northeast Fill Area and a Southwest Fill Area. The fill areas are not capped with engineered covers. Soil gas surveys conducted in 1996 and 2002 at the Northeast Fill Area detected methane, TCE, and PCE. Debris at the Southwest Fill Area is currently visible on the ground surface approximately 800 ft northeast of well TA2-W-26. The COA has installed 31 shallow soil-vapor wells across the two fill areas. The shallow wells (completed at less than 50 ft bgs) are monitored for landfill gases (methane, oxygen, carbon dioxide, and flammability limits), but sampling for VOCs has not been conducted. Groundwater monitoring wells installed by the COA at the Eubank Landfill are screened across a 30-ft interval in the Regional Aquifer. Groundwater samples have not exceeded water-quality standards. However, the wells were installed in 1996 to 1998 using mud rotary and the presence of the PGWS was possibly not recognizable. The suspected disposal of chlorinated solvents at the Eubank Landfill appears to be the most likely source of VOCs detected at well TA2-W-26.

- The soil-vapor sampling results for SNL/NM-installed vapor wells TAG-SV-04 and TAG-SV-05, which are located 930 ft to the northeast and 1,060 ft to the north of TA2-W-26, respectively, were evaluated. Both wells are equipped with FLUTe™ samplers with multiple ports set at 50-ft intervals. TAG-SV-04 has five sampling ports ranging from 46 to 246 ft bgs. Well TAG-SV-05 has six sampling ports ranging from 50 to 300 ft bgs. The two wells were last sampled in December 2004 using SUMMA canisters. The highest VOC concentrations in soil vapor corresponded to depth of approximately 100 ft bgs. The maximum total VOCs and TCE concentrations at well TAG-SV-04 were 774 and 55 parts per billion (ppb), respectively. The maximum total VOCs and TCE concentrations at well TAG-SV-05 were 45,534 and 9,400 ppb, respectively.

Only one Regional Aquifer monitoring well had a TCE concentration that was above the detection limit of 0.300 µg/L (Table 6C-2). Monitoring well TJA-3 had a TCE concentration of 0.380 µg/L (J-qualified). This well has had sporadic detections of TCE since 2001 but never above the MCL.

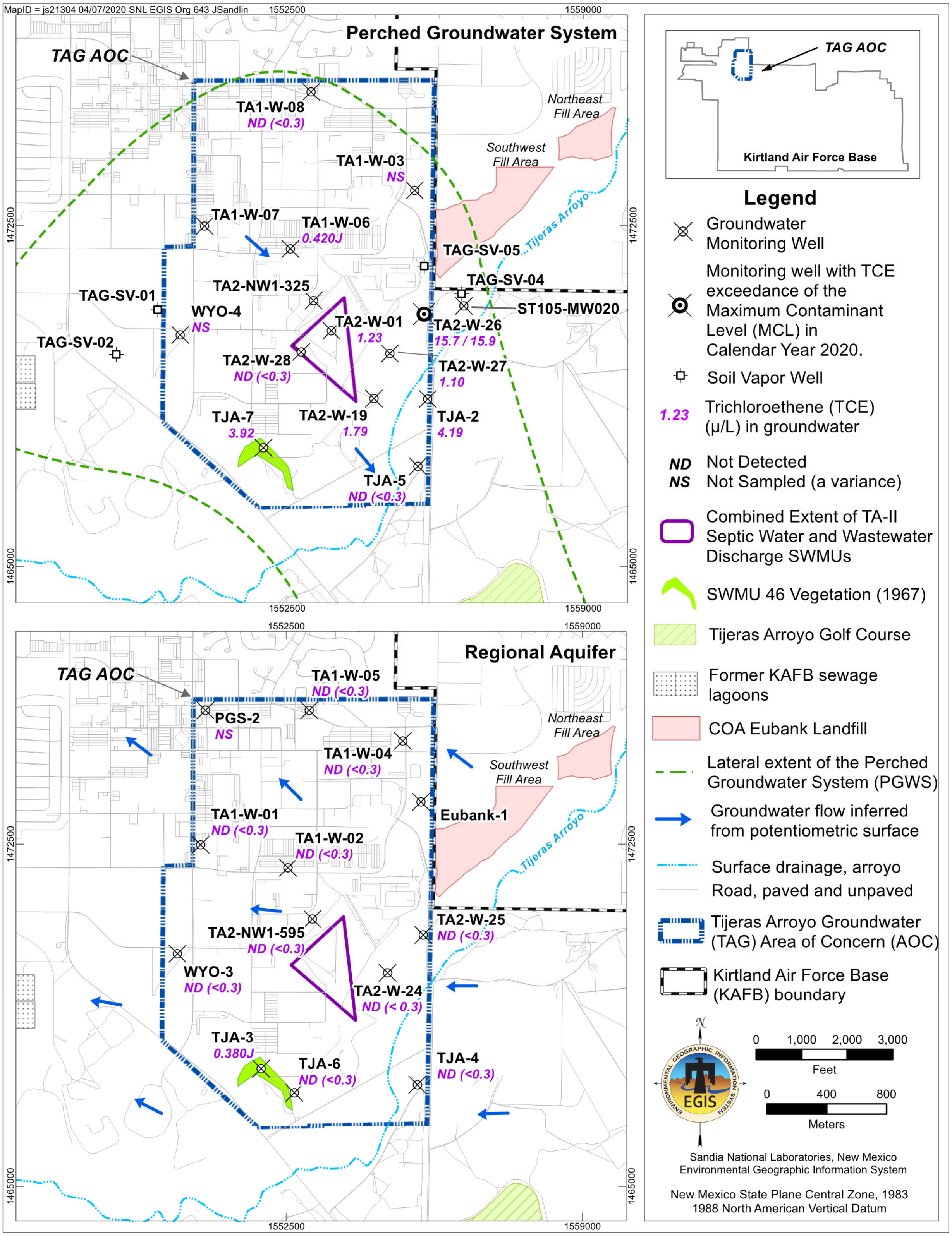


Figure 6-10. Maximum Concentrations of TCE in the Perched Groundwater System and the Regional Aquifer at the Tijeras Arroyo Groundwater Area of Concern for Calendar Year 2020

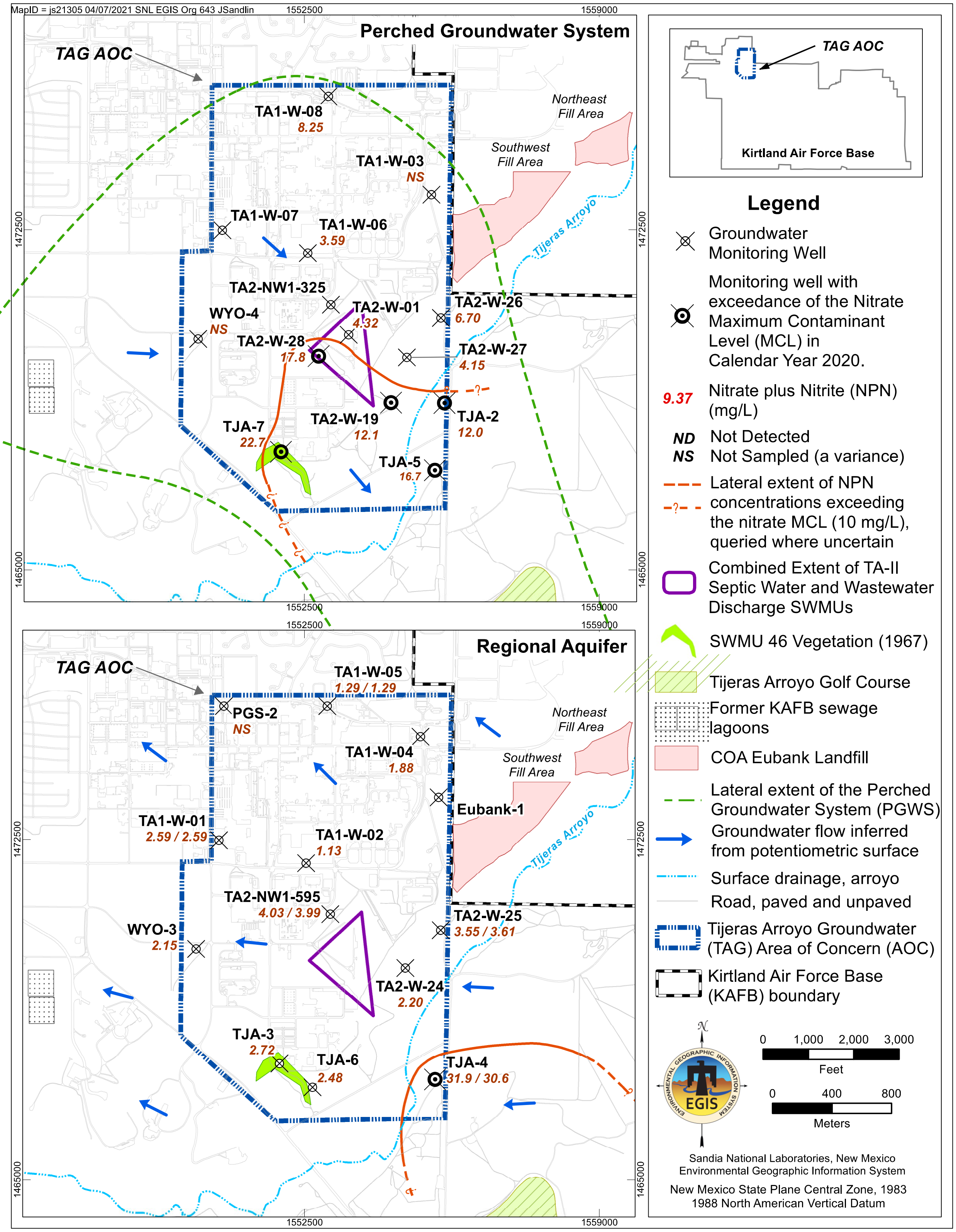


Figure 6-11. Maximum Concentrations of NPN in the Perched Groundwater System and the Regional Aquifer at the Tijeras Arroyo Groundwater Area of Concern for Calendar Year 2020

Five PGWS monitoring wells (TA2-W-19, TA2-W-28, TJA-2, TJA-5, and TJA-7) had NPN results exceeding the nitrate MCL of 10 mg/L in CY 2020 (Table 6C-3). These NPN concentrations ranged from 10.7 to 22.7 mg/L. For the last five years (since January 2014), the NPN trends for the environmental samples are as follows:

- TA2-W-19 (Figure 6D-2). NPN concentrations have ranged from 10.1 mg/L (May 2014) to a maximum of 13.8 mg/L (June 2019). In CY 2020, the maximum NPN concentration was 12.1 mg/L. The overall NPN trend for the last five years is stable while the water level consistently declined at approximately 0.51 ft/yr.

- TA2-W-28 (Figure 6D-3). NPN concentrations have ranged from 15.6 mg/L (September 2018) to 27.8 mg/L (September 2015). In CY 2020, the maximum NPN concentration was 17.8 mg/L. The overall NPN trend for the last five years shows overall decreasing concentrations while the water level consistently declined at approximately 0.49 ft/yr. Monitoring well TA2-W-28 (first sampled in December 2014) is the replacement well for TA2-SW1-320 (last sampled in August 2014). Monitoring well TA2-W-28 is the most upgradient well in the TAG AOC with NPN concentrations exceeding the MCL.

- TJA-2 (Figure 6D-4). NPN concentrations have ranged from 10.9 mg/L (March 2014, September 2014, and June 2018) to a maximum of 13.5 mg/L (June 2019). In CY 2020, the maximum NPN concentration was 12.0 mg/L. The overall NPN trend for the last five years is stable while the water level consistently declined at approximately 0.43 ft/yr.

- TJA-4 (Figure 6D-5). NPN concentrations have ranged from 26.5 mg/L (September 2015) to a maximum of 37.1 mg/L (June 2019). In CY 2020, the maximum NPN concentration was 31.9 mg/L. The overall NPN trend for the last five years is stable while the water level increased at 0.10 ft/yr. This is the only DOE-owned monitoring well completed in the merging zone.

- TJA-7 (Figure 6D-6). NPN concentrations have ranged from 20.3 mg/L (September 2015) to 26.0 mg/L (December 2017). In CY 2020, the maximum NPN concentration was 22.7 mg/L. The overall NPN trend for the last five years is stable while the water level consistently declined at approximately 0.27 ft/yr.

- TJA-5 (Figure 6D-7). The collection of groundwater samples has not been a regulatory requirement for well TJA-5. However, in anticipation of a new sampling protocol for the TAG AOC, the well was returned to annual sampling status in June 2018. The September 2020 NPN concentration was 16.7 mg/L. The overall NPN trend for the last three years shows decreasing concentrations. SNL/NM personnel did not sample the well from 2001 to 2018. However, water levels have been measured quarterly since the well was installed in 1998. For the last five years, the water level consistently declined at approximately 0.29 ft/yr.

Monitoring well (TJA-4) had the greatest NPN concentration (31.9 mg/L) of all the TAG AOC wells in CY 2020. This well is located at the southeast corner of the TAG AOC and is screened in the merging zone above the Regional Aquifer. Figure 6D-4 shows that the general trend of NPN concentrations is relatively stable or slightly increasing since 2013. Monitoring well TJA-4 has historically been categorized as a Regional Aquifer well because its water level continues to increase in a manner similar to other monitoring wells that are clearly screened in the Regional Aquifer. Monitoring well TJA-4 is screened in a merging (intermediate) zone between the two water-bearing units and its potentiometric surface cannot be reasonably contoured with the potentiometric surfaces for either the PGWS or the Regional Aquifer. Saturation of the merging zone is most likely related to groundwater recharge from the nearby Tijeras

Arroyo Golf Course that is located approximately 0.6 miles to the southeast. It is likely that elevated nitrate in this well reflects contributions from sources outside the TAG AOC.

Table 6C-4 presents the CY 2020 analytical results for 1,4-dioxane. Groundwater samples were collected from the 21 monitoring wells following the frequency in Table 6-1. The 1,4-dioxane concentrations ranged from non-detect (<0.100) to 1.34 (J-qualified) µg/L. Eleven monitoring well have been sampled twice and have therefore met the NMED requirement for two sampling events with results less than the 4.59 µg/L NMED action level. The remaining ten wells are on an annual sampling schedule and will be sampled again in CY 2021.

Table 6C-5 presents the analytical results for anions and alkalinity; no anion concentrations exceeded the established MCLs.

Table 6C-6 presents the analytical results for the 23 Target Analyte List (TAL) metals and uranium. No analytes exceeded the established MCLs.

Table 6C-7 presents the analytical results for gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40), gross alpha/beta activity, and tritium. The gross alpha activity was measured as a radiological screening tool in accordance with 40 Code of Federal Regulations Part 141. Naturally occurring uranium was measured independently. The total uranium concentration was measured in conjunction with the metals analysis described above. The gross alpha activity measurements were corrected by subtracting the total uranium activity from the uncorrected gross alpha activity results. Radiological results were reviewed by an SNL Health Physicist to verify that the samples were nonradioactive prior to shipment to the analytical laboratories. All reported radionuclide activities were below MCLs, where established. Gross beta results are used as a radiological screening tool; results do not indicate the presence of a beta-emitting radionuclide that would exceed the established EPA MCL of 4 millirems per year. Tritium and gamma spectroscopy radionuclide activities were below the laboratory minimum detectable activity levels in all groundwater samples.

Table 6C-8 presents the field parameter measurements obtained during purging and immediately before sample collection at each well. The parameters consist of temperature, specific conductivity, oxidation-reduction potential, potential of hydrogen, turbidity, and dissolved oxygen. The parameters are measured for determining that stabilization has occurred, and representative water samples are collected. The goal for turbidity is 5 NTU.

6.7 Quality Control Results

Section 1.3 (Chapter 1) describes the field and laboratory QC sampling and analyses protocols. Tables 6C-1 through 6C-7 (Attachment 6C) provide analytical data and corresponding validation qualifiers. The results of QC samples and the influence on data quality for the TAG sampling events are discussed below. Four types of field QC samples were evaluated: environmental duplicates, EB samples, FB samples, and TB samples.

For CY 2020, the results for the environmental-duplicate sample pairs for each sampling event (Table 6-6) showed good correlation based on the relative percent difference (RPD) values. RPDs are unit-less values calculated for those constituents with detections above the laboratory MDL in both environmental and environmental duplicate samples per well.

The calculated RPD values for the NPN sample pairs (environmental versus environmental duplicate samples) ranged from <1 to 4; thus, are much less than the RPD goal of 35. The calculated RPD values for the VOC sample pairs ranged from 2 to 6; thus, are less than the RPD goal of 20.

The calculated RPD values for the environmental duplicate analyses per quarter are as follows:

- **February/March 2020 Sampling Event**—Environmental duplicate samples were collected from monitoring wells TA2-W-28, TJA-3, and TJA-6. The NPN RPD values were 3, 1, and 2, respectively. No VOCs were reported for the three wells.

- **June 2020 Sampling Event**—Environmental duplicate samples were collected from monitoring wells TJA-2 and TJA-7. The NPN RPD values were <1 for both wells. The TCE RPD values were 4 and 2 for wells TJA-2 and TJA-7, respectively.

- **August/September 2020 Sampling Event**—Environmental duplicate samples were collected from six monitoring wells (TA1-W-01, TA1-W-05, TA2-W-01, TA2-NW1-595, TA2-W-25, and TA2-W-28). The NPN RPD values ranged from <1 to 2. VOCs were only detected at well TA2-W-01; the RPD values for PCE and TCE were 6 and 3, respectively.

- **December 2020 Sampling Event—**Environmental duplicate samples were collected from monitoring wells TA2-W-26 and TJA-4. The NPN RPD values were 3 and 4, respectively. VOCs were only detected at well TA2-W-26; the RPDs for the five detected VOCs ranged from <1 to 4.

The results for the EB analyses per quarter are as follows:

- **February/March 2020 Sampling Event—**EB samples were collected prior to sampling monitoring wells TA2-W-28, TJA-3, and TJA-6. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was required because these compounds were not detected above the laboratory MDLs in the associated environmental samples.

- **June 2020 Sampling Event**—EB samples were collected prior to sampling monitoring wells TJA-2, TJA-3, and TJA-7. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was necessary because these analytes were not detected above laboratory MDLs in the associated environmental samples.

- **August/September 2020 Sampling Event—**EB samples were collected prior to sampling six monitoring wells (TA1-W-01, TA1-W-05, TA2-NW1-595, TA2-W-01, TA2-W-25, and TA2-W-28). Acetone, alkalinity, arsenic, bromodichloromethane, bromoform, 2-butanone, chloroform, chloride, copper, dibromochloromethane, sodium, vanadium, and zinc, were detected above laboratory MDLs in various EB samples. No corrective action was required for acetone, alkalinity, bromodichloromethane, bromoform, 2-butanone chloroform, chloride, copper, dibromochloromethane, sodium, or zinc because these parameters were not detected in the environmental samples or the reported values for environmental samples were greater than five times the EB concentration. Arsenic in TA2-NW1-595 and vanadium in TA2-W-01 were qualified as not detected during data validation because these metals were detected at similar concentrations in both the EB and the environmental sample.

- **December 2020 Sampling Event**—EB samples were collected prior to the sampling of monitoring wells TA2-W-19 and TJA-7. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the EB samples. Except for chloroform, no corrective action was necessary because these compounds were not detected above laboratory MDLs in the associated environmental samples. Chloroform in the

TA2-W-26 environmental and environmental duplicate samples were qualified as not detected during data validation because chloroform was reported above the practical quantitation limit (PQL) in the EB sample and at concentrations less than the PQL in the environmental samples.

The results for the FB analyses per quarter are as follows:

- **February/March 2020 Sampling Event**—FB samples for VOC analysis were collected at monitoring wells TA1-W-06 and TA2-W-26. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in FB samples. No corrective action was necessary for acetone, bromodichloromethane, bromoform, or dibromochloromethane because these compounds were not detected above laboratory MDLs in the associated environmental samples. Chloroform was detected above the PQL in the FB sample associated with TA2-W-26. However, chloroform was qualified as not detected in the TA2-W-26 environmental sample during data validation because chloroform was reported less than the PQL.

- **June 2020 Sampling Event**—FB samples were collected at monitoring wells TJA-3 and TJA-4. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the FB samples. No corrective action was necessary because these analytes were not detected above the laboratory MDLs in the associated environmental samples.

- **August/September 2020 Sampling Event**—FB samples were collected at four monitoring wells (TA1-W-01, TA2-W-04, TA2-W-01, TJA-4). The compounds detected in the FB samples included acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was necessary because these compounds were not detected above laboratory MDLs in the associated environmental samples.

- **December 2020 Sampling Event**—FB samples were collected at monitoring wells TJA-2 and TJA-3. Five VOCs (acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane) were detected in the FB samples. No corrective action was necessary because these compounds were not detected above laboratory MDLs in the associated environmental samples.

The results for the TB analyses per quarter are as follows:

- **February/March 2020 Sampling Event—**A total of 14 TB samples were submitted for VOC analysis. No VOCs were detected above laboratory MDLs in any of the TB samples, except for acetone. Acetone was detected in two TB samples but was qualified as not detected due to associated laboratory method blank contamination. No corrective action was required.

- **June 2020 Sampling Event—**No VOCs were detected above laboratory MDLs in any of the 11 TB samples.

- **August/September 2020 Sampling Event**—No VOCs were detected above laboratory MDLs in any of the 28 TB samples.

- **December 2020 Sampling Event—**No VOCs were detected above laboratory MDLs in any of the nine TB samples.

6.8 Variances and Non-Conformances

Variances (non-conformances) from field or sampling requirements as specified in the four TAG Investigation Mini-Sampling and Analysis Plans (SNL January 2020, May 2020, July 2020, and October 2020) are noted as follows:

- **All Quarterly Events in CY 2020**—Monitoring well WYO-4 was not sampled because responsibility for the well and the surrounding area has been transferred to the KAFB ERP. This well will be tracked until NMED HWB responds to the Revised TAG CCM/CME Report (SNL February 2018).

- **February/March 2020 Sampling Event**—One well had a variance. During purging, sand and silt material were observed at TA2-W-26. Sampling personnel raised the sample pump and continued purging. The turbidity stabilized at approximately 70 NTU and a sample was collected. The other five parameters were stable prior to sample collection.

- **June 2020 Sampling Event**—Two wells had a variance. During purging, sand and silt material were observed at TA2-W-26. Sampling personnel raised the sample pump and continued purging. The turbidity stabilized at approximately 76 NTU and a sample was collected. The other five parameters were stable prior to sample collection. At well TA2-W-28, the proposed minimum purge volume was not achieved. The water level in the well was allowed to recover overnight and a sample was collected. All six parameters were stable prior to sample collection.

- **August/September 2020 Sampling Event**—Three wells had a variance. Two wells (TA1-W-03 and PGS-2) were not sampled. The conditions at wells TA1-W-03 and PGS-2 were taken into account during preparation of the Revised TAG CCM/CME Report (SNL February 2018). Monitoring well TA1-W-03 is screened in the PGWS and has not contained a sufficient volume of water for collecting a groundwater sample since August 2017; natural dewatering of the PGWS was anticipated. Grout intrusion into the screen at Regional Aquifer monitoring well PGS-2 precludes the collection of representative groundwater samples. Well PGS-2 continues to be useful for measuring water levels. The third variance involves well TA2-W-26. During purging, sand and silt material were observed at well TA2-W-26. The well was purged to dryness prior to meeting the stability criteria for turbidity. The water level in the well was allowed to recover over the weekend. During sampling, the turbidity was approximately 8 NTU. All six parameters were stable prior to sample collection.

- **December 2020 Sampling Event**—One well had a variance. During purging, sand and silt material were observed at well TA2-W-26. The well was purged to dryness prior to meeting the stability criteria for turbidity. The water level in the well was allowed to recover over the weekend. During sampling, the turbidity was approximately 20 NTU. All six parameters were stable prior to sample collection.

6.9 Summary and Conclusions

This section provides a brief summary of activities, contaminants, the CSM, and CY 2021 plans for the TAG AOC.

The TAG AOC encompasses an area of approximately 1.82 sq mi in the north-central portion of KAFB. Groundwater investigations were initiated in 1992 and the current groundwater network consists of 21 monitoring wells for water quality analysis and 30 monitoring wells for groundwater level measurements. In CY 2020, monitoring wells were sampled in four events (February/March 2020, June 2020, August/September 2020, and December 2020). The groundwater samples for each event were analyzed for VOCs and NPN. Additional analytes (anions, alkalinity, TAL metals [plus total uranium], gamma spectroscopy [short list], gross alpha/beta activity, and tritium) were analyzed for the August/September 2020 event. Groundwater samples from three sampling events were analyzed for 1,4-dioxane. Analytical results for VOCs, NPN, anions, metals, and radionuclides were compared to EPA MCLs for drinking water (EPA March 2018) and the results for 1,4-dioxane were compared to the NMED risk-based level (NMED HWB September 2019).

In CY 2020, NPN, TCE, and PCE were the analytes that exceeded the MCL in TAG AOC groundwater samples. NPN concentrations exceeded the MCL of 10 mg/L in samples from five monitoring wells (TA2-W-19, TA2-W-28, TJA-2, TJA-5, and TJA-7) that are screened in the PGWS and from one monitoring well (TJA-4) screened in the merging zone above the Regional Aquifer. The maximum NPN concentration in groundwater samples collected from the PGWS was 22.7 mg/L. The maximum NPN concentration in the Regional Aquifer exclusive of the merging zone was 4.03 mg/L. In the merging zone above the Regional Aquifer, the maximum NPN concentration was 31.9 mg/L.

Two VOCs (TCE and PCE) exceeded MCLs at one PGWS well in CY 2020. The environmental sample for monitoring well TA2-W-26 had maximum TCE and PCE concentrations of 15.7 and 7.59 µg/L, respectively. The environmental duplicate for well TA2-W-26 had TCE and PCE concentrations of 15.9 and 7.88 µg/L, respectively. After the last sampling event in CY 2020, a BaroBall™ was installed on the well.

In CY 2020, the only reported TCE concentration for the Regional Aquifer was 0.380 µg/L (J-qualified) and corresponded to the sample from well TJA-3. TCE was not detected in the merging zone (well TJA-4).

The following conclusions are based on a comprehensive review of available information for current groundwater analyses for the TAG AOC:

- In the PGWS, the distribution of NPN concentrations exceeding the nitrate MCL is restricted to the southeast corner of the TAG AOC and likely reflects NPN sources from multiple release sites from several organizations.

- In the Regional Aquifer, the distribution of NPN concentrations exceeding the nitrate MCL is restricted to the merging zone in the extreme southeast corner of the TAG AOC and is probably attributable to release sites that are located outside of the TAG AOC.

- In the PGWS, TCE and PCE concentrations exceeded the MCL at one monitoring well in the TAG AOC.

- In the Regional Aquifer and merging zone, TCE concentrations did not exceed the MCL in the TAG AOC.

- The potential sources of nitrate and TCE are located both within and outside the TAG AOC. The potential sources include the former KAFB Sewage Lagoons, wastewater outfalls, buried septic systems, landfills, sewer lines, Tijeras Arroyo Golf Course, the Eubank Landfill, and geologic nitrate. SNL/NM operations involving the release of septic and wastewater that could affect groundwater were eliminated in 1992.

- The 1,4-dioxane concentrations in groundwater ranged from non-detect (<0.100) to 1.34 (J-qualified) µg/L. Eleven monitoring well have been sampled twice and have therefore met the requirement for two sampling events.

- The CSM (Figure 6-3) was slightly updated from the version that was previously presented in the Revised TAG CCM/CME Report (SNL February 2018) and the CY 2019 AGMR (SNL June 2020).

- Nitrate concentrations in the PGWS are expected to decrease to background concentrations and below regulatory standards because of natural groundwater transport mechanisms such as advection, dispersion, and diffusion unless geologic nitrate is a factor.

- The PGWS is a thin, artificially created water-bearing unit that was mostly created by historic anthropogenic sources (septic and wastewater discharges). These types of recharge at SNL/NM were curtailed by 1992. The Perching Horizon dips to the southeast.

- Water levels continue to decline in the PGWS as the system naturally dewaters. For evaluating the remedial alternatives in the Revised TAG CCM/CME Report (SNL February 2018), the decline rate was studied for a five-year period (October 2010 to October 2015). The average decline was 0.48 ft/yr across the TAG AOC. Some areas will dewater faster than others.

- Groundwater from the PGWS is not pumped for any type of beneficial use within or near the TAG AOC.

- There is no foreseeable risk to human health involving production wells completed in the Regional Aquifer.

Ongoing environmental studies in the TAG AOC include the following:

- Groundwater sampling at up to 21 monitoring wells on a quarterly, semiannual, or annual basis. At a minimum, the analytes for groundwater sampling per well will consist of NPN and VOCs. Groundwater from ten wells will be analyzed for 1,4-dioxane in CY 2021.

- Closely monitoring the VOC concentrations at well TA2-W-26. SNL/NM personnel will continue quarterly groundwater sampling of well TA2-W-26. SNL/NM personnel will also collect soil-vapor samples from TAG-SV-04 and TAG-SV-05; this sampling is tentatively scheduled for May 2021. SNL/NM personnel will jointly coordinate the KAFB sampling of well ST105-MW020 for VOCs.

- Collecting quarterly measurements of groundwater elevations in 30 monitoring wells.

- Maintaining contact with the KAFB ERP personnel with respect to the results of their nitrate in groundwater abatement studies. Revision 1 of the Technical Memorandum (Section 6.1.7.5) will be prepared by SNL/NM personnel to include newly acquired information on NPN sources and groundwater geochemical data.

- Obtaining groundwater results relevant to the TAG AOC from KAFB, USGS, and the COA, as available.

- Reporting future results in the CY 2021 SNL/NM AGMR.

- If required, prepare a Corrective Measures Implementation Plan upon receiving NMED HWB comments on the Revised TAG CCM/CME Report that was submitted in February 2018. Three remedial alternatives (monitored natural attenuation, in-situ bioremediation, and groundwater extraction and treatment) were proposed for addressing the elevated nitrate concentrations in the PGWS (SNL February 2018).

Attachment 6A
Historical Timeline of the Tijeras Arroyo Groundwater Area of Concern

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Table 6A-1. Historical Timeline of the Tijeras Arroyo Groundwater Area of Concern

Year	Event	Reference
1928	Land-use development on the East Mesa began in 1928 when the public Albuquerque Airport was built. Renamed Oxnard Field in 1929, the airport was used until late 1939 when the vicinity of Oxnard Field was purchased by the federal government for use as an Army Air Depot Training Station, later to be known as Sandia Base.	www.airfields-freeman.com 2016; CE2 Corporation September 2016
1939	In 1939, public airline service was moved approximately four miles to the west of Oxnard Field where the Albuquerque Municipal Airport was built. Using the municipal set of runways, the Albuquerque Army Air Base began operations in 1941.	www.econtent.unm.edu 2016; en.wikipedia.org 2016
1945	"Z Division" of the Manhattan Engineers District, an extension of the original Los Alamos Laboratory, was established at Sandia Base in the area that would become known as TA-I.	Furman April 1990
1946	After World War II, the old Oxnard Field runways and a new extensive grid of taxiways were used for parking military aircraft. Starting in 1946, the War Assets Administration managed the sale or the dismantlement and smelting of approximately 2,250 surplus military aircraft.	www.militarymediainc.com 2016
1947	Wastewater and septic-water discharges begin at TA-II. (All discharges to the ground surface or buried leach fields ended in 1992).	SNL November 2005
1948	Wastewater and possibly septic-water discharges associated with TA-I begin at SWMU 46. (All discharges to ground surface at the outfall ditches ceased in 1974).	SNL November 2005
1949	The independent Sandia Laboratory was established. Existing buildings in TA-I were remodeled. New buildings in TA-I and TA-II were constructed.	Furman 1990
1977	Construction of TA-IV accelerator facilities began in 1977. All buildings use modern wastewater and septic disposal systems. No discharges to the ground were allowed.	SNL November 2005
1984	DOE created CEARP to evaluate potential release sites at SNL/NM.	DOE September 1987
1988	The SNL/NM ER Project was created and begins conducting investigations using the CEARP list of sites.	SNL March 1995a
1992	ER Project starts to investigate groundwater at TA-II. The Perched Groundwater System was discovered with the installation of monitoring wells TA2-SW1-320, TA2-NW1-325, and TA2-NW1-595. The presence of the Regional Aquifer was previously known from base-wide studies.	SNL March 1995a
1994	Installed groundwater monitoring wells TA2-W-01 and TJA-2.	SNL March 1995a
1994	First detection of TCE in a groundwater sample from a SNL/NM well near Tijeras Arroyo. The October 1994 sample from monitoring well TA2-W-01 contained TCE at 1 µg/L.	SNL March 1995b, GWPP annual
1995	Installed nested groundwater monitoring wells WYO-1 and WYO-2 in a single borehole. Installed groundwater monitoring wells PGS-2 and TA2-W-19.	SNL March 1996a
1995	First TCE exceedance of the U.S. Environmental Protection Agency MCL of 5 µg/L. The November 1995 groundwater sample from monitoring well TA2-W-19 contained TCE at 8.1 µg/L.	SNL March 1996b, GWPP annual
1995	Comprehensive study of the geologic and hydrogeologic setting for SNL/NM and KAFB area completed.	GRAM and Lettis December 1995
1996	Sandia North Groundwater Investigation Plan submitted to the NMED HWB.	SNL March 1996b

Refer to footnotes on page 6A-6.

Table 6A-1. Historical Timeline of the Tijeras Arroyo Groundwater Area of Concern *(Continued)*

Year	Event	Reference
1996	Shallow (Perched Groundwater System) Water-Bearing Zone Hydrologic Evaluation report prepared for aquifer parameters.	Wolford September 1996
1996	Pressure transducer program conducted at four Perched Groundwater System monitoring wells (TA2-NW1-325, TA2-SW1-320, TA2-W-01, and TA2-W-19), three Regional Aquifer monitoring wells (PGS-2, TA2-NW1-595), and one production well (KAFB-5).	SNL March 1998
1996	Installed soil-vapor monitoring wells TA2-VW-20 and TA2-VW-21.	IT January 1997
1997	Sandia North Geological Investigation Project Report was submitted to NMED HWB.	Fritts and Van Hart March 1997
1997	Installed groundwater monitoring wells TA1-W-01 and TA2-W-25.	SNL March 1998
1997	Downhole geophysical surveying (electromagnetic induction, neutron, and natural gamma) was conducted on 21 SNL/NM and USAF monitoring wells near Tijeras Arroyo.	SNL March 1998
1998	Installed groundwater monitoring wells TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-07, TA2-W-24, TA2-W-26, TA2-W-27, TJA-3, TJA-4, and TJA-5.	SNL June 2000
1998	Revision of the 1995 comprehensive study of the geologic and hydrogeologic setting for SNL/NM and KAFB area was completed.	SNL February 1998
1999	Colloidal borescope investigation was performed on 18 Perched Groundwater System monitoring wells.	AquaVISION July 1999
1999	Structural interpretation was conducted using USGS aeromagnetic survey.	Van Hart et al. October 1999
2000	Project name at SNL/NM was changed from the “Sandia North Groundwater Investigation” to the “Tijeras Arroyo Groundwater” or TAG Investigation.	Collins December 2000
2000	At NMED direction, the TAG HPT held its first meeting in Albuquerque, New Mexico.	SNL June 2003
2001	Installed groundwater monitoring wells TA1-W-08, TJA-6, and TJA-7.	SNL November 2002
2001	Installed soil-vapor monitoring wells 46-VW-01, 46-VW-02, and 227-VW-01.	SNL November 2002
2001	Geologic model of the Perched Groundwater System was updated.	Van Hart June 2001
2001	Geochemical modeling of the Perched Groundwater System was conducted.	Brady and Domski 2001
2001	Capture zone analysis conducted for production wells located outside the TAG investigation area.	SNL February 2001
2001	Pressure transducer study was conducted using 19 monitoring wells (11 wells are screened in Perched Groundwater System and 8 wells are screened in Regional Aquifer).	SNL August 2001
2001	Installed replacement groundwater monitoring wells WYO-3 and WYO-4. Plugged and abandoned wells WYO-1 and WYO-2.	SNL June 2003
2002	Completed the calibration of the three-dimensional groundwater flow modeling of the TAG vicinity using the numerical code FEMWATER.	BGW September 2002
2002	TAG Continuing Investigation Report was submitted to the NMED HWB.	SNL November 2002
2003	Updated the interpretation of the subsurface geology at KAFB, including the TAG area.	Van Hart June 2003
2003	TAG Investigation Work Plan submitted to the NMED HWB. The plan discussed the tasks that SNL/NM proposed to conduct.	SNL June 2003
2003	TAG Investigation Work Plan was approved by the NMED HWB.	NMED HWB September 2003
2003	Installed soil-vapor monitoring wells 159-VW-01, 165-VW-01, 1004-VW-01, and 1052-VW-01.	SNL October 2003
2003	Final meeting of TAG HPT was held in October 2003. Twenty meetings were held during the three-year period (2000 to 2003).	Copland and Skelly October 2003

Refer to footnotes on page 6A-6.

Table 6A-1. Historical Timeline of the Tijeras Arroyo Groundwater Area of Concern *(Continued)*

Year	Event	Reference
2004	Slug testing was conducted at five Perched Groundwater System monitoring wells and five Regional Aquifer monitoring wells.	Skelly et al. May 2004
2004	The Compliance Order on Consent identified the TAG investigation as an AOC and required the preparation of a CME report for the TAG AOC.	NMED HWB April 2004
2004	TAG CME Work Plan was submitted to the NMED HWB.	SNL July 2004
2004	Installed soil-vapor monitoring wells TAG-SV-01, TAG-SV-02, TAG-SV-03, TAG-SV-04, and TAG-SV-05.	SNL November 2005
2004	Stable isotope ($\delta^{15}N$) analyses conducted for five Perched Groundwater System monitoring wells.	SNL November 2004
2004	TAG CME Work Plan was approved by the NMED HWB.	NMED HWB October 2004
2005	TAG CME Report was submitted to NMED HWB. Report included contaminant transport modeling for groundwater.	SNL August 2005
2005	TAG Investigation Report (analogous to a CCM) was submitted to the NMED HWB.	SNL November 2005
2006	Plugged and abandoned soil-vapor monitoring well TAG-SV-03.	Skelly November 2006
2008	NMED HWB issued a NOD on the TAG Investigation Report.	NMED HWB August 2008
2009	Response to the August 2008 NOD for the TAG Investigation Report submitted to NMED HWB.	SNL February 2009
2009	NMED HWB issued a second NOD concerning the TAG Investigation Report.	NMED HWB August 2009
2010	Response to the second NOD concerning the TAG Investigation Report submitted to NMED HWB.	SNL January 2010
2010	NMED HWB issued a Notice of Approval for the TAG Investigation Report.	NMED HWB February 2010
2012	Plugged and abandoned soil-vapor monitoring wells 159-VW-01, 165-VW-01, 227-VW-01, 1004-VW-01, and 1052-VW-01.	SNL March 2013
2012	Groundwater samples for dual isotopes analyses ($\delta^{15}N$ versus $\delta^{18}O$) were collected from five Regional Aquifer monitoring wells.	Madrid et al. June 2013
2014	Installed replacement groundwater monitoring well TA2-W-28. Plugged and abandoned nearby groundwater monitoring well TA2-SW1-320.	SNL April 2015
2015	Meeting was held between personnel from SNL/NM, DOE/NNSA, and NMED HWB for discussing the schedule (milestones) for report submittals concerning the TAG AOC, the TA-V Groundwater AOC, and the Burn Site Groundwater AOC.	DOE March 2016
2016	NMED HWB milestones letter required that an "Updated CCM and CME Report" for the TAG AOC be submitted in December 2016.	NMED HWB April 2016
2016	A combined and updated TAG CCM/CME Report (dated December 2016) was submitted to NMED HWB. The transmittal letter was dated November 23, 2016.	DOE December 2016, DOE November 2016
2017	NMED HWB issued a disapproval letter for the TAG CCM/CME Report. NMED HWB requested submittal of a revised report before November 30, 2017.	NMED HWB May 2017
2017	Meeting held between SNL/NM, DOE/NNSA, and NMED HWB personnel to discuss the disapproval letter issues.	None

Refer to footnotes on page 6A-6.

Table 6A-1. Historical Timeline of the Tijeras Arroyo Groundwater Area of Concern *(Concluded)*

Year	Event	Reference
2017	Requested a time extension for submittal of the Revised TAG CCM/CME Report.	DOE September 2017
2017	NMED HWB approved the time extension request. Submittal date for the Revised TAG CCM/CME Report was set for February 15, 2018.	NMED HWB October 2017
2018	The Revised TAG CCM/CME Report was submitted to NMED HWB.	SNL February 2018
2018	Slug testing was conducted at replacement monitoring well TA2-W-28 to determine the hydraulic conductivity of the screened sediments.	Skelly, et al. August 2018
2018	Status and locations of KAFB production wells were evaluated. More accurate coordinates were determined using field inspections and ortho-rectified aerial photography.	Copland July 2018
2019	BaroBall™ vented cap installed at well TJA-2 on April 26, 2020.	This report
2019	Conducted extensive review of potential nitrate-release sites located in the north-central portion of KAFB and adjacent Albuquerque.	SNL December 2019
2020	Personnel from DOE/NNSA, SNL/NM, and NMED HWB met virtually to discuss NMED's ongoing review of the Revised TAG CCM/CME Report (SNL February 2018) on September 23, 2020.	This report
2020	BaroBall™ (passive venting device) installed at monitoring well TA2-W-26 on December 21, 2020.	This report
2020	Continue to conduct groundwater monitoring across the TAG AOC.	This report

NOTES:

$\delta^{15}N$ = Delta 15 nitrogen.
$\delta^{18}O$ = Delta 18 oxygen.
µg/L = Microgram(s) per liter.
AOC = Area of Concern.
BGW = Balleau Groundwater Inc.
CCM = Current Conceptual Model.
CEARP = Comprehensive Environmental Assessment and Response Program.
CME = Corrective Measures Evaluation.
DOE = U.S. Department of Energy.
ER = Environmental Restoration.
FEMWATER = Finite Element Model of Water.
GRAM = GRAM, Inc.
GWPP = Groundwater Protection Program.
HPT = High Performing Team.
HWB = Hazardous Waste Bureau.
IT = IT Corporation.
KAFB = Kirtland Air Force Base.
Lettis = William Lettis & Associates, Inc.
MCL = Maximum contaminant level.
NMED = New Mexico Environment Department.
NNSA = National Nuclear Security Administration.
NOD = Notice of Disapproval.
PGS = Parade Ground South.
SNL = Sandia National Laboratories.
SNL/NM = Sandia National Laboratories, New Mexico.
SV = Soil vapor.
SWMU = Solid Waste Management Unit.
TA = Technical Area.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-SW = Technical Area-II (Southwest).
TA2-W = Technical Area-II (Well).
TAG = Tijeras Arroyo Groundwater.
TCE = Trichloroethene.
TJA = Tijeras Arroyo.
USGS = U.S. Geological Survey.
VW = Vapor Well.
WYO = Wyoming.

Attachment 6B
Tijeras Arroyo Groundwater
Hydrographs

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Attachment 6B Hydrographs

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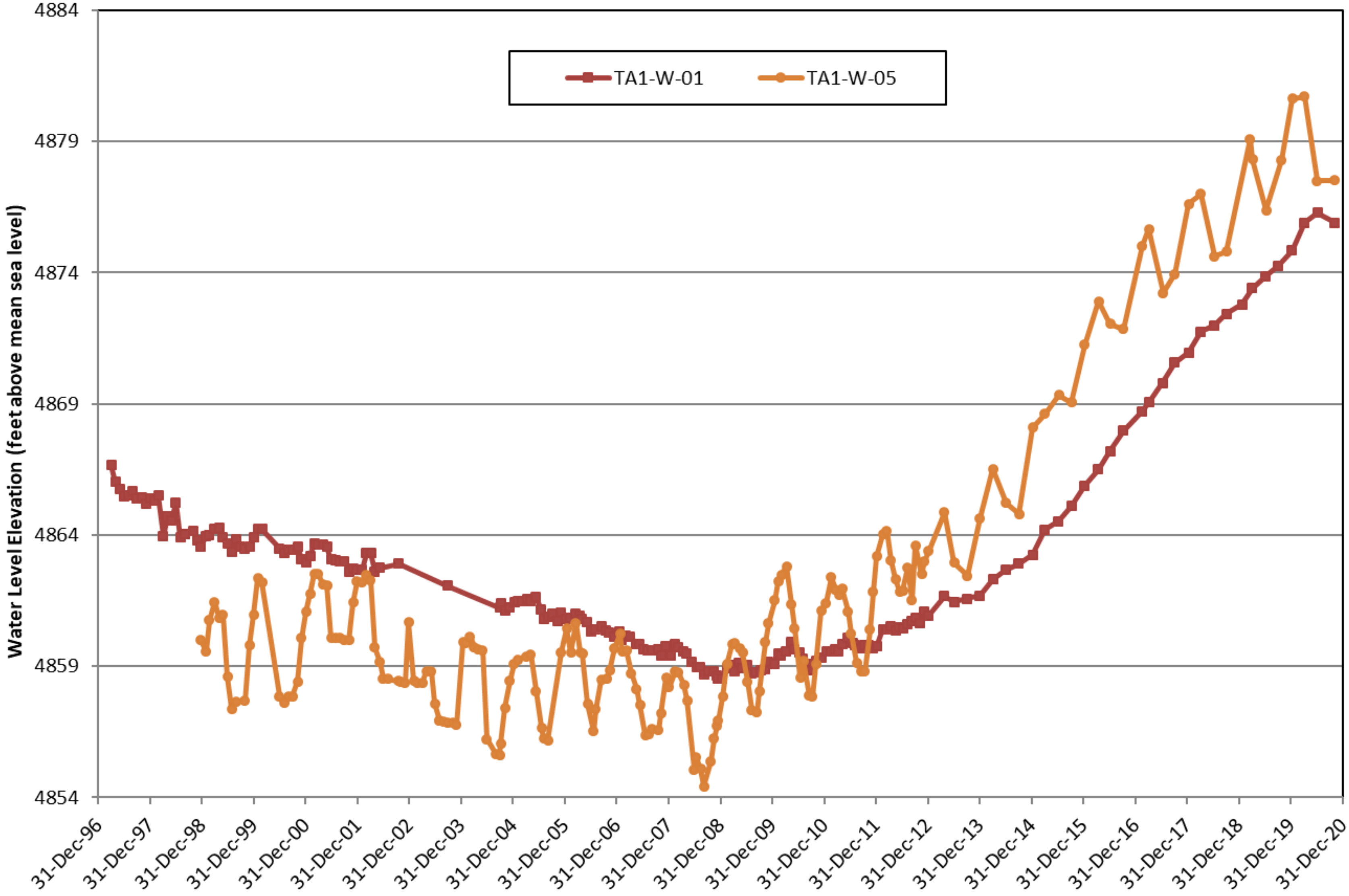

Figure 6B-1. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (1 of 10)

Figure 6B-2. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (2 of 10)

Figure 6B-3. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (3 of 10)

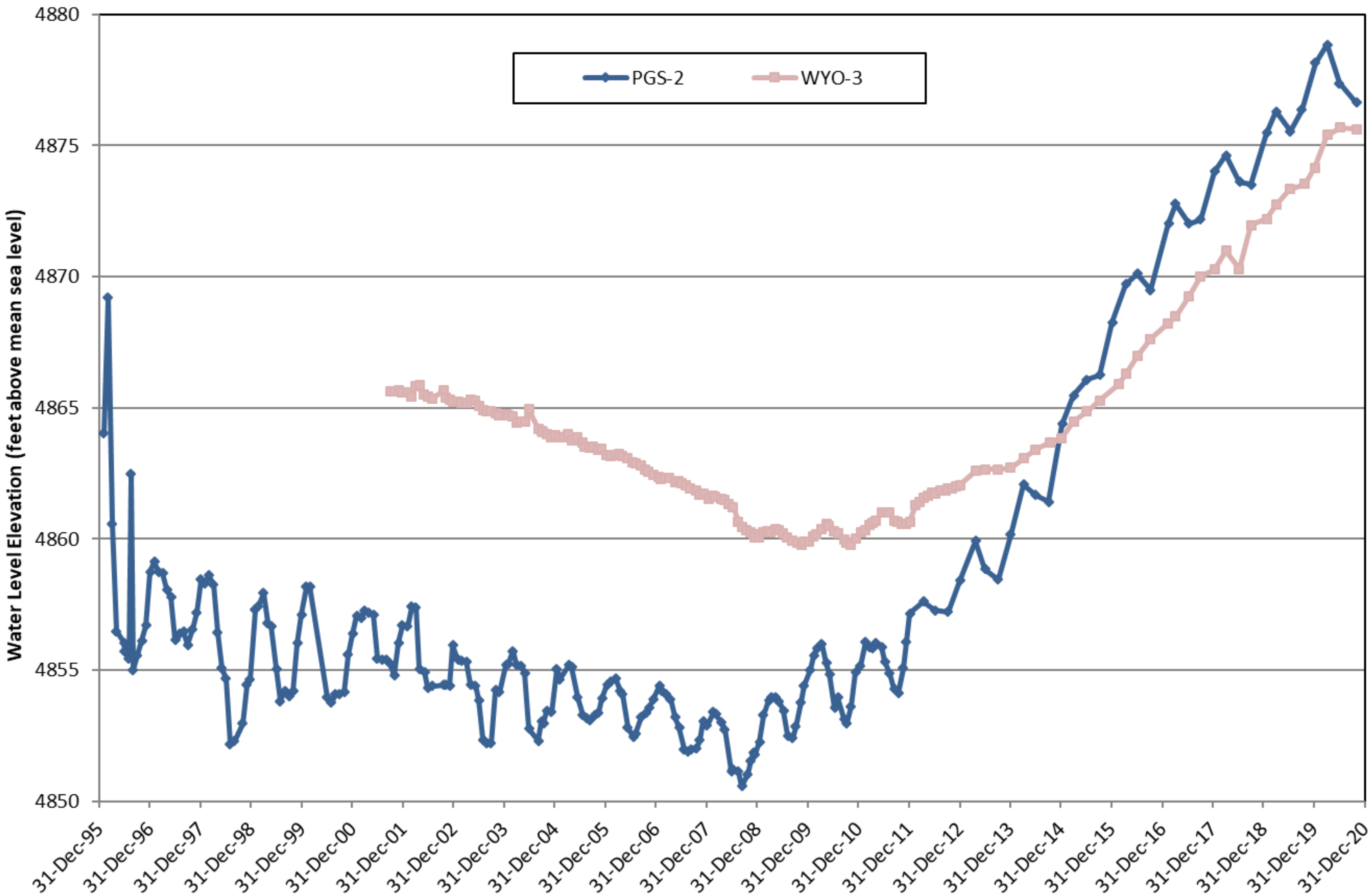

Figure 6B-4. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (4 of 10)

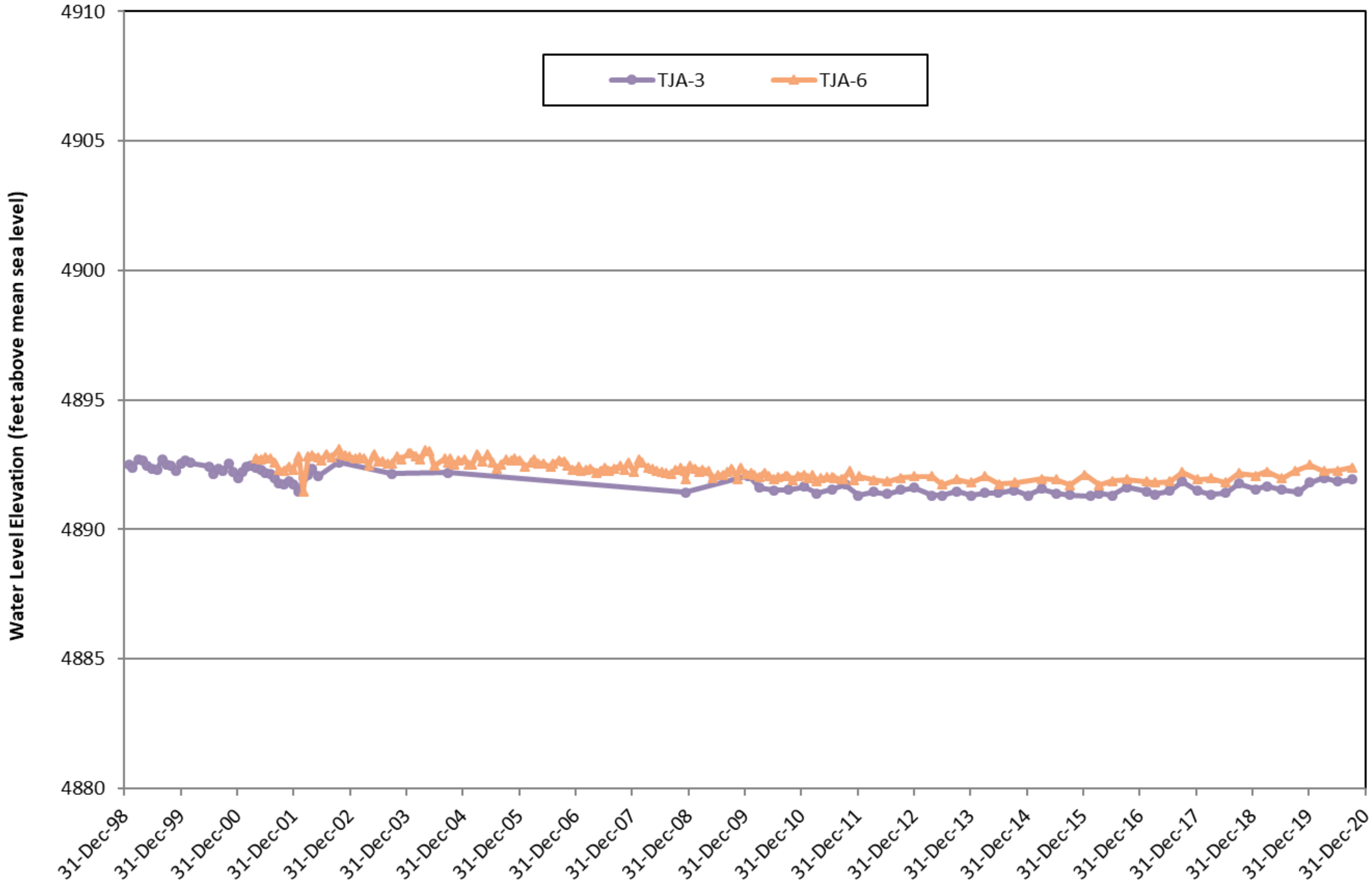

Figure 6B-5. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (5 of 10)

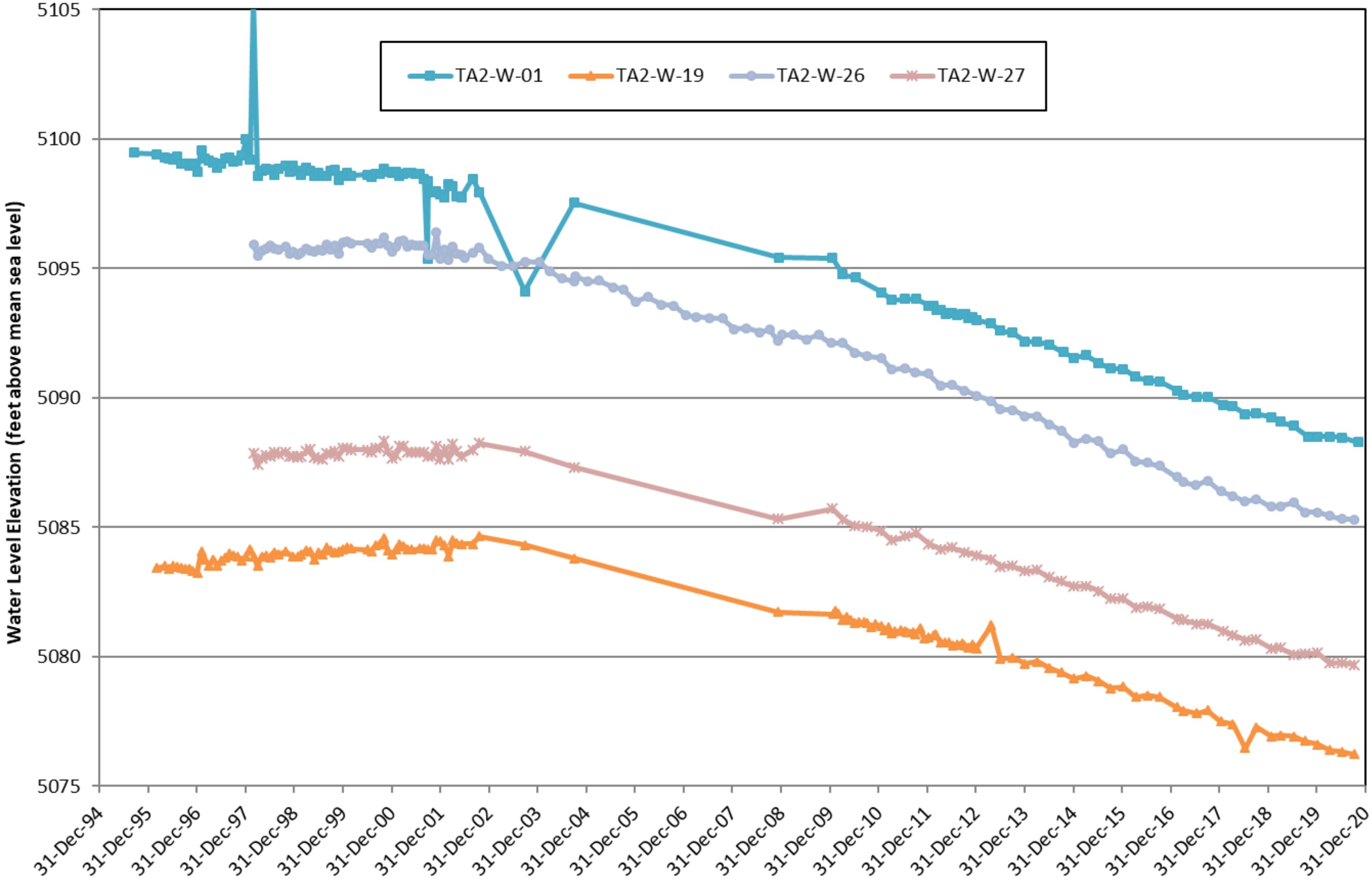

Figure 6B-6. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (6 of 10)

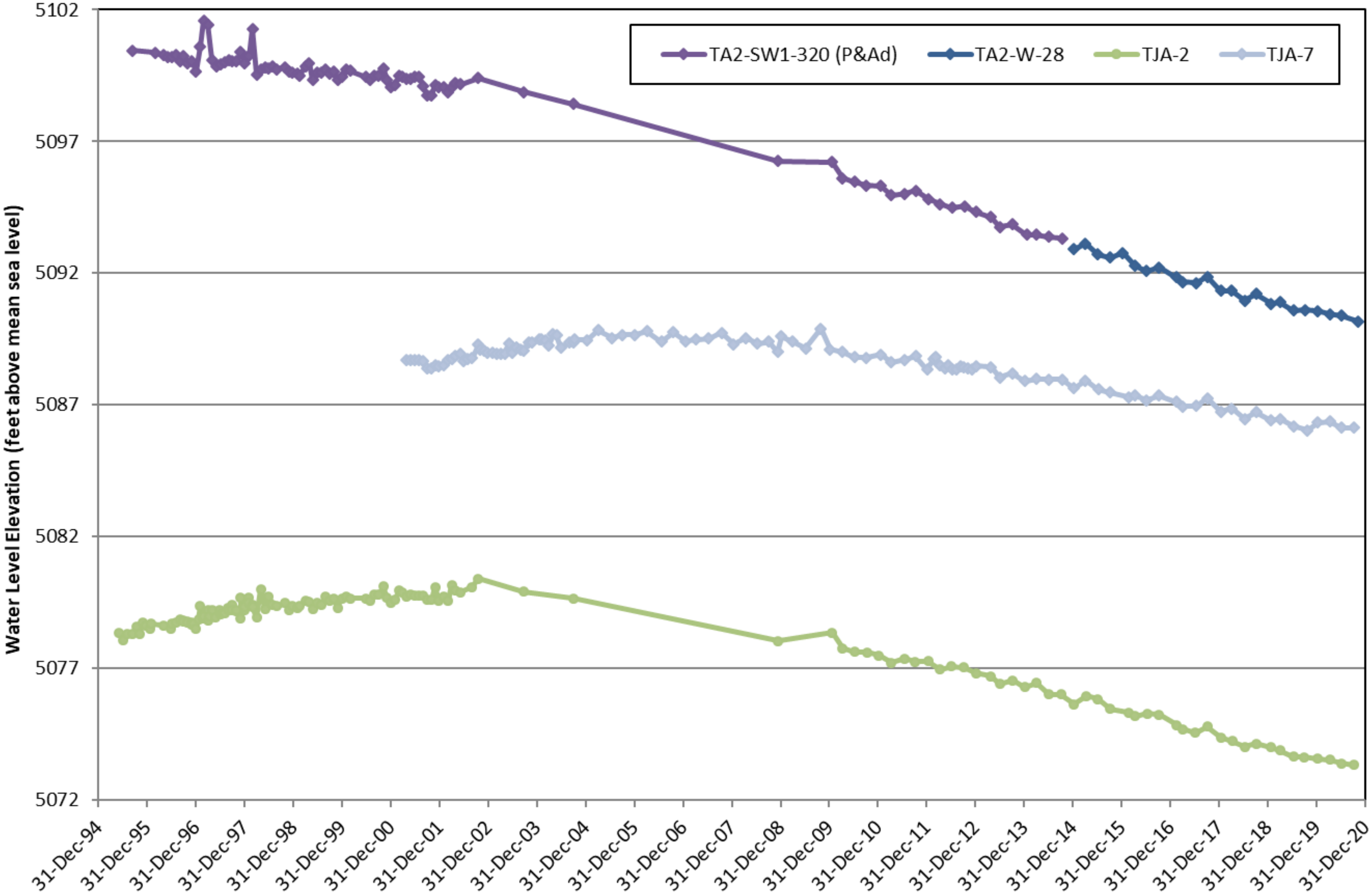

Figure 6B-7. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (7 of 10)

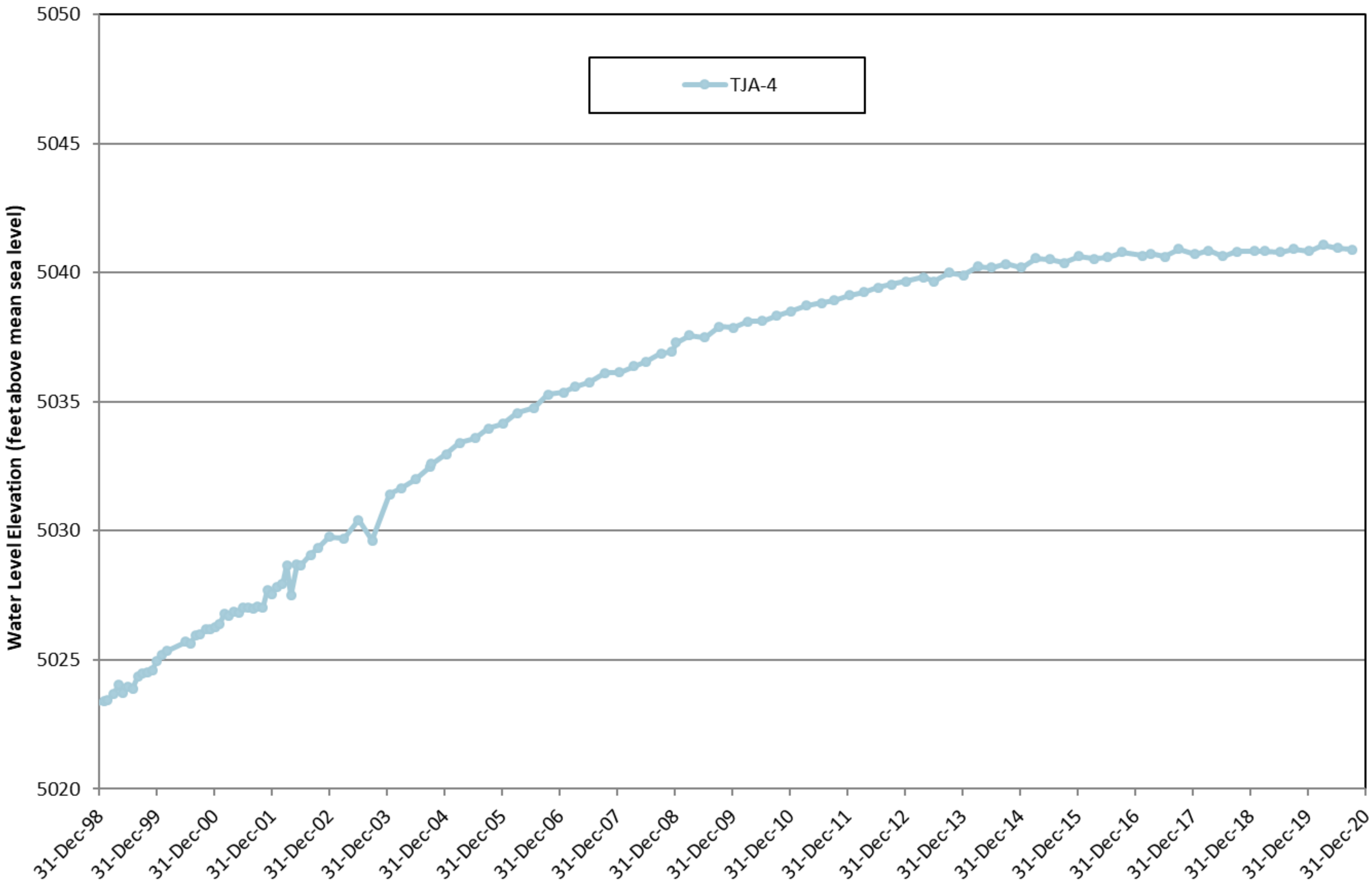

Figure 6B-8. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (8 of 10)

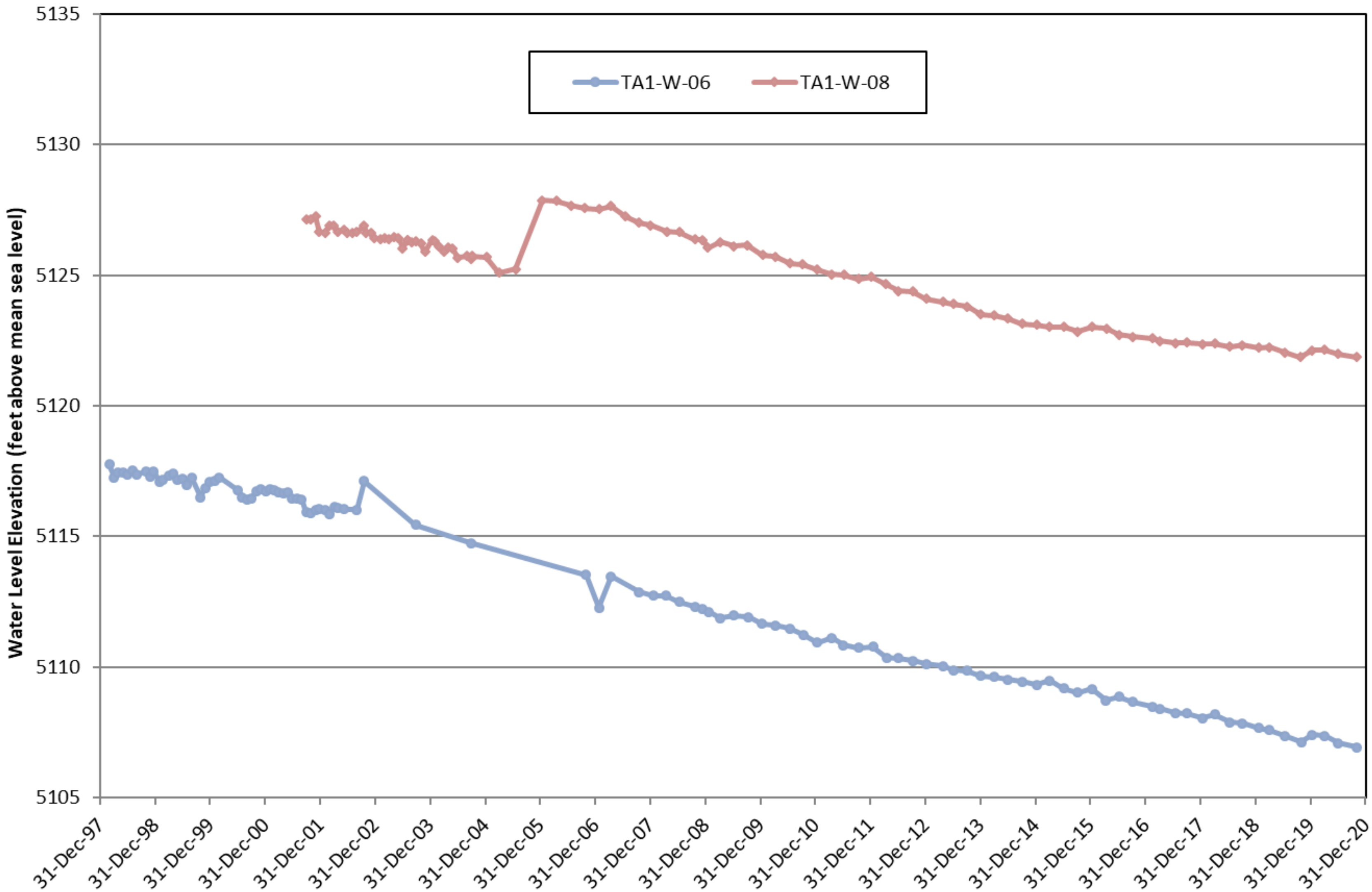

Figure 6B-9. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (9 of 10)

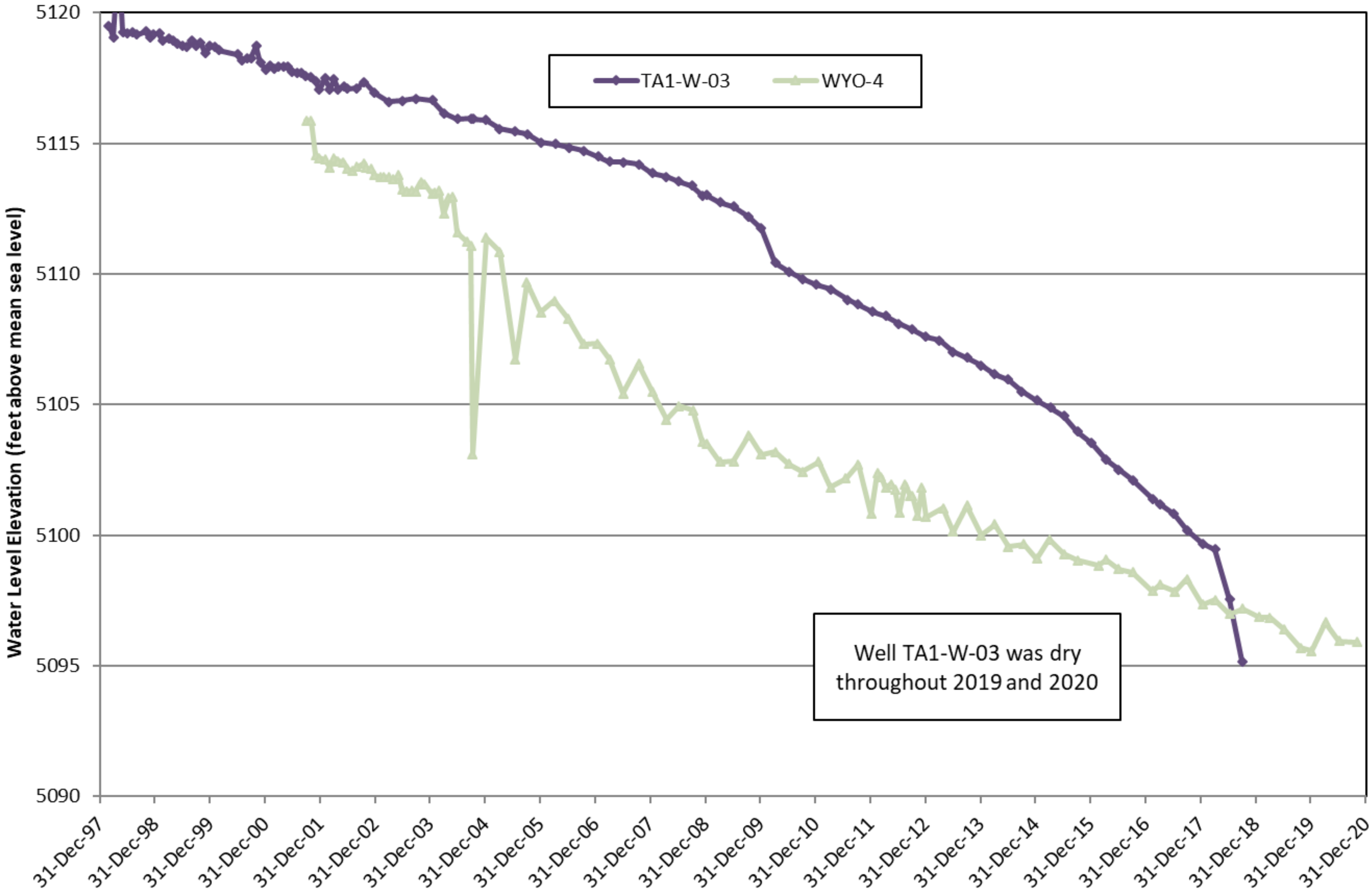

Figure 6B-10. Tijeras Arroyo Groundwater Area of Concern Monitoring Wells (10 of 10)

Attachment 6C
Tijeras Arroyo Groundwater
Analytical Results Tables

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Attachment 6C Tables

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Table 6C-1
Summary of Detected Volatile Organic Compounds
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06	1,1-Dichloroethene	1.02	0.300	1.00	7.00			112390-001	SW846-8260B
26-Feb-20	Trichloroethene	0.410	0.300	1.00	5.00	J		112390-001	SW846-8260B
TA2-W-01	Tetrachloroethene	0.370	0.300	1.00	5.00	J		112393-001	SW846-8260B
27-Feb-20	Trichloroethene	1.23	0.300	1.00	5.00			112393-001	SW846-8260B
TA2-W-19 04-Mar-20	Trichloroethene	1.79	0.300	1.00	5.00			112399-001	SW846-8260B
TA2-W-26	Chloroform	0.350	0.300	1.00	NE	J	1.00U	112397-001	SW846-8260B
02-Mar-20	1,1-Dichloroethane	0.510	0.300	1.00	NE	J		112397-001	SW846-8260B
	Tetrachloroethene	1.62	0.300	1.00	5.00			112397-001	SW846-8260B
	Trichloroethene	2.10	0.300	1.00	5.00			112397-001	SW846-8260B
	cis-1,2-Dichloroethene	0.670	0.300	1.00	70.0	J		112397-001	SW846-8260B
TA2-W-27	Tetrachloroethene	1.57	0.300	1.00	5.00			112394-001	SW846-8260B
28-Feb-20	Trichloroethene	1.10	0.300	1.00	5.00			112394-001	SW846-8260B
TJA-2	1,1-Dichloroethane	0.420	0.300	1.00	NE	J		112401-001	SW846-8260B
03-Mar-20	Trichloroethene	4.01	0.300	1.00	5.00			112401-001	SW846-8260B
	cis-1,2-Dichloroethene	0.420	0.300	1.00	70.0	J		112401-001	SW846-8260B
TJA-4 09-Mar-20	Acetone	3.43	1.50	10	NE	B, J	10.0U	112412-001	SW846-8260B
TJA-7	Acetone	2.76	1.50	10	NE	B, J	10.0U	112403-001	SW846-8260B
06-Mar-20	Trichloroethene	3.60	0.300	1.00	5.00			112403-001	SW846-8260B
TA2-W-19 18-Jun-20	Trichloroethene	1.71	0.300	1.00	5.00			113135-001	SW846-8260B
TA2-W-26	Chloroform	0.340	0.300	1.00	NE	J		113124-001	SW846-8260B
16-Jun-20	1,1-Dichloroethane	1.02	0.300	1.00	NE			113124-001	SW846-8260B
	1,1-Dichloroethene	0.360	0.300	1.00	7.00	J		113124-001	SW846-8260B
	Tetrachloroethene	2.56	0.300	1.00	5.00			113124-001	SW846-8260B
	Trichloroethene	3.68	0.300	1.00	5.00			113124-001	SW846-8260B
	cis-1,2-Dichloroethene	1.29	0.300	1.00	70.0			113124-001	SW846-8260B
TJA-2	1,1-Dichloroethane	0.390	0.300	1.00	NE	J		113130-001	SW846-8260B
17-Jun-20	Trichloroethene	4.17	0.300	1.00	5.00			113130-001	SW846-8260B
	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		113130-001	SW846-8260B
TJA-2 (Duplicate)	1,1-Dichloroethane	0.410	0.300	1.00	NE	J		113131-001	SW846-8260B
17-Jun-20	Trichloroethene	4.02	0.300	1.00	5.00			113131-001	SW846-8260B
	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		113131-001	SW846-8260B

Refer to footnotes on page 6C-48.

Table 6C-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-3 15-Jun-20	Trichloroethene	0.380	0.300	1.00	5.00	J		113122-001	SW846-8260B
TJA-7 23-Jun-20	Trichloroethene	3.80	0.300	1.00	5.00			113141-001	SW846-8260B
TJA-7 (Duplicate) 23-Jun-20	Trichloroethene	3.73	0.300	1.00	5.00			113142-001	SW846-8260B
TA1-W-06 14-Sep-20	1,1-Dichloroethene	0.870	0.300	1.00	7.00	J		113514-001	SW846-8260B
	Trichloroethene	0.420	0.300	1.00	5.00	J		113514-001	SW846-8260B
TA2-W-01 16-Sep-20	Tetrachloroethene	0.370	0.300	1.00	5.00	J		113521-001	SW846-8260B
	Trichloroethene	1.11	0.300	1.00	5.00			113521-001	SW846-8260B
TA2-W-01 (Duplicate) 16-Sep-20	Tetrachloroethene	0.350	0.300	1.00	5.00	J		113522-001	SW846-8260B
	Trichloroethene	1.08	0.300	1.00	5.00			113522-001	SW846-8260B
TA2-W-19 22-Sep-20	Trichloroethene	1.54	0.300	1.00	5.00			113528-001	SW846-8260B
TA2-W-24 31-Aug-20	Methylene chloride	1.90	1.00	10.0	5.00	B, J	10UJ	113487-001	SW846-8260B
TA2-W-26 21-Sep-20	Chloroform	0.880	0.300	1.00	NE	J		113526-001	SW846-8260B
	1,1-Dichloroethane	4.42	0.300	1.00	NE			113526-001	SW846-8260B
	1,1-Dichloroethene	1.62	0.300	1.00	7.00			113526-001	SW846-8260B
	Tetrachloroethene	4.07	0.300	1.00	5.00			113526-001	SW846-8260B
	Toluene	0.390	0.300	1.00	1000	J		113526-001	SW846-8260B
	Trichloroethene	**11.6**	0.300	1.00	5.00			113526-001	SW846-8260B
	cis 1,2-Dichloroethene	5.03	0.300	1.00	70.0			113526-001	SW846-8260B
TA2-W-27 15-Sep-20	Tetrachloroethene	1.26	0.300	1.00	5.00			113516-001	SW846-8260B
	Trichloroethene	0.920	0.300	1.00	5.00	J		113516-001	SW846-8260B
TJA-2 25-Sep-20	1,1-Dichloroethane	0.400	0.300	1.00	NE	J		113539-001	SW846-8260B
	Trichloroethene	4.19	0.300	1.00	5.00			113539-001	SW846-8260B
	cis 1,2-Dichloroethene	0.370	0.300	1.00	70.0	J		113539-001	SW846-8260B
TJA-3 09-Sep-20	Trichloroethene	0.320	0.300	1.00	5.00	J		113503-001	SW846-8260B
TJA-7 28-Sep-20	Trichloroethene	3.28	0.300	1.00	5.00			113541-001	SW846-8260B

Refer to footnotes on page 6C-48.

Table 6C-1 *(Concluded)*
Summary of Detected Volatile Organic Compounds
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-19 14-Dec-20	Trichloroethene	1.40	0.300	1.00	5.00			114086-001	SW846-8260B
TA2-W-26 21-Dec-20	Chloroform	0.550	0.300	1.00	NE	J	1.00U	114105-001	SW846-8260B
	1,1-Dichloroethane	4.93	0.300	1.00	NE			114105-001	SW846-8260B
	1,1-Dichloroethene	2.26	0.300	1.00	7.00			114105-001	SW846-8260B
	Tetrachloroethene	**7.59**	0.300	1.00	5.00			114105-001	SW846-8260B
	Trichloroethene	**15.7**	0.300	1.00	5.00			114105-001	SW846-8260B
	cis-1,2-Dichloroethene	6.76	0.300	1.00	70.0			114105-001	SW846-8260B
TA2-W-26 (Duplicate) 21-Dec-20	Chloroform	0.580	0.300	1.00	NE	J	1.00U	114106-001	SW846-8260B
	1,1-Dichloroethane	5.06	0.300	1.00	NE			114106-001	SW846-8260B
	1,1-Dichloroethene	2.26	0.300	1.00	7.00			114106-001	SW846-8260B
	Tetrachloroethene	**7.88**	0.300	1.00	5.00			114106-001	SW846-8260B
	Trichloroethene	**15.9**	0.300	1.00	5.00			114106-001	SW846-8260B
	cis-1,2-Dichloroethene	6.59	0.300	1.00	70.0			114106-001	SW846-8260B
TJA-2 11-Dec-20	1,1-Dichloroethane	0.370	0.300	1.00	NE	J		114084-001	SW846-8260B
	Trichloroethene	3.68	0.300	1.00	5.00			114084-001	SW846-8260B
	cis-1,2-Dichloroethene	0.400	0.300	1.00	70.0	J		114084-001	SW846-8260B
TJA-7 16-Dec-20	Trichloroethene	3.92	0.300	1.00	5.00			114093-001	SW846-8260B

Refer to footnotes on page 6C-48.

Table 6C-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] 8260B)
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300	Chlorobenzene	0.300
1,1,2,2-Tetrachloroethane	0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.300	Chloroform	0.300
1,1-Dichloroethane	0.300	Chloromethane	0.300
1,1-Dichloroethene	0.300	Cyclohexane	0.300
1,2,3-Trichlorobenzene	0.300	Dibromochloromethane	0.300
1,2,4-Trichlorobenzene	0.300	Dichlorodifluoromethane	0.300
1,2-Dibromo-3-chloropropane	0.500	Ethylbenzene	0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.300	Methylcyclohexane	0.300
1,2-Dichloropropane	0.300	Methylene chloride	1.00
1,3-Dichlorobenzene	0.300	Styrene	0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	2.00	Tetrachloroethene	0.300
2-Butanone	1.50	Toluene	0.300
2-Hexanone	1.50	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	1.50	Vinyl chloride	0.300
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.300	cis-1,3-Dichloropropene	0.300
Bromoform	0.300	m-, p-Xylene	0.300
Bromomethane	0.300	o-Xylene	0.300
Carbon disulfide	1.50	trans-1,2-Dichloroethene	0.300
Carbon tetrachloride	0.300	trans-1,3-Dichloropropene	0.300

Refer to footnotes on page 6C-48.

Table 6C-3
Summary of Nitrate plus Nitrite Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06 26-Feb-20	Nitrate plus nitrite	3.59	0.085	0.250	10.0			112390-003	EPA 353.2
TA2-W-01 27-Feb-20	Nitrate plus nitrite	4.32	0.085	0.250	10.0			112392-003	EPA 353.2
TA2-W-19 04-Mar-20	Nitrate plus nitrite	**12.1**	0.425	1.25	10.0			112399-003	EPA 353.2
TA2-W-26 02-Mar-20	Nitrate plus nitrite	6.70	0.170	0.500	10.0			112397-003	EPA 353.2
TA2-W-27 28-Feb-20	Nitrate plus nitrite	4.15	0.085	0.250	10.0			112394-003	EPA 353.2
TA2-W-28 05-Mar-20	Nitrate plus nitrite	**16.8**	0.850	2.50	10.0			112409-003	EPA 353.2
TA2-W-28 (Duplicate) 05-Mar-20	Nitrate plus nitrite	**17.3**	0.850	2.50	10.0			112410-003	EPA 353.2
TJA-2 03-Mar-20	Nitrate plus nitrite	**12.0**	0.425	1.25	10.0			112401-003	EPA 353.2
TJA-3 25-Feb-20	Nitrate plus nitrite	2.62	0.085	0.250	10.0			112386-003	EPA 353.2
TJA-3 (Duplicate) 25-Feb-20	Nitrate plus nitrite	2.60	0.085	0.250	10.0			112387-003	EPA 353.2
TJA-4 09-Mar-20	Nitrate plus nitrite	**31.3**	0.850	2.50	10.0			112412-003	EPA 353.2
TJA-6 24-Feb-20	Nitrate plus nitrite	2.44	0.170	0.500	10.0			112381-003	EPA 353.2
TJA-6 (Duplicate) 24-Feb-20	Nitrate plus nitrite	2.48	0.085	0.250	10.0			112382-003	EPA 353.2
TJA-7 06-Mar-20	Nitrate plus nitrite	**22.7**	0.850	2.50	10.0			112403-003	EPA 353.2
TA2-W-19 18-Jun-20	Nitrate plus nitrite	**12.0**	0.425	1.25	10.0			113135-003	EPA 353.2
TA2-W-26 16-Jun-20	Nitrate plus nitrite	6.61	0.170	0.500	10.0	N	J-	113124-003	EPA 353.2
TA2-W-28 22-Jun-20	Nitrate plus nitrite	**17.8**	0.425	1.25	10.0			113137-003	EPA 353.2

Refer to footnotes on page 6C-48.

Table 6C-3 *(Continued)*
Summary of Nitrate plus Nitrite Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-2 17-Jun-20	Nitrate plus nitrite	**11.8**	0.425	1.25	10.0			113130-003	EPA 353.2
TJA-2 (Duplicate) 17-Jun-20	Nitrate plus nitrite	**11.8**	0.425	1.25	10.0			113131-003	EPA 353.2
TJA-3 15-Jun-20	Nitrate plus nitrite	0.276	0.0170	0.0500	10.0	N	J	113122-003	EPA 353.2
TJA-4 24-Jun-20	Nitrate plus nitrite	**31.0**	0.850	2.50	10.0			113145-003	EPA 353.2
TJA-7 23-Jun-20	Nitrate plus nitrite	**22.0**	0.425	1.25	10.0			113141-003	EPA 353.2
TJA-7 (Duplicate) 23-Jun-20	Nitrate plus nitrite	**22.1**	0.425	1.25	10.0			113142-003	EPA 353.2
TA1-W-01 02-Sep-20	Nitrate plus nitrite	2.59	0.085	0.250	10.0			113493-003	EPA 353.2
TA1-W-01 (Duplicate) 02-Sep-20	Nitrate plus nitrite	2.59	0.085	0.250	10.0			113493-003	EPA 353.2
TA1-W-02 24-Aug-20	Nitrate plus nitrite	1.13	0.017	0.050	10.0			113466-003	EPA 353.2
TA1-W-04 26-Aug-20	Nitrate plus nitrite	1.88	0.085	0.250	10.0			113481-003	EPA 353.2
TA1-W-05 25-Aug-20	Nitrate plus nitrite	1.29	0.017	0.050	10.0			113470-003	EPA 353.2
TA1-W-05 (Duplicate) 25-Aug-20	Nitrate plus nitrite	1.29	0.017	0.050	10.0			113471-003	EPA 353.2
TA1-W-06 14-Sep-20	Nitrate plus nitrite	3.51	0.085	0.250	10.0			113514-003	EPA 353.2
TA1-W-08 17-Sep-20	Nitrate plus nitrite	8.25	0.425	1.25	10.0			113524-003	EPA 353.2
TA2-NW1-595 10-Sep-20	Nitrate plus nitrite	4.03	0.085	0.250	10.0			113508-003	EPA 353.2
TA2-NW1-595 (Duplicate) 10-Sep-20	Nitrate plus nitrite	3.99	0.085	0.250	10.0			113509-003	EPA 353.2
TA2-W-01 16-Sep-20	Nitrate plus nitrite	4.20	0.170	0.500	10.0			113521-003	EPA 353.2

Refer to footnotes on page 6C-48.

Table 6C-3 *(Continued)*
Summary of Nitrate plus Nitrite Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01 (Duplicate) 16-Sep-20	Nitrate plus nitrite	4.17	0.170	0.500	10.0			113522-003	EPA 353.2
TA2-W-19 22-Sep-20	Nitrate plus nitrite	**11.5**	0.850	2.50	10.0			113528-003	EPA 353.2
TA2-W-24 31-Aug-20	Nitrate plus nitrite	2.20	0.085	0.250	10.0			113487-003	EPA 353.2
TA2-W-25 08-Sep-20	Nitrate plus nitrite	3.55	0.170	0.500	10.0			113500-003	EPA 353.2
TA2-W-25 (Duplicate) 08-Sep-20	Nitrate plus nitrite	3.61	0.170	0.500	10.0			113501-003	EPA 353.2
TA2-W-26 21-Sep-20	Nitrate plus nitrite	5.27	0.170	0.500	10.0			113526-003	EPA 353.2
TA2-W-27 15-Sep-20	Nitrate plus nitrite	4.02	0.085	0.250	10.0			113516-003	EPA 353.2
TA2-W-28 24-Sep-20	Nitrate plus nitrite	**17.1**	0.425	1.25	10.0			113536-003	EPA 353.2
TA2-W-28 (Duplicate) 24-Sep-20	Nitrate plus nitrite	**16.8**	0.425	1.25	10.0			113537-003	EPA 353.2
TJA-2 25-Sep-20	Nitrate plus nitrite	**10.7**	0.425	1.25	10.0			113539-003	EPA 353.2
TJA-3 09-Sep-20	Nitrate plus nitrite	2.72	0.085	0.250	10.0			113503-003	EPA 353.2
TJA-4 29-Sep-20	Nitrate plus nitrite	**29.2**	0.850	2.50	10.0			113544-003	EPA 353.2
TJA-5 23-Sep-20	Nitrate plus nitrite	**16.7**	0.850	2.50	10.0			113530-003	EPA 353.2
TJA-6 03-Sep-20	Nitrate plus nitrite	2.48	0.085	0.250	10.0			113496-003	EPA 353.2
TJA-7 28-Sep-20	Nitrate plus nitrite	**20.7**	0.850	2.50	10.0			113541-003	EPA 353.2
WYO-3 27-Aug-20	Nitrate plus nitrite	2.15	0.085	0.250	10.0			113483-003	EPA 353.2

Refer to footnotes on page 6C-48.

Table 6C-3 *(Concluded)*
Summary of Nitrate plus Nitrite Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-19 14-Dec-20	Nitrate plus nitrite	**11.8**	0.170	0.500	10.0			114086-002	EPA 353.2
TA2-W-26 21-Dec-20	Nitrate plus nitrite	6.26	0.170	0.500	10.0			114105-002	EPA 353.2
TA2-W-26 (Duplicate) 21-Dec-20	Nitrate plus nitrite	6.43	0.170	0.500	10.0			114106-002	EPA 353.2
TA2-W-28 15-Dec-20	Nitrate plus nitrite	**17.6**	0.850	2.50	10.0			114091-002	EPA 353.2
TJA-2 11-Dec-20	Nitrate plus nitrite	**11.6**	0.170	0.500	10.0			114084-002	EPA 353.2
TJA-3 10-Dec-20	Nitrate plus nitrite	2.69	0.0850	0.250	10.0			114081-002	EPA 353.2
TJA-4 17-Dec-20	Nitrate plus nitrite	**31.9**	0.850	2.50	10.0			114099-002	EPA 353.2
TJA-4 (Duplicate) 17-Dec-20	Nitrate plus nitrite	**30.6**	0.850	2.50	10.0			114100-002	EPA 353.2
TJA-7 16-Dec-20	Nitrate plus nitrite	**22.2**	0.850	2.50	10.0			114093-002	EPA 353.2

Refer to footnotes on page 6C-48.

Table 6C-4
Summary of 1,4-Dioxane Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06 26-Feb-20	1,4-Dioxane	0.276	0.100	0.400	NE	J, N, *	J+	112330-002	SW846-8270D SIM
TA2-W-01 27-Feb-20	1,4-Dioxane	1.06	0.100	0.400	NE	N, *	J+	112392-002	SW846-8270D SIM
TA2-W-19 04-Mar-20	1,4-Dioxane	0.563	0.100	0.400	NE			112399-002	SW846-8270D SIM
TA2-W-26 02-Mar-20	1,4-Dioxane	0.316	0.100	0.400	NE	J, N, *	J+	112397-002	SW846-8270D SIM
TA2-W-27 28-Feb-20	1,4-Dioxane	1.34	0.100	0.400	NE	N, *	J+	112394-002	SW846-8270D SIM
TA2-W-28 05-Mar-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112409-002	SW846-8270D SIM
TA2-W-28 (Duplicate) 05-Mar-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112410-002	SW846-8270D SIM
TJA-2 03-Mar-20	1,4-Dioxane	1.02	0.100	0.400	NE			112401-002	SW846-8270D SIM
TJA-3 25-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U, *	UJ	112386-002	SW846-8270D SIM
TJA-3 (Duplicate) 25-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U, *	UJ	112387-002	SW846-8270D SIM
TJA-4 09-Mar-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112412-002	SW846-8270D SIM
TJA-6 24-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U, *	UJ	112381-002	SW846-8270D SIM
TJA-6 (Duplicate) 24-Feb-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U, *	UJ	112382-002	SW846-8270D SIM
TJA-7 06-Mar-20	1,4-Dioxane	ND	0.100	0.400	NE	U		112403-002	SW846-8270D SIM
TA2-W-19 18-Jun-20	1,4-Dioxane	0.401	0.100	0.400	NE			113135-002	SW846-8270D SIM
TA2-W-26 16-Jun-20	1,4-Dioxane	0.235	0.100	0.400	NE	J		113124-002	SW846-8270D SIM
TA2-W-28 22-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113137-002	SW846-8270D SIM

Refer to footnotes on page 6C-48.

Table 6C-4 *(Continued)*
Summary of 1,4-Dioxane Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-2 17-Jun-20	1,4-Dioxane	0.912	0.100	0.400	NE			113130-002	SW846-8270D SIM
TJA-2 (Duplicate) 17-Jun-20	1,4-Dioxane	0.965	0.100	0.400	NE			113131-002	SW846-8270D SIM
TJA-3 15-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113122-002	SW846-8270D SIM
TJA-4 24-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	UJ	113145-002	SW846-8270D SIM
TJA-7 23-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	UJ	113141-002	SW846-8270D SIM
TJA-7 (Duplicate) 23-Jun-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	UJ	113142-002	SW846-8270D SIM
TA1-W-01 02-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113493-002	SW846-8270D SIM
TA1-W-01 (Duplicate) 02-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113494-002	SW846-8270D SIM
TA1-W-02 24-Aug-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113466-002	SW846-8270D SIM
TA1-W-04 26-Aug-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113481-002	SW846-8270D SIM
TA1-W-05 25-Aug-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113470-002	SW846-8270D SIM
TA1-W-05 (Duplicate) 25-Aug-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113471-002	SW846-8270D SIM
TA1-W-06 14-Sep-20	1,4-Dioxane	0.238	0.100	0.400	NE	J		113514-002	SW846-8270D SIM
TA1-W-08 17-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113524-002	SW846-8270D SIM
TA2-NW1-595 17-Sep-20	1,4-Dioxane	0.143	0.100	0.400	NE	J		113508-002	SW846-8270D SIM
TA2-NW1-595 (Duplicate) 17-Sep-20	1,4-Dioxane	0.151	0.100	0.400	NE	J		113509-002	SW846-8270D SIM
TA2-W-01 16-Sep-20	1,4-Dioxane	0.858	0.100	0.400	NE			113521-002	SW846-8270D SIM

Refer to footnotes on page 6C-48.

Table 6C-4 *(Concluded)*
Summary of 1,4-Dioxane Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01 (Duplicate) 16-Sep-20	1,4-Dioxane	0.685	0.100	0.400	NE			113522-002	SW846-8270D SIM
TA2-W-24 31-Aug-20	1,4-Dioxane	ND	0.100	0.400	NE	N, U	UJ	113487-002	SW846-8270D SIM
TA2-W-25 08-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113500-002	SW846-8270D SIM
TA2-W-25 (Duplicate) 08-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113501-002	SW846-8270D SIM
TA2-W-27 15-Sep-20	1,4-Dioxane	1.16	0.100	0.400	NE	N	J-	113516-002	SW846-8270D SIM
TJA-3 09-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113503-002	SW846-8270D SIM
TJA-5 23-Sep-20	1,4-Dioxane	0.119	0.100	0.400	NE	J		113530-002	SW846-8270D SIM
TJA-6 03-Sep-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113496-002	SW846-8270D SIM
WYO-3 27-Aug-20	1,4-Dioxane	ND	0.100	0.400	NE	U		113483-002	SW846-8270D SIM

Refer to footnotes on page 6C-48.

Table 6C-5
Summary of Anions and Alkalinity Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-01	Bromide	0.193	0.067	0.200	NE	J		113493-004	SW846-056A
02-Sep-20	Chloride	14.0	0.335	1.00	NE			113493-004	SW846-056A
	Fluoride	0.419	0.033	0.100	4.0			113493-004	SW846-056A
	Sulfate	77.0	0.655	2.00	NE			113493-004	SW846-056A
	Bicarbonate Alkalinity	175	1.45	4.00	NE			113493-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113493-005	SM 2320B
TA1-W-02	Bromide	0.217	0.067	0.200	NE			113466-004	SW846-056A
24-Aug-20	Chloride	14.8	0.670	2.00	NE			113466-004	SW846-056A
	Fluoride	0.456	0.033	0.100	4.0			113466-004	SW846-056A
	Sulfate	75.6	1.33	4.00	NE			113466-004	SW846-056A
	Bicarbonate Alkalinity	174	1.45	4.00	NE			113466-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113466-005	SM 2320B
TA1-W-04	Bromide	0.183	0.067	0.200	NE	J		113481-004	SW846-056A
26-Aug-20	Chloride	13.7	0.670	2.00	NE			113481-004	SW846-056A
	Fluoride	0.446	0.033	0.100	4.0			113481-004	SW846-056A
	Sulfate	65.1	1.33	4.00	NE			113481-004	SW846-056A
	Bicarbonate Alkalinity	175	1.45	4.00	NE			113481-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113481-005	SM 2320B
TA1-W-05	Bromide	0.144	0.067	0.200	NE	J		113470-004	SW846-056A
25-Aug-20	Chloride	11.0	0.670	2.00	NE			113470-004	SW846-056A
	Fluoride	0.314	0.033	0.100	4.0			113470-004	SW846-056A
	Sulfate	98.8	1.33	4.00	NE			113470-004	SW846-056A
	Bicarbonate Alkalinity	212	1.45	4.00	NE			113470-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113470-005	SM 2320B
TA1-W-06	Bromide	1.56	0.067	0.200	NE			113514-004	SW846-056A
14-Sep-20	Chloride	96.2	1.34	4.00	NE			113514-004	SW846-056A
	Fluoride	0.275	0.033	0.100	4.0			113514-004	SW846-056A
	Sulfate	200	2.66	8.00	NE			113514-004	SW846-056A
	Bicarbonate Alkalinity	89.2	1.45	4.00	NE			113514-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113514-005	SM 2320B
TA1-W-08	Bromide	2.71	0.067	0.200	NE			113524-004	SW846-056A
17-Sep-20	Chloride	217	6.70	20.0	NE			113524-004	SW846-056A
	Fluoride	0.228	0.033	0.100	4.0			113524-004	SW846-056A
	Sulfate	681	13.3	40.0	NE			113524-004	SW846-056A
	Bicarbonate Alkalinity	83.2	1.45	4.00	NE			113524-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113524-005	SM 2320B

Refer to footnotes on page 6CA-48.

Table 6C-5 *(Continued)*
Summary of Anions and Alkalinity Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-NW1-595	Bromide	1.14	0.067	0.200	NE			113508-004	SW846-056A
10-Sep-20	Chloride	73.5	1.34	4.0	NE			113508-004	SW846-056A
	Fluoride	0.295	0.033	0.100	4.0			113508-004	SW846-056A
	Sulfate	89.7	2.66	8.00	NE			113508-004	SW846-056A
	Bicarbonate Alkalinity	140	1.45	4.00	NE			113508-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113508-005	SM 2320B
TA2-W-01	Bromide	1.38	0.067	0.200	NE			113521-004	SW846-056A
16-Sep-20	Chloride	92.0	1.34	4.00	NE			113521-004	SW846-056A
	Fluoride	0.361	0.033	0.100	4.0			113521-004	SW846-056A
	Sulfate	60.8	2.66	8.00	NE			113521-004	SW846-056A
	Bicarbonate Alkalinity	97.9	1.45	4.00	NE			113521-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113521-005	SM 2320B
TA2-W-19	Bromide	0.701	0.067	0.200	NE			113528-004	SW846-056A
22-Sep-20	Chloride	50.4	0.670	2.00	NE			113528-004	SW846-056A
	Fluoride	0.358	0.033	0.100	4.0			113528-004	SW846-056A
	Sulfate	57.7	1.33	4.00	NE			113528-004	SW846-056A
	Bicarbonate Alkalinity	115	1.45	4.00	NE			113528-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113528-005	SM 2320B
TA2-W-24	Bromide	0.190	0.067	0.200	NE	J		113487-004	SW846-056A
31-Aug-20	Chloride	14.4	0.335	1.00	NE			113487-004	SW846-056A
	Fluoride	0.545	0.033	0.100	4.0			113487-004	SW846-056A
	Sulfate	48.3	0.665	2.00	NE			113487-004	SW846-056A
	Bicarbonate Alkalinity	163	1.45	4.00	NE			113487-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113487-005	SM 2320B
TA2-W-25	Bromide	0.216	0.067	0.200	NE			113500-004	SW846-056A
08-Sep-20	Chloride	13.9	0.335	1.00	NE			113500-004	SW846-056A
	Fluoride	0.326	0.033	0.100	4.0			113500-004	SW846-056A
	Sulfate	71.5	0.665	2.00	NE			113500-004	SW846-056A
	Bicarbonate Alkalinity	170	1.45	4.00	NE			113500-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113500-005	SM 2320B
TA2-W-26	Bromide	0.668	0.067	0.200	NE			113526-004	SW846-056A
21-Sep-20	Chloride	53.0	0.670	2.00	NE			113526-004	SW846-056A
	Fluoride	0.267	0.033	0.100	4.0			113526-004	SW846-056A
	Sulfate	139	1.33	4.00	NE			113526-004	SW846-056A
	Bicarbonate Alkalinity	147	1.45	4.00	NE			113526-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113526-005	SM 2320B

Refer to footnotes on page 6C-48.

Table 6C-5 *(Continued)*
Summary of Anions and Alkalinity Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-27	Bromide	1.47	0.067	0.200	NE			113516-004	SW846-056A
15-Sep-20	Chloride	105	1.34	4.00	NE		J	113516-004	SW846-056A
	Fluoride	0.299	0.033	0.100	4.0			113516-004	SW846-056A
	Sulfate	146	2.66	8.00	NE		J	113516-004	SW846-056A
	Bicarbonate Alkalinity	97.5	1.45	4.00	NE			113516-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113516-005	SM 2320B
TA2-W-28	Bromide	0.597	0.067	0.200	NE			113536-004	SW846-056A
24-Sep-20	Chloride	38.2	0.335	1.00	NE			113536-004	SW846-056A
	Fluoride	0.432	0.033	0.100	4.0			113536-004	SW846-056A
	Sulfate	16.2	1.33	4.00	NE		J	113536-004	SW846-056A
	Bicarbonate Alkalinity	122	1.45	4.00	NE			113536-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113536-005	SM 2320B
TJA-2	Bromide	0.846	0.067	0.200	NE			113539-004	SW846-056A
25-Sep-20	Chloride	60.6	0.670	2.0	NE			113539-004	SW846-056A
	Fluoride	0.366	0.033	0.100	4.0			113539-004	SW846-056A
	Sulfate	50.5	1.33	4.00	NE			113539-004	SW846-056A
	Bicarbonate Alkalinity	112	1.45	4.00	NE			113539-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113539-005	SM 2320B
TJA-3	Bromide	0.171	0.067	0.200	NE	J		113503-004	SW846-056A
09-Sep-20	Chloride	12.4	0.335	1.00	NE			113503-004	SW846-056A
	Fluoride	0.332	0.033	0.100	4.0			113503-004	SW846-056A
	Sulfate	78.6	0.665	2.00	NE			113503-004	SW846-056A
	Bicarbonate Alkalinity	173	1.45	4.00	NE			113503-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113503-005	SM 2320B
TJA-4	Bromide	0.367	0.067	0.200	NE			113544-004	SW846-056A
29-Sep-20	Chloride	21.2	0.335	1.00	NE			113544-004	SW846-056A
	Fluoride	0.413	0.033	0.100	4.0			113544-004	SW846-056A
	Sulfate	17.3	0.133	0.400	NE		J	113544-004	SW846-056A
	Bicarbonate Alkalinity	139	1.45	4.00	NE			113544-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113544-005	SM 2320B
TJA-5	Bromide	0.306	0.067	0.200	NE			113530-004	SW846-056A
23-Sep-20	Chloride	18.1	0.670	2.00	NE			113530-004	SW846-056A
	Fluoride	0.377	0.033	0.100	4.0			113530-004	SW846-056A
	Sulfate	96.6	1.33	4.00	NE			113530-004	SW846-056A
	Bicarbonate Alkalinity	124	1.45	4.00	NE			113530-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113530-005	SM 2320B

Refer to footnotes on page 6C-48.

Table 6C-5 *(Concluded)*
Summary of Anions and Alkalinity Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-6	Bromide	0.182	0.067	0.200	NE	J		113496-004	SW846-056A
03-Sep-20	Chloride	13.6	0.335	1.00	NE			113496-004	SW846-056A
	Fluoride	0.389	0.033	0.100	4.0			113496-004	SW846-056A
	Sulfate	61.2	0.665	2.00	NE			113496-004	SW846-056A
	Bicarbonate Alkalinity	164	1.45	4.00	NE			113496-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113496-005	SM 2320B
TJA-7	Bromide	0.422	0.067	0.200	NE			113541-004	SW846-056A
28-Sep-20	Chloride	22.9	0.335	1.00	NE			113541-004	SW846-056A
	Fluoride	0.395	0.033	0.100	4.0			113541-004	SW846-056A
	Sulfate	23.3	0.665	2.00	NE			113541-004	SW846-056A
	Bicarbonate Alkalinity	132	1.45	4.00	NE			113541-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113541-005	SM 2320B
WYO-3	Bromide	0.196	0.067	0.200	NE	J		113483-004	SW846-056A
27-Aug-20	Chloride	14.6	0.670	2.00	NE			113483-004	SW846-056A
	Fluoride	0.512	0.033	0.100	4.0			113483-004	SW846-056A
	Sulfate	84.2	1.33	4.00	NE			113483-004	SW846-056A
	Bicarbonate Alkalinity	173	1.45	4.00	NE			113483-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113483-005	SM 2320B

Refer to footnotes on page 6C-48.

Table 6C-6
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-01	Aluminum	ND	0.0193	0.050	NE	U		113493-006	SW846-6020B
02-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113493-006	SW846-6020B
	Arsenic	0.00202	0.002	0.005	0.010	J		113493-006	SW846-6020B
	Barium	0.0602	0.00067	0.004	2.00			113493-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113493-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113493-006	SW846-6020B
	Calcium	74.5	0.800	2.00	NE			113493-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113493-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113493-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113493-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113493-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113493-006	SW846-6020B
	Magnesium	14.0	0.010	0.030	NE			113493-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113493-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113493-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113493-006	SW846-6020B
	Potassium	2.56	0.080	0.300	NE			113493-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113493-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113493-006	SW846-6020B
	Sodium	27.8	0.080	0.250	NE			113493-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113493-006	SW846-6020B
	Uranium	0.00351	0.000067	0.0002	0.030			113493-006	SW846-6020B
	Vanadium	0.0056	0.0033	0.020	NE	B, J	0.02U	113493-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113493-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-02	Aluminum	ND	0.0193	0.050	NE	U		113466-006	SW846-6020B
24-Aug-20	Antimony	ND	0.001	0.003	0.006	U		113466-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113466-006	SW846-6020B
	Barium	0.0487	0.00067	0.004	2.00			113466-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113466-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113466-006	SW846-6020B
	Calcium	72.4	0.400	1.00	NE			113466-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113466-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113466-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113466-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113466-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113466-006	SW846-6020B
	Magnesium	13.5	0.010	0.030	NE			113466-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113466-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113466-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113466-006	SW846-6020B
	Potassium	2.14	0.080	0.300	NE			113466-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113466-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113466-006	SW846-6020B
	Sodium	25.6	0.080	0.250	NE			113466-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113466-006	SW846-6020B
	Uranium	0.00324	0.000067	0.0002	0.030			113466-006	SW846-6020B
	Vanadium	0.00539	0.0033	0.020	NE	J		113466-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113466-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-04	Aluminum	ND	0.0193	0.050	NE	U		113481-006	SW846-6020B
26-Aug-20	Antimony	ND	0.001	0.003	0.006	U		113481-006	SW846-6020B
	Arsenic	0.00222	0.002	0.005	0.010	J		113481-006	SW846-6020B
	Barium	0.0700	0.00067	0.004	2.00			113481-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113481-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113481-006	SW846-6020B
	Calcium	70.4	0.400	1.00	NE			113481-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113481-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113481-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113481-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113481-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113481-006	SW846-6020B
	Magnesium	12.6	0.010	0.030	NE			113481-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113481-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113481-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113481-006	SW846-6020B
	Potassium	2.32	0.080	0.300	NE			113481-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113481-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113481-006	SW846-6020B
	Sodium	28.3	0.080	0.250	NE			113481-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113481-006	SW846-6020B
	Uranium	0.00345	0.000067	0.0002	0.030			113481-006	SW846-6020B
	Vanadium	0.00584	0.0033	0.020	NE	J		113481-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113481-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-05	Aluminum	ND	0.0193	0.050	NE	U		113470-006	SW846-6020B
25-Aug-20	Antimony	ND	0.001	0.003	0.006	U		113470-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113470-006	SW846-6020B
	Barium	0.0361	0.00067	0.004	2.00			113470-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113470-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113470-006	SW846-6020B
	Calcium	89.1	0.400	1.00	NE			113470-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113470-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113470-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113470-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113470-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113470-006	SW846-6020B
	Magnesium	12.9	0.010	0.030	NE			113470-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113470-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113470-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113470-006	SW846-6020B
	Potassium	2.30	0.080	0.300	NE			113470-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113470-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113470-006	SW846-6020B
	Sodium	35.8	0.080	0.250	NE			113470-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113470-006	SW846-6020B
	Uranium	0.00349	0.000067	0.0002	0.030			113470-006	SW846-6020B
	Vanadium	0.00397	0.0033	0.020	NE	J		113470-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113470-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06	Aluminum	0.0422	0.0193	0.050	NE	J		113514-006	SW846-6020B
14-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113514-006	SW846-6020B
	Arsenic	0.00222	0.002	0.005	0.010	J		113514-006	SW846-6020B
	Barium	0.0261	0.00067	0.004	2.00			113514-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113514-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113514-006	SW846-6020B
	Calcium	119	0.800	2.00	NE			113514-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113514-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113514-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113514-006	SW846-6020B
	Iron	0.0481	0.033	0.100	NE	J		113514-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113514-006	SW846-6020B
	Magnesium	16.1	0.010	0.030	NE			113514-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113514-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113514-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113514-006	SW846-6020B
	Potassium	2.03	0.080	0.300	NE			113514-006	SW846-6020B
	Selenium	0.00842	0.002	0.005	0.050			113514-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113514-006	SW846-6020B
	Sodium	31.8	0.080	0.250	NE			113514-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113514-006	SW846-6020B
	Uranium	0.00111	0.000067	0.0002	0.030			113514-006	SW846-6020B
	Vanadium	0.00456	0.0033	0.020	NE	J		113514-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113514-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-08	Aluminum	ND	0.0193	0.050	NE	U		113524-006	SW846-6020B
17-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113524-006	SW846-6020B
	Arsenic	0.00212	0.002	0.005	0.010	J		113524-006	SW846-6020B
	Barium	0.0184	0.00067	0.004	2.00			113524-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113524-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113524-006	SW846-6020B
	Calcium	343	0.800	2.00	NE			113524-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113524-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113524-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113524-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113524-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113524-006	SW846-6020B
	Magnesium	36.3	0.010	0.030	NE			113524-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U	R	113524-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113524-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113524-006	SW846-6020B
	Potassium	2.94	0.080	0.300	NE			113524-006	SW846-6020B
	Selenium	0.0282	0.002	0.005	0.050			113524-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113524-006	SW846-6020B
	Sodium	88.2	0.800	2.50	NE			113524-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113524-006	SW846-6020B
	Uranium	0.00167	0.000067	0.0002	0.030			113524-006	SW846-6020B
	Vanadium	ND	0.0033	0.020	NE	U		113524-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113524-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-NW1-595	Aluminum	ND	0.0193	0.050	NE	U		113508-006	SW846-6020B
10-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113508-006	SW846-6020B
	Arsenic	0.00212	0.002	0.005	0.010	J	0.0005U	113508-006	SW846-6020B
	Barium	0.0426	0.00067	0.004	2.00			113508-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113508-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113508-006	SW846-6020B
	Calcium	94.2	0.400	1.00	NE			113508-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113508-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113508-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113508-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113508-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113508-006	SW846-6020B
	Magnesium	15.2	0.010	0.030	NE			113508-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113508-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113508-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113508-006	SW846-6020B
	Potassium	2.34	0.080	0.300	NE			113508-006	SW846-6020B
	Selenium	0.00789	0.002	0.005	0.050			113508-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113508-006	SW846-6020B
	Sodium	29.2	0.080	0.250	NE			113508-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113508-006	SW846-6020B
	Uranium	0.00215	0.000067	0.0002	0.030			113508-006	SW846-6020B
	Vanadium	0.00496	0.0033	0.020	NE	B, J	0.02U	113508-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113508-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01	Aluminum	ND	0.0193	0.050	NE	U		113521-006	SW846-6020B
16-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113521-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113521-006	SW846-6020B
	Barium	0.0643	0.00067	0.004	2.00			113521-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113521-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113521-006	SW846-6020B
	Calcium	91.0	0.400	1.00	NE			113521-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113521-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113521-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113521-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113521-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113521-006	SW846-6020B
	Magnesium	11.6	0.010	0.030	NE			113521-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113521-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113521-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113521-006	SW846-6020B
	Potassium	1.77	0.080	0.300	NE			113521-006	SW846-6020B
	Selenium	0.00563	0.002	0.005	0.050			113521-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113521-006	SW846-6020B
	Sodium	21.2	0.080	0.250	NE			113521-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113521-006	SW846-6020B
	Uranium	0.00110	0.000067	0.0002	0.030			113521-006	SW846-6020B
	Vanadium	0.00337	0.0033	0.020	NE	J	0.02U	113521-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113521-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-19	Aluminum	ND	0.0193	0.050	NE	U		113528-006	SW846-6020B
27-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113528-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113528-006	SW846-6020B
	Barium	0.0493	0.00067	0.004	2.00			113528-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113528-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113528-006	SW846-6020B
	Calcium	80.5	0.400	1.00	NE			113528-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113528-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113528-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113528-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113528-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113528-006	SW846-6020B
	Magnesium	11.3	0.010	0.030	NE			113528-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113528-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113528-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113528-006	SW846-6020B
	Potassium	1.69	0.080	0.300	NE			113528-006	SW846-6020B
	Selenium	0.00401	0.002	0.005	0.050	J		113528-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113528-006	SW846-6020B
	Sodium	22.5	0.080	0.250	NE			113528-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113528-006	SW846-6020B
	Uranium	0.00128	0.000067	0.0002	0.030			113528-006	SW846-6020B
	Vanadium	0.00575	0.0033	0.020	NE	B, J	0.02U	113528-006	SW846-6020B
	Zinc	0.00350	0.0033	0.020	NE	J, N	J	113528-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-24	Aluminum	ND	0.0193	0.050	NE	U		113487-006	SW846-6020B
31-Aug-20	Antimony	ND	0.001	0.003	0.006	U		113487-006	SW846-6020B
	Arsenic	0.00227	0.002	0.005	0.010	J		113487-006	SW846-6020B
	Barium	0.0981	0.00067	0.004	2.00			113487-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113487-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113487-006	SW846-6020B
	Calcium	66.3	0.800	2.00	NE			113487-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113487-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113487-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113487-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113487-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113487-006	SW846-6020B
	Magnesium	11.5	0.010	0.030	NE			113487-006	SW846-6020B
	Manganese	0.00142	0.001	0.005	NE	J		113487-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	113487-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113487-006	SW846-6020B
	Potassium	3.73	0.080	0.300	NE			113487-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113487-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113487-006	SW846-6020B
	Sodium	25.9	0.080	0.250	NE			113487-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113487-006	SW846-6020B
	Uranium	0.00305	0.000067	0.0002	0.030			113487-006	SW846-6020B
	Vanadium	0.00632	0.0033	0.020	NE	B, J	0.02U	113487-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113487-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-25	Aluminum	ND	0.0193	0.050	NE	U		113500-006	SW846-6020B
08-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113500-006	SW846-6020B
	Arsenic	0.00207	0.002	0.005	0.010	J		113500-006	SW846-6020B
	Barium	0.0400	0.00067	0.004	2.00			113500-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113500-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113500-006	SW846-6020B
	Calcium	73.6	0.400	1.00	NE			113500-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113500-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113500-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113500-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113500-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113500-006	SW846-6020B
	Magnesium	9.90	0.010	0.030	NE			113500-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113500-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113500-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113500-006	SW846-6020B
	Potassium	1.75	0.080	0.300	NE			113500-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113500-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113500-006	SW846-6020B
	Sodium	25.7	0.080	0.250	NE			113500-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113500-006	SW846-6020B
	Uranium	0.00239	0.000067	0.0002	0.030			113500-006	SW846-6020B
	Vanadium	0.00509	0.0033	0.020	NE	B, J	0.02U	113500-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113500-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-26	Aluminum	0.350	0.0193	0.050	NE			113526-006	SW846-6020B
21-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113526-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113526-006	SW846-6020B
	Barium	0.0549	0.00067	0.004	2.00			113526-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113526-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113526-006	SW846-6020B
	Calcium	108	0.400	1.00	NE			113526-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113526-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113526-006	SW846-6020B
	Copper	0.000891	0.0003	0.002	NE	J		113526-006	SW846-6020B
	Iron	0.325	0.033	0.100	NE			113526-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113526-006	SW846-6020B
	Magnesium	13.0	0.010	0.030	NE			113526-006	SW846-6020B
	Manganese	0.00815	0.001	0.005	NE			113526-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113526-006	SW846-7470A
	Nickel	0.000875	0.0006	0.002	NE	J		113526-006	SW846-6020B
	Potassium	1.75	0.080	0.300	NE			113526-006	SW846-6020B
	Selenium	0.00605	0.002	0.005	0.050			113526-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113526-006	SW846-6020B
	Sodium	25.5	0.080	0.250	NE			113526-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113526-006	SW846-6020B
	Uranium	0.00180	0.000067	0.0002	0.030			113526-006	SW846-6020B
	Vanadium	0.00547	0.0033	0.020	NE	B, J	0.02U	113526-006	SW846-6020B
	Zinc	0.0174	0.0033	0.020	NE	J, N	J	113526-006	SW846-6020B

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Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-27	Aluminum	ND	0.0193	0.050	NE	U		113516-006	SW846-6020B
15-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113516-006	SW846-6020B
	Arsenic	0.00218	0.002	0.005	0.010	J		113516-006	SW846-6020B
	Barium	0.0600	0.00067	0.004	2.00			113516-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113516-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113516-006	SW846-6020B
	Calcium	120	0.400	1.00	NE			113516-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113516-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113516-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113516-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113516-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113516-006	SW846-6020B
	Magnesium	16.0	0.010	0.030	NE			113516-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U	R	113516-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113516-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113516-006	SW846-6020B
	Potassium	2.05	0.080	0.300	NE			113516-006	SW846-6020B
	Selenium	0.00777	0.002	0.005	0.050			113516-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113516-006	SW846-6020B
	Sodium	28.9	0.080	0.250	NE			113516-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113516-006	SW846-6020B
	Uranium	0.00114	0.000067	0.0002	0.030			113516-006	SW846-6020B
	Vanadium	0.00473	0.0033	0.020	NE	J		113516-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113516-006	SW846-6020B

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Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-28	Aluminum	ND	0.0193	0.050	NE	U		113536-006	SW846-6020B
24-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113536-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113536-006	SW846-6020B
	Barium	0.189	0.00067	0.004	2.00			113536-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113536-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113536-006	SW846-6020B
	Calcium	68.6	0.400	1.00	NE			113536-006	SW846-6020B
	Chromium	0.00348	0.003	0.010	0.100	J		113536-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113536-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113536-006	SW846-6020B
	Iron	0.0411	0.033	0.100	NE			113536-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113536-006	SW846-6020B
	Magnesium	11.1	0.010	0.030	NE	J		113536-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113536-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113536-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113536-006	SW846-6020B
	Potassium	1.82	0.080	0.300	NE			113536-006	SW846-6020B
	Selenium	0.00319	0.002	0.005	0.050	J		113536-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113536-006	SW846-6020B
	Sodium	18.6	0.080	0.250	NE			113536-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113536-006	SW846-6020B
	Uranium	0.00144	0.000067	0.0002	0.030			113536-006	SW846-6020B
	Vanadium	0.00562	0.0033	0.020	NE	B, J	0.02U	113536-006	SW846-6020B
	Zinc	0.00464	0.0033	0.020	NE	J, N	J	113536-006	SW846-6020B

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Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-2	Aluminum	0.0241	0.0193	0.050	NE	J		113539-006	SW846-6020B
25-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113539-006	SW846-6020B
	Arsenic	0.00203	0.002	0.005	0.010	J		113539-006	SW846-6020B
	Barium	0.0506	0.00067	0.004	2.00			113539-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113539-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113539-006	SW846-6020B
	Calcium	80.9	0.400	1.00	NE			113539-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113539-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113539-006	SW846-6020B
	Copper	0.000423	0.0003	0.002	NE	J	J-	113539-006	SW846-6020B
	Iron	0.0426	0.033	0.100	NE	J		113539-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113539-006	SW846-6020B
	Magnesium	11.6	0.010	0.030	NE			113539-006	SW846-6020B
	Manganese	0.00143	0.001	0.005	NE	J		113539-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	113539-006	SW846-7470A
	Nickel	0.000636	0.0006	0.002	NE	J		113539-006	SW846-6020B
	Potassium	1.71	0.080	0.300	NE			113539-006	SW846-6020B
	Selenium	0.00424	0.002	0.005	0.050	J		113539-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113539-006	SW846-6020B
	Sodium	23.0	0.080	0.250	NE			113539-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113539-006	SW846-6020B
	Uranium	0.00134	0.000067	0.0002	0.030			113539-006	SW846-6020B
	Vanadium	0.00616	0.0033	0.020	NE	J		113539-006	SW846-6020B
	Zinc	0.00511	0.0033	0.020	NE	J		113539-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-3	Aluminum	ND	0.0193	0.050	NE	U		113503-006	SW846-6020B
09-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113503-006	SW846-6020B
	Arsenic	0.00212	0.002	0.005	0.010	J		113503-006	SW846-6020B
	Barium	0.0453	0.00067	0.004	2.00			113503-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113503-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113503-006	SW846-6020B
	Calcium	70.6	0.400	1.00	NE			113503-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113503-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113503-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113503-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113503-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113503-006	SW846-6020B
	Magnesium	11.7	0.010	0.030	NE			113503-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113503-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113503-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113503-006	SW846-6020B
	Potassium	1.96	0.080	0.300	NE			113503-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113503-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113503-006	SW846-6020B
	Sodium	25.1	0.080	0.250	NE			113503-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113503-006	SW846-6020B
	Uranium	0.00257	0.000067	0.0002	0.030			113503-006	SW846-6020B
	Vanadium	0.00598	0.0033	0.020	NE	B, J	0.02U	113503-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113503-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-4	Aluminum	ND	0.0193	0.050	NE	U		113544-006	SW846-6020B
29-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113544-006	SW846-6020B
	Arsenic	0.00237	0.002	0.005	0.010	J		113544-006	SW846-6020B
	Barium	0.192	0.00067	0.004	2.00			113544-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113544-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113544-006	SW846-6020B
	Calcium	69.7	0.400	1.00	NE			113544-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113544-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113544-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113544-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113544-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113544-006	SW846-6020B
	Magnesium	13.6	0.010	0.030	NE			113544-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113544-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113544-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113544-006	SW846-6020B
	Potassium	3.23	0.080	0.300	NE			113544-006	SW846-6020B
	Selenium	0.00279	0.002	0.005	0.050	J		113544-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113544-006	SW846-6020B
	Sodium	25.4	0.080	0.250	NE			113544-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113544-006	SW846-6020B
	Uranium	0.00296	0.000067	0.0002	0.030			113544-006	SW846-6020B
	Vanadium	0.00679	0.0033	0.020	NE	J		113544-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113544-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-5	Aluminum	ND	0.0193	0.050	NE	U		113530-006	SW846-6020B
23-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113530-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113530-006	SW846-6020B
	Barium	0.0521	0.00067	0.004	2.00			113530-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113530-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113530-006	SW846-6020B
	Calcium	88.1	0.400	1.00	NE			113530-006	SW846-6020B
	Chromium	0.00352	0.003	0.010	0.100	J		113530-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113530-006	SW846-6020B
	Copper	0.000462	0.0003	0.002	NE	J		113530-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113530-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113530-006	SW846-6020B
	Magnesium	13.8	0.010	0.030	NE			113530-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113530-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113530-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113530-006	SW846-6020B
	Potassium	1.74	0.080	0.300	NE			113530-006	SW846-6020B
	Selenium	0.00410	0.002	0.005	0.050	J		113530-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113530-006	SW846-6020B
	Sodium	21.9	0.080	0.250	NE			113530-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113530-006	SW846-6020B
	Uranium	0.00208	0.000067	0.0002	0.030			113530-006	SW846-6020B
	Vanadium	0.00556	0.0033	0.020	NE	B, J	0.02U	113530-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	N, U	UJ	113530-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-6	Aluminum	0.0489	0.0193	0.050	NE	J		113496-006	SW846-6020B
03-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113496-006	SW846-6020B
	Arsenic	0.00222	0.002	0.005	0.010	B, J	0.005U	113496-006	SW846-6020B
	Barium	0.0692	0.00067	0.004	2.00			113496-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113496-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113496-006	SW846-6020B
	Calcium	65.9	0.400	1.00	NE			113496-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113496-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113496-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113496-006	SW846-6020B
	Iron	0.0417	0.033	0.100	NE	J		113496-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113496-006	SW846-6020B
	Magnesium	11.7	0.010	0.030	NE			113496-006	SW846-6020B
	Manganese	0.00162	0.001	0.005	NE	J		113496-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113496-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113496-006	SW846-6020B
	Potassium	2.27	0.080	0.300	NE			113496-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113496-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113496-006	SW846-6020B
	Sodium	23.2	0.080	0.250	NE			113496-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113496-006	SW846-6020B
	Uranium	0.00303	0.000067	0.0002	0.030			113496-006	SW846-6020B
	Vanadium	0.00686	0.0033	0.020	NE	B, J	0.02U	113496-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113496-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-7	Aluminum	0.0861	0.0193	0.050	NE			113541-006	SW846-6020B
28-Sep-20	Antimony	ND	0.001	0.003	0.006	U		113541-006	SW846-6020B
	Arsenic	ND	0.002	0.005	0.010	U		113541-006	SW846-6020B
	Barium	0.230	0.00067	0.004	2.00			113541-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113541-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113541-006	SW846-6020B
	Calcium	63.5	0.400	1.00	NE			113541-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113541-006	SW846-6020B
	Cobalt	0.00109	0.0003	0.001	NE			113541-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U	0.002UJ	113541-006	SW846-6020B
	Iron	0.0751	0.033	0.100	NE	J		113541-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113541-006	SW846-6020B
	Magnesium	12.1	0.010	0.030	NE			113541-006	SW846-6020B
	Manganese	0.00131	0.001	0.005	NE	J		113541-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	113541-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113541-006	SW846-6020B
	Potassium	1.85	0.080	0.300	NE			113541-006	SW846-6020B
	Selenium	0.00365	0.002	0.005	0.050	J		113541-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113541-006	SW846-6020B
	Sodium	19.4	0.080	0.250	NE			113541-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113541-006	SW846-6020B
	Uranium	0.00177	0.000067	0.0002	0.030			113541-006	SW846-6020B
	Vanadium	0.00681	0.0033	0.020	NE	J		113541-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113541-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-6 *(Concluded)*
Summary of Target Analyte List Metals plus Uranium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
WYO-3	Aluminum	ND	0.0193	0.050	NE	U		113483-006	SW846-6020B
27-Aug-20	Antimony	ND	0.001	0.003	0.006	U		113483-006	SW846-6020B
	Arsenic	0.00260	0.002	0.005	0.010	J		113483-006	SW846-6020B
	Barium	0.0547	0.00067	0.004	2.00			113483-006	SW846-6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113483-006	SW846-6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113483-006	SW846-6020B
	Calcium	70.7	0.400	1.00	NE			113483-006	SW846-6020B
	Chromium	ND	0.003	0.010	0.100	U		113483-006	SW846-6020B
	Cobalt	ND	0.0003	0.001	NE	U		113483-006	SW846-6020B
	Copper	ND	0.0003	0.002	NE	U		113483-006	SW846-6020B
	Iron	ND	0.033	0.100	NE	U		113483-006	SW846-6020B
	Lead	ND	0.0005	0.002	NE	U		113483-006	SW846-6020B
	Magnesium	13.7	0.010	0.030	NE			113483-006	SW846-6020B
	Manganese	ND	0.001	0.005	NE	U		113483-006	SW846-6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113483-006	SW846-7470A
	Nickel	ND	0.0006	0.002	NE	U		113483-006	SW846-6020B
	Potassium	2.38	0.080	0.300	NE			113483-006	SW846-6020B
	Selenium	ND	0.002	0.005	0.050	U		113483-006	SW846-6020B
	Silver	ND	0.0003	0.001	NE	U		113483-006	SW846-6020B
	Sodium	31.7	0.080	0.250	NE			113483-006	SW846-6020B
	Thallium	ND	0.0006	0.002	0.002	U		113483-006	SW846-6020B
	Uranium	0.00414	0.000067	0.0002	0.030			113483-006	SW846-6020B
	Vanadium	0.00642	0.0033	0.020	NE	J		113483-006	SW846-6020B
	Zinc	ND	0.0033	0.020	NE	U		113483-006	SW846-6020B

Refer to footnotes on page 6C-48.

Table 6C-7
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-01	Americium-241	0.467 ± 6.24	11.0	5.33	NE	U	BD	113493-007	EPA 901.1
02-Sep-20	Cesium-137	3.81 ± 2.45	2.30	1.07	NE	X	R	113493-007	EPA 901.1
	Cobalt-60	-2.20 ± 3.05	3.22	1.48	NE	U	BD	113493-007	EPA 901.1
	Potassium-40	20.2 ± 42.4	28.2	12.9	NE	U	BD	113493-007	EPA 901.1
	Gross Alpha	1.10	NA	NA	15 pCi/L	NA	None	113493-008	EPA 900.0
	Gross Beta	2.20 ± 1.05	1.69	0.822	4 mrem/yr		J	113493-008	EPA 900.0
	Tritium	-46.9 ± 98.4	190	86.7	NE	U	BD	113493-009	EPA 906.0M
TA1-W-02	Americium-241	5.92 ± 17.8	28.7	14.0	NE	U	BD	113466-007	EPA 901.1
24-Aug-20	Cesium-137	0.933 ± 2.14	3.39	1.62	NE	U	BD	113466-007	EPA 901.1
	Cobalt-60	2.07 ± 2.29	3.64	1.69	NE	U	BD	113466-007	EPA 901.1
	Potassium-40	-14.4 ± 44.3	53.3	25.4	NE	U	BD	113466-007	EPA 901.1
	Gross Alpha	1.62	NA	NA	15 pCi/L	NA	None	113466-008	EPA 900.0
	Gross Beta	3.21 ± 0.838	1.26	0.610	4 mrem/yr		J	113466-008	EPA 900.0
	Tritium	11.3 ± 90.2	164	74.7	NE	U	BD	113466-009	EPA 906.0M
TA1-W-04	Americium-241	1.67 ± 3.97	7.06	3.42	NE	U	BD	113481-007	EPA 901.1
26-Aug-20	Cesium-137	0.767 ± 1.69	2.77	1.30	NE	U	BD	113481-007	EPA 901.1
	Cobalt-60	-1.11 ± 1.85	3.11	1.43	NE	U	BD	113481-007	EPA 901.1
	Potassium-40	-5.82 ± 38.3	46.1	21.8	NE	U	BD	113481-007	EPA 901.1
	Gross Alpha	3.20	NA	NA	15 pCi/L	NA	None	113481-008	EPA 900.0
	Gross Beta	2.71 ± 0.879	1.36	0.658	4 mrem/yr		J	113481-008	EPA 900.0
	Tritium	-2.69 ± 85.1	158	71.7	NE	U	BD	113481-009	EPA 906.0M
TA1-W-05	Americium-241	-0.738 ± 7.01	10.8	5.26	NE	U	BD	113470-007	EPA 901.1
25-Aug-20	Cesium-137	0.526 ± 2.83	3.35	1.60	NE	U	BD	113470-007	EPA 901.1
	Cobalt-60	0.114 ± 1.77	3.24	1.49	NE	U	BD	113470-007	EPA 901.1
	Potassium-40	-36.0 ± 40.7	45.0	21.2	NE	U	BD	113470-007	EPA 901.1
	Gross Alpha	0.03	NA	NA	15 pCi/L	NA	None	113470-008	EPA 900.0
	Gross Beta	2.16 ± 0.549	0.764	0.362	4 mrem/yr		J	113470-008	EPA 900.0
	Tritium	-54.5 ± 84.1	166	75.7	NE	U	BD	113470-009	EPA 906.0M
TA1-W-06	Americium-241	-5.42 ± 14.7	25.5	12.4	NE	U	BD	113514-007	EPA 901.1
14-Sep-20	Cesium-137	-1.35 ± 2.43	3.91	1.84	NE	U	BD	113514-007	EPA 901.1
	Cobalt-60	-0.232 ± 2.59	4.61	2.13	NE	U	BD	113514-007	EPA 901.1
	Potassium-40	34.8 ± 55.2	48.5	22.4	NE	U	BD	113514-007	EPA 901.1
	Gross Alpha	0.03	NA	NA	15 pCi/L	NA	None	113514-008	EPA 900.0
	Gross Beta	1.01 ± 1.08	1.80	0.872	4 mrem/yr	U, *	BD	113514-008	EPA 900.0
	Tritium	65.8 ± 79.1	132	59.0	NE	U	BD	113514-009	EPA 906.0M

Refer to footnotes on page 6C-48.

Table 6C-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-08	Americium-241	-8.02 ± 24.0	27.8	13.4	NE	U	BD	113524-007	EPA 901.1
17-Sep-19	Cesium-137	3.35 ± 2.67	4.27	2.03	NE	U	BD	113524-007	EPA 901.1
	Cobalt-60	-0.22 ± 2.75	4.28	1.96	NE	U	BD	113524-007	EPA 901.1
	Potassium-40	-14.4 ± 52.3	60.1	28.2	NE	U	BD	113524-007	EPA 901.1
	Gross Alpha	6.63	NA	NA	15 pCi/L	NA	None	113524-008	EPA 900.0
	Gross Beta	3.21 ± 2.48	4.11	2.00	4 mrem/yr	U, *	BD	113524-008	EPA 900.0
	Tritium	-0.839 ± 96.3	178	80.9	NE	U	BD	113524-009	EPA 906.0M
TA2-NW1-595	Americium-241	1.76 ± 6.32	9.89	4.80	NE	U	BD	113508-007	EPA 901.1
10-Sep-20	Cesium-137	0.196 ± 1.63	2.85	1.35	NE	U	BD	113508-007	EPA 901.1
	Cobalt-60	0.989 ± 1.79	3.32	1.53	NE	U	BD	113508-007	EPA 901.1
	Potassium-40	39.6 ± 35.8	24.3	10.9	NE		J	113508-007	EPA 901.1
	Gross Alpha	0.04	NA	NA	15 pCi/L	NA	None	113508-008	EPA 900.0
	Gross Beta	5.62 ± 1.17	1.68	0.811	4 mrem/yr			113508-008	EPA 900.0
	Tritium	34.1 ± 80.2	139	64.9	NE	U	BD	113508-009	EPA 906.0M
TA2-W-01	Americium-241	-1.86 ± 17.8	28.4	13.8	NE	U	BD	113521-007	EPA 901.1
16-Sep-20	Cesium-137	-0.156 ± 1.84	3.20	1.52	NE	U	BD	113521-007	EPA 901.1
	Cobalt-60	-0.790 ± 1.99	3.46	1.60	NE	U	BD	113521-007	EPA 901.1
	Potassium-40	30.5 ± 53.5	35.9	16.6	NE	U	BD	113521-007	EPA 901.1
	Gross Alpha	-0.18	NA	NA	15 pCi/L	NA	None	113521-008	EPA 900.0
	Gross Beta	1.81 ± 0.744	1.18	0.573	4 mrem/yr	*	J	113521-008	EPA 900.0
	Tritium	77.7 ± 75.0	121	53.7	NE	U	BD	113521-009	EPA 906.0M
TA2-W-19	Americium-241	-0.887 ± 9.93	16.2	7.85	NE	U	BD	113528-007	EPA 901.1
22-Sep-20	Cesium-137	-0.844 ± 1.69	2.79	1.32	NE	U	BD	113528-007	EPA 901.1
	Cobalt-60	1.17 ± 1.80	3.34	1.55	NE	U	BD	113528-007	EPA 901.1
	Potassium-40	-32.6 ± 42.0	45.9	21.7	NE	U	BD	113528-007	EPA 901.1
	Gross Alpha	0.52	NA	NA	15 pCi/L	NA	None	113528-008	EPA 900.0
	Gross Beta	1.72 ± 0.776	1.24	0.598	4 mrem/yr		J	113528-008	EPA 900.0
	Tritium	-16.3 ± 97.7	182	83.3	NE	U	BD	113528-009	EPA 906.0M
TA2-W-24	Americium-241	0.555 ± 15.7	27.9	13.5	NE	U	BD	113487-007	EPA 901.1
31-Aug-20	Cesium-137	-0.548 ± 1.81	3.12	1.47	NE	U	BD	113487-007	EPA 901.1
	Cobalt-60	2.07 ± 2.24	4.07	1.89	NE	U	BD	113487-007	EPA 901.1
	Potassium-40	-8.49 ± 44.9	59.8	28.5	NE	U	BD	113487-007	EPA 901.1
	Gross Alpha	1.55	NA	NA	15 pCi/L	NA	None	113487-008	EPA 900.0
	Gross Beta	2.94 ± 0.557	0.705	0.336	4 mrem/yr	*	J	113487-008	EPA 900.0
	Tritium	-25.8 ± 73.8	136	63.6	NE	U	BD	113487-009	EPA 906.0M

Refer to footnotes on page 6C-48.

Table 6C-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-25	Americium-241	20.8 ± 18.1	26.2	12.7	NE	U	BD	113500-007	EPA 901.1
08-Sep-20	Cesium-137	0.158 ± 2.19	3.86	1.83	NE	U	BD	113500-007	EPA 901.1
	Cobalt-60	2.45 ± 2.78	4.87	2.26	NE	U	BD	113500-007	EPA 901.1
	Potassium-40	-35.9 ± 48.3	56.4	26.5	NE	U	BD	113500-007	EPA 901.1
	Gross Alpha	2.82	NA	NA	15 pCi/L	NA	None	113500-008	EPA 900.0
	Gross Beta	2.61 ± 0.763	1.14	0.550	4 mrem/yr		J	113500-008	EPA 900.0
	Tritium	5.06 ± 103	188	85.9	NE	U	BD	113500-009	EPA 906.0M
TA2-W-26	Americium-241	11.2 ± 15.8	25.0	12.2	NE	U	BD	113526-007	EPA 901.1
21-Sep-20	Cesium-137	1.45 ± 2.25	3.95	1.87	NE	U	BD	113526-007	EPA 901.1
	Cobalt-60	1.18 ± 2.28	4.16	1.91	NE	U	BD	113526-007	EPA 901.1
	Potassium-40	-43.3 ± 47.0	53.2	24.9	NE	U	BD	113526-007	EPA 901.1
	Gross Alpha	4.15	NA	NA	15 pCi/L	NA	None	113526-008	EPA 900.0
	Gross Beta	3.64 ± 0.854	1.24	0.602	4 mrem/yr		J	113526-008	EPA 900.0
	Tritium	-25.1 ± 92.5	174	79.8	NE	U	BD	113526-009	EPA 906.0M
TA2-W-27	Americium-241	-1.69 ± 14.5	26.0	12.6	NE	U	BD	113516-007	EPA 901.1
15-Sep-20	Cesium-137	1.81 ± 3.37	4.08	1.94	NE	U	BD	113516-007	EPA 901.1
	Cobalt-60	0.568 ± 2.37	4.25	1.96	NE	U	BD	113516-007	EPA 901.1
	Potassium-40	-56.1 ± 51.0	51.0	27.2	NE	U	BD	113516-007	EPA 901.1
	Gross Alpha	-0.54	NA	NA	15 pCi/L	NA	None	113516-008	EPA 900.0
	Gross Beta	0.241 ± 1.37	2.35	1.15	4 mrem/yr	U, *	BD	113516-008	EPA 900.0
	Tritium	15.8 ± 90.5	164	74.4	NE	U	BD	113516-009	EPA 906.0M
TA2-W-28	Americium-241	0.554 ± 3.05	5.16	2.51	NE	U	BD	113536-007	EPA 901.1
24-Sep-20	Cesium-137	1.33 ± 2.31	4.20	1.99	NE	U	BD	113536-007	EPA 901.1
	Cobalt-60	-0.949 ± 2.51	3.63	1.64	NE	U	BD	113536-007	EPA 901.1
	Potassium-40	30.7 ± 52.3	40.2	18.3	NE	U	BD	113536-007	EPA 901.1
	Gross Alpha	1.60	NA	NA	15 pCi/L	NA	None	113536-008	EPA 900.0
	Gross Beta	2.03 ± 1.03	1.66	0.809	4 mrem/yr		J	113536-008	EPA 900.0
	Tritium	-34.4 ± 97.8	185	85.0	NE	U	BD	113536-009	EPA 906.0M
TJA-2	Americium-241	-1.86 ± 17.9	28.2	13.6	NE	U	BD	113539-007	EPA 901.1
25-Sep-20	Cesium-137	-0.850 ± 2.27	3.87	1.84	NE	U	BD	113539-007	EPA 901.1
	Cobalt-60	-0.350 ± 2.25	4.00	1.84	NE	U	BD	113539-007	EPA 901.1
	Potassium-40	40.6 ± 34.5	56.8	26.7	NE	U	BD	113539-007	EPA 901.1
	Gross Alpha	1.16	NA	NA	15 pCi/L	NA	None	113539-008	EPA 900.0
	Gross Beta	2.48 ± 0.994	1.59	0.775	4 mrem/yr		J	113539-008	EPA 900.0
	Tritium	-18.3 ± 86.9	163	74.5	NE	U	BD	113539-009	EPA 906.0M

Refer to footnotes on page 6C-48.

Table 6C-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-3	Americium-241	6.12 ± 7.08	10.5	5.12	NE	U	BD	113503-007	EPA 901.1
09-Sep-20	Cesium-137	0.662 ± 1.70	2.98	1.41	NE	U	BD	113503-007	EPA 901.1
	Cobalt-60	2.05 ± 2.64	2.83	1.29	NE	U	BD	113503-007	EPA 901.1
	Potassium-40	17.1 ± 43.6	31.6	14.5	NE	U	BD	113503-007	EPA 901.1
	Gross Alpha	2.70	NA	NA	15 pCi/L	NA	None	113503-008	EPA 900.0
	Gross Beta	3.23 ± 1.11	1.76	0.858	4 mrem/yr		J	113503-008	EPA 900.0
	Tritium	-12.1 ± 99.7	186	84.8	NE	U	BD	113503-009	EPA 906.0M
TJA-4	Americium-241	-5.65 ± 10.1	15.5	7.51	NE	U	BD	113544-007	EPA 901.1
29-Sep-20	Cesium-137	-0.621 ± 1.56	2.62	1.23	NE	U	BD	113544-007	EPA 901.1
	Cobalt-60	0.310 ± 1.61	3.01	1.38	NE	U	BD	113544-007	EPA 901.1
	Potassium-40	-29.8 ± 43.7	45.2	21.4	NE	U	BD	113544-007	EPA 901.1
	Gross Alpha	1.07	NA	NA	15 pCi/L	NA	None	113544-008	EPA 900.0
	Gross Beta	2.71 ± 0.686	1.00	0.481	4 mrem/yr		J	113544-008	EPA 900.0
	Tritium	-55.0 ± 93.6	182	83.2	NE	U	BD	113544-009	EPA 906.0M
TJA-5	Americium-241	2.05 ± 3.87	5.95	2.90	NE	U	BD	113530-007	EPA 901.1
23-Sep-20	Cesium-137	-1.91 ± 2.55	4.15	1.96	NE	U	BD	113530-007	EPA 901.1
	Cobalt-60	1.41 ± 2.50	4.61	2.11	NE	U	BD	113530-007	EPA 901.1
	Potassium-40	38.5 ± 31.5	54.5	25.3	NE	U	BD	113530-007	EPA 901.1
	Gross Alpha	0.82	NA	NA	15 pCi/L	NA	None	113530-008	EPA 900.0
	Gross Beta	1.79 ± 0.750	1.19	0.573	4 mrem/yr		J	113530-008	EPA 900.0
	Tritium	-2.11 ± 101	185	85.0	NE	U	BD	113530-009	EPA 906.0M
TJA-6	Americium-241	6.99 ± 7.70	11.1	5.40	NE	U	BD	113496-007	EPA 901.1
03-Sep-20	Cesium-137	-0.0235 ± 1.90	3.41	1.63	NE	U	BD	113496-007	EPA 901.1
	Cobalt-60	1.65 ± 2.08	3.64	1.71	NE	U	BD	113496-007	EPA 901.1
	Potassium-40	-4.91 ± 35.4	49.8	23.7	NE	U	BD	113496-007	EPA 901.1
	Gross Alpha	2.50	NA	NA	15 pCi/L	NA	None	113496-008	EPA 900.0
	Gross Beta	3.50 ± 1.09	1.71	0.833	4 mrem/yr		J	113496-008	EPA 900.0
	Tritium	-7.02 ± 102	189	86.2	NE	U	BD	113496-009	EPA 906.0M
TJA-7	Americium-241	-2.86 ± 15.8	25.8	12.5	NE	U	BD	113541-007	EPA 901.1
28-Sep-20	Cesium-137	2.22 ± 2.79	4.29	2.04	NE	U	BD	113541-007	EPA 901.1
	Cobalt-60	-1.27 ± 2.57	4.28	1.98	NE	U	BD	113541-007	EPA 901.1
	Potassium-40	-37.5 ± 57.4	56.5	26.6	NE	U	BD	113541-007	EPA 901.1
	Gross Alpha	2.47	NA	NA	15 pCi/L	NA	None	113541-008	EPA 900.0
	Gross Beta	1.86 ± 1.02	1.67	0.816	4 mrem/yr		J	113541-008	EPA 900.0
	Tritium	4.59 ± 87.8	161	73.3	NE	U	BD	113541-009	EPA 906.0M

Refer to footnotes on page 6C-48.

Table 6C-7 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
WYO-3	Americium-241	-0.569 ± 3.95	7.05	3.40	NE	U	BD	113483-007	EPA 901.1
27-Aug-20	Cesium-137	0.00747 ± 1.78	3.19	1.50	NE	U	BD	113483-007	EPA 901.1
	Cobalt-60	0.458 ± 1.85	3.52	1.61	NE	U	BD	113483-007	EPA 901.1
	Potassium-40	-42.7 ± 50.2	52.2	24.6	NE	U	BD	113483-007	EPA 901.1
	Gross Alpha	4.18	NA	NA	15 pCi/L	NA	None	113483-008	EPA 900.0
	Gross Beta	2.62 ± 0.804	1.22	0.591	4 mrem/yr		J	113483-008	EPA 900.0
	Tritium	39.1 ± 84.8	68.4	68.4	NE	U	BD	113483-009	EPA 906.0M

Refer to footnotes on page 6C-48.

Table 6C-8
Summary of Field Water Quality Measurements[h]
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TA1-W-06	26-Feb-20	16.75	790.48	200.2	7.68	1.18	97.88	7.89
TA2-W-01	27-Feb-20	17.75	590.05	202.3	7.71	0.94	100.99	7.97
TA2-W-19	04-Mar-20	18.06	550.81	146.9	7.67	0.41	112.27	8.76
TA2-W-26	02-Mar-20	17.67	1349.90	208.2	7.61	70.1	103.47	7.96
TA2-W-27	28-Feb-20	17.75	862.78	200.3	7.58	0.71	101.14	7.96
TA2-W-28	05-Mar-20	18.30	484.12	121.8	7.67	1.16	92.83	7.25
TJA-2	03-Mar-20	17.59	550.01	145.2	7.58	0.51	108.39	8.36
TJA-3	25-Feb-20	18.30	473.46	179.9	7.59	0.13	94.40	7.29
TJA-4	09-Mar-20	17.84	518.37	157.3	7.60	0.33	64.66	5.09
TJA-6	24-Feb-20	18.41	439.01	143.1	7.57	1.29	72.22	5.53
TJA-7	06-Mar-20	18.35	472.47	163.4	7.62	0.67	87.31	6.80
TA2-W-19	18-Jun-20	19.41	542.88	135.5	7.64	0.64	101.77	7.89
TA2-W-26	16-Jun-20	21.77	1429.5	130.9	7.51	76.3	92.21	6.84
TA2-W-28	22-Jun-20	20.59	479.61	151.9	7.66	1.82	90.79	6.91
TJA-2	17-Jun-20	20.20	573.71	170.9	7.61	0.42	92.72	7.10
TJA-3	15-Jun-20	22.30	519.69	107.6	7.43	0.33	73.65	5.36
TJA-4	24-Jun-20	19.61	543.65	163.5	7.58	0.64	63.85	4.94
TJA-7	23-Jun-20	22.18	520.90	168.7	7.61	1.16	88.87	6.54
TA1-W-01	02-Sep-20	20.66	489.19	219.5	7.50	0.67	77.47	6.18
TA1-W-02	24-Aug-20	21.51	479.12	230.1	7.45	0.95	71.29	5.38
TA1-W-04	26-Aug-20	20.69	457.91	241.1	7.47	0.51	63.93	5.02
TA1-W-05	25-Aug-20	21.49	566.47	241.7	7.31	0.63	89.09	6.94
TA1-W-06	14-Sep-20	18.74	796.79	275.2	7.65	1.05	83.53	6.88
TA1-W-08	17-Sep-19	19.04	1839.9	274.6	7.52	0.39	84.17	7.07
TA2-NW1-595	10-Sep-20	18.25	612.84	246.6	7.50	0.35	88.15	7.33
TA2-W-01	16-Sep-20	19.69	600.70	246.6	7.71	0.40	88.45	7.18
TA2-W-19	22-Sep-20	18.56	515.13	261.9	7.74	1.20	95.38	8.20
TA2-W-24	31-Aug-20	20.23	410.29	214.3	7.57	0.58	48.29	3.87
TA2-W-25	08-Sep-20	20.73	481.81	268.3	7.53	0.83	85.87	6.89
TA2-W-26	21-Sep-20	22.24	600.37	255.0	7.23	7.66	110.90	8.72

Refer to footnotes on page 6C-48.

Table 6C-8 *(Concluded)*
Summary of Field Water Quality Measurements[h]
Tijeras Arroyo Groundwater, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TA2-W-27	15-Sep-20	20.09	770.12	234.4	7.63	0.97	93.07	7.47
TA2-W-28	24-Sep-20	18.82	449.60	232.0	7.73	1.27	83.35	7.19
TJA-2	25-Sep-20	19.24	534.29	250.6	7.66	2.43	86.11	7.36
TJA-3	09-Sep-20	17.58	446.91	237.0	7.54	0.31	79.22	6.67
TJA-4	29-Sep-20	18.18	509.55	307.4	7.62	0.83	59.42	5.51
TJA-5	23-Sep-20	18.59	538.86	288.4	7.63	1.08	98.34	8.57
TJA-6	03-Sep-20	21.61	449.76	226.9	7.54	2.09	71.90	5.62
TJA-7	28-Sep-20	16.62	444.06	236.2	7.71	1.44	77.69	7.23
WYO-3	27-Aug-20	20.71	493.93	238.7	7.62	0.64	88.29	6.99
TA2-W-19	14-Dec-20	16.31	479.87	211.4	7.69	0.55	97.16	8.47
TA2-W-26	21-Dec-20	16.23	570.33	125.8	7.65	19.8	91.56	7.55
TA2-W-28	15-Dec-20	15.43	414.03	211.1	7.75	1.81	84.33	7.40
TJA-2	11-Dec-20	16.85	504.88	223.7	7.80	0.44	89.15	7.61
TJA-3	10-Dec-20	16.99	428.05	163.1	7.66	0.26	70.55	5.90
TJA-4	17-Dec-20	17.81	459.29	170.4	7.62	0.44	60.70	5.10
TJA-7	16-Dec-20	16.58	401.78	184.1	7.72	1.59	82.20	7.15

Refer to footnotes on page 6C-48.

Footnotes for Tijeras Arroyo Groundwater Analytical Results Tables

Wells screened in the Perched Groundwater System are highlighted with green shading.

%	= percent.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
ID	= Identifier.
μg/L	= micrograms per liter.
mg/L	= milligrams per liter.
mrem/yr	= millirem per year.
No.	= Number.
pCi/L	= picocuries per liter.
RPD	= Relative Percent Difference.

[a]Result or Activity

Result applies to Tables 6C-1 and 6C-3 through 6C-6. Activity applies to Table 6C-7.
Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Parts 9, 141, and 142, Table 1-4).

Bold = Value exceed the established MCL.
ND = not detected (at method detection limit).
Activities of zero or less are considered not detected.

[b]MDL or MDA

The MDL applies to Tables 6C-1 through 6C-6. MDA applies to Table 6C-7.

MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.

MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

NA = Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level

The PQL applies to Tables 6C-1 and 6C-3 through 6C-6. Critical Level applies to Table 6C-7.

Critical Level = The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.

NA = Not applicable for gross alpha activities. The critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[d]MCL

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards, (EPA May 2018).

- The total for trihalomethanes (including chloroform) is 80 μg/L.

The following are the MCLs for gross alpha particles and beta particles in community water systems:

- 15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table 1-4).
- 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

NE = Not established.

Footnotes for Tijeras Arroyo Groundwater Analytical Results Tables *(Concluded)*

[e]Laboratory Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

B = The analyte was found in the blank above the effective MDL.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N = Results associated with a spike analysis that was outside control limits.
NA = Not applicable.
U = Analyte is absent or below the method detection limit.
X = Uncertain identification for gamma spectroscopy.
* = Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.

[f]Validation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J = The associated value is an estimated quantity.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
J- = The associated numerical value is an estimated quantity with a suspected negative bias.
None = No data validation for corrected gross alpha activity.
U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R = The data are unusable, and resampling or reanalysis are necessary for verification.

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DOE = U.S. Department of Energy.
HASL = Health and Safety Laboratory.
SIM = Selected ion monitoring.
SM = Standard Method.
SW = Solid Waste.

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

˚C = Degrees Celsius.
% Sat = Percent saturation.
μmho/cm = Micromhos per centimeter.
mg/L = Milligrams per liter.
mV = Millivolts.
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 6D
Tijeras Arroyo Groundwater
Plots

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Attachment 6D Plots

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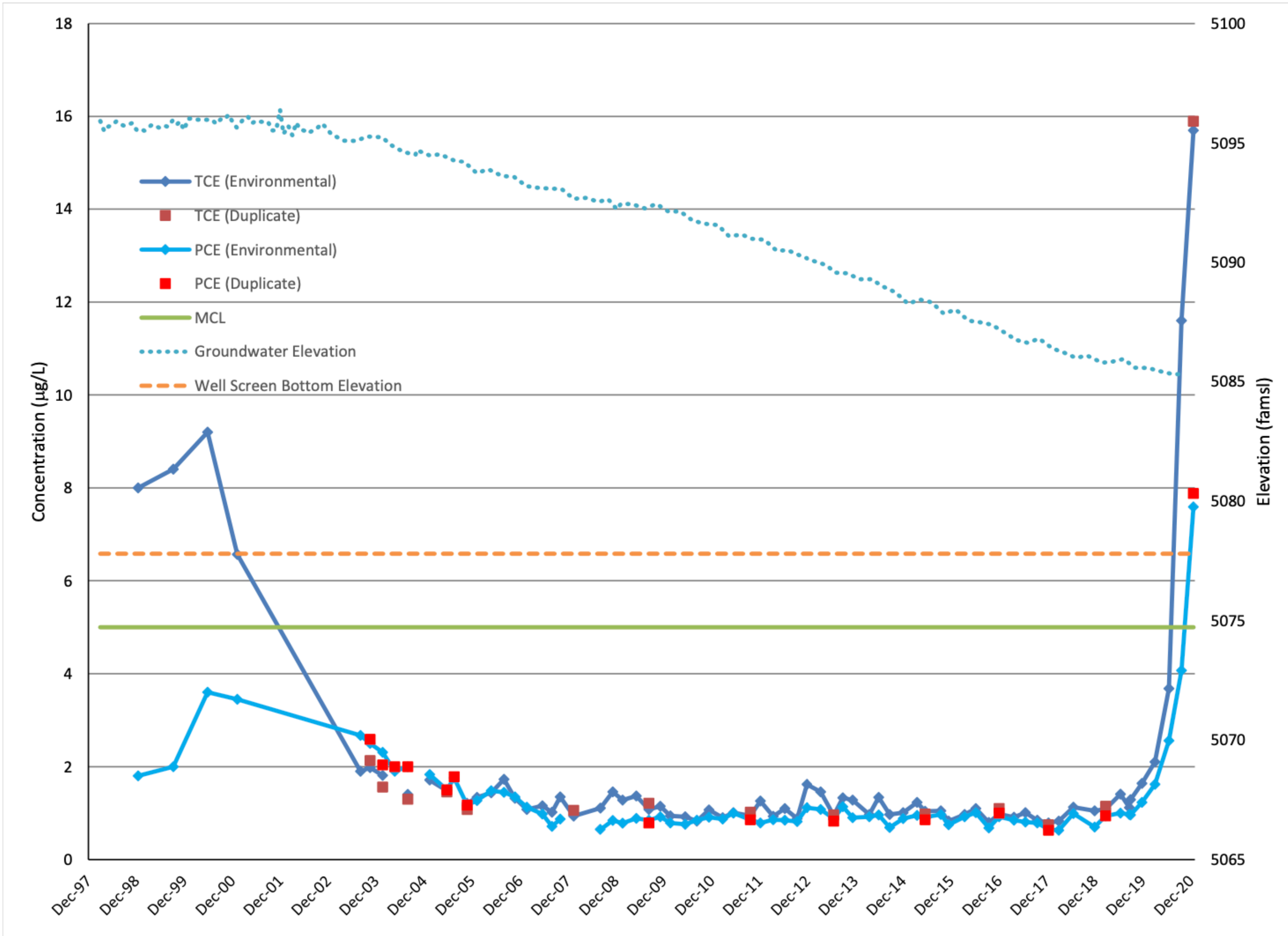

Figure 6D-1. Trichloroethene and Tetrachloroethene Concentrations, TA2-W-26

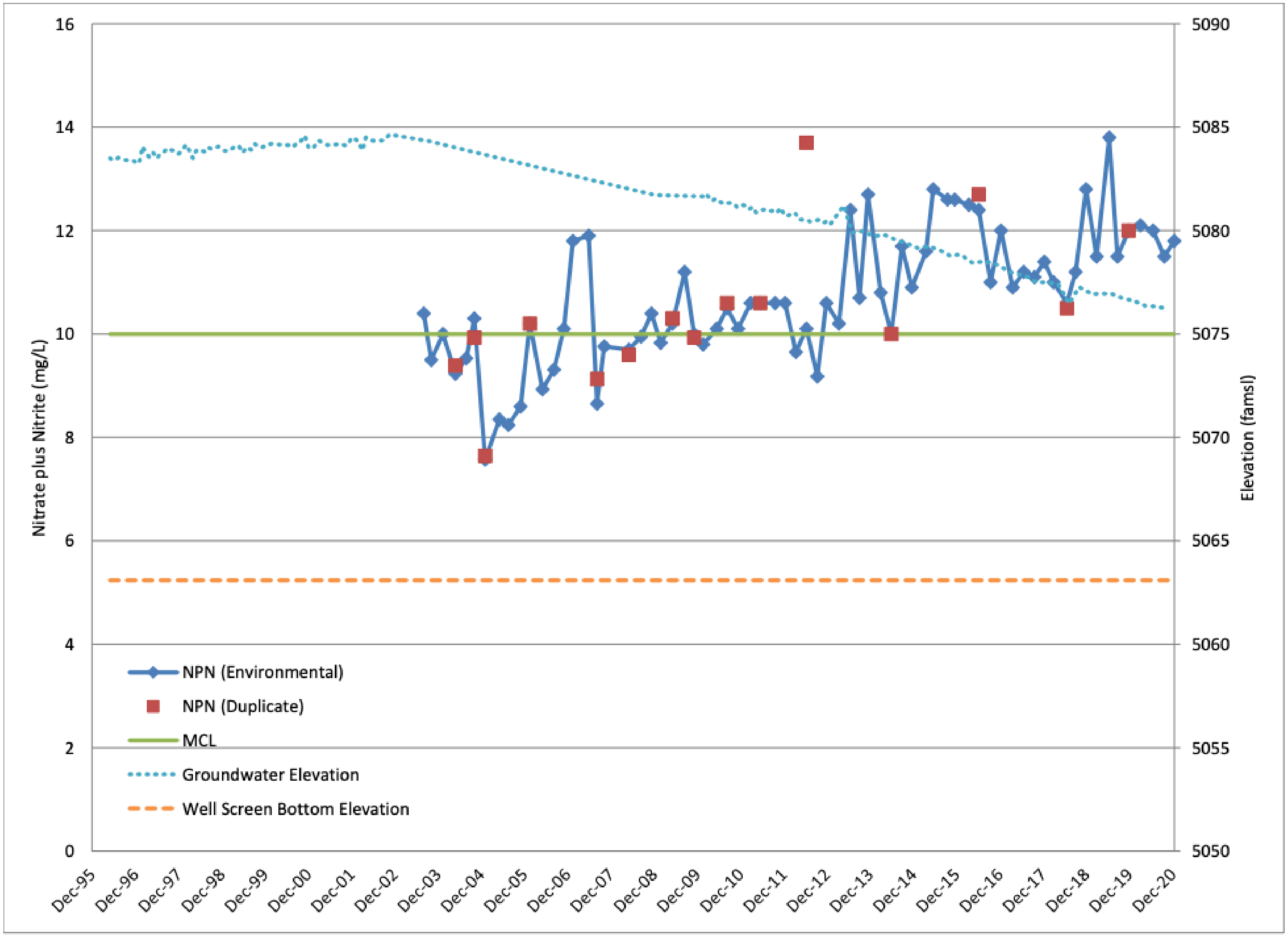

Figure 6D-2. Nitrate plus Nitrite Concentrations, TA2-W-19

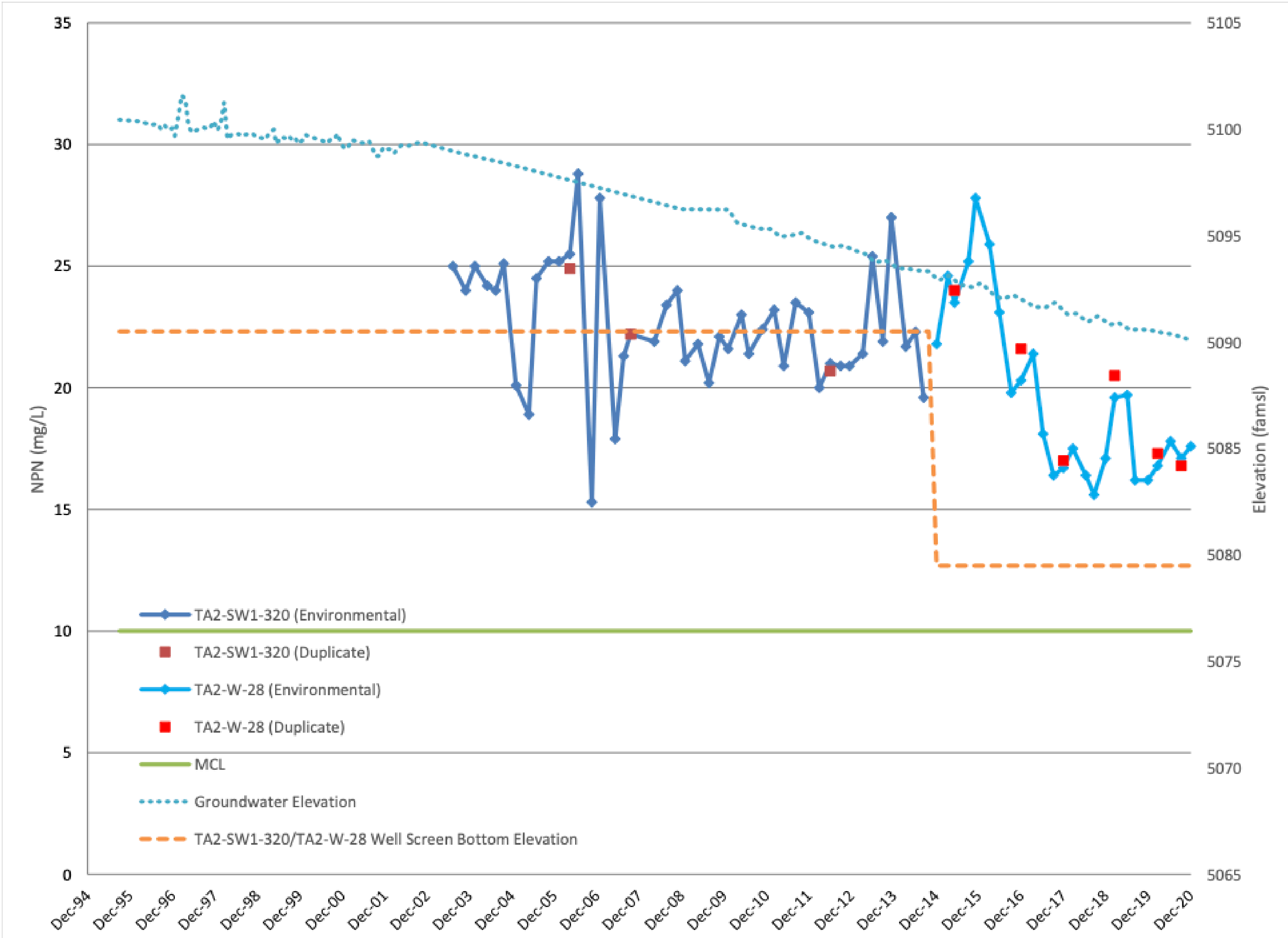

Figure 6D-3. Nitrate plus Nitrite Concentrations, TA2-W-28 and TA2-SW1-320

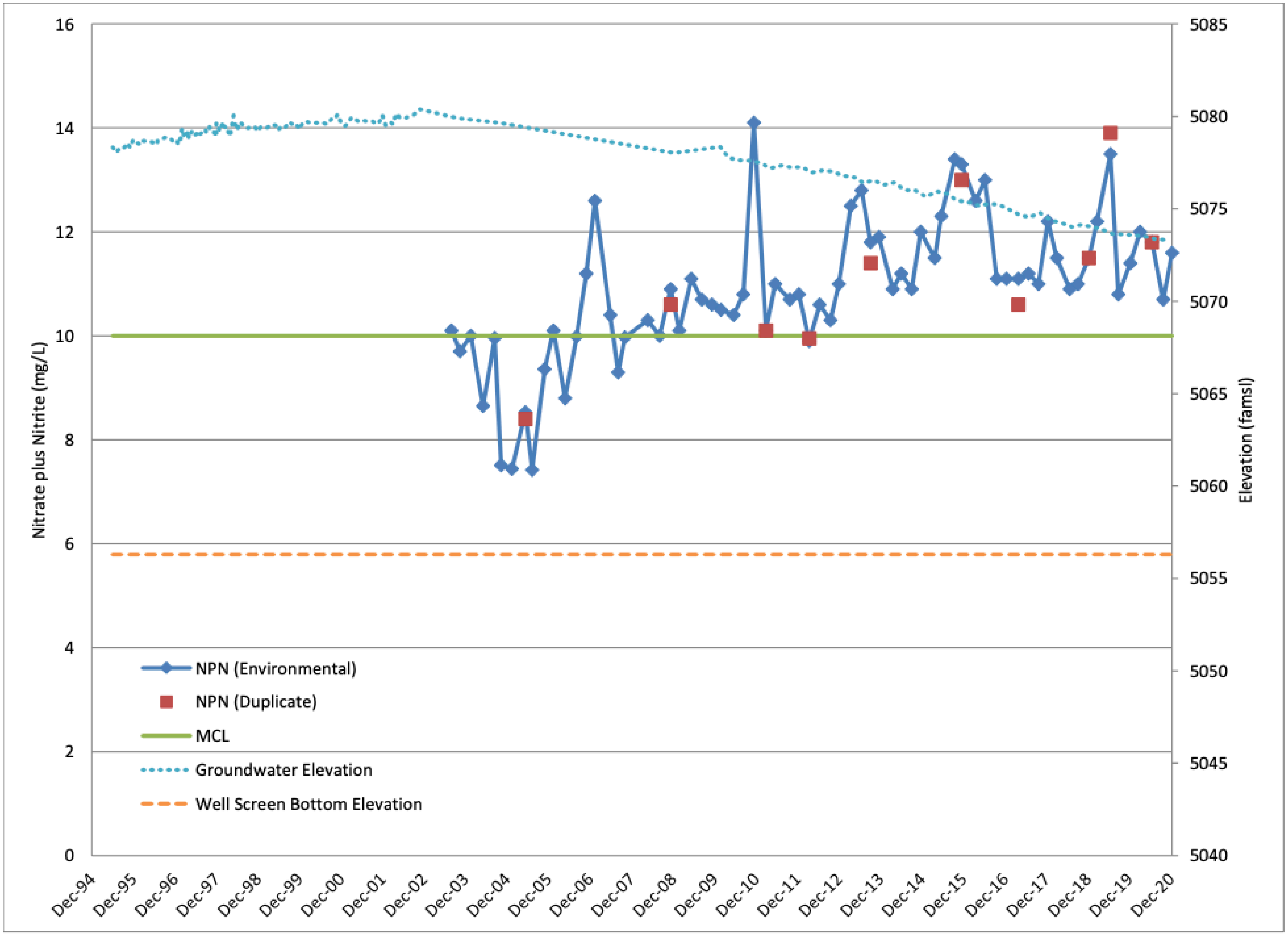

Figure 6D-4. Nitrate plus Nitrite Concentrations, TJA-2

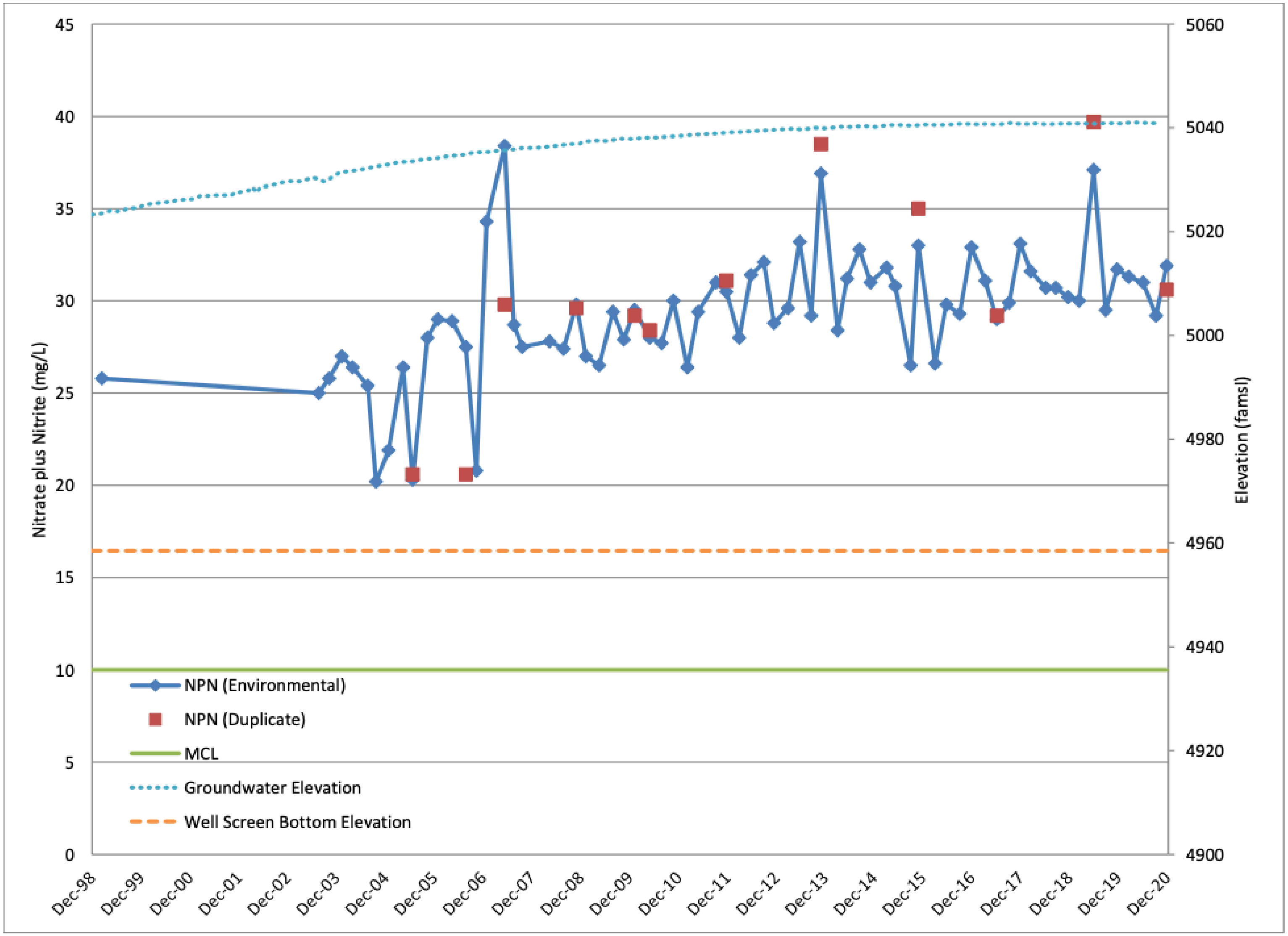

Figure 6D-5. Nitrate plus Nitrite Concentrations, TJA-4

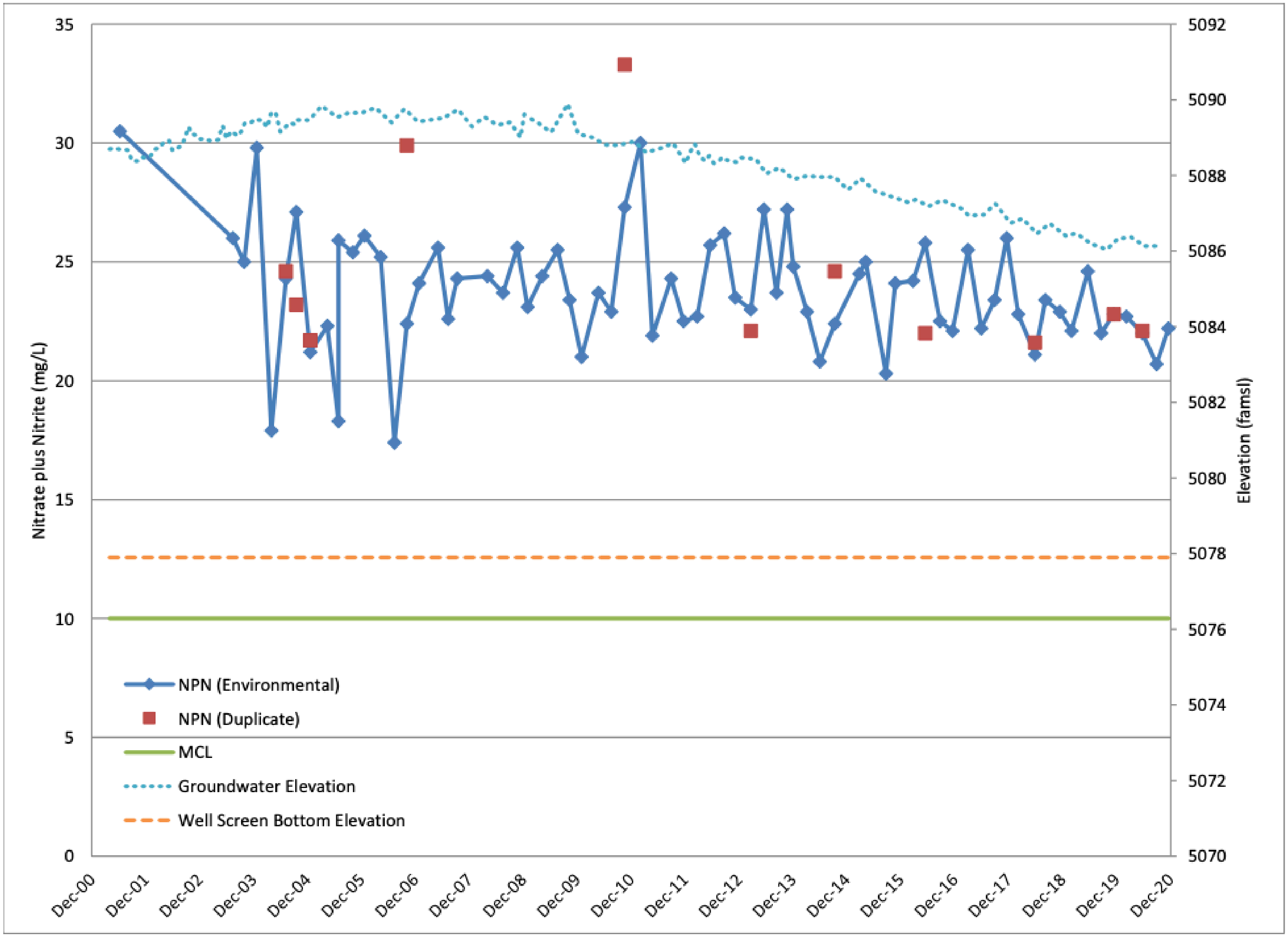

Figure 6D-6. Nitrate plus Nitrite Concentrations, TJA-7

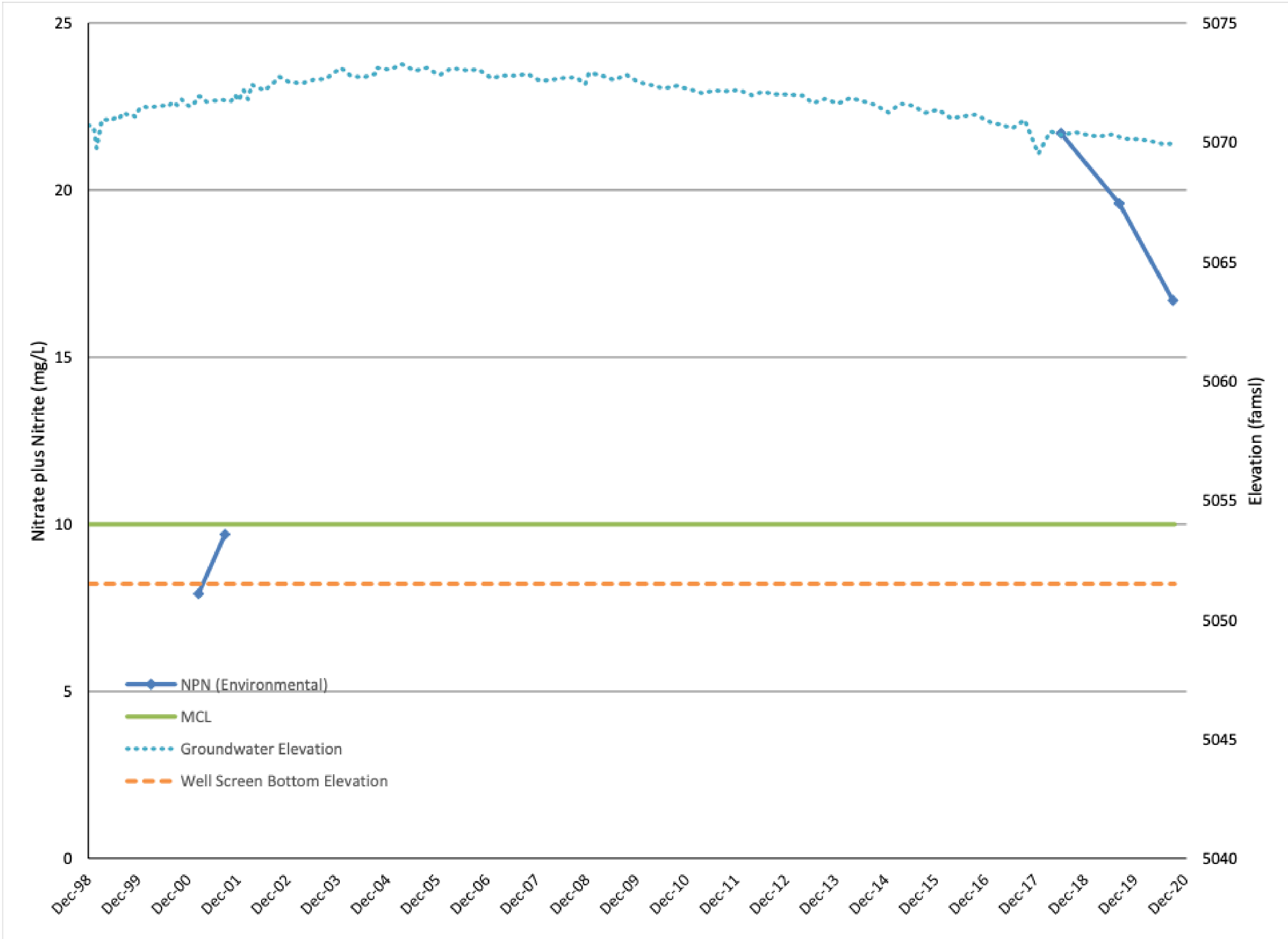

Figure 6D-7. Nitrate plus Nitrite Concentrations, TJA-5

Chapter 6
Tijeras Arroyo Groundwater
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7.0 Burn Site Groundwater Area of Concern

7.1 Introduction

The Burn Site Groundwater (BSG) Area of Concern (AOC), located in the Manzanita Mountains (Figure 7-1), is an area with low concentrations of nitrate in a fractured bedrock aquifer. Nitrate has been identified as a constituent of concern (COC) in groundwater based on detections above the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) in samples collected from several monitoring wells. Since August 1998, the maximum concentration of nitrate detected has been 49.6 milligrams per liter (mg/L). The EPA MCL and State of New Mexico drinking water standard for nitrate (as nitrogen) is 10 mg/L (only EPA MCLs are included in the data tables).

Perchlorate has been detected in one groundwater monitoring well, and its replacement well, in the BSG AOC. Currently, there is no EPA MCL or State of New Mexico drinking water standard for perchlorate. However, Section IV.B of the Compliance Order on Consent (Consent Order) stipulates that a select group of groundwater monitoring wells are to be sampled for perchlorate using a screening level/laboratory method detection limit (MDL) of 4 micrograms per liter (µg/L) [New Mexico Environment Department (NMED) April 2004]. Furthermore, the Consent Order requires that for detections equal to or greater than 4 µg/L, the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and Sandia National Laboratories, New Mexico (SNL/NM) personnel will evaluate the nature and extent of perchlorate contamination in groundwater. Since perchlorate monitoring began in March 2006, the maximum concentration of perchlorate in groundwater at the BSG AOC has been 8.93 µg/L.

7.1.1 Location

The Coyote Canyon Test Area is located in the eastern portion of Kirtland Air Force Base (KAFB). The Burn Site is in Lurance Canyon, one of three canyons that are located on the eastern edge of the Coyote Canyon Test Area and within the Manzanita Mountains. Two other canyons, Madera Canyon and Sol se Mete Canyon, intersect Lurance Canyon to the west of the Burn Site. These three canyons are the headwaters of Arroyo del Coyote, which is a tributary to Tijeras Arroyo. Testing activities at the Lurance Canyon Burn Facility, which includes the Burn Site, began in 1967.

The BSG AOC is located along the eastern margin of the Albuquerque Basin, and the terrain is characterized by large topographic relief, exceeding 500 feet (ft). Lurance Canyon, deeply incised into Paleozoic and Precambrian rocks, provides local westward drainage of ephemeral surface water flows to Arroyo del Coyote.

7.1.2 Site History

Groundwater issues at the BSG AOC are primarily associated with two Solid Waste Management Units (SWMUs). The Lurance Canyon Burn Site (SWMU 94) and the nearby Lurance Canyon Explosive Test Site (SWMU 65) have been used since 1967. Most of the operational activities involved testing the fire survivability of transportation containers, weapon components, simulated weapons, and satellite components. Historical operations (Attachment 7A, Table 7A-1) include open detonation of high explosive (HE) compounds and ammonium-nitrate slurry along with the open burning of HE compounds, liquid propellants, and solid propellants. Most HE testing activities occurred between 1967 and 1975 and was completely phased out by the 1980s.

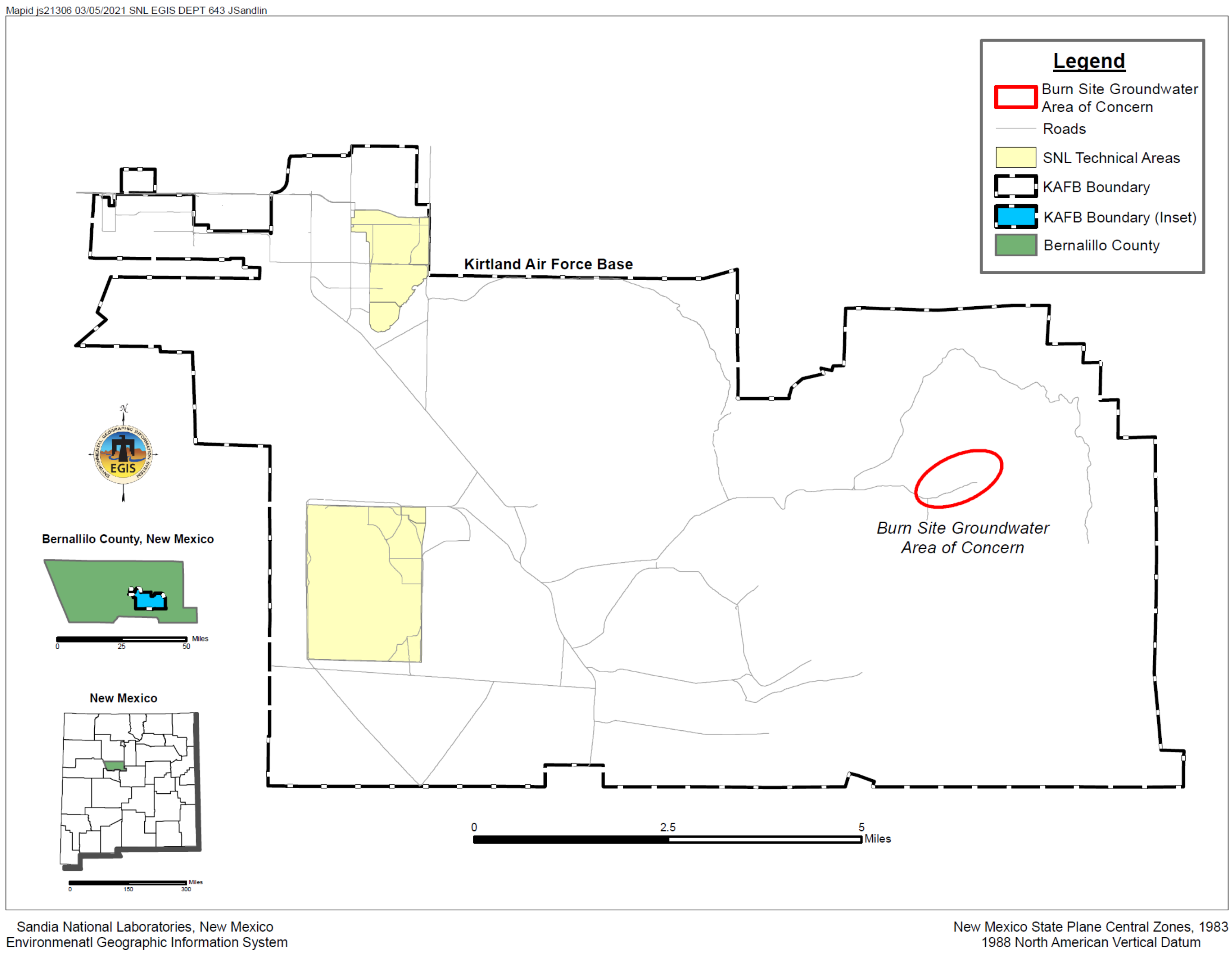

Figure 7-1. Location of the Burn Site Groundwater Area of Concern

Burn testing began in the early 1970s and has continued to the present. Early burn testing was conducted in unlined pits excavated in native soil and alluvium. By 1975, portable steel burn pans were used for open burning, mostly using jet propellant, fuel grade 4 (JP-4). Several engineered structures, such as the Light Air Transport Accident Resistant Container Unit, were used at the Burn Site. The structures mostly used JP-4 and occasionally used diesel fuel and gasoline to create the high temperatures associated with transportation accidents. In the mid-1990s, jet propellant, fuel grade 8 replaced JP-4 as the petroleum fuel used for burn tests. Most test structures have been dismantled. The only remaining test cell is the Fire Laboratory for Accreditation of Modeling by Experiment. Portable burn pans up to 25 ft in diameter are occasionally used.

7.1.3 Monitoring History

Groundwater samples collected during 1996 from the Burn Site Well (a non-potable production well used for fire suppression) contained elevated concentrations of nitrate (maximum of 27 mg/L in August 1996). In 1997, the NMED Hazardous Waste Bureau (HWB), DOE, and SNL/NM personnel agreed to investigate the source of this contamination. Later in 1997, monitoring wells CYN-MW1D and CYN-MW2S were installed downgradient of the Burn Site Well (Table 7-1). Samples from monitoring well CYN-MW1D contained nitrate concentrations exceeding the EPA MCL. Two more monitoring wells, CYN-MW3 and CYN-MW4, were installed in 1999 to further characterize the study area. Based on regulatory requirements, monitoring wells CYN-MW6, CYN-MW7, and CYN-MW8 were installed from 2005 through 2006. Figure 7-2 shows the current BSG AOC groundwater monitoring network.

Previous monitoring reports include analytical results for monitoring well CYN-MW5. Groundwater monitoring well CYN-MW5 was installed at SWMU 49 in 2001 as part of the investigation of Drain and Septic System sites. This monitoring well was sampled for eight quarters as part of the Drain and Septic System investigation and was incorporated into the BSG AOC investigation as a downgradient well. However, in its February 2005 letter, the NMED stated that it "will not consider monitoring well CYN-MW5 as a downgradient well because it is located over two miles away from the Burn Site" (NMED February 2005). Based on the NMED determination, monitoring well CYN-MW5 has not been sampled as part of the BSG AOC investigation since the third quarter of Fiscal Year 2005.

Since the initial discovery of nitrate at the BSG AOC, numerous characterization activities have been conducted (Attachment 7A, Table 7A-1). The results of these characterization activities are summarized in the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site* (SNL June 2004a) and subsequent update (SNL April 2008a); that report provides a comprehensive list of groundwater monitoring data sources used to support the summary of investigations.

In April 2004, the Consent Order became effective, which specified the Burn Site as an area of groundwater contamination. In response to the Consent Order, the BSG AOC Corrective Measures Evaluation (CME) Work Plan was submitted to the NMED in June 2004 (SNL June 2004b). Based on requirements stipulated by the NMED (discussed in Section 7.2), the BSG Interim Measures Work Plan (IMWP) was submitted (SNL May 2005) on May 30, 2005. As detailed in the IMWP, three monitoring wells (CYN-MW6, CYN-MW7, and CYN-MW8) were installed near the Burn Site during December 2005 to January 2006. Quarterly sampling for eight quarters began for these three monitoring wells in March 2006 and was completed in December 2007. Samples from the two monitoring wells (CYN-MW7 and CYN-MW8) located downgradient of CYN-MW1D were analyzed for nitrate and other analytes. Groundwater samples from monitoring well CYN-MW6 (adjacent to SWMU 94F) were analyzed for nitrate, total petroleum hydrocarbons as gasoline range organics (GRO) and diesel range organics (DRO), and other parameters. Groundwater monitoring programs have continued as outlined in the IMWP.

Table 7-1. Groundwater Monitoring Wells at the Burn Site Groundwater Area of Concern

Well	Installation Year	WQ	WL	Comments
12AUP01	1996			Alluvial-underflow monitoring well, plugged and abandoned in November 2012
Burn Site Well	1986		✓	Non-potable bedrock production well, inactive since 2003
CYN-MW1D	1997			Bedrock groundwater well, plugged and abandoned in November 2012
CYN-MW2S	1997			Alluvial-underflow monitoring well, plugged and abandoned in November 2012
CYN-MW3	1999		✓	Bedrock groundwater well
CYN-MW4	1999	✓	✓	Bedrock groundwater well
CYN-MW6	2005		✓	Bedrock groundwater well
CYN-MW7	2005	✓	✓	Bedrock groundwater well
CYN-MW8	2006	✓	✓	Bedrock groundwater well
CYN-MW9	2010	✓	✓	Bedrock groundwater well
CYN-MW10	2010	✓	✓	Bedrock groundwater well
CYN-MW11	2010	✓	✓	Bedrock groundwater well
CYN-MW12	2010	✓	✓	Bedrock groundwater well
CYN-MW13	2012	✓	✓	Bedrock groundwater well, replaced CYN-MW1D
CYN-MW14A	2014	✓	✓	Bedrock groundwater well
CYN-MW15	2014	✓	✓	Bedrock groundwater well, replaced CYN-MW6
CYN-MW16	2019	✓	✓	Bedrock groundwater well
CYN-MW17	2019	✓	✓	Bedrock groundwater well
CYN-MW18	2019	✓	✓	Bedrock groundwater well
CYN-MW19	2019	✓	✓	Bedrock groundwater well
Total		14	17	Total for AGMR reporting

NOTES:
Check marks in the WQ and WL columns indicate WQ sampling and WL measurements were obtained during this reporting period.
AGMR = Annual Groundwater Monitoring Report.
CYN = Canyons.
MW = Monitoring well.
WL = Water level.
WQ = Water quality.

Based on a letter received from the NMED (NMED April 2009), DOE/NNSA and SNL/NM personnel were required to further characterize the nature and extent of the perchlorate contamination at the BSG AOC. The BSG Characterization Work Plan (SNL November 2009) was submitted and then conditionally approved by the NMED (NMED February 2010). In July 2010, the requirements of the work plan were implemented and four groundwater monitoring wells (CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) were installed to determine the extent of groundwater contamination. These four wells were sampled for the first time in September 2010.

In February 2012, a work plan was submitted by DOE/NNSA and SNL/NM personnel to decommission three obsolete groundwater monitoring wells (12AUP01, CYN-MW1D, and CYN-MW2S); and install a replacement groundwater monitoring well, CYN-MW13 (SNL February 2012). Monitoring wells 12AUP01 and CYN-MW2S were screened at the contact of unconsolidated coarse sand and gravel (alluvium) and the underlying bedrock. Although alluvium at this contact was dry during drilling, these wells were installed in anticipation of recharge occurring after rainfall events. However, these wells were consistently dry. Monitoring well CYN-MW1D was constructed with a nonstandard completion (low carbon steel screen and riser pipe), had very turbid water, and exhibited erratic nitrate concentrations.

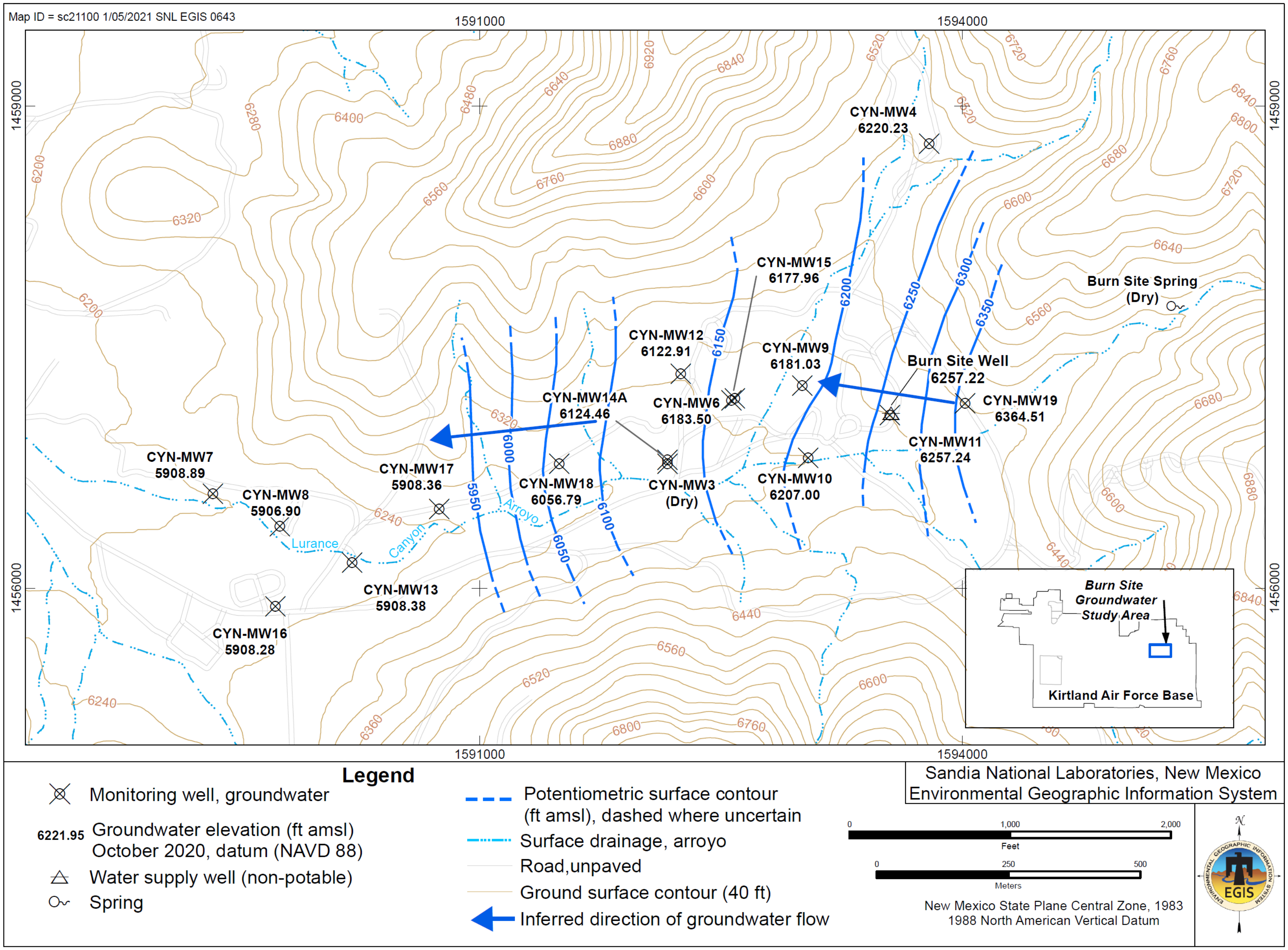

Figure 7-2. Localized Potentiometric Surface of the Burn Site Groundwater Area of Concern (October 2020)

A video log showed that the well was heavily corroded. In April 2012, the NMED approved the work plan (NMED April 2012); the three monitoring wells (12AUP01, CYN-MW1D, and CYN-MW2S) were decommissioned in November 2012; and replacement monitoring well CYN-MW13 was installed in December 2012 near well CYN-MW1D.

In August 2013, DOE/NNSA and SNL/NM personnel submitted an Extension Request to the NMED for the BSG CME Report to March 31, 2013 (DOE August 2013). DOE/NNSA and SNL/NM personnel requested the extension for consideration of recently collected groundwater sample analytical results from replacement well CYN-MW13 that could impact the BSG CME Report.

In October 2013, DOE Office of Environmental Management submitted the BSG AOC Internal Remedy Review memorandum to the DOE/NNSA Sandia Field Office (DOE October 2013). This memorandum stated that more characterization activities should be conducted at the BSG AOC before a CME could be prepared. The Internal Remedy Review recommended a weight of evidence approach to determine the source(s) of nitrate contamination.

In September 2013, a work plan for the installation of two groundwater monitoring wells was submitted (SNL September 2013a), and in June 2014 the work plan was approved by NMED (NMED June 2014a). The work plan discussed the need for installing two replacement wells (CYN-MW14 and CYN-MW15) because of declining groundwater levels at the Burn Site. Monitoring well CYN-MW14 was planned to replace CYN-MW3, whereas well CYN-MW15 was planned to replace CYN-MW6. In December 2014, monitoring wells CYN-MW14A (note the ‘A’ suffix) and CYN-MW15 were installed (SNL April 2015). The installation of a direct replacement for well CYN-MW3 was not possible because the shallow water-bearing fracture zone was not encountered by either of the two nearby boreholes. A deeper-than-planned well, CYN-MW14A, was installed near CYN-MW3. The replacement well CYN-MW15 was installed as planned (at a similar water-bearing fracture depth) near well CYN-MW6.

A work plan for the installation of four to eight groundwater monitoring wells was submitted in January 2019 (SNL January 2019), and in February 2019 the work plan was approved by NMED (NMED February 2019). Based on NMED requirements (NMED June 2018) the work plan discussed the need for installing four wells (CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19) to help define the extent of nitrate concentrations in groundwater and refine the potentiometric surface. Specifically, these wells were required to define the upgradient and downgradient extent of the nitrate plume and provide information on the 2,000-ft data gap between existing wells CYN-MW3 and CYN-MW13. Groundwater monitoring wells CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19 were installed during Calendar Year (CY) 2019; the potential installation of up to four additional wells (SNL January 2019) will be evaluated when eight quarters of water level and validated analytical sample data are available. The eight-quarters strategy is a long-standing SNL/NM protocol.

7.1.4 Current Monitoring Network

Currently 16 monitoring wells in the BSG AOC are in place to monitor for water levels and water quality, including: CYN-MW3, CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15, CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19 (Figure 7-2). However, monitoring well CYN-MW3 was dry, and CYN-MW6 did not produce adequate water volume during CY 2020 sampling events.

7.1.5 Summary of Calendar Year 2020 Activities

The following activities were performed for the BSG AOC during CY 2020:

- Conducted quarterly groundwater sampling at monitoring wells CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19 in January, April, July, and October/November 2020.
- Conducted semiannual groundwater sampling at monitoring wells CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN- MW14A, and CYN-MW15 in April and October/November 2020.
- Submitted a report on the installation of groundwater monitoring wells CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19 to the NMED (SNL May 2020).
- Submitted an extension request for the delivery of the BSG AOC Current Conceptual Model (CCM)/CME Report to the NMED (SNL June 2020a).
- The NMED approved the monitoring well installation report (NMED July 2020a).
- The NMED approved the extension request for the delivery of the BSG AOC CCM/CME Report; the new submittal date for this document is January 31, 2023 (NMED July 2020b).
- Met with the NMED in September 2020 to discuss the groundwater analytical data and groundwater elevation data from the four newest monitoring wells.
- Prepared tables of analytical results (Attachment 7B), concentration versus time graphs (Attachment 7C), and hydrographs (Attachment 7D) in support of this Annual Groundwater Monitoring Report (AGMR).

7.1.6 Conceptual Site Model

The BSG AOC groundwater flow is controlled by the local geologic framework and structural features described in the following sections.

7.1.6.1 Regional Hydrogeologic Conditions

The Manzanita Mountains are composed of a complex sequence of uplifted Precambrian metamorphic and granitic units that were subjected to several episodes of significant deformation. These units are capped by Paleozoic sandstones, shales, and limestones of the Sandia, Gray Mesa, and Atrasado Formations (the Gray Mesa and Atrasado Formations are part of the Madera Group; Kues 2001). The geologic history of the Manzanita Mountains is thoroughly described in the *Groundwater Investigation, Canyons Test Area, Operable Unit 1333, Burn Site, Lurance Canyon* (SNL November 2001) and utilizes the model presented by Brown et al. (1999). The local geology is also summarized in the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site* (SNL April 2008a).

Groundwater in the Manzanita Mountains predominantly occurs in fractured metamorphic and intrusive units that consist of metavolcanics, quartzite, metasediments (schists and phyllites), and the Manzanita Granite. Groundwater migrates through bedrock fractures in a generally westward direction. The only perennial spring in the immediate area, the Burn Site Spring (Figure 7-2), is located upgradient and upslope of the testing facilities at a limestone outcrop. No flow has been observed at this spring since 2007.

The matrix permeability of the fractured bedrock units is low, and most groundwater is produced from discontinuous water-bearing fracture zones. Groundwater discharges to small ephemeral springs located at the base of the Manzanita Mountains approximately 3 miles west of the Burn Site. The groundwater from these springs at the base of the Manzanita Mountains is of a different geochemical character than that under the BSG AOC. Additionally, some groundwater may discharge as underflow to the Regional Aquifer in unconsolidated sedimentary deposits of the Albuquerque Basin after crossing the Tijeras Fault Zone.

The Precambrian metamorphic rocks (predominantly schists and phyllite) and the Precambrian intrusive rocks (predominantly granitic gneiss) are typically fractured as a result of the long and complex history of regional deformation. Drill core data, borehole video logging, and outcrop exposures indicate that some fractures in shallow bedrock are filled with chemical precipitates, such as calcium carbonate. The carbonate precipitation likely occurred when the water table was regionally elevated prior to the development of the Rio Grande. As chemical precipitates filled the fractures, permeability was effectively reduced, possibly creating a semiconfined unit above underlying bedrock with open fractures.

The Burn Site is bisected by a north-south trending system of faults, consisting locally of several high angle normal and reverse faults that are mostly downfaulted to the east (Karlstrom et al. 2000). Faults (where exposed) are characterized by zones of crushing and brecciation. The Burn Site Fault trends north to south in the vicinity of the Burn Site Well and monitoring well CYN-MW4. Nearby outcrops indicate that the fault displacement is approximately 160 ft (SNL June 2004a). Based upon water levels measured at the monitoring wells installed in 2019, initial interpretations suggest that faults between CYN-MW17 and CYN-MW18 have a significant control upon the potentiometric surface.

The BSG AOC canyon floor consists of unconsolidated deposits over bedrock. These deposits typically are sand and gravel derived from erosion of upslope colluvium and bedrock, or aeolian deposits derived from the basin to the west. These unconsolidated deposits range in thickness from 21 to 55 ft as evidenced in boreholes drilled at the BSG AOC. The unconsolidated deposits pinch-out nearby along the steep canyon slopes.

7.1.6.2 Hydrogeologic Conditions at the Burn Site Groundwater Area of Concern

When the Burn Site Well was installed in 1986, the depth to the groundwater bearing fracture zone was approximately 222 ft below ground surface. Following completion of the well in fractured bedrock, the water level rose approximately 154 ft above the fracture zone due to positive head. The fractured rocks of the Manzanita Mountains are recharged by infiltration of precipitation, largely occurring from summer thundershowers and, to a lesser degree, winter snowfall on the higher elevations. Groundwater recharge is restricted by high evapotranspiration rates (losses to the atmosphere by evaporation and plant transpiration), the low permeability of the bedrock matrix, and the discontinuous nature of the bedrock fractures.

Regionally, groundwater in the western Manzanita Mountains flows generally toward the west from a groundwater flow divide located east of the BSG AOC. Groundwater flow along Lurance Canyon discharges primarily as direct underflow to the unconsolidated basin fill deposits of the Albuquerque Basin. Based on field observations, some discharge also occurs at ephemeral and perennial springs along the mountain front. Much of the flow that discharges from these springs undergoes evapotranspiration. Some flow from the springs infiltrates nearby alluvial deposits.

Annual precipitation in the Manzanita Mountains occurs in the form of rainfall and minor snowfall. Most precipitation falls between July and October, mainly in the form of brief, heavy rain showers. The average annual precipitation in this drainage basin is estimated to range between 12 and 16 inches (SNL April 2008a). In 2019 a meteorological observation tower (LC1) was installed in Lurance Canyon west of the Burn Site (Figure 1-4). 6.58 inches of precipitation was measured at LC1 in CY 2020 (Table 2-3), with

April and July being the two wettest months of the year at this tower (Figure 2B-11). There are no annual precipitation data available for LC1 prior to CY 2020, but data from other meteorological observation towers in the vicinity show that CY 2020 was an abnormally dry year (Section 2.6.2.1). Potential evapotranspiration in the Albuquerque area greatly exceeds precipitation. Because much of the rainfall in the Lurance Canyon drainage occurs during the summer, losses to evapotranspiration are high. A small percentage of precipitation may infiltrate into the exposed bedrock, or into alluvial deposits along the canyon floor.

Ephemeral surface water flows occur in response to precipitation in the drainage basin. In 1997, two shallow monitoring wells (CYN-MW2S and 12AUP01) were constructed in Lurance Canyon to monitor presumed water levels within the channel deposits at the contact with underlying Precambrian bedrock. No groundwater was detected in either shallow monitoring well until September 2, 2004. After a series of rain events, between 1 and 2 inches of water were measured in monitoring well 12AUP01. The water level remained constant for about one month. However, no water was measured in monitoring well 12AUP01 since 2005 and no groundwater had ever been measured in monitoring well CYN-MW2S. Both wells were plugged and abandoned in 2012 (SNL March 2013). It is likely that significant saturation in the alluvium occurs only after a series of significant rain events. Episodic accumulation of precipitation may provide a mechanism for recharging the brecciated fault zones and non-cemented fractures in the underlying bedrock.

7.1.6.3 Local Direction of Groundwater Flow

Figure 7-2 presents the October 2020 potentiometric surface for the BSG monitoring well network, and Table 7-2 presents the data used to construct the potentiometric surface map. The general direction of groundwater flow beneath the BSG AOC is to the west-southwest as inferred from the potentiometric surface. With the addition of the four new monitoring wells at the Burn Site, a more defined interpretation of the potentiometric surface for the fractured bedrock system was possible. The interpretation of the potentiometric surface in the western part of the BSG AOC changed significantly between CY 2018 and CY 2019 based on the data from the newly installed wells. Most notably, the 6,000-ft contour is shifted eastward by approximately 400 ft.

The CY 2020 potentiometric surface (Figure 7-2) depicts a steep groundwater gradient from easternmost well CYN-MW19 to well CYN-MW17 in the west with nearly 456 ft of groundwater elevation difference over approximately 3,200 ft (0.6 miles) producing a gradient of 0.14 ft per ft. In contrast, the five westernmost wells (CYN-MW7, CYN-MW8, CYN-MW13, CYN-MW16, and CYN-MW17) spread along a down-canyon distance of approximately 1,200 ft have groundwater elevations within a narrow range of approximately 2 ft producing a gradient of essentially zero. The gradient between CYN-MW17 and CYN-MW7 has less than 1 ft of groundwater elevation difference over 1,400 ft (0.27 miles), and although it is

Table 7-2. Groundwater Elevations Measured in October 2020 at Monitoring Wells Completed in the Fractured Bedrock System at the Burn Site Groundwater Area of Concern

Well ID	Measuring Point (ft amsl) NAVD 88	Date Measured	Depth to Water (ft btoc)	Water Elevation (ft amsl)
Burn Site Well	6374.66	01-Oct-2020	117.44	6257.22
CYN-MW3	6313.26	01-Oct-2020	--	--
CYN-MW4	6455.48	01-Oct-2020	235.25	6220.23
CYN-MW6	6343.37	01-Oct-2020	159.87	6183.50
CYN-MW7	6216.35	01-Oct-2020	307.46	5908.89
CYN-MW8	6230.11	01-Oct-2020	323.21	5906.90
CYN-MW9	6360.67	01-Oct-2020	179.64	6181.03
CYN-MW10	6345.45	01-Oct-2020	138.45	6207.00
CYN-MW11	6374.41	01-Oct-2020	117.17	6257.24
CYN-MW12	6345.16	01-Oct-2020	222.25	6122.91
CYN-MW13	6237.79	01-Oct-2020	329.41	5908.38
CYN-MW14A	6315.85	01-Oct-2020	191.39	6124.46
CYN-MW15	6344.44	01-Oct-2020	166.48	6177.96
CYN-MW16	6249.60	01-Oct-2020	341.32	5908.28
CYN-MW17	6268.95	01-Oct-2020	360.59	5908.36
CYN-MW18	6304.02	01-Oct-2020	247.23	6056.79
CYN-MW19	6410.43	01-Oct-2020	45.92	6364.51

NOTES:

amsl = Above mean sea level.
btoc = Below top of casing.
CYN = Canyons.
ft = Feet.
ID = Identifier.
MW = Monitoring well.
NAVD 88 = North American Vertical Datum of 1988.
-- = No data, monitoring well dry during this measurement period.

located further west (presumably the "downgradient" direction) the groundwater elevation at CYN-MW7 is slightly higher than that at CYN-MW17. Of the five western wells, CYN-MW8 has the lowest groundwater elevation and is therefore the most downgradient well at the BSG AOC.

The flat gradient in the western portion of the BSG AOC may be related to (or controlled by) several high-angle faults that offset Precambrian and Paleozoic bedrock in the area west of CYN-MW18 (Karlstrom, et. al. 2000). Another explanation for the flat groundwater gradient is that the area is possibly influenced by localized groundwater flow emanating from Sol se Mete Canyon, a large surface drainage south of the BSG AOC.

No production wells are located near the BSG AOC, except for the Burn Site Well that was used only rarely (last pumped in 2003) for non-potable applications, such as for fire suppression in testing structures and for fuel pool tests. The submersible pump was removed from the well in December 2014 and has not been reinstalled. Groundwater levels in the Paleozoic and Precambrian bedrock near the BSG AOC are not influenced by production well pumping from the basin fill deposits of the Albuquerque Basin (Regional Aquifer), which are located to the west of the Tijeras Fault Zone.

The variability of hydraulic gradients in Lurance Canyon indicates that localized controls are associated with brecciated fault zones in the low-permeability fractured bedrock at the BSG AOC. Limited groundwater flow velocity information is based on COC first arrival estimates. Based on petroleum fuel releases from SWMU 94F arriving at monitoring well CYN-MW1D, the minimum apparent velocity of the

COCs was initially estimated to be approximately 160 ft per year (ft/yr; SNL April 2008a). However, recent geochemical studies indicate that inferring such a groundwater velocity may not be valid because fracture connectivity may be limited. No information is available about vertical flow velocity within the fractured rocks at the BSG AOC. However, vertical movement of groundwater within the brecciated fault zones probably occurs as rapid, partially saturated to saturated flow.

Filled fractures within the upper portion of the metamorphic and intrusive rocks may act as a semiconfined unit restricting vertical flow. These concepts were corroborated by an aquifer pumping test conducted in March 2017 that showed there is significant compartmentalization of groundwater into distinct hydraulic domains, such that portions of the bedrock aquifer are unconfined and respond to precipitation infiltration, whereas other portions are semi-confined to confined. Some faults and fractures are sealed and act as barriers to groundwater flow (SNL December 2017).

Water levels have been routinely monitored in BSG monitoring wells since 1999. Figures 7D-1 through 7D-9 (hydrographs, Attachment 7D) show groundwater levels in BSG wells that are completed in bedrock. There are no active production wells in the area and there are no substantial seasonal variations in water levels in these wells. The wide range of hydraulic gradients in Lurance Canyon and the lack of correlation between water level fluctuations in these wells support the assessment that the BSG AOC low-permeability fractured groundwater system is poorly interconnected. Water level fluctuations may be a result of local heterogeneities in hydraulic properties related to the water-bearing fracture zones.

The five BSG monitoring wells in the lower portion of the canyon (CYN-MW7, CYN-MW8, CYN-MW13, CYN-MW16, and CYN-MW17) exhibit little variability over time with a steady decline of approximately 0.75 ft/yr (Figure 7D-4). The BSG monitoring wells in the upper portion of the canyon, most notably at monitoring wells CYN-MW6, CYN-MW9, CYN-MW10, CYN-MW11 (and Burn Site Well), and CYN-MW15, showed significant increases in groundwater levels during a two-year interval starting in early 2014, apparently in response to intense thunderstorms in the 2014 and 2015 monsoon seasons. Water levels in these five wells rebounded by 14.79 to 19.65 ft between July 2014 and October 2015 (Figures 7D-3, 7D-6, and 7D-7). Since then, these five wells and most of the remaining BSG wells currently show declining groundwater elevations of three or more ft/yr (Figures 7D-1 through 7D-3, 7D-6 through 7D-8).

7.1.6.4 Contaminant Sources

Nitrate in the BSG AOC may be derived from both natural and anthropogenic sources. The NMED-specified background concentration for nitrate in groundwater is 4 mg/L (Dinwiddie September 1997). This value was based upon a study by the NMED (Moats and Winn January 1995). However, those authors considered the background concentration to not be “reliably established” due to the lack of suitable (convincingly uncontaminated) wells available at that time. Potential natural sources include the weathering of rocks, atmospheric deposition, and the grading of soils and alluvium. Evaporation and transpiration of rainwater that has infiltrated canyon alluvial sediments might have increased nitrate concentrations. Potential anthropogenic nitrate sources include the use of ammonium-nitrate slurry, wastewater discharges, and the degradation of HE compounds. SNL/NM personnel have conducted several soil sampling events in the BSG AOC to identify the source of nitrate; however, no conclusive source has been identified, most likely because chemical releases ceased decades ago and precipitation has leached away the nitrate.

Some evidence indicates that evaporation and transpiration may concentrate nitrate in sediments beneath ephemeral drainages in the vicinity of the Manzanita Mountains. This evidence includes nitrate concentrations that exceed the EPA MCL in groundwater beneath these drainages and a chloride to nitrate ratio in groundwater that is similar to the chloride to nitrate ratio in rainfall (McQuillan and Space 1995).

SWMU 65 is located in the center of the BSG AOC and contains open-air detonation areas where nitrate-based explosives were used. The detonations dispersed explosive compounds across the ground surface, and subsequent degradation (weathering) of these explosive compounds most likely released some nitrate. SWMU 94 testing also involved burn tests involving large volumes of ammonium-nitrate slurry, HE compounds (both nitrate-based and plastic explosives), and rocket propellants. Nitrate is highly soluble in water, and precipitation can enhance the migration of nitrate to groundwater. In addition to nitrate, petroleum products were detected in soil samples; therefore, the potential for petroleum fuel products in groundwater was evaluated.

7.1.6.5 Contaminant Distribution and Transport in Groundwater

In October 1991, nitrate was first detected above the EPA MCL of 10 mg/L in groundwater samples from the Burn Site Well. Since the installation of the monitoring wells shown in Table 7-3, nitrate concentrations that exceed the EPA MCL have consistently been detected in groundwater samples. Nitrate concentrations in groundwater samples from monitoring wells CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW17, CYN-MW18, and CYN-MW19 have not exceeded the EPA MCL, and are not included in Table 7- 3.

Potential downgradient receptors for the nitrate plume are Coyote Springs, approximately 3 miles west of the BSG AOC, and the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) and KAFB well fields, located approximately 7 to 12 miles to the west-northwest of the BSG AOC. Numerical simulations suggest nitrate concentrations in groundwater would decrease to below the EPA MCL by the time the nitrate reaches Coyote Springs, and to far below laboratory MDLs in the Regional Aquifer through dispersion and dilution as the nitrate-impacted groundwater moves into the more hydraulically conductive alluvial-fan and Ancestral Rio Grande deposits west of Coyote Springs. Numerical simulations also predict that groundwater travel times exceed 600 years from the study area to the ABCWUA and KAFB well fields (SNL May 2005).

Table 7-3. Summary of Historical Nitrate Concentrations in Groundwater Monitoring Wells that Exceed the MCL[a] at the Burn Site Groundwater Area of Concern

Well	Historical Maximum NPN Concentration (mg/L)	Approximate Distance and Direction from Burn Site Well
Burn Site Well	27.0	Not applicable
CYN-MW1D	28.0	3,400 ft west-southwest
CYN-MW3	14.7	1,400 ft west
CYN-MW6	39.9	1,000 ft west
CYN-MW9	49.6	600 ft west-northwest
CYN-MW10	21.8	600 ft west-southwest
CYN-MW11	25.4	10 ft south
CYN-MW12	20.2	1,300 ft west-northwest
CYN-MW13	40.0	3,400 ft west-southwest
CYN-MW14A	15.7	1,400 ft west
CYN-MW15	29.8	1,000 ft west
CYN-MW16	11.7	4,000 ft west-southwest

NOTES:
[a]EPA MCL for nitrate is 10 mg/L.
CYN = Canyons.
EPA = U.S. Environmental Protection Agency.
ft = Feet.
MCL = Maximum contaminant level.
mg/L = Milligrams per liter.
MW = Monitoring well.
NPN = Nitrate plus nitrite (as nitrogen).

7.2 Regulatory Criteria

The NMED HWB provides regulatory oversight of SNL/NM Environmental Restoration (ER) Operations, as well as implements and enforces regulations mandated by the Resource Conservation and Recovery Act (RCRA). All SWMUs and AOCs are listed in the *RCRA Facility Operating Permit, NM5890110518* (RCRA Permit) (NMED January 2015).

All BSG AOC corrective action requirements are contained in the Consent Order. The BSG groundwater monitoring activities are not associated with a single SWMU but are more regional in nature. Before the Consent Order became effective in April 2004, BSG AOC groundwater investigations had been conducted voluntarily by SNL/NM ER Operations.

Initially, BSG groundwater monitoring was initiated to satisfy the requirements of the RCRA Permit for characterization of SWMUs. The Consent Order transferred regulatory authority for corrective action requirements from the RCRA Permit to the Consent Order. The BSG investigation must comply with requirements set forth in the Consent Order for site characterization and the development of a CME.

In response to the Consent Order, the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site*, and *Corrective Measures Evaluation Work Plan, Burn Site Groundwater* (SNL April 2008a and 2008b) was submitted to the NMED. The CCM provides site-specific characteristics by which remedial alternatives were evaluated. The CME Work Plan provides a description and justification of the remedial alternatives considered and the methods and criteria to be used in the evaluation. The CME Work Plan was completed to comply with requirements set forth in the Consent Order and with the guidance of the *RCRA Corrective Action Plan* (EPA 1994).

On March 1, 2005, a letter was received from the NMED that disapproved the CME Work Plan and offered the following statements/requirements:

- DOE/NNSA and SNL/NM personnel must prepare and submit an IMWP within 90 days from the receipt of the letter (by May 30, 2005).

- The NMED requires additional characterization of the nitrate-contaminated groundwater near the BSG AOC. Specifically, the downgradient extent of groundwater with nitrate concentrations greater than 10 mg/L shall be determined.

- The NMED does not accept the *Corrective Measures Evaluation Work Plan, Burn Site Groundwater* (SNL April 2008b) because it is not satisfied with the existing characterization of nitrate-contaminated groundwater near the BSG AOC.

- The NMED also requires the installation of one additional monitoring well "adjacent to SWMU 94F in order to establish groundwater conditions in this petroleum-contamination source area."

In May 2005, an IMWP was submitted to the NMED that proposed the installation of additional groundwater monitoring wells to characterize the extent of nitrate contamination in the fractured bedrock system downgradient of monitoring well CYN-MW1D and fuel-related compounds downgradient of SWMU 94F (SNL May 2005). The selected interim measures described in the IMWP included additional well installation, groundwater monitoring, and institutional controls. These interim measures were proposed to serve three purposes: provide data to support the CME; monitor the migration of the nitrate plume to provide an early warning if an impact to downgradient ecological receptors (Coyote Springs) becomes apparent; and protect human health and the environment by limiting exposure to contaminated groundwater by restricting access to the monitoring wells.

In support of the selected interim measures, the IMWP included the following reports as attachments:

- Remedial Alternatives Data Gaps Review
- Nitrate Source Evaluation
- Evaluation of Contaminant Transport

The Remedial Alternatives Data Gaps Review included detailed definitions of remedial alternatives and a preliminary evaluation of data gaps (SNL May 2005). One of the data gaps included determining background nitrate concentrations in soil/rock and evaluating the potential for a residual source of nitrate in the vadose zone. The investigation initiated to fill this data gap and the analytical results were presented in the Nitrate Source Evaluation. The Evaluation of Contaminant Transport consisted of a cross-sectional modeling approach to simulate transport and dilution of nitrate between the current location of nitrate in BSG and potential human and ecological receptors.

Data collected as part of additional characterization required by the IMWP were incorporated into an updated version of the Conceptual Site Model that provides the basis for a technically defensible remediation program that was developed and documented in the CME Work Plan (SNL April 2008b), the results of which will eventually be documented in the BSG CME Report. The April 2008 CME Work Plan was developed to address the concerns outlined in the March 1, 2005 letter from the NMED and to comply with requirements of the Consent Order. The CME Work Plan provides information and data gathered during interim measures, and performance and compliance goals and objectives for the possible remediation of BSG.

On April 30, 2009, a letter was received from the NMED entitled, *Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID #NM5890110518* (NMED April 2009). The letter discussed the occurrence of perchlorate in groundwater at concentrations at or greater than 1 µg/L at various locations at SNL/NM. The letter also stated that DOE/NNSA and SNL/NM personnel must characterize the nature and extent of the assumed perchlorate contamination at the BSG AOC and submit to the NMED a plan for such characterization. DOE/NNSA and SNL/NM personnel met with the NMED in June and July 2009 and submitted a letter requesting an extension to the November 30, 2009 due date (DOE July 2009). The results of the discussions have been incorporated into the BSG Characterization Work Plan (SNL November 2009), which included such items as number and locations of wells and boreholes.

In February 2010, a notice of conditional approval for the November 2009 BSG Characterization Work Plan was received. In July 2010, the requirements of the work plan were implemented, and subsurface soil sampling was completed at 10 deep soil borehole locations to determine contaminant sources, and four groundwater monitoring wells were installed to determine the extent of groundwater contamination. Due to an outstanding schedule commitment, an extension request was submitted for the BSG CME Report in September 2010 (SNL September 2010), which was approved by the NMED (NMED October 2010) with a revised CME Report submittal date of March 31, 2014. In January 2014, the DOE/NNSA and SNL/NM personnel requested an additional extension to the delivery date of the BSG CME Report to March 31, 2016 (DOE January 2014). In June 2015, NMED approved the DOE/NNSA's proposed extension request.

In June 2016, DOE/NNSA and SNL/NM personnel submitted the *Aquifer Pumping Test Work Plan for the Burn Site Groundwater Area of Concern* (SNL June 2016a), and this plan was quickly approved by the NMED (NMED June 2016). Field work associated with the aquifer pumping test was performed in 2017, and in December 2017, the *Aquifer Pumping Test Report for the Burn Site Groundwater Area of Concern* was submitted to NMED (SNL December 2017). Early in 2018 the NMED approved the *Aquifer Pumping Test Report for the Burn Site Groundwater Area of Concern* (NMED January 2018).

Based on the findings of the 2017 report, DOE/NNSA and SNL/NM personnel presented recommendations for additional site characterization to the NMED (DOE June 2018). However, the NMED disapproved the proposed recommendations and required the submittal of a Well Installation Work Plan (NMED June 2018). DOE/NNSA and SNL/NM personnel submitted a Well Installation Work Plan (SNL January 2019) that was subsequently approved by the NMED (NMED February 2019). Based on the approved 2019 work plan, four monitoring wells were installed in the fall 2019. The well installation activities were documented in a well installation report (SNL May 2020) that was subsequently approved by the NMED (NMED July 2020a).

In this AGMR, BSG monitoring data are presented for both hazardous and radioactive constituents; however, the monitoring data for radionuclides (i.e., gamma spectroscopy, gross alpha/beta activity, and tritium) are provided voluntarily by the DOE/NNSA and SNL/NM personnel. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements of the Consent Order. Additional information on radionuclides and the scope of the Consent Order is available in Section III.A of the Consent Order.

7.3 Scope of Activities

Section 7.1.5 lists the BSG investigation activities conducted during this reporting period, including the preparation plans and reports. The field activities completed during CY 2020 included groundwater monitoring (Table 7-4). Table 7-5 lists the analytical parameters for each well and each sampling event.

Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples include environmental duplicate samples, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Section 1.3 discusses the utility of QC samples.

7.4 Field Methods and Measurements

Section 1.3 describes in detail the monitoring procedures conducted for the BSG groundwater monitoring. Figure 7-2 and Table 7-2 present the water level information used to create the potentiometric surface map, and Attachment 7D (Figures 7D-1 through 7D-9) presents the hydrographs.

7.5 Analytical Methods

Section 1.3.2 describes EPA-specified protocols utilized for groundwater samples analyzed by the offsite laboratories (Tables 1-5 and 1-6).

7.6 Summary of Analytical Results

This section discusses analytical results, exceedances of regulatory standards, and pertinent trends in COC concentrations. Attachment 7B (Tables 7B-1 through 7B-12) present the analytical results and field measurements for the CY 2020 BSG sampling events. Tables 7B-1 through 7B-12 footnotes explain the data qualifiers. Attachment 7C (Figures 7C-1 through 7C-7) presents the nitrate plus nitrite (NPN) (reported as nitrogen) concentration trend plots.

Table 7-4. Groundwater Monitoring Well Network and Sampling Dates for the Burn Site Groundwater Area of Concern, Calendar Year 2020

Date of Sampling Event	Wells Sampled		SAP
January 2020	CYN-MW16 CYN-MW17 CYN-MW18 CYN-MW19		*Burn Site Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2020—ER Wells* (SNL January 2020)
April 2020	CYN-MW4 CYN-MW7 CYN-MW8 CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12	CYN-MW13 CYN-MW14A CYN-MW15 CYN-MW16 CYN-MW17 CYN-MW18 CYN-MW19	*Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2020* (SNL April 2020)
July 2020	CYN-MW16 CYN-MW17 CYN-MW18 CYN-MW19		*Burn Site Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2020* (SNL June 2020c)
October/November 2020	CYN-MW4 CYN-MW7 CYN-MW8 CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12	CYN-MW13 CYN-MW14A CYN-MW15 CYN-MW16 CYN-MW17 CYN-MW18 CYN-MW19	*Burn Site Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2021* (SNL September 2020)

NOTES:
CYN = Canyons.
ER = Environmental Restoration (Operations).
MW = Monitoring well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.

During the January and July 2020 sampling events, acetone was detected in four samples, and methylene chloride and trans-1,3-dichloropropene were detected in one sample. The compound trans-1,3-dichloropropene was reported in well CYN-MW19 at a concentration of 0.67 μg/L; there is not an established EPA MCL for this compound. All the acetone and the methylene chloride results were qualified as not detected during data validation due to associated blank contamination (Table 7B-1). No other volatile organic compounds (VOCs) or HE compounds were detected. Table 7B-2 lists the laboratory MDLs for all analyzed VOCs and Table 7B-3 lists the laboratory MDLs for all analyzed HE compounds.

Table 7B-4 presents the analytical results for NPN and Figure 7-3 presents the BSG AOC NPN concentration contours for the October/November 2020 sampling event. NPN results exceeded the EPA MCL of 10 mg/L in samples from monitoring wells CYN-MW9, CYN-MW11 (April 2020 sampling event only), CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15, and CYN-MW16 (January 2020 sampling event only). NPN concentrations in samples from the other BSG monitoring wells were less than the EPA MCL (Table 7B-4). NPN concentrations in samples from the four newest monitoring wells significantly changed the interpretation of the contaminant distribution in the central and western part of the BSG AOC from CY 2018 to CY 2019. As currently depicted for CY 2020 (Figure 7-3) there are two distinct plumes with elevated NPN concentrations; it is unknown if the plumes were derived from the same source. NPN concentrations below the EPA MCL in two new groundwater monitoring wells (CYN-MW17 and CYN-MW18) demonstrate that the two plumes are not contiguous, and that the areal extent of NPN exceeding the EPA MCL is much less than previously thought. NPN concentrations currently below the EPA MCL in new groundwater monitoring well CYN-MW16 defines the western extent of the NPN plume. NPN concentrations below the EPA MCL in new groundwater monitoring well CYN-MW19 defines the eastern extent of the NPN plume. In addition, NPN concentrations in CYN-MW10 continued to be below the EPA MCL during this reporting period so the southern boundary of the eastern plume has been defined.

Table 7-5. Parameters Sampled at Burn Site Groundwater Area of Concern Wells for Each Sampling Event, Calendar Year 2020

Parameter	January 2020	
Anions DRO Gamma Spectroscopy (short list[a]) GRO Gross Alpha/Beta Activity HE Compounds Isotopic Uranium NPN Perchlorate TAL Metals Tritium VOCs	CYN-MW16 CYN-MW17 CYN-MW18 CYN-MW18 (Duplicate) CYN-MW19	
Parameter	**April 2020**	
Alkalinity Anions DRO Gamma Spectroscopy (short list[a]) GRO Gross Alpha/Beta Activity HE Compounds Isotopic Uranium NPN Perchlorate[b] TAL Metals Tritium VOCs	CYN-MW4 CYN-MW7 CYN-MW7 (Duplicate) CYN-MW8 CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12 CYN-MW13	CYN-MW13 (Duplicate) CYN-MW14A CYN-MW15 CYN-MW15 (Duplicate) CYN-MW16 CYN-MW17 CYN-MW17 (Duplicate) CYN-MW18
Parameter	**July 2020**	
Anions DRO Gamma Spectroscopy (short list[a]) GRO Gross Alpha/Beta Activity HE Compounds Isotopic Uranium NPN Perchlorate TAL Metals Tritium VOCs	CYN-MW16 CYN-MW17 CYN-MW18 CYN-MW19 CYN-MW19 (Duplicate)	

Refer to footnotes on page 7-18.

Table 7-5. Parameters Sampled at Burn Site Groundwater Area of Concern Wells for Each Sampling Event, Calendar Year 2020 *(Concluded)*

Parameter	October/November 2020	
DRO GRO NPN Perchlorate[c]	CYN-MW4 CYN-MW4 (Duplicate) CYN-MW7 CYN-MW8 CYN-MW8 (Duplicate) CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12	CYN-MW13 CYN-MW14A CYN-MW14A (Duplicate) CYN-MW15 CYN-MW16 CYN-MW17 CYN-MW17 (Duplicate) CYN-MW18 CYN-MW19
Alkalinity Anions Gamma Spectroscopy (short list[a]) Gross Alpha/Beta Activity HE Compounds Isotopic Uranium TAL Metals Tritium VOCs	CYN-MW16 CYN-MW17 CYN-MW17 (Duplicate) CYN-MW18 CYN-MW19	

NOTES:

[a]Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).

[b]Perchlorate analysis performed on samples from monitoring wells CYN-MW15, CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19.

[c]Perchlorate analysis performed on sample from monitoring well CYN-MW15.

CYN = Canyons.
DRO = Diesel range organics.
GRO = Gasoline range organics.
HE = High explosive.
MW = Monitoring well.
NPN = Nitrate plus nitrate (reported as nitrogen).
TAL = Target Analyte List.
VOC = Volatile organic compound.

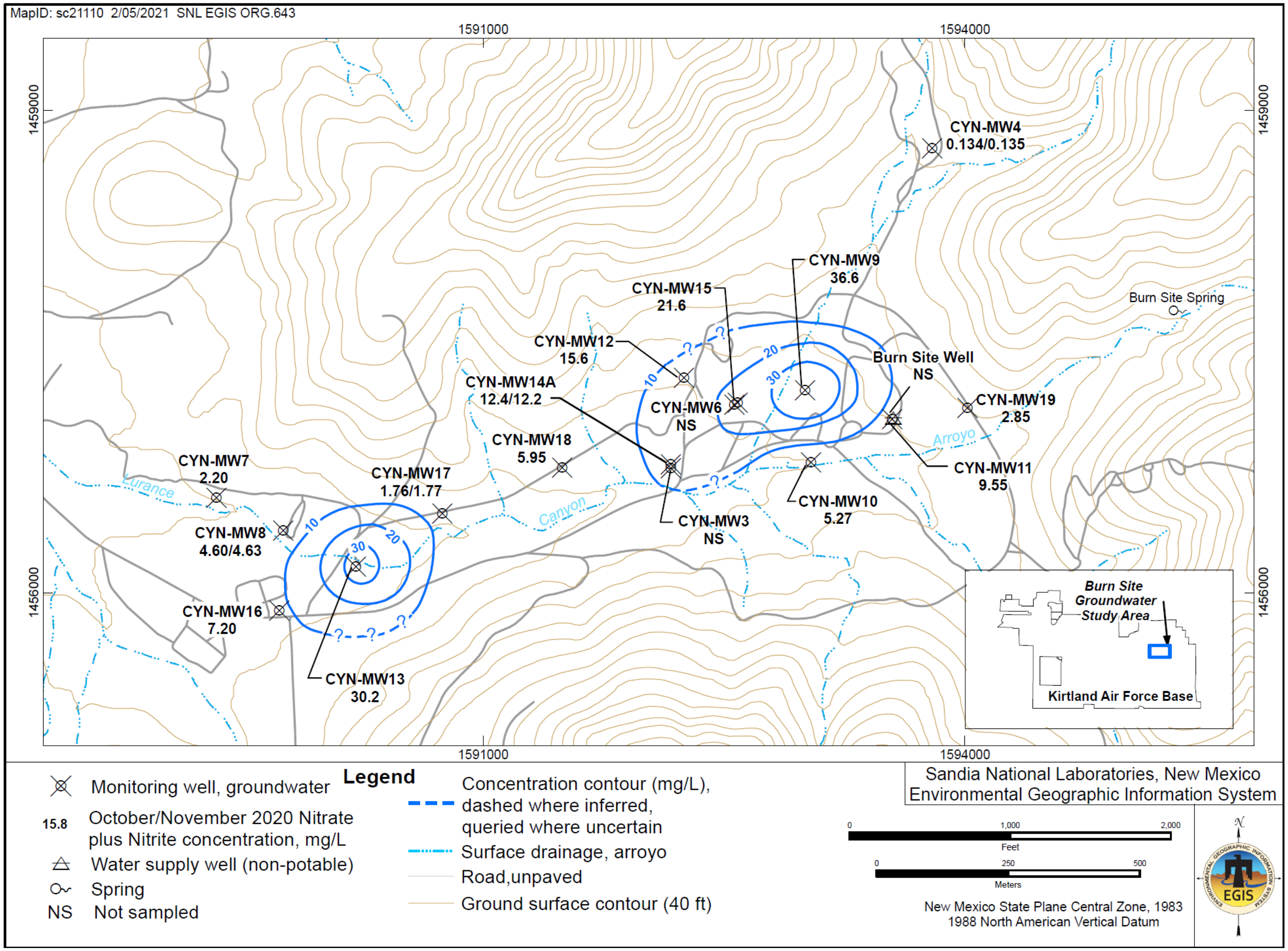

Figure 7-3. Nitrate plus Nitrite Concentration Contour Map for the Burn Site Groundwater Area of Concern, October/November 2020

For CY 2020, the NPN concentrations for wells exceeding the EPA MCL are summarized as follows:

- Monitoring well CYN-MW9 had reported concentrations of 49.6 mg/L (April 2020), and 36.6 mg/L (November 2020). The April 2020 concentration is a new historical maximum, and the historical range of NPN concentrations for monitoring well CYN-MW9 is approximately 29 to 50 mg/L with an overall consistent trend with high variability over the life of the well (Figure 7C-1).

- Monitoring well CYN-MW11 had reported concentrations of 11.5 mg/L (April 2020) and 9.55 mg/L (October 2020). The historical range of NPN concentrations for monitoring well CYN-MW11 is approximately 9 to 25 mg/L with a consistent trend until June 2014, then a mostly increasing trend starting in 2015, followed by a mostly decreasing trend for the last seven sampling events (Figure 7C-2).

- Monitoring well CYN-MW12 had reported concentrations of 19.6 mg/L (April 2020) and 15.6 mg/L (November 2020). The historical range of NPN concentrations for monitoring well CYN-MW12 is approximately 11 to 20 mg/L with increasing concentrations with high variability over the life of the well (Figure 7C-3).

- Monitoring well CYN-MW13 had reported concentrations of 38.4 mg/L (April 2020), 40.0 mg/L (April 2020, environmental duplicate sample), and 30.2 mg/L (November 2020). The historical range of NPN concentrations for monitoring well CYN-MW13 is approximately 30 to 40 mg/L with an overall consistent trend over the life of the well (Figure 7C-4).

- Monitoring well CYN-MW14A had reported concentrations of 14.5 mg/L (April 2020), 12.4 mg/L (October 2020), and 12.2 mg/L (October 2020, environmental duplicate sample). The historical range of NPN concentrations for monitoring well CYN-MW14A is approximately 10 to 16 mg/L with an overall consistent trend over the life of the well (Figure 7C-5).

- Monitoring well CYN-MW15 had reported concentrations of 24.3 mg/L (April 2020), 25.9 (April 2020, environmental duplicate sample), and 21.6 mg/L (November 2020). Monitoring well CYN-MW15 replaced well CYN-MW6 in December 2014; Figure 7C-6 displays all NPN concentrations for monitoring well CYN-MW6 and the replacement monitoring well CYN-MW15. The historical range of NPN concentrations for monitoring wells CYN-MW6 and CYN-MW15 is approximately 19 to 40 mg/L with a generally stable trend with high variability over the life of the wells (Figure 7C-6).

- Monitoring well CYN-MW16 had reported concentrations of 11.7 mg/L (January 2020), 8.97 mg/L (April 2020), 7.76 mg/L (July 2020), and 7.20 mg/L (October 2020). CYN-MW16 is one of the newly installed monitoring wells and the historical range of NPN concentrations is approximately 7 to 12 mg/L with a generally decreasing trend over the life of the well (Figure 7C-7).

Table 7B-5 lists the results for DRO and GRO. EPA MCLs for DRO or GRO have not been established. No detections of DRO and GRO were reported for any of the samples collected during the CY 2020 sampling event except for DRO in two wells during the October/November sampling event. CYN-MW9 reported a DRO value of 109 μg/L and CYN-MW12 reported a DRO value of 373 μg/L. Both values were qualified during data validation as “J-” (the associated numerical value is an estimated quantity with a suspected negative bias).

Table 7B-6 lists the results for perchlorate. Results for perchlorate are compared to the screening level of 4 μg/L. No detections of perchlorate were reported for any of the samples collected during CY 2020 sampling events.

Table 7B-7 presents the analytical results for anions. None of the analytes exceed established EPA MCLs.

Table 7B-8 presents the analytical results for alkalinity. No EPA MCLs exist for alkalinity parameters.

Table 7B-9 presents total metal results. No metals exceed established EPA MCLs.

Table 7B-10 presents filtered metal results. No metals exceed established EPA MCLs.

Table 7B-11 presents the results of groundwater samples analyzed for gamma spectroscopy (short list), gross alpha/beta activity, isotopic uranium, and tritium. All radionuclide activity results were below established EPA MCLs. Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations Part 141. Naturally occurring uranium is measured independently and the gross alpha activity measurements are corrected by subtracting the total uranium activity from the uncorrected gross alpha activity results. Radiological results are further reviewed by an SNL/NM Health Physicist to assure that samples are nonradioactive. Corrected gross alpha activity results are below the EPA MCL of 15 picocuries per liter for all samples. The cesium-137 activity in the January 2020 environmental sample at CYN-MW18 was rejected by the contract laboratory (GEL Laboratories, LLC) due to the peak not meeting identification criteria.

Field water quality parameters are measured during purging of each monitoring well prior to sampling and include temperature, specific conductivity, oxidation-reduction potential, potential of hydrogen (pH), turbidity, and dissolved oxygen. Table 7B-12 presents the field water quality parameter measurements obtained immediately prior to sample collection at each well.

7.7 Quality Control Results

Section 1.3 describes how the field and laboratory QC samples were collected and prepared. Attachment 7B provides data validation qualifiers with the analytical results. The results of QC samples and the impact on data quality for the BSG sampling events are discussed in the following sections.

Environmental duplicate results from all CY 2020 sampling events show good correlation (relative percent difference values less than 35 for inorganic analyses) for all calculated parameters.

The results of the EB sample analyses are as follows:

- **January 2020 Sampling Event at Monitoring Well CYN-MW18**—The EB sample was collected prior to sampling this well and analyzed for all parameters. Acetone, bromodichloromethane, chloride, chloroform, copper, dibromochloromethane, and vanadium were detected above the laboratory MDLs. No corrective action was necessary for acetone, bromodichloromethane, chloride, chloroform, or dibromochloromethane because these analytes were not detected in environmental samples or were detected at concentrations less than 10 times the associated environmental sample result. Copper and vanadium were detected in the CYN-MW18 environmental sample at a concentration less than five times the associated EB result and were qualified as not detected during data validation.

- **April 2020 Sampling Event at Monitoring Wells CYN-MW9, CYN-MW11, CYN-MW12, and CYN- MW16**—The EB samples were collected prior to sampling these wells and analyzed for all parameters. Acetone, arsenic, 2-butanone, bromodichloromethane, chloride, chloroform, copper, dibromochloromethane, and zinc were detected above the laboratory MDLs. No corrective action was necessary for acetone, 2-butanone, bromodichloromethane, chloride, chloroform, or dibromochloromethane because these analytes were not detected in environmental samples or were detected at concentrations less than 10 times the associated environmental sample result. Arsenic in CYN-MW12; copper in CYN-MW7, CYN-MW12, and CYN-MW16; and zinc in CYN-MW4 and CYN-MW12 were detected at concentrations less than five times the associated EB result and were qualified as not detected during data validation.

- **July 2020 Sampling Event at Monitoring Well CYN-MW19**— The EB sample was collected prior to sampling well CYN-MW19 and was analyzed for all parameters. Acetone, bromodichloromethane, chloride, chloroform, copper, dibromochloromethane, and zinc were detected above the laboratory MDLs. No corrective action was necessary for bromodichloromethane, chloride, chloroform, dibromochloromethane, or zinc because these analytes were not detected in the environmental sample or were detected at concentrations less than 10 times the associated environmental sample result. Acetone and copper were detected in the CYN-MW19 environmental sample at concentrations less than five times the associated EB result and were qualified as not detected during data validation.

- **October/November 2020 Sampling Event at Monitoring Wells CYN-MW4, CYN-MW8, CYN-MW14A, and CYN-MW17**— The EB sample was collected prior to sampling these wells and analyzed for all parameters. Acetone, alkalinity, bromodichloromethane, bromoform, chloride, chloroform, copper, dibromochloromethane, and NPN were detected above the laboratory MDLs in the EB sample associated with CYN-MW17. No corrective action was necessary because these analytes were not detected or were detected at concentrations less than 10 times the associated environmental sample result.

FB samples were collected for VOCs and GRO to assess whether contamination of the samples resulted from ambient field conditions. The results of the FB sample analyses are as follows:

- **January 2020 Sampling Event at Monitoring Well CYN-MW16**—No GRO were detected above laboratory MDLs in the FB sample. Acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the FB sample. No corrective action was necessary because these compounds were not detected in the environmental sample.

- **April 2020 Sampling Event at Monitoring Wells CYN-MW4, CYN-MW8, CYN-MW14A, and CYN-MW18**—No GRO were detected above laboratory MDLs in these FB samples. Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected in the FB samples. No corrective action was necessary because these compounds were not detected in associated environmental samples.

- **July 2020 Sampling Event at Monitoring Well CYN-MW16**—Acetone, 2-butanone, bromodichloromethane, bromoform, chloroform, dibromochloromethane, and GRO were detected in the FB sample. No corrective action was necessary because these compounds were not detected in the environmental sample.

- **October/November 2020 Sampling Event at Monitoring Wells CYN-MW7, CYN-MW10, and CYN-MW16**—No GRO were detected above laboratory MDLs in these FB samples. Bromodichloromethane, chloroform, and dibromochloromethane were detected in the FB sample associated with CYN-MW16. No corrective action was necessary because these compounds were not detected in the environmental sample.

TB samples were submitted whenever samples were collected for VOC and GRO analyses to assess whether contamination of the samples had occurred during shipment and storage. The results of the TB sample analyses are as follows:

- **January 2020 Sampling Event**—A total of five VOC and five GRO TBs were submitted during this sampling event. No GRO was detected above laboratory MDLs in any TB sample. Acetone and methylene chloride were reported in VOC TB samples. Both acetone and methylene chloride were reported in CYN-MW17, CYN-MW18, and CYN-MW19 environmental samples at concentration less than ten times the associated TB and were qualified as not detected during data validation.

- **April 2020 Sampling Event**—A total of 21 VOC and 21 GRO TBs were submitted with the April 2020 samples. No VOC or GRO were detected above laboratory MDLs or sample quantitation limit.

- **July 2020 Sampling Event**—A total of six VOC and six GRO TBs were submitted during this sampling event. No GRO were detected above laboratory MDLs in any TB sample. Acetone was reported in one VOC TB sample. No corrective action was necessary because acetone was not detected in the associated environmental sample.

- **October/November 2020 Sampling Event**—A total of five VOC and 19 GRO TBs were submitted during this sampling event. No VOC or GRO were detected above laboratory MDLs or sample quantitation limit, except methylene chloride. Methylene chloride was reported at concentrations less than the practical quantitation limit (PQL) in all TB samples. Methylene chloride in associated environmental samples (CYN-MW19) were qualified as not detected at the PQL during data validation.

7.8 Project Field Notes and Comments

During the January, April, and July 2020 sampling events the field crew noted a strong sulfur-like odor from groundwater at well CYN-MW17. During the July 2020 sampling event the field crew also noted a strong sulfur-like odor from groundwater at well CYN-MW18.

No other variances or issues from requirements in the BSG Mini-Sampling and Analysis Plans (Table 7- 4) were identified during sampling activities for the CY 2020 sampling events.

7.9 Summary and Conclusions

This section provides a brief summary of the following: field activities, COC concentrations, trends of concentrations versus time, and plans for studies to be completed during CY 2021 at the BSG AOC.

The BSG AOC is located in the vicinity of the active Lurance Canyon Burn Site facility. Groundwater investigations were initiated in 1997 at the request of the NMED after elevated nitrate levels were discovered in the non-potable Burn Site Well.

Groundwater monitoring wells CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19 were installed during CY 2019 and these wells were sampled for the fifth time in October/November 2020.

Monitoring wells were sampled during January, April, July, and October/November 2020. The samples were analyzed for VOCs, HE compounds, DRO, GRO, NPN, Target Analyte List metals, anions, alkalinity, perchlorate, gamma spectroscopy (short list), gross alpha/beta activity, isotopic uranium, and tritium. Analytical results were compared with EPA MCLs for drinking water (EPA March 2018) and the screening level of 4 μg/L for perchlorate.

NPN was the only COC that exceeded EPA MCLs. NPN was detected at concentrations exceeding the EPA MCL of 10 mg/L in samples from seven BSG AOC monitoring wells: CYN-MW9, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15, and CYN-MW16. The maximum concentration reported in CY 2020 was 49.6 mg/L in the sample collected from monitoring well CYN-MW9 during the April 2020 sampling event. During the January 2020 sampling event the NPN detections above the EPA MCL at monitoring well CYN-MW16 represent the second-time exceedance of the EPA MCL for NPN at this new location; however, the NPN concentrations for the three subsequent sampling events at this well were all below the EPA MCL. As shown on Figure 7-3, two distinct NPN plumes exceeding 10 mg/L are now evident. Based on the three recent sampling events, the areal extent of NPN contamination has been bounded by the current well network.

The analytical results for this reporting period are mostly consistent with historical concentrations. Ongoing environmental studies of the BSG AOC include the following:

- Continue semiannual collection of groundwater samples at 10 monitoring wells (CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, and CYN-MW15) during the second and fourth quarters of CY 2021. At a minimum, the analytes for groundwater sampling per well will consist of NPN, DRO, and GRO.

- Continue quarterly collection of groundwater samples at four monitoring wells (CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19) in CY 2021. At a minimum, the analytes for groundwater sampling per well will consist of NPN, DRO, and GRO.

- Continue periodic measurements of groundwater elevations in 16 monitoring wells and the Burn Site Well.

- Report future BSG investigation results in the CY 2021 SNL/NM AGMR.

- Continue discussions with NMED on future characterization activities based on the groundwater sampling analytical results from the four newly installed monitoring wells.

Attachment 7A
Historical Timeline of the Burn Site Groundwater Area of Concern

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Table 7A-1. Historical Timeline of the Burn Site Groundwater Area of Concern

Month	Year	Event	Reference
	1967-early 1980s	HE outdoor testing conducted at the BSG AOC until early 1980s. Burn testing began in 1970s using excavation pits and portable burn pans with JP-4. Open detonations of HE materials conducted. Wastewater discharged into unlined pits.	SNL November 2001
	1987	Eighteen potential SWMUs were identified during the Comprehensive Environmental Assessment and Response Program investigation. HE compounds, nitrate, and diesel range organics identified as potential COCs.	DOE September 1987
February	1996	Burn Site Well (a non-potable production well) was installed at the eastern edge of the HE testing area.	SNL April 2008a
November	1996	Groundwater sample from Burn Site Well yielded nitrate concentration of 25 mg/L.	SNL January 2005
July	1997	NMED/DOE OB, DOE, and Sandia agreed on installation of deep and shallow monitoring wells and one year of quarterly sampling.	SNL July 1997
November	1997	Monitoring wells CYN-MW2S and 12AUP01 are installed to serve as piezometers. (Piezometers are constructed of narrow-diameter casing and not used for collecting groundwater samples.)	SNL June 1998
December	1997	Monitoring well CYN-MW1D installed.	SNL June 1998
February	1998	Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report containing description of BSG hydrogeology submitted.	SNL February 1998
March	1999	GWPP Fiscal Year 1998 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 1999
June	1999	Monitoring wells CYN-MW3 and CYN-MW4 installed.	SNL November 2001
	Various (e.g., 1994)	BSG AOC SWMUs 94 and 65 proposed and approved for NFA/CAC.	Numerous references, for example: SNL February 2004
March	2000	GWPP Fiscal Year 1999 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2000
April	2001	GWPP Fiscal Year 2000 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL April 2001
August	2001	Monitoring well CYN-MW5 installed 1.7 miles west of the BSG AOC.	SNL June 2005
November	2001	Comprehensive BSG Investigation Report documenting hydrogeologic characteristics of the study area prepared.	SNL November 2001
March	2002	GWPP Fiscal Year 2001 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2002
March	2003	GWPP Fiscal Year 2002 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2003
June	2003	Further refinements of the hydrogeologic setting of the BSG AOC are presented.	Van Hart June 2003
	2003	Burn Site Well (production well) removed from use.	None
March	2004	GWPP Fiscal Year 2003 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2004
April	2004	Compliance Order on Consent lists BSG as an AOC that requires a CME.	NMED April 2004
June	2004	A CCM of the BSG AOC prepared.	SNL June 2004a
June	2004	A CME Work Plan for the BSG AOC prepared.	SNL June 2004b
January	2005	Nitrate source evaluation of deep soil in the BSG AOC performed.	SNL January 2005
February	2005	NMED required additional site characterization and the preparation of an Interim Measures Work Plan.	NMED February 2005
May	2005	BSG Interim Measures Work Plan submitted.	SNL May 2005
July	2005	NMED sent an RSI for the Interim Measures Work Plan.	NMED July 2005
August	2005	Response for RSI is submitted to NMED.	SNL August 2005

Refer to footnotes on page 7A-6.

Table 7A-1. Historical Timeline of the Burn Site Groundwater Area of Concern *(Continued)*

Month	Year	Event	Reference
October	2005	GWPP Fiscal Year 2004 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL October 2005
December	2005	Monitoring wells CYN-MW6 and CYN-MW7 installed.	SNL October 2006
January	2006	Monitoring well CYN-MW8 installed.	SNL October 2006
March	2007	GWPP Fiscal Year 2006 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2007
March	2008	GWPP Fiscal Year 2007 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2008
April	2008	BSG CCM resubmitted.	SNL April 2008a
April	2008	BSG CME Work Plan resubmitted.	SNL April 2008b
April	2009	NMED required supplemental characterization of soil and groundwater in the BSG AOC.	NMED April 2009
June	2009	GWPP Calendar Year 2008 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL June 2009
November	2009	BSG Characterization Work Plan submitted.	SNL November 2009
February	2010	Received notice of conditional approval for the November 2009 BSG Characterization Work Plan.	NMED February 2010
July	2010	Completed subsurface soil sampling at 10 deep soil boring locations to determine contaminant sources.	SNL November 2009
July	2010	Installed four groundwater monitoring wells (CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) to determine extent of groundwater contamination.	SNL November 2009
September	2010	An extension request for the BSG CME Report submitted.	SNL September 2010
October	2010	Received approval of a time extension for submittal of the BSG CME Report.	NMED October 2010
October	2010	GWPP Calendar Year 2009 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL October 2010
August	2011	Received approval of the March 2008 CME Work Plan.	NMED August 2011
September	2011	GWPP Calendar Year 2010 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL September 2011
January	2012	Summary Report for BSG Characterization Field Program submitted.	SNL January 2012
February	2012	Monitoring Well Plug and Abandonment Plan and Well Construction Plan for BSG wells and status of CYN-MW3 submitted.	SNL February 2012
April	2012	Received notice of approval for the January 2012 BSG Monitoring Well Plug and Abandonment Plan and Well Construction Plan.	NMED April 2012
June	2012	Received notice of approval for the January 2012 Summary Report for BSG Characterization Field Program.	NMED June 2012
September	2012	GWPP Calendar Year 2011 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL September 2012
December	2012	Completed field program to decommission BSG monitoring wells 12AUP01, CYN-MW1D, CYN-MW2S, and install monitoring well CYN-MW13.	SNL March 2013
August	2013	Submitted an Extension Request to the NMED for the BSG CME Report to March 31, 2013.	DOE August 2013
September	2013	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2012 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2013b
October	2013	DOE Office of Environmental Management submitted the first Internal Remedy Review of the BSG AOC to DOE/NNSA Sandia Field Office.	DOE October 2013
November	2013	Monitoring Well Plug and Abandonment Plan and Well Construction Plan for Installation of Groundwater Monitoring Wells CYN-MW14 and CYN-MW15 submitted.	SNL September 2013a

Refer to footnotes on page 7A-6.

Table 7A-1. Historical Timeline of the Burn Site Groundwater Area of Concern *(Continued)*

Month	Year	Event	Reference
January	2014	DOE/NNSA requested an extension to the delivery date of the BSG CME Report to March 31, 2016.	DOE January 2014
June	2014	Approval for installation of groundwater monitoring wells CYN-MW14A and CYN-MW15.	NMED June 2014a
June	2014	NMED approved the proposed extension request for the BSG CME Report to March 31, 2016.	NMED June 2014b
October	2014	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2013 SNL/NM Annual Groundwater Monitoring Report.	SNL October 2014
November	2014	Office of Environmental Management submitted the second Internal Remedy Review of the BSG AOC to DOE/NNSA Sandia Field Office.	DOE November 2014
December	2014	Installed groundwater monitoring wells CYN-MW14A and CYN-MW15.	SNL April 2015
April	2015	Summary Report for Installation of Groundwater Monitoring Wells CYN-MW14A and CYN-MW15 submitted.	SNL April 2015
May	2015	Office of Environmental Management submitted the third Internal Remedy Review of the BSG AOC to DOE/NNSA Sandia Field Office.	DOE May 2015
June	2015	Approval of the Installation Report for CYN-MW14A and CYN-MW15.	NMED June 2015
June	2015	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2014 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2015
March	2016	Proposed weight-of-evidence activities and schedule milestones for implementation of the studies.	DOE March 2016
April	2016	NMED approved the activities and milestones proposed by DOE/NNSA for the weight-of-evidence activities.	NMED April 2016
June	2016	Aquifer Pumping Test Work Plan submitted.	SNL June 2016a
June	2016	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2015 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2016b
June	2016	Aquifer Pumping Test Work Plan approved.	NMED June 2016
July	2016	Stable Isotope denitrification and groundwater age dating report summary.	Madrid et. al. July 2016
March	2017	Field requirements of the Aquifer Pumping Test were completed, including long-term transducer study, step drawdown test, constant rate test, and groundwater interval sampling for nitrate.	SNL December 2017
May	2017	Preliminary results of the pumping test were shared with NMED on May 10, 2017 at the NMED District 1 office.	SNL December 2017
June	2017	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2016 SNL/NM Annual Groundwater Monitoring Report.	SNL July 2017
November	2017	Requested an extension for the submittal of recommendations for further characterization activities.	DOE November 2017
November	2017	Extension request approved.	NMED November 2017
December	2017	Aquifer Pumping Test Report submitted.	SNL December 2017
January	2018	Aquifer Pumping Test Report approved.	NMED January 2018
June	2018	Proposed recommendations for additional site characterization.	DOE June 2018
June	2018	NMED disapproved the proposed recommendations and required the submittal of a Well Installation Work Plan.	NMED June 2018
June	2018	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2017 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2018

Refer to footnotes on page 7A-6.

Table 7A-1. Historical Timeline of the Burn Site Groundwater Area of Concern *(Concluded)*

Month	Year	Event	Reference
January	2019	Monitoring Well Installation Work Plan for CYN-MW16 through CYN-MW23 submitted.	SNL January 2019
February	2019	NMED approved the Monitoring Well Installation Work Plan.	NMED February 2019
June	2019	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2018 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2019
September	2019	Monitoring well field program started.	SNL May 2020
December	2019	Monitoring well field program completed. Four monitoring wells (CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19) were installed and sampled.	SNL May 2020
May	2020	Monitoring Well Installation Report for CYN-MW16 through CYN-MW19 submitted.	SNL May 2020
June	2020	Extension request for CCM/CME submitted.	SNL June 2020a
June	2020	Groundwater sampling analytical results for BSG wells reported in the Calendar Year 2019 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2020b
July	2020	NMED approved the Monitoring Well Installation Report.	NMED July 2020a
July	2020	NMED approved the CCM/CME extension request (new due date is January 31, 2023).	NMED July 2020b
September	2020	Preliminary results from the first four quarterly sampling events at the four new monitoring wells were shared with NMED on September 23, 2020.	This report

NOTES:
AOC = Area of Concern.
BSG = Burn Site Groundwater.
CAC = Corrective Action Complete.
CCM = Current Conceptual Model.
CME = Corrective Measures Evaluation.
CYN = Canyons.
COC = Constituent of concern.
DOE = U.S. Department of Energy.
GWPP = Groundwater Protection Program.
HE = High explosive.
JP-4 = Jet propellant, fuel grade 4.
mg/L = Milligram(s) per liter.
MW = Monitoring well.
NFA = No Further Action.
NMED = New Mexico Environment Department.
NNSA = National Nuclear Security Administration.
OB = Oversight Bureau.
RSI = Request for Supplemental Information.
Sandia = Sandia Corporation.
SNL = Sandia National Laboratories.
SNL/NM = Sandia National Laboratories, New Mexico.
SWMU = Solid Waste Management Unit.

Attachment 7B
Burn Site Groundwater
Analytical Results Tables

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Attachment 7B Tables

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Table 7B-1
Summary of Detected Volatile Organic Compounds, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17 14-Jan-20	Acetone	2.11	1.50	10.0	NE	J	10U	112094-001	SW846-8260B
CYN-MW18 15-Jan-20	Acetone	1.87	1.50	10.0	NE	J	10U	112101-001	SW846-8260B
YN-MW19 13-Jan-20	Acetone	3.13	1.50	10.0	NE	J	10U	112090-001	SW846-8260B
	Methylene chloride	2.02	1.00	10.0	5.00	J	10U	112090-001	SW846-8260B
	trans-1,3-Dichloropropene	0.67	0.300	1.00	NE	J		112090-001	SW846-8260B
CYN-MW19 13-Jul-20	Acetone	1.96	1.50	10.0	NE	J	10U	113317-001	SW846-8260B

Refer to footnotes on page 7B-61.

Table 7B-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300	Chlorobenzene	0.300
1,1,2,2-Tetrachloroethane	0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.300	Chloroform	0.300
1,1-Dichloroethane	0.300	Chloromethane	0.300
1,1-Dichloroethene	0.300	Cyclohexane	0.300
1,2,3-Trichlorobenzene	0.300	Dibromochloromethane	0.300
1,2,4-Trichlorobenzene	0.300	Dichlorodifluoromethane	0.300
1,2-Dibromo-3-chloropropane	0.500	Ethyl benzene	0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.300	Methylcyclohexane	0.300
1,2-Dichloropropane	0.300	Methylene chloride	1.00
1,3-Dichlorobenzene	0.300	Styrene	0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
2,2-Trifluoroethane, 1,1,2-Trichloro-1	2.00	Tetrachloroethene	0.300
2-Butanone	1.50	Toluene	0.300
2-Hexanone	1.50	Trichloroethene	0.300
4-Methyl- 2-pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	1.50	Vinyl chloride	0.300
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.300	cis-1,3-Dichloropropene	0.300
Bromoform	0.300	m-, p-Xylene	0.300
Bromomethane	0.300	o-Xylene	0.300
Carbon disulfide	1.50	trans-1,2-Dichloroethene	0.300
Carbon tetrachloride	0.300	trans-1,3-Dichloropropene	0.300

Refer to footnotes on page 7B-61.

Table 7B-3
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8330B), Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0816 – 0.0909
1,3-Dinitrobenzene	0.0816 – 0.0909
2,4,6-Trinitrotoluene	0.0816 – 0.0909
2,4-Dinitrotoluene	0.0816 – 0.0909
2,6-Dinitrotoluene	0.0816 – 0.0909
2-Amino-4,6-dinitrotoluene	0.0816 – 0.0909
2-Nitrotoluene	0.0837 – 0.0932
3-Nitrotoluene	0.0816 – 0.0909
4-Amino-2,6-dinitrotoluene	0.0816 – 0.0909
4-Nitrotoluene	0.153 – 0.170
HMX	0.0816 – 0.0909
Nitro-benzene	0.0816 – 0.0909
Pentaerythritol tetranitrate	0.102 – 0.114
RDX	0.0816 – 0.0909
Tetryl	0.0816 – 0.0909

Refer to footnotes on page 7B-61.

Table 7B-4
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16 16-Jan-20	Nitrate plus nitrite	**11.7**	0.170	0.500	10.0			112105-005	EPA 353.2
CYN-MW17 14-Jan-20	Nitrate plus nitrite	2.40	0.0850	0.250	10.0			112094-005	EPA 353.2
CYN-MW18 15-Jan-20	Nitrate plus nitrite	6.74	0.170	0.500	10.0			112101-005	EPA 353.2
CYN-MW18 (Duplicate) 15-Jan-20	Nitrate plus nitrite	6.48	0.170	0.500	10.0			112102-005	EPA 353.2
CYN-MW19 13-Jan-20	Nitrate plus nitrite	3.23	0.0850	0.250	10.0			112090-005	EPA 353.2
CYN-MW4 10-Apr-20	Nitrate plus nitrite	0.125	0.0170	0.0500	10.0			112679-005	EPA 353.2
CYN-MW7 16-Apr-20	Nitrate plus nitrite	2.49	0.085	0.250	10.0			112690-005	EPA 353.2
CYN-MW7 (Duplicate) 16-Apr-20	Nitrate plus nitrite	2.69	0.085	0.250	10.0			112691-005	EPA 353.2
CYN-MW8 15-Apr-20	Nitrate plus nitrite	5.45	0.085	0.250	10.0			112682-005	EPA 353.2
CYN-MW9 29-Apr-20	Nitrate plus nitrite	**49.6**	0.850	2.50	10.0			112736-005	EPA 353.2
CYN-MW10 27-Apr-20	Nitrate plus nitrite	6.49	0.170	0.500	10.0			112695-005	EPA 353.2
CYN-MW11 23-Apr-20	Nitrate plus nitrite	**11.5**	0.170	0.500	10.0			112699-005	EPA 353.2
CYN-MW12 29-Apr-20	Nitrate plus nitrite	**19.6**	0.850	2.50	10.0			112707-005	EPA 353.2
CYN-MW13 30-Apr-20	Nitrate plus nitrite	**38.4**	0.850	2.50	10.0			112742-005	EPA 353.2
CYN-MW13 (Duplicate) 30-Apr-20	Nitrate plus nitrite	**40.0**	0.850	2.50	10.0			112743-005	EPA 353.2
CYN-MW14A 28-Apr-20	Nitrate plus nitrite	**14.5**	0.850	2.50	10.0			112703-005	EPA 353.2
CYN-MW15 28-Apr-20	Nitrate plus nitrite	**24.3**	0.850	2.50	10.0			112730-005	EPA 353.2
CYN-MW15 (Duplicate) 28-Apr-20	Nitrate plus nitrite	**25.9**	0.850	2.50	10.0			112731-005	EPA 353.2

Refer to footnotes on page 7B-61.

Table 7B-4 *(Continued)*
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16 22-Apr-20	Nitrate plus nitrite	8.97	0.170	0.500	10.0			112777-005	EPA 353.2
CYN-MW17 23-Apr-20	Nitrate plus nitrite	0.681	0.017	0.050	10.0		J	112769-005	EPA 353.2
CYN-MW17 (Duplicate) 23-Apr-20	Nitrate plus nitrite	0.790	0.017	0.050	10.0		J	112770-005	EPA 353.2
CYN-MW18 17-Apr-20	Nitrate plus nitrite	6.15	0.085	0.250	10.0			112774-005	EPA 353.2
CYN-MW19 22-Apr-20	Nitrate plus nitrite	3.16	0.170	0.500	10.0			112763-005	EPA 353.2
CYN-MW16 16-Jul-20	Nitrate plus nitrite	7.76	0.170	0.500	10.0			113329-005	EPA 353.2
CYN-MW17 15-Jul-20	Nitrate plus nitrite	1.94	0.085	0.250	10.0			113324-005	EPA 353.2
CYN-MW18 14-Jul-20	Nitrate plus nitrite	6.23	0.170	0.500	10.0			113320-005	EPA 353.2
CYN-MW19 13-Jul-20	Nitrate plus nitrite	3.25	0.085	0.250	10.0			113317-005	EPA 353.2
CYN-MW19 (Duplicate) 13-Jul-20	Nitrate plus nitrite	3.26	0.085	0.250	10.0			113318-002	EPA 353.2
CYN-MW4 15-Oct-20	Nitrate plus nitrite	0.134	0.017	0.050	10.0			113767-003	EPA 353.2
CYN-MW4 (Duplicate) 15-Oct-20	Nitrate plus nitrite	0.135	0.017	0.050	10.0			113768-003	EPA 353.2
CYN-MW7 20-Oct-20	Nitrate plus nitrite	2.20	0.085	0.250	10.0			113771-003	EPA 353.2
CYN-MW8 22-Oct-20	Nitrate plus nitrite	4.60	0.170	0.500	10.0			113791-003	EPA 353.2
CYN-MW8 (Duplicate) 22-Oct-20	Nitrate plus nitrite	4.63	0.170	0.500	10.0			113792-003	EPA 353.2
CYN-MW9 05-Nov-20	Nitrate plus nitrite	**36.6**	0.850	2.50	10.0			113815-003	EPA 353.2
CYN-MW10 23-Oct-20	Nitrate plus nitrite	5.27	0.170	0.500	10.0			113795-003	EPA 353.2

Refer to footnotes on page 7B-61.

Table 7B-4 *(Concluded)*
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW11 26-Oct-20	Nitrate plus nitrite	9.55	0.170	0.500	10.0			113797-003	EPA 353.2
CYN-MW12 04-Nov-20	Nitrate plus nitrite	**15.6**	0.850	2.50	10.0			113804-003	EPA 353.2
CYN-MW13 04-Nov-20	Nitrate plus nitrite	**30.2**	1.70	5.00	10.0		J	113813-003	EPA 353.2
CYN-MW14A 29-Oct-20	Nitrate plus nitrite	**12.4**	0.425	1.25	10.0			113801-003	EPA 353.2
CYN-MW14A (Duplicate) 29-Oct-20	Nitrate plus nitrite	**12.2**	0.425	1.25	10.0			113802-003	EPA 353.2
CYN-MW15 05-Nov-20	Nitrate plus nitrite	**21.6**	0.850	2.50	10.0			113809-003	EPA 353.2
CYN-MW16 21-Oct-20	Nitrate plus nitrite	7.20	0.170	0.500	10.0			113848-005	EPA 353.2
CYN-MW17 20-Oct-20	Nitrate plus nitrite	1.76	0.085	0.250	10.0			113840-005	EPA 353.2
CYN-MW17 (Duplicate) 20-Oct-20	Nitrate plus nitrite	1.77	0.085	0.250	10.0			113841-003	EPA 353.2
CYN-MW18 19-Oct-20	Nitrate plus nitrite	5.95	0.017	0.500	10.0		J	113845-005	EPA 353.2
CYN-MW19 16-Oct-20	Nitrate plus nitrite	2.85	0.017	0.500	10.0		J	113836-005	EPA 353.2

Refer to footnotes on page 7B-61.

Table 7B-5
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Diesel Range Organics	ND	82.5	220	NE	U		112105-003	SW846 8015D
16-Jan-20	Gasoline Range Organics	ND	16.7	100	NE	U		112105-002	SW846 8015A/B
CYN-MW17	Diesel Range Organics	ND	75.0	200	NE	U		112094-003	SW846 8015D
14-Jan-20	Gasoline Range Organics	ND	16.7	100	NE	U		112094-002	SW846 8015A/B
CYN-MW18	Diesel Range Organics	ND	82.5	220	NE	U		112101-003	SW846 8015D
15-Jan-20	Gasoline Range Organics	ND	16.7	100	NE	U		112101-002	SW846 8015A/B
CYN-MW18 (Duplicate)	Diesel Range Organics	ND	82.6	220	NE	U		112102-002	SW846 8015D
15-Jan-20	Gasoline Range Organics	ND	16.7	100	NE	U		112102-001	SW846 8015A/B
CYN-MW19	Diesel Range Organics	ND	75.0	200	NE	U		112090-003	SW846 8015D
13-Jan-20	Gasoline Range Organics	ND	16.7	100	NE	U		112090-002	SW846 8015A/B
CYN-MW4	Diesel Range Organics	ND	75.0	200	NE	U		112679-003	SW846 8015D
10-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112679-002	SW846 8015A/B
CYN-MW7	Diesel Range Organics	ND	75.0	200	NE	U		112690-003	SW846 8015D
16-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112690-002	SW846 8015A/B
CYN-MW7 (Duplicate)	Diesel Range Organics	ND	79.8	213	NE	U		112691-003	SW846 8015D
16-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112691-002	SW846 8015A/B
CYN-MW8	Diesel Range Organics	ND	75.0	200	NE	U		112682-003	SW846 8015D
15-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112682-002	SW846 8015A/B
CYN-MW9	Diesel Range Organics	ND	81.4	217	NE	U		112736-003	SW846 8015D
29-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112736-002	SW846 8015A/B
CYN-MW10	Diesel Range Organics	ND	75.0	200	NE	U		112695-003	SW846 8015D
27-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112695-002	SW846 8015A/B
CYN-MW11	Diesel Range Organics	ND	76.2	203	NE	U		112699-003	SW846 8015D
23-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112699-002	SW846 8015A/B
CYN-MW12	Diesel Range Organics	ND	75.0	200	NE	U		112707-003	SW846 8015D
29-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112707-002	SW846 8015A/B
CYN-MW13	Diesel Range Organics	ND	83.7	223	NE	U		112742-003	SW846 8015D
30-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112742-002	SW846 8015A/B
CYN-MW13 (Duplicate)	Diesel Range Organics	ND	84.9	227	NE	U		112743-003	SW846 8015D
30-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112743-002	SW846 8015A/B
CYN-MW14A	Diesel Range Organics	ND	75.0	200	NE	*, U	200UJ	112703-003	SW846 8015D
28-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112703-002	SW846 8015A/B

Refer to footnotes on page 7B-61.

Table 7B-5 *(Continued)*
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW15	Diesel Range Organics	ND	80.4	214	NE	*, U	214UJ	112730-003	SW846 8015D
28-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112730-002	SW846 8015A/B
CYN-MW15 (Duplicate)	Diesel Range Organics	ND	80.3	214	NE	*, U	214UJ	112731-003	SW846 8015D
28-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112731-002	SW846 8015A/B
CYN-MW16	Diesel Range Organics	ND	78.6	210	NE	U		112777-003	SW846 8015D
22-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112777-002	SW846 8015A/B
CYN-MW17	Diesel Range Organics	ND	79.5	212	NE	U		112769-003	SW846 8015D
23-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112769-002	SW846 8015A/B
CYN-MW17 (Duplicate)	Diesel Range Organics	ND	76.8	205	NE	U		112770-003	SW846 8015D
23-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112771-002	SW846 8015A/B
CYN-MW18	Diesel Range Organics	ND	75.0	200	NE	U		112774-003	SW846 8015D
17-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112774-002	SW846 8015A/B
CYN-MW19	Diesel Range Organics	ND	75.0	200	NE	U		112763-003	SW846 8015D
22-Apr-20	Gasoline Range Organics	ND	16.7	100	NE	U		112763-002	SW846 8015A/B
CYN-MW16	Diesel Range Organics	ND	75.0	200	NE	U		113329-003	SW846 8015D
16-Jul-20	Gasoline Range Organics	ND	16.7	100	NE	U		113329-004	SW846 8015A/B
CYN-MW17	Diesel Range Organics	ND	82.1	219	NE	*, U	219UJ	113324-003	SW846 8015D
15-Jul-20	Gasoline Range Organics	ND	16.7	100	NE	U		113324-004	SW846 8015A/B
CYN-MW18	Diesel Range Organics	ND	75.0	200	NE	*, U	200UJ	113320-003	SW846 8015D
14-Jul-20	Gasoline Range Organics	ND	16.7	100	NE	U		113320-004	SW846 8015A/B
CYN-MW19	Diesel Range Organics	ND	75.0	200	NE	U		113317-003	SW846 8015D
13-Jul-20	Gasoline Range Organics	ND	16.7	100	NE	U		113317-004	SW846 8015A/B
CYN-MW19 (Duplicate)	Diesel Range Organics	ND	78.1	208	NE	U		113331-001	SW846 8015D
13-Jul-20	Gasoline Range Organics	ND	16.7	100	NE	U		113318-001	SW846 8015A/B
CYN-MW4	Diesel Range Organics	ND	781	208	NE	U		113767-002	SW846 8015D
15-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113767-001	SW846 8015A/B
CYN-MW4 (Duplicate)	Diesel Range Organics	ND	78.7	210	NE	U		113768-002	SW846 8015D
15-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113768-001	SW846 8015A/B
CYN-MW7	Diesel Range Organics	ND	84.4	225	NE	U		113771-002	SW846 8015D
20-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113771-001	SW846 8015A/B
CYN-MW8	Diesel Range Organics	ND	81.6	218	NE	U		113791-002	SW846 8015D
22-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113791-001	SW846 8015A/B
CYN-MW8 (Duplicate)	Diesel Range Organics	ND	79.2	211	NE	U		113792-002	SW846 8015D
22-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113792-001	SW846 8015A/B

Refer to footnotes on page 7B-61.

Table 7B-5 *(Concluded)*
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW9	Diesel Range Organics	109	79.9	213	NE	J, N	J-	113815-002	SW846 8015D
05-Nov-20	Gasoline Range Organics	ND	16.7	100	NE	U		113815-001	SW846 8015A/B
CYN-MW10	Diesel Range Organics	ND	79.9	213	NE	U		113795-002	SW846 8015D
23-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113795-001	SW846 8015A/B
CYN-MW11	Diesel Range Organics	ND	75.0	200	NE	U		113797-002	SW846 8015D
23-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113797-001	SW846 8015A/B
CYN-MW12	Diesel Range Organics	373	75.0	200	NE	N	J-	113804-002	SW846 8015D
04-Nov-20	Gasoline Range Organics	ND	16.7	100	NE	U		113804-001	SW846 8015A/B
CYN-MW13	Diesel Range Organics	ND	80.5	215	NE	N, U	215UJ	113813-002	SW846 8015D
04-Nov-20	Gasoline Range Organics	ND	16.7	100	NE	U		113813-001	SW846 8015A/B
CYN-MW14A	Diesel Range Organics	ND	75.0	200	NE	U		113801-002	SW846 8015D
29-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113801-001	SW846 8015A/B
CYN-MW14A (Duplicate)	Diesel Range Organics	ND	81.5	217	NE	U		113802-002	SW846 8015D
29-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113802-001	SW846 8015A/B
CYN-MW15	Diesel Range Organics	ND	81.4	217	NE	N, U	217UJ	113809-002	SW846 8015D
05-Nov-20	Gasoline Range Organics	ND	16.7	100	NE	U		113809-001	SW846 8015A/B
CYN-MW16	Diesel Range Organics	ND	82.5	220	NE	U		113848-003	SW846 8015D
21-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113848-004	SW846 8015A/B
CYN-MW17	Diesel Range Organics	ND	75.0	200	NE	U		113840-003	SW846 8015D
20-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113840-004	SW846 8015A/B
CYN-MW17 (Duplicate)	Diesel Range Organics	ND	77.3	206	NE	U		113841-003	SW846 8015D
20-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113841-004	SW846 8015A/B
CYN-MW18	Diesel Range Organics	ND	80.9	216	NE	U		113845-003	SW846 8015D
19-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113845-004	SW846 8015A/B
CYN-MW19	Diesel Range Organics	ND	75.0	200	NE	U		113836-003	SW846 8015D
16-Oct-20	Gasoline Range Organics	ND	16.7	100	NE	U		113836-004	SW846 8015A/B

Refer to footnotes on page 7B-61.

Table 7B-6
Summary of Perchlorate Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16 16-Jan-20	ND	0.004	0.0120	NE	U		112105-007	EPA 314.0
CYN-MW17 14-Jan-20	ND	0.004	0.0120	NE	U		112094-007	EPA 314.0
CYN-MW18 15-Jan-20	ND	0.004	0.0120	NE	U		112101-007	EPA 314.0
CYN-MW18 (Duplicate) 15-Jan-20	ND	0.004	0.0120	NE	U		112102-007	EPA 314.0
CYN-MW19 13-Jan-20	ND	0.004	0.0120	NE	U		112090-007	EPA 314.0
CYN-MW15 28-Apr-20	ND	0.004	0.012	NE	U		112730-006	EPA 314.0
CYN-MW15 (Duplicate) 28-Apr-20	ND	0.004	0.012	NE	U		112731-006	EPA 314.0
CYN-MW16 22-Apr-20	ND	0.004	0.012	NE	U		112777-006	EPA 314.0
CYN-MW17 23-Apr-20	ND	0.004	0.012	NE	U		112769-006	EPA 314.0
CYN-MW17 (Duplicate) 23-Apr-20	ND	0.004	0.012	NE	U		112770-006	EPA 314.0
CYN-MW18 17-Apr-20	ND	0.004	0.012	NE	U		112774-006	EPA 314.0
CYN-MW19 22-Apr-20	ND	0.004	0.012	NE	U		112763-006	EPA 314.0
CYN-MW16 16-Jul-20	ND	0.004	0.012	NE	U		113329-007	EPA 314.0
CYN-MW17 15-Jul-20	ND	0.004	0.012	NE	U		113324-007	EPA 314.0
CYN-MW18 14-Jul-20	ND	0.004	0.012	NE	U		113320-007	EPA 314.0
CYN-MW19 13-Jul-20	ND	0.004	0.012	NE	U		113317-007	EPA 314.0
CYN-MW19 (Duplicate) 13-Jul-20	ND	0.004	0.012	NE	U		113318-003	EPA 314.0

Refer to footnotes on page 7B-61.

Table 7B-6 *(Concluded)*
Summary of Perchlorate Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW15 05-Nov-20	ND	0.004	0.012	NE	U		113809-004	EPA 314.0

Refer to footnotes on page 7B-61.

Table 7B-7
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Bromide	0.637	0.067	0.200	NE			112105-006	SW846 9056A
16-Jan-20	Chloride	41.4	0.670	2.00	NE			112105-006	SW846 9056A
	Fluoride	1.40	0.033	0.100	4.0			112105-006	SW846 9056A
	Sulfate	112	1.33	4.00	NE			112105-006	SW846 9056A
CYN-MW17	Bromide	0.589	0.067	0.200	NE			112094-006	SW846 9056A
14-Jan-20	Chloride	34.0	0.670	2.00	NE			112094-006	SW846 9056A
	Fluoride	1.75	0.033	0.100	4.0			112094-006	SW846 9056A
	Sulfate	92.3	1.33	4.00	NE			112094-006	SW846 9056A
CYN-MW18	Bromide	0.604	0.067	0.200	NE			112101-006	SW846 9056A
15-Jan-20	Chloride	41.6	1.68	5.00	NE			112101-006	SW846 9056A
	Fluoride	1.99	0.033	0.100	4.0			112101-006	SW846 9056A
	Sulfate	190	3.33	10.0	NE			112101-006	SW846 9056A
CYN-MW19	Bromide	0.461	0.067	0.200	NE			112090-006	SW846 9056A
13-Jan-20	Chloride	30.5	0.670	2.00	NE			112090-006	SW846 9056A
	Fluoride	0.595	0.033	0.100	4.0			112090-006	SW846 9056A
	Sulfate	119	1.33	4.00	NE			112090-006	SW846 9056A
CYN-MW4	Bromide	0.333	0.067	0.200	NE			112679-006	SW846 9056A
10-Apr-20	Chloride	23.9	0.670	2.00	NE			112679-006	SW846 9056A
	Fluoride	0.676	0.033	0.100	4.0			112679-006	SW846 9056A
	Sulfate	132	1.33	4.00	NE			112679-006	SW846 9056A
CYN-MW7	Bromide	0.616	0.067	0.200	NE			112690-006	SW846 9056A
16-Apr-20	Chloride	43.6	0.670	2.00	NE			112690-006	SW846 9056A
	Fluoride	1.44	0.033	0.100	4.0			112690-006	SW846 9056A
	Sulfate	87.0	1.33	4.00	NE			112690-006	SW846 9056A
CYN-MW8	Bromide	0.772	0.067	0.200	NE			112682-006	SW846 9056A
15-Apr-20	Chloride	62.3	0.670	2.00	NE			112682-006	SW846 9056A
	Fluoride	1.49	0.033	0.100	4.0			112682-006	SW846 9056A
	Sulfate	131	1.33	4.00	NE			112682-006	SW846 9056A
CYN-MW9	Bromide	0.695	0.067	0.200	NE			112736-006	SW846 9056A
29-Apr-20	Chloride	50.2	0.670	2.00	NE			112736-006	SW846 9056A
	Fluoride	0.574	0.033	0.100	4.0			112736-006	SW846 9056A
	Sulfate	131	1.33	4.00	NE			112736-006	SW846 9056A
CYN-MW10	Bromide	0.617	0.067	0.200	NE			112695-006	SW846 9056A
27-Apr-20	Chloride	41.7	1.34	4.00	NE	N	J+	112695-006	SW846 9056A
	Fluoride	0.634	0.033	0.100	4.0			112695-006	SW846 9056A
	Sulfate	154	2.66	8.00	NE	B, N	J+	112695-006	SW846 9056A

Refer to footnotes on page 7B-61.

Table 7B-7 *(Continued)*
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW11	Bromide	1.19	0.067	0.200	NE			112699-006	SW846 9056A
23-Apr-20	Chloride	93.2	1.34	4.00	NE			112699-006	SW846 9056A
	Fluoride	0.752	0.033	0.100	4.0			112699-006	SW846 9056A
	Sulfate	204	2.66	8.00	NE			112699-006	SW846 9056A
CYN-MW12	Bromide	1.01	0.067	0.200	NE			112707-006	SW846 9056A
29-Apr-20	Chloride	86.7	1.34	4.00	NE			112707-006	SW846 9056A
	Fluoride	1.07	0.033	0.100	4.0			112707-006	SW846 9056A
	Sulfate	234	2.66	8.00	NE			112707-006	SW846 9056A
CYN-MW13	Bromide	0.345	0.067	0.200	NE			112742-006	SW846 9056A
30-Apr-20	Chloride	20.2	0.670	2.00	NE			112742-006	SW846 9056A
	Fluoride	1.68	0.033	0.100	4.0			112742-006	SW846 9056A
	Sulfate	81.3	1.33	4.00	NE			112742-006	SW846 9056A
CYN-MW14A	Bromide	0.844	0.067	0.200	NE			112703-006	SW846 9056A
28-Apr-20	Chloride	65.9	1.34	4.00	NE			112703-006	SW846 9056A
	Fluoride	0.985	0.033	0.100	4.0			112703-006	SW846 9056A
	Sulfate	188	2.66	8.00	NE			112703-006	SW846 9056A
CYN-MW15	Bromide	1.23	0.067	0.200	NE			112730-007	SW846 9056A
28-Apr-20	Chloride	109	1.34	4.00	NE			112730-007	SW846 9056A
	Fluoride	0.713	0.033	0.100	4.0			112730-007	SW846 9056A
	Sulfate	206	2.66	8.00	NE			112730-007	SW846 9056A
CYN-MW16	Bromide	0.638	0.067	0.200	NE			112777-007	SW846 9056A
22-Apr-20	Chloride	46.4	0.670	2.00	NE			112777-007	SW846 9056A
	Fluoride	1.73	0.033	0.100	4.0			112777-007	SW846 9056A
	Sulfate	121	1.33	4.00	NE			112777-007	SW846 9056A
CYN-MW17	Bromide	0.616	0.067	0.200	NE			112769-007	SW846 9056A
23-Apr-20	Chloride	36.6	0.670	2.00	NE			112769-007	SW846 9056A
	Fluoride	1.96	0.033	0.100	4.0			112769-007	SW846 9056A
	Sulfate	91.4	1.33	4.00	NE			112769-007	SW846 9056A
CYN-MW18	Bromide	0.621	0.067	0.200	NE			112774-007	SW846 9056A
17-Apr-20	Chloride	67.1	1.68	5.00	NE	N	J+	112774-007	SW846 9056A
	Fluoride	ND	0.033	0.100	4.0	U		112774-007	SW846 9056A
	Sulfate	301	3.33	10.0	NE	N	J+	112774-007	SW846 9056A
CYN-MW19	Bromide	0.531	0.067	0.200	NE			112763-007	SW846 9056A
22-Apr-20	Chloride	32.4	0.670	2.00	NE			112763-007	SW846 9056A
	Fluoride	0.605	0.033	0.100	4.0			112763-007	SW846 9056A
	Sulfate	127	1.33	4.00	NE			112763-007	SW846 9056A

Refer to footnotes on page 7B-61.

Table 7B-7 *(Concluded)*
Summary of Anion Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Bromide	0.643	0.067	0.200	NE			113329-006	SW846 9056A
16-Jul-20	Chloride	45.6	0.670	2.00	NE			113329-006	SW846 9056A
	Fluoride	1.65	0.033	0.100	4.0			113329-006	SW846 9056A
	Sulfate	117	1.33	4.00	NE			113329-006	SW846 9056A
CYN-MW17	Bromide	0.592	0.067	0.200	NE			113324-006	SW846 9056A
15-Jul-20	Chloride	34.4	0.670	2.00	NE			113324-006	SW846 9056A
	Fluoride	1.95	0.033	0.100	4.0			113324-006	SW846 9056A
	Sulfate	86.8	1.33	4.00	NE			113324-006	SW846 9056A
CYN-MW18	Bromide	0.635	0.067	0.200	NE			113320-006	SW846 9056A
14-Jul-20	Chloride	44.8	0.670	2.00	NE			113320-006	SW846 9056A
	Fluoride	2.40	0.033	0.100	4.0			113320-006	SW846 9056A
	Sulfate	200	2.66	8.00	NE			113320-006	SW846 9056A
CYN-MW19	Bromide	0.529	0.067	0.200	NE			113317-006	SW846 9056A
13-Jul-20	Chloride	33.1	0.670	2.00	NE			113317-006	SW846 9056A
	Fluoride	0.611	0.033	0.100	4.0			113317-006	SW846 9056A
	Sulfate	129	1.33	4.00	NE			113317-006	SW846 9056A
CYN-MW16	Bromide	0.629	0.067	0.200	NE			113848-006	SW846 9056A
21-Oct-20	Chloride	41.3	0.670	2.00	NE			113848-006	SW846 9056A
	Fluoride	1.45	0.033	0.100	4.0			113848-006	SW846 9056A
	Sulfate	107	1.33	4.00	NE			113848-006	SW846 9056A
CYN-MW17	Bromide	0.597	0.067	0.200	NE			113840-006	SW846 9056A
20-Oct-20	Chloride	31.6	0.670	2.00	NE			113840-006	SW846 9056A
	Fluoride	1.72	0.033	0.100	4.0			113840-006	SW846 9056A
	Sulfate	78.0	1.33	4.00	NE			113840-006	SW846 9056A
CYN-MW18	Bromide	0.621	0.067	0.200	NE			113845-006	SW846 9056A
19-Oct-20	Chloride	40.2	1.34	4.00	NE			113845-006	SW846 9056A
	Fluoride	2.12	0.033	0.100	4.0			113845-006	SW846 9056A
	Sulfate	182	2.66	8.00	NE			113845-006	SW846 9056A
CYN-MW19	Bromide	0.510	0.067	0.200	NE			113836-006	SW846 9056A
16-Oct-20	Chloride	30.2	0.670	2.00	NE			113836-006	SW846 9056A
	Fluoride	0.569	0.033	0.100	4.0			113836-006	SW846 9056A
	Sulfate	120	1.33	4.00	NE			113836-006	SW846 9056A

Refer to footnotes on page 7B-61.

Table 7B-8
Summary of Alkalinity Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW4	Bicarbonate Alkalinity	243	1.45	4.00	NE			112679-007	SM 2320B
10-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112679-007	SM 2320B
CYN-MW7	Bicarbonate Alkalinity	274	1.45	4.00	NE			112690-007	SM 2320B
16-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112690-007	SM 2320B
CYN-MW8	Bicarbonate Alkalinity	258	1.45	4.00	NE			112682-007	SM 2320B
15-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112682-007	SM 2320B
CYN-MW9	Bicarbonate Alkalinity	283	1.45	4.00	NE			112736-007	SM 2320B
29-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112736-007	SM 2320B
CYN-MW10	Bicarbonate Alkalinity	264	1.45	4.00	NE			112695-007	SM 2320B
27-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112695-007	SM 2320B
CYN-MW11	Bicarbonate Alkalinity	241	1.45	4.00	NE			112699-007	SM 2320B
23-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112699-007	SM 2320B
CYN-MW12	Bicarbonate Alkalinity	250	1.45	4.00	NE			112707-007	SM 2320B
29-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112707-007	SM 2320B
CYN-MW13	Bicarbonate Alkalinity	183	1.45	4.00	NE			112742-007	SM 2320B
30-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112742-007	SM 2320B
CYN-MW14A	Bicarbonate Alkalinity	246	1.45	4.00	NE			112703-007	SM 2320B
28-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112703-007	SM 2320B
CYN-MW15	Bicarbonate Alkalinity	286	1.45	4.00	NE			112730-008	SM 2320B
28-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112730-008	SM 2320B
CYN-MW16	Bicarbonate Alkalinity	218	1.45	4.00	NE			112777-008	SM 2320B
22-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112777-008	SM 2320B
CYN-MW17	Bicarbonate Alkalinity	192	1.45	4.00	NE			112769-008	SM 2320B
23-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112769-008	SM 2320B
CYN-MW18	Bicarbonate Alkalinity	200	1.45	4.00	NE			112774-008	SM 2320B
17-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112774-008	SM 2320B
CYN-MW19	Bicarbonate Alkalinity	264	1.45	4.00	NE			112763-008	SM 2320B
22-Apr-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		112763-008	SM 2320B
CYN-MW16	Bicarbonate Alkalinity	223	1.45	4.00	NE			113848-007	SM 2320B
21-Oct-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113848-007	SM 2320B
CYN-MW17	Bicarbonate Alkalinity	188	1.45	4.00	NE			113840-007	SM 2320B
20-Oct-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113840-007	SM 2320B
CYN-MW18	Bicarbonate Alkalinity	196	1.45	4.00	NE			113845-007	SM 2320B
19-Oct-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113845-007	SM 2320B
CYN-MW19	Bicarbonate Alkalinity	269	1.45	4.00	NE			113836-007	SM 2320B
16-Oct-20	Carbonate Alkalinity	ND	1.45	4.00	NE	U		113836-007	SM 2320B

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Table 7B-9
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Aluminum	ND	0.0193	0.0500	NE	U		112105-008	SW846 6020B
16-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112105-008	SW846 6020B
	Arsenic	0.00398	0.00200	0.00500	0.010	J		112105-008	SW846 6020B
	Barium	0.0851	0.000670	0.00400	2.00			112105-008	SW846 6020B
	Beryllium	ND	0.000200	0.000500	0.004	U		112105-008	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112105-008	SW846 6020B
	Calcium	112	0.800	2.00	NE			112105-008	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112105-008	SW846 6020B
	Cobalt	ND	0.000300	0.00100	NE	U		112105-008	SW846 6020B
	Copper	0.00101	0.000300	0.00200	NE	J		112105-008	SW846 6020B
	Iron	ND	0.0330	0.100	NE	U		112105-008	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112105-008	SW846 6020B
	Magnesium	21.3	0.0100	0.0300	NE			112105-008	SW846 6020B
	Manganese	0.119	0.00100	0.00500	NE		J-	112105-008	SW846 6020B
	Mercury	ND	0.000067	0.000200	0.002	U		112105-008	SW846 7470A
	Molybdenum	0.00584	0.000200	0.00100	NE			112105-008	SW846 6020B
	Nickel	0.00111	0.000600	0.00200	NE	J		112105-008	SW846 6020B
	Potassium	2.67	0.0800	0.300	NE			112105-008	SW846 6020B
	Selenium	0.00689	0.00200	0.00500	0.050			112105-008	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112105-008	SW846 6020B
	Sodium	34.5	0.0800	0.250	NE			112105-008	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112105-008	SW846 6020B
	Vanadium	0.00472	0.00330	0.0200	NE	B, J	0.02U	112105-008	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112105-008	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17	Aluminum	ND	0.0193	0.0500	NE	U		112094-008	SW846 6020B
14-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112094-008	SW846 6020B
	Arsenic	0.00789	0.00200	0.00500	0.010			112094-008	SW846 6020B
	Barium	0.0942	0.000670	0.00400	2.00	B		112094-008	SW846 6020B
	Beryllium	ND	0.000200	0.000500	0.004	U		112094-008	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112094-008	SW846 6020B
	Calcium	79.4	0.800	2.00	NE			112094-008	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112094-008	SW846 6020B
	Cobalt	0.00101	0.000300	0.00100	NE			112094-008	SW846 6020B
	Copper	ND	0.000300	0.00200	NE	U		112094-008	SW846 6020B
	Iron	0.666	0.0330	0.100	NE			112094-008	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112094-008	SW846 6020B
	Magnesium	17.7	0.0100	0.0300	NE			112094-008	SW846 6020B
	Manganese	0.288	0.00100	0.00500	NE			112094-008	SW846 6020B
	Mercury	0.000106	0.000067	0.000200	0.002	J	J+	112094-008	SW846 7470A
	Molybdenum	0.00489	0.000200	0.00100	NE			112094-008	SW846 6020B
	Nickel	0.00139	0.000600	0.00200	NE	J	J-	112094-008	SW846 6020B
	Potassium	2.30	0.0800	0.300	NE			112094-008	SW846 6020B
	Selenium	0.00438	0.00200	0.00500	0.050	J		112094-008	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112094-008	SW846 6020B
	Sodium	32.9	0.0800	0.250	NE			112094-008	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112094-008	SW846 6020B
	Vanadium	0.00668	0.00330	0.0200	NE	B, J	0.02U	112094-008	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112094-008	SW846 6020B

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW18	Aluminum	ND	0.0193	0.0500	NE	U		112101-008	SW846 6020B
15-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112101-008	SW846 6020B
	Arsenic	0.00261	0.00200	0.00500	0.010	J		112101-008	SW846 6020B
	Barium	0.0429	0.000670	0.00400	2.00	B		112101-008	SW846 6020B
	Beryllium	0.00237	0.000200	0.000500	0.004			112101-008	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112101-008	SW846 6020B
	Calcium	122	0.800	2.00	NE			112101-008	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112101-008	SW846 6020B
	Cobalt	ND	0.000300	0.00100	NE	U		112101-008	SW846 6020B
	Copper	0.000345	0.000300	0.00200	NE	J	0.002U	112101-008	SW846 6020B
	Iron	0.0855	0.0330	0.100	NE	J		112101-008	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112101-008	SW846 6020B
	Magnesium	29.7	0.0100	0.0300	NE			112101-008	SW846 6020B
	Manganese	0.0584	0.00100	0.00500	NE		J-	112101-008	SW846 6020B
	Mercury	ND	0.000067	0.000200	0.002	U		112101-008	SW846 7470A
	Molybdenum	0.00351	0.000200	0.00100	NE			112101-008	SW846 6020B
	Nickel	0.000691	0.000600	0.00200	NE	J	J-	112101-008	SW846 6020B
	Potassium	1.99	0.0800	0.300	NE			112101-008	SW846 6020B
	Selenium	0.00591	0.00200	0.00500	0.050			112101-008	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112101-008	SW846 6020B
	Sodium	34.6	0.0800	0.250	NE			112101-008	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112101-008	SW846 6020B
	Vanadium	0.00491	0.00330	0.0200	NE	B, J	0.02U	112101-008	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112101-008	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Aluminum	ND	0.0193	0.0500	NE	U		112090-008	SW846 6020B
13-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112090-008	SW846 6020B
	Arsenic	0.00364	0.00200	0.00500	0.010	J		112090-008	SW846 6020B
	Barium	0.0669	0.000670	0.00400	2.00			112090-008	SW846 6020B
	Beryllium	ND	0.000200	0.000500	0.004	U		112090-008	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112090-008	SW846 6020B
	Calcium	113	0.400	1.00	NE			112090-008	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112090-008	SW846 6020B
	Cobalt	0.000315	0.000300	0.00100	NE	J	J+	112090-008	SW846 6020B
	Copper	ND	0.000300	0.00200	NE	U		112090-008	SW846 6020B
	Iron	0.134	0.0330	0.100	NE			112090-008	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112090-008	SW846 6020B
	Magnesium	32.8	0.0100	0.0300	NE			112090-008	SW846 6020B
	Manganese	0.0679	0.00100	0.00500	NE		J-	112090-008	SW846 6020B
	Mercury	0.000118	0.000067	0.000200	0.002	B, J	0.0002U	112090-008	SW846 7470A
	Molybdenum	0.00415	0.000200	0.00100	NE			112090-008	SW846 6020B
	Nickel	ND	0.000600	0.00200	NE	U	0.002UJ	112090-008	SW846 6020B
	Potassium	2.07	0.0800	0.300	NE			112090-008	SW846 6020B
	Selenium	0.00646	0.00200	0.00500	0.050			112090-008	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112090-008	SW846 6020B
	Sodium	24.1	0.0800	0.250	NE			112090-008	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112090-008	SW846 6020B
	Vanadium	0.00708	0.00330	0.0200	NE	B, J	0.02U	112090-008	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112090-008	SW846 6020B

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW4	Aluminum	ND	0.0193	0.050	NE	U		112679-008	SW846 6020B
10-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112679-008	SW846 6020B
	Arsenic	0.00252	0.002	0.005	0.010	J		112679-008	SW846 6020B
	Barium	0.0411	0.00067	0.004	2.00			112679-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112679-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112679-008	SW846 6020B
	Calcium	69.5	0.800	2.00	NE			112679-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112679-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112679-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112679-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112679-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112679-008	SW846 6020B
	Magnesium	35.1	0.010	0.030	NE			112679-008	SW846 6020B
	Manganese	0.00124	0.001	0.005	NE	J		112679-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112679-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112679-008	SW846 6020B
	Potassium	6.40	0.080	0.300	NE			112679-008	SW846 6020B
	Selenium	0.0148	0.002	0.005	0.050			112679-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112679-008	SW846 6020B
	Sodium	43.5	0.080	0.250	NE			112679-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112679-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	U		112679-008	SW846 6020B
	Zinc	0.00763	0.0033	0.020	NE	J	0.02U	112679-008	SW846 6020B

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW7	Aluminum	ND	0.0193	0.050	NE	U		112690-008	SW846 6020B
16-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112690-008	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112690-008	SW846 6020B
	Barium	0.117	0.00067	0.004	2.00			112690-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112690-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112690-008	SW846 6020B
	Calcium	105	0.800	2.00	NE			112690-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112690-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112690-008	SW846 6020B
	Copper	0.000384	0.0003	0.002	NE	J	0.002U	112690-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112690-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112690-008	SW846 6020B
	Magnesium	21.5	0.010	0.030	NE			112690-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U	R	112690-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	N, U		112690-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112690-008	SW846 6020B
	Potassium	2.52	0.080	0.300	NE			112690-008	SW846 6020B
	Selenium	0.00442	0.002	0.005	0.050	J		112690-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112690-008	SW846 6020B
	Sodium	40.1	0.080	0.250	NE			112690-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112690-008	SW846 6020B
	Vanadium	0.00458	0.0033	0.020	NE	J		112690-008	SW846 6020B
	Zinc	0.00806	0.0033	0.020	NE	J	0.02U	112690-008	SW846 6020B

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW8	Aluminum	ND	0.0193	0.050	NE	U		112682-008	SW846 6020B
15-Apr-20	Antimony	0.00104	0.001	0.003	0.006	J		112682-008	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112682-008	SW846 6020B
	Barium	0.0568	0.00067	0.004	2.00		J+	112682-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112682-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112682-008	SW846 6020B
	Calcium	121	0.800	2.00	NE			112682-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112682-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112682-008	SW846 6020B
	Copper	0.000343	0.0003	0.002	NE	J		112682-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112682-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112682-008	SW846 6020B
	Magnesium	25.0	0.010	0.030	NE			112682-008	SW846 6020B
	Manganese	0.00157	0.001	0.005	NE	J	J-	112682-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112682-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112682-008	SW846 6020B
	Potassium	2.33	0.080	0.300	NE			112682-008	SW846 6020B
	Selenium	0.00732	0.002	0.005	0.050			112682-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112682-008	SW846 6020B
	Sodium	45.2	0.080	0.250	NE			112682-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112682-008	SW846 6020B
	Vanadium	0.00423	0.0033	0.020	NE	J		112682-008	SW846 6020B
	Zinc	0.00821	0.0033	0.020	NE	J		112682-008	SW846 6020B

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW9	Aluminum	ND	0.0193	0.050	NE	U		112736-008	SW846 6020B
29-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112736-008	SW846 6020B
	Arsenic	0.00290	0.002	0.005	0.010	J		112736-008	SW846 6020B
	Barium	0.0565	0.00067	0.004	2.00		J+	112736-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112736-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112736-008	SW846 6020B
	Calcium	138	0.800	2.00	NE			112736-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112736-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112736-008	SW846 6020B
	Copper	0.000376	0.0003	0.002	NE	J		112736-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112736-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112736-008	SW846 6020B
	Magnesium	41.4	0.010	0.030	NE			112736-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112736-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112736-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112736-008	SW846 6020B
	Potassium	2.24	0.080	0.300	NE			112736-008	SW846 6020B
	Selenium	0.00496	0.002	0.005	0.050	J		112736-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112736-008	SW846 6020B
	Sodium	36.7	0.080	0.250	NE			112736-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112736-008	SW846 6020B
	Vanadium	0.00887	0.0033	0.020	NE	B, J	0.02U	112736-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112736-008	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW10	Aluminum	ND	0.0193	0.050	NE	U		112695-008	SW846 6020B
27-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112695-008	SW846 6020B
	Arsenic	0.00240	0.002	0.005	0.010	J		112695-008	SW846 6020B
	Barium	0.0574	0.00067	0.004	2.00		J+	112695-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112695-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112695-008	SW846 6020B
	Calcium	113	0.800	2.00	NE			112695-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112695-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112695-008	SW846 6020B
	Copper	0.000318	0.0003	0.002	NE	J		112695-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112695-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112695-008	SW846 6020B
	Magnesium	32.9	0.010	0.030	NE			112695-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112695-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112695-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112695-008	SW846 6020B
	Potassium	1.90	0.080	0.300	NE			112695-008	SW846 6020B
	Selenium	0.00568	0.002	0.005	0.050			112695-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112695-008	SW846 6020B
	Sodium	40.2	0.080	0.250	NE			112695-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112695-008	SW846 6020B
	Vanadium	0.00878	0.0033	0.020	NE	B, J	0.02U	112695-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112695-008	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW11	Aluminum	ND	0.0193	0.050	NE	U		112699-008	SW846 6020B
23-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112699-008	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112699-008	SW846 6020B
	Barium	0.0723	0.00067	0.004	2.00		J+	112699-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112699-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U	0.001UJ	112699-008	SW846 6020B
	Calcium	143	0.400	1.00	NE			112699-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112699-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112699-008	SW846 6020B
	Copper	0.000415	0.0003	0.002	NE	J	0.002U	112699-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112699-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112699-008	SW846 6020B
	Magnesium	43.8	0.010	0.030	NE			112699-008	SW846 6020B
	Manganese	0.0336	0.001	0.005	NE		J-	112699-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112699-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112699-008	SW846 6020B
	Potassium	3.01	0.080	0.300	NE			112699-008	SW846 6020B
	Selenium	0.00652	0.002	0.005	0.050	N	J	112699-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112699-008	SW846 6020B
	Sodium	43.0	0.080	0.250	NE			112699-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112699-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	U		112699-008	SW846 6020B
	Zinc	0.0113	0.0033	0.020	NE	J		112699-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW12	Aluminum	ND	0.0193	0.050	NE	U		112707-008	SW846 6020B
29-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112707-008	SW846 6020B
	Arsenic	0.00256	0.002	0.005	0.010	J	0.005U	112707-008	SW846 6020B
	Barium	0.0341	0.00067	0.004	2.00		J+	112707-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112707-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112707-008	SW846 6020B
	Calcium	149	0.800	2.00	NE			112707-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112707-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112707-008	SW846 6020B
	Copper	0.000361	0.0003	0.002	NE	J	0.002U	112707-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112707-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112707-008	SW846 6020B
	Magnesium	42.0	0.010	0.030	NE			112707-008	SW846 6020B
	Manganese	0.00738	0.001	0.005	NE		J+	112707-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112707-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112707-008	SW846 6020B
	Potassium	2.46	0.080	0.300	NE			112707-008	SW846 6020B
	Selenium	0.00895	0.002	0.005	0.050			112707-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112707-008	SW846 6020B
	Sodium	42.6	0.080	0.250	NE			112707-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112707-008	SW846 6020B
	Vanadium	0.00742	0.0033	0.020	NE	B, J	0.02U	112707-008	SW846 6020B
	Zinc	0.0112	0.0033	0.020	NE	J		112707-008	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW13	Aluminum	ND	0.0193	0.050	NE	U		112742-008	SW846 6020B
30-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112742-008	SW846 6020B
	Arsenic	0.00266	0.002	0.005	0.010	J		112742-008	SW846 6020B
	Barium	0.0922	0.00067	0.004	2.00			112742-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112742-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112742-008	SW846 6020B
	Calcium	105	0.800	2.00	NE			112742-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112742-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112742-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112742-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112742-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112742-008	SW846 6020B
	Magnesium	20.8	0.010	0.030	NE			112742-008	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112742-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112742-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112742-008	SW846 6020B
	Potassium	2.06	0.080	0.300	NE			112742-008	SW846 6020B
	Selenium	0.00304	0.002	0.005	0.050	J		112742-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112742-008	SW846 6020B
	Sodium	25.6	0.080	0.250	NE			112742-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112742-008	SW846 6020B
	Vanadium	0.00861	0.0033	0.020	NE	B, J	0.02U	112742-008	SW846 6020B
	Zinc	0.00519	0.0033	0.020	NE	J		112742-008	SW846 6020B

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW14A	Aluminum	ND	0.0193	0.050	NE	U		112703-008	SW846 6020B
28-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112703-008	SW846 6020B
	Arsenic	0.00226	0.002	0.005	0.010			112703-008	SW846 6020B
	Barium	0.0420	0.00067	0.004	2.00		J+	112703-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112703-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112703-008	SW846 6020B
	Calcium	132	0.800	2.00	NE			112703-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112703-008	SW846 6020B
	Cobalt	0.00178	0.0003	0.001	NE		J+	112703-008	SW846 6020B
	Copper	0.000367	0.0003	0.002	NE	J		112703-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112703-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112703-008	SW846 6020B
	Magnesium	36.6	0.010	0.030	NE			112703-008	SW846 6020B
	Manganese	0.00297	0.001	0.005	NE	J	J+	112703-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112703-008	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112703-008	SW846 6020B
	Potassium	2.19	0.080	0.300	NE			112703-008	SW846 6020B
	Selenium	0.00807	0.002	0.005	0.050			112703-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112703-008	SW846 6020B
	Sodium	40.3	0.080	0.250	NE			112703-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112703-008	SW846 6020B
	Vanadium	0.00694	0.0033	0.020	NE	B, J	0.02U	112703-008	SW846 6020B
	Zinc	0.00533	0.0033	0.020	NE	J		112703-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW15	Aluminum	ND	0.0193	0.050	NE	U		112730-009	SW846 6020B
28-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112730-009	SW846 6020B
	Arsenic	0.00324	0.002	0.005	0.010	J		112730-009	SW846 6020B
	Barium	0.0609	0.00067	0.004	2.00		J+	112730-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112730-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112730-009	SW846 6020B
	Calcium	161	0.800	2.00	NE			112730-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112730-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112730-009	SW846 6020B
	Copper	0.00148	0.0003	0.002	NE	J	0.002U	112730-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112730-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112730-009	SW846 6020B
	Magnesium	48.2	0.010	0.030	NE			112730-009	SW846 6020B
	Manganese	ND	0.001	0.005	NE	U		112730-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112730-009	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112730-009	SW846 6020B
	Potassium	2.65	0.080	0.300	NE			112730-009	SW846 6020B
	Selenium	0.00877	0.002	0.005	0.050			112730-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112730-009	SW846 6020B
	Sodium	47.4	0.080	0.250	NE			112730-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112730-009	SW846 6020B
	Vanadium	0.00838	0.0033	0.020	NE	B, J	0.02U	112730-009	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112730-009	SW846 6020B

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Table 7B-9 (*Continued*)
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Aluminum	ND	0.0193	0.050	NE	U		112777-009	SW846 6020B
22-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112777-009	SW846 6020B
	Arsenic	0.00273	0.002	0.005	0.010	J		112777-009	SW846 6020B
	Barium	0.0827	0.00067	0.004	2.00			112777-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112777-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U	0.001UJ	112777-009	SW846 6020B
	Calcium	123	0.400	1.00	NE			112777-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112777-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112777-009	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112777-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112777-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112777-009	SW846 6020B
	Magnesium	21.0	0.010	0.030	NE			112777-009	SW846 6020B
	Manganese	0.0794	0.001	0.005	NE		J-	112777-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112777-009	SW846 7470A
	Nickel	0.00129	0.0006	0.002	NE	J		112777-009	SW846 6020B
	Potassium	2.61	0.080	0.300	NE			112777-009	SW846 6020B
	Selenium	0.00762	0.002	0.005	0.050	N	J	112777-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112777-009	SW846 6020B
	Sodium	36.5	0.080	0.250	NE			112777-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112777-009	SW846 6020B
	Vanadium	0.00473	0.0033	0.020	NE	J		112777-009	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112777-009	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17	Aluminum	ND	0.0193	0.050	NE	U		112769-009	SW846 6020B
23-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112769-009	SW846 6020B
	Arsenic	0.00534	0.002	0.005	0.010			112769-009	SW846 6020B
	Barium	0.0817	0.00067	0.004	2.00			112769-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112769-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112769-009	SW846 6020B
	Calcium	88.3	0.400	1.00	NE			112769-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112769-009	SW846 6020B
	Cobalt	0.000439	0.0003	0.001	NE	J		112769-009	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		112769-009	SW846 6020B
	Iron	0.149	0.033	0.100	NE			112769-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112769-009	SW846 6020B
	Magnesium	17.3	0.010	0.030	NE			112769-009	SW846 6020B
	Manganese	0.255	0.001	0.005	NE			112769-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112769-009	SW846 7470A
	Nickel	0.000732	0.0006	0.002	NE	J		112769-009	SW846 6020B
	Potassium	2.10	0.080	0.300	NE			112769-009	SW846 6020B
	Selenium	0.00458	0.002	0.005	0.050	J, N	J	112769-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112769-009	SW846 6020B
	Sodium	35.4	0.080	0.250	NE			112769-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112769-009	SW846 6020B
	Vanadium	0.00419	0.0033	0.020	NE	J		112769-009	SW846 6020B
	Zinc	0.00372	0.0033	0.020	NE	J		112769-009	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW18	Aluminum	ND	0.0193	0.050	NE	U		112774-009	SW846 6020B
17-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112774-009	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		112774-009	SW846 6020B
	Barium	0.0376	0.00067	0.004	2.00		J+	112774-009	SW846 6020B
	Beryllium	0.00219	0.0002	0.0005	0.004			112774-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		112774-009	SW846 6020B
	Calcium	126	0.800	2.00	NE			112774-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112774-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112774-009	SW846 6020B
	Copper	0.000374	0.0003	0.002	NE	J		112774-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112774-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112774-009	SW846 6020B
	Magnesium	29.1	0.010	0.030	NE			112774-009	SW846 6020B
	Manganese	0.080	0.001	0.005	NE			112774-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112774-009	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112774-009	SW846 6020B
	Potassium	1.83	0.080	0.300	NE			112774-009	SW846 6020B
	Selenium	0.00454	0.002	0.005	0.050	J		112774-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112774-009	SW846 6020B
	Sodium	33.1	0.080	0.250	NE			112774-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112774-009	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	U		112774-009	SW846 6020B
	Zinc	0.00396	0.0033	0.020	NE	J		112774-009	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Aluminum	ND	0.0193	0.050	NE	U		112763-009	SW846 6020B
22-Apr-20	Antimony	ND	0.001	0.003	0.006	U		112763-009	SW846 6020B
	Arsenic	0.00247	0.002	0.005	0.010	J		112763-009	SW846 6020B
	Barium	0.0705	0.00067	0.004	2.00		J+	112763-009	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		112763-009	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U	0.001UJ	112763-009	SW846 6020B
	Calcium	106	0.400	1.00	NE			112763-009	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		112763-009	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		112763-009	SW846 6020B
	Copper	0.000454	0.0003	0.002	NE	J		112763-009	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		112763-009	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		112763-009	SW846 6020B
	Magnesium	33.1	0.010	0.030	NE			112763-009	SW846 6020B
	Manganese	0.0414	0.0500	0.150	NE		J-	112763-009	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		112763-009	SW846 7470A
	Nickel	ND	0.0006	0.002	NE	U		112763-009	SW846 6020B
	Potassium	2.11	0.080	0.300	NE			112763-009	SW846 6020B
	Selenium	0.00639	0.002	0.005	0.050			112763-009	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		112763-009	SW846 6020B
	Sodium	27.4	0.080	0.250	NE			112763-009	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		112763-009	SW846 6020B
	Vanadium	0.00398	0.0033	0.020	NE	J		112763-009	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		112763-009	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Aluminum	ND	0.0193	0.050	NE	U		113329-008	SW846 6020B
16-Jul-20	Antimony	ND	0.001	0.003	0.006	U		113329-008	SW846 6020B
	Arsenic	0.00288	0.002	0.005	0.010	J		113329-008	SW846 6020B
	Barium	0.080	0.00067	0.004	2.00			113329-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113329-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113329-008	SW846 6020B
	Calcium	111	0.400	1.00	NE			113329-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113329-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113329-008	SW846 6020B
	Copper	0.000357	0.0003	0.002	NE	J		113329-008	SW846 6020B
	Iron	0.0335	0.033	0.100	NE	J		113329-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113329-008	SW846 6020B
	Magnesium	20.1	0.010	0.030	NE			113329-008	SW846 6020B
	Manganese	0.0466	0.001	0.005	NE		J-	113329-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113329-008	SW846 7470A
	Molybdenum	0.00679	0.0002	0.001	NE			113329-008	SW846 6020B
	Nickel	0.000986	0.0006	0.002	NE	J		113329-008	SW846 6020B
	Potassium	2.69	0.080	0.300	NE			113329-008	SW846 6020B
	Selenium	0.00564	0.002	0.005	0.050			113329-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113329-008	SW846 6020B
	Sodium	33.2	0.080	0.250	NE			113329-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113329-008	SW846 6020B
	Vanadium	0.00544	0.0033	0.020	NE	J		113329-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		113329-008	SW846 6020B

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Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17	Aluminum	ND	0.0193	0.050	NE	U		113324-008	SW846 6020B
15-Jul-20	Antimony	ND	0.001	0.003	0.006	U		113324-008	SW846 6020B
	Arsenic	0.00418	0.002	0.005	0.010	J		113324-008	SW846 6020B
	Barium	0.0836	0.00067	0.004	2.00			113324-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113324-008	SW846 6020B
	Cadmium	0.000362	0.0003	0.001	0.005	J		113324-008	SW846 6020B
	Calcium	80.5	0.400	1.00	NE			113324-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113324-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113324-008	SW846 6020B
	Copper	0.000377	0.0003	0.002	NE	J		113324-008	SW846 6020B
	Iron	0.0965	0.033	0.100	NE	J		113324-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113324-008	SW846 6020B
	Magnesium	16.3	0.010	0.030	NE			113324-008	SW846 6020B
	Manganese	0.144	0.001	0.005	NE			113324-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113324-008	SW846 7470A
	Molybdenum	0.00344	0.0002	0.001	NE			113324-008	SW846 6020B
	Nickel	0.000663	0.0006	0.002	NE	J		113324-008	SW846 6020B
	Potassium	2.12	0.080	0.300	NE			113324-008	SW846 6020B
	Selenium	0.00382	0.002	0.005	0.050	J		113324-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113324-008	SW846 6020B
	Sodium	32.5	0.080	0.250	NE			113324-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113324-008	SW846 6020B
	Vanadium	0.00473	0.0033	0.020	NE	J		113324-008	SW846 6020B
	Zinc	0.00343	0.0033	0.020	NE	J		113324-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW18	Aluminum	ND	0.0193	0.050	NE	U		113320-008	SW846 6020B
14-Jul-20	Antimony	ND	0.001	0.003	0.006	U		113320-008	SW846 6020B
	Arsenic	ND	0.002	0.005	0.010	U		113320-008	SW846 6020B
	Barium	0.0378	0.00067	0.004	2.00			113320-008	SW846 6020B
	Beryllium	0.00252	0.0002	0.0005	0.004			113320-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113320-008	SW846 6020B
	Calcium	127	0.400	1.00	NE			113320-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113320-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113320-008	SW846 6020B
	Copper	0.000501	0.0003	0.002	NE	J		113320-008	SW846 6020B
	Iron	0.0344	0.033	0.100	NE	J		113320-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113320-008	SW846 6020B
	Magnesium	27.0	0.010	0.030	NE			113320-008	SW846 6020B
	Manganese	0.0692	0.001	0.005	NE		J-	113320-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113320-008	SW846 7470A
	Molybdenum	0.00312	0.0002	0.001	NE			113320-008	SW846 6020B
	Nickel	ND	0.0006	0.002	NE	U		113320-008	SW846 6020B
	Potassium	1.92	0.080	0.300	NE			113320-008	SW846 6020B
	Selenium	0.00497	0.002	0.005	0.050	J		113320-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113320-008	SW846 6020B
	Sodium	32.9	0.080	0.250	NE			113320-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113320-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	U		113320-008	SW846 6020B
	Zinc	0.00435	0.0033	0.020	NE	J		113320-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Aluminum	ND	0.0193	0.050	NE	U		113317-008	SW846 6020B
13-Jul-20	Antimony	ND	0.001	0.003	0.006	U		113317-008	SW846 6020B
	Arsenic	0.00217	0.002	0.005	0.010	J		113317-008	SW846 6020B
	Barium	0.0658	0.00067	0.004	2.00			113317-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113317-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113317-008	SW846 6020B
	Calcium	114	0.400	1.00	NE			113317-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113317-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113317-008	SW846 6020B
	Copper	0.000562	0.0003	0.002	NE	J	0.002U	113317-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		113317-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113317-008	SW846 6020B
	Magnesium	32.0	0.010	0.030	NE			113317-008	SW846 6020B
	Manganese	0.0152	0.001	0.005	NE		J-	113317-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113317-008	SW846 7470A
	Molybdenum	0.00375	0.0002	0.001	NE			113317-008	SW846 6020B
	Nickel	ND	0.0006	0.002	NE	U		113317-008	SW846 6020B
	Potassium	2.02	0.080	0.300	NE			113317-008	SW846 6020B
	Selenium	0.00639	0.002	0.005	0.050			113317-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113317-008	SW846 6020B
	Sodium	24.5	0.080	0.250	NE			113317-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113317-008	SW846 6020B
	Vanadium	0.00413	0.0033	0.020	NE	J		113317-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		113317-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Aluminum	ND	0.0193	0.050	NE	U		113848-008	SW846 6020B
21-Oct-20	Antimony	ND	0.001	0.003	0.006	U		113848-008	SW846 6020B
	Arsenic	0.00284	0.002	0.005	0.010	J		113848-008	SW846 6020B
	Barium	0.0779	0.00067	0.004	2.00			113848-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113848-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113848-008	SW846 6020B
	Calcium	114	1.60	4.00	NE			113848-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113848-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113848-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		113848-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		113848-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113848-008	SW846 6020B
	Magnesium	21.8	0.010	0.030	NE			113848-008	SW846 6020B
	Manganese	0.0376	0.001	0.005	NE			113848-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113848-008	SW846 7470A
	Molybdenum	0.00652	0.0002	0.001	NE			113848-008	SW846 6020B
	Nickel	0.00144	0.0006	0.002	NE	J		113848-008	SW846 6020B
	Potassium	2.69	0.080	0.300	NE			113848-008	SW846 6020B
	Selenium	0.00669	0.002	0.005	0.050			113848-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113848-008	SW846 6020B
	Sodium	36.2	0.080	0.250	NE			113848-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113848-008	SW846 6020B
	Vanadium	0.00481	0.0033	0.020	NE	J		113848-008	SW846 6020B
	Zinc	0.00885	0.0033	0.020	NE	B, J	0.02U	113848-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17	Aluminum	ND	0.0193	0.050	NE	U		113840-008	SW846 6020B
20-Oct-20	Antimony	ND	0.001	0.003	0.006	U		113840-008	SW846 6020B
	Arsenic	0.0035	0.002	0.005	0.010	J		113840-008	SW846 6020B
	Barium	0.0797	0.00067	0.004	2.00			113840-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113840-008	SW846 6020B
	Cadmium	0.00037	0.0003	0.001	0.005	J		113840-008	SW846 6020B
	Calcium	79.6	1.60	4.00	NE			113840-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113840-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U		113840-008	SW846 6020B
	Copper	ND	0.0003	0.002	NE	U		113840-008	SW846 6020B
	Iron	0.076	0.033	0.100	NE	J		113840-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113840-008	SW846 6020B
	Magnesium	15.8	0.010	0.030	NE			113840-008	SW846 6020B
	Manganese	0.0913	0.001	0.005	NE			113840-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113840-008	SW846 7470A
	Molybdenum	0.00345	0.0002	0.001	NE			113840-008	SW846 6020B
	Nickel	0.000724	0.0006	0.002	NE	J		113840-008	SW846 6020B
	Potassium	2.17	0.080	0.300	NE			113840-008	SW846 6020B
	Selenium	0.0042	0.002	0.005	0.050	J		113840-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113840-008	SW846 6020B
	Sodium	31.6	0.080	0.250	NE			113840-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113840-008	SW846 6020B
	Vanadium	0.0047	0.0033	0.020	NE	J		113840-008	SW846 6020B
	Zinc	0.0053	0.0033	0.020	NE	J		113840-008	SW846 6020B

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Table 7B-9 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW18	Aluminum	ND	0.0193	0.050	NE	U		113845-008	SW846 6020B
19-Oct-20	Antimony	ND	0.001	0.003	0.006	U		113845-008	SW846 6020B
	Arsenic	0.00215	0.002	0.005	0.010	J		113845-008	SW846 6020B
	Barium	0.0365	0.00067	0.004	2.00			113845-008	SW846 6020B
	Beryllium	0.00225	0.0002	0.0005	0.004			113845-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113845-008	SW846 6020B
	Calcium	126	0.800	2.00	NE			113845-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113845-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U	R	113845-008	SW846 6020B
	Copper	0.000401	0.0003	0.002	NE	J		113845-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		113845-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113845-008	SW846 6020B
	Magnesium	27.7	0.010	0.030	NE			113845-008	SW846 6020B
	Manganese	0.0653	0.001	0.005	NE			113845-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113845-008	SW846 7470A
	Molybdenum	0.00317	0.0002	0.001	NE			113845-008	SW846 6020B
	Nickel	0.000865	0.0006	0.002	NE	J		113845-008	SW846 6020B
	Potassium	1.91	0.080	0.300	NE			113845-008	SW846 6020B
	Selenium	0.00616	0.002	0.005	0.050			113845-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113845-008	SW846 6020B
	Sodium	33.2	0.080	0.250	NE			113845-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113845-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	U		113845-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		113845-008	SW846 6020B

Refer to footnotes on page 7B-61.

Table 7B-9 *(Concluded)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Aluminum	ND	0.0193	0.050	NE	U		113836-008	SW846 6020B
16-Oct-20	Antimony	ND	0.001	0.003	0.006	U		113836-008	SW846 6020B
	Arsenic	0.0027	0.002	0.005	0.010	J		113836-008	SW846 6020B
	Barium	0.0636	0.00067	0.004	2.00			113836-008	SW846 6020B
	Beryllium	ND	0.0002	0.0005	0.004	U		113836-008	SW846 6020B
	Cadmium	ND	0.0003	0.001	0.005	U		113836-008	SW846 6020B
	Calcium	111	0.800	2.00	NE			113836-008	SW846 6020B
	Chromium	ND	0.003	0.010	0.100	U		113836-008	SW846 6020B
	Cobalt	ND	0.0003	0.001	NE	U	R	113836-008	SW846 6020B
	Copper	0.000553	0.0003	0.002	NE	J		113836-008	SW846 6020B
	Iron	ND	0.033	0.100	NE	U		113836-008	SW846 6020B
	Lead	ND	0.0005	0.002	NE	U		113836-008	SW846 6020B
	Magnesium	32.4	0.010	0.030	NE			113836-008	SW846 6020B
	Manganese	0.00181	0.001	0.005	NE	J		113836-008	SW846 6020B
	Mercury	ND	0.000067	0.0002	0.002	U		113836-008	SW846 7470A
	Molybdenum	0.00367	0.0002	0.001	NE			113836-008	SW846 6020B
	Nickel	0.000721	0.0006	0.002	NE	J		113836-008	SW846 6020B
	Potassium	2.08	0.080	0.300	NE			113836-008	SW846 6020B
	Selenium	0.00747	0.002	0.005	0.050			113836-008	SW846 6020B
	Silver	ND	0.0003	0.001	NE	U		113836-008	SW846 6020B
	Sodium	24.7	0.080	0.250	NE			113836-008	SW846 6020B
	Thallium	ND	0.0006	0.002	0.002	U		113836-008	SW846 6020B
	Vanadium	ND	0.0033	0.020	NE	U		113836-008	SW846 6020B
	Zinc	ND	0.0033	0.020	NE	U		113836-008	SW846 6020B

Refer to footnotes on page 7B-61.

Table 7B-10
Summary of Filtered Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Aluminum	ND	0.0193	0.0500	NE	U		112105-009	SW846 6020B
16-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112105-009	SW846 6020B
	Arsenic	0.00392	0.00200	0.00500	0.010	J		112105-009	SW846 6020B
	Barium	0.0893	0.000670	0.00400	2.00			112105-009	SW846 6020B
	Beryllium	ND	0.000200	0.000500	0.004	U		112105-009	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112105-009	SW846 6020B
	Calcium	115	0.800	2.00	NE			112105-009	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112105-009	SW846 6020B
	Cobalt	ND	0.000300	0.00100	NE	U		112105-009	SW846 6020B
	Copper	ND	0.000300	0.00200	NE	U		112105-009	SW846 6020B
	Iron	0.0361	0.0330	0.100	NE	J		112105-009	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112105-009	SW846 6020B
	Magnesium	20.9	0.0100	0.0300	NE			112105-009	SW846 6020B
	Manganese	0.134	0.00100	0.00500	NE		J-	112105-009	SW846 6020B
	Mercury	ND	0.000067	0.000200	0.002	U		112105-009	SW846 7470A
	Molybdenum	0.00627	0.000200	0.00100	NE			112105-009	SW846 6020B
	Nickel	0.00122	0.000600	0.00200	NE	J		112105-009	SW846 6020B
	Potassium	2.80	0.0800	0.300	NE			112105-009	SW846 6020B
	Selenium	0.00688	0.00200	0.00500	0.050			112105-009	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112105-009	SW846 6020B
	Sodium	34.3	0.0800	0.250	NE			112105-009	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112105-009	SW846 6020B
	Vanadium	0.00476	0.00330	0.0200	NE	B, J	0.02U	112105-009	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112105-009	SW846 6020B

Refer to footnotes on page 7B-61.

Table 7B-10 *(Continued)*
Summary of Filtered Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17	Aluminum	ND	0.0193	0.0500	NE	U		112094-009	SW846 6020B
14-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112094-009	SW846 6020B
	Arsenic	0.00762	0.00200	0.00500	0.010			112094-009	SW846 6020B
	Barium	0.0933	0.000670	0.00400	2.00	B		112094-009	SW846 6020B
	Beryllium	ND	0.000200	0.000500	0.004	U		112094-009	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112094-009	SW846 6020B
	Calcium	78.5	0.800	2.00	NE			112094-009	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112094-009	SW846 6020B
	Cobalt	0.000981	0.000300	0.00100	NE	J		112094-009	SW846 6020B
	Copper	ND	0.000300	0.00200	NE	U		112094-009	SW846 6020B
	Iron	0.630	0.0330	0.100	NE			112094-009	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112094-009	SW846 6020B
	Magnesium	17.9	0.0100	0.0300	NE			112094-009	SW846 6020B
	Manganese	0.297	0.00100	0.00500	NE			112094-009	SW846 6020B
	Mercury	0.000101	0.000067	0.000200	0.002	J	J+	112094-009	SW846 7470A
	Molybdenum	0.00493	0.000200	0.00100	NE			112094-009	SW846 6020B
	Nickel	0.00139	0.000600	0.00200	NE	J	J-	112094-009	SW846 6020B
	Potassium	2.30	0.0800	0.300	NE			112094-009	SW846 6020B
	Selenium	0.00386	0.00200	0.00500	0.050	J		112094-009	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112094-009	SW846 6020B
	Sodium	32.9	0.0800	0.250	NE			112094-009	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112094-009	SW846 6020B
	Vanadium	0.00643	0.00330	0.0200	NE	B, J	0.02U	112094-009	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112094-009	SW846 6020B

Refer to footnotes on page 7B-61.

Table 7B-10 *(Continued)*
Summary of Filtered Metal Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW18	Aluminum	ND	0.0193	0.0500	NE	U		112101-009	SW846 6020B
15-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112101-009	SW846 6020B
	Arsenic	0.00235	0.00200	0.00500	0.010	J		112101-009	SW846 6020B
	Barium	0.0421	0.000670	0.00400	2.00	B		112101-009	SW846 6020B
	Beryllium	0.00237	0.000200	0.000500	0.004			112101-009	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112101-009	SW846 6020B
	Calcium	114	0.800	2.00	NE			112101-009	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112101-009	SW846 6020B
	Cobalt	ND	0.000300	0.00100	NE	U		112101-009	SW846 6020B
	Copper	0.000337	0.000300	0.00200	NE	J		112101-009	SW846 6020B
	Iron	0.0823	0.0330	0.100	NE	J		112101-009	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112101-009	SW846 6020B
	Magnesium	29.3	0.0100	0.0300	NE			112101-009	SW846 6020B
	Manganese	0.057	0.00100	0.00500	NE		J-	112101-009	SW846 6020B
	Mercury	ND	0.000067	0.000200	0.002	U		112101-009	SW846 7470A
	Molybdenum	0.00351	0.000200	0.00100	NE			112101-009	SW846 6020B
	Nickel	ND	0.000600	0.00200	NE	U	0.002UJ	112101-009	SW846 6020B
	Potassium	1.97	0.0800	0.300	NE			112101-009	SW846 6020B
	Selenium	0.00564	0.00200	0.00500	0.050			112101-009	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112101-009	SW846 6020B
	Sodium	34.2	0.0800	0.250	NE			112101-009	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112101-009	SW846 6020B
	Vanadium	0.00459	0.00330	0.0200	NE	B, J	0.02U	112101-009	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112101-009	SW846 6020B

Refer to footnotes on page 7B-61.

Table 7B-10 *(Concluded)*
Summary of Filtered Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Aluminum	ND	0.0193	0.0500	NE	U		112090-009	SW846 6020B
13-Jan-20	Antimony	ND	0.00100	0.00300	0.006	U		112090-009	SW846 6020B
	Arsenic	0.00349	0.00200	0.00500	0.010	J		112090-009	SW846 6020B
	Barium	0.0672	0.000670	0.00400	2.00			112090-009	SW846 6020B
	Beryllium	ND	0.000200	0.000500	0.004	U		112090-009	SW846 6020B
	Cadmium	ND	0.000300	0.00100	0.005	U		112090-009	SW846 6020B
	Calcium	112	0.400	1.00	NE			112090-009	SW846 6020B
	Chromium	ND	0.00300	0.0100	0.100	U		112090-009	SW846 6020B
	Cobalt	0.00031	0.000300	0.00100	NE	J	J+	112090-009	SW846 6020B
	Copper	0.00108	0.000300	0.00200	NE	J	J+	112090-009	SW846 6020B
	Iron	0.128	0.0330	0.100	NE			112090-009	SW846 6020B
	Lead	ND	0.000500	0.00200	NE	U		112090-009	SW846 6020B
	Magnesium	31.8	0.0100	0.0300	NE			112090-009	SW846 6020B
	Manganese	0.0661	0.00100	0.00500	NE		J-	112090-009	SW846 6020B
	Mercury	0.000144	0.000067	0.000200	0.002	B, J	0.0002U	112090-009	SW846 7470A
	Molybdenum	0.0041	0.000200	0.00100	NE			112090-009	SW846 6020B
	Nickel	ND	0.000600	0.00200	NE	U	0.002UJ	112090-009	SW846 6020B
	Potassium	2.08	0.0800	0.300	NE			112090-009	SW846 6020B
	Selenium	0.00703	0.00200	0.00500	0.050			112090-009	SW846 6020B
	Silver	ND	0.000300	0.00100	NE	U		112090-009	SW846 6020B
	Sodium	24.5	0.0800	0.250	NE			112090-009	SW846 6020B
	Thallium	ND	0.000600	0.00200	0.002	U		112090-009	SW846 6020B
	Vanadium	0.00709	0.00330	0.0200	NE	B, J	0.02U	112090-009	SW846 6020B
	Zinc	ND	0.00330	0.0200	NE	U		112090-009	SW846 6020B

Refer to footnotes on page 7B-61.

Table 7B-11
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Americium-241	0.515 ± 16.5	27.5	13.5	NE	U	BD	112105-010	EPA 901.1
16-Jan-20	Cesium-137	-0.898 ± 3.35	4.86	2.35	NE	U	BD	112105-010	EPA 901.1
	Cobalt-60	1.66 ± 3.15	5.51	2.62	NE	U	BD	112105-010	EPA 901.1
	Potassium-40	-50.8 ± 55.4	63.8	30.5	NE	U	BD	112105-010	EPA 901.1
	Gross Alpha	3.54	NA	NA	15 pCi/L	NA	None	112105-011	EPA 900.0
	Gross Beta	4.17 ± 1.25	1.91	0.926	4 mrem/yr		J	112105-011	EPA 900.0
	Uranium-233/234	8.26 ± 0.788	0.0406	0.0178	NE			112105-012	HASL-300
	Uranium-235/236	0.147 ± 0.0405	0.0347	0.0143	NE			112105-012	HASL-300
	Uranium-238	1.55 ± 0.176	0.0378	0.0164	NE			112105-012	HASL-300
	Tritium	5.22 ± 75.0	134	62.7	NE	U	BD	112105-013	EPA 906.0
CYN-MW17	Americium-241	6.11 ± 17.7	28.4	13.9	NE	U	BD	112094-010	EPA 901.1
14-Jan-20	Cesium-137	-0.212 ± 2.36	3.64	1.75	NE	U	BD	112094-010	EPA 901.1
	Cobalt-60	-1.41 ± 2.21	3.64	1.70	NE	U	BD	112094-010	EPA 901.1
	Potassium-40	-9.95 ± 39.0	53.4	25.5	NE	U	BD	112094-010	EPA 901.1
	Gross Alpha	1.73	NA	NA	15 pCi/L	NA	None	112094-011	EPA 900.0
	Gross Beta	3.55 ± 0.943	1.37	0.656	4 mrem/yr		J	112094-011	EPA 900.0
	Uranium-233/234	5.17 ± 0.531	0.0483	0.0211	NE			112094-012	HASL-300
	Uranium-235/236	0.0936 ± 0.0336	0.0413	0.0169	NE		J	112094-012	HASL-300
	Uranium-238	1.06 ± 0.138	0.0450	0.0195	NE			112094-012	HASL-300
	Tritium	5.90 ± 77.0	137	64.2	NE	U	BD	112094-013	EPA 906.0
CYN-MW18	Americium-241	-0.202 ± 15.9	27.3	13.6	NE	U	BD	112101-010	EPA 901.1
15-Jan-20	Cesium-137	5.25 ± 2.74	4.64	2.27	NE	X	R	112101-010	EPA 901.1
	Cobalt-60	-0.173 ± 3.33	5.86	2.84	NE	U	BD	112101-010	EPA 901.1
	Potassium-40	5.00 ± 45.2	66.9	32.6	NE	U	BD	112101-010	EPA 901.1
	Gross Alpha	-1.06	NA	NA	15 pCi/L	NA	None	112101-011	EPA 900.0
	Gross Beta	4.71 ± 1.06	1.53	0.734	4 mrem/yr			112101-011	EPA 900.0
	Uranium-233/234	5.82 ± 0.609	0.0552	0.0242	NE			112101-012	HASL-300
	Uranium-235/236	0.0851 ± 0.0353	0.0473	0.0194	NE		J	112101-012	HASL-300
	Uranium-238	1.52 ± 0.192	0.0515	0.0223	NE			112101-012	HASL-300
	Tritium	-43.9 ± 71.6	134	62.8	NE	U	BD	112101-013	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Americium-241	14.0 ± 16.3	21.6	10.6	NE	U	BD	112090-010	EPA 901.1
13-Jan-20	Cesium-137	0.767 ± 2.83	4.29	2.06	NE	U	BD	112090-010	EPA 901.1
	Cobalt-60	0.216 ± 2.64	4.67	2.20	NE	U	BD	112090-010	EPA 901.1
	Potassium-40	2.75 ± 72.2	42.1	19.7	NE	U	BD	112090-010	EPA 901.1
	Gross Alpha	1.87	NA	NA	15 pCi/L	NA	None	112090-011	EPA 900.0
	Gross Beta	2.86 ± 0.813	1.17	0.555	4 mrem/yr		J	112090-011	EPA 900.0
	Uranium-233/234	5.57 ± 0.682	0.142	0.0622	NE			112090-012	HASL-300
	Uranium-235/236	0.114 ± 0.072	0.122	0.0499	NE	U	BD	112090-012	HASL-300
	Uranium-238	2.20 ± 0.326	0.132	0.0573	NE			112090-012	HASL-300
	Tritium	-71.6 ± 68.3	132	61.8	NE	U	BD	112090-013	EPA 906.0
CYN-MW4	Americium-241	4.90 ± 6.04	9.93	4.83	NE	U	BD	112679-009	EPA 901.1
10-Apr-20	Cesium-137	-0.273 ± 2.47	3.20	1.52	NE	U	BD	112679-009	EPA 901.1
	Cobalt-60	1.48 ± 1.87	3.37	1.57	NE	U	BD	112679-009	EPA 901.1
	Potassium-40	19.3 ± 46.9	27.6	12.6	NE	U	BD	112679-009	EPA 901.1
	Gross Alpha	11.33	NA	NA	15 pCi/L	NA	None	112679-010	EPA 900.0
	Gross Beta	10.4 ± 1.57	2.12	1.03	4 mrem/yr			112679-010	EPA 900.0
	Uranium-233/234	34.8 ± 3.32	0.0889	0.0387	NE			112679-011	HASL-300
	Uranium-235/236	0.329 ± 0.0891	0.0816	0.0338	NE			112679-011	HASL-300
	Uranium-238	4.24 ± 0.474	0.0754	0.0320	NE			112679-011	HASL-300
	Tritium	54.2 ± 94.3	159	77.0	NE	U	BD	112679-012	EPA 906.0
CYN-MW7	Americium-241	1.58 ± 16.7	28.0	13.6	NE	U	BD	112690-009	EPA 901.1
16-Apr-20	Cesium-137	-0.281 ± 2.59	4.04	1.92	NE	U	BD	112690-009	EPA 901.1
	Cobalt-60	-1.63 ± 2.78	4.66	2.17	NE	U	BD	112690-009	EPA 901.1
	Potassium-40	-9.92 ± 53.7	63.9	30.3	NE	U	BD	112690-009	EPA 901.1
	Gross Alpha	-3.67	NA	NA	15 pCi/L	NA	None	112690-010	EPA 900.0
	Gross Beta	4.98 ± 1.13	1.61	0.773	4 mrem/yr			112690-010	EPA 900.0
	Uranium-233/234	18.0 ± 2.09	0.172	0.0751	NE			112690-011	HASL-300
	Uranium-235/236	0.263 ± 0.112	0.158	0.0654	NE		J	112690-011	HASL-300
	Uranium-238	2.31 ± 0.370	0.146	0.0620	NE			112690-011	HASL-300
	Tritium	-10.7 ± 94.1	178	80.1	NE	U	BD	112690-012	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW8	Americium-241	9.29 ± 18.2	30.1	14.9	NE	U	BD	112682-009	EPA 901.1
15-Apr-20	Cesium-137	1.63 ± 3.21	4.88	2.37	NE	U	BD	112682-009	EPA 901.1
	Cobalt-60	1.00 ± 3.48	6.14	2.97	NE	U	BD	112682-009	EPA 901.1
	Potassium-40	-56.1 ± 54.9	66.7	32.3	NE	U	BD	112682-009	EPA 901.1
	Gross Alpha	-1.42	NA	NA	15 pCi/L	NA	None	112682-010	EPA 900.0
	Gross Beta	7.19 ± 1.54	2.28	1.11	4 mrem/yr			112682-010	EPA 900.0
	Uranium-233/234	23.5 ± 2.39	0.116	0.0505	NE			112682-011	HASL-300
	Uranium-235/236	0.238 ± 0.0864	0.106	0.0440	NE		J	112682-011	HASL-300
	Uranium-238	2.58 ± 0.344	0.0983	0.0417	NE			112682-011	HASL-300
	Tritium	155 ± 107	168	81.3	NE	U	BD	112682-012	EPA 906.0
CYN-MW9	Americium-241	-3.63 ± 18.5	30.4	14.9	NE	U	BD	112736-009	EPA 901.1
29-Apr-20	Cesium-137	-1.37 ± 2.93	4.33	2.07	NE	U	BD	112736-009	EPA 901.1
	Cobalt-60	0.117 ± 2.88	5.25	2.46	NE	U	BD	112736-009	EPA 901.1
	Potassium-40	-16.4 ± 55.8	63.5	30.1	NE	U	BD	112736-009	EPA 901.1
	Gross Alpha	4.39	NA	NA	15 pCi/L	NA	None	112736-010	EPA 900.0
	Gross Beta	3.36 ± 1.24	1.91	0.918	4 mrem/yr		J	112736-010	EPA 900.0
	Uranium-233/234	8.67 ± 0.854	0.0574	0.0250	NE			112736-011	HASL-300
	Uranium-235/236	0.256 ± 0.0636	0.0527	0.0218	NE			112736-011	HASL-300
	Uranium-238	2.38 ± 0.270	0.0487	0.0207	NE			112736-011	HASL-300
	Tritium	26.9 ± 84.3	151	68.0	NE	U	BD	112736-012	EPA 906.0
CYN-MW10	Americium-241	0.397 ± 12.9	20.0	9.75	NE	U	BD	112695-009	EPA 901.1
27-Apr-20	Cesium-137	-0.830 ± 2.62	3.80	1.81	NE	U	BD	112695-009	EPA 901.1
	Cobalt-60	1.26 ± 2.15	3.90	1.81	NE	U	BD	112695-009	EPA 901.1
	Potassium-40	-20.3 ± 43.6	50.9	24.1	NE	U	BD	112695-009	EPA 901.1
	Gross Alpha	2.02	NA	NA	15 pCi/L	NA	None	112695-010	EPA 900.0
	Gross Beta	4.84 ± 1.54	2.41	1.17	4 mrem/yr		J	112695-010	EPA 900.0
	Uranium-233/234	5.50 ± 0.579	0.0817	0.0356	NE			112695-011	HASL-300
	Uranium-235/236	0.177 ± 0.0623	0.0750	0.0310	NE		J	112695-011	HASL-300
	Uranium-238	2.13 ± 0.266	0.0693	0.0294	NE			112695-011	HASL-300
	Tritium	66.7 ± 90.7	153	69.4	NE	U	BD	112695-012	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW11	Americium-241	3.92 ± 8.53	13.0	6.37	NE	U	BD	112699-009	EPA 901.1
23-Apr-20	Cesium-137	0.00857 ± 2.08	3.18	1.51	NE	U	BD	112699-009	EPA 901.1
	Cobalt-60	-0.373 ± 1.97	3.47	1.61	NE	U	BD	112699-009	EPA 901.1
	Potassium-40	-47.5 ± 40.0	43.9	20.7	NE	U	BD	112699-009	EPA 901.1
	Gross Alpha	3.75	NA	NA	15 pCi/L	NA	None	112699-010	EPA 900.0
	Gross Beta	5.64 ± 1.47	2.21	1.08	4 mrem/yr	*	J	112699-010	EPA 900.0
	Uranium-233/234	5.76 ± 0.619	0.0897	0.0391	NE			112699-011	HASL-300
	Uranium-235/236	0.126 ± 0.0559	0.0824	0.0341	NE		J	112699-011	HASL-300
	Uranium-238	1.66 ± 0.227	0.0761	0.0323	NE			112699-011	HASL-300
	Tritium	-73.7 ± 111	195	94.9	NE	U	BD	112699-012	EPA 906.0
CYN-MW12	Americium-241	1.48 ± 14.9	26.5	13.0	NE	U	BD	112707-009	EPA 901.1
29-Apr-20	Cesium-137	-0.195 ± 2.22	4.42	1.63	NE	U	BD	112707-009	EPA 901.1
	Cobalt-60	1.22 ± 2.52	4.37	2.06	NE	U	BD	112707-009	EPA 901.1
	Potassium-40	-45.5 ± 51.6	56.5	27.0	NE	U	BD	112707-009	EPA 901.1
	Gross Alpha	-4.35	NA	NA	15 pCi/L	NA	None	112707-010	EPA 900.0
	Gross Beta	1.94 ± 2.00	3.35	1.63	4 mrem/yr	U	BD	112707-010	EPA 900.0
	Uranium-233/234	12.9 ± 1.26	0.0601	0.0262	NE			112707-011	HASL-300
	Uranium-235/236	0.180 ± 0.0556	0.0552	0.0228	NE			112707-011	HASL-300
	Uranium-238	2.77 ± 0.311	0.0510	0.0216	NE			112707-011	HASL-300
	Tritium	38.3 ± 86.8	152	69.1	NE	U	BD	112707-012	EPA 906.0
CYN-MW13	Americium-241	-1.61 ± 5.11	7.92	3.87	NE	U	BD	112742-009	EPA 901.1
30-Apr-20	Cesium-137	-2.11 ± 2.53	2.52	1.20	NE	U	BD	112742-009	EPA 901.1
	Cobalt-60	0.870 ± 1.71	3.05	1.44	NE	U	BD	112742-009	EPA 901.1
	Potassium-40	-46.9 ± 43.4	38.9	18.6	NE	U	BD	112742-009	EPA 901.1
	Gross Alpha	-2.41	NA	NA	15 pCi/L	NA	None	112742-010	EPA 900.0
	Gross Beta	4.66 ± 1.08	1.63	0.795	4 mrem/yr		J	112742-010	EPA 900.0
	Uranium-233/234	9.47 ± 0.908	0.0516	0.0225	NE			112742-011	HASL-300
	Uranium-235/236	0.0847 ± 0.0374	0.0474	0.0196	NE		J	112742-011	HASL-300
	Uranium-238	1.62 ± 0.192	0.0438	0.0186	NE			112742-011	HASL-300
	Tritium	47.9 ± 89.9	156	70.7	NE	U	BD	112742-012	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW14A 28-Apr-20	Americium-241	6.18 ± 11.7	19.4	9.55	NE	U	BD	112703-009	EPA 901.1
	Cesium-137	2.30 ± 3.25	4.82	2.33	NE	U	BD	112703-009	EPA 901.1
	Cobalt-60	0.695 ± 3.24	5.66	2.72	NE	U	BD	112703-009	EPA 901.1
	Potassium-40	-24.5 ± 46.3	61.9	29.8	NE	U	BD	112703-009	EPA 901.1
	Gross Alpha	3.64	NA	NA	15 pCi/L	NA	None	112703-010	EPA 900.0
	Gross Beta	4.79 ± 1.98	3.20	1.56	4 mrem/yr		J	112703-010	EPA 900.0
	Uranium-233/234	12.4 ± 1.14	0.0459	0.0200	NE			112703-011	HASL-300
	Uranium-235/236	0.323 ± 0.0653	0.0421	0.0174	NE			112703-011	HASL-300
	Uranium-238	2.64 ± 0.278	0.0389	0.0165	NE			112703-011	HASL-300
	Tritium	79.5 ± 87.8	145	65.5	NE	U	BD	112703-012	EPA 906.0
CYN-MW15 28-Apr-20	Americium-241	22.2 ± 21.7	31.2	15.2	NE	U	BD	112730-010	EPA 901.1
	Cesium-137	0.502 ± 2.47	3.84	1.84	NE	U	BD	112730-010	EPA 901.1
	Cobalt-60	-0.875 ± 2.47	4.21	1.98	NE	U	BD	112730-010	EPA 901.1
	Potassium-40	-20.4 ± 46.1	58.1	27.8	NE	U	BD	112730-010	EPA 901.1
	Gross Alpha	3.80	NA	NA	15 pCi/L	NA	None	112730-011	EPA 900.0
	Gross Beta	3.72 ± 2.47	4.09	2.00	4 mrem/yr	U	BD	112730-011	EPA 900.0
	Uranium-233/234	13.7 ± 1.32	0.0580	0.0253	NE			112730-012	HASL-300
	Uranium-235/236	0.484 ± 0.0922	0.0533	0.0220	NE			112730-012	HASL-300
	Uranium-238	3.52 ± 0.378	0.0493	0.0209	NE			112730-012	HASL-300
	Tritium	96.5 ± 90.6	145	65.9	NE	U	BD	112730-013	EPA 906.0
CYN-MW16 22-Apr-20	Americium-241	-3.09 ± 11.3	17.0	8.34	NE	U	BD	112777-010	EPA 901.1
	Cesium-137	2.33 ± 2.77	4.11	1.98	NE	U	BD	112777-010	EPA 901.1
	Cobalt-60	1.02 ± 2.48	4.44	2.10	NE	U	BD	112777-010	EPA 901.1
	Potassium-40	-23.5 ± 36.8	50.1	23.8	NE	U	BD	112777-010	EPA 901.1
	Gross Alpha	1.91	NA	NA	15 pCi/L	NA	None	112777-011	EPA 900.0
	Gross Beta	4.18 ± 1.43	2.25	1.09	4 mrem/yr	*	J	112777-011	EPA 900.0
	Uranium-233/234	8.81 ± 0.906	0.0910	0.0396	NE			112777-012	HASL-300
	Uranium-235/236	0.224 ± 0.0725	0.0836	0.0346	NE		J	112777-012	HASL-300
	Uranium-238	1.76 ± 0.238	0.0772	0.0328	NE			112777-012	HASL-300
	Tritium	-31.0 ± 111	194	94.1	NE	U	BD	112777-013	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW17	Americium-241	0.051 ± 13.4	22.3	10.9	NE	U	BD	112769-010	EPA 901.1
23-Apr-20	Cesium-137	2.52 ± 3.01	4.43	2.13	NE	U	BD	112769-010	EPA 901.1
	Cobalt-60	-0.0269 ± 2.58	4.00	1.86	NE	U	BD	112769-010	EPA 901.1
	Potassium-40	-20.8 ± 44.3	54.3	25.8	NE	U	BD	112769-010	EPA 901.1
	Gross Alpha	7.76	NA	NA	15 pCi/L	NA	None	112769-011	EPA 900.0
	Gross Beta	6.32 ± 1.38	2.03	0.989	4 mrem/yr	*	J	112769-011	EPA 900.0
	Uranium-233/234	5.09 ± 0.553	0.0869	0.0379	NE			112769-012	HASL-300
	Uranium-235/236	0.107 ± 0.049	0.0799	0.0330	NE		J	112769-012	HASL-300
	Uranium-238	1.04 ± 0.161	0.0738	0.0313	NE			112769-012	HASL-300
	Tritium	-135 ± 103	185	90.0	NE	U	BD	112769-013	EPA 906.0
CYN-MW18	Americium-241	-1.20 ± 14.1	23.1	11.4	NE	U	BD	112774-010	EPA 901.1
17-Apr-20	Cesium-137	0.374 ± 3.18	4.80	2.32	NE	U	BD	112774-010	EPA 901.1
	Cobalt-60	1.36 ± 3.26	5.72	2.74	NE	U	BD	112774-010	EPA 901.1
	Potassium-40	5.98 ± 56.0	56.9	27.2	NE	U	BD	112774-010	EPA 901.1
	Gross Alpha	-0.87	NA	NA	15 pCi/L	NA	None	112774-011	EPA 900.0
	Gross Beta	5.29 ± 1.43	2.18	1.06	4 mrem/yr		J	112774-011	EPA 900.0
	Uranium-233/234	5.89 ± 0.661	0.106	0.0462	NE			112774-012	HASL-300
	Uranium-235/236	0.106 ± 0.0568	0.0973	0.0402	NE		J	112774-012	HASL-300
	Uranium-238	1.45 ± 0.220	0.0899	0.0381	NE			112774-012	HASL-300
	Tritium	58.3 ± 105	181	81.8	NE	U	BD	112774-013	EPA 906.0
CYN-MW19	Americium-241	5.88 ± 10.7	16.1	7.91	NE	U	BD	112763-010	EPA 901.1
22-Apr-20	Cesium-137	2.84 ± 2.86	4.15	1.99	NE	U	BD	112763-010	EPA 901.1
	Cobalt-60	-0.648 ± 2.46	4.26	2.01	NE	U	BD	112763-010	EPA 901.1
	Potassium-40	27.2 ± 57.5	37.9	17.7	NE	U	BD	112763-010	EPA 901.1
	Gross Alpha	5.26	NA	NA	15 pCi/L	NA	None	112763-011	EPA 900.0
	Gross Beta	3.35 ± 1.30	2.04	0.992	4 mrem/yr	*	J	112763-011	EPA 900.0
	Uranium-233/234	5.51 ± 0.562	0.0720	0.0314	NE			112763-012	HASL-300
	Uranium-235/236	0.211 ± 0.0637	0.0661	0.0273	NE			112763-012	HASL-300
	Uranium-238	2.12 ± 0.254	0.0611	0.0259	NE			112763-012	HASL-300
	Tritium	-115 ± 112	199	96.8	NE	U	BD	112763-013	EPA 906.0

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Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

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Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW16	Americium-241	-10.3 ± 11.1	15.6	7.55	NE	U	BD	113329-009	EPA 901.1
16-Jul-20	Cesium-137	0.329 ± 1.73	3.03	1.43	NE	U	BD	113329-009	EPA 901.1
	Cobalt-60	1.82 ± 2.35	3.33	1.53	NE	U	BD	113329-009	EPA 901.1
	Potassium-40	9.67 ± 44.3	31.7	14.5	NE	U	BD	113329-009	EPA 901.1
	Gross Alpha	-0.18	NA	NA	15 pCi/L	NA	None	113329-010	EPA 900.0
	Gross Beta	5.45 ± 1.23	1.80	0.871	4 mrem/yr			113329-010	EPA 900.0
	Uranium-233/234	9.18 ± 0.939	0.0640	0.0276	NE			113329-011	HASL-300
	Uranium-235/236	0.202 ± 0.0651	0.0497	0.0194	NE			113329-011	HASL-300
	Uranium-238	1.90 ± 0.239	0.0601	0.0256	NE			113329-011	HASL-300
	Tritium	-17.6 ± 80.5	153	69.2	NE	U	BD	113329-012	EPA 906.0
CYN-MW17	Americium-241	0.869 ± 6.48	11.3	5.48	NE	U	BD	113324-009	EPA 901.1
15-Jul-20	Cesium-137	0.035 ± 2.31	3.70	1.77	NE	U	BD	113324-009	EPA 901.1
	Cobalt-60	-1.05 ± 3.25	4.71	2.22	NE	U	BD	113324-009	EPA 901.1
	Potassium-40	25.6 ± 52.1	40.2	18.7	NE	U	BD	113324-009	EPA 901.1
	Gross Alpha	0.40	NA	NA	15 pCi/L	NA	None	113324-010	EPA 900.0
	Gross Beta	5.04 ± 0.997	1.44	0.698	4 mrem/yr			113324-010	EPA 900.0
	Uranium-233/234	4.87 ± 0.592	0.113	0.0488	NE			113324-011	HASL-300
	Uranium-235/236	0.121 ± 0.0736	0.0878	0.0342	NE		J	113324-011	HASL-300
	Uranium-238	1.03 ± 0.190	0.106	0.0453	NE			113324-011	HASL-300
	Tritium	-14.2 ± 84.2	159	72.0	NE	U	BD	113324-012	EPA 906.0
CYN-MW18	Americium-241	11.6 ± 16.7	25.5	12.5	NE	U	BD	113320-009	EPA 901.1
14-Jul-20	Cesium-137	0.396 ± 3.17	4.85	2.32	NE	U	BD	113320-009	EPA 901.1
	Cobalt-60	2.21 ± 3.15	5.58	2.63	NE	U	BD	113320-009	EPA 901.1
	Potassium-40	20.1 ± 60.8	49.0	22.9	NE	U	BD	113320-009	EPA 901.1
	Gross Alpha	-2.24	NA	NA	15 pCi/L	NA	None	113320-010	EPA 900.0
	Gross Beta	2.73 ± 1.29	2.08	1.01	4 mrem/yr		J	113320-010	EPA 900.0
	Uranium-233/234	5.57 ± 0.563	0.0512	0.0221	NE			113320-011	HASL-300
	Uranium-235/236	0.100 ± 0.0375	0.0397	0.0155	NE		J	113320-011	HASL-300
	Uranium-238	1.31 ± 0.167	0.0481	0.0205	NE			113320-011	HASL-300
	Tritium	0.200 ± 79.0	147	66.3	NE	U	BD	113320-012	EPA 906.0

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Table 7B-11 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW19	Americium-241	-0.705 ± 11.2	18.2	8.81	NE	U	BD	113317-009	EPA 901.1
13-Jul-20	Cesium-137	-0.697 ± 2.02	3.38	1.58	NE	U	BD	113317-009	EPA 901.1
	Cobalt-60	-1.91 ± 2.19	3.25	1.46	NE	U	BD	113317-009	EPA 901.1
	Potassium-40	-18.7 ± 41.3	46.6	21.7	NE	U	BD	113317-009	EPA 901.1
	Gross Alpha	0.14	NA	NA	15 pCi/L	NA	None	113317-010	EPA 900.0
	Gross Beta	2.76 ± 1.13	1.78	0.862	4 mrem/yr		J	113317-010	EPA 900.0
	Uranium-233/234	5.77 ± 0.621	0.0663	0.0286	NE			113317-011	HASL-300
	Uranium-235/236	0.167 ± 0.0578	0.0514	0.0201	NE			113317-011	HASL-300
	Uranium-238	2.38 ± 0.289	0.0623	0.0266	NE			113317-011	HASL-300
	Tritium	36.5 ± 94.8	168	76.1	NE	U	BD	113317-012	EPA 906.0
CYN-MW16	Americium-241	3.98 ± 14.9	23.8	11.7	NE	U	BD	113848-009	EPA 901.1
21-Oct-20	Cesium-137	0.00134 ± 2.81	4.35	2.08	NE	U	BD	113848-009	EPA 901.1
	Cobalt-60	2.47 ± 5.58	5.30	2.50	NE	U	BD	113848-009	EPA 901.1
	Potassium-40	-68.4 ± 55.4	61.6	29.3	NE	U	BD	113848-009	EPA 901.1
	Gross Alpha	4.99	NA	NA	15 pCi/L	NA	None	113848-010	EPA 900.0
	Gross Beta	6.28 ± 1.09	1.47	0.706	4 mrem/yr			113848-010	EPA 900.0
	Uranium-233/234	8.94 ± 0.810	0.0677	0.0300	NE			113848-011	HASL-300
	Uranium-235/236	0.116 ± 0.0417	0.0578	0.0241	NE		J	113848-011	HASL-300
	Uranium-238	1.75 ± 0.201	0.0615	0.0269	NE			113848-011	HASL-300
	Tritium	21.9 ± 77.0	138	62.5	NE	U	BD	113848-012	EPA 906.0
CYN-MW17	Americium-241	-3.46 ± 23.8	40.9	19.9	NE	U	BD	113840-009	EPA 901.1
20-Oct-20	Cesium-137	-2.79 ± 2.76	3.96	1.87	NE	U	BD	113840-009	EPA 901.1
	Cobalt-60	0.938 ± 2.61	4.89	2.27	NE	U	BD	113840-009	EPA 901.1
	Potassium-40	44.1 ± 67.3	51.4	23.9	NE	U	BD	113840-009	EPA 901.1
	Gross Alpha	2.22	NA	NA	15 pCi/L	NA	None	113840-010	EPA 900.0
	Gross Beta	4.12 ± 0.941	1.38	0.665	4 mrem/yr		J	113840-010	EPA 900.0
	Uranium-233/234	3.82 ± 0.387	0.0721	0.0320	NE			113840-011	HASL-300
	Uranium-235/236	0.0597 ± 0.0347	0.0615	0.0257	NE	U	BD	113840-011	HASL-300
	Uranium-238	0.866 ± 0.125	0.0655	0.0287	NE			113840-011	HASL-300
	Tritium	49.9 ± 81.4	140	63.4	NE	U	BD	113840-012	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-11 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW18	Americium-241	20.2 ± 18.6	26.6	13.2	NE	U	BD	113845-009	EPA 901.1
19-Oct-20	Cesium-137	1.11 ± 5.99	4.87	2.38	NE	U	BD	113845-009	EPA 901.1
	Cobalt-60	0.332 ± 3.29	5.71	2.76	NE	U	BD	113845-009	EPA 901.1
	Potassium-40	-20.0 ± 46.2	65.4	31.7	NE	U	BD	113845-009	EPA 901.1
	Gross Alpha	2.69	NA	NA	15 pCi/L	NA	None	113845-010	EPA 900.0
	Gross Beta	3.42 ± 0.993	1.46	0.701	4 mrem/yr		J	113845-010	EPA 900.0
	Uranium-233/234	5.86 ± 0.579	0.0839	0.0372	NE			113845-011	HASL-300
	Uranium-235/236	0.0998 ± 0.045	0.0716	0.0299	NE		J	113845-011	HASL-300
	Uranium-238	1.45 ± 0.189	0.0762	0.0333	NE			113845-011	HASL-300
	Tritium	35.5 ± 82.0	144	65.4	NE	U	BD	113845-012	EPA 906.0
CYN-MW19	Americium-241	24.1 ± 19.9	27.2	13.3	NE	U	BD	113836-009	EPA 901.1
16-Oct-20	Cesium-137	0.656 ± 2.42	3.87	1.83	NE	U	BD	113836-009	EPA 901.1
	Cobalt-60	4.07 ± 3.26	5.30	2.48	NE	U	BD	113836-009	EPA 901.1
	Potassium-40	-21.9 ± 45.9	59.5	28.0	NE	U	BD	113836-009	EPA 901.1
	Gross Alpha	0.50	NA	NA	15 pCi/L	NA	None	113836-010	EPA 900.0
	Gross Beta	4.65 ± 1.43	2.20	1.07	4 mrem/yr		J	113836-010	EPA 900.0
	Uranium-233/234	5.75 ± 0.527	0.0580	0.0257	NE			113836-011	HASL-300
	Uranium-235/236	0.0991 ± 0.0376	0.0495	0.0207	NE		J	113836-011	HASL-300
	Uranium-238	2.38 ± 0.246	0.0527	0.0231	NE			113836-011	HASL-300
	Tritium	40.8 ± 75.2	131	59	NE	U	BD	113836-012	EPA 906.0

Refer to footnotes on page 7B-61.

Table 7B-12
Summary of Field Water Quality Measurements[h],
Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CYN-MW16	16-Jan-20	16.06	716.20	-27.7	7.37	0.32	9.70	0.82
CYN-MW17	14-Jan-20	18.25	599.10	-40.5	7.15	0.48	20.50	1.63
CYN-MW18	15-Jan-20	17.49	819.50	141.6	6.89	0.75	7.60	0.61
CYN-MW19	13-Jan-20	14.58	631.80	-95.5	7.62	0.18	65.30	5.53
CYN-MW4	10-Apr-20	17.97	681.77	168.4	7.30	1.58	49.54	3.93
CYN-MW7	16-Apr-20	18.10	807.45	167.0	7.11	0.45	56.20	4.36
CYN-MW8	15-Apr-20	17.13	811.09	177.9	7.19	0.33	60.74	4.66
CYN-MW9	29-Apr-20	16.58	965.91	148.7	7.03	0.94	55.30	4.43
CYN-MW10	27-Apr-20	17.74	799.45	141.4	7.39	0.47	80.73	6.37
CYN-MW11	23-Apr-20	17.27	1100.4	120.9	7.28	1.07	5.62	0.45
CYN-MW12	29-Apr-20	18.19	1043.3	189.7	7.08	0.60	12.22	1.01
CYN-MW13	30-Apr-20	19.28	750.91	114.4	7.21	0.37	44.06	3.33
CYN-MW14A	28-Apr-20	18.67	1079.0	171.8	7.24	0.21	16.23	1.35
CYN-MW15	28-Apr-20	18.25	1188.3	153.2	7.02	1.50	14.34	1.12
CYN-MW16	22-Apr-20	17.92	842.45	-69.1	7.31	0.24	11.70	0.96
CYN-MW17	23-Apr-20	19.67	572.88	-24.2	7.07	0.44	28.57	2.21
CYN-MW18	17-Apr-20	19.46	831.99	134.8	6.84	0.86	9.65	0.74
CYN-MW19	22-Apr-20	15.27	667.74	69.4	7.44	0.59	66.78	5.60
CYN-MW16	16-Jul-20	19.71	704.80	120.8	7.42	0.48	13.33	1.00
CYN-MW17	15-Jul-20	19.91	541.51	85.1	7.19	0.68	37.73	2.85
CYN-MW18	14-Jul-20	19.65	777.11	221.1	6.93	0.80	9.20	0.72
CYN-MW19	13-Jul-20	16.53	555.88	242.8	7.26	0.36	73.48	6.31

Refer to footnotes on page 7B-61.

Table 7B-12 *(Concluded)*
Summary of Field Water Quality Measurements[h], Burn Site Groundwater Monitoring, Sandia National Laboratories, New Mexico

Calendar Year 2020

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CYN-MW4	15-Oct-20	17.58	655.17	17.1	7.33	0.52	30.33	2.52
CYN-MW7	20-Oct-20	20.19	755.45	127.4	7.19	0.21	59.17	4.76
CYN-MW8	22-Oct-20	19.04	811.07	232.3	7.29	0.66	63.32	4.91
CYN-MW9	05-Nov-20	17.62	1020.8	210.4	7.09	1.08	58.30	4.70
CYN-MW10	23-Oct-20	17.20	772.40	215.0	7.45	0.29	84.76	6.71
CYN-MW11	26-Oct-20	12.57	861.65	135.9	7.14	0.64	5.15	0.46
CYN-MW12	04-Nov-20	18.99	1157.9	166.8	7.14	0.69	14.42	1.17
CYN-MW13	04-Nov-20	18.86	703.74	186.9	7.26	0.32	46.94	3.60
CYN-MW14A	29-Oct-20	17.66	944.58	101.3	7.26	0.27	16.71	1.39
CYN-MW15	05-Nov-20	18.05	1209.9	183.5	7.06	0.58	13.80	1.14
CYN-MW16	21-Oct-20	19.68	732.59	142.7	7.29	0.66	13.54	1.06
CYN-MW17	20-Oct-20	19.37	555.43	41.7	7.12	0.44	34.70	2.77
CYN-MW18	19-Oct-20	19.71	827.90	219.3	6.86	0.96	10.01	0.79
CYN-MW19	16-Oct-20	16.13	675.97	242.8	7.47	0.31	65.13	5.57

Refer to footnotes on page 7B-61.

Footnotes for Burn Site Groundwater Analytical Results Tables

%	= Percent.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
HMX	= Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	= Identifier.
µg/L	= Micrograms per liter.
mg/L	= Milligrams per liter.
mrem/yr	= Millirem per year.
No.	= Number.
pCi/L	= Picocuries per liter.
RDX	= Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Tetryl	= Methyl-2,4,6-trinitrophenylnitramine.

[a]Result or Activity

Result applies to Tables 7B-1 and 7B-4 through 7B-10. Activity applies to Table 7B-11.

Activity	= Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Part 141). Activities of zero or less are considered to be not detected.
Bold	= Value exceed the established MCL.
ND	= Not detected (at method detection limit).

[b]MDL or MDA

The MDL applies to Tables 7B-1 through 7B-10. MDA applies to Table 7B-11.

MDA	= The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.
MDL	= Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix specific.
NA	= Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level

The PQL applies to Tables 7B-1 and 7B-4 through 7B-10. Critical level applies to Table 7B-11.

Critical Level	= The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix specific.
NA	= Not applicable for gross alpha activities. The critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.
PQL	= Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.

[d]MCL

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards (EPA March 2018).

The following are the MCLs for gross alpha particles and beta particles in community water systems:

- 15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table 7A-1-4).
- 4 mrem/yr = Any combination of beta and/or gamma emitting radionuclides (as dose rate).

NE = Not established.

Footnotes for Burn Site Groundwater Analytical Results Tables (Concluded)

[e]Laboratory Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

B = The analyte was detected in the blank above the effective MDL.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N = Results associated with the spike analysis that was outside control limits.
NA = Not applicable.
U = Analyte is absent or below the method detection limit.
X = Uncertain identification for gamma spectroscopy.
* = Recovery or relative percent difference (RPD) not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.

[f]Validation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J = The associated value is an estimated quantity.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
J- = The associated numerical value is an estimated quantity with a suspected negative bias.
None = No data validation for corrected gross alpha activity.
R = The data are unusable, and resampling or reanalysis are necessary for verification.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for but was not detected. The associated numerical value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method

Standard Methods for the Examination of Water and Wastewater, 23rd ed., 2017, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1997, "EML [Environmental Measurements Laboratory] Procedures Manual," 27th ed., Vol. 1, Rev. 1992, HASL-300.

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DOE = U.S. Department of Energy.
HASL = Health and Safety Laboratory.
SM = Standard Method.
SW = Solid Waste.

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.
% Sat = Percent saturation.
µmho/cm = Micromhos per centimeter.
mg/L = Milligrams per liter.
mV = Millivolts.
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 7C
Burn Site Groundwater
Plots

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Attachment 7C Plots

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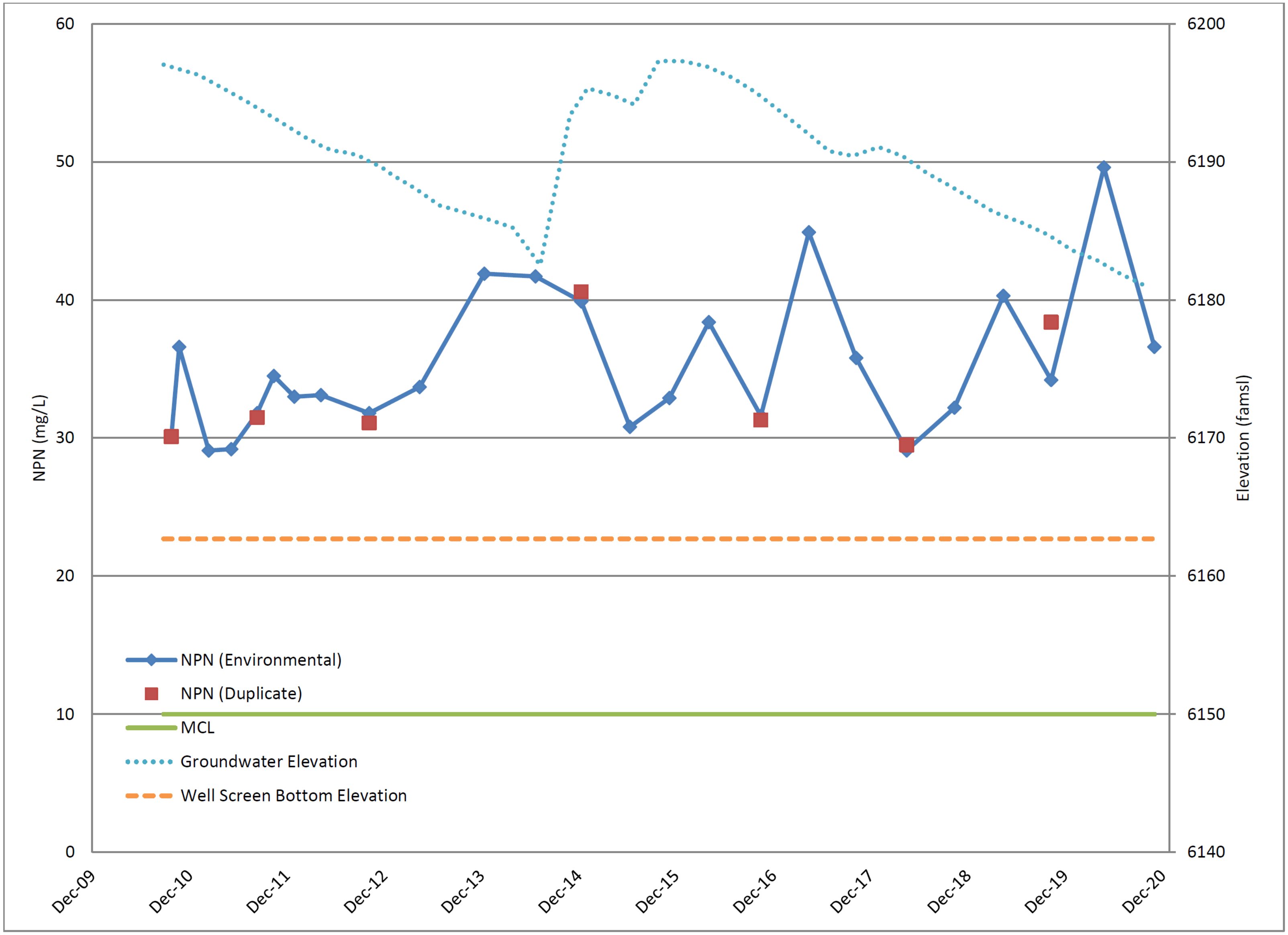

Figure 7C-1. Nitrate plus Nitrite Concentrations, CYN-MW9

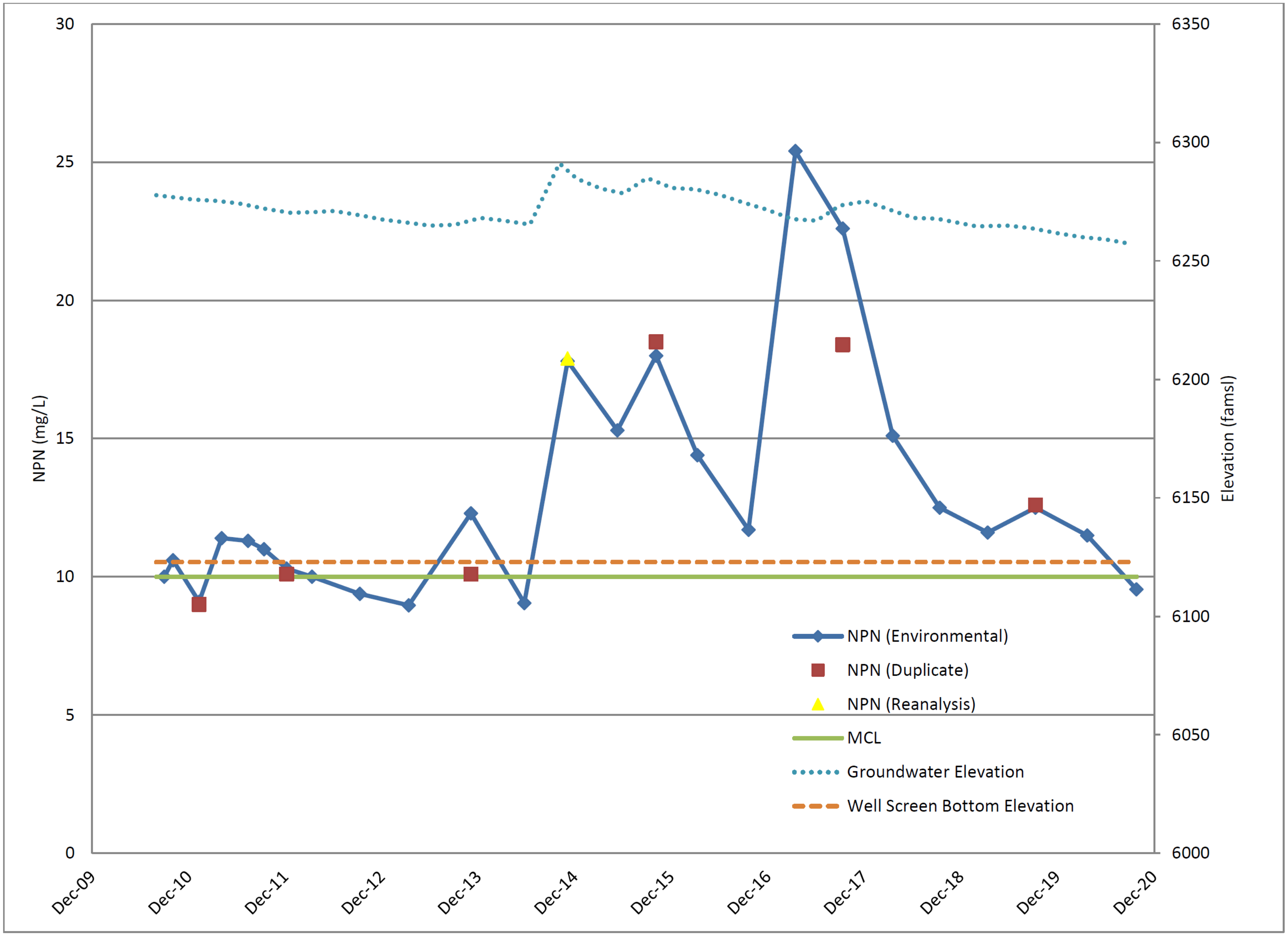

Figure 7C-2. Nitrate plus Nitrite Concentrations, CYN-MW11

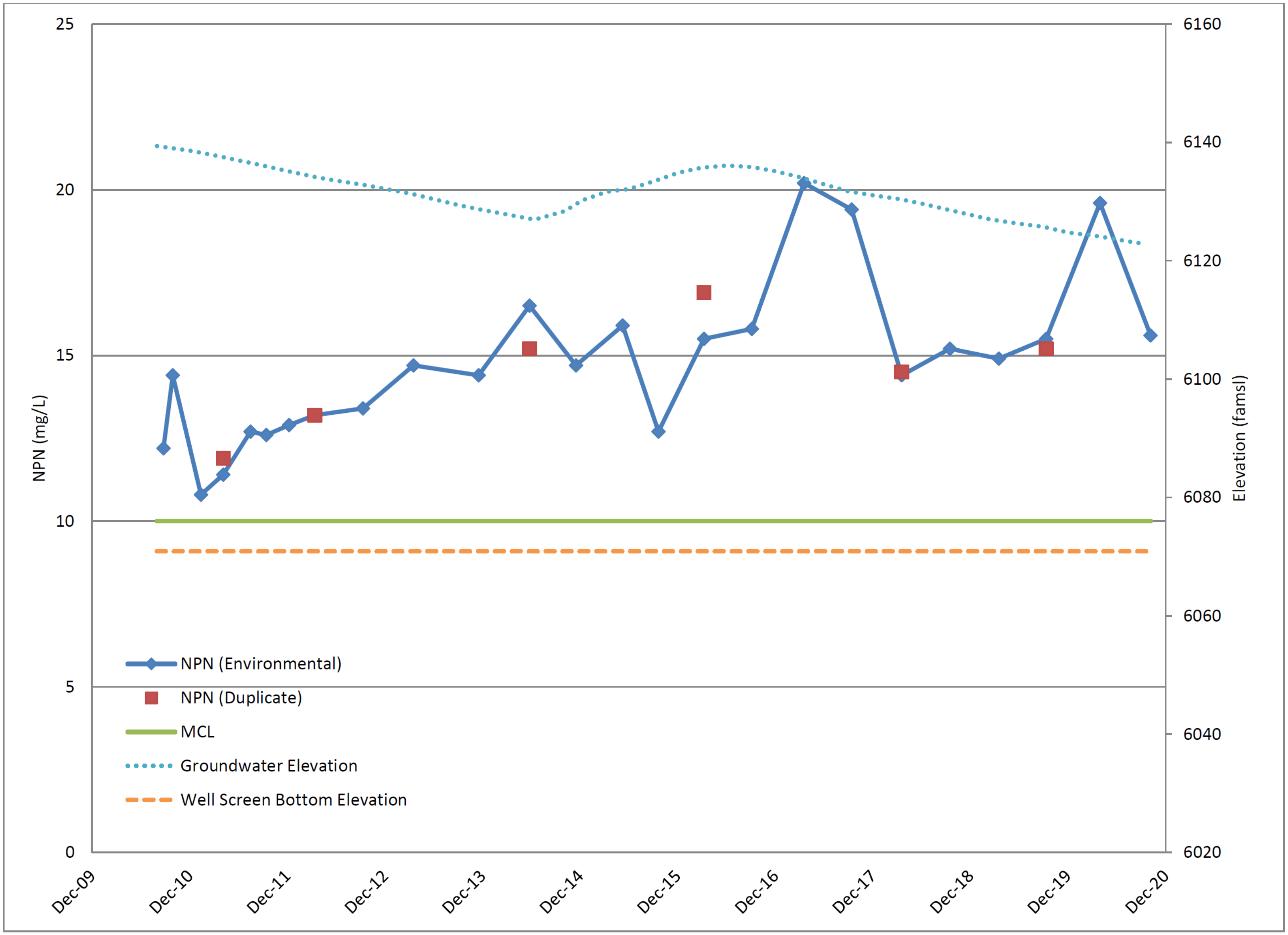

Figure 7C-3. Nitrate plus Nitrite Concentrations, CYN-MW12

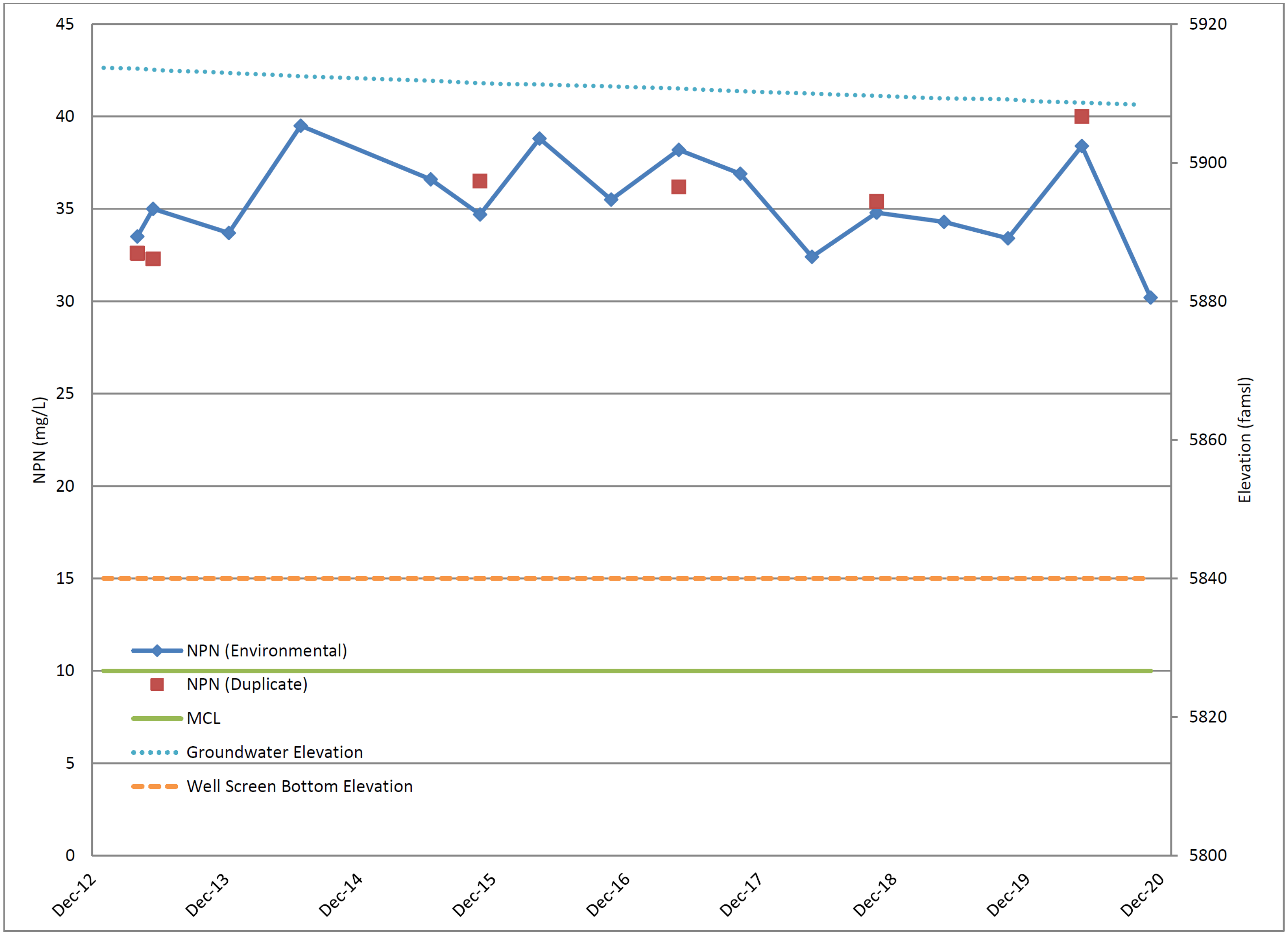

Figure 7C-4. Nitrate plus Nitrite Concentrations, CYN-MW13

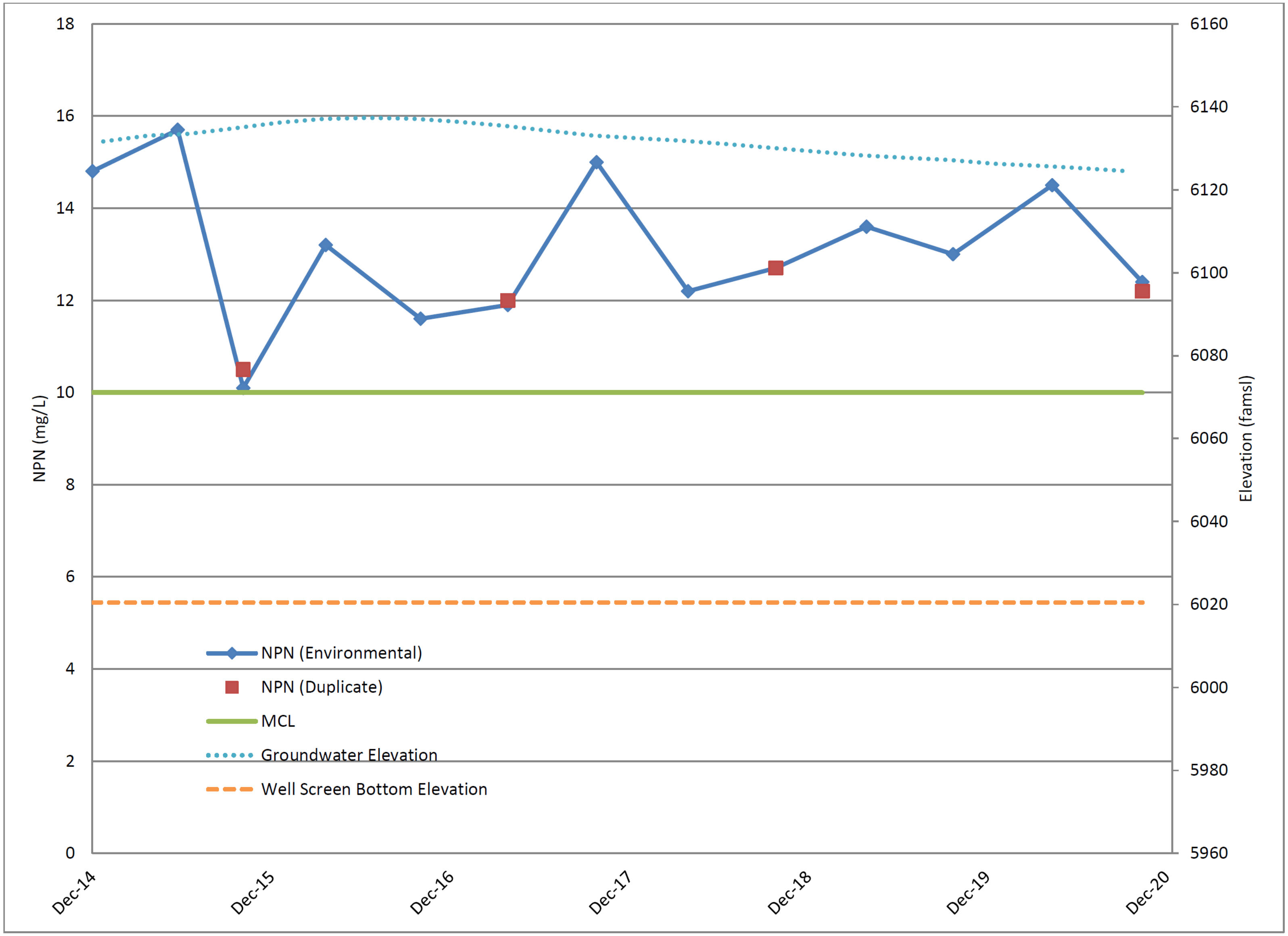

Figure 7C-5. Nitrate plus Nitrite Concentrations, CYN-MW14A

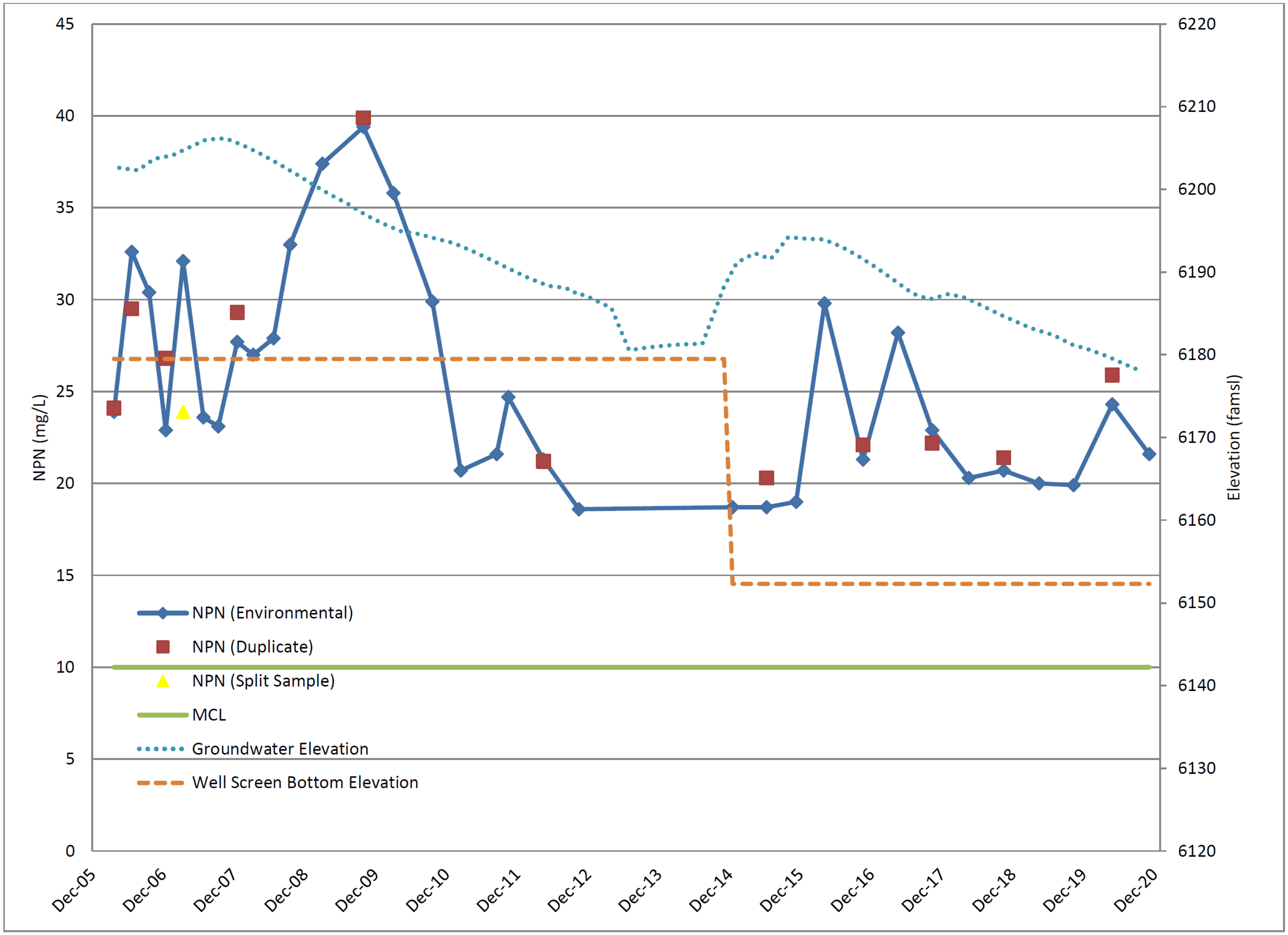

Figure 7C-6. Nitrate plus Nitrite Concentrations, CYN-MW15 (Includes Historical CYN-MW6 Data)

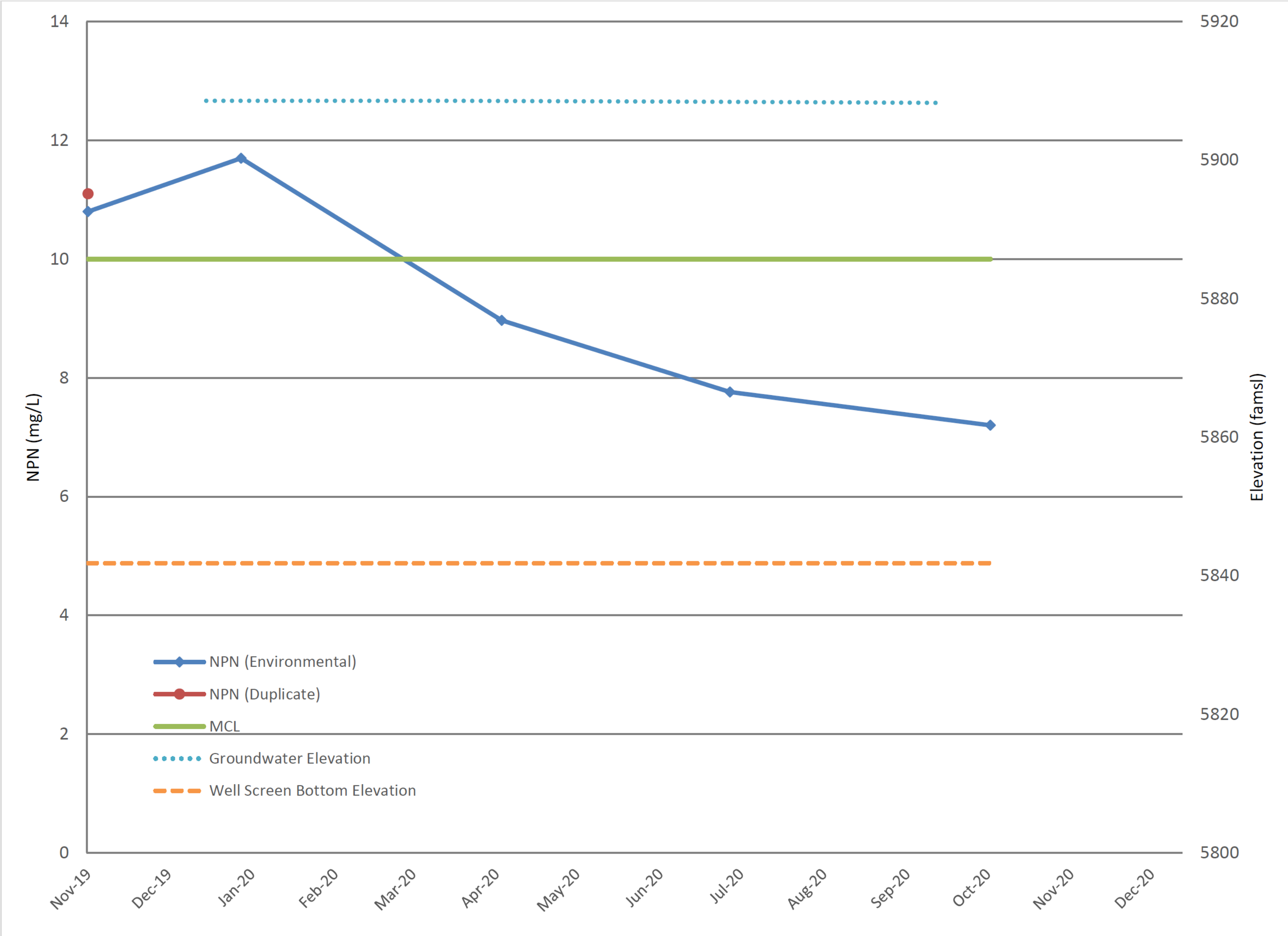

Figure 7C-7. Nitrate plus Nitrite Concentrations, CYN-MW16

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Attachment 7D
Burn Site Groundwater Hydrographs

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Attachment 7D Hydrographs

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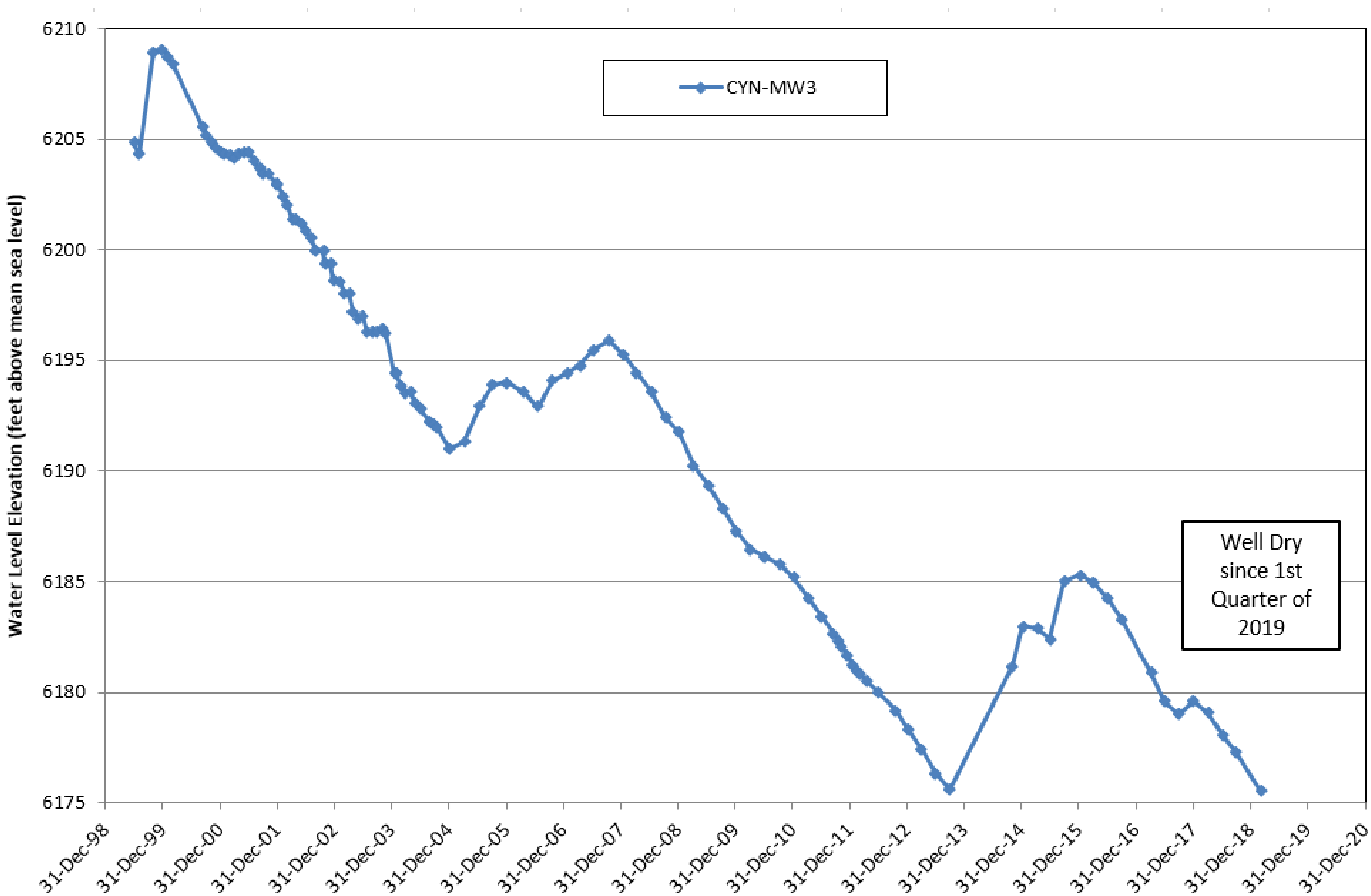

Figure 7D-1. Burn Site Groundwater Area of Concern Wells (1 of 9)

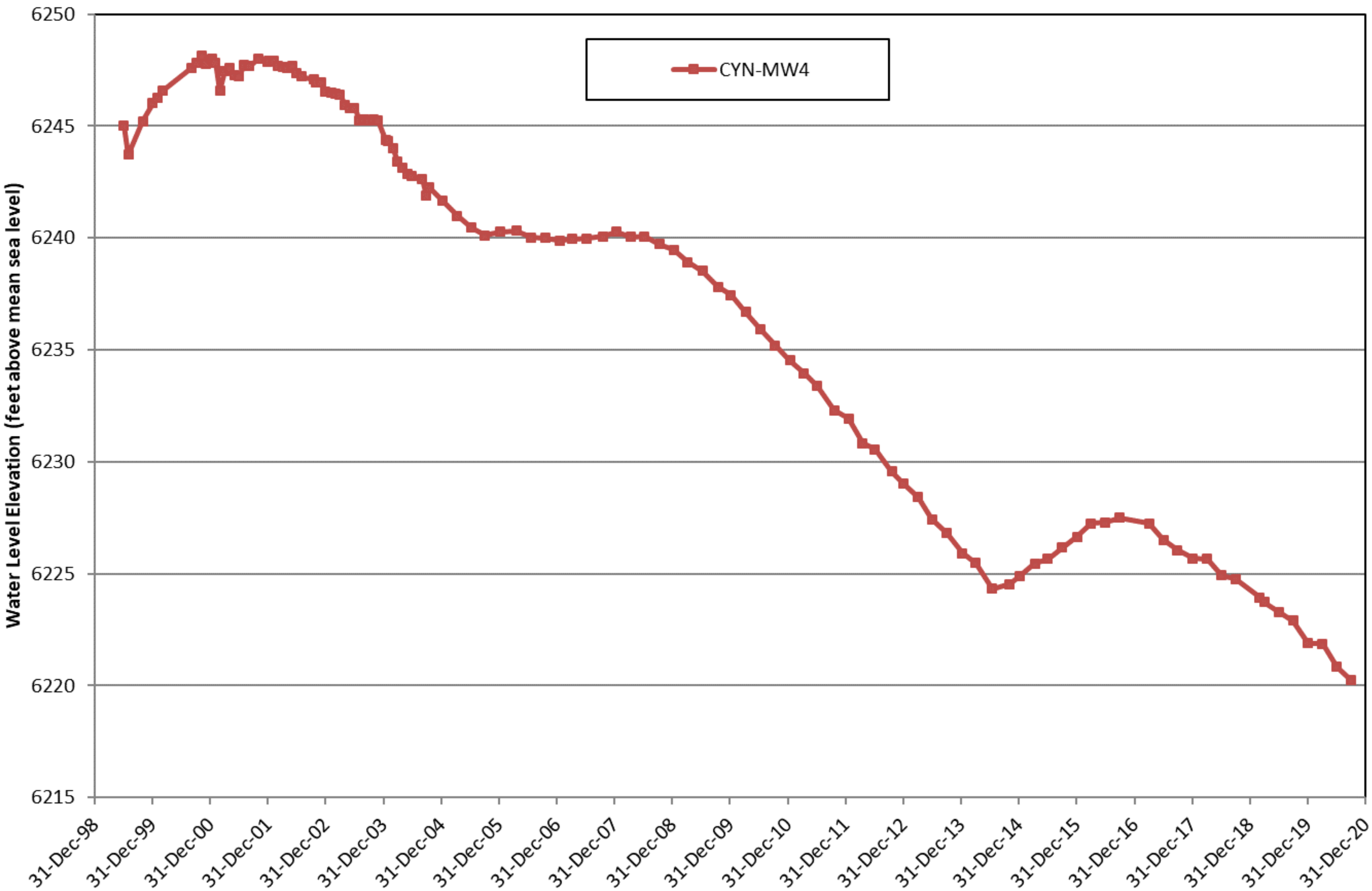

Figure 7D-2. Burn Site Groundwater Area of Concern Wells (2 of 9)

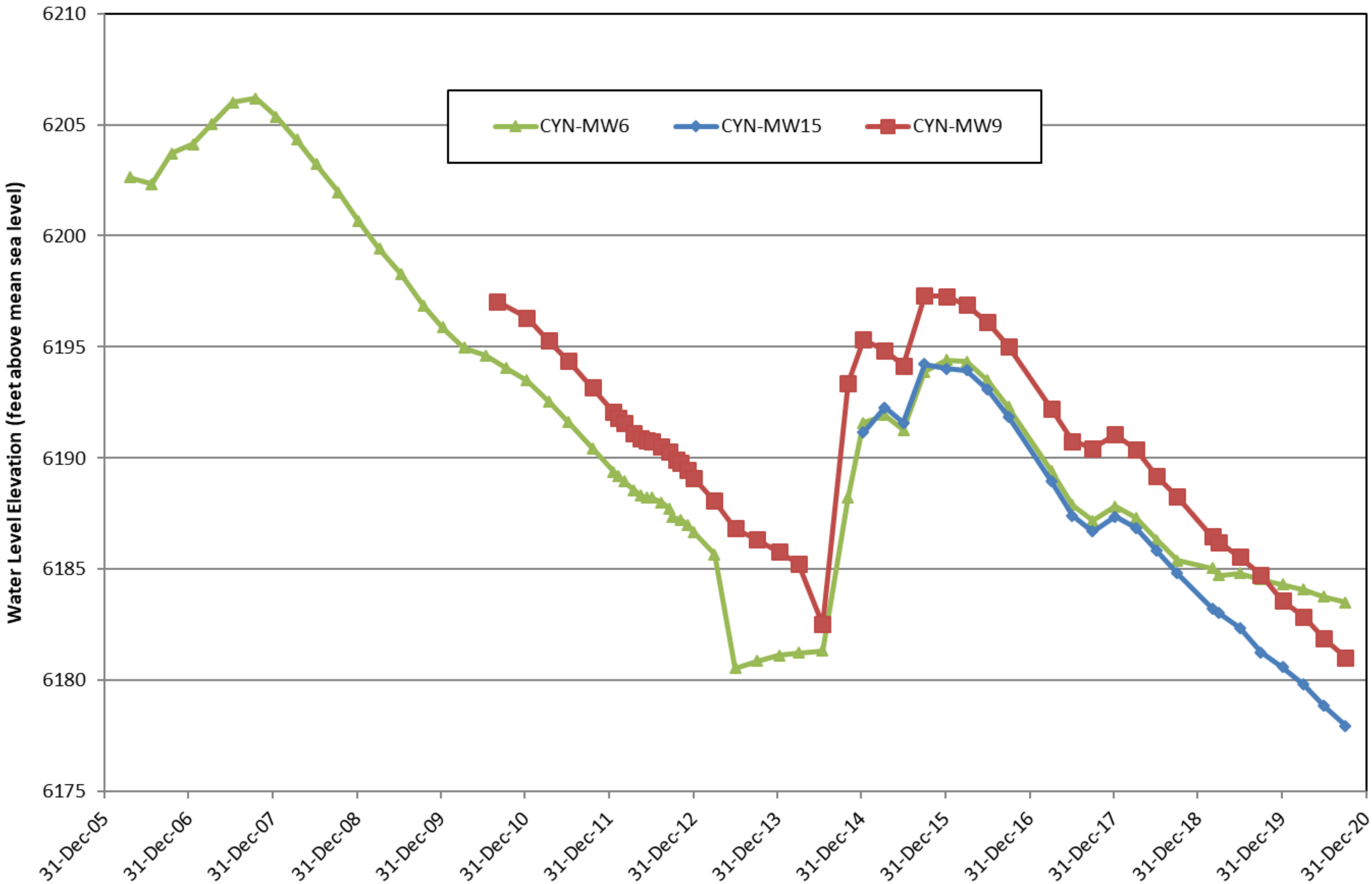

Figure 7D-3. Burn Site Groundwater Area of Concern Wells (3 of 9)

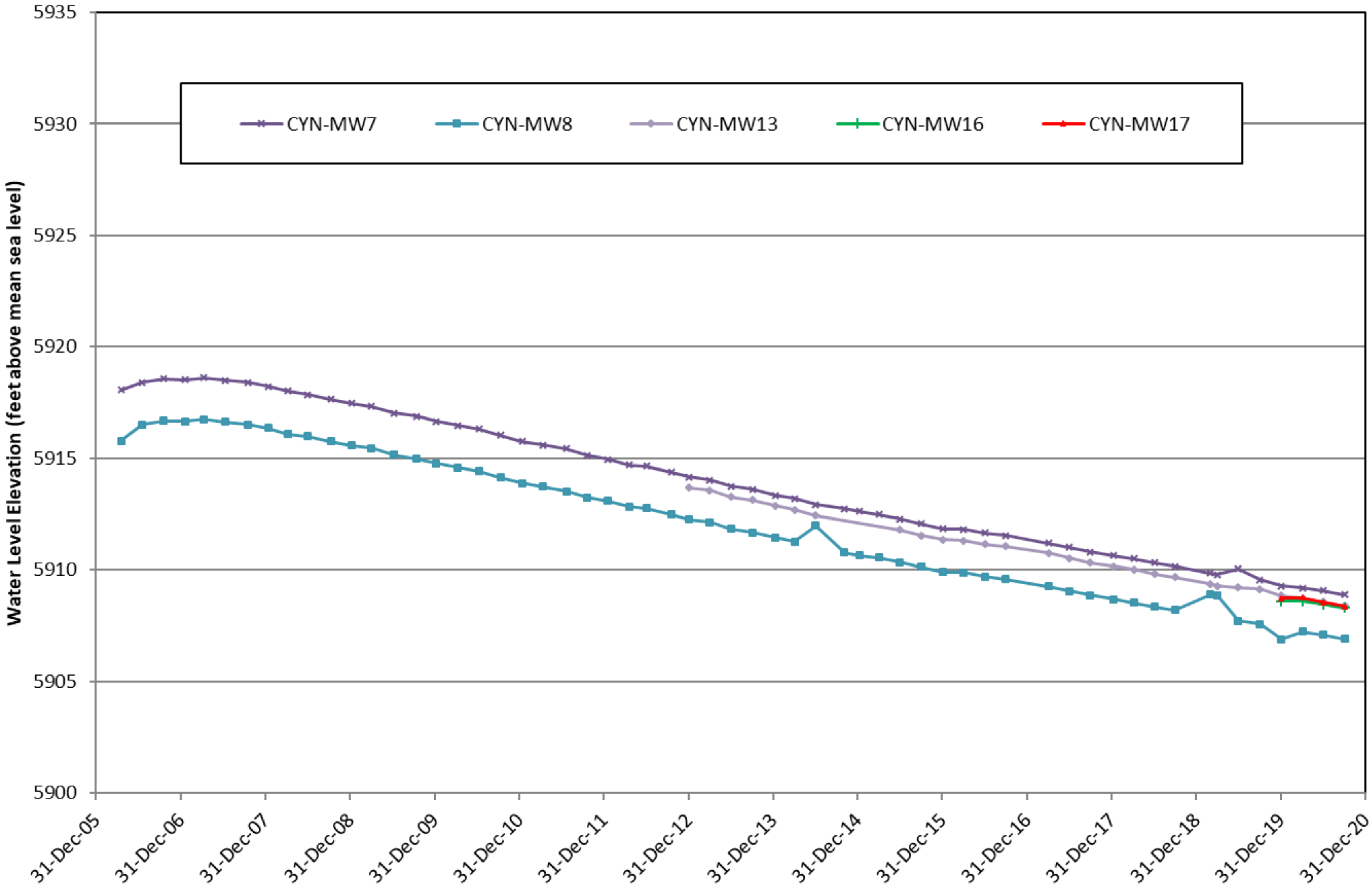

Figure 7D-4. Burn Site Groundwater Area of Concern Wells (4 of 9)

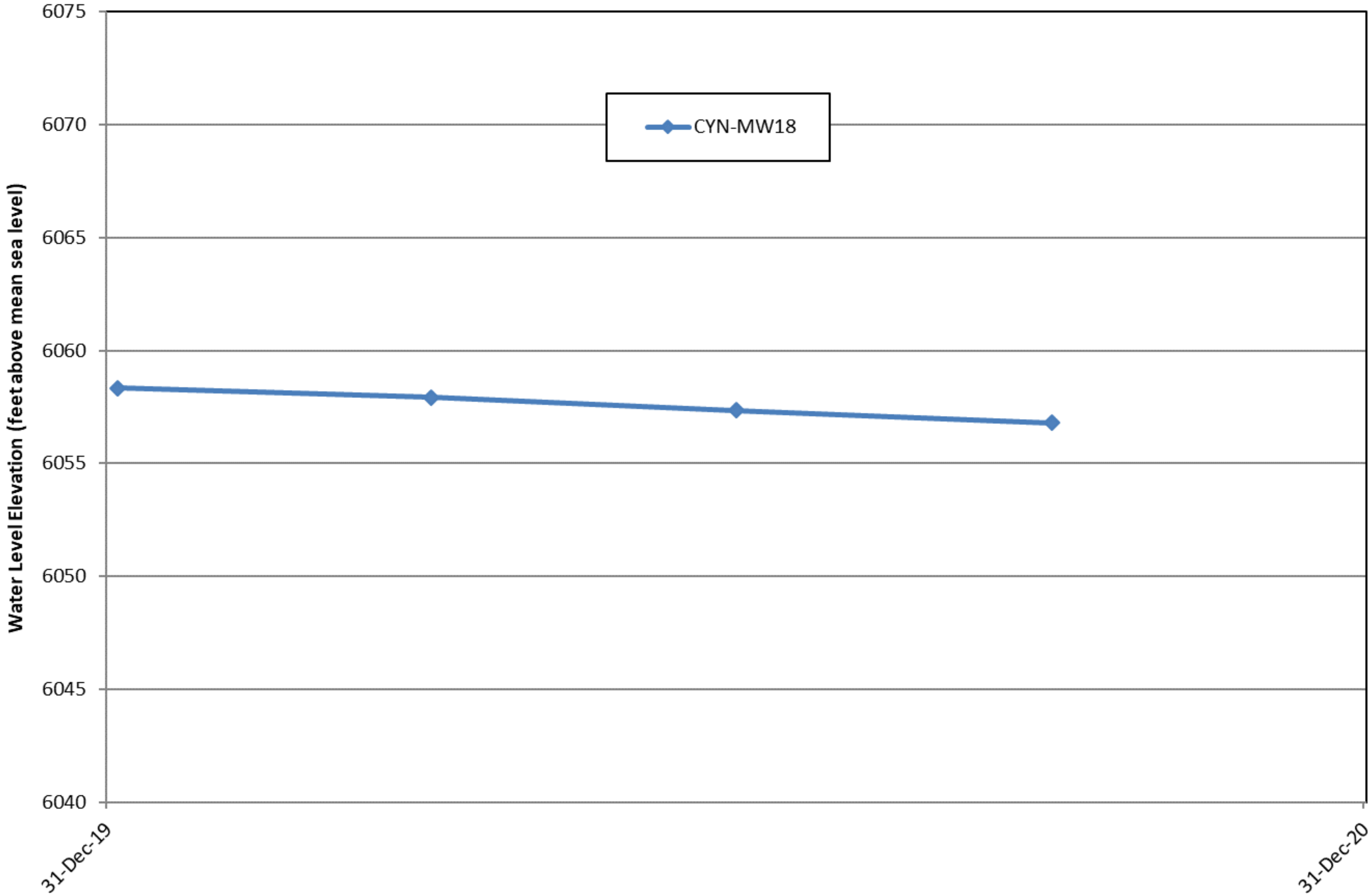

Figure 7D-5. Burn Site Groundwater Area of Concern Wells (5 of 9)

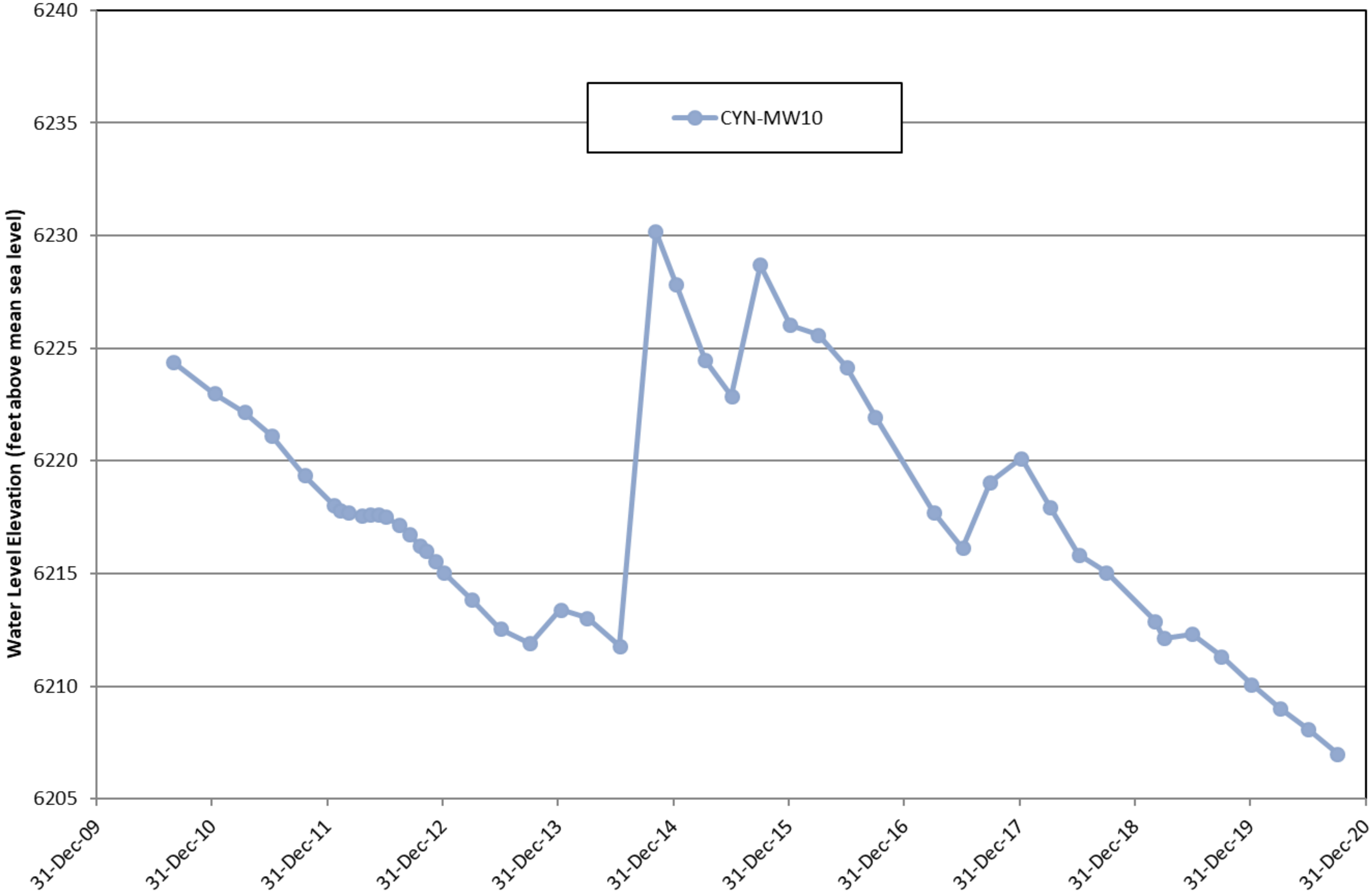

Figure 7D-6. Burn Site Groundwater Area of Concern Wells (6 of 9)

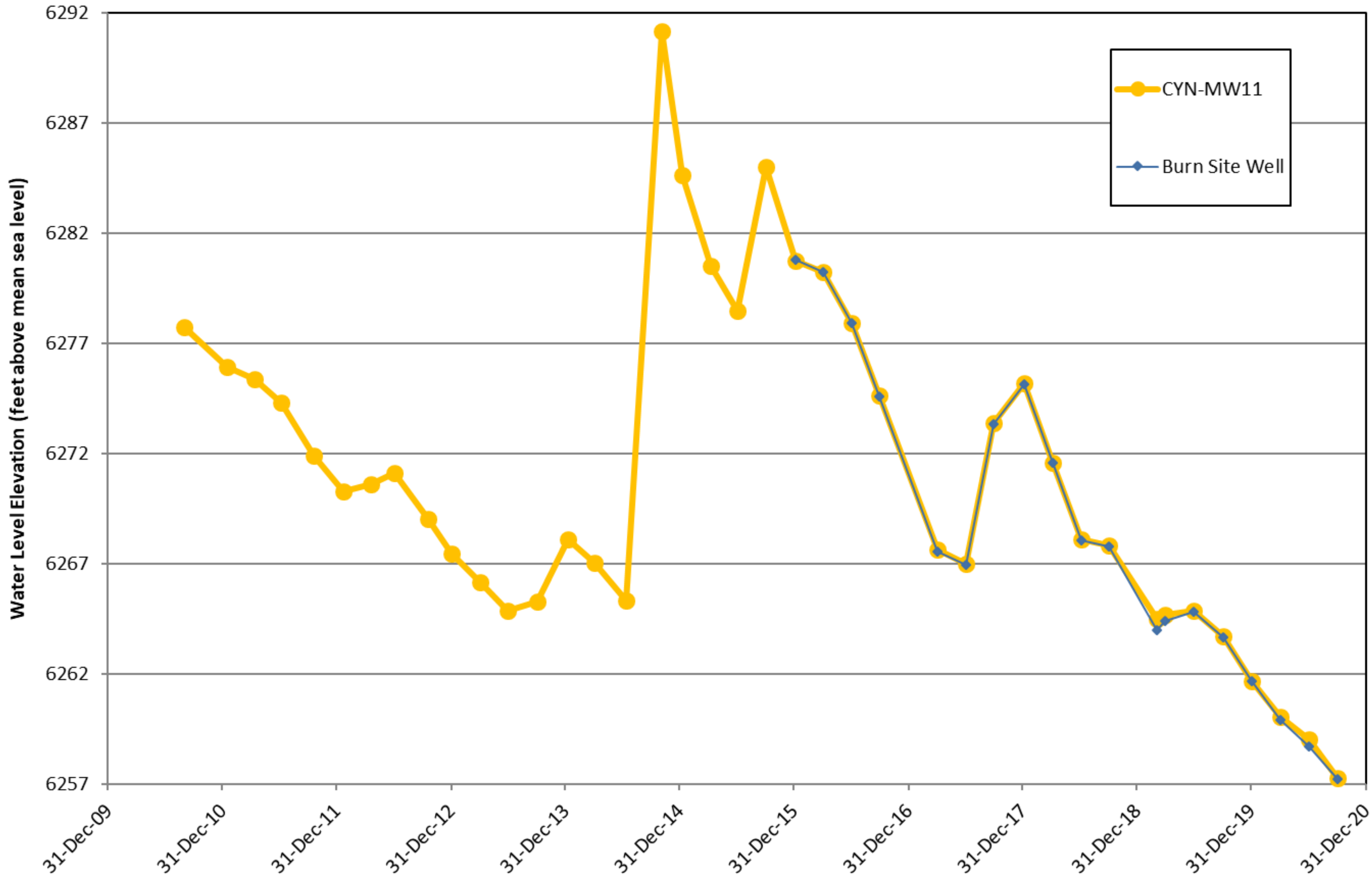

Figure 7D-7. Burn Site Groundwater Area of Concern Wells (7 of 9)

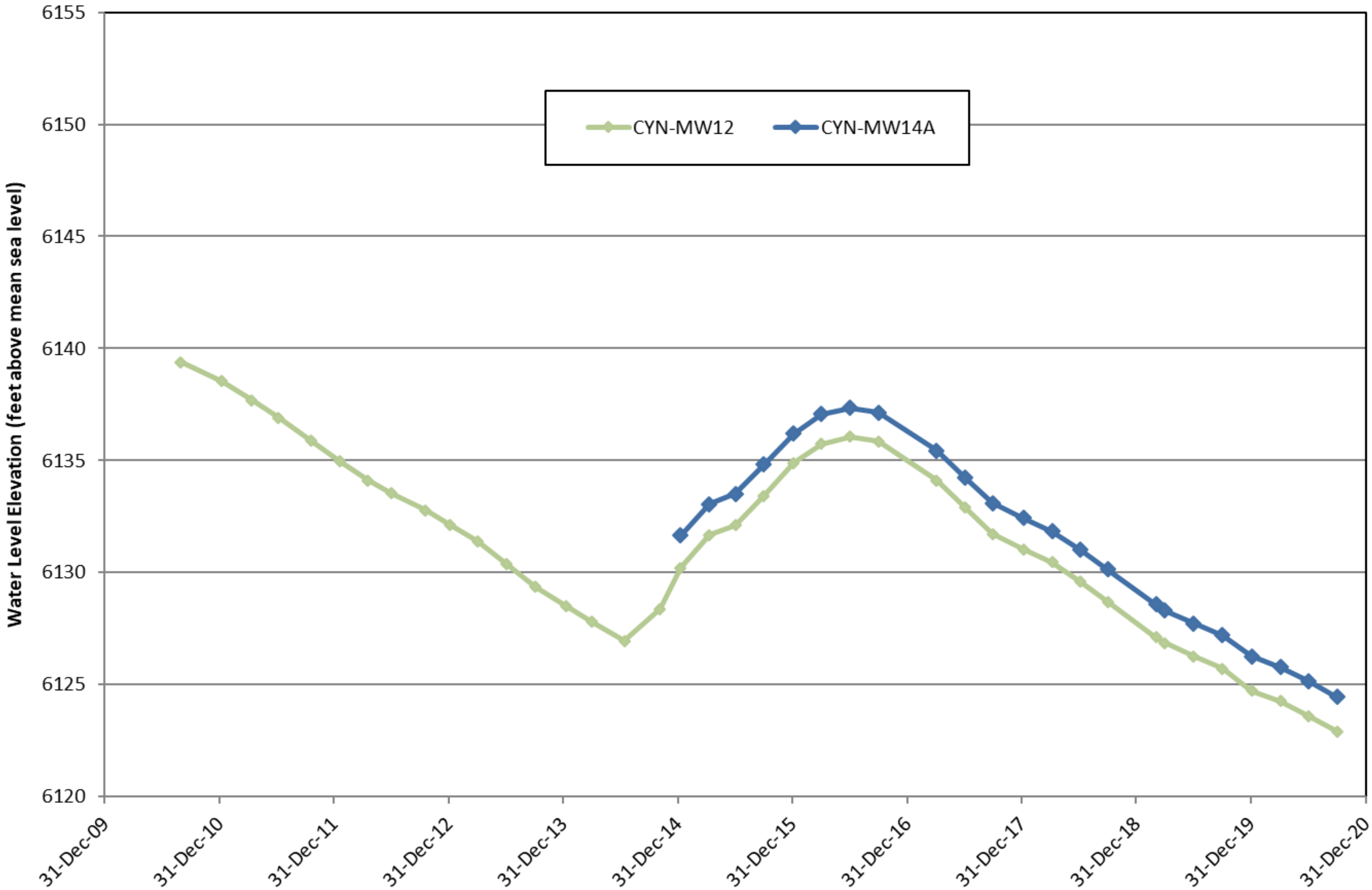

Figure 7D-8. Burn Site Groundwater Area of Concern Wells (8 of 9)

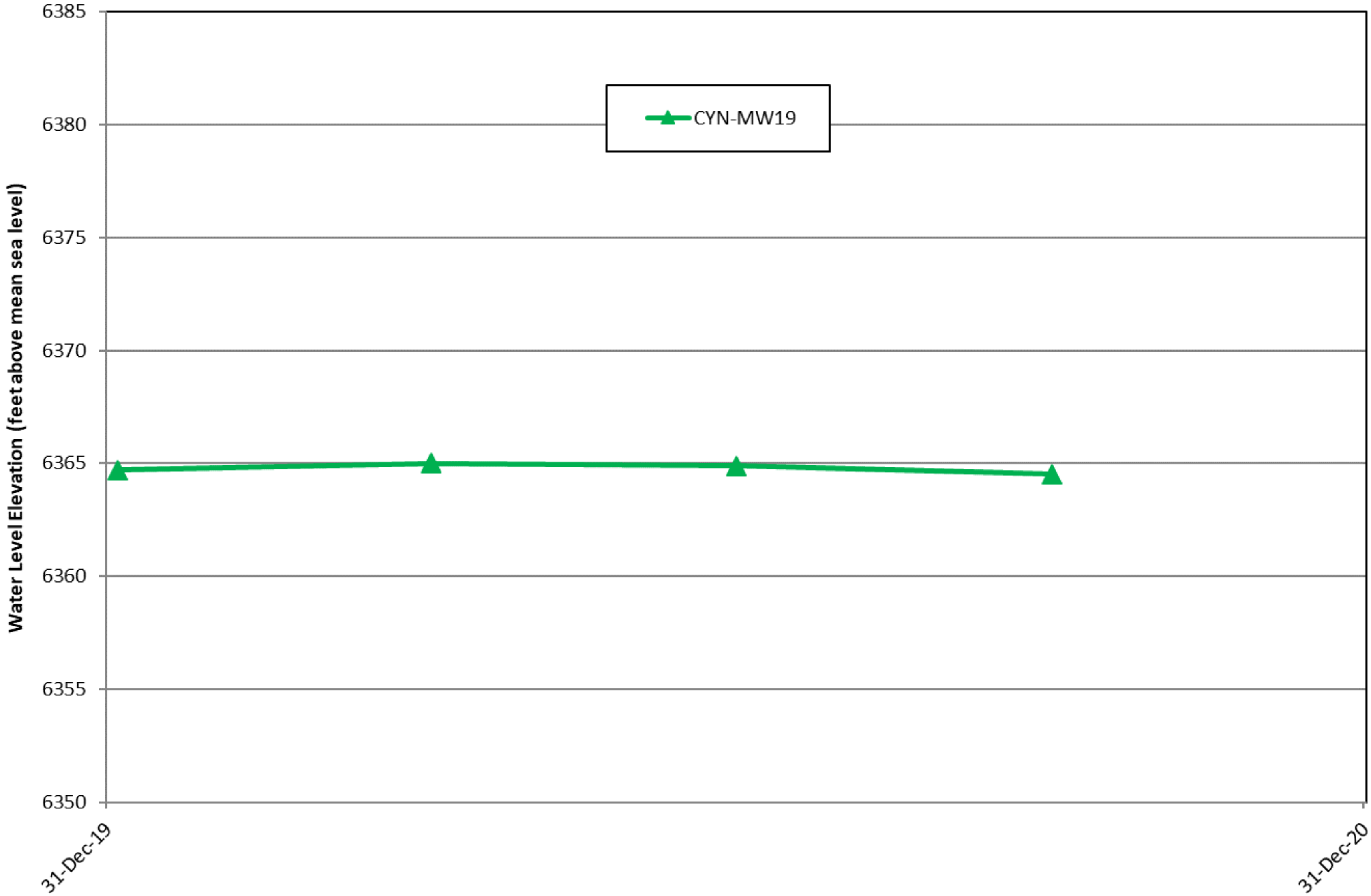

Figure 7D-9. Burn Site Groundwater Area of Concern Wells (9 of 9)

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Chapter 7
Burn Site Groundwater
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DOE January 2014 U.S. Department of Energy (DOE), January 2014. Letter to J.E. Kieling (New Mexico Environment Department), "Extension Request for the Burn Site Groundwater Corrective Measures Evaluation Report," U.S. Department of Energy, National Nuclear Security Administration, Sandia Site Office, Albuquerque, New Mexico, January 31, 2014.

DOE October 2013 U.S. Department of Energy (DOE), October 2013. *Internal Remedy Review of the Burn Site Groundwater Area of Concern, Sandia National Laboratories, Albuquerque, New Mexico*, memorandum from Steven Golian, Chair, Office of Environmental Compliance, to Geoffrey Beausoleil, Manager, U.S. Department of Energy, Energy, National Nuclear Security Administration, Sandia Site Office, Albuquerque, New Mexico, October 30, 2013.

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Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas

Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Chemical Waste Landfill and Vicinity													
CWL-BW1	MW	5437.95	5436.0	445.0	495.0	4991.0	4941.0	495.0	2.1	SS	Regional Aquifer – SFG sediments	08-Jul-1985	Aug-2003
CWL-BW2	MW	5436.21	5434.3	490.0	980.0	4944.3	4454.3	980.0	5.6	S/SS	Regional Aquifer – SFG sediments	17-Sep-1985	2003
CWL-BW3	MW	5432.76	5431.6	485.0	505.0	4946.6	4926.6	507.5	4.8	PVC	Regional Aquifer – SFG sediments	22-Sep-1988	12-Nov-2012
CWL-BW4	MW	5427.67	5431.7	485.0	505.0	4946.7	4926.7	510.0	4.8	PVC	Regional Aquifer – SFG sediments	06-May-1994	Jan-1997
CWL-BW4A	MW	5434.03	5431.8	485.0	505.0	4946.8	4926.8	510.0	4.8	PVC	Regional Aquifer – SFG sediments	16-May-1994	14-Apr-2010
CWL-BW5	MW	5434.79	5432.2	500.0	520.0	4932.2	4912.2	525.0	4.8	PVC	Regional Aquifer – SFG sediments	11-May-2010	
CWL-MW1	MW	5425.88	5423.7	535.0	575.0	4888.7	4848.7	610.0	2.1	SS	Regional Aquifer – SFG sediments	01-Sep-1985	Sep-1997
CWL-MW1A	MW	5424.16	5423.1	474.0	494.0	4949.1	4929.1	495.0	4.8	PVC	Regional Aquifer – SFG sediments	31-Jul-1988	11-Nov-2012
CWL-MW2	MW	5421.22	5419.1	520.0	650.0	4899.1	4769.1	650.0	2.1	SS	Regional Aquifer – SFG sediments	22-Sep-1985	Sep-1997
CWL-MW2A	MW	5421.25	5419.8	473.0	493.0	4946.8	4926.8	495.0	5.0	PVC	Regional Aquifer – SFG sediments	01-Aug-1988	Jun-2004
CWL-MW2BL	MW	5421.85	5420.1	532.5	552.5	4887.6	4867.6	557.5	4.8	PVC	Regional Aquifer – SFG sediments	05-Jun-1994	10-Nov-2012
CWL-MW2BU	MW	5421.88	5420.1	476.0	496.0	4944.1	4924.1	501.0	1.9	PVC	Regional Aquifer – SFG sediments	05-Jun-1994	10-Nov-2012
CWL-MW3	MW	5421.50	5419.5	525.0	565.0	4894.5	4854.5	615.0	2.1	SS	Regional Aquifer – SFG sediments	26-Sep-1985	Sep-1997
CWL-MW3A	MW	5420.45	5419.1	470.0	490.0	4949.1	4929.1	492.0	4.8	PVC/SS	Regional Aquifer – SFG sediments	11-Aug-1988	10-Nov-2012
CWL-MW4	MW	5423.00	5421.0	478.0	498.0	4943.0	4923.0	503.0	3.8	PVC/SS	Regional Aquifer – SFG sediments	04-May-1990	14-Apr-2010
CWL-MW5L	MW	5418.47	5416.7	533.0	553.0	4883.7	4863.7	558.0	1.9	PVC	Regional Aquifer – SFG sediments	19-Apr-1994	14-Apr-2010
CWL-MW5U	MW	5418.68	5416.7	477.0	497.0	4939.7	4919.7	502.0	4.8	PVC	Regional Aquifer – SFG sediments	19-Apr-1994	14-Apr-2010
CWL-MW6L	MW	5419.80	5417.3	539.0	559.0	4878.3	4858.3	564.0	1.9	PVC	Regional Aquifer – SFG sediments	04-May-1994	14-Apr-2010
CWL-MW6U	MW	5419.45	5417.3	477.0	497.0	4940.3	4920.3	502.0	4.8	PVC	Regional Aquifer – SFG sediments	04-May-1994	14-Apr-2010
CWL-MW7	MW	5421.98	5419.9	618.0	638.0	4801.9	4781.9	643.0	4.8	PVC	Regional Aquifer – SFG sediments	20-Mar-2003	12-Nov-2012
CWL-MW8	MW	5421.71	5419.8	612.0	632.0	4807.8	4787.8	637.0	4.8	PVC	Regional Aquifer – SFG sediments	02-Apr-2003	12-Nov-2012
CWL-MW9	MW	5426.12	5423.5	495.0	515.0	4928.5	4908.5	520.0	4.8	PVC	Regional Aquifer – SFG sediments	13-May-2010	
CWL-MW10	MW	5424.58	5422.2	493.0	513.0	4929.2	4909.2	518.0	4.8	PVC	Regional Aquifer – SFG sediments	27-May-2010	
CWL-MW11	MW	5423.24	5420.8	491.0	511.0	4929.8	4909.8	516.0	4.8	PVC	Regional Aquifer – SFG sediments	27-May-2010	
MRN-1	MW	5308.54	5306.4	546.7	586.7	4759.7	4719.7	606.7	4.8	SS	Regional Aquifer – SFG sediments	22-Jan-1995	Aug-2001
MRN-2	MW	5308.18	5306.2	410.0	440.0	4896.2	4866.2	450.0	3.7	PVC	Regional Aquifer – SFG sediments	28-Jan-1995	
MRN-3D	MW	5309.34	5306.8	660.3	680.3	4646.5	4626.5	685.3	4.8	PVC	Regional Aquifer – SFG sediments	20-Jul-2003	
SWTA-3	MW	5323.24	5321.6	407.2	427.2	4914.4	4894.4	432.2	4.8	PVC/SS	Regional Aquifer – SFG sediments	06-Sep-1989	Apr-1998
SWTA3-MW2	MW	5325.60	5323.2	455.0	475.0	4868.2	4848.2	480.0	4.8	PVC	Regional Aquifer – SFG sediments	07-May-2002	
SWTA3-MW3	MW	5323.94	5321.4	619.0	639.0	4702.4	4682.4	659.4	4.8	PVC	Regional Aquifer – SFG sediments	20-Feb-2004	
SWTA3-MW4	MW	5324.81	5322.3	430.0	450.0	4892.3	4872.3	460.0	4.7	PVC	Regional Aquifer – SFG sediments	26-Aug-2005	
Lurance Canyon and Burn Site Vicinity													
12AUP01	MW	6357.00	6355.0	52.5	57.5	6302.5	6297.5	58.1	2.0	PVC	Alluvium and bedrock (granitic gneiss)	19-Nov-1996	14-Nov-2012
CCBA-MW1	MW	5902.34	5899.9	60.0	80.0	5839.9	5819.9	85.0	4.7	PVC	Alluvium and bedrock (granite)	01-Sep-2011	
CCBA-MW2	MW	5939.28	5937.0	98.0	118.0	5839.0	5819.0	123.0	4.7	PVC	Bedrock (granite)	31-Aug-2011	

Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Lurance Canyon and Burn Site Vicinity (Continued)													
CYN-MW1D	MW	6239.59	6236.7	372.0	382.0	5864.7	5854.7	392.0	5.1	S	Bedrock (granitic gneiss)	22-Dec-1997	15-Nov-2012
CYN-MW2S	MW	6239.41	6236.7	23.6	28.6	6213.1	6208.1	34.2	4.0	PVC	Alluvium and bedrock (granitic gneiss)	22-Dec-1997	15-Nov-2012
CYN-MW3	MW	6313.26	6311.9	120.0	130.0	6191.9	6181.9	135.0	5.0	PVC	Bedrock (metamorphics)	18-Jun-1999	
CYN-MW4	MW	6455.48	6454.7	260.0	280.0	6194.7	6174.7	290.0	5.0	PVC	Bedrock (quartzite)	18-Jun-1999	
CYN-MW5	MW	5984.23	5981.3	135.0	155.0	5846.3	5826.3	160.0	5.0	PVC	Bedrock (quartzite)	15-Aug-2001	
CYN-MW6	MW	6343.37	6340.5	141.5	161.3	6199.0	6179.2	161.7	5.0	PVC	Bedrock (metamorphics)	09-Dec-2005	
CYN-MW7	MW	6216.35	6213.7	315.0	334.2	5898.7	5879.5	339.9	5.0	PVC	Bedrock (granitic gneiss)	06-Dec-2005	
CYN-MW8	MW	6230.11	6227.8	338.5	358.3	5889.3	5869.5	363.4	5.0	PVC	Bedrock (granitic gneiss)	12-Jan-2006	
CYN-MW9	MW	6360.67	6358.5	175.8	195.8	6182.7	6162.7	200.8	4.8	PVC	Bedrock (metamorphics)	27-Jul-2010	
CYN-MW10	MW	6345.45	6342.8	150.4	170.4	6192.4	6172.4	175.4	4.8	PVC	Bedrock (metamorphics)	28-Jul-2010	
CYN-MW11	MW	6374.41	6371.9	229.8	249.8	6142.1	6122.1	254.8	4.8	PVC	Bedrock (metamorphics)	29-Jul-2010	
CYN-MW12	MW	6345.16	6342.9	252.5	272.5	6090.4	6070.4	277.5	4.8	PVC	Bedrock (metamorphics)	29-Jul-2010	
CYN-MW13	MW	6237.79	6236.0	376.8	396.8	5859.2	5839.2	402.2	4.8	PVC	Bedrock (granitic gneiss)	05-Dec-2012	
CYN-MW14A	MW	6315.85	6313.5	263.6	293.6	6049.9	6019.9	298.6	4.8	PVC	Bedrock (metamorphics)	09-Dec-2014	
CYN-MW15	MW	6344.44	6342.3	162.2	192.2	6180.1	6150.1	195.0	4.8	PVC	Bedrock (metamorphics)	08-Dec-2014	
CYN-MW16	MW	6249.60	6247.4	375.6	405.6	5871.8	5841.8	410.6	4.75	PVC	Bedrock (granitic gneiss)	5-Nov-2019	
CYN-MW17	MW	6268.95	6266.6	370.3	400.3	5896.3	5866.3	405.3	4.75	PVC	Bedrock (granitic gneiss)	6-Nov-2019	
CYN-MW18	MW	6304.02	6301.5	270.4	300.4	6031.1	6001.1	305.4	4.75	PVC	Bedrock (metamorphics)	7-Nov-2019	
CYN-MW19	MW	6410.43	6408.1	59.3	89.3	6348.8	6318.8	94.3	4.75	PVC	Bedrock (metamorphics)	8-Nov-2019	
Greystone-MW2	MW	5814.20	5811.4	60.0	80.0	5751.4	5731.4	85.0	4.8	PVC	Alluvium, shallow	25-Apr-2002	
Mixed Waste Landfill and Vicinity													
MWL-BW1	MW	5387.18	5385.4	452.2	472.2	4933.2	4913.2	477.2	5.0	PVC	Regional Aquifer – SFG sediments	01-Jul-1989	24-Jan-2008
MWL-BW2	MW	5391.02	5388.7	467.0	497.0	4921.7	4891.7	502.0	4.8	PVC	Regional Aquifer – SFG sediments	22-Jan-2008	
MWL-MW1	MW	5384.21	5381.8	456.0	476.0	4925.8	4905.8	478.0	5.0	PVC/S	Regional Aquifer – SFG sediments	01-Oct-1988	Jul-2008
MWL-MW2	MW	5379.93	5378.4	452.0	472.0	4926.4	4906.4	477.0	5.0	PVC/SS	Regional Aquifer – SFG sediments	01-Aug-1989	Jul-2008
MWL-MW3	MW	5383.99	5381.7	451.3	471.3	4930.4	4910.4	476.3	4.8	PVC/SS	Regional Aquifer – SFG sediments	22-Aug-1989	Jul-2008
MWL-MW4 [d]	MW	5391.70	5390.2	488.4[d]	508.4[d]	4901.8[d]	4881.8[d]	553.9[d]	4.8	PVC	Regional Aquifer – SFG sediments	10-Feb-1993	
MWL-MW5	MW	5382.56	5380.4	496.5	516.5	4883.9	4863.9	521.5	4.8	PVC	Regional Aquifer – SFG sediments	19-Nov-2000	
MWL-MW6	MW	5375.31	5372.7	505.5	525.5	4867.2	4847.2	530.5	4.8	PVC	Regional Aquifer – SFG sediments	19-Oct-2000	
MWL-MW7	MW	5383.30	5380.9	464.7	494.0	4916.2	4886.9	498.8	4.8	PVC	Regional Aquifer – SFG sediments	24-Jun-2008	
MWL-MW8	MW	5384.67	5382.4	465.0	495.0	4917.4	4887.4	500.0	4.8	PVC	Regional Aquifer – SFG sediments	26-Jun-2008	
MWL-MW9	MW	5381.91	5379.3	465.0	495.0	4914.3	4884.3	500.0	4.8	PVC	Regional Aquifer – SFG sediments	30-Jun-2008	
NWTA3-MW1	MW	5336.48	5332.9	434.9	454.9	4898.0	4878.0	460.4	4.8	PVC	Regional Aquifer – SFG sediments	20-Sep-1989	12-Sep-2002
NWTA3-MW2	MW	5337.49	5335.5	455.0	475.0	4880.5	4860.5	505.0	4.8	PVC	Regional Aquifer – SFG sediments	25-Aug-2000	
NWTA3-MW3D	MW	5340.80	5335.7	654.4	674.4	4681.3	4661.3	679.4	4.8	PVC	Regional Aquifer – SFG sediments	09-Jul-2003	
PL-1	MW	5334.99	5333.4	440.0	470.0	4893.4	4863.4	480.0	2.0	PVC	Regional Aquifer – SFG sediments	28-Oct-1994	12-Sep-2009
PL-2	MW	5336.01	5333.0	577.0	597.0	4756.0	4736.0	617.0	4.8	SS	Regional Aquifer – SFG sediments	18-Nov-1994	

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PL-3	MW	5334.64	5332.8	445.0	465.0	4887.8	4867.8	475.0	3.8	PVC	Regional Aquifer – SFG sediments	04-Dec-1994	12-Sep-2009
PL-4	MW	5334.98	5332.7	464.0	494.0	4868.7	4838.7	499.0	4.8	PVC	Regional Aquifer – SFG sediments	28-Sep-2009	
Coyote Test Field and Vicinity													
CTF-MW1	MW	6082.63	6079.7	240.0	260.0	5839.7	5819.7	265.0	5.0	PVC	Bedrock (granite)	16-Aug-2001	
CTF-MW2	MW	5578.60	5575.6	110.0	130.0	5465.6	5445.6	135.0	5.0	PVC	Bedrock (granite)	18-Aug-2001	
CTF-MW3	MW	5522.82	5519.8	340.0	360.0	5179.8	5159.8	365.0	5.0	PVC	Bedrock (granite)	21-Aug-2001	
LMF-1	MW	5628.60	5626.5	310.0	350.0	5316.5	5276.5	360.0	4.1	PVC	Bedrock (limestone)	11-Aug-1995	15-Jan-1998
OBS-MW1	MW	5871.42	5869.1	135.0	155.0	5734.1	5714.1	160.0	4.7	PVC	Bedrock (granite)	31-Aug-2011	
OBS-MW2	MW	5863.16	5860.8	234.0	254.0	5626.8	5606.8	259.0	4.7	PVC	Bedrock (granite)	30-Aug-2011	
OBS-MW3	MW	5865.50	5863.3	190.0	210.0	5673.3	5653.3	215.0	4.7	PVC	Bedrock (granite)	30-Aug-2011	
SFR-1D [e]	MW	5399.13	5396.9	348.0	368.0	5048.9	5028.9	378.0	3.8	PVC	Regional Aquifer – SFG sediments	06-Aug-1992	
SFR-1S [e]	MW	5399.16	5396.9	152.0	172.0	5244.9	5224.9	182.0	1.9	PVC	Regional Aquifer – SFG sediments	08-Aug-1992	
SFR-2S	MW	5432.77	5430.3	97.0	117.0	5333.3	5313.3	122.0	3.8	PVC	Regional Aquifer – SFG sediments	20-Aug-1992	
SFR-3D	MW	5497.94	5496.1	311.5	351.5	5184.6	5144.6	361.5	1.9	PVC	Regional Aquifer – SFG sediments	05-Nov-1992	
SFR-3P	MW	5499.63	5497.2	175.0	195.0	5322.2	5302.2	205.0	3.8	PVC	Regional Aquifer – SFG sediments	12-Jul-1993	
SFR-3S	MW	5498.24	5496.1	182.0	212.0	5314.1	5284.1	222.0	1.9	PVC	Regional Aquifer – SFG sediments	10-Nov-1992	
SFR-3T	MW	5498.66	5496.9	713.0	733.0	4783.9	4763.9	753.0	5.4	SS	Bedrock (sandstone)	23-Sep-1993	
SFR-4P	MW	5573.33	5571.3	344.0	354.0	5227.3	5217.3	364.0	1.9	PVC	Bedrock (sandstone)	29-Jul-1993	
SFR-4T	MW	5573.95	5572.4	340.0	360.0	5232.4	5212.4	380.0	4.8	PVC/SS	Bedrock (sandstone)	30-Sep-1993	
STW-1	MW	5535.53	5533.3	149.8	169.8	5383.5	5363.5	179.8	4.3	PVC	Regional Aquifer – SFG sediments	18-Jun-1995	23-Sep-1997
TRE-1	MW	5497.25	5495.2	255.0	295.0	5240.2	5200.2	305.0	4.3	PVC	Regional Aquifer – SFG sediments	31-Jul-1995	
TRE-2	MW	5497.20	5495.2	150.0	170.0	5345.2	5325.2	190.0	2.0	PVC	Regional Aquifer – SFG sediments	31-Jul-1995	
TRN-1	MW	5735.62	5733.6	320.0	340.0	5413.6	5393.6	350.0	3.8	PVC	Bedrock (sandstone)	12-Oct-1994	
TRS-1D	MW	5779.80	5777.5	266.4	306.4	5511.1	5471.1	316.4	1.9	PVC	Bedrock (limestone)	06-Sep-1995	
TRS-1S	MW	5780.07	5777.5	164.0	204.0	5613.5	5573.5	214.8	1.9	PVC	Bedrock (limestone)	06-Sep-1995	
TRS-2	MW	5780.76	5778.3	165.0	205.0	5613.3	5573.3	210.0	4.5	S	Bedrock (limestone)	09-Sep-1995	
Tijeras Arroyo Groundwater													
PGS-1	MW	5407.41	5407.9	503.0	513.0	4904.9	4894.9	538.0	5.0	SS	Regional Aquifer – SFG sediments	12-Oct-1994	Apr-1998
PGS-2 [f]	MW	5408.29	5407.9	535.0[g]	565.0[g]	4872.9	4842.9	655.0	5.0	SS	Regional Aquifer – SFG sediments	22-Sep-1995	
TA1-W-01	MW	5403.82	5401.8	575.0	595.0	4826.8	4806.8	600.0	4.8	PVC	Regional Aquifer – SFG sediments	22-Mar-1997	
TA1-W-02	MW	5416.62	5416.9	540.0	560.0	4876.9	4856.9	565.6	5.0	PVC	Regional Aquifer – SFG sediments	27-Feb-1998	
TA1-W-03	MW	5457.03	5454.9	337.0	357.0	5117.9	5097.9	362.6	5.0	PVC	PGWS – SFG sediments	27-Jan-1998	
TA1-W-04	MW	5460.98	5458.3	576.0	596.0	4882.3	4862.3	601.7	5.0	PVC	Regional Aquifer – SFG sediments	06-Oct-1998	
TA1-W-05	MW	5433.84	5434.2	597.5	617.5	4836.7	4816.7	623.2	5.0	PVC	Regional Aquifer – SFG sediments	16-Nov-1998	
TA1-W-06	MW	5417.10	5417.4	300.0	320.0	5117.4	5097.4	325.6	5.0	PVC	PGWS – SFG sediments	27-Feb-1998	
TA1-W-07	MW	5404.92	5402.8	268.6	288.6	5134.2	5114.2	289.1	5.0	PVC	PGWS – SFG sediments	03-Dec1998	
TA1-W-08	MW	5434.19	5434.7	302.0	322.0	5132.7	5112.7	327.0	4.5	PVC	PGWS – SFG sediments	10-Oct2001	
TA2-NW1-325	MW	5421.94	5420.0	295.0	325.0	5125.0	5095.0	330.3	4.8	PVC	PGWS – SFG sediments	01-Apr-1993	

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Tijeras Arroyo Groundwater (Continued)													
TA2-NW1-595 [g]	MW	5421.26	5420.0	535.0[f]	555.0[f]	4885.0	4865.0	598.0	4.8	PVC	Regional Aquifer – SFG sediments	27-Jul-1993	
TA2-SW1-320	MW	5411.85	5410.1	299.6	319.6	5110.5	5090.5	324.6	3.8	PVC	PGWS – SFG sediments	30-Nov-1992	12-Dec-2014
TA2-W-01	MW	5419.99	5417.4	312.0	332.0	5105.4	5085.4	332.0	4.8	PVC	PGWS – SFG sediments	27-Jun-1994	
TA2-W-19	MW	5351.21	5349.0	265.9	285.9	5083.1	5063.1	285.9	4.8	PVC	PGWS – SFG sediments	29-Nov-1995	
TA2-W-24	MW	5363.66	5361.8	465.0	485.0	4896.8	4876.8	490.6	5.0	PVC	Regional Aquifer – SFG sediments	09-Feb-1998	
TA2-W-25	MW	5374.86	5372.5	492.0	512.0	4880.5	4860.5	517.8	4.8	PVC	Regional Aquifer – SFG sediments	28-Apr-1997	
TA2-W-26	MW	5375.77	5373.8	276.0	296.0	5097.8	5077.8	301.6	5.0	PVC	PGWS – SFG sediments	19-Jan-1998	
TA2-W-27	MW	5362.85	5360.8	275.0	295.0	5085.8	5065.8	300.6	5.0	PVC	PGWS – SFG sediments	09-Feb-1998	
TA2-W-28	MW	5412.41	5410.0	310.5	330.5	5099.5	5079.5	335.45	4.8	PVC	PGWS – SFG sediments	10-Dec-2014	
TJA-1	MW	unk	5351.3	275.0	295.0	5076.3	5056.3	305.0	3.8	PVC	PGWS – SFG sediments	25-Jun-1994	9-Jul-1994
TJA-2	MW	5353.20	5351.3	275.0	295.0	5076.3	5056.3	305.0	3.8	PVC	PGWS – SFG sediments	12-Jul-1994	
TJA-3	MW	5390.56	5387.8	496.0	516.0	4891.8	4871.8	521.7	5.0	PVC	Regional Aquifer – SFG sediments	04-Dec-1998	
TJA-4 [h]	MW	5341.16	5338.5	360.0	380.0	4978.5	4958.5	385.7	5.0	PVC	Merging Zone – SFG sediments	01-Dec-1998	
TJA-5	MW	5341.33	5338.5	267.0	287.0	5071.5	5051.5	292.7	5.0	PVC	PGWS – SFG sediments	02-Dec1998	
TJA-6	MW	5343.16	5340.6	454.9	474.9	4885.7	4865.7	480.7	5.0	PVC	Regional Aquifer – SFG sediments	04-Feb-2001	
TJA-7	MW	5391.27	5388.4	290.5	310.5	5097.9	5077.9	316.3	5.0	PVC	PGWS – SFG sediments	12-Mar-2001	
WYO-1	MW	5392.50	5390.4	510.0	560.0	4880.4	4830.4	570.0	4.3	PVC	Regional Aquifer – SFG sediments	28-Aug-1995	Jul-2001
WYO-2	MW	5392.50	5390.4	265.0	285.0	5125.4	5105.4	295.0	2.0	PVC	PGWS – SFG sediments	26-Sep-1995	Jul-2001
WYO-3	MW	5392.09	5390.0	520.0	540.0	4870.0	4850.0	545.0	4.5	PVC	Regional Aquifer – SFG sediments	10-Oct-2001	
WYO-4	MW	5392.57	5390.2	275.0	295.0	5115.2	5095.2	300.0	4.5	PVC	PGWS – SFG sediments	16-Oct-2001	
Technical Area V													
AVN-1	MW	5443.00	5440.2	570.0	590.0	4870.2	4850.2	600.0	5.0	SS	Regional Aquifer – SFG sediments	23-May-1995	
AVN-2	MW	5442.39	5440.6	495.0	515.0	4945.6	4925.6	520.0	3.8	PVC	Regional Aquifer – SFG sediments	5-Jun-1995	
LWDS-MW1	MW	5423.83	5424.5	495.0	515.0	4929.5	4909.5	520.3	3.9	PVC	Regional Aquifer – SFG sediments	03-May-1993	
LWDS-MW2	MW	5412.41	5411.5	506.0	526.0	4905.5	4885.5	531.0	3.9	PVC	Regional Aquifer – SFG sediments	30-Oct-1992	
TAV-INJ1[i]	INJ	5429.70	5430.1	509.0	539.0	4921.1	4891.1	544.0	5.0	Dual PVC	Regional Aquifer – SFG sediments	11-Oct-2017	
TAV-MW1	MW	5437.81	5435.2	489.5	509.5	4945.7	4925.7	509.5	5.0	PVC	Regional Aquifer – SFG sediments	28-Feb-1995	05-Feb-2008
TAV-MW2	MW	5427.33	5424.3	497.0	513.5	4927.3	4910.8	513.5	4.8	PVC	Regional Aquifer – SFG sediments	30-Mar-1995	
TAV-MW3	MW	5464.30	5461.6	532.0	552.0	4929.6	4909.6	557.7	4.8	PVC	Regional Aquifer – SFG sediments	11-Apr-1997	
TAV-MW4	MW	5427.89	5425.4	495.0	515.0	4930.4	4910.4	520.7	4.8	PVC	Regional Aquifer – SFG sediments	18-Apr-1997	
TAV-MW5	MW	5408.71	5406.6	487.0	507.0	4919.6	4899.6	512.7	4.8	PVC	Regional Aquifer – SFG sediments	26-Apr-1997	
TAV-MW6	MW	5431.17	5431.5	507.0	527.0	4924.5	4904.5	532.0	4.8	PVC	Regional Aquifer – SFG sediments	24-Apr-2001	
TAV-MW7	MW	5430.40	5430.9	597.0	617.0	4833.9	4813.9	622.0	4.8	PVC	Regional Aquifer – SFG sediments	06-Apr-2001	
TAV-MW8	MW	5417.00	5417.4	491.0	511.0	4926.4	4906.4	516.0	4.8	PVC	Regional Aquifer – SFG sediments	11-Apr-2001	
TAV-MW9	MW	5416.27	5416.9	582.0	602.0	4834.9	4814.9	607.0	4.8	PVC	Regional Aquifer – SFG sediments	17-Mar-2001	
TAV-MW10	MW	5437.03	5434.7	508.0	528.0	4926.7	4906.7	533.0	4.8	PVC	Regional Aquifer – SFG sediments	06-Feb-2008	

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Technical Area V (Continued)													
TAV-MW11	MW	5440.12	5440.4	512.0	532.0	4928.4	4908.4	537.0	4.8	PVC	Regional Aquifer – SFG sediments	19-Nov-2010	
TAV-MW12	MW	5435.72	5432.9	507.0	527.0	4925.9	4905.9	532.0	4.8	PVC	Regional Aquifer – SFG sediments	16-Nov-2010	
TAV-MW13	MW	5409.02	5406.0	525.0	545.0	4881.0	4861.0	550.0	4.8	PVC	Regional Aquifer – SFG sediments	12-Nov-2010	
TAV-MW14	MW	5441.52	5438.6	512.0	532.0	4926.6	4906.6	538.0	4.8	PVC	Regional Aquifer – SFG sediments	09-Nov-2010	
TAV-MW15	MW	5437.32	5435.1	516.0	541.0	4919.1	4894.1	546.0	4.8	PVC	Regional Aquifer – SFG sediments	18-Jan-2017	
TAV-MW16	MW	5448.34	5446.1	527.0	552.0	4919.1	4894.1	557.0	4.8	PVC	Regional Aquifer – SFG sediments	12-Jan-2017	
Albuquerque Bernalillo County Water Utility Authority, Lovelace Respiratory Research Institute, New Mexico Environment Department, Isleta Pueblo, and Unites States Geological Survey													
4HILLS-1	MW	5554.17	5552.7	24.0	64.0	5528.7	5488.7	69.0	4.0	PVC	Alluvial sands and gravels	1-Dec-1989	
Eubank-1	MW	5460.02	5458.1	550.0	610.0	4908.1	4848.1	615.0	4.0	SS	Regional Aquifer – SFG sediments	16-Jul-1998	
Eubank-2	MW	5474.39	5472.4	552.0	592.0	4920.4	4880.4	597.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Nov-1996	
Eubank-3	MW	5498.73	5496.7	590.0	650.0	4906.7	4846.7	655.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Nov-1996	
Eubank-5	MW	5507.40	5505.4	605.0	665.0	4900.4	4840.4	670.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Nov-1996	
ITRI-MW-16	MW	5644.91	5643.7	100.0	120.0	5543.7	5523.7	120.0	4.0	PVC	Regional Aquifer – SFG sediments	13-Jan-1993	2017
Mesa del Sol-S	MW	5302.67	5302.7	420.0	520.0	4882.7	4782.7	525.0	2.2	PVC	Regional Aquifer – SFG sediments	14-May-1997	
Montessa Park-S	MW	5102.67	5102.7	260.0	320.0	4842.7	4782.7	330.0	2.2	PVC	Regional Aquifer – SFG sediments	10-Sep-1997	
NMED-1	MW	5623.44	5620.7	90.0	110.0	5530.7	5510.7	115.0	4.0	PVC	Regional Aquifer – SFG sediments	12-Jun-1995	2016
YALE-MW1	MW	5308.45	5309.0?	400.0	464.0	4909.0	4845.0	464.0	4.0	PVC	Regional Aquifer – SFG sediments	1997?	
YALE-MW9	MW	5271.06	5272.0?	382.0	422.0	4890.0	4850.0	427.0	4.0	PVC	Regional Aquifer – SFG sediments	19-May-1997	
Kirtland Air Force Base/U.S. Air Force [j]													
EOD Well	MW	5829.70	5828.7	206.0	247.0	5622.7	5581.7	206.0	6.0	S/OH	Bedrock (granite)	1970?	Apr? 2019
KAFB-0118	MW	5320.75	5321.2	458.0	488.0	4863.2	4833.2	499.6	5.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-0119	MW	5315.82	5315.6	452.3	482.3	4863.3	4833.3	482.0	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-0120	MW	5292.29	5288.7	429.0	459.0	4859.7	4829.7	461.5	4.0	PVC	Regional Aquifer – SFG sediments	12-Jun-2006	
KAFB-0121	MW	5307.60	5305.0	445.8	475.8	4859.2	4829.2	480.8	4.0	PVC	Regional Aquifer – SFG sediments	24-Nov-2006	
KAFB-0213	MW	5283.29	5280.3	378.0	428.0	4919.3	4869.3	438.0	5.0	PVC	Regional Aquifer – SFG sediments	10-Jan-1984	
KAFB-0219	MW	5263.69	5262.7	396.0	426.0	4866.7	4836.7	428.5	4.0	PVC	Regional Aquifer – SFG sediments	08-Jun-2006	
KAFB-0220	MW	5265.10	5262.5	424.0	454.0	4838.5	4808.5	456.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	15-Jul-2006	
KAFB-0221	MW	5274.36	5271.5	410.5	440.5	4861.0	4831.0	455.0	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-0222	MW	5247.65	5245.2	366.0	396.0	4879.2	4849.2	401.0	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-0223	MW	5254.49	5252.1	376.0	406.0	4876.1	4846.1	411.0	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-0307	MW	5364.53	5362.7	405.0	450.0	4957.7	4912.7	460.0	3.8	PVC	Regional Aquifer – SFG sediments	04-Aug-1991	
KAFB-0308	MW	5381.65	5380.7	463.0	488.0	4917.7	4892.7	498.0	3.8	PVC	Regional Aquifer – SFG sediments	31-Jul-1991	
KAFB-0309	MW	5411.80	5410.7	500.0	525.0	4910.7	4885.7	535.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	6-Jul-1992	
KAFB-0310	MW	5416.48	5413.2	400.0	445.0	5013.2	4968.2	455.0	3.8	PVC	PGWS – SFG sediments	27-Aug-1991	
KAFB-0311	MW	5353.29	5351.7	433.0	458.0	4918.7	4893.7	468.0	3.8	PVC	Regional Aquifer – SFG sediments	24-Jul-1992	

Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base/U.S. Air Force (Continued)													
KAFB-0312	MW	5432.17	5430.2	503.0	528.0	4927.2	4902.2	533.0	4.5	PVC	Regional Aquifer – SFG sediments	26-Aug-1998	
KAFB-0313	MW	5418.98	5416.9	348.0	368.0	5068.9	5048.9	373.0	4.5	PVC	PGWS – SFG sediments	13-Aug-1998	
KAFB-0314	MW	5455.75	5453.9	428.0	448.0	5025.9	5005.9	453.0	4.5	PVC	Regional Aquifer – SFG sediments	30-Sep-1998	
KAFB-0315	MW	5466.11	5464.1	447.0	472.0	5017.1	4992.1	477.0	4.5	PVC	Regional Aquifer – SFG sediments	08-Sep-2000	
KAFB-0417	MW	5313.07	5310.0	430.0	455.0	4880.0	4855.0	465.0	3.8	PVC	Regional Aquifer – SFG sediments	06-Jun-1992	
KAFB-0504	MW	5357.87	5356.9	470.0	490.0	4886.9	4866.9	500.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	20-Jan-1990	
KAFB-0505	MW	5362.81	5360.8	495.4	520.5	4865.4	4840.3	521.3	4.5	PVC	Regional Aquifer – SFG sediments	22-Jul-1999	
KAFB-0506	MW	5363.47	5361.0	200.0	220.0	5161.0	5141.0	220.0	4.5	PVC	PGWS – SFG sediments	31-Aug-1998	
KAFB-0507R	MW	5358.21	5355.7	495.0	515.0	4863.7	4843.7	520.0	4.0	PVC	Regional Aquifer – SFG sediments	3-Apr-2013	
KAFB-0508	MW	5351.88	5349.7	481.0	506.0	4868.7	4843.7	507.0	3.5	PVC	Regional Aquifer – SFG sediments	02-May-2001	
KAFB-0509	MW	5441.56	5349.9	195	220	5149.9	5129.9	221	3.5	PVC	PGWS – SFG sediments	10-May-2001	
KAFB-0510	MW	5367.10	5364.7	511.0	536.0	4853.7	4828.7	537.0	3.5	PVC	Regional Aquifer – SFG sediments	17-May-2001	
KAFB-0512R	MW	5302.73	5300.2	430.0	450.0	4870.2	4850.2	455.0	4.0	PVC	Regional Aquifer – SFG sediments	4-Apr-2013	
KAFB-0514	MW	5206.41	5204.7	340.0	365.0	4864.7	4839.7	366.0	3.5	PVC	Regional Aquifer – SFG sediments	17-May-2001	
KAFB-0516	MW	5205.64	5203.4	322.0	357.0	4881.4	4846.4	358.0	4.0	PVC	Regional Aquifer – SFG sediments	29-Jan-2002	
KAFB-0517	MW	5197.10	5194.6	325.0	350.0	4869.6	4844.6	352.0	4.0	PVC	Regional Aquifer – SFG sediments	08-Nov-2002	
KAFB-0518	MW	5177.76	5175.5	305.0	335.0	4870.5	4840.5	337.0	4.0	PVC	Regional Aquifer – SFG sediments	22-Dec-2002	
KAFB-0519	MW	5365.37	5362.7	700.0	725.0	4662.7	4637.7	727	5	PVC	Regional Aquifer – SFG sediments	12-May-2003	
KAFB-0520	MW	5247.90	5246.2	379.5	404.5	4866.7	4841.7	410.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Jun-2004	
KAFB-0521 [k]	MWF	5352.45	5349.7	550	655	4799.7	4694.7	562	5	FLUTe™	Regional Aquifer – SFG sediments	7-May-2004	
KAFB-0522	MW	5267.48	5265.7	405.0	430.0	4860.7	4835.7	432.5	4.0	PVC	Regional Aquifer – SFG sediments	23-Jun-2004	
KAFB-0523	MW	5352.62	5350.5	600.0	625.0	4750.5	4725.5	627.0	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-0524	MW	5345.61	5343.4	484.0	509.0	4859.4	4834.4	511.0	4.0	PVC	Regional Aquifer – SFG sediments	31-Oct-2006	
KAFB-0525	MW	5229.75	5227.9	371.0	396.0	4856.9	4831.9	398.0	4.0	PVC	Regional Aquifer – SFG sediments	19-Nov-2006	
KAFB-0611	MW	5386.09	5383.5	498.0	508.0	4885.5	4875.5	513.0	4.0	PVC	Regional Aquifer – SFG sediments	13-Nov-2002	
KAFB-0612	MW	5385.45	5383.5	290.0	315.0	5093.5	5068.5	317.0	4.0	PVC	PGWS – SFG sediments	21-Nov-2002	
KAFB-0613	MW	5390.78	5391.3	420.0	450.0	4971.3	4941.3	452.0	4.0	PVC	Regional Aquifer – SFG sediments	08-Dec-2002	
KAFB-0614	MW	5390.89	5391.4	360.0	370.0	5031.4	5021.4	372.0	4.0	PVC	PGWS – SFG sediments	12-Dec-2002	
KAFB-0615	MW	5638.43	5636.3	300.0	325.0	5336.3	5311.3	327.0	4.0	PVC	Bedrock (granite)	27-Nov-2002	
KAFB-0616	MW	5481.07	5478.7	472.0	497.0	5006.7	4981.7	499.0	4.0	PVC	Regional Aquifer – SFG sediments	24-Nov-2002	
KAFB-0617	MW	5505.78	5503.3	565.0	590.0	4938.3	4913.3	592.0	4.0	PVC	Regional Aquifer – SFG sediments	18-May-2004	
KAFB-0618	MW	5410.05	5408.2	535.0	560.0	4873.2	4848.2	562.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Jun-2004	
KAFB-0619	MW	5410.78	5409.0	389.0	404.0	5020.0	5005.0	406.0	4.0	PVC	PGWS – SFG sediments	04-Jun-2004	
KAFB-0620	MW	5334.64	5332.0	447.0	472.0	4885.0	4860.0	474.5	4.0	PVC	Regional Aquifer – SFG sediments	18-Jun-2004	
KAFB-0621	MW	5569.89	5568.0	624.0	649.0	4944.0	4919.0	650.0	4.0	PVC	Regional Aquifer – SFG sediments	17-Jun-2004	
KAFB-0622	MW	5488.64	5486.2	529.0	554.0	4957.2	4932.2	555.0	4.0	PVC	Regional Aquifer – SFG sediments	25-Jun-2004	

Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base/U.S. Air Force (Continued)													
KAFB-0623	MW	5328.94	5327.0	265.0	290.0	5062.0	5037.0	292.5	4.0	PVC	PGWS – SFG sediments	29-Jun-2004	
KAFB-0624	MW	5673.78	5671.1	765.0	790.0	4906.1	4881.1	792.5	3.8	PVC	Regional Aquifer – SFG sediments	31-Oct-2008	
KAFB-0625	MW	5390.23?	5387.5?	470.0	495.0	4917.5	4892.5	497.5	4.0	unk	Regional Aquifer – SFG sediments	unk	
KAFB-0626 [k]	MWF	5331.21	5328.8	425.0 [i]	629.0[i]	4903.8	4699.8	638.4	5.0	FLUTe™	Regional Aquifer – SFG sediments	20-Aug-2010	
KAFB-0901	MW	5390.07	5389.8	465.0	527.0	4924.8	4862.8	537.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Mar-1990	
KAFB-0902	MW	5229.97	5228.0	337	357	4891.0	4871.0	367	4.0	PVC	Regional Aquifer – SFG sediments	20-Feb-1990	28-Feb-2000
KAFB-0903	MW	5391.63	5389.4	225.0	250.0	5164.4	5139.4	251.0	4.0	PVC	above PGWS – SFG sediments	3-Apr-2002	
KAFB-0904	MW	5291.75	5289.3?	343.0	368.0	5034.0	5009.0	368.0	4.0	PVC	Regional Aquifer – SFG sediments	2002	
KAFB-1001	MW	5260.43	5255.7	342.0	367.0	4913.7	4888.7	377.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	19-Apr-1992	
KAFB-1002	MW	5254.75	5252.7	342.0	367.0	4910.7	4885.7	377.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	30-Mar-1992	
KAFB-1003	MW	5258.29	5257.7	345.0	370.0	4912.7	4887.7	380.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	21-May-1992	
KAFB-1004	MW	5258.81	5267.7	348.0	373.0	4919.7	4894.7	383.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	24-Aug-1992	
KAFB-1005	MW	5274.68	5287.7	363.0	388.0	4924.7	4899.7	398.0	4.0	PVC/SS	Regional Aquifer – SFG sediments	26-May-1992	
KAFB-1006	MW	5257.01	5257.0	363.0	383.0	4894.0	4874.0	383.0	4.0	SS	Regional Aquifer – SFG sediments	10-Aug-1996	
KAFB-1007R	MW	5260.62	5258.4	376.5	396.5	4881.9	4861.9	401.5	4.0	PVC	Regional Aquifer – SFG sediments	18-May-2013	
KAFB-1008	MW	5260.77	5258.8	367.6	397.6	4891.2	4861.2	400.0	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-1009	MW	5272.16	5271.8	392.7	422.7	4879.1	4849.1	427.7	4.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-1021	MW	5348.02	5348.0	479.0	504.0	4869.0	4844.0	505	4	PVC	Regional Aquifer – SFG sediments	17-Mar-2002	
KAFB-1901	MW	5751.58	5748.7	80.5	105.5	5668.2	5643.2	115.5	4.0	PVC/SS	Regional Aquifer – SFG sediments	30-Jun-1992	
KAFB-1902	MW	5754.27	5752.7	80.7	105.7	5672.0	5647.0	115.7	4.0	PVC/SS	Regional Aquifer – SFG sediments	9-Jul-1992	
KAFB-1904	MW	5752.29	5750.0?	84.3	104.3	5665.7	5645.7	104.3	4.0	SS	Regional Aquifer – SFG sediments	1992?	
KAFB-2004	MW	5592.08	5592.5?	278.0	308.0	5314.5	5284.5	309.0	4.0	PVC	Bedrock (granite)	17-Feb-2002	2008
KAFB-2005	MW	5624.27	5624.6	126.0	156.0	5498.6	5468.6	158.5	4.0	PVC	Bedrock (granite)	10-May-2006	
KAFB-2006	MW	5590.88	5591.0?	303.0	333.0	5288.0	5258.0	335.0	4.0	PVC	Bedrock (granite)	10-May-2006	
KAFB-2007	MW	5564.48	5562.1	273.0	303.0	5289.1	5259.1	305.5	4.0	PVC	Bedrock (granite)	13-May-2006	
KAFB-2008	MW	5541.74	5539.5	650.0	680.0	4889.5	4859.5	688.0	5.0	PVC	Regional Aquifer – SFG sediments	15-Oct-2010	
KAFB-2009	MW	5655.63	5653.4	74.0	104.0	5579.4	5549.4	110.0	4.0	PVC	Bedrock (granite)	15-Oct-2010	
KAFB-2622	MW	5358.14	5356.5	195.0	215.0	5161.5	5141.5	217.0	4.0	PVC	PGWS – SFG sediments	02-Dec-2004	
KAFB-2623	MW	5367.48	5365.3	199.8	219.8	5165.5	5145.5	221.8	4.0	PVC	PGWS – SFG sediments	30-Dec-2004	
KAFB-2624	MW	5362.27	5359.6	195.0	215.0	5164.6	5144.6	217.0	4.0	PVC	PGWS – SFG sediments	2013?	
KAFB-2625	MW	5359.26	5357.4	185.0	205.0	5172.4	5152.4	207.0	4.0	PVC	PGWS – SFG sediments	2010?	
KAFB-2626	MW	5357.51	5355.6	185.0	205.0	5170.6	5150.6	208.0	4.0	PVC	PGWS – SFG sediments	22-Feb-2009	
KAFB-2627	MW	5367.47	5365.5	195.0	215.0	5170.5	5150.5	217.5	4.0	PVC	PGWS – SFG sediments	2-Mar-2009	
KAFB-2628	MW	5369.64	5367.4	506.0	530.0	4861.4	4837.4	535.0	5.0	PVC	Regional Aquifer – SFG sediments	2-Aug-2011	
KAFB-2629	MW	5361.53	5359.0	496	519.5	4859.7	4839.7	523.5	5.0	PVC	Regional Aquifer – SFG sediments	9-Aug-2011	
KAFB-2630	MW	5361.71	5359.2	205.9	225.7	5153.3	5133.5	227.9	4.0	PVC	above PGWS – SFG sediments	20-Aug-2011	
KAFB-2631	MW	5335.70	5335.5	154.3	174.1	5181.2	5161.4	176.3	4.0	PVC	above PGWS – SFG sediments	16-Aug-2011	

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Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base/U.S. Air Force (Continued)													
KAFB-2632	MW	5329.08	5328.8	157.4	177.2	5171.4	5151.6	179.4	4.0	PVC	above PGWS – SFG sediments	11-Aug-2011	
KAFB-2901	MW	5839.08	5836.7	121.0	141.0	5715.7	5695.7	146.0	4.0	PVC	Regional Aquifer – SFG sediments	31-May-2015	
KAFB-2902	MW	5832.10	5829.7	160.0	180.0	5669.7	5649.7	185.0	4.0	PVC	Regional Aquifer – SFG sediments	9-May-2015	
KAFB-2903	MW	5819.46	5817.0	165.0	185.0	5652.0	5632.0	190.0	4.0	PVC	Bedrock (Abo Formation) siltstone and shale	11-Jun-2015	
KAFB-2904	MW	5842.72	5840.4	58.0	78.0	5782.4	5762.4	83.0	4.0	PVC	Bedrock (Madera Formation) limestone	14-Jun-2015	
KAFB-3391	MW	5396.60	5394.1	262.3	282.3	5131.8	5111.8	284.3	4.0	PVC	PGWS – SFG sediments	1-Aug-1998	
KAFB-3392	MW	5394.51	5393.4	536.0	561.0	4857.4	4832.4	562.0	4.0	PVC	Regional Aquifer – SFG sediments	08-Oct-1999	
KAFB-3411	MW	5342.81	5340.5	477.0	502.0	4863.5	4838.5	503.0	4.0	PVC	Regional Aquifer – SFG sediments	11-Nov-1999	
KAFB-6241	MW	5466.50	5463.2	528.0	553.0	4935.2	4910.2	555.0	4.0	PVC	Regional Aquifer – SFG sediments	16-Jan-2007	
KAFB-6243	MW	5423.48	5421.0	488.0	513.0	4933.0	4908.0	516.0	4.0	unk	Regional Aquifer – SFG sediments	2009?	
KAFB-6301	MW	5459.64	5457.3	535.0	560.0	4922.3	4897.3	561.0	4.0	PVC	Regional Aquifer – SFG sediments	7-Sep-1999	
KAFB-7001	MW	5322.87	5323.0?	454.0	479.0	4869.0	4844.0	480.0	4.0	PVC	Regional Aquifer – SFG sediments	before 2011	
KAFB-8281	MW	5401.03	5401.7	544.0	569.0	4857.7	4832.7	570.0	4.0	PVC	Regional Aquifer – SFG sediments	27-Oct-1999	
KAFB-8282	MW	5402.92	5403.4	262.0	287.0	5141.4	5116.4	288.0	4.0	PVC	PGWS – SFG sediments	1999?	
KAFB-8351	MW	5325.51	5323.3	474.0	499.0	4849.3	4824.3	505.0	4.0	PVC	Regional Aquifer – SFG sediments	23-Nov-1999	
KAFB-ST105-EX01	MW	5353.54	5348.5	505.0	575.0	4843.5	4773.5	575.0	10.0	PVC/SS	Regional Aquifer – SFG sediments	2008?	
Site 58 MW-1	MW	5720.88	5718.4?	46.8	71.8	5671.6	5646.6	71.8	2.0	PVC	Colluvium and Bedrock (granite)	2001?	
Site 58 MW-2	MW	5715.94	5715.9	76.7	96.7	5639.2	5619.2	96.7	2.0	PVC	Bedrock (granite)	2001?	
Site 58 MW-3	MW	5717.88	5717.9	52.0	72.0	5665.9	5645.9	72.0	2.0	PVC	Colluvium?	2001?	
Site 58 MW-4	MW	5722.31	5719.8?	55.5	75.5	5664.3	5644.3	75.5	2.0	PVC	Bedrock (granite)	2001?	
Site 58 MW-5	MW	5716.83	5716.8	25.0	65.0	5691.8	5651.8	80.0	4.0	PVC	Colluvium?	2001?	
Site 58 MW-6	MW	5720.30	5717.8?	57.0	82.0	5660.8	5635.8	87.0	2.0	PVC	Colluvium and Bedrock (granite)?	2001?	
Site 58 MW-7	MW	5717.76	5715.3?	50.0	75.0	5665.3	5640.3	80.0	2.0	PVC	Colluvium and Bedrock (granite)?	2001?	
ST105-MW001	MW	5279.34	5276.6	408.0	428.0	4868.6	4848.6	433.4	4.0	PVC	Regional Aquifer – SFG sediments	11-Mar-2103	
ST105-MW002	MW	5180.32	5177.8	308.4	328.4	4869.0	4849.0	333.4	4.0	PVC	Regional Aquifer – SFG sediments	25-Feb-2013	
ST105-MW003	MW	5174.61	5171.9	301.0	321.0	4870.9	4850.9	326.0	4.0	PVC	Regional Aquifer – SFG sediments	28-Feb-2013	
ST105-MW004	MW	5234.61	5232.2	365.0	385.0	4869.1	4849.1	390.4	4.0	PVC	Regional Aquifer – SFG sediments	11-Feb-2013	
ST105-MW005	MW	5287.57	5284.9	273.0	293.0	5011.9	4991.9	298.0	4.0	PVC	Regional Aquifer – SFG sediments	24-May-2103	
ST105-MW006	MW	5313.26	5310.7	228.0	248.0	5082.7	5062.7	253.0	4.0	PVC	PGWS – SFG sediments	25-Feb-2013	
ST105-MW007	MW	5311.18	5308.5	290.0	310.0	5018.5	4998.5	315.0	4.0	PVC	Regional Aquifer – SFG sediments	24-Feb-2013	
ST105-MW008	MW	5358.94	5356.5	456.0	476.0	4895.5	4880.5	481.0	4.0	PVC	Regional Aquifer – SFG sediments	23-Mar-2013	
ST105-MW009	MW	5519.71	5517.5	480.0	500.0	5037.5	5017.5	505.0	4.0	PVC	Regional Aquifer – SFG sediments	16-Nov-2013	
ST105-MW010	MW	5334.70	5332.1	436.5	456.5	4895.6	4875.6	461.5	4.0	PVC	Regional Aquifer – SFG sediments	1-Jun-2013	
ST105-MW011	MW	5422.66	5420.0	456.8	476.8	4963.2	4943.2	482.3	4.0	PVC	Regional Aquifer – SFG sediments	10-Apr-2013	
ST105-MW012	MW	5419.90	5417.1	375.0	395.0	5041.1	5021.1	401.0	4.0	PVC	PGWS – SFG sediments	17-Apr-2013	
ST105-MW013	MW	5447.27	5444.5	433.6	453.6	5010.9	4990.9	458.6	4.0	PVC	Regional Aquifer – SFG sediments	17-Apr-2013	
ST105-MW015	MW	5623.95	5621.2	687.0	707.0	4934.2	4914.2	712.0	4.0	PVC	Regional Aquifer – SFG sediments	8-May-2013	

Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base/U.S. Air Force (Continued)													
ST105-MW017	MW	5621.97	5619.6	702.0	722.0	4917.6	4897.6	727.0	4.0	PVC	Regional Aquifer – SFG sediments	15-Jun-2013	
ST105-MW018	MW	5221.68	5218.8	349.2	369.2	4869.6	4849.6	374.6	4.0	PVC	Regional Aquifer – SFG sediments	10-Mar-2013	
ST105-MW019	MW	5217.94	5215.2	345.0	365.0	4870.2	4850.2	370.4	4.0	PVC	Regional Aquifer – SFG sediments	5-Mar-2013	
ST105-MW020	MW	5383.72	5381.0	281.0	301.0	5100.0	5080.0	306.0	4.0	PVC	PGWS – SFG sediments	25-Apr-2013	
ST105-MW021	MW	5390.90	5388.4	290.0	310.0	5066.4	5046.4	315.0	4.0	PVC	PGWS – SFG sediments	6-Apr-2013	
ST105-MW022	MW	5386.66	5383.9	472.0	492.0	4911.9	4891.9	502.3	4.0	PVC	Regional Aquifer – SFG sediments	10-Apr-2013	
ST105-MW023	MW	5275.86	5273.3	406.0	426.0	4867.3	4847.3	431.0	4.0	PVC	Regional Aquifer – SFG sediments	4-Nov-2013	
ST105-MW024	MW	5595.67	5593.3	442.0	462.0	5151.3	5131.3	467.0	4.0	PVC	Bedrock (granite)	21-Nov-2013	
Production, Injection, and Extraction Wells													
ASL-PD	P	6030.00	6030.0	337.0	401.6	5693.0	5628.4	401.6	4.0	PVC	Bedrock (granite)	11-Jan-1990	
Burn Site Well	Px	6374.66	6372.9	231.0	341.0	6141.9	6031.9	341.0	4.0	PVC	Bedrock (schist and granite)	20-Feb-1986	Inactive 2003
Greystone Well	P	5822.87	5820.8	44.0	54.0	5776.8	5766.8	54.0	4.0	PVC/S	Alluvium	1902?	12-Sep-2002
KAFB-1	P	unk	5386.5	550.0	1,199.0	4836.5	4187.5	1,199.0	12.0	S	Regional Aquifer – SFG sediments	1-Aug-1949	Dec 2016
KAFB-2	P	5327.06	5327.1	494.0	1,000.0	4833.1	4327.1	1,000.0	12.0	S	Regional Aquifer – SFG sediments	Jan-1951	Dec 2016
KAFB-3	P	unk	5356.9	452.0	900.0	4904.9	4456.9	900.0	14.0	S	Regional Aquifer – SFG sediments	01-Oct-1949	
KAFB-4	P	unk	5360.2	494.0	1,000.0	4866.2	4360.2	1,000.0	14.0	S	Regional Aquifer – SFG sediments	01-Dec-1949	
KAFB-5	P	unk	5439.0	504.0	1,004.0	4935.0	4435.0	1,004.0	14.0	S	Regional Aquifer – SFG sediments	1-Jul-1952	1999
KAFB-6	P	unk	5423.5	504.0	1,006.0	4919.5	4421.5	1,006.0	14.0	S	Regional Aquifer – SFG sediments	1-Jul-1952	1999
KAFB-7	INJ	unk	5350.4	448.0	976.0	4902.4	4374.4	976.0	16.0	S	Regional Aquifer – SFG sediments	1-Feb-1955	Inj. starts 2016
KAFB-8	P	5372.00	5372.0	440.0	975.0	4932.0	4397.0	1,000.0	14.0	S	Regional Aquifer – SFG sediments	1-Feb-1955	1999
KAFB-9	P	5501.19	5501.2	unk	unk	unk	4851.2?	650.0	10.0	S	Regional Aquifer – SFG sediments	1-Oct-1949	1970
KAFB-10	P	5418.65	5418.7	495.0	970.0	4923.7	4448.7	970.0	12.75	S	Regional Aquifer – SFG sediments	27-May-1959	Apr 1996
KAFB-11	P	5470.67	5481.0	670.0	1,327.0	4811.0	4154.0	1,327.0	16.0	S	Regional Aquifer – SFG sediments	10-Apr-1972	Dec 2016
KAFB-12	P	5322.87	5324.2	446.0	1,032.0	4878.2	4292.2	1,032.0	16.0	S	Regional Aquifer – SFG sediments	1-Oct-1952	1999
KAFB-13	P	5305.67	5307.0	413.0	953.0	4894.0	4354.0	977.0	14.0	S	Regional Aquifer – SFG sediments	1-Mar-1956	1999
KAFB-14	P	5324.67	5324.2	380.0	1,000.0	4944.2	4324.2	1,000.0	16.0	S	Regional Aquifer – SFG sediments	01-Jan-1969	
KAFB-15	P	unk	5347.0	697.0	993.0	4650.0	4354.0	1,600.0	30.0	S	Regional Aquifer – SFG sediments	1996	
KAFB-16	P	unk	5370.0	697.0	993.0	4673.0	4377.0	1,600.0	30.0	S	Regional Aquifer – SFG sediments	1996	
KAFB-17 (Heliport #1)	Px	unk	5301.7	530 .0	598.0	4771.7	4703.7	598.0	6.0	SS	Regional Aquifer – SFG sediments	1992	Dec 2016
KAFB-18 (SOR) [l]	Px	5965.70	5965.7	160.0	320.0	5805.7	5645.7	320.0	5.0	PVC	Bedrock (metarhyolite)	19-Aug-1987	
KAFB-19 (HERTF)	P	unk	6229.7	449.0	500.0	5780.7	5729.7	500.0	5.0	S/OH?	Bedrock (granite)	13-Jul-1990	2008
KAFB-20	P	unk	5389.0	710.0	1,180.0	4679.0	4209.0	1,240.0	20.0	S	Regional Aquifer – SFG sediments	Jan 2008	
KAFB-PG-1598 [m]	Ext	5369.90	5368.4	290.0	440.0	5078.4	4928.4	455.0	12.0	SS	PGWS – SFG sediments	14-Oct-1998	
KAFB-060	Ext	5365.47	5364.2	437.0	457.0	4927.2	4907.2	467.0	4.0	PVC/SS	PGWS – SFG sediments	20-Mar-1990	
KAFB-0608	Ext	5361.17	5359.9	307.0	327.0	5052.9	5032.9	338.0	4.0	PVC/SS	PGWS – SFG sediments	28-Mar-1990	
KAFB-0609	Ext	5365.87	5364.7	316.0	336.0	5048.7	5028.7	345.0	4.0	PVC/SS	PGWS – SFG sediments	31-Mar-1990	22-Jun-2014
KAFB-0610	Ext	5359.47	5357.3	333.0	353.0	5024.3	5004.3	363.0	4.0	PVC/SS	PGWS – SFG sediments	04-Apr-1990	

Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b, c] (ft amsl, NAVD 88)	Ground Surface [c] (ft amsl, NAVD 88)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft amsl)	Bottom of Screen (ft amsl)	Casing Total Depth (ft bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Production, Injection, and Extraction Wells (Continued)													
KAFB-106228	Ext	5319.62	5322.9	440.0	540.0	4882.9	4782.9	545.0	8.0	SS	Regional Aquifer – SFG sediments	2-June-2015	
KAFB-106233	Ext	5312.20	5315.5	430.0	532.1	4885.5	4783.4	537.1	8.0	SS	Regional Aquifer – SFG sediments	30-Sep-2015	
KAFB-106234	Ext	5323.07	5326.3	439.7	539.7	4886.6	4786.6	544.7	8.0	SS	Regional Aquifer – SFG sediments	9-Oct-2015	
KAFB-106239	Ext	5330.09	5333.4	470.0	570.0	4863.4	4763.4	575.0	8.0	SS	Regional Aquifer – SFG sediments	3-May-2017	
KAFB-106IN2	Inj		5365.0	600	900						Regional Aquifer – SFG sediments	1-Dec-2020	
Lake Christian West [n]	Px	5716.61	5714.8	60.0	72.0	5654.8	5642.8	72.0	6.0	S	SFG sediments or sandstone	before 1990	after 2004
Ridgecrest 1	P	unk	5444.7	636.0	1,260.0	4808.7	4184.7	1,260.0	16.0	S	Regional Aquifer – SFG sediments	13-Jan-1964	
Ridgecrest 2	P	unk	5418.7	730.0	1,500.0	4688.7	3918.7	1,543.0	16.0	S	Regional Aquifer – SFG sediments	1-Jan-1977	
Ridgecrest 3	P	unk	5387.7	621.0	1,436.0	4766.7	3951.7	1,449.0	16.0	S	Regional Aquifer – SFG sediments	01-May-1974	
Ridgecrest 4	P	unk	5346.7	573.0	1,413.0	4773.7	3933.7	1,450.0	unk	S	Regional Aquifer – SFG sediments	01-Mar-1974	
Ridgecrest 5	P	unk	5356.7	650.0	1,450.0	4706.7	3906.7	1,450.0	20.0	S	Regional Aquifer – SFG sediments	8-Dec-1990	
RG-01091	Px	unk	5602.0?	650.0	1180.0	unk	unk	1,200.0	18	S	Regional Aquifer – SFG sediments	1-Sep-1957	
RG-44737	P	unk	6021.0?	unk	unk	unk	unk	100.0?	5?	unk	Bedrock (metamorphics?)	1986?	Aug 1991
RG-58935-3	P	unk	6260.0?	160.0	480.0	6100.0?	5780.0?	480.0	4	PVC	Bedrock (metamorphics)	2017?	
RG-61206	P	unk	6320.0?	100.0	500.0	6220.0?	5820.0?	500.0	4	PVC	Bedrock (metamorphics)	18-Dec-1994	
RG-61207	P	unk	6370.0?	100.0	480.0	6270.0?	5890.0	500.0	4	PVC	Bedrock (metamorphics)	17-Dec-1994	
RG-76274	P	unk	6280.0?	180.0	540.0	6100.0?	5740.0?	540.0	4.5	PVC	Bedrock (granite and metamorphics?)	3-Sep-2001	
School House Well	P	5796.33	5799.0	83.0	103.0	5716.0	5696.0	103.0	6.0	S/OH	Bedrock (Sandia Formation) sandstone?	1930s?	inactive
TSA-1	P	6063.68	6060.2	190.0	210.0	5870.2	5850.2	300.0	6.0	S	Bedrock (metamorphics)	10-Nov-1987	Aug 2001
VA-1	P	unk	5344.0	unk	unk	unk	unk	unk	unk	unk	Regional Aquifer – SFG sediments	1940?	1997?
VA-2	P	unk	5346.2?	590.0	990.0	4756.3	4356.3	1,010.0	13.4	SS	Regional Aquifer – SFG sediments	18-Apr-1997	
Yates Well	P	6104.67	6102.7	unk	unk	unk	unk	unk	unk	S	Bedrock (granite)	1929	1942?

Notes:

[a] The status of all SNL/NM-installed groundwater wells is maintained in this table. However, not all of decommissioned (P&A) groundwater wells for KAFB and LRRI are listed.

[b] Measuring Point is the elevation for the top of well casing, typically the top of PVC casing, that is used for measuring and calculating groundwater elevations.

[c] Elevations are relative to the NAVD 88, New Mexico State Plane Coordinate System, Central Zone. Elevation data from other government agencies were converted as necessary (were not in NAVD 88) using a conversion (re-projection) of +2.671 feet.

[d] MWL-MW4 well casing was installed at 6 degrees from vertical. Casing depths were measured during well installation and are not corrected for true vertical (perpendicular to the ground surface) distance of the slant hole.

[e] The casings for wells SFR-1D and SFR-1S were installed in a single borehole.

[f] Monitoring well PGS-2 has three screens: 535 to 565 ft bgs, 585 to 595 ft bgs, and 625 to 645 ft bgs. Groundwater samples were collected from the upper screen.

[g] Monitoring well TA2-NW1-595 has two screens: 535 to 555 ft bgs, and 585 to 595 ft bgs. Groundwater samples are collected from the upper screen.

[h] Well TJA-4 is screened in the Merging Zone. The Merging Zone refers to layers of saturation near Tijeras Arroyo, typically between the Perched Groundwater System and the Regional Aquifer.

[i] Injection well TAV-INJ1 is a nested well with two PVC casings installed in a single borehole. The 5-inch diameter monitoring screen extends from 509 to 539 ft bgs. The 1.5-inch diameter injection screen extends from 519 to 539 ft bgs. The primary sandpack (2-millimeter SilLibeads®) extends from 504 to 544.5 ft bgs.

Table 1. Inventory of Active and Decommissioned Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at Sandia National Laboratories, New Mexico[a], Kirtland Air Force Base, and Surrounding Areas *(Concluded)*

Notes (Continued):

[j] Many of the Bulk Fuels Facility (BFF) monitoring wells, such as KAFB-1062, are not shown in order to reduce clutter on the AGMR figures and Plate 1. The BFF plume does not impact groundwater quality in the SNL/NM groundwater areas of concern.

[k] Monitoring wells KAFB-0521 and KAFB-0626 were constructed with a FLUTe™ monitoring system with multiple sampling ports. Groundwater elevations cannot be measured. Sample tubing (0.25-inch diameter) for the ports was installed in 5-inch diameter PVC casings. Well KAFB-0521 has ports set at 550 – 555, 600 – 605, and 650 – 655 ft bgs. Well KAFB-0626 has ports set at 425, 471, 515, and 629 ft bgs.

[l] KAFB-18 is also known as the Optical Range Well or the Starfire Optical Range well.

[m] The production-non-potable well (water supply well) KAFB-PG-1598 is also known as the Golf Course Main Pond well. Some KAFB documents also use the identifier RG-1598-S-4 or RG-1589-S-4. Pumped water is used for irrigating the KAFB Tijeras Arroyo Golf Course.

[n] Lake Christian West is also known as well KAFB-1903. Well was used for non-potable purposes including the filling of a U.S. Air Force high-explosives testing pond located approximately 1,600 ft to the east of the well.

AGMR = Annual Groundwater Monitoring Report.
amsl = Above mean sea level.
ASL-PD = Albuquerque Seismological Laboratory Production.
AVN = Area-V (North).
bgs = Below ground surface.
BW = Background Well.
CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
CWL = Chemical Waste Landfill.
CYN = Canyons (Lurance Canyon area).
D = Deep.
Dual PVC = Two PVC casings in one borehole.
EOD = Explosive Ordnance Disposal.
EX = Well proposed for extraction purposes, but used for monitoring purposes only. This applies to the well number for ST105-EX01.
Ext = Extraction well used for remediating groundwater at the KAFB BFF and the KAFB Tijeras Arroyo Golf Course.
ft = feet/foot.
FLUTe™ = Flexible Liner Underground Technologies, LLC.
HERTF = High Energy Research Test Facility.
ID = Identifier.
INJ = Injection well.
ITRI = Inhalation Toxicology Research Institute (renamed in 1996 as Lovelace Respiratory Research Institute).
KAFB = Kirtland Air Force Base.
L = Lower screen, a term used at CWL.
LMF = Large Melt Facility.
LRRI = Lovelace Respiratory Research Institute.
LWDS = Liquid Waste Disposal System.
MRN = Magazine Road North.
MVMW = Mountain View Monitoring Well.
MW = Monitoring Well.
MWF = Monitoring Well FLUTe™.
MWL = Mixed Waste Landfill.
NAVD 88 = North American Vertical Datum of 1988.
NMED = New Mexico Environment Department.
NWTA3 = Northwest Technical Area-III.
OBS = Old Burn Site.
P = Production well (water supply well) used for potable purposes.
P&A = Plugged and abandoned (decommissioned).
Px = Production well (water supply well) used for non-potable purposes such as irrigating the golf course.
PGS = Parade Ground South.
PGWS = Perched Groundwater System.
PL = Power Line Road (northwest of Technical Area-III). The better-known Power Line Road (also known as Pole Line Road) is near the Tijeras Arroyo Golf Course.
PVC = Polyvinyl chloride.
PVC/S = Composition of blank well casing is PVC and composition of well screen is steel (carbon steel).
PVC/SS = Composition of blank well casing is PVC and composition of well screen is stainless steel.
R = Replacement well (term used by KAFB).
RG = Rio Grande.
S = Shallow.
S = Steel (carbon steel).
S/OH = Open hole completion (no well screen) with blank casing above.
S/SS = Composition of blank well casing is carbon steel and composition of well screen is stainless steel.
SFG = Santa Fe Group.
SFR = South Fence Road.
SNL/NM = Sandia National Laboratories, New Mexico.
SOR = Starfire Optical Range.
SS = Stainless steel.
ST105 = Series of KAFB/USAF wells for nitrate abatement study.
STW = Solar Tower (West).
SWTA3 = Southwest Technical Area-III.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-SW = Technical Area-II (Southwest).
TA2-W = Technical Area-II (Well).
TAV = Technical Area-V (monitoring well designation).
TJA = Tijeras Arroyo.
TRE = Thunder Road East.
TRN = Target Road North.
TRS = Target Road South.
TSA = Transportation Safeguards Academy.
U = Upper screen, a term used at CWL.
unk = Unknown information, not available.
USAF = U.S. Air Force.
VA = Veterans Administration.
WYO = Wyoming.
YALE = Yale Boulevard area.
? = Value is an estimate or has questionable accuracy.
12AUP = Environmental Restoration Site 12A underflow piezometer.

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Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020

Well ID	Measurement Point[a, b, c], ft amsl, NAVD 88	Date Measured, 2020	Depth to Water, ft btoc, 2020	Groundwater Elevation, ft amsl, 2020	Groundwater Elevation, rounded, ft amsl, 2020	Screened Unit	Comment, as needed	Groundwater Elevation, ft amsl, 2019	Data Source	Well Owner
DOE/NNSA Owned Wells										
AVN-1	5443.00	6-Oct-2020	527.99	4915.01	4915	Regional Aquifer – SFG sediments		4915.50	SNL/NM	DOE/NNSA
AVN-2	5442.39	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	SNL/NM	DOE/NNSA
Burn Site Well	6374.66	1-Oct-2020	117.44	6257.22	6257	Bedrock (schist and granite)		6263.66	SNL/NM	DOE/NNSA
CCBA-MW1	5902.34	5-Oct-2020	48.13	5854.21	5854	Alluvium and bedrock (granite)		5854.24	SNL/NM	DOE/NNSA
CCBA-MW2	5939.28	5-Oct-2020	72.54	5866.74	5867	Bedrock (granite)		5866.86	SNL/NM	DOE/NNSA
CTF-MW1	6082.63	5-Oct-2020	241.24	5841.39	5841	Bedrock (granite)		5842.21	SNL/NM	DOE/NNSA
CTF-MW2	5578.60	5-Oct-2020	43.87	5534.73	5535	Bedrock (granite)		5534.93	SNL/NM	DOE/NNSA
CTF-MW3	5522.82	5-Oct-2020	311.00	5211.82	5212	Bedrock (granite)		5212.28	SNL/NM	DOE/NNSA
CWL-BW5	5434.79	6-Oct-2020	515.14	4919.65	4920	Regional Aquifer – SFG sediments		4919.95	SNL/NM	DOE/NNSA
CWL-MW9	5426.12	6-Oct-2020	506.38	4919.74	4920	Regional Aquifer – SFG sediments		4919.99	SNL/NM	DOE/NNSA
CWL-MW10	5424.58	6-Oct-2020	503.38	4921.20	4921	Regional Aquifer – SFG sediments		4921.41	SNL/NM	DOE/NNSA
CWL-MW11	5423.24	6-Oct-2020	501.53	4921.71	4922	Regional Aquifer – SFG sediments		4921.90	SNL/NM	DOE/NNSA
CYN-MW3	6313.26	1-Oct-2020	dry	dry	dry	Bedrock (metamorphics)		dry	SNL/NM	DOE/NNSA
CYN-MW4	6455.48	1-Oct-2020	235.25	6220.23	6220	Bedrock (quartzite)		6222.91	SNL/NM	DOE/NNSA
CYN-MW5	5984.23	1-Oct-2020	109.07	5875.16	5875	Bedrock (quartzite)		5875.56	SNL/NM	DOE/NNSA
CYN-MW6	6343.37	1-Oct-2020	159.87	6183.50	6184	Bedrock (metamorphics)		6184.54	SNL/NM	DOE/NNSA
CYN-MW7	6216.35	1-Oct-2020	307.46	5908.89	5909	Bedrock (granitic gneiss)		5909.55	SNL/NM	DOE/NNSA
CYN-MW8	6230.11	1-Oct-2020	323.21	5906.90	5907	Bedrock (granitic gneiss)		5907.58	SNL/NM	DOE/NNSA
CYN-MW9	6360.67	1-Oct-2020	179.64	6181.03	6181	Bedrock (metamorphics)		6184.74	SNL/NM	DOE/NNSA
CYN-MW10	6345.45	1-Oct-2020	138.45	6207.00	6207	Bedrock (metamorphics)		6211.32	SNL/NM	DOE/NNSA
CYN-MW11	6374.41	1-Oct-2020	117.17	6257.24	6257	Bedrock (metamorphics)		6263.69	SNL/NM	DOE/NNSA
CYN-MW12	6345.16	1-Oct-2020	222.25	6122.91	6123	Bedrock (metamorphics)		6125.71	SNL/NM	DOE/NNSA
CYN-MW13	6237.79	1-Oct-2020	329.41	5908.38	5908	Bedrock (granitic gneiss)		5909.15	SNL/NM	DOE/NNSA
CYN-MW14A	6315.85	1-Oct-2020	191.39	6124.46	6124	Bedrock (metamorphics)	NC - deeper fracture	6127.21	SNL/NM	DOE/NNSA
CYN-MW15	6344.44	1-Oct-2020	166.48	6177.96	6178	Bedrock (metamorphics)		6181.26	SNL/NM	DOE/NNSA
CYN-MW16	6249.60	1-Oct-2020	341.32	5908.28	5908	Bedrock (granitic gneiss)		5908.76	SNL/NM	DOE/NNSA
CYN-MW17	6268.95	1-Oct-2020	360.59	5908.36	5908	Bedrock (granitic gneiss)		5908.86	SNL/NM	DOE/NNSA
CYN-MW18	6304.02	1-Oct-2020	247.23	6056.79	6057	Bedrock (metamorphics)		6058.49	SNL/NM	DOE/NNSA
CYN-MW19	6410.43	1-Oct-2020	45.92	6364.51	6365	Bedrock (metamorphics)		6364.72	SNL/NM	DOE/NNSA
Greystone-MW2	5814.20	5-Oct-2020	55.34	5758.86	5759	Alluvium in arroyo, recent	NC - alluvium	5759.21	SNL/NM	DOE/NNSA
LWDS-MW1	5423.83	7-Oct-2020	506.19	4917.64	4918	Regional Aquifer – SFG sediments		4918.33	SNL/NM	DOE/NNSA
LWDS-MW2	5412.41	7-Oct-2020	494.92	4917.49	4917	Regional Aquifer – SFG sediments		4917.87	SNL/NM	DOE/NNSA
MRN-2	5308.18	2-Oct-2020	430.93	4877.25	4877	Regional Aquifer – SFG sediments		4876.56	SNL/NM	DOE/NNSA
MRN-3D	5309.34	2-Oct-2020	431.39	4877.95	4878	Regional Aquifer – SFG sediments		4877.50	SNL/NM	DOE/NNSA
MWL-BW2	5391.02	5-Oct-2020	482.13	4908.89	4909	Regional Aquifer – SFG sediments		4909.08	SNL/NM	DOE/NNSA
MWL-MW4	5391.70	5-Oct-2020	502.19	4889.51	4890	Regional Aquifer – SFG sediments	corrected	4891.96	SNL/NM	DOE/NNSA
MWL-MW5	5382.56	5-Oct-2020	493.54	4889.02	4889	Regional Aquifer – SFG sediments		4888.94	SNL/NM	DOE/NNSA
MWL-MW6	5375.31	5-Oct-2020	487.05	4888.26	4888	Regional Aquifer – SFG sediments		4887.89	SNL/NM	DOE/NNSA
MWL-MW7	5383.30	5-Oct-2020	490.62	4892.68	4893	Regional Aquifer – SFG sediments		4892.66	SNL/NM	DOE/NNSA
MWL-MW8	5384.67	5-Oct-2020	492.17	4892.50	4893	Regional Aquifer – SFG sediments		4892.43	SNL/NM	DOE/NNSA
MWL-MW9	5381.91	5-Oct-2020	491.96	4889.95	4890	Regional Aquifer – SFG sediments		4889.74	SNL/NM	DOE/NNSA
NWTA3-MW2	5337.49	6-Oct-2020	460.89	4876.60	4877	Regional Aquifer – SFG sediments		4875.21	SNL/NM	DOE/NNSA
NWTA3-MW3D	5340.80	6-Oct-2020	459.83	4880.97	4881	Regional Aquifer – SFG sediments		4879.86	SNL/NM	DOE/NNSA
OBS-MW1	5871.42	5-Oct-2020	72.51	5798.91	5799	Bedrock (granite)		5799.49	SNL/NM	DOE/NNSA

Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020 *(Continued)*

Well ID	Measurement Point[a, b, c], ft amsl, NAVD 88	Date Measured, 2020	Depth to Water, ft btoc, 2020	Groundwater Elevation, ft amsl, 2020	Groundwater Elevation, rounded, ft amsl, 2020	Screened Unit	Comment, as needed	Groundwater Elevation, ft amsl, 2019	Data Source	Well Owner
OBS-MW2	5863.16	5-Oct-2020	173.41	5689.75	5690	Bedrock (granite)		5689.15	SNL/NM	DOE/NNSA
OBS-MW3	5865.50	5-Oct-2020	69.91	5795.59	5796	Bedrock (granite)		5796.10	SNL/NM	DOE/NNSA
PGS-2	5408.29	3-Nov-2020	531.65	4876.64	4877	Regional Aquifer – SFG sediments		4876.35	SNL/NM	DOE/NNSA
PL-2	5336.01	2-Oct-2020	459.80	4876.21	4876	Regional Aquifer – SFG sediments		4875.46	SNL/NM	DOE/NNSA
PL-4	5334.98	2-Oct-2020	458.88	4876.10	4876	Regional Aquifer – SFG sediments		4875.01	SNL/NM	DOE/NNSA
SFR-1D	5399.13	2-Oct-2020	140.24	5258.89	5259	Regional Aquifer – SFG sediments	NC - deeper fracture	5259.23	SNL/NM	DOE/NNSA
SFR-1S	5399.16	2-Oct-2020	90.35	5308.81	5309	Regional Aquifer – SFG sediments		5308.97	SNL/NM	DOE/NNSA
SFR-2S	5432.77	2-Oct-2020	101.49	5331.28	5331	Regional Aquifer – SFG sediments		5331.54	SNL/NM	DOE/NNSA
SFR-3D	5497.94	2-Oct-2020	162.88	5335.06	5335	Regional Aquifer – SFG sediments		5335.56	SNL/NM	DOE/NNSA
SFR-3P	5499.63	2-Oct-2020	163.04	5336.59	5337	Regional Aquifer – SFG sediments		5336.85	SNL/NM	DOE/NNSA
SFR-3S	5498.24	2-Oct-2020	162.06	5336.18	5336	Regional Aquifer – SFG sediments		5336.78	SNL/NM	DOE/NNSA
SFR-3T	5498.66	2-Oct-2020	68.49	5430.17	5430	Bedrock (sandstone)		5430.16	SNL/NM	DOE/NNSA
SFR-4P	5573.33	2-Oct-2020	151.15	5422.18	5422	Bedrock (sandstone)		5423.50	SNL/NM	DOE/NNSA
SFR-4T	5573.95	2-Oct-2020	148.32	5425.63	5426	Bedrock (sandstone)		5426.52	SNL/NM	DOE/NNSA
SWTA3-MW2	5325.60	6-Oct-2020	447.10	4878.50	4879	Regional Aquifer – SFG sediments		4877.65	SNL/NM	DOE/NNSA
SWTA3-MW3	5323.94	6-Oct-2020	445.85	4878.09	4878	Regional Aquifer – SFG sediments		4878.34	SNL/NM	DOE/NNSA
SWTA3-MW4	5324.81	6-Oct-2020	445.64	4879.17	4879	Regional Aquifer – SFG sediments		4878.42	SNL/NM	DOE/NNSA
TA1-W-01	5403.82	3-Nov-2020	527.92	4875.90	4876	Regional Aquifer – SFG sediments		4874.26	SNL/NM	DOE/NNSA
TA1-W-02	5416.62	3-Nov-2020	517.58	4899.04	4899	Regional Aquifer – SFG sediments		4898.68	SNL/NM	DOE/NNSA
TA1-W-03	5457.03	4-Nov-2020	dry	dry	dry	PGWS - SFG sediments		dry	SNL/NM	DOE/NNSA
TA1-W-04	5460.98	4-Nov-2020	564.30	4896.68	4897	Regional Aquifer – SFG sediments		4896.37	SNL/NM	DOE/NNSA
TA1-W-05	5433.84	3-Nov-2020	556.33	4877.51	4878	Regional Aquifer – SFG sediments		4878.30	SNL/NM	DOE/NNSA
TA1-W-06	5417.10	3-Nov-2020	310.18	5106.92	5107	PGWS - SFG sediments		5107.12	SNL/NM	DOE/NNSA
TA1-W-07	5404.92	3-Nov-2020	286.94	5117.98	5118	PGWS - SFG sediments		5118.23	SNL/NM	DOE/NNSA
TA1-W-08	5434.19	3-Nov-2020	312.33	5121.86	5122	PGWS - SFG sediments		5121.86	SNL/NM	DOE/NNSA
TA2-NW1-325	5421.94	4-Nov-2020	321.20	5100.74	5101	PGWS - SFG sediments		5101.14	SNL/NM	DOE/NNSA
TA2-NW1-595	5421.26	4-Nov-2020	517.04	4904.22	4904	Regional Aquifer – SFG sediments		4903.43	SNL/NM	DOE/NNSA
TA2-W-01	5419.99	4-Nov-2020	331.70	5088.29	5088	PGWS - SFG sediments		5088.50	SNL/NM	DOE/NNSA
TA2-W-19	5351.21	7-Oct-2020	274.97	5076.24	5076	PGWS - SFG sediments		5076.74	SNL/NM	DOE/NNSA
TA2-W-24	5363.66	7-Oct-2020	439.41	4924.25	4924	Regional Aquifer – SFG sediments		4923.86	SNL/NM	DOE/NNSA
TA2-W-25	5374.86	7-Oct-2020	463.58	4911.28	4911	Regional Aquifer – SFG sediments		4910.61	SNL/NM	DOE/NNSA
TA2-W-26	5375.77	7-Oct-2020	290.47	5085.30	5085	PGWS - SFG sediments		5085.58	SNL/NM	DOE/NNSA
TA2-W-27	5362.85	7-Oct-2020	283.16	5079.69	5080	PGWS - SFG sediments		5080.13	SNL/NM	DOE/NNSA
TA2-W-28	5412.41	7-Oct-2020	322.24	5090.17	5090	PGWS - SFG sediments		5090.61	SNL/NM	DOE/NNSA
TAV-MW2	5427.33	7-Oct-2020	510.44	4916.89	4917	Regional Aquifer – SFG sediments		4919.81	SNL/NM	DOE/NNSA
TAV-MW3	5464.30	6-Oct-2020	548.66	4915.64	4916	Regional Aquifer – SFG sediments		4915.85	SNL/NM	DOE/NNSA
TAV-MW4	5427.89	6-Oct-2020	510.40	4917.49	4917	Regional Aquifer – SFG sediments		4917.86	SNL/NM	DOE/NNSA
TAV-MW5	5408.71	7-Oct-2020	493.89	4914.82	4915	Regional Aquifer – SFG sediments		4915.83	SNL/NM	DOE/NNSA
TAV-MW6	5431.17	7-Oct-2020	513.85	4917.32	4917	Regional Aquifer – SFG sediments		4917.52	SNL/NM	DOE/NNSA
TAV-MW7	5430.40	7-Oct-2020	516.03	4914.37	4914	Regional Aquifer – SFG sediments		4914.43	SNL/NM	DOE/NNSA
TAV-MW8	5417.00	7-Oct-2020	499.06	4917.94	4918	Regional Aquifer – SFG sediments		4918.59	SNL/NM	DOE/NNSA
TAV-MW9	5416.27	7-Oct-2020	502.13	4914.14	4914	Regional Aquifer – SFG sediments		4914.44	SNL/NM	DOE/NNSA
TAV-MW10	5437.03	7-Oct-2020	520.19	4916.84	4917	Regional Aquifer – SFG sediments		4917.33	SNL/NM	DOE/NNSA
TAV-MW11	5440.12	7-Oct-2020	522.87	4917.25	4917	Regional Aquifer – SFG sediments		4917.57	SNL/NM	DOE/NNSA
TAV-MW12	5435.72	7-Oct-2020	519.57	4916.15	4916	Regional Aquifer – SFG sediments		4916.02	SNL/NM	DOE/NNSA
TAV-MW13	5409.02	7-Oct-2020	498.40	4910.62	4911	Regional Aquifer – SFG sediments		4911.25	SNL/NM	DOE/NNSA

Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020 *(Continued)*

Well ID	Measurement Point[a, b, c], ft amsl, NAVD 88	Date Measured, 2020	Depth to Water, ft btoc, 2020	Groundwater Elevation, ft amsl, 2020	Groundwater Elevation, rounded, ft amsl, 2020	Screened Unit	Comment, as needed	Groundwater Elevation, ft amsl, 2019	Data Source	Well Owner
TAV-MW14	5441.52	7-Oct-2020	526.65	4914.87	4915	Regional Aquifer – SFG sediments		4915.24	SNL/NM	DOE/NNSA
TAV-MW15	5437.32	7-Oct-2020	521.49	4915.83	4916	Regional Aquifer – SFG sediments		4916.40	SNL/NM	DOE/NNSA
TAV-MW16	5448.34	6-Oct-2020	532.89	4915.45	4915	Regional Aquifer – SFG sediments		4911.71	SNL/NM	DOE/NNSA
TJA-2	5353.20	7-Oct-2020	279.88	5073.32	5073	PGWS - SFG sediments		5073.62	SNL/NM	DOE/NNSA
TJA-3	5390.56	7-Oct-2020	498.63	4891.93	4892	Regional Aquifer – SFG sediments		4891.45	SNL/NM	DOE/NNSA
TJA-4	5341.16	7-Oct-2020	300.27	5040.89	5041	Merging zone – SFG sediments	NC - merging zone	5040.92	SNL/NM	DOE/NNSA
TJA-5	5341.33	7-Oct-2020	271.39	5069.94	5070	PGWS - SFG sediments		5070.15	SNL/NM	DOE/NNSA
TJA-6	5343.16	7-Oct-2020	450.77	4892.39	4892	Regional Aquifer – SFG sediments		4892.25	SNL/NM	DOE/NNSA
TJA-7	5391.27	7-Oct-2020	305.14	5086.13	5086	PGWS - SFG sediments		5086.04	SNL/NM	DOE/NNSA
TRE-1	5497.25	2-Oct-2020	178.55	5318.70	5319	Regional Aquifer – SFG sediments		5319.31	SNL/NM	DOE/NNSA
TRE-2	5497.20	nm	nm	nm	nm	Regional Aquifer – SFG sediments				
TRN-1	5735.62	5-Oct-2020	92.82	5642.80	5643	Bedrock (sandstone)		5642.98	SNL/NM	DOE/NNSA
TRS-1D	5779.80	5-Oct-2020	127.89	5651.91	5652	Bedrock (limestone)		5644.63	SNL/NM	DOE/NNSA
TRS-1S	5780.07	5-Oct-2020	135.57	5644.50	5645	Bedrock (limestone)		5644.08	SNL/NM	DOE/NNSA
TRS-2	5780.76	5-Oct-2020	136.12	5644.64	5645	Bedrock (limestone)		5651.96	SNL/NM	DOE/NNSA
WYO-3	5392.09	3-Nov-2020	516.47	4875.62	4876	Regional Aquifer – SFG sediments		4873.53	SNL/NM	DOE/NNSA
WYO-4	5392.57	3-Nov-2020	296.67	5095.90	5096	PGWS - SFG sediments		5095.68	SNL/NM	DOE/NNSA
Wells Owned by Other Entities										
Eubank-1	5460.02	19-Oct-2020	541.15	4918.87	4919	Regional Aquifer – SFG sediments		4915.02	SNL/NM	COA EHD
Eubank-2	5474.39	3-Sep-2020	571.48	4902.91	4903	Regional Aquifer – SFG sediments		4902.30	COA EHD	COA EHD
Eubank-3	5498.73	3-Sep-2020	600.30	4898.43	4898	Regional Aquifer – SFG sediments		4898.70	COA EHD	COA EHD
Eubank-5	5507.40	3-Sep-2020	609.35	4898.05	4898	Regional Aquifer – SFG sediments		4898.48	COA EHD	COA EHD
KAFB-0118	5320.75	13-Oct-2020	443.36	4877.39	4877	Regional Aquifer – SFG sediments		4873.94	KAFB	KAFB
KAFB-0119	5315.82	13-Oct-2020	438.83	4876.99	4877	Regional Aquifer – SFG sediments		4873.48	KAFB	KAFB
KAFB-0120	5292.29	13-Oct-2020	411.98	4880.31	4880	Regional Aquifer – SFG sediments		4876.86	KAFB	KAFB
KAFB-0121	5307.60	13-Oct-2020	430.69	4876.91	4877	Regional Aquifer – SFG sediments		4873.50	KAFB	KAFB
KAFB-0213	5283.29	13-Oct-2020	406.80	4876.49	4876	Regional Aquifer – SFG sediments		4886.86	KAFB	KAFB
KAFB-0219	5263.69	13-Oct-2020	388.23	4875.46	4875	Regional Aquifer – SFG sediments		4874.07	KAFB	KAFB
KAFB-0220	5265.10	13-Oct-2020	389.65	4875.45	4875	Regional Aquifer – SFG sediments		4872.69	KAFB	KAFB
KAFB-0221	5274.36	13-Oct-2020	399.00	4875.36	4875	Regional Aquifer – SFG sediments		4872.19	KAFB	KAFB
KAFB-0222	5247.65	13-Oct-2020	369.10	4878.55	4879	Regional Aquifer – SFG sediments		4875.69	KAFB	KAFB
KAFB-0223	5254.49	13-Oct-2020	376.18	4878.31	4878	Regional Aquifer – SFG sediments		4875.49	KAFB	KAFB
KAFB-0307	5364.53	14-Oct-2020	417.72	4946.81	4947	Regional Aquifer – SFG sediments		4944.48	KAFB	KAFB
KAFB-0308	5381.65	14-Oct-2020	443.48	4938.17	4938	Regional Aquifer – SFG sediments		4937.45	KAFB	KAFB
KAFB-0309	5411.80	14-Oct-2020	474.74	4937.06	4937	Regional Aquifer – SFG sediments		4935.63	KAFB	KAFB
KAFB-0310	5416.48	14-Oct-2020	355.23	5061.25	5061	PGWS - SFG sediments		5062.17	KAFB	KAFB
KAFB-0311	5353.29	14-Oct-2020	417.02	4936.27	4936	Regional Aquifer – SFG sediments		4935.26	KAFB	KAFB
KAFB-0312	5432.17	14-Oct-2020	416.94	5015.23	5015	Regional Aquifer – SFG sediments		5015.24	KAFB	KAFB
KAFB-0313	5418.98	nm	nm	nm	nm	PGWS - SFG sediments		5068.03	KAFB	KAFB
KAFB-0314	5455.75	14-Oct-2020	417.90	5037.85	5038	Regional Aquifer – SFG sediments		5038.71	KAFB	KAFB
KAFB-0315	5466.11	14-Oct-2020	438.18	5027.93	5028	Regional Aquifer – SFG sediments		5028.20	KAFB	KAFB
KAFB-0417	5313.07	2-Nov-2020	440.72	4872.35	4872	Regional Aquifer – SFG sediments		4868.85	KAFB	KAFB
KAFB-0504	5357.87	nm	nm	nm	nm	Regional Aquifer – SFG sediments		4872.73	KAFB	KAFB
KAFB-0505	5362.81	13-Oct-2020	488.91	4873.90	4874	Regional Aquifer – SFG sediments		4871.04	KAFB	KAFB
KAFB-0506	5363.47	13-Oct-2020	211.03	5152.44	5152	PGWS - SFG sediments		5153.36	KAFB	KAFB
KAFB-0507R	5358.21	19-Oct-2020	483.35	4874.86	4875	Regional Aquifer – SFG sediments		4871.48	KAFB	KAFB

Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020 *(Continued)*

Well ID	Measurement Point[a, b, c], ft amsl, NAVD 88	Date Measured, 2020	Depth to Water, ft btoc, 2020	Groundwater Elevation, ft amsl, 2020	Groundwater Elevation, rounded, ft amsl, 2020	Screened Unit	Comment, as needed	Groundwater Elevation, ft amsl, 2019	Data Source	Well Owner
KAFB-0508	5351.88	15-Oct-2020	477.02	4874.86	4875	Regional Aquifer – SFG sediments		4870.53	KAFB	KAFB
KAFB-0509	5441.56	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-0510	5367.10	15-Oct-2020	494.21	4872.89	4873	Regional Aquifer – SFG sediments		4869.75	KAFB	KAFB
KAFB-0512R	5302.73	19-Oct-2020	427.38	4875.35	4875	Regional Aquifer – SFG sediments		4871.99	KAFB	KAFB
KAFB-0514	5206.41	19-Oct-2020	331.85	4874.56	4875	Regional Aquifer – SFG sediments		4871.22	KAFB	KAFB
KAFB-0516	5205.64	19-Oct-2020	331.21	4874.43	4874	Regional Aquifer – SFG sediments		4871.22	KAFB	KAFB
KAFB-0517	5197.10	19-Oct-2020	325.30	4871.80	4872	Regional Aquifer – SFG sediments		4873.42	KAFB	KAFB
KAFB-0518	5177.76	19-Oct-2020	300.68	4877.08	4877	Regional Aquifer – SFG sediments		4873.87	KAFB	KAFB
KAFB-0519	5365.37	15-Oct-2020	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-0520	5247.90	15-Oct-2020	373.48	4874.42	4874	Regional Aquifer – SFG sediments		4871.01	KAFB	KAFB
KAFB-0521	5352.45	nm	nm	nm	nm	Regional Aquifer – SFG sediments	FLUTe well	nm	KAFB	KAFB
KAFB-0522	5267.48	15-Oct-2020	394.67	4872.81	4873	Regional Aquifer – SFG sediments		4869.87	KAFB	KAFB
KAFB-0523	5352.62	15-Oct-2020	473.62	4879.00	4879	Regional Aquifer – SFG sediments		4875.35	KAFB	KAFB
KAFB-0524	5345.61	15-Oct-2020	469.23	4876.38	4876	Regional Aquifer – SFG sediments		4872.87	KAFB	KAFB
KAFB-0525	5229.75	15-Oct-2020	nm	nm	nm	Regional Aquifer – SFG sediments		4872.52	KAFB	KAFB
KAFB-0611	5386.09	19-Oct-2020	472.73	4913.36	4913	Regional Aquifer – SFG sediments		4923.18	KAFB	KAFB
KAFB-0612	5385.45	26-Oct-2018	288.51	5096.94	5097	PGWS - SFG sediments		5096.94	KAFB	KAFB
KAFB-0613	5390.78	19-Oct-2020	353.08	5037.70	5038	Regional Aquifer – SFG sediments		5037.82	KAFB	KAFB
KAFB-0614	5390.89	29-Jan-2020	331.71	5059.18	5059	PGWS - SFG sediments		5059.11	KAFB	KAFB
KAFB-0615	5638.43	19-Oct-2020	209.94	5428.49	5428	Bedrock (granite)		5430.79	KAFB	KAFB
KAFB-0616	5481.07	19-Oct-2020	444.28	5036.79	5037	Regional Aquifer – SFG sediments		5037.46	KAFB	KAFB
KAFB-0617	5505.78	19-Oct-2020	555.48	4950.30	4950	Regional Aquifer – SFG sediments	NC - nearby fault	4949.48	KAFB	KAFB
KAFB-0618	5410.05	19-Oct-2020	484.21	4925.84	4926	Regional Aquifer – SFG sediments		4925.91	KAFB	KAFB
KAFB-0619	5410.78	19-Oct-2020	384.84	5025.94	5026	PGWS - SFG sediments		5025.78	KAFB	KAFB
KAFB-0620	5334.64	19-Oct-2020	442.40	4892.24	4892	Regional Aquifer – SFG sediments		4891.94	KAFB	KAFB
KAFB-0621	5569.89	19-Oct-2020	624.44	4945.45	4945	Regional Aquifer – SFG sediments	NC - nearby fault	4945.89	KAFB	KAFB
KAFB-0622	5488.64	19-Oct-2020	553.08	4935.56	4936	Regional Aquifer – SFG sediments		4936.22	KAFB	KAFB
KAFB-0623	5328.94	nm	nm	nm	nm	PGWS - SFG sediments		5069.48	KAFB	KAFB
KAFB-0624	5673.78	19-Oct-2020	769.55	4904.23	4904	Regional Aquifer – SFG sediments	NC - nearby fault	4904.57	KAFB	KAFB
KAFB-0625	5390.23	19-Oct-2020	473.19	4917.04	4917	Regional Aquifer – SFG sediments		4917.40	KAFB	KAFB
KAFB-0626	5331.21	nm	nm	nm	nm	Regional Aquifer – SFG sediments	FLUTe well	nm	KAFB	KAFB
KAFB-0901	5390.07	nm	nm	nm	nm	Regional Aquifer – SFG sediments		4922.00	KAFB	KAFB
KAFB-0903	5391.63	nm	nm	nm	nm	Above PGWS – SFG sediments	NC - semiconfined?	5155.08	KAFB	KAFB
KAFB-0904	5291.75	nm	nm	nm	nm	Regional Aquifer – SFG sediments	NC - semiconfined?	4940.07	KAFB	KAFB
KAFB-1001	5260.43	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1002	5254.75	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1003	5258.29	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1004	5258.81	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1005	5274.68	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1006	5257.01	5-Nov-2020	381.22	4875.79	4876	Regional Aquifer – SFG sediments		4876.73	KAFB	KAFB
KAFB-1007R	5260.62	5-Nov-2020	381.99	4878.63	4879	Regional Aquifer – SFG sediments		4876.97	KAFB	KAFB
KAFB-1008	5260.77	5-Nov-2020	379.51	4881.26	4881	Regional Aquifer – SFG sediments		4880.06	KAFB	KAFB
KAFB-1009	5272.16	5-Nov-2020	390.72	4881.44	4881	Regional Aquifer – SFG sediments		4879.27	KAFB	KAFB
KAFB-1021	5348.02	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1901	5751.58	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-1902	5754.27	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB

Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020 *(Continued)*

Well ID	Measurement Point[a, b, c], ft amsl, NAVD 88	Date Measured, 2020	Depth to Water, ft btoc, 2020	Groundwater Elevation, ft amsl, 2020	Groundwater Elevation, rounded, ft amsl, 2020	Screened Unit	Comment, as needed	Groundwater Elevation, ft amsl, 2019	Data Source	Well Owner
KAFB-1904	5752.29	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-2005	5624.27	nm	nm	nm	nm	Bedrock (granite)		5510.47	KAFB	KAFB
KAFB-2006	5590.88	nm	nm	nm	nm	Bedrock (granite)		5303.72	KAFB	KAFB
KAFB-2007	5564.48	nm	nm	nm	nm	Bedrock (granite)		5301.86	KAFB	KAFB
KAFB-2008	5541.74	2-Nov-2020	599.29	4942.45	4942	Regional Aquifer – SFG sediments		4943.96	KAFB	KAFB
KAFB-2009	5655.63	nm	nm	nm	nm	Bedrock (granite)		5579.67	KAFB	KAFB
KAFB-2622	5358.14	13-Oct-2020	dry	dry	dry	PGWS - SFG sediments		5148.70	KAFB	KAFB
KAFB-2623	5367.48	nm	nm	nm	nm	PGWS - SFG sediments		dry	KAFB	KAFB
KAFB-2624	5362.27	13-Oct-2020	dry	dry	dry	PGWS - SFG sediments		dry	KAFB	KAFB
KAFB-2625	5359.26	13-Oct-2020	199.14	5160.12	5160	PGWS - SFG sediments		5160.98	KAFB	KAFB
KAFB-2626	5357.51	13-Oct-2020	dry	dry	dry	PGWS - SFG sediments		5150.09	KAFB	KAFB
KAFB-2627	5367.47	nm	nm	nm	nm	PGWS - SFG sediments		dry	KAFB	KAFB
KAFB-2628	5369.64	19-Oct-2020	494.88	4874.76	4875	Regional Aquifer – SFG sediments		4870.97	KAFB	KAFB
KAFB-2629	5361.53	19-Oct-2020	488.31	4873.22	4873	Regional Aquifer – SFG sediments		4871.55	KAFB	KAFB
KAFB-2630	5361.71	13-Oct-2020	213.19	5148.52	5149	Above PGWS – SFG sediments		nm	KAFB	KAFB
KAFB-2631	5335.70	13-Oct-2020	dry	dry	dry	Above PGWS – SFG sediments		nm	KAFB	KAFB
KAFB-2632	5329.08	13-Oct-2020	172.13	5156.95	5157	Above PGWS – SFG sediments		nm	KAFB	KAFB
KAFB-2901	5839.08	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-2902	5832.10	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-2903	5819.46	nm	nm	nm	nm	Bedrock (Abo Formation) siltstone and shale		nm	KAFB	KAFB
KAFB-2904	5842.72	nm	nm	nm	nm	Bedrock (Madera Formation) limestone		nm	KAFB	KAFB
KAFB-3391	5396.60	nm	nm	nm	nm	PGWS - SFG sediments		5119.83	KAFB	KAFB
KAFB-3392	5394.51	nm	nm	nm	nm	Regional Aquifer – SFG sediments		4870.49	KAFB	KAFB
KAFB-3411	5342.81	nm	nm	nm	nm	Regional Aquifer – SFG sediments		4872.88	KAFB	KAFB
KAFB-6241	5466.50	nm	nm	nm	nm	Regional Aquifer – SFG sediments		4925.90	KAFB	KAFB
KAFB-6243	5423.48	2-Nov-2020	502.26	4921.22	4921	Regional Aquifer – SFG sediments		4925.22	KAFB	KAFB
KAFB-6301	5459.64	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-7001	5322.87	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
KAFB-8281	5401.03	nm	nm	nm	nm	Regional Aquifer – SFG sediments		4872.33	KAFB	KAFB
KAFB-8282	5402.92	nm	nm	nm	nm	PGWS - SFG sediments		5131.57	KAFB	KAFB
KAFB-8351	5325.51	2-Nov-2020	445.72	4879.79	4880	Regional Aquifer – SFG sediments		4876.77	KAFB	KAFB
KAFB-ST105-EX01	5353.54	nm	nm	nm	nm	Regional Aquifer – SFG sediments		nm	KAFB	KAFB
Mesa del Sol-S	5302.67	2-Oct-2020	420.50	4882.17	4882	Regional Aquifer – SFG sediments		4881.32	USGS	NMOSE
Montessa Park-S	5102.67	6-Oct-2020	212.83	4889.84	4890	Regional Aquifer – SFG sediments		4887.48	USGS	ABCWUA
Site 58 MW-1	5721.74	nm	nm	nm	nm	Sandy gravel colluvium and granite		nm	KAFB	KAFB
Site 58 MW-2	5715.94	nm	nm	nm	nm	Bedrock (granite)		nm	KAFB	KAFB
Site 58 MW-3	5717.88	nm	nm	nm	nm	Sandy gravel colluvium?		nm	KAFB	KAFB
Site 58 MW-4	5722.31	nm	nm	nm	nm	Granite		nm	KAFB	KAFB
Site 58 MW-5	5716.83	nm	nm	nm	nm	Sandy gravel colluvium?		5654.96	KAFB	KAFB
Site 58 MW-6	5720.30	nm	nm	nm	nm	Sandy gravel colluvium and granite?		nm	KAFB	KAFB
Site 58 MW-7	5717.76	nm	nm	nm	nm	Sandy gravel colluvium and granite?		nm	KAFB	KAFB
ST105-MW001	5279.34	15-Oct-2020	402.74	4876.60	4877	Regional Aquifer – SFG sediments		4873.13	KAFB	KAFB
ST105-MW002	5180.32	15-Oct-2020	303.68	4876.64	4877	Regional Aquifer – SFG sediments		4873.40	KAFB	KAFB
ST105-MW003	5174.61	15-Oct-2020	298.08	4876.53	4877	Regional Aquifer – SFG sediments		4873.39	KAFB	KAFB
ST105-MW004	5234.61	19-Oct-2020	359.04	4875.57	4876	Regional Aquifer – SFG sediments		4872.37	KAFB	KAFB

Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020 *(Continued)*

Well ID	Measurement Point[a, b, c], ft amsl, NAVD 88	Date Measured, 2020	Depth to Water, ft btoc, 2020	Groundwater Elevation, ft amsl, 2020	Groundwater Elevation, rounded, ft amsl, 2020	Screened Unit	Comment, as needed	Groundwater Elevation, ft amsl, 2019	Data Source	Well Owner
ST105-MW005	5287.57	nm	nm	nm	nm	Regional Aquifer – SFG sediments	NC - semiconfined?	4990.02	KAFB	KAFB
ST105-MW006	5313.26	19-Oct-2020	236.72	5076.54	5077	PGWS - SFG sediments		5076.67	KAFB	KAFB
ST105-MW007	5311.18	nm	nm	nm	nm	Regional Aquifer – SFG sediments	NC - semiconfined?	4993.77	KAFB	KAFB
ST105-MW008	5358.94	19-Oct-2020	477.80	4881.14	4881	Regional Aquifer – SFG sediments		4881.15	KAFB	KAFB
ST105-MW009	5519.71	19-Oct-2020	485.94	5033.77	5034	Regional Aquifer – SFG sediments		5034.43	KAFB	KAFB
ST105-MW010	5334.70	19-Oct-2020	444.40	4890.30	4890	Regional Aquifer – SFG sediments		4889.99	KAFB	KAFB
ST105-MW011	5422.66	15-Oct-2020	483.67	4938.99	4939	Regional Aquifer – SFG sediments		4938.93	KAFB	KAFB
ST105-MW012	5419.90	nm	nm	nm	nm	PGWS - SFG sediments		5035.80	KAFB	KAFB
ST105-MW013	5447.27	19-Oct-2020	436.48	5010.79	5011	Regional Aquifer – SFG sediments		5010.59	KAFB	KAFB
ST105-MW015	5623.95	19-Oct-2020	686.86	4937.09	4937	Regional Aquifer – SFG sediments	NC - nearby fault	4935.95	KAFB	KAFB
ST105-MW017	5621.97	19-Oct-2020	705.88	4916.09	4916	Regional Aquifer – SFG sediments	NC - nearby fault	4915.44	KAFB	KAFB
ST105-MW018	5221.68	19-Oct-2020	345.82	4875.86	4876	Regional Aquifer – SFG sediments		4872.72	KAFB	KAFB
ST105-MW019	5217.94	19-Oct-2020	342.13	4875.81	4876	Regional Aquifer – SFG sediments		4872.50	KAFB	KAFB
ST105-MW020	5383.72	29-Oct-2020	299.76	5083.96	5084	PGWS - SFG sediments		5086.00	KAFB	KAFB
ST105-MW021	5390.90	nm	nm	nm	nm	PGWS - SFG sediments		5059.86	KAFB	KAFB
ST105-MW022	5386.66	19-Oct-2020	470.08	4916.58	4917	Regional Aquifer – SFG sediments		4916.97	KAFB	KAFB
ST105-MW023	5275.86	19-Oct-2020	400.24	4875.62	4876	Regional Aquifer – SFG sediments		4872.22	KAFB	KAFB
ST105-MW024	5595.67	19-Oct-2020	346.19	5249.48	5249	Bedrock (granite)		5253.38	KAFB	KAFB
YALE-MW1	5308.45	2-Sep-2020	416.60	4891.85	4892	Regional Aquifer – SFG sediments		4889.33	ABCWUA	ABCWUA
YALE-MW9	5271.06	2-Sep-2020	372.87	4898.19	4898	Regional Aquifer – SFG sediments		4896.35	ABCWUA	ABCWUA
4-HILLS-1	5554.17	nm	nm	nm	nm	Alluvial sands and gravels		nm	COA EHD	COA EHD

Table 2. Base-Wide Groundwater Elevations for Active Monitoring Wells Located at Sandia National Laboratories, New Mexico and the Kirtland Air Force Base Vicinity for Calendar Year 2020 *(Concluded)*

Notes:

[a] Measuring point is the top of casing elevation used for measuring and calculating groundwater elevations.

[b] Elevations are relative to the North American Vertical Datum of 1988 (NAVD 88), New Mexico State Plane Coordinate System, Central Zone. Where necessary, elevation data from other government agencies that was based on the National Geodetic Vertical Datum of 1929 (NGVD 29) were converted (re-projected) by +2.671 ft.

[c] Well construction details are listed in Table 1.

ABCWUA	= Albuquerque Bernalillo County Water Utility Authority.
AVN	= Area-V (North).
BW	= Background Well.
CCBA	= Coyote Canyon Blast Area.
COA EHD	= City of Albuquerque Environmental Health Department.
corrected	= MWL-MW4 depth to groundwater was corrected for the inclined well casing (6 degrees).
CTF	= Coyote Test Field.
CWL	= Chemical Waste Landfill.
CYN	= Canyons (Lurance Canyon area).
D	= Deep (deeper bedrock well completion) at TRS wells.
dry	= Water was not present in the well screen.
EX	= Well proposed for extraction purposes but used for monitoring purposes only. This applies to the well number for ST105-EX01screened unit maybe under semiconfined conditions or is hydraulically isolated.
FLUTe	= Flexible Liner Underground Technologies, LLC.
ft amsl	= feet above mean sea level.
ft btoc	= feet below top of casing (feet below the measuring point).
ID	= Identifier.
ITRI	= Inhalation Toxicology Research Institute.
KAFB	= Kirtland Air Force Base.
LRRI	= Lovelace Respiratory Research Institute (formerly ITRI).
LWDS	= Liquid Waste Disposal System.
MP	= measuring point (typically the top of PVC [polyvinyl chloride] well casing).
MRN	= Magazine Road North.
MVMW	= Mountain View Monitoring Well.
MW	= Monitoring Well.
MWL	= Mixed Waste Landfill.
NAVD 88	= North American Vertical Datum of 1988.
NC	= Not contoured (see explanations below).
NC – alluvium	= Well is screened in alluvium along the arroyo channel.
NC – deeper fracture	= Well is screened in a deeper fracture zone at the Burn Site.
NC – merging zone	= Well is screened in a merging zone between the Regional Aquifer and the PGWS.
NC – nearby fault	= A buried (unmapped) fault appears to have a localized effect on groundwater.
NC – semiconfined	= The screened unit maybe under semiconfined conditions or is hydraulically isolated.
NM	= not measured.
NMOSE	= New Mexico Office of the State Engineer.
NWTA3	= Northwest Technical Area-III.
OBS	= Old Burn Site.
PGS	= Parade Ground South.
PGWS	= Perched Groundwater System.
PL	= Power Line road (northwest of Technical Area-III).
R	= Replacement well (term used by KAFB).
S	= Shallow (shallower bedrock well completion) at TRS well.
SFG	= Santa Fe Group.
SFR	= South Fence Road.
SNL/NM	= Sandia National Laboratories, New Mexico.
ST105	= Series of KAFB/USAF wells for nitrate abatement study.
SWTA3	= Southwest Technical Area-III.
TA1-W	= Technical Area-I (Well).
TA2-NW	= Technical Area-II (Northwest).
TA2-SW	= Technical Area II (Southwest).
TA2-W	= Technical Area-II (Well).
TAV	= Technical Area-V (monitoring well designation).
TJA	= Tijeras Arroyo.
TRE	= Thunder Road East.
TRN	= Target Road North.
TRS	= Target Road South.
USGS	= U.S. Geological Survey.
W	= well.
WYO	= Wyoming.
YALE	= Yale Boulevard area.
?	= Accuracy of Information or interpretation is questionable.

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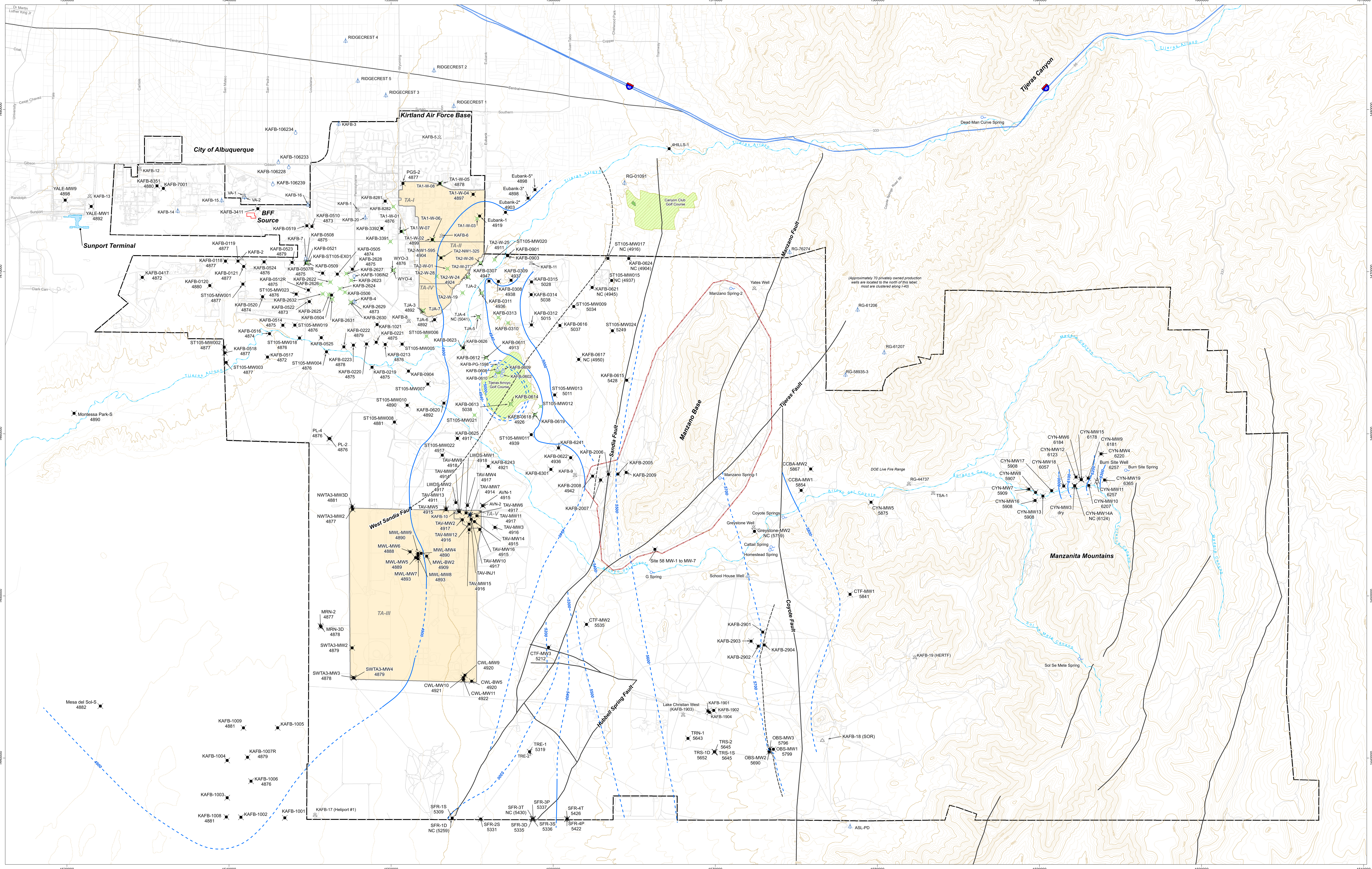

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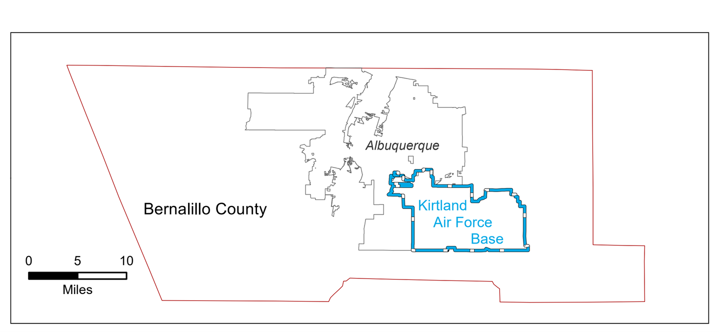
Miles: 0 0.5 1
Kilometers: 0 0.75 1.5



Legend

- Monitoring Well, Regional Aquifer / Fractured Bedrock System
- Monitoring Well, Perched Groundwater System
- Production Well, potable
- Production Well, non-potable
- Production Well, plugged and abandoned
- Extraction Well
- Extraction Well, plugged and abandoned
- Injection Well
- Spring, current or historical flow
- NC Not Contoured
- * See Note 3
- Potentiometric surface contour (ft amsl),
- dashed where uncertain
- Fault, exposed and concealed
- Fault, fully concealed
- Surface drainage, arroyo
- Ground surface contour (40 ft interval)
- Bulk Fuels Facility, KAFB
- Golf Course
- Golf Course Main Pond
- SNL/NM Technical Area (TA) boundary
- Manzano Base boundary
- Kirtland Air Force Base (KAFB) boundary
- Road, paved and unpaved

NOTES:

1. Groundwater elevations for the Regional Aquifer and the Fractured Bedrock System are shown for monitoring wells located near SNL/NM facilities. The wells with no available recent groundwater elevation have no value plotted.
2. Monitoring wells with anomalous groundwater elevations in the Regional Aquifer or Fractured Bedrock System are shown with an NC (not contoured) label next to the value. Table 2 states the rationale.
3. Groundwater elevations are rounded to the nearest foot. Water levels were measured at SNL/NM wells between 1 October and 4 November 2020. Wells owned by other entities that were measured outside this date range are noted by an asterisk next to the well number. Groundwater elevations and measurement dates are listed in Table 2.
4. Groundwater elevations were not used for production-potable wells.
5. Groundwater elevations for monitoring wells screened in the Perched Groundwater System are not plotted. A potentiometric surface figure for the Perched Groundwater System is presented in Chapter 6.
6. Potentiometric surface contours for the Regional Aquifer are primarily shown using two intervals: below 5000 ft amsl the contour intervals are 40 and 60 feet; above 5000 ft amsl the contour interval is 100 feet.
7. Most of the monitoring wells located near the KAFB Bulk Fuels Facility and at KAFB Site 58 are not plotted.
8. Decommissioned (plugged and abandoned) monitoring wells are not shown.
9. Principal faults are derived from GRAM and Lettis (1995), Karlstrom et al. (2000), and Van Hart (2003). The dashed faults located near wells KAFB-2007 and OBS-MW1 are inferred from groundwater elevations.
10. West of the Sandia Fault, the Regional Aquifer is present within the unconsolidated Santa Fe Group sediments. Groundwater within and east of the Tijeras Fault Zone (bounded by the Sandia and Tijeras Faults) is primarily present in the Paleozoic and Precambrian bedrock.
11. The West Sandia Fault does not affect the alluvial-fan sediments at the water table.
12. Coordinates for some KAFB production wells were more accurately plotted using ortho-rectified aerial photography (Copland July 2018).

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Plate 1
Potentiometric Surface for the Regional Aquifer and the Fractured Bedrock System at Sandia National Laboratories, New Mexico and Kirtland Air Force Base for Calendar Year 2020

Transverse Mercator Projection
New Mexico State Plane Coordinate System, Central Zone
1983 North American Horizontal Datum
1988 North American Vertical Datum

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