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Annual Groundwater Monitoring Report

Prepared by
Sandia National Laboratories, Albuquerque, New Mexico

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Annual Groundwater Monitoring Report
Calendar Year 2016

Long-Term Stewardship Consolidated Groundwater Monitoring Program
Sandia National Laboratories, New Mexico
June 2017

Prepared by:
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Abstract

Sandia National Laboratories, New Mexico (SNL/NM) is a government-owned/contractor-operated laboratory. National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., manages and operates SNL/NM for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA). The DOE/NNSA Sandia Field Office administers the contract and oversees contractor operations at the site. Two types of groundwater surveillance monitoring are conducted at SNL/NM: (1) on a site-wide basis as part of the SNL/NM Long-Term Stewardship (LTS) Program's Groundwater Monitoring Program (GMP) Groundwater Surveillance Task and (2) on a site-specific groundwater monitoring at LTS/Environmental Restoration (ER) Operations sites with ongoing groundwater investigations.

This Annual Groundwater Monitoring Report summarizes data collected during groundwater monitoring events conducted at GMP locations and at the following SNL/NM sites through December 31, 2016: Burn Site Groundwater Area of Concern (AOC); Chemical Waste Landfill; Mixed Waste Landfill; Technical Area-V Groundwater AOC; and the Tijeras Arroyo Groundwater AOC. Environmental monitoring and surveillance programs are required by the New Mexico Environment Department (NMED) and DOE Order 436.1, *Departmental Sustainability,* and DOE Order 231.1B, *Environment, Safety, and Health Reporting*.

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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
AVN	Area V (North)
BFF	Bulk Fuels Facility
BGW	Balleau Groundwater, Inc.
bgs	below ground surface
BSG	Burn Site Groundwater (AOC)
btoc	below top of casing
BW	background well
$CaCO_3$	calcium carbonate
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
DI	deionized
DO	dissolved oxygen
DOE	U.S. Department of Energy
DP	Discharge Permit
DRO	diesel range organics
DSS	Drain and Septic System
dup	duplicate (environmental or laboratory duplicate)
EB	equipment blank
ECP	Environmental Compliance Program
EDMS	Environmental Data Management System
EHD	Environmental Health Department
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ET	evapotranspirative
FB	field blank

Abbreviations and Acronyms (continued)

Final Closure Plan	*Chemical Waste Landfill Final Closure Plan and Postclosure Permit Application*
FOP	Field Operating Procedure
FY	Fiscal Year
GEL	GEL Laboratories LLC
GMP	Groundwater Monitoring Program
GRO	gasoline range organics
GWQB	Ground Water Quality Bureau
HASL	Health and Safety Laboratory
HE	high explosive
HPT	High Performing Team
HSWA	Hazardous and Solid Waste Amendments
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HWB	Hazardous Waste Bureau
ID	identifier
IMWP	Interim Measures Work Plan
IRP	Installation Restoration Program (USAF)
IRR	Internal Remedy Reviews
ISB	in-situ bioremediation
IT	IT Corporation
JP-4	jet propellant, fuel grade 4
JP-8	jet propellant, fuel grade 8
KAFB	Kirtland Air Force Base
LCS	laboratory control sample
LRRI	Lovelace Respiratory Research Institute
LTMM	Long-Term Monitoring and Maintenance
LTMMP	Long-Term Monitoring and Maintenance Plan
LTS	Long-Term Stewardship
LWDS	Liquid Waste Disposal System
MAC	maximum allowable concentration (established by the NMED)
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
MNA	Monitored Natural Attenuation
MW	monitoring well
MWL	Mixed Waste Landfill
N	nitrogen
NA	not applicable
NAVD 88	North American Vertical Datum of 1988
NC	Not Contoured
ND	not detected
NE	not established
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department

Abbreviations and Acronyms (concluded)

NMOSE	New Mexico Office of the State Engineer
NMWQCC	New Mexico Water Quality Control Commission
NNSA	National Nuclear Security Administration
No.	number
NOD	Notice of Disapproval or Notice of Deficiency
NPN	nitrate plus nitrite
NW	northwest
O	oxygen
OB	Oversight Bureau
ORP	oxidation-reduction potential
OU	Operable Unit
PCCP	Post-Closure Care Permit
Permit	Resource Conservation and Recovery Act Facility Operating Permit
PGS	Parade Ground South
PGWS	Perched Groundwater System, only used on figures and tables
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RPD	relative percent difference
RSI	Request for Supplemental Information
SAP	Sampling and Analysis Plan
SC	specific conductivity
SFG	Santa Fe Group
SFO	Sandia Field Office
SM	standard method
SMO	Sample Management Office
SNL/NM	Sandia National Laboratories, New Mexico
SRNL	Savannah River National Laboratory
SU	standard unit(s)
SVOC	semivolatile organic compound
SW	solid waste
SWHC	Site-Wide Hydrogeologic Characterization
SWMU	solid waste management unit
TA	Technical Area
TAG	Tijeras Arroyo Groundwater (AOC)
TAL	Target Analyte List
TAV	Technical Area-V
TAVG	Technical Area-V Groundwater (AOC)
TB	trip blank
TCE	trichloroethene (equivalent to trichlorethylene)
Tetryl	methyl 2,4,6-trinitrophenylnitramine
TOC	total organic carbon

Abbreviations and Acronyms (concluded)

TOX	total organic halogens
TPH	total petroleum hydrocarbons
TSWP	Treatability Study Work Plan
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USGS	U.S. Geological Survey
VA	Veterans Administration
VCM	voluntary corrective measure
VOC	volatile organic compound
WL	water level
WQ	water quality

Units

%	percent
% Sat	percent saturation
°C	degrees Celsius.
µg/L	micrograms per liter (equivalent to ppb)
µmhos/cm	micromhos per centimeter
AF/yr	acre-feet per year
CF/yr	cubic-feet per year
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
in/yr	inches per year
Ma	Mega Annum (million years)
Meq/L	milliequivalents per liter
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
ppm	parts per million
rem	roentgen equivalent man
sq mi	square miles
SU	standard units
yr	years

Well Location Descriptions

ASL PD	Albuquerque Seismological Laboratory Production (well)
AVN-#	Area V (North)
CCBA-#	Coyote Canyon Blast Area
CTF-#	Coyote Test Field
CWL-#	Chemical Waste Landfill
CYN-#	Lurance Canyon
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 BFF and the KAFB Tijeras Arroyo Golf Course.
Greystone-#	Greystone
HERTF	High Energy Research Test Facility
IP	Isleta Pueblo
Inj	Injection well
ITRI	Inhalation Toxicology Research Institute
KAFB	Kirtland Air Force Base
LMF	Large Melt Facility
LWDS-#	Liquid Waste Disposal System
MP-#	Montessa Park
MRN-#	Magazine Road North
MVMW#	Mountain View Monitoring Well
MWL-#	Mixed Waste Landfill
NMED-#	New Mexico Environment Department
NWTA3-#	Northwest Technical Area-III
OBS-#	Old Burn Site
PGS-#	Parade Ground South
PL-#	Power Line Road, west
SFR-#	South Fence Road
STW-#	Solar Tower (West)
SWTA-#	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
TJA-#	Tijeras Arroyo
TRE-#	Thunder Road East
TRN-#	Target Road North
TRS-#	Target Road South
TSA-#	Transportation Safeguards Academy
WYO-#	Wyoming
VA	Veterans Administration
12AUP-#	ER Site 12A Underflow Piezometer

Meteorological Towers

SC1	School House
A-21	TA-I
A-36	TA-III and TA-V
KABQ	Albuquerque International Sunport (National Weather Service)

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Annual Groundwater Monitoring Report

Executive Summary

Sandia National Laboratories, New Mexico (SNL/NM) conducts groundwater surveillance monitoring for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA). Monitoring is conducted on a site-wide basis as part of the SNL/NM Long-Term Stewardship (LTS) Program's Groundwater Monitoring Program (GMP) Groundwater Surveillance Task, and on a site-specific basis at LTS/Environmental Restoration (ER) Operations sites with ongoing groundwater investigations. 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 and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the DOE's NNSA under contract DE-NA-0003525.

This Annual Groundwater Monitoring Report (AGMR) documents the results of the groundwater monitoring activities at SNL/NM for Calendar Year (CY) 2016. This report has been prepared to meet the environmental reporting requirements for the CY 2016 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 Administration, 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 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 [ft] below ground surface [bgs]) and the more shallow bedrock aquifer systems within the uplifted areas (generally between 50 to 325 ft bgs).

The remaining chapters focus on the investigation activities at each of the following monitoring networks maintained at SNL/NM: 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).

The LTS Program monitors the GMP network to provide site-wide characterization data. In addition, SNL/NM LTS/ER Operations maintain five site-specific groundwater monitoring networks at the following locations:

- CWL
- MWL
- TAVG AOC

- TAG AOC
- BSG AOC

At SNL/NM, Solid Waste Management Units (SWMUs) are regulated under the SNL/NM Resource Conservation and Recovery Act (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 Compliance Order on Consent (Consent Order) governs corrective actions for these sites and, accordingly, monitoring 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 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. 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. Groundwater monitoring requirements, procedures, and protocols are detailed in the CWL PCCP Attachment 2, Groundwater Sampling and Analysis Plan.

Groundwater Quality Monitoring Activities and Results

During CY 2016, groundwater samples were collected from monitoring wells for the six investigations (GMP and five LTS/ER Operations sites). The analytical results for samples from all monitoring wells were compared with maximum contaminant levels (MCLs) established by the U.S. Environmental Protection Agency (EPA). 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, 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 January 2016 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 2016, groundwater elevations were measured in 218 wells and groundwater samples were collected from 12 monitoring wells (Greystone-MW2, MRN-2, MRN-3D, NWTA3-MW3D, PL-2, PL-4, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1), and one surface water sample 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), general chemistry, Target Analyte List (TAL) metals plus total uranium, mercury, total cyanide, gross alpha/beta activity, radionuclides by gamma spectroscopy, radium-226, and radium-228. Additional samples were collected at selected monitoring wells for analysis of high explosive (HE) compounds and isotopic uranium. No analytes were detected at concentrations exceeding the associated MCLs or MACs, except for beryllium and fluoride. Fluoride was detected above the MAC of 1.6 milligrams per liter (mg/L) in the environmental sample from monitoring well SFR-4T at a concentration of 2.64 mg/L. The results are similar to historical concentrations. Beryllium was detected above the MCL of 0.004 mg/L in the

environmental surface water sample from Coyote Springs at a concentration of 0.0069 mg/L, which is similar to historical concentrations and is considered to be of natural origin.

Water levels were measured at monitoring wells by SNL/NM personnel either quarterly or annually depending on the response characteristics of the groundwater system. The water levels were used to construct contours of the potentiometric surface. The contours display a pattern that reflects the impact of the groundwater withdrawal by water supply 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 2016 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 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 2016, groundwater elevations were measured and groundwater samples were collected from four monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11). Groundwater samples during the January sampling event were analyzed for trichloroethene (TCE), 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene, 1,1-dichloroethene, chloroform, trichlorofluoromethane, nickel, and chromium; groundwater samples during the July sampling event were analyzed for TCE, nickel, and chromium. No analytes were detected at concentrations exceeding the associated MCLs in the CWL groundwater samples. The analytical results are comparable to historical values. Other activities conducted at the CWL during CY 2016 include site inspections, cover maintenance, and soil-vapor sampling.

Mixed Waste Landfill

Chapter 4.0 discusses the semiannual groundwater monitoring activities conducted in April and October 2016 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 and 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 Long-Term Monitoring and Maintenance Plan (LTMMP). During CY 2016, 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, tritium, and radon-222. No analytes were detected at concentrations exceeding the associated MCLs or MWL-specific trigger levels, and the analytical results are comparable to historical values. Other activities conducted at the MWL during CY 2016 include cover maintenance, soil-vapor sampling, inspections, and other monitoring required by 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 SNL RCRA Facility Operating Permit.

Technical Area-V Groundwater Area of Concern

Chapter 5.0 discusses the quarterly groundwater monitoring activities conducted during February-March, May, July-August, and October-November 2016 at the TAVG AOC. The site is located in the northeast corner of TA-III. Several wastewater facilities were used at the site from the 1960s to the early 1990s. Both TCE and nitrate have been identified as constituents of concern in groundwater at the TAVG AOC based on detections above the MCLs. Activities at this site are regulated under the requirements of the

Consent Order. During CY 2016, groundwater elevations were measured and groundwater samples were collected from 16 monitoring wells (AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14). Groundwater samples were analyzed for VOCs, total organic carbon, NPN, general chemistry, metals (iron and manganese) or TAL metals plus total uranium, sulfides, gross alpha/beta activity, radionuclides by gamma spectroscopy, 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 monitoring wells AVN-1, LWDS-MW1, TAV-MW6, TAV-MW10, and TAV-MW14, with a maximum concentration of 15.2 mg/L in the sample from monitoring well TAV-MW10 collected in May. TCE concentrations exceeded the MCL of 5 micrograms per liter (µg/L) in samples from monitoring wells LWDS-MW1, TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14 with a maximum concentration of 19.2 µg/L in the sample from monitoring well LWDS-MW1 collected in February. The analytical results of TCE in the other eleven monitoring wells are below the MCL and are consistent with historical concentrations. Other activities conducted at TAVG AOC during CY 2016 include preparation of documents related to a Treatability Study, and starting the installation of two new groundwater monitoring wells (TAV-MW15 and TAV-MW16).

Tijeras Arroyo Groundwater Area of Concern

Chapter 6.0 discusses the quarterly groundwater monitoring activities conducted during March, June, August-September, and December 2016 at 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 has been impacted since the late 1940s and includes numerous potential SNL/NM and non-SNL/NM wastewater sources. Activities at this site are regulated under the requirements of the Consent Order. During CY 2016, groundwater elevations were measured in 30 monitoring wells and groundwater samples were collected from 20 monitoring wells (PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, 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, and WYO-3). Groundwater samples were analyzed for VOCs, NPN, general chemistry, TAL metals plus total uranium, gross alpha/beta activity, radionuclides by gamma spectroscopy, 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 monitoring wells TA2-W-19, TA2-W-28, TJA-2, TJA-4, and TJA-7, with a maximum concentration of 32.9 mg/L in the sample from monitoring well TJA-4 collected in December. 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 and TA2-W-19.

Burn Site Groundwater Area of Concern

Chapter 7.0 discusses the semiannual groundwater monitoring activities conducted in April and October, 2016 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 in 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 Production Well. Activities at this site are regulated under the requirements of the Consent Order. During CY 2017, groundwater elevations were measured in 12 wells and groundwater samples were collected from 10 wells (CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, and CYN-MW15). Samples were analyzed for VOCs, HE compounds, total petroleum hydrocarbons (TPH)-diesel range organics, TPH-gasoline range organics, NPN, general chemistry, TAL metals plus total uranium, perchlorate (at CYN-MW15 only), gross alpha/beta activity, radionuclides by gamma spectroscopy, 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-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A,

and CYN-MW15) with a maximum concentration of 38.8 mg/L in the sample from monitoring well CYN-MW13, collected in April. The nitrate concentration trends in these wells have increased slightly over the past year. Other activities conducted at the BSG AOC include submitting the Aquifer Pumping Test Work Plan.

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 2017, in accordance with regulatory requirements. The results for these monitoring events will be presented in the Annual Groundwater Monitoring Report for CY 2017.

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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). Monitoring is conducted on a site-wide basis as part of the SNL/NM Long-Term Stewardship (LTS) Program's Groundwater Monitoring Program (GMP) Groundwater Surveillance Task, and site-specific groundwater monitoring at LTS/Environmental Restoration (ER) Operations sites with ongoing groundwater investigations. 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) 2016.

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

- LTS Consolidated 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), and
- 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. The range of elevations is 5,162 to 7,986 ft above mean sea level. 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 9.45 inches (Chapter 2.6.2.1). Approximately half of this precipitation occurs from June through August due to brief, intense thunderstorms. 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 3 miles.

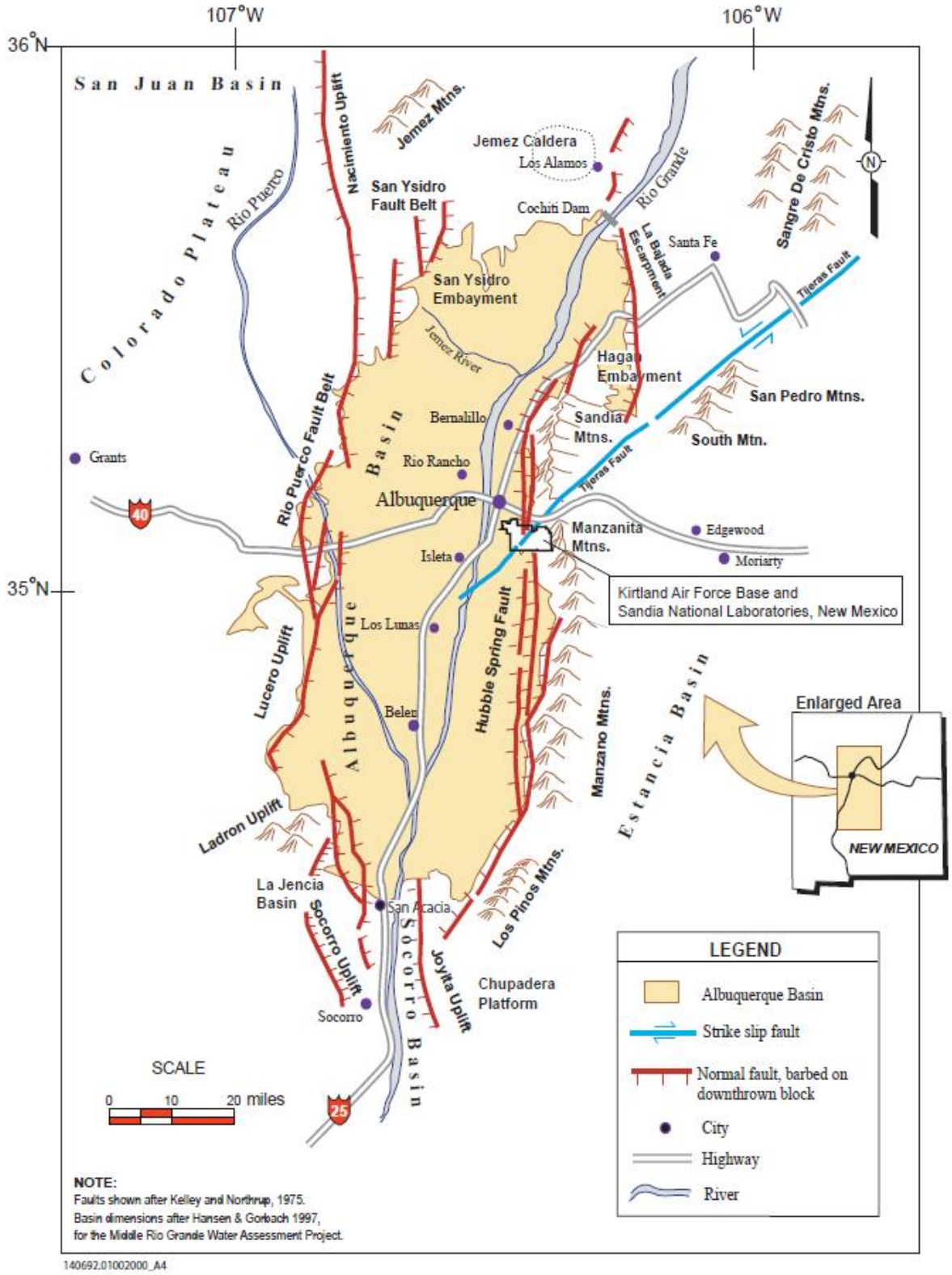

Figure 1-1. Albuquerque Basin, North-Central New Mexico

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. The thickness of the Santa Fe Group 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 Santa Fe Group 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.

As shown on Figures 1-2 and 1-3, the four primary faults on the east side of KAFB are (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 in the vicinity of the Tijeras Fault. The Sandia and the Hubbell Spring Faults are north-south trending, down to the west, en-echelon normal faults bounding the east side of the Albuquerque Basin.

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 at least 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.

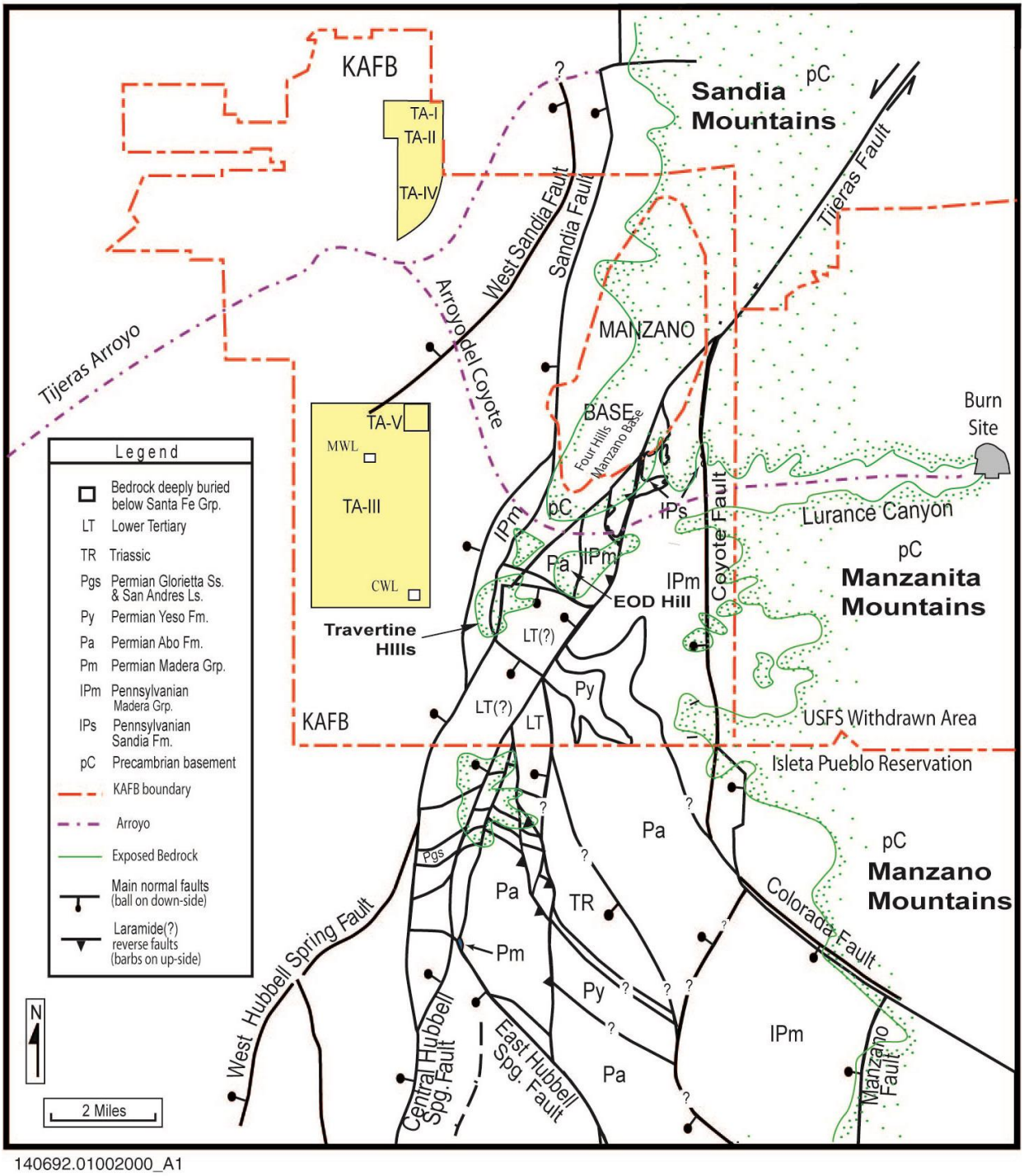

Figure 1-2. Generalized Geology in the Vicinity of SNL/NM and KAFB (Van Hart June 2003)

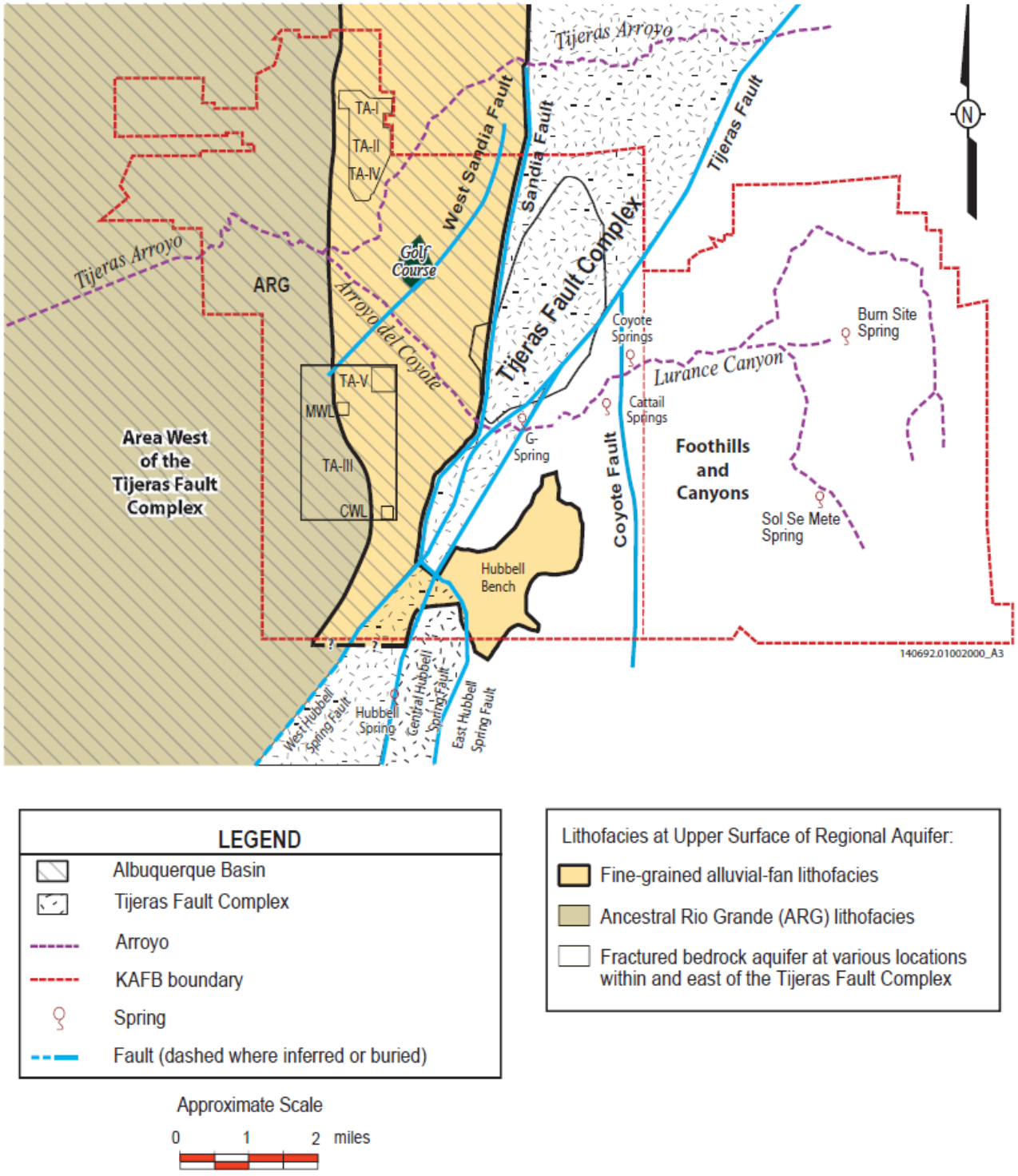

Figure 1-3. Hydrogeologically Distinct Areas Primarily Controlled by Faults (Modified from SNL March 1996)

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. A Perched Groundwater System lies above the Regional Aquifer in the vicinity of TA-I, TA-II, and TA-IV in the TAG AOC. The Perched Groundwater System is not shown on Figure 1-3, but is discussed in detail in Chapter 6.0. The Perched Groundwater System extends northward from the KAFB Golf Course area to TA-I, west of TA-II, and along the west side of the active KAFB Landfill. Possible recharge sources for the Perched Groundwater System are arroyo recharge, irrigation of the golf course, landscape watering, water leakage from utility distribution lines, former waste-water discharges, and infiltration from a former unlined KAFB sewage lagoon system (SNL February 1998).

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 325 ft below ground surface. Most nonpotable water supply 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 is relatively steep, 0.03 feet per foot (feet of vertical change per foot of horizontal distance). The change in the groundwater elevation is 350 ft over 15,840 ft in crossing the Tijeras Fault Complex from east to west. The steep gradient suggests that westward groundwater flow is retarded by the Tijeras Fault Complex. Within the sediments of the Albuquerque Basin, the gradient flattens out quickly to about 0.005 feet per foot in the more permeable sediments. 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 Administration, 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 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 (U.S. Army Corps of Engineers [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 in the vicinity of 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-feet per year (CF/yr) (50 acre-feet per year [AF/yr]) (SNL February 1998). The best estimate for the groundwater recharge associated with Arroyo del Coyote is 0.4 million CF/yr (9.2 AF/yr). Infiltration studies conducted by the ER 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 (U.S. Air Force Installation Restoration Program and SNL/NM LTS/ER). The U.S. Air Force Installation Restoration Program has a large monitoring well network associated with several closed landfills and a former sewage lagoon system. Additional KAFB wells are sited to monitor and characterize several nitrate plumes and an extensive KAFB 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 LTS/ER Operations 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 along with Table 1, which provides construction details for the groundwater monitoring, production, and remediation wells. Table 1-1 lists the CY 2016 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 May 2009) for samples collected by SNL/NM personnel during CY 2016.

In this report, groundwater monitoring data are presented for both hazardous and radioactive constituents; however, the monitoring data for radionuclides (gamma spectroscopy and gross alpha/beta activity) 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 (NMED April 2004).

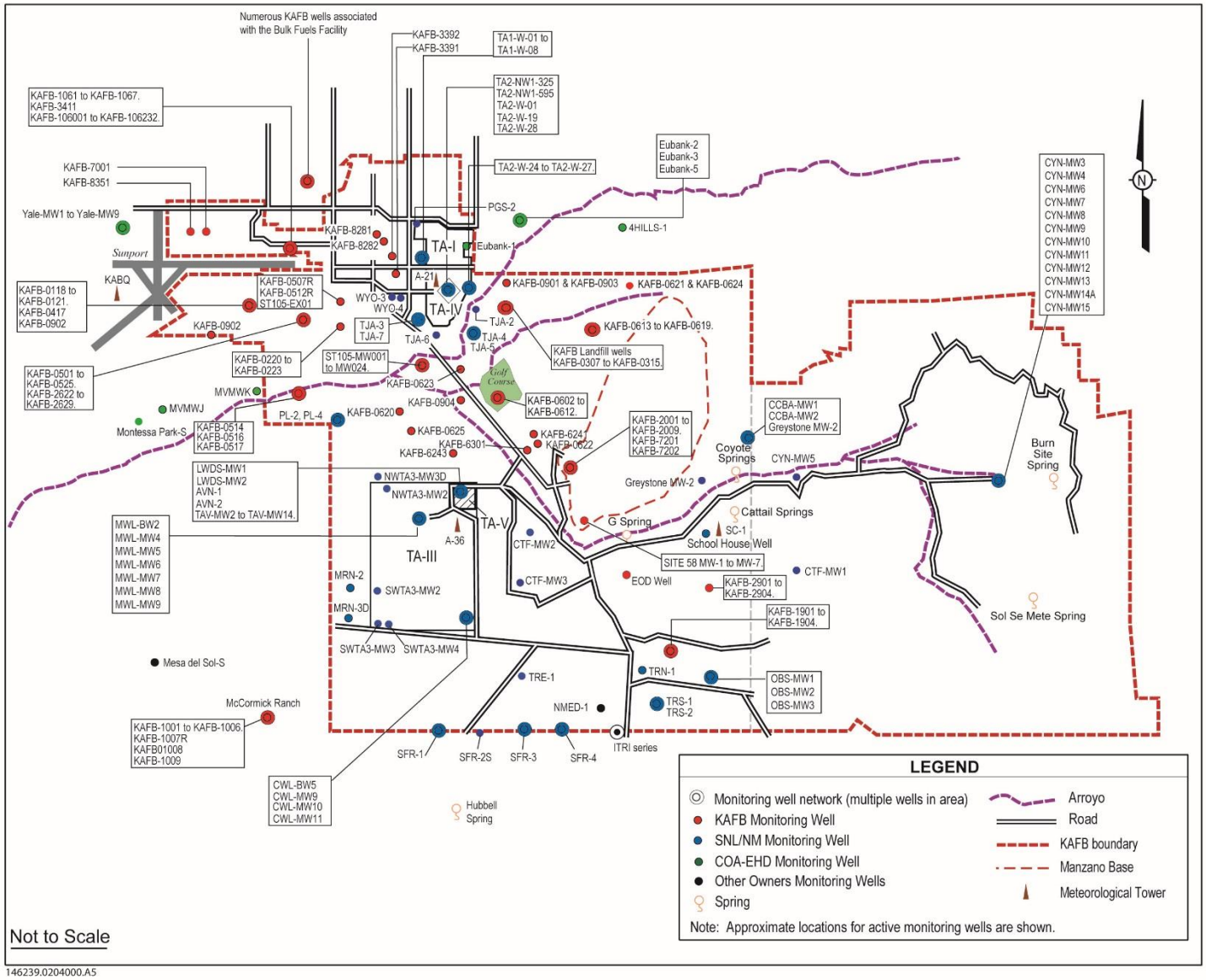

Figure 1-4. Wells and Springs within SNL/NM and KAFB

Table 1-1. Sample Collection Dates for Groundwater Quality Monitoring at SNL/NM for Calendar Year 2016

2016 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.
SNL/NM = Sandia National Laboratories, New Mexico.
TAG = Tijeras Area Groundwater (Area of Concern).
TAVG = Technical Area-V Groundwater (Area of Concern).

Table 1-2. Summary of SNL/NM Groundwater Monitoring Analytical Results for Calendar Year 2016

SNL/NM Groundwater Monitoring	
Number of Active Wells/Springs Monitored	67
Number of Analyses Performed	12,753
Percent of Non-detected Results	80%

Analyte	Number of Detects	Number of Non-Detects	Minimum Detected Value	Maximum Detected Value	Mean Detected Value	Standard Deviation for Detected Values	MCL
Summary of Field Water Quality Parameters (units as indicated below)							
pH in SU	151	0	6.12	8.82	7.58	0.3483	NE
Specific Conductivity in µmhos/cm	151	0	359.9	6640.3	725.2	613.2	NE
Temperature in °C	151	0	11.28	27.63	19.58	2.355	NE
Turbidity in NTU	151	0	0.11	25.2	1.50	3.200	NE
Detected Organic Compounds in µg/L							
Chloroform	8	157	0.300	0.890	0.5563	0.2670	NE
Dichloroethane, 1,1-	8	152	0.310	0.520	0.395	0.0859	NE
Dichloroethene, 1,1-	2	163	0.650	0.970	0.810	0.226	7.0
Dichloroethene, cis-1,2-	35	125	0.320	4.22	1.279	1.153	70
Diesel Range Organics	1	25	68.1	68.1	68.1	N/A	NE
Methylene Chloride	1	159	1.93	1.93	1.93	N/A	5.0
Tetrachloroethene	10	155	0.310	1.62	0.844	0.418	5.0
Trichloroethene	69	101	0.330	19.2	5.094	4.812	5.0
Detected Metals in mg/L							
Aluminum	28	40	0.0154	1.20	0.1691	0.2776	NE
Arsenic	40	28	0.0017	0.00499	0.002228	0.000725	0.010
Barium	68	0	0.0089	0.231	0.06917	0.03738	2.0
Beryllium	3	65	0.00021	0.0069	0.00258	0.00375	0.004
Cadmium	4	74	0.000138	0.000761	0.000334	0.000292	0.005
Calcium	127	0	36.9	308	84.07	51.69	NE
Chromium	17	71	0.00205	0.0397	0.00983	0.01209	0.100
Cobalt	14	54	0.000102	0.00915	0.001211	0.002476	NE
Copper	17	50	0.0004	0.0139	0.00196	0.00314	NE
Iron	49	87	0.0342	0.711	0.1519	0.1662	NE
Lead	3	65	0.000605	0.00126	0.000978	0.000337	NE
Magnesium	127	0	3.08	63.3	20.094	10.268	NE

Refer to footnotes on page 1-12.

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2016 *(Continued)*

Analyte	Number of Detects	Number of Non-Detects	Minimum Detected Value	Maximum Detected Value	Mean Detected Value	Standard Deviation for Detected Values	MCL
Detected Metals in mg/L							
Manganese	37	99	0.001	1.42	0.0482	0.2328	NE
Mercury	1	83	0.000088	0.000088	0.000088	N/A	0.002
Nickel	26	62	0.0005	0.0559	0.00645	0.0148	NE
Potassium	127	0	1.79	29.6	3.639	2.538	NE
Selenium	51	17	0.00164	0.0315	0.0064	0.00736	0.050
Silver	1	67	0.00045	0.00045	0.00045	N/A	NE
Sodium	127	0	19.1	1140	60.21	103.45	NE
Uranium, total	68	0	0.000248	0.0179	0.004176	0.003159	0.030
Vanadium	43	25	0.00404	0.00984	0.00615	0.001256	NE
Zinc	18	50	0.00373	0.0448	0.01356	0.01025	NE
Detected Inorganic Parameters in mg/L							
Nitrate plus nitrite	166	0	0.133	38.8	9.495	8.251	10
Bromide	67	1	0.135	3.14	0.655	0.7164	NE
Chloride	117	0	9.40	474	51.93	59.04	NE
Fluoride	68	0	0.125	2.64	0.7703	0.5016	4.0
Sulfate	117	0	15.6	1850	92.7	187	NE
Acid Soluble Sulfides	13	55	1.04	5.98	2.452	1.642	NE
Total Organic Halogens	4	12	0.00458	0.0168	0.00861	0.00573	NE
Total Organic Carbon #1	50	18	0.330	2.04	0.5189	0.2402	NE
Total Organic Carbon #2	54	14	0.340	2.13	0.5328	0.2412	NE
Total Organic Carbon #3	55	13	0.332	2.18	0.5349	0.2464	NE
Total Organic Carbon #4	54	14	0.331	2.18	0.5514	0.2720	NE
Total Organic Carbon, Average	52	16	0.333	2.14	0.5305	0.2467	NE
Alkalinity as $CaCO_3$	117	0	64.9	1100	197.89	105.52	NE
Perchlorate	4	1	0.00398	0.00418	0.004065	0.00009	NE
Ammonia	9	1	0.0212	0.138	0.0687	0.0418	NE
Total Kjeldahl Nitrogen	4	6	0.0496	0.263	0.1841	0.0937	NE

Refer to footnotes on page 1-12.

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2016 *(Concluded)*

Analyte	Number of Detects	Number of Non-Detects	Minimum Detected Value	Maximum Detected Value	Mean Detected Value	Standard Deviation for Detected Values	MCL
Detected Radiochemistry Activities in pCi/L (unless noted otherwise)							
Alpha, gross (corrected)	75	0	-8.00	12.59	2.416	3.009	15.0[a]
Beta, gross	66	9	1.39	32.7	5.942	5.338	4 mrem/yr
Potassium-40	2	62	66.1	74.4	70.25	5.87	NE
Radium-226	9	7	0.414	1.53	0.635	0.347	5.0[b]
Radium-228	3	13	0.700	0.768	0.7317	0.0342	5.0[b]
Radon-222	10	0	105	462	283.7	147.2	NE
Uranium-233/234	15	0	0.48	33.1	12.52	8.86	NE
Uranium-235/236	14	1	0.171	0.893	0.3977	0.2223	NE
Uranium-238	15	0	0.094	5.87	2.735	1.647	NE

NOTES:

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

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

°C = Degree Celsius.
µg/L = Micrograms per liter.
µmhos/cm = Micromhos per centimeter.
4 mrem/yr = Any combination of beta- and/or gamma-emitting radionuclides (as dose rate).
$CaCO_3$ = 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 Primary Drinking Water Regulations (Title 40 Code of Federal Regulations § 141.11[b]), National Primary Drinking Water Standards (EPA May 2009).
mg/L = Milligrams per liter.
mrem/yr = Millirem per year.
N/A = Not applicable.
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 SNL/NM Groundwater Monitoring Wells and Springs Sampled During Calendar Year 2016

Analyte	Well (Relevant Chapter)	Exceedance	Date
Beryllium MCL = 0.004 mg/L	Coyote Springs (Ch. 2)	0.0069 mg/L[a]	January 2016
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	AVN-1 (Ch. 5)	11.2 mg/L	May 2016
	CYN-MW9 (Ch. 7)	38.4 mg/L	April 2016
		31.6 mg/L	October 2016
	CYN-MW9 (Duplicate) (Ch. 7)	31.3 mg/L	October 2016
	CYN-MW10 (Ch. 7)	21.5 mg/L	April 2016
		21.0 mg/L	October 2016
	CYN-MW10 (Duplicate) (Ch. 7)	21.4 mg/L	April 2016
	CYN-MW11 (Ch. 7)	14.4 mg/L	April 2016
		11.7 mg/L	October 2016
	CYN-MW12 (Ch. 7)	15.5 mg/L	April 2016
		15.8 mg/L	October 2016
	CYN-MW12 (Duplicate) (Ch. 7)	16.9 mg/L	April 2016
	CYN-MW13 (Ch. 7)	38.8 mg/L	April 2016
		35.5 mg/L	October 2016
	CYN-MW14A (Ch. 7)	13.2 mg/L	April 2016
		11.6 mg/L	October 2016
	CYN-MW15 (Ch. 7)	29.8 mg/L	April 2016
		21.3 mg/L	October 2016
	CYN-MW15 (Duplicate) (Ch. 7)	22.1 mg/L	October 2016
	LWDS-MW1 (Ch. 5)	10.9 mg/L	February 2016
		11.0 mg/L	May 2016
		12.1 mg/L	August 2016
		11.6 mg/L	November 2016
	LWDS-MW1 (Duplicate) (Ch. 5)	11.8 mg/L	August 2016
	TA2-W-19 (Ch. 6)	12.5 mg/L	March 2016
		12.4 mg/L	June 2016
		11.0 mg/L	September 2016
		12.0 mg/L	December 2016
	TA2-W-19 (Duplicate) (Ch. 6)	12.7 mg/L	June 2016
	TA2-W-28 (Ch. 6)	25.9 mg/L	March 2016
		23.1 mg/L	June 2016
		19.8 mg/L	September 2016
		20.3 mg/L	December 2016
	TA2-W-28 (Duplicate) (Ch. 6)	21.6 mg/L	December 2016
	TJA-2 (Ch. 6)	12.6 mg/L	March 2016
		13.0 mg/L	June 2016
		11.1 mg/L	September 2016
		11.7 mg/L	December 2016
	TJA-4 (Ch. 6)	26.6 mg/L	March 2016
		29.8 mg/L	June 2016
		29.3 mg/L	September 2016
		32.9 mg/L	December 2016
	TJA-7 (Ch. 6)	24.2 mg/L	March 2016
		25.8 mg/L	June 2016
		22.5 mg/L	September 2016
		22.1 mg/L	December 2016
	TJA-7 (Duplicate) (Ch. 6)	22.0 mg/L	June 2016
	TAV-MW6 (Ch. 5)	10.8 mg/L	February 2016

Refer to footnotes on page 1-14.

Table 1-3. Summary of Exceedances for SNL/NM Groundwater Monitoring Wells and Springs Sampled During Calendar Year 2016 *(Concluded)*

Analyte	Well (Relevant Chapter)	Exceedance	Date
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	TAV-MW10 (Ch. 5)	12.3 mg/L	March 2016
		15.2 mg/L	May 2016
		11.6 mg/L	August 2016
		10.9 mg/L	November 2016
	TAV-MW14 (Ch. 5)	11.8 mg/L	February 2016
		10.7 mg/L	May 2016
	TAV-MW14 (Duplicate) (Ch. 5)	10.7 mg/L	May 2016
Trichloroethene MCL = 5.0 µg/L	LWDS-MW1 (Ch. 5)	19.2 µg/L	February 2016
		15.6 µg/L	May 2016
		14.5 µg/L	August 2016
		18.1 µg/L	November 2016
	LWDS-MW1 (Duplicate) (Ch. 5)	14.9 µg/L	August 2016
	TAV-MW6 (Ch. 5)	14.0 µg/L	February 2016
		12.1 µg/L	May 2016
		12.3 µg/L	August 2016
		13.4 µg/L	November 2016
	TAV-MW6 (Duplicate) (Ch. 5)	12.3 µg/L	August 2016
	TAV-MW10 (Ch. 5)	12.7 µg/L	March 2016
		11.5 µg/L	May 2016
		10.4 µg/L	August 2016
		10.6 µg/L	November 2016
	TAV-MW12 (Ch. 5)	8.81 µg/L	February 2016
		7.14 µg/L	May 2016
		7.40 µg/L	August 2016
		6.30 µg/L	November 2016
	TAV-MW12 (Duplicate) (Ch. 5)	6.07 µg/L	November 2016
	TAV-MW14 (Ch. 5)	6.05 µg/L	February 2016

NOTES:
[a]Analytical result for filtered water sample. All other analytical results are for unfiltered water samples.
µg/L = Micrograms per liter.
AVN = Area V (North) (monitoring well designation only).
Ch. = Chapter
CYN = Canyons.
LWDS = Liquid Waste Disposal System.
MCL = Maximum contaminant level.
mg/L = Milligrams per liter.
MW = Monitoring well.
SNL/NM = Sandia National Laboratories, New Mexico.
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).
WYO = Wyoming.

1.2.1 Long-Term Stewardship and Environmental Restoration Operations Monitoring

SNL/NM LTS/ER Operations conduct groundwater monitoring where groundwater contamination is documented, or in areas where the potential exists for groundwater contamination from legacy surface or near-surface contamination at release sites. Currently, there are five LTS/ER Operations groundwater monitoring networks: CWL, MWL, TAVG AOC, TAG AOC, and BSG AOC. The LTS/ER Operations groundwater monitoring wells are located upgradient and downgradient of known release sites with associated groundwater investigations.

1.2.2 Long-Term Stewardship Groundwater Monitoring Program

The SNL/NM LTS Program's GMP conducts groundwater surveillance monitoring through a network of wells on KAFB, most are located in areas near SNL/NM operational test facilities. Groundwater surveillance monitoring allows the detection and evaluation of the impacts (if any) of current SNL/NM operations on groundwater.

1.2.3 Groundwater Monitoring Regulatory Criteria and U.S. Department of Energy Orders

Groundwater monitoring performed by SNL/NM LTS Program's GMP and LTS/ER Operations are directed based on three broad sets of requirements: DOE Directives, the Resource Conservation and Recovery Act (RCRA) Permit, and the Consent Order.

Groundwater surveillance conducted at the GMP network is directed by DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE June 2011). Groundwater monitoring results at all sites are compared with federal and state water quality standards and DOE drinking water guidelines, where established.

In addition to the DOE Order, ER 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).

At SNL/NM, 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. 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 (CAC) with Controls" list; and any releases of hazardous waste or hazardous constituents that occur after the Consent Order is no longer effective.

The three groundwater AOCs at SNL/NM (TAVG, TAG, and BSG) are undergoing corrective action in accordance with the Consent Order. Each of the AOCs complies with requirements set forth in the Consent Order for site characterization and the development of a Corrective Measures Evaluation. The New Mexico Environment Department (NMED) is the regulatory agency responsible for enforcing the requirements identified in the Consent Order for each of the three AOCs (SNL June 2004, July 2004, and December 2004). The Consent Order also extends NMED regulatory jurisdiction to 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.

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. 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 CAC 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 SNL RCRA Facility Operating Permit (Kieling February 2016). Ongoing monitoring, inspection, and maintenance/repair are comprehensively documented in MWL Annual Long-Term Monitoring and Maintenance Reports submitted to the NMED by June 30th of each year.

1.3 Field Methods, Analytical Methods, and Quality Control Procedures

The monitoring procedures, as conducted by LTS/ER Operations 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. Any site-specific variances from the procedures discussed in this section are presented in Chapters 2.0 through 7.0.

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 2016, 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 2016a). The water level information was used to create the potentiometric surface maps and hydrographs presented in Chapters 2.0 through 7.0.

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 prior to collecting groundwater samples, according to SNL/NM FOP 05-01 (SNL January 2015a). Groundwater temperature, SC, ORP, pH, and DO were measured using a YSI™ EXO1 water quality meter. 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 measures within 0.1 pH units.
Sample Flow Rate	Measured in gpm.
Specific Conductivity (µmhos/cm)	Stability measure: Four consecutive measurements within 5 percent.
Temperature (°C)	Stability measure: Four consecutive measures within 1°C.
Turbidity (NTU)	Stability measure: Four consecutive measurements within 10 percent or less than 5 NTU.

NOTES:
°C = Degrees Celsius.
µmhos/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 Chapter 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 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 within 10 percent for turbidity values greater than 5 NTU. 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 installation into each monitoring well according to procedures described in SNL/NM FOP 05-03 (SNL January 2015b). 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. 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 LTS/ER Operations personnel. The SMO staff reviews the Mini-SAPs (as identified in Chapters 2.0 through 7.0), obtains sample containers, issues sample control and tracking numbers, tracks the chain-of-custody forms, and reviews analytical results 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 06* (SNL April 2016b) and Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 4* (SNL June 2014).

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 (SNL January 2015c). 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.

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)	SM2320B
Ammonia as nitrogen	EPA 350.1
Anions	SW846-9056
Filtered Metals (including Cations)	SW846-6020/7470
HE compounds	SW846-8321A
NPN	EPA 353.2
Perchlorate	EPA 314.0
Sulfide	SW846-9034
Metals	SW846-6010/6020/7470
Total Cyanide	SW846-9012B
Total Kjeldahl Nitrogen	EPA 351.2
Total Organic Carbon	SW846-9060A
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

NOTES:

[a]**Analytical Method References**

EPA 1999 (and updates), *Perchlorate in Drinking Water Using Ion Chromatography,* EPA 815/R-00-014.

EPA 1986b (and updates), *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.

EPA 1984, *Methods for Chemical Analysis of Water and Wastes,* EPA 600-4-79-020.

Rice, E.W., R.B. Baird, A.D. Eaton, and L.S. Clesceri 2012, *Standard Methods for the Examination of Water and Wastewater*, 22nd ed., Method 2320B, Washington, D.C.

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

Table 1-6. Radiochemical Analytical Methods

Analyte	Analytical Method[a]
Gamma Spectroscopy (short list[b])	EPA 901.0
Gross Alpha/Beta Activity	EPA 900.0
Isotopic Uranium	HASL-300
Radon-222	SM7500
Radium-226	EPA 903.1
Radium-228	EPA 904.0
Tritium	EPA 906.0

NOTES:

[a]**Analytical Method References**

DOE 1997, *EML [Environmental Measurements Laboratory] Procedures Manual,* 28th ed., Vol. 1, Rev. 0, HASL-300.

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

Rice, E.W., R.B. Baird, A.D. Eaton, and L.S. Clesceri 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd ed., SM7500-Rn B Method, Washington, D.C.

[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, Revision 4.* Although some minor 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.

1.3.4 Field Quality Control Samples

Field QC samples included duplicate environmental, 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 Duplicate Environmental Samples

Duplicate environmental samples were analyzed to estimate the overall reproducibility of the sampling and analytical process. A duplicate environmental sample is collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. The results for duplicate environmental sample analyses (for concentrations above detection limits only) are used to calculate relative percent difference values. The 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 installation into each monitoring well according to procedures described in SNL/NM FOP 05-03. An EB is collected to verify the effectiveness of the equipment decontamination process. The results for the EB analyses are discussed in Chapters 2.0 through 7.0.

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, or storage 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.

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

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 VOC and gasoline range organics (GRO) analyses. The results for the FB analyses are discussed in Chapters 2.0 through 7.0.

1.3.4.4 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analysis. These samples are used to determine potential contamination during sampling, transportation, analysis, and storage. 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. The results for the TB analyses are discussed in Chapters 2.0 through 7.0.

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, Revision 4*. Laboratory data qualifiers are provided with the analytical results in the tables attached to Chapters 2.0 through 7.0.

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2.0 Long-Term Stewardship Consolidated Groundwater Monitoring Program

2.1 Introduction

This chapter documents the results for the calendar year (CY) 2016 groundwater surveillance monitoring activities conducted as part of the Sandia National Laboratories, New Mexico (SNL/NM) Long-Term Stewardship Consolidated Groundwater Monitoring Program (GMP). The surveillance activities include the annual collection and analysis of groundwater samples from 12 monitoring wells and 1 surface water sample from a perennial spring. As part of the activities, SNL/NM personnel used groundwater elevation data from 218 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 identify potential sources of contamination.
- To work with other SNL/NM organizations to prevent groundwater 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 requirements for well registration and well construction data tracking.
- Coordinate with the Surface Water Discharge Program 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 surveillance monitoring involves completing the following objectives:

- Establish baseline water quality and groundwater flow information for the Regional Aquifer, the Perched Groundwater System, 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, including Long-Term Stewardship/Environmental Restoration (ER) Operations monitoring wells and characterization boreholes. 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. The *SNL/NM Long-Term Stewardship Consolidated Groundwater Monitoring Program Plan* (SNL May 2016) provides additional information for the GMP.

2.2 Regulatory Criteria

The following actions ensure the implementation of a successful GMP that includes relevant elements of the Environmental Management System (EMS) 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 affected or potentially affected groundwater consistent with water quality, and 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 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 primarily affecting ER sites for a variety of potential contaminants, 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/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 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 nondetections 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 (SFO). 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 May 2009)
NMWQCC [a] Standards for Groundwater (20 6.2.3103A NMAC Human Health Standards)	MAC	NMED (NMWQCC September 2004)

NOTES:
[a] MACs for human health and domestic water supply standards are identified in the analytical results tables in Attachment 2A. Domestic water supply standards are based on aesthetic considerations, not on the direct human health risks used for promulgating MCLs.
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 and gross alpha/beta activity) 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 2016 include sampling at designated wells (Figure 2-1), sample analysis, groundwater level measurements, and construction of hydrographs and a potentiometric surface map (Plate 1).

2.3.1 Groundwater Quality Surveillance Monitoring

Annual sampling of groundwater was conducted during the period from January 21 to February 8, 2016. Samples were collected from 12 wells and 1 spring. Groundwater surveillance samples were collected from the following monitoring wells: Greystone-MW2, MRN-2, MRN-3D, NWTA3-MW3D, PL-2, PL-4, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1. A water sample was also collected from Coyote Springs.

Samples collected from the 13 locations were analyzed for the following analytes:

- Safe Drinking Water Act list of volatile organic compounds (VOCs)
- Total organic halogens (TOX)
- Total phenols
- Total alkalinity
- Nitrate plus nitrite (NPN)
- Total cyanide
- High explosives (HE), 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-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. Environmental duplicate samples from monitoring wells MRN-2, PL-2, and SWTA3-MW2 were submitted for analyses.

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 Kirtland Air Force Base (KAFB). In addition to wells owned by the DOE/NNSA, data are solicited from the U.S. Air Force (USAF) Installation 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 2016, depending on the owner's requirements and the well characteristics. Plate 1 depicts groundwater elevations at the wells and is used for preparing a base-wide potentiometric surface map of the Regional Aquifer (see discussion in Section 2.6.2.2).

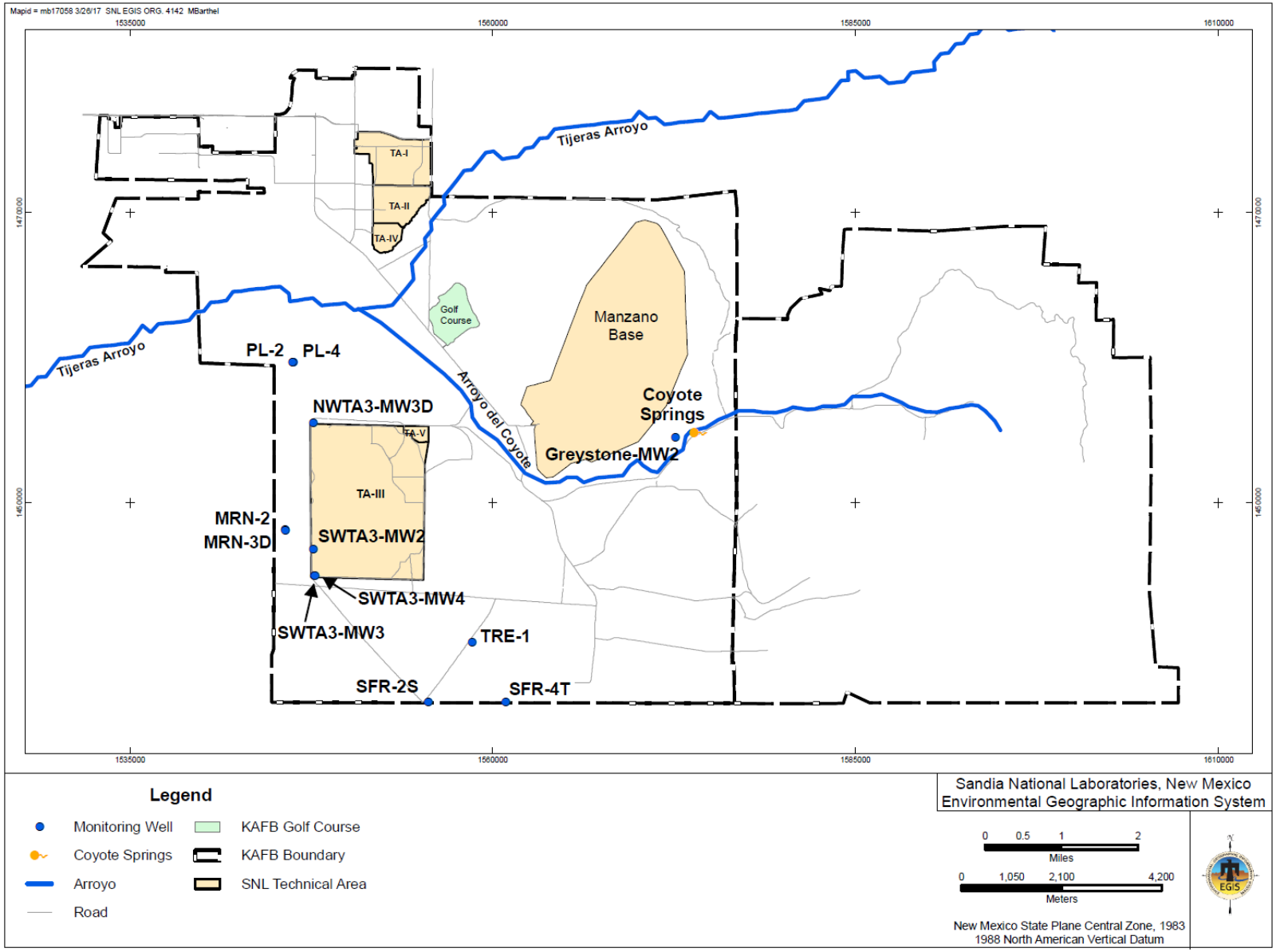

Figure 2-1. Groundwater Monitoring Program Water Quality Monitoring Network

Groundwater pumped from KAFB, Albuquerque Bernalillo County Water Utility Authority (ABCWUA), and Veterans Administration water supply 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 2016.

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

2.6 Summary of Monitoring Results

Results of the CY 2016 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-6, present the hydrographs that utilize the water level measurements collected, and Figures 2B-7 through 2B-11 present precipitation and production well data. Attachment 2C, Figures 2C-1 and 2C-2, present the time trend plots for specific parameters at Coyote Springs and for monitoring well SFR-4T.

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 May 2009) and NMED maximum allowable concentrations (MACs) for human health standards of groundwater as promulgated by the New Mexico Water Quality Control Commission (NMWQCC) in September 2004. Analytical reports from GEL, including certificates of analyses, analytical methods, MDLs, practical quantitation limits (PQLs), minimum detectable activity (MDA) 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. Analytical results, laboratory QC qualifiers, and third-party data validation qualifiers are archived in the Environmental Data Management System (EDMS) electronic database.

Table 2A-1 summarizes the detected VOC and HE compound results for groundwater samples collected in 2016. No HE compounds were detected above laboratory MDLs. No VOCs were detected at concentrations above established MCLs or MACs from any groundwater sample. No VOCs were detected above laboratory MDLs, except chloroform. Chloroform was detected below the MAC of 100 µg/L in TRE-1 at a concentration of 0.590 µg/L. Table 2A-2 lists the laboratory MDLs for VOC and HE compounds.

Table 2A-3 summarizes the NPN results. NPN was detected in water samples above associated MDLs, and ranged from 0.232 to 5.02 milligrams per liter (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 phenols, 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 the sample from monitoring well SFR-4T at a concentration of 2.64 mg/L. Fluoride in groundwater is suspected to be naturally occurring (geogenic). Figure 2C-1 presents the time trend plots for fluoride for monitoring well SFR-4T.

Detected concentrations for alkalinity, major anions, TOX, and total phenols are consistent with historical GMP groundwater monitoring data. The following parameters were qualified as not detected during data validation due to associated blank contamination.

- TOX was qualified as not detected during data validation in samples from monitoring wells Greystone-MW2, SFR-2S, and TRE-1 because TOX was reported at concentrations less than values reported in associated blank samples.

- Total phenol was qualified as not detected during data validation in samples from NWTA3-MW3D and the environmental duplicate sample from SWTA3-MW2 because total phenol was detected in both laboratory method and calibration blank samples.

Total cyanide was not detected in any of the samples from Coyote Springs or the 12 monitoring wells.

Mercury was analyzed using unfiltered samples and is reported as total mercury. Mercury was not detected above associated laboratory MDLs in samples from Coyote Springs or the monitoring wells (Table 2A-5).

Table 2A-6 summarizes dissolved TAL metals and total uranium results. No metal parameters, other than beryllium, were detected above established regulatory limits in any groundwater samples. Beryllium was detected above the MCL of 0.004 mg/L in the sample from Coyote Springs at a concentration of 0.0069 mg/L. Beryllium in groundwater at Coyote Springs is suspected to be naturally occurring (geogenic). Figure 2C-2 presents the trend for beryllium concentrations at Coyote Springs and demonstrates that the 2016 beryllium result is consistent with prior years. Copper, chromium, nickel, thallium, and vanadium were qualified as not detected in samples listed below during data validation.

- Copper was detected in Coyote Spring and PL-2 samples at concentrations less than five times the laboratory calibration blank sample.

- Chromium was reported in MRN-3D and PL-2 samples at concentrations less than five times the laboratory method or calibration blank samples.

- Nickel was detected in PL-2 and SFR-4T samples at concentrations less than five times the laboratory calibration blank sample.

- Thallium was reported in Coyote Spring, MRN-3D, NWTA3-MW3D, PL-4, SWTA3-MW2, and TRE-1 samples at concentrations less than five times the associated calibration and method blank samples.

- Vanadium was reported in MRN-2, NWTA3-MW3D, SWTA3-MW2, SWTA3-MW3, and SWTA3-MW4 samples at concentrations less than five times the associated laboratory method blank samples.

Table 2A-7 summarizes the radiological analyses results. This includes analyses for alpha- and beta-emitting radioisotopes (gross alpha/beta activities), radium-226, radium-228, isotopic uranium, and gamma spectroscopy results for short-list gamma radiation-emitting radioisotopes (americium-241, cesium-137, cobalt-60, and potassium-40). Reported activities were below established MCLs or MACs. The analytical laboratory rejected Potassium-40 results for Coyote Springs and MRN-2 environmental duplicate sample because the peak 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 collected at Coyote Springs and monitoring wells Greystone-MW2, SFR-2S, SFR-4T, and TRE-1 because groundwater contacts bedrock, which contains minerals high in naturally occurring uranium.

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 (pCi/L).

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, pH, temperature, specific conductivity, oxidation-reduction potential, and dissolved oxygen.

2.6.2 Groundwater Elevation Measurements

Table 1 lists construction details for monitoring wells located on or near KAFB. During CY 2016, SNL/NM GMP personnel measured groundwater elevations in 101 SNL/NM monitoring wells (Table 2). The groundwater elevations were measured with an electric well sounder (water level meter). Data were also available for 117 additional monitoring wells owned by KAFB, COA, Lovelace Respiratory Research Institute, and NMOSE. The groundwater elevation data are maintained in the corporate EDMS. Table 2 provides the groundwater elevation data for CY 2016. Table 2-2 provides the total number of wells listed by the respective organization.

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 Albuquerque Basin's climate is semiarid. Long-term average precipitation ranges from 9.45 inches per year (in/yr) (30-year norm based on 1981-2010 data) at Albuquerque International Sunport up to 35 in/yr at the crest of the Sandia Mountains. The normal seasonal distribution of precipitation in the Albuquerque area is for the majority to occur during the months of July through September when monsoonal thunderstorm activity is greatest. For CY 2016, the wettest months were July and August.

Table 2-2. Groundwater Elevations Measured in Monitoring Wells by SNL/NM and Other Organizations

Total Wells	Measuring Agency	Well Owner	Location
101	SNL/NM GMP	DOE/NNSA	Site-wide surveillance network wells: BSG, CWL, MWL, TAG, and TAVG
109	KAFB	KAFB	ECP Long-term Monitoring Program
4	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
1	LRRI	LRRI	Southern boundary of KAFB

NOTES:
BSG = Burn Site Groundwater.
COA = City of Albuquerque.
CWL = Chemical Waste Landfill.
DOE = U.S. Department of Energy.
ECP = Environmental Compliance Program.
EHD = Environmental Health Department.
GMP = Groundwater Monitoring Program.
LRRI = Lovelace Respiratory Research Institute.
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 four rain gauge locations. Three 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);
- 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.

Table 2-3 shows annual precipitation during CY 2016 at four locations. CY 2015 data are also presented for comparison. The differences in precipitation totals from the four locations show the isolated nature of rain showers in the Albuquerque area. The 6.68 inches of precipitation measured at KABQ during CY 2016 is 4.81 inches less than the corresponding period for the previous year; and it is 2.77 inches below the 30-year (1981-2010) norm of 9.45 inches. Figure 2B-7 shows monthly distribution of precipitation during CY 2016 at the four locations. Figure 2B-8 shows the annual distribution of precipitation at these four locations for the period from January 2006 to December 2016.

Table 2-3. Precipitation Data for Kirtland Air Force Base, Calendar Years 2015 and 2016

Year	Meteorological Station			
	A21	A36	SC1	KABQ
CY 2015	10.58	11.17	14.23	11.49
CY 2016	8.02	8.42	8.24	6.68

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.
SC1 = SNL/NM meteorological station in the foothills of the Manzanita Mountains.

Groundwater Withdrawal

The KAFB production wells are screened over a depth from about 500 to 2,000 feet (ft) below ground surface and extract groundwater from the Regional Aquifer in the upper and middle unit of the Santa Fe Group. During CY 2016, KAFB pumped groundwater primarily from four water supply wells.

KAFB supplies the water for SNL/NM and other DOE/NNSA facilities located on KAFB. Figure 2B-9 shows the CY 2016 monthly production for KAFB water supply wells. The highest level of production was in July at 110 million gallons (gal.); the lowest occurred in January at 33 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-10 shows the CY 2016 monthly production for each KAFB water supply well. Figure 2B-11 shows the trend of total annual groundwater production at KAFB since 2006. Table 2-4 provides a comparison of water pumped during CY 2016 to the previous year.

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

Units	CY 2015	CY 2016
Million gallons	813	737
Acre-feet	2,494	2,263

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

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, USAF Installation Restoration Program, COA EHD, USGS, and NMOSE were used to construct the base-wide CY 2016 potentiometric surface map of the Regional Aquifer as shown on Plate 1. Water level measurements for October through December 2016 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 bedrock east of the fault zone (Figure 1-3). West of the Tijeras Fault Zone, the Regional Aquifer is under unconfined (water table) conditions and is present within the Santa Fe Group, which consists of a fine-

grained alluvial-fan lithofacies and the coarser Ancestral Rio Grande 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 Santa Fe Group) 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 drawdowns created by KAFB and ABCWUA water supply 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 Isleta Pueblo Reservation. The flat gradient in the middle of the trough is indicative of flow through the highly permeable sediments of the Ancestral Rio Grande 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 below ground surface. This was 200 ft above the Regional Aquifer. The installation of additional wells completed in this Perched Groundwater System defined the lateral extent of the system, which is approximately 4.4 square miles. The western edge trends along the west side of former KAFB sewage lagoons. The northern edge coincides with the northern boundary of TA-I. To the east, the Perched Groundwater System is defined using USAF 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 Perched Groundwater System comprises much of the Tijeras Arroyo Groundwater Area of Concern, and the elevation data for wells completed in the Perched Groundwater System 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 12 GMP monitoring wells (Figures 2B-1 through 2B-6). The groundwater elevation data for these wells are considered to be representative of groundwater in the Regional Aquifer across KAFB. Historical data from quarterly and annual groundwater elevation measurements through CY 2016 were used for plotting the hydrographs. Specific information gleaned from the hydrographs includes the following:

- **Greystone-MW2 (Figure 2B-1)**—Overall declining trend 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.

- **MRN-2 and MRN-3D (Figure 2B-2)**—Declining trend until early 2011; since then groundwater elevations have stabilized with a slight increasing trend 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 a slight to moderate increasing trend.

- **SFR-2S and TRE-1 (Figure 2B-4)**—Slight declining trend since 2004.

- **SFR-4T (Figure 2B-5)**—Cyclical pattern with yearly fluctuations of 20 to 30 ft since 2001, but less pronounced cyclical pattern in 2011 through 2016.

- **SWTA3-MW2, SWTA3-MW3, and SWTA3-MW4 (Figure 2B-6)**—Moderate declining trend until late 2011; since then, groundwater elevations stabilized for several years and show a slight increasing trend in 2016.

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 sample, equipment blank (EB), trip blank (TB), and field blank (FB) samples.

Environmental duplicate samples were collected to estimate the overall reproducibility of the sampling and analytical process. Environmental duplicate samples from monitoring wells MRN-2, PL-2, and SWTA3-MW2 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.

EB samples were collected prior to well purging and sampling at monitoring wells MRN-2, PL-2, and SWTA3-MW2 and submitted for analyses. EB samples detected alkalinity, bromodichloromethane, calcium, chloroform, copper, dibromochloromethane, magnesium, phenol, sodium, and sulfate. No corrective action was required because these parameters were not detected in associated environmental samples or were detected at concentrations greater than five times the EB result.

Three 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 PL-4, SFR-2S, and SWTA3-MW4 sampling points to simulate the transfer of environmental samples from the sampling system to the sample container. The VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs. On February 3, 2016, an additional FB sample was collected from the source deionized (DI) water used during the equipment decontamination process prior to sampling monitoring well MRN-2. Bromodichloromethane and dibromochloromethane were detected in the source DI water. No corrective action was necessary because these compounds were not detected in the 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 16 TBs were submitted with the CY 2016 samples. No VOCs were detected above associated laboratory MDLs in any TB sample.

QC samples are prepared at the laboratory to determine whether contaminant chemicals are introduced into laboratory processes and procedures. These include method blanks, laboratory control samples, matrix spike, matrix spike duplicate, and surrogate spike samples. Although some minor analytical results were qualified during the data validation process, the data were deemed acceptable and the reported QC

measures were deemed adequate, except for two occurrences of potassium-40. The potassium-40 activity in the samples from Coyote Spring and MRN-2 environmental duplicate sample were qualified as unusable during data validation because GEL was unable to meet minimum peak identification criteria.

2.8 Variances and Nonconformances

No modifications or issues of field activities from requirements in the GMP Mini-Sampling and Analysis Plan (SAP) (SNL January 2016) were identified during CY 2016 sampling activities.

2.9 Summary and Conclusions

The annual groundwater surveillance monitoring sampling event was conducted between January 21 and February 8, 2016. Groundwater samples were collected from 12 monitoring wells and 1 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 0.232 to 5.02 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 September 2004) in the sample from monitoring well SFR-4T at a concentration of 2.64 mg/L. The MCL for fluoride is 4.0 mg/L.
- No metals, other than beryllium, were detected above established regulatory limits in any groundwater sample. Beryllium was detected above the MCL of 0.004 mg/L in the sample from Coyote Springs at a concentration of 0.0069 mg/L.

Groundwater elevations were obtained during CY 2016 at 101 SNL/NM monitoring wells on a monthly or quarterly basis. Groundwater elevations from the SNL/NM wells and 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 impact of the groundwater withdrawal by water supply wells located in the northwestern portion of KAFB and adjacent parts of Albuquerque.

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Attachment 2A
Long-Term Stewardship
Consolidated Groundwater Monitoring Program
Analytical Results Tables

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Attachment 2A Tables

2A-1 Summary of Detected Volatile Organic Compounds and High Explosive Compounds, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-5

2A-2 Method Detection Limits for Volatile Organic Compounds and High Explosive Compounds, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-6

2A-3 Summary of Nitrate plus Nitrite Results, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-7

2A-4 Summary of Alkalinity, Anion, Total Organic Halogens, Total Phenol, and Total Cyanide Results, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-8

2A-5 Summary of Mercury Results, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-12

2A-6 Summary of Target Analyte List Metals and Uranium Results, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-13

2A-7 Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Radium, and Isotopic Uranium Results, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-29

2A-8 Summary of Field Water Quality Measurements, Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 2A-34

Footnotes for Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task Analytical Results Tables 2A-35

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

Calendar Year 2016

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]
TRE-1 25-Jan-16	Chloroform	0.590	0.300	1.00	NE	100	J		098772-001	SW846-8260

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]
1,1,1,2-Tetrachloroethane	0.300	SW846 8260	Ethyl benzene	0.300	SW846 8260
1,1,1-Trichloroethane	0.300	SW846 8260	Hexachlorobutadiene	0.300	SW846 8260
1,1,2,2-Tetrachloroethane	0.300	SW846 8260	Isopropylbenzene	0.300	SW846 8260
1,1,2-Trichloroethane	0.300	SW846 8260	Methylene chloride	1.00	SW846 8260
1,1-Dichloroethane	0.300	SW846 8260	Naphthalene	0.300	SW846 8260
1,1-Dichloroethene	0.300	SW846 8260	Styrene	0.300	SW846 8260
1,1-Dichloropropene	0.300	SW846 8260	Tert-butyl methyl ether	0.300	SW846 8260
1,2,3-Trichlorobenzene	0.300	SW846 8260	Tetrachloroethene	0.300	SW846 8260
1,2,3-Trichloropropane	0.300	SW846 8260	Toluene	0.300	SW846 8260
1,2,4-Trichlorobenzene	0.300	SW846 8260	Trichloroethene	0.300	SW846 8260
1,2,4-Trimethylbenzene	0.300	SW846 8260	Trichlorofluoromethane	0.300	SW846 8260
1,2-Dibromo-3-chloropropane	0.500	SW846 8260	Vinyl chloride	0.300	SW846 8260
1,2-Dibromoethane	0.300	SW846 8260	cis-1,2-Dichloroethene	0.300	SW846 8260
1,2-Dichlorobenzene	0.300	SW846 8260	cis-1,3-Dichloropropene	0.300	SW846 8260
1,2-Dichloroethane	0.300	SW846 8260	m-, p-Xylene	0.300	SW846 8260
1,2-Dichloropropane	0.300	SW846 8260	n-Butylbenzene	0.300	SW846 8260
1,3,5-Trimethylbenzene	0.300	SW846 8260	n-Propylbenzene	0.300	SW846 8260
1,3-Dichlorobenzene	0.300	SW846 8260	o-Xylene	0.300	SW846 8260
1,3-Dichloropropane	0.300	SW846 8260	sec-Butylbenzene	0.300	SW846 8260
1,4-Dichlorobenzene	0.300	SW846 8260	tert-Butylbenzene	0.300	SW846 8260
2,2-Dichloropropane	0.300	SW846 8260	trans-1,2-Dichloroethene	0.300	SW846 8260
2-Chlorotoluene	0.300	SW846 8260	trans-1,3-Dichloropropene	0.300	SW846 8260
4-Chlorotoluene	0.300	SW846 8260	1,3,5-Trinitrobenzene	0.0758–0.0909	SW846 8321A
4-Isopropyltoluene	0.300	SW846 8260	1,3-Dinitrobenzene	0.0758–0.0909	SW846 8321A
Benzene	0.300	SW846 8260	2,4,6-Trinitrotoluene	0.0758–0.0909	SW846 8321A
Bromobenzene	0.300	SW846 8260	2,4-Dinitrotoluene	0.0758–0.0909	SW846 8321A
Bromochloromethane	0.300	SW846 8260	2,6-Dinitrotoluene	0.0758–0.0909	SW846 8321A
Bromodichloromethane	0.300	SW846 8260	2-Amino-4,6-dinitrotoluene	0.0758–0.0909	SW846 8321A
Bromoform	0.300	SW846 8260	2-Nitrotoluene	0.0777–0.0932	SW846 8321A
Carbon tetrachloride	0.300	SW846 8260	3-Nitrotoluene	0.0758–0.0909	SW846 8321A
Chlorobenzene	0.300	SW846 8260	4-Amino-2,6-dinitrotoluene	0.0758–0.0909	SW846 8321A
Chloroethane	0.300	SW846 8260	4-Nitrotoluene	0.142–0.170	SW846 8321A
Chloroform	0.300	SW846 8260	HMX	0.0758–0.0909	SW846 8321A
Chloromethane	0.300	SW846 8260	Nitro-benzene	0.0758–0.0909	SW846 8321A
Dibromochloromethane	0.300	SW846 8260	Pentaerythritol tetranitrate	0.0948–0.114	SW846 8321A
Dibromomethane	0.300	SW846 8260	RDX	0.0758–0.0909	SW846 8321A
Dichlorodifluoromethane	0.300	SW846 8260	Tetryl	0.0758–0.0909	SW846 8321A

Refer to footnotes on page 2A-35.

Table 2A-3
Summary of Nitrate plus Nitrite Results,
Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task,
Sandia National Laboratories/New Mexico

Calendar Year 2016

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 Spring 22-Jan-16	Nitrate plus nitrite	0.507	0.017	0.050	10.0			098770-018	EPA 353.2
Greystone-MW2 21-Jan-16	Nitrate plus nitrite	3.29	0.170	0.500	10.0			098768-018	EPA 353.2
MRN-2 04-Feb-16	Nitrate plus nitrite	4.49	0.085	0.250	10.0			098789-018	EPA 353.2
MRN-2 (Duplicate) 04-Feb-16	Nitrate plus nitrite	4.46	0.085	0.250	10.0			098790-018	EPA 353.2
MRN-3D 05-Feb-16	Nitrate plus nitrite	2.58	0.034	0.100	10.0			098792-018	EPA 353.2
NWTA3-MW3D 08-Feb-16	Nitrate plus nitrite	1.05	0.017	0.050	10.0			098805-018	EPA 353.2
PL-2 29-Jan-16	Nitrate plus nitrite	2.82	0.085	0.250	10.0			098784-018	EPA 353.2
PL-2 (Duplicate) 29-Jan-16	Nitrate plus nitrite	2.70	0.085	0.250	10.0			098785-018	EPA 353.2
PL-4 28-Jan-16	Nitrate plus nitrite	5.02	0.170	0.500	10.0			098780-018	EPA 353.2
SFR-2S 26-Jan-16	Nitrate plus nitrite	0.877	0.017	0.050	10.0			098775-018	EPA 353.2
SFR-4T 27-Jan-16	Nitrate plus nitrite	0.232	0.017	0.050	10.0			098777-018	EPA 353.2
SWTA3-MW2 02-Feb-16	Nitrate plus nitrite	0.859	0.017	0.050	10.0			098797-018	EPA 353.2
SWTA3-MW2 (Duplicate) 02-Feb-16	Nitrate plus nitrite	0.861	0.017	0.050	10.0			098798-018	EPA 353.2
SWTA3-MW3 03-Feb-16	Nitrate plus nitrite	0.548	0.017	0.050	10.0			098800-018	EPA 353.2
SWTA3-MW4 01-Feb-16	Nitrate plus nitrite	0.995	0.017	0.050	10.0			098803-018	EPA 353.2
TRE-1 25-Jan-16	Nitrate plus nitrite	2.42	0.085	0.250	10.0			098772-018	EPA 353.2

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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 Spring	Total Organic Halogens	0.0168	0.00333	0.010	NE	NE			098770-003	SW846 9020
22-Jan-16	Bromide	ND	0.067	0.200	NE	NE	N, U		098770-016	SW846 9056
	Chloride	474	6.70	20.0	NE	NE			098770-016	SW846 9056
	Fluoride	1.56	0.033	0.100	4.0	1.60			098770-016	SW846 9056
	Sulfate	126	13.3	40.0	NE	NE			098770-016	SW846 9056
	Alkalinity as CaCO3	1100	0.725	1.00	NE	NE			098770-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U		098770-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098770-027	SW846 9012
Greystone-MW2	Total Organic Halogens	0.0111	0.00333	0.010	NE	NE		0.023U	098768-003	SW846 9020
21-Jan-16	Bromide	0.606	0.268	0.800	NE	NE	J		098768-016	SW846 9056
	Chloride	111	1.68	5.00	NE	NE			098768-016	SW846 9056
	Fluoride	0.760	0.033	0.100	4.0	1.60			098768-016	SW846 9056
	Sulfate	50.7	0.532	1.60	NE	NE			098768-016	SW846 9056
	Alkalinity as CaCO3	468	0.725	1.00	NE	NE		J	098768-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098768-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098768-027	SW846 9012
MRN-2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098789-003	SW846 9020
04-Feb-16	Bromide	0.175	0.067	0.200	NE	NE	J		098789-016	SW846 9056
	Chloride	13.0	0.268	0.800	NE	NE			098789-016	SW846 9056
	Fluoride	0.509	0.033	0.100	4.0	1.60			098789-016	SW846 9056
	Sulfate	51.1	0.532	1.60	NE	NE			098789-016	SW846 9056
	Alkalinity as CaCO3	153	0.725	1.00	NE	NE			098789-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098789-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098789-027	SW846 9012
MRN-2 (Duplicate)	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098790-003	SW846 9020
04-Feb-16	Bromide	0.188	0.067	0.200	NE	NE	J		098790-016	SW846 9056
	Chloride	13.1	0.268	0.800	NE	NE			098790-016	SW846 9056
	Fluoride	0.511	0.033	0.100	4.0	1.60			098790-016	SW846 9056
	Sulfate	51.3	0.532	1.60	NE	NE			098790-016	SW846 9056
	Alkalinity as CaCO3	153	0.725	1.00	NE	NE			098790-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098790-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098790-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098792-003	SW846 9020
05-Feb-16	Bromide	0.210	0.067	0.200	NE	NE			098792-016	SW846 9056
	Chloride	14.2	0.335	1.00	NE	NE			098792-016	SW846 9056
	Fluoride	0.414	0.033	0.100	4.0	1.60			098792-016	SW846 9056
	Sulfate	74.3	0.665	2.00	NE	NE			098792-016	SW846 9056
	Alkalinity as CaCO3	159	0.725	1.00	NE	NE			098792-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098792-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098792-027	SW846 9012
NWTA3-MW3D	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098805-003	SW846 9020
08-Feb-16	Bromide	0.159	0.067	0.200	NE	NE	J		098805-016	SW846 9056
	Chloride	10.6	0.268	0.800	NE	NE			098805-016	SW846 9056
	Fluoride	0.659	0.033	0.100	4.0	1.60			098805-016	SW846 9056
	Sulfate	50.7	0.532	1.60	NE	NE			098805-016	SW846 9056
	Alkalinity as CaCO3	138	0.725	1.00	NE	NE			098805-022	SM2320B
	Total Phenol	0.00329	0.00175	0.005	NE	NE	B, J	0.025U	098805-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098805-027	SW846 9012
PL-2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098784-003	SW846 9020
29-Jan-16	Bromide	0.194	0.067	0.200	NE	NE	J, N	J+	098784-016	SW846 9056
	Chloride	14.2	0.335	1.00	NE	NE		J	098784-016	SW846 9056
	Fluoride	0.425	0.033	0.100	4.0	1.60			098784-016	SW846 9056
	Sulfate	72.9	0.665	2.00	NE	NE		J	098784-016	SW846 9056
	Alkalinity as CaCO3	153	0.725	1.00	NE	NE			098784-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U		098784-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098784-027	SW846 9012
PL-2 (Duplicate)	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098785-003	SW846 9020
29-Jan-16	Bromide	0.194	0.067	0.200	NE	NE	J, N	J+	098785-016	SW846 9056
	Chloride	14.0	0.335	1.00	NE	NE		J	098785-016	SW846 9056
	Fluoride	0.407	0.033	0.100	4.0	1.60			098785-016	SW846 9056
	Sulfate	72.1	0.665	2.00	NE	NE		J	098785-016	SW846 9056
	Alkalinity as CaCO3	150	0.725	1.00	NE	NE			098785-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098785-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098785-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098780-003	SW846 9020
28-Jan-16	Bromide	0.220	0.067	0.200	NE	NE	N	J+	098780-016	SW846 9056
	Chloride	15.5	0.335	1.00	NE	NE		J	098780-016	SW846 9056
	Fluoride	0.272	0.033	0.100	4.0	1.60			098780-016	SW846 9056
	Sulfate	70.6	0.665	2.00	NE	NE		J	098780-016	SW846 9056
	Alkalinity as CaCO3	170	0.725	1.00	NE	NE			098780-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U		098780-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098780-027	SW846 9012
SFR-2S	Total Organic Halogens	0.00526	0.00333	0.010	NE	NE	J	0.022U	098775-003	SW846 9020
26-Jan-16	Bromide	0.660	0.134	0.400	NE	NE	N	J+	098775-016	SW846 9056
	Chloride	124	1.68	5.00	NE	NE			098775-016	SW846 9056
	Fluoride	1.40	0.066	0.200	4.0	1.60			098775-016	SW846 9056
	Sulfate	71.5	3.33	10.0	NE	NE			098775-016	SW846 9056
	Alkalinity as CaCO3	426	0.725	1.00	NE	NE			098775-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U		098775-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098775-027	SW846 9012
SFR-4T	Total Organic Halogens	0.00838	0.00333	0.010	NE	NE	J		098777-003	SW846 9020
27-Jan-16	Bromide	1.53	0.067	0.200	NE	NE	N	J+	098777-016	SW846 9056
	Chloride	180	13.4	40.0	NE	NE			098777-016	SW846 9056
	Fluoride	**2.64**	0.033	0.100	4.0	1.60			098777-016	SW846 9056
	Sulfate	1850	26.6	80.0	NE	NE			098777-016	SW846 9056
	Alkalinity as CaCO3	111	0.725	1.00	NE	NE			098777-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U		098777-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098777-027	SW846 9012
SWTA3-MW2	Total Organic Halogens	0.0047	0.00333	0.010	NE	NE	J		098797-003	SW846 9020
02-Feb-16	Bromide	0.182	0.067	0.200	NE	NE	J		098797-016	SW846 9056
	Chloride	16.6	0.268	0.800	NE	NE			098797-016	SW846 9056
	Fluoride	0.905	0.033	0.100	4.0	1.60			098797-016	SW846 9056
	Sulfate	56.4	0.532	1.60	NE	NE			098797-016	SW846 9056
	Alkalinity as CaCO3	167	0.725	1.00	NE	NE			098797-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098797-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098797-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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 (Duplicate)	Total Organic Halogens	0.00458	0.00333	0.010	NE	NE	J		098798-003	SW846 9020
02-Feb-16	Bromide	0.186	0.067	0.200	NE	NE	J		098798-016	SW846 9056
	Chloride	16.6	0.268	0.800	NE	NE			098798-016	SW846 9056
	Fluoride	0.917	0.033	0.100	4.0	1.60			098798-016	SW846 9056
	Sulfate	56.2	0.532	1.60	NE	NE			098798-016	SW846 9056
	Alkalinity as CaCO3	167	0.725	1.00	NE	NE			098798-022	SM2320B
	Total Phenol	0.00433	0.00175	0.005	NE	NE	B, J	0.025U	098798-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098798-027	SW846 9012
SWTA3-MW3	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098800-003	SW846 9020
03-Feb-16	Bromide	0.171	0.067	0.200	NE	NE	J		098800-016	SW846 9056
	Chloride	13.6	0.268	0.800	NE	NE			098800-016	SW846 9056
	Fluoride	1.18	0.033	0.100	4.0	1.60			098800-016	SW846 9056
	Sulfate	64.9	0.532	1.60	NE	NE			098800-016	SW846 9056
	Alkalinity as CaCO3	160	0.725	1.00	NE	NE			098800-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098800-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098800-027	SW846 9012
SWTA3-MW4	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		098803-003	SW846 9020
01-Feb-16	Bromide	0.186	0.067	0.200	NE	NE	J		098803-016	SW846 9056
	Chloride	19.6	0.268	0.800	NE	NE			098803-016	SW846 9056
	Fluoride	1.50	0.033	0.100	4.0	1.60			098803-016	SW846 9056
	Sulfate	50.6	0.532	1.60	NE	NE			098803-016	SW846 9056
	Alkalinity as CaCO3	177	0.725	1.00	NE	NE			098803-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098803-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	098803-027	SW846 9012
TRE-1	Total Organic Halogens	0.00862	0.00333	0.010	NE	NE	J	0.022U	098772-003	SW846 9020
25-Jan-16	Bromide	0.755	0.134	0.400	NE	NE	N	J+	098772-016	SW846 9056
	Chloride	134	1.68	5.00	NE	NE			098772-016	SW846 9056
	Fluoride	1.42	0.066	0.200	4.0	1.60			098772-016	SW846 9056
	Sulfate	103	3.33	10.0	NE	NE			098772-016	SW846 9056
	Alkalinity as CaCO3	518	0.725	1.00	NE	NE			098772-022	SM2320B
	Total Phenol	ND	0.00175	0.005	NE	NE	U	UJ	098772-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U		098772-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

Well ID	Mercury 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 Spring 22-Jan-16	ND	0.000067	0.0002	0.002	U		098770-010	SW846 7470A
Greystone-MW2 21-Jan-16	ND	0.000067	0.0002	0.002	U	UJ	098768-010	SW846 7470A
MRN-2 04-Feb-16	ND	0.000067	0.0002	0.002	U		098789-010	SW846 7470A
MRN-2 (Duplicate) 04-Feb-16	ND	0.000067	0.0002	0.002	U		098790-010	SW846 7470A
MRN-3D 05-Feb-16	ND	0.000067	0.0002	0.002	U		098792-010	SW846 7470A
NWTA3-MW3D 08-Feb-16	ND	0.000067	0.0002	0.002	U		098805-010	SW846 7470A
PL-2 29-Jan-16	ND	0.000067	0.0002	0.002	U		098784-010	SW846 7470A
PL-2 (Duplicate) 29-Jan-16	ND	0.000067	0.0002	0.002	U		098785-010	SW846 7470A
PL-4 28-Jan-16	ND	0.000067	0.0002	0.002	U		098780-010	SW846 7470A
SFR-2S 26-Jan-16	ND	0.000067	0.0002	0.002	U		098775-010	SW846 7470A
SFR-4T 27-Jan-16	ND	0.000067	0.0002	0.002	U		098777-010	SW846 7470A
SWTA3-MW2 02-Feb-16	ND	0.000067	0.0002	0.002	U		098797-010	SW846 7470A
SWTA3-MW2 (Duplicate) 02-Feb-16	ND	0.000067	0.0002	0.002	U		098798-010	SW846 7470A
SWTA3-MW3 03-Feb-16	ND	0.000067	0.0002	0.002	U		098800-010	SW846 7470A
SWTA3-MW4 01-Feb-16	ND	0.000067	0.0002	0.002	U		098803-010	SW846 7470A
TRE-1 25-Jan-16	ND	0.000067	0.0002	0.002	U		098772-010	SW846 7470A

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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 Spring	Aluminum	0.196	0.015	0.050	NE	NE			098770-009	SW846 6020
22-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098770-009	SW846 6020
	Arsenic	0.00499	0.0017	0.005	0.010	0.100	J		098770-009	SW846 6020
	Barium	0.0416	0.0006	0.002	2.00	1.00			098770-009	SW846 6020
	Beryllium	**0.0069**	0.0002	0.0005	0.004	NE			098770-009	SW846 6020
	Cadmium	0.000152	0.00011	0.001	0.005	0.010	J	J+	098770-009	SW846 6020
	Calcium	272	0.600	2.00	NE	NE			098770-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098770-009	SW846 6020
	Cobalt	0.00915	0.0001	0.001	NE	NE			098770-009	SW846 6020
	Copper	0.000992	0.00035	0.001	NE	NE	J	0.0032UJ	098770-009	SW846 6020
	Iron	0.0657	0.033	0.100	NE	NE	J		098770-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098770-009	SW846 6020
	Magnesium	63.3	0.100	0.300	NE	NE			098770-009	SW846 6020
	Manganese	1.42	0.010	0.050	NE	NE		J	098770-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098770-009	SW846 7470
	Nickel	0.0232	0.0005	0.002	NE	NE			098770-009	SW846 6020
	Potassium	29.6	0.080	0.300	NE	NE			098770-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098770-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098770-009	SW846 6020
	Sodium	423	0.800	2.50	NE	NE			098770-009	SW846 6020
	Thallium	0.00256	0.00045	0.002	0.002	NE	B	0.0055U	098770-009	SW846 6020
	Uranium	0.00673	0.000067	0.0002	0.03	0.03			098770-009	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	NE	U		098770-009	SW846 6020
	Zinc	0.0448	0.0035	0.010	NE	NE			098770-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	0.015	0.050	NE	NE	U		098768-009	SW846 6020
21-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098768-009	SW846 6020
	Arsenic	0.00385	0.0017	0.005	0.010	0.100	J		098768-009	SW846 6020
	Barium	0.145	0.0006	0.002	2.00	1.00			098768-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098768-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098768-009	SW846 6020
	Calcium	143	0.300	1.00	NE	NE			098768-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098768-009	SW846 6020
	Cobalt	0.000307	0.0001	0.001	NE	NE	J		098768-009	SW846 6020
	Copper	0.000489	0.00035	0.001	NE	NE	J	J-	098768-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098768-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098768-009	SW846 6020
	Magnesium	28.2	0.010	0.030	NE	NE			098768-009	SW846 6020
	Manganese	0.00136	0.001	0.005	NE	NE	J		098768-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	098768-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U	UJ	098768-009	SW846 6020
	Potassium	4.98	0.080	0.300	NE	NE			098768-009	SW846 6020
	Selenium	0.00206	0.0015	0.005	0.050	0.050	J		098768-009	SW846 6020
	Silver	ND	0.0001	0.001	NE	0.050	U		098768-009	SW846 6020
	Sodium	93.0	0.400	1.25	NE	NE			098768-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098768-009	SW846 6020
	Uranium	0.00688	0.000067	0.0002	0.03	0.03			098768-009	SW846 6020
	Vanadium	0.00404	0.003	0.010	NE	NE	J		098768-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098768-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	0.015	0.050	NE	NE	U		098789-009	SW846 6020
04-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098789-009	SW846 6020
	Arsenic	0.00187	0.0017	0.005	0.010	0.100	J		098789-009	SW846 6020
	Barium	0.0574	0.0006	0.002	2.00	1.00			098789-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098789-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098789-009	SW846 6020
	Calcium	47.6	0.060	0.200	NE	NE			098789-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098789-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098789-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098789-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098789-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098789-009	SW846 6020
	Magnesium	14.9	0.010	0.030	NE	NE			098789-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098789-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098789-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098789-009	SW846 6020
	Potassium	3.23	0.080	0.300	NE	NE			098789-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098789-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098789-009	SW846 6020
	Sodium	23.6	0.080	0.250	NE	NE			098789-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098789-009	SW846 6020
	Uranium	0.00306	0.000067	0.0002	0.03	0.03			098789-009	SW846 6020
	Vanadium	0.00961	0.0045	0.010	NE	NE	B, J	0.031U	098789-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098789-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	NE	U		098790-009	SW846 6020
04-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098790-009	SW846 6020
	Arsenic	0.00177	0.0017	0.005	0.010	0.100	J		098790-009	SW846 6020
	Barium	0.0584	0.0006	0.002	2.00	1.00			098790-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098790-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098790-009	SW846 6020
	Calcium	48.8	0.060	0.200	NE	NE			098790-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098790-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098790-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098790-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098790-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098790-009	SW846 6020
	Magnesium	15.5	0.010	0.030	NE	NE			098790-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098790-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098790-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098790-009	SW846 6020
	Potassium	3.35	0.080	0.300	NE	NE			098790-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098790-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098790-009	SW846 6020
	Sodium	24.4	0.080	0.250	NE	NE			098790-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098790-009	SW846 6020
	Uranium	0.00309	0.000067	0.0002	0.03	0.03			098790-009	SW846 6020
	Vanadium	0.00997	0.0045	0.010	NE	NE	B, J	0.031U	098790-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098790-009	SW846 6020

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
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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]
MRN-3D	Aluminum	ND	0.015	0.050	NE	NE	U		098792-009	SW846 6020
05-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098792-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		098792-009	SW846 6020
	Barium	0.119	0.0006	0.002	2.00	1.00			098792-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098792-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098792-009	SW846 6020
	Calcium	67.2	0.600	2.00	NE	NE			098792-009	SW846 6020
	Chromium	0.00433	0.002	0.010	0.100	0.050	B, J	0.019U	098792-009	SW846 6020
	Cobalt	0.000163	0.0001	0.001	NE	NE	J		098792-009	SW846 6020
	Copper	0.00113	0.00035	0.001	NE	NE			098792-009	SW846 6020
	Iron	0.162	0.033	0.100	NE	NE			098792-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098792-009	SW846 6020
	Magnesium	13.0	0.010	0.030	NE	NE			098792-009	SW846 6020
	Manganese	0.00102	0.001	0.005	NE	NE	J		098792-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098792-009	SW846 7470
	Nickel	0.00134	0.0005	0.002	NE	NE	J		098792-009	SW846 6020
	Potassium	4.21	0.080	0.300	NE	NE			098792-009	SW846 6020
	Selenium	0.00194	0.0015	0.005	0.050	0.050	J		098792-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098792-009	SW846 6020
	Sodium	24.6	0.080	0.250	NE	NE			098792-009	SW846 6020
	Thallium	0.000686	0.00045	0.002	0.002	NE	J	0.0041U	098792-009	SW846 6020
	Uranium	0.00453	0.000067	0.0002	0.03	0.03	N	J+	098792-009	SW846 6020
	Vanadium	0.00574	0.0045	0.010	NE	NE	J		098792-009	SW846 6020
	Zinc	0.0335	0.0035	0.010	NE	NE			098792-009	SW846 6020

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Table 2A-6 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
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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]
NWTA3-MW3D	Aluminum	ND	0.015	0.050	NE	NE	U		098805-009	SW846 6020
08-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098805-009	SW846 6020
	Arsenic	0.00201	0.0017	0.005	0.010	0.100	J		098805-009	SW846 6020
	Barium	0.0955	0.0006	0.002	2.00	1.00			098805-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098805-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098805-009	SW846 6020
	Calcium	40.7	0.060	0.200	NE	NE			098805-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098805-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098805-009	SW846 6020
	Copper	0.0004	0.00035	0.001	NE	NE	J		098805-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098805-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098805-009	SW846 6020
	Magnesium	8.48	0.010	0.030	NE	NE			098805-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098805-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098805-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098805-009	SW846 6020
	Potassium	3.86	0.080	0.300	NE	NE			098805-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098805-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098805-009	SW846 6020
	Sodium	40.8	0.080	0.250	NE	NE			098805-009	SW846 6020
	Thallium	0.0005	0.00045	0.002	0.002	NE	B, J	0.0035U	098805-009	SW846 6020
	Uranium	0.00382	0.000067	0.0002	0.03	0.03		J	098805-009	SW846 6020
	Vanadium	0.0103	0.0045	0.010	NE	NE	B	0.028U	098805-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098805-009	SW846 6020

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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]
PL-2	Aluminum	ND	0.015	0.050	NE	NE	U		098784-009	SW846 6020
29-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098784-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		098784-009	SW846 6020
	Barium	0.080	0.0006	0.002	2.00	1.00			098784-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098784-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098784-009	SW846 6020
	Calcium	63.2	0.600	2.00	NE	NE			098784-009	SW846 6020
	Chromium	0.00244	0.002	0.010	0.100	0.050	J	0.012U	098784-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098784-009	SW846 6020
	Copper	0.000534	0.00035	0.001	NE	NE	J	0.0032U	098784-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098784-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098784-009	SW846 6020
	Magnesium	10.2	0.010	0.030	NE	NE			098784-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U	UJ	098784-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098784-009	SW846 7470
	Nickel	0.00361	0.0005	0.002	NE	NE		0.0043U	098784-009	SW846 6020
	Potassium	3.54	0.080	0.300	NE	NE			098784-009	SW846 6020
	Selenium	0.00164	0.0015	0.005	0.050	0.050	J		098784-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098784-009	SW846 6020
	Sodium	29.4	0.080	0.250	NE	NE			098784-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098784-009	SW846 6020
	Uranium	0.00378	0.000067	0.0002	0.03	0.03			098784-009	SW846 6020
	Vanadium	0.00773	0.0045	0.010	NE	NE	J		098784-009	SW846 6020
	Zinc	0.0112	0.0035	0.010	NE	NE			098784-009	SW846 6020

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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]
PL-2 (Duplicate)	Aluminum	ND	0.015	0.050	NE	NE	U		098785-009	SW846 6020
29-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098785-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		098785-009	SW846 6020
	Barium	0.0807	0.0006	0.002	2.00	1.00			098785-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098785-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098785-009	SW846 6020
	Calcium	61.9	0.600	2.00	NE	NE			098785-009	SW846 6020
	Chromium	0.00243	0.002	0.010	0.100	0.050	J	0.012U	098785-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098785-009	SW846 6020
	Copper	0.000525	0.00035	0.001	NE	NE	J	0.0032U	098785-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098785-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098785-009	SW846 6020
	Magnesium	10.2	0.010	0.030	NE	NE			098785-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U	UJ	098785-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098785-009	SW846 7470
	Nickel	0.00359	0.0005	0.002	NE	NE		0.0043U	098785-009	SW846 6020
	Potassium	3.54	0.080	0.300	NE	NE			098785-009	SW846 6020
	Selenium	0.00182	0.0015	0.005	0.050	0.050	J		098785-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098785-009	SW846 6020
	Sodium	29.9	0.080	0.250	NE	NE			098785-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098785-009	SW846 6020
	Uranium	0.00378	0.000067	0.0002	0.03	0.03			098785-009	SW846 6020
	Vanadium	0.00758	0.0045	0.010	NE	NE	J		098785-009	SW846 6020
	Zinc	0.0109	0.0035	0.010	NE	NE			098785-009	SW846 6020

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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]
PL-4	Aluminum	ND	0.015	0.050	NE	NE	U		098780-009	SW846 6020
28-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098780-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		098780-009	SW846 6020
	Barium	0.0715	0.0006	0.002	2.00	1.00			098780-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098780-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098780-009	SW846 6020
	Calcium	71.6	0.600	2.00	NE	NE			098780-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098780-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098780-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098780-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098780-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098780-009	SW846 6020
	Magnesium	12.8	0.010	0.030	NE	NE			098780-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U	UJ	098780-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098780-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098780-009	SW846 6020
	Potassium	5.28	0.080	0.300	NE	NE			098780-009	SW846 6020
	Selenium	0.00207	0.0015	0.005	0.050	0.050	J		098780-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098780-009	SW846 6020
	Sodium	25.4	0.080	0.250	NE	NE			098780-009	SW846 6020
	Thallium	0.000994	0.00045	0.002	0.002	NE	B, J	0.0055U	098780-009	SW846 6020
	Uranium	0.00372	0.000067	0.0002	0.03	0.03			098780-009	SW846 6020
	Vanadium	0.00532	0.0045	0.010	NE	NE	J		098780-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098780-009	SW846 6020

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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-2S	Aluminum	ND	0.015	0.050	NE	NE	U		098775-009	SW846 6020
26-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098775-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		098775-009	SW846 6020
	Barium	0.060	0.0006	0.002	2.00	1.00			098775-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098775-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098775-009	SW846 6020
	Calcium	135	0.600	2.00	NE	NE			098775-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098775-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098775-009	SW846 6020
	Copper	0.0139	0.00035	0.001	NE	NE		J-	098775-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098775-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098775-009	SW846 6020
	Magnesium	36.7	0.010	0.030	NE	NE			098775-009	SW846 6020
	Manganese	0.00249	0.001	0.005	NE	NE	J	J	098775-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098775-009	SW846 7470
	Nickel	0.0049	0.0005	0.002	NE	NE			098775-009	SW846 6020
	Potassium	7.63	0.080	0.300	NE	NE			098775-009	SW846 6020
	Selenium	0.00255	0.0015	0.005	0.050	0.050	J		098775-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098775-009	SW846 6020
	Sodium	89.7	0.800	2.50	NE	NE			098775-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098775-009	SW846 6020
	Uranium	0.0165	0.000067	0.0002	0.03	0.03			098775-009	SW846 6020
	Vanadium	0.00495	0.0045	0.010	NE	NE	J		098775-009	SW846 6020
	Zinc	0.0113	0.0035	0.010	NE	NE			098775-009	SW846 6020

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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	0.015	0.050	NE	NE	U		098777-009	SW846 6020
27-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098777-009	SW846 6020
	Arsenic	0.00294	0.0017	0.005	0.010	0.100	J		098777-009	SW846 6020
	Barium	0.0089	0.0006	0.002	2.00	1.00			098777-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098777-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098777-009	SW846 6020
	Calcium	65.0	1.20	4.00	NE	NE			098777-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098777-009	SW846 6020
	Cobalt	0.000115	0.0001	0.001	NE	NE	J		098777-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098777-009	SW846 6020
	Iron	0.297	0.033	0.100	NE	NE			098777-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098777-009	SW846 6020
	Magnesium	3.08	0.010	0.030	NE	NE			098777-009	SW846 6020
	Manganese	0.0236	0.001	0.005	NE	NE		J	098777-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098777-009	SW846 7470
	Nickel	0.00139	0.0005	0.002	NE	NE	J	0.0043U	098777-009	SW846 6020
	Potassium	2.29	0.080	0.300	NE	NE			098777-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098777-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098777-009	SW846 6020
	Sodium	1140	4.00	12.5	NE	NE			098777-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098777-009	SW846 6020
	Uranium	0.000248	0.000067	0.0002	0.03	0.03			098777-009	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	NE	U		098777-009	SW846 6020
	Zinc	0.0153	0.0035	0.010	NE	NE			098777-009	SW846 6020

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

Calendar Year 2016

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	0.015	0.050	NE	NE	U		098797-009	SW846 6020
02-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098797-009	SW846 6020
	Arsenic	0.00175	0.0017	0.005	0.010	0.100	J		098797-009	SW846 6020
	Barium	0.0733	0.0006	0.002	2.00	1.00			098797-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098797-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098797-009	SW846 6020
	Calcium	43.6	0.060	0.200	NE	NE			098797-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098797-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098797-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098797-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098797-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098797-009	SW846 6020
	Magnesium	13.3	0.010	0.030	NE	NE			098797-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098797-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098797-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098797-009	SW846 6020
	Potassium	4.17	0.080	0.300	NE	NE			098797-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098797-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098797-009	SW846 6020
	Sodium	37.1	0.080	0.250	NE	NE			098797-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098797-009	SW846 6020
	Uranium	0.00323	0.000067	0.0002	0.03	0.03			098797-009	SW846 6020
	Vanadium	0.0079	0.0045	0.010	NE	NE	B, J	0.031U	098797-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098797-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	NE	U		098798-009	SW846 6020
02-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098798-009	SW846 6020
	Arsenic	0.00197	0.0017	0.005	0.010	0.100	J		098798-009	SW846 6020
	Barium	0.0761	0.0006	0.002	2.00	1.00			098798-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098798-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098798-009	SW846 6020
	Calcium	45.3	0.060	0.200	NE	NE			098798-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098798-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098798-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098798-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098798-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098798-009	SW846 6020
	Magnesium	13.6	0.010	0.030	NE	NE			098798-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098798-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098798-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098798-009	SW846 6020
	Potassium	4.28	0.080	0.300	NE	NE			098798-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098798-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098798-009	SW846 6020
	Sodium	38.4	0.080	0.250	NE	NE			098798-009	SW846 6020
	Thallium	0.000586	0.00045	0.002	0.002	NE	B, J	0.0038U	098798-009	SW846 6020
	Uranium	0.00329	0.000067	0.0002	0.03	0.03			098798-009	SW846 6020
	Vanadium	0.0086	0.0045	0.010	NE	NE	B, J	0.031U	098798-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098798-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	0.015	0.050	NE	NE	U		098800-009	SW846 6020
03-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098800-009	SW846 6020
	Arsenic	0.00202	0.0017	0.005	0.010	0.100	J		098800-009	SW846 6020
	Barium	0.0596	0.0006	0.002	2.00	1.00			098800-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098800-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098800-009	SW846 6020
	Calcium	38.6	0.060	0.200	NE	NE			098800-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098800-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098800-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098800-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098800-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098800-009	SW846 6020
	Magnesium	11.3	0.010	0.030	NE	NE			098800-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098800-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098800-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098800-009	SW846 6020
	Potassium	4.81	0.080	0.300	NE	NE			098800-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098800-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098800-009	SW846 6020
	Sodium	53.0	1.60	5.00	NE	NE			098800-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098800-009	SW846 6020
	Uranium	0.00237	0.000067	0.0002	0.03	0.03			098800-009	SW846 6020
	Vanadium	0.0112	0.0045	0.010	NE	NE	B	0.031U	098800-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098800-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	0.015	0.050	NE	NE	U		098803-009	SW846 6020
01-Feb-16	Antimony	ND	0.001	0.003	0.006	NE	U		098803-009	SW846 6020
	Arsenic	0.00198	0.0017	0.005	0.010	0.100	J		098803-009	SW846 6020
	Barium	0.0545	0.0006	0.002	2.00	1.00			098803-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		098803-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098803-009	SW846 6020
	Calcium	36.9	0.060	0.200	NE	NE			098803-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098803-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098803-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U		098803-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098803-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098803-009	SW846 6020
	Magnesium	10.4	0.010	0.030	NE	NE			098803-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		098803-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098803-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098803-009	SW846 6020
	Potassium	4.35	0.080	0.300	NE	NE			098803-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		098803-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098803-009	SW846 6020
	Sodium	56.9	1.60	5.00	NE	NE			098803-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		098803-009	SW846 6020
	Uranium	0.00228	0.000067	0.0002	0.03	0.03			098803-009	SW846 6020
	Vanadium	0.0114	0.0045	0.010	NE	NE	B	0.031U	098803-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098803-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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	0.015	0.050	NE	NE	U		098772-009	SW846 6020
25-Jan-16	Antimony	ND	0.001	0.003	0.006	NE	U		098772-009	SW846 6020
	Arsenic	0.00192	0.0017	0.005	0.010	0.100	J		098772-009	SW846 6020
	Barium	0.0452	0.0006	0.002	2.00	1.00			098772-009	SW846 6020
	Beryllium	0.000205	0.0002	0.0005	0.004	NE	J		098772-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		098772-009	SW846 6020
	Calcium	169	0.600	2.00	NE	NE			098772-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		098772-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		098772-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	NE	U	UJ	098772-009	SW846 6020
	Iron	ND	0.033	0.100	NE	NE	U		098772-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		098772-009	SW846 6020
	Magnesium	36.5	0.010	0.030	NE	NE			098772-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U	UJ	098772-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		098772-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	NE	U		098772-009	SW846 6020
	Potassium	7.19	0.080	0.300	NE	NE			098772-009	SW846 6020
	Selenium	0.00292	0.0015	0.005	0.050	0.050	J		098772-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		098772-009	SW846 6020
	Sodium	112	0.800	2.50	NE	NE			098772-009	SW846 6020
	Thallium	0.00108	0.00045	0.002	0.002	NE	B, J	0.0055U	098772-009	SW846 6020
	Uranium	0.0179	0.000067	0.0002	0.03	0.03			098772-009	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	NE	U		098772-009	SW846 6020
	Zinc	ND	0.0035	0.010	NE	NE	U		098772-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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 Spring	Americium-241	7.50 ± 10.2	15.5	7.55	NE	NE	U	BD	098770-033	EPA 901.1
22-Jan-16	Cesium-137	0.724 ± 1.85	3.32	1.58	NE	NE	U	BD	098770-033	EPA 901.1
	Cobalt-60	-2.08 ± 2.13	3.13	1.45	NE	NE	U	BD	098770-033	EPA 901.1
	Potassium-40	52.7 ± 46.9	32.7	15.1	NE	NE	X	R	098770-033	EPA 901.1
	Gross Alpha	-4.89	NA	NA	15 pCi/L	NE	NA	None	098770-034	EPA 900.0
	Gross Beta	32.7 ± 8.00	8.39	4.06	4mrem/yr	NE		J	098770-034	EPA 900.0
	Uranium-233/234	11.5 ± 1.39	0.515	0.239	NE	NE			098770-035	HASL-300
	Uranium-235/236	0.381 ± 0.166	0.328	0.142	NE	NE		J	098770-035	HASL-300
	Uranium-238	2.11 ± 0.394	0.322	0.143	NE	NE			098770-035	HASL-300
	Radium-226	0.472 ± 0.341	0.477	0.194	5 pCi/L	30 pCi/L	U	BD	098770-038	EPA 903.1
	Radium-228	0.087 ± 0.270	0.499	0.212	5 pCi/L	30 pCi/L	U	BD	098770-039	EPA 904.0
Greystone-MW2	Americium-241	7.05 ± 15.6	24.7	12.1	NE	NE	U	BD	098768-033	EPA 901.1
21-Jan-16	Cesium-137	-1.79 ± 4.67	5.64	2.70	NE	NE	U	BD	098768-033	EPA 901.1
	Cobalt-60	-1.37 ± 3.18	5.49	2.56	NE	NE	U	BD	098768-033	EPA 901.1
	Potassium-40	74.4 ± 68.7	59.8	27.9	NE	NE		J	098768-033	EPA 901.1
	Gross Alpha	3.36	NA	NA	15 pCi/L	NE	NA	None	098768-034	EPA 900.0
	Gross Beta	11.3 ± 3.01	3.53	1.72	4mrem/yr	NE		J	098768-034	EPA 900.0
	Uranium-233/234	9.81 ± 1.09	0.131	0.0604	NE	NE			098768-035	HASL-300
	Uranium-235/236	0.198 ± 0.0643	0.084	0.0358	NE	NE		J	098768-035	HASL-300
	Uranium-238	2.42 ± 0.313	0.0823	0.0361	NE	NE			098768-035	HASL-300
	Radium-226	1.53 ± 0.550	0.504	0.205	5 pCi/L	30 pCi/L			098768-038	EPA 903.1
	Radium-228	-0.0149 ± 0.260	0.496	0.220	5 pCi/L	30 pCi/L	U	BD	098768-039	EPA 904.0
MRN-2	Americium-241	4.97 ± 16.0	25.3	12.3	NE	NE	U	BD	098789-033	EPA 901.1
04-Feb-16	Cesium-137	-0.456 ± 2.87	4.94	2.32	NE	NE	U	BD	098789-033	EPA 901.1
	Cobalt-60	0.0936 ± 2.90	5.26	2.41	NE	NE	U	BD	098789-033	EPA 901.1
	Potassium-40	31.3 ± 46.0	44.5	20.0	NE	NE	U	BD	098789-033	EPA 901.1
	Gross Alpha	0.60	NA	NA	15 pCi/L	NE	NA	None	098789-034	EPA 900.0
	Gross Beta	2.90 ± 0.942	1.21	0.590	4mrem/yr	NE		J	098789-034	EPA 900.0
	Radium-226	0.238 ± 0.196	0.285	0.113	5 pCi/L	30 pCi/L	U	BD	098789-038	EPA 903.1
	Radium-228	0.202 ± 0.282	0.475	0.209	5 pCi/L	30 pCi/L	U	BD	098789-039	EPA 904.0

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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]
MRN-2	Americium-241	-7.37 ± 14.4	22.0	10.7	NE	NE	U	BD	098790-033	EPA 901.1
(Duplicate)	Cesium-137	-0.254 ± 3.45	5.91	2.79	NE	NE	U	BD	098790-033	EPA 901.1
04-Feb-16	Cobalt-60	0.159 ± 3.36	6.29	2.88	NE	NE	U	BD	098790-033	EPA 901.1
	Potassium-40	81.3 ± 56.9	53.3	23.9	NE	NE	X	R	098790-033	EPA 901.1
	Gross Alpha	1.03	NA	NA	15 pCi/L	NE	NA	None	098790-034	EPA 900.0
	Gross Beta	2.00 ± 0.805	1.02	0.488	4mrem/yr	NE		J	098790-034	EPA 900.0
	Radium-226	0.259 ± 0.206	0.299	0.122	5 pCi/L	30 pCi/L	U	BD	098790-038	EPA 903.1
	Radium-228	0.768 ± 0.394	0.504	0.231	5 pCi/L	30 pCi/L		NJ+	098790-039	EPA 904.0
MRN-3D	Americium-241	5.50 ± 17.0	28.9	14.1	NE	NE	U	BD	098792-033	EPA 901.1
05-Feb-16	Cesium-137	-0.919 ± 2.33	3.91	1.86	NE	NE	U	BD	098792-033	EPA 901.1
	Cobalt-60	0.458 ± 2.43	4.48	2.09	NE	NE	U	BD	098792-033	EPA 901.1
	Potassium-40	-5.74 ± 46.8	58.0	27.5	NE	NE	U	BD	098792-033	EPA 901.1
	Gross Alpha	1.87	NA	NA	15 pCi/L	NE	NA	None	098792-034	EPA 900.0
	Gross Beta	4.60 ± 1.23	1.27	0.613	4mrem/yr	NE		J	098792-034	EPA 900.0
	Radium-226	0.445 ± 0.261	0.327	0.133	5 pCi/L	30 pCi/L		J	098792-038	EPA 903.1
	Radium-228	-0.141 ± 0.217	0.477	0.204	5 pCi/L	30 pCi/L	U	BD	098792-039	EPA 904.0
NWTA3-MW3D	Americium-241	-2.4 ± 16.5	28.5	14.0	NE	NE	U	BD	098805-033	EPA 901.1
08-Feb-16	Cesium-137	0.159 ± 2.57	3.93	1.89	NE	NE	U	BD	098805-033	EPA 901.1
	Cobalt-60	-0.498 ± 2.35	4.09	1.92	NE	NE	U	BD	098805-033	EPA 901.1
	Potassium-40	-41.1 ± 45.1	51.9	24.7	NE	NE	U	BD	098805-033	EPA 901.1
	Gross Alpha	0.78	NA	NA	15 pCi/L	NE	NA	None	098805-034	EPA 900.0
	Gross Beta	3.33 ± 0.904	0.989	0.476	4mrem/yr	NE			098805-034	EPA 900.0
	Radium-226	0.566 ± 0.283	0.326	0.133	5 pCi/L	30 pCi/L		J	098805-038	EPA 903.1
	Radium-228	0.145 ± 0.288	0.505	0.223	5 pCi/L	30 pCi/L	U	BD	098805-039	EPA 904.0

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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]
PL-2	Americium-241	5.35 ± 10.6	18.7	9.11	NE	NE	U	BD	098784-033	EPA 901.1
29-Jan-16	Cesium-137	-0.265 ± 2.76	4.70	2.23	NE	NE	U	BD	098784-033	EPA 901.1
	Cobalt-60	-1.88 ± 3.24	4.56	2.09	NE	NE	U	BD	098784-033	EPA 901.1
	Potassium-40	43.3 ± 60.6	44.6	20.4	NE	NE	U	BD	098784-033	EPA 901.1
	Gross Alpha	1.50	NA	NA	15 pCi/L	NE	NA	None	098784-034	EPA 900.0
	Gross Beta	3.17 ± 1.25	1.75	0.845	4mrem/yr	NE		J	098784-034	EPA 900.0
	Radium-226	0.653 ± 0.383	0.503	0.205	5 pCi/L	30 pCi/L		NJ+	098784-038	EPA 903.1
	Radium-228	0.373 ± 0.330	0.506	0.223	5 pCi/L	30 pCi/L	U	BD	098784-039	EPA 904.0
PL-2 (Duplicate)	Americium-241	8.54 ± 15.6	24.2	11.8	NE	NE	U	BD	098785-033	EPA 901.1
29-Jan-16	Cesium-137	-0.239 ± 3.17	5.48	2.61	NE	NE	U	BD	098785-033	EPA 901.1
	Cobalt-60	2.66 ± 3.69	4.43	2.03	NE	NE	U	BD	098785-033	EPA 901.1
	Potassium-40	11.4 ± 53.2	56.6	26.4	NE	NE	U	BD	098785-033	EPA 901.1
	Gross Alpha	3.45	NA	NA	15 pCi/L	NE	NA	None	098785-034	EPA 900.0
	Gross Beta	5.88 ± 1.51	1.61	0.779	4mrem/yr	NE		J	098785-034	EPA 900.0
	Radium-226	0.483 ± 0.286	0.371	0.151	5 pCi/L	30 pCi/L		NJ+	098785-038	EPA 903.1
	Radium-228	0.700 ± 0.399	0.508	0.223	5 pCi/L	30 pCi/L		J	098785-039	EPA 904.0
PL-4	Americium-241	-2.42 ± 12.1	18.1	8.83	NE	NE	U	BD	098780-033	EPA 901.1
28-Jan-16	Cesium-137	0.976 ± 4.13	3.01	1.44	NE	NE	U	BD	098780-033	EPA 901.1
	Cobalt-60	-1.62 ± 2.01	3.11	1.45	NE	NE	U	BD	098780-033	EPA 901.1
	Potassium-40	-8.71 ± 38.3	42.9	20.4	NE	NE	U	BD	098780-033	EPA 901.1
	Gross Alpha	0.51	NA	NA	15 pCi/L	NE	NA	None	098780-034	EPA 900.0
	Gross Beta	3.94 ± 1.02	1.08	0.519	4mrem/yr	NE		J	098780-034	EPA 900.0
	Radium-226	0.023 ± 0.186	0.371	0.151	5 pCi/L	30 pCi/L	U	BD	098780-038	EPA 903.1
	Radium-228	0.114 ± 0.280	0.498	0.222	5 pCi/L	30 pCi/L	U	BD	098780-039	EPA 904.0

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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]
SFR-2S	Americium-241	2.47 ± 7.49	9.93	4.86	NE	NE	U	BD	098775-033	EPA 901.1
26-Jan-16	Cesium-137	0.306 ± 1.99	3.02	1.45	NE	NE	U	BD	098775-033	EPA 901.1
	Cobalt-60	5.21 ± 3.45	5.21	1.75	NE	NE	U	BD	098775-033	EPA 901.1
	Potassium-40	-24.1 ± 39.5	48.1	23.1	NE	NE	U	BD	098775-033	EPA 901.1
	Gross Alpha	6.52	NA	NA	15 pCi/L	NE	NA	None	098775-034	EPA 900.0
	Gross Beta	11.4 ± 3.33	4.12	2.01	4mrem/yr	NE		J	098775-034	EPA 900.0
	Uranium-233/234	21.1 ± 2.37	0.152	0.0703	NE	NE			098775-035	HASL-300
	Uranium-235/236	0.508 ± 0.177	0.0977	0.0416	NE	NE			098775-035	HASL-300
	Uranium-238	5.87 ± 0.710	0.0957	0.042	NE	NE			098775-035	HASL-300
	Radium-226	0.674 ± 0.388	0.473	0.193	5 pCi/L	30 pCi/L		J	098775-038	EPA 903.1
	Radium-228	0.450 ± 0.342	0.501	0.221	5 pCi/L	30 pCi/L	U	BD	098775-039	EPA 904.0
SFR-4T	Americium-241	-0.626 ± 5.77	8.83	4.31	NE	NE	U	BD	098777-033	EPA 901.1
27-Jan-16	Cesium-137	1.07 ± 1.84	3.19	1.54	NE	NE	U	BD	098777-033	EPA 901.1
	Cobalt-60	1.39 ± 1.99	3.51	1.66	NE	NE	U	BD	098777-033	EPA 901.1
	Potassium-40	-43.9 ± 43.0	44.0	21.1	NE	NE	U	BD	098777-033	EPA 901.1
	Gross Alpha	-8.00	NA	NA	15 pCi/L	NE	NA	None	098777-034	EPA 900.0
	Gross Beta	-0.412 ± 6.60	11.4	5.53	4mrem/yr	NE	U	BD	098777-034	EPA 900.0
	Uranium-233/234	0.482 ± 0.0835	0.0993	0.0463	NE	NE			098777-035	HASL-300
	Uranium-235/236	0.0336 ± 0.0218	0.0631	0.0274	NE	NE	U	BD	098777-035	HASL-300
	Uranium-238	0.0939 ± 0.0319	0.062	0.0277	NE	NE		J	098777-035	HASL-300
	Radium-226	0.471 ± 0.293	0.381	0.155	5 pCi/L	30 pCi/L		J	098777-038	EPA 903.1
	Radium-228	0.260 ± 0.312	0.514	0.226	5 pCi/L	30 pCi/L	U	BD	098777-039	EPA 904.0
SWTA3-MW2	Americium-241	0.740 ± 3.67	5.65	2.76	NE	NE	U	BD	098797-033	EPA 901.1
02-Feb-16	Cesium-137	-0.273 ± 2.57	4.37	2.09	NE	NE	U	BD	098797-033	EPA 901.1
	Cobalt-60	-0.314 ± 2.41	4.29	2.00	NE	NE	U	BD	098797-033	EPA 901.1
	Potassium-40	7.60 ± 47.1	44.5	20.7	NE	NE	U	BD	098797-033	EPA 901.1
	Gross Alpha	1.34	NA	NA	15 pCi/L	NE	NA	None	098797-034	EPA 900.0
	Gross Beta	3.76 ± 1.26	1.65	0.809	4mrem/yr	NE		J	098797-034	EPA 900.0
	Radium-226	0.414 ± 0.317	0.446	0.182	5 pCi/L	30 pCi/L	U	BD	098797-038	EPA 903.1
	Radium-228	0.261 ± 0.294	0.477	0.206	5 pCi/L	30 pCi/L	U	BD	098797-039	EPA 904.0

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

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]
SWTA3-MW2	Americium-241	4.19 ± 11.8	18.6	8.95	NE	NE	U	BD	098798-033	EPA 901.1
(Duplicate)	Cesium-137	1.10 ± 3.41	6.28	2.93	NE	NE	U	BD	098798-033	EPA 901.1
02-Feb-16	Cobalt-60	1.33 ± 3.81	7.21	3.28	NE	NE	U	BD	098798-033	EPA 901.1
	Potassium-40	-45.6 ± 56.0	89.2	41.4	NE	NE	U	BD	098798-033	EPA 901.1
	Gross Alpha	4.69	NA	NA	15 pCi/L	NE	NA	None	098798-034	EPA 900.0
	Gross Beta	4.35 ± 0.999	0.930	0.447	4mrem/yr	NE		J	098798-034	EPA 900.0
	Radium-226	0.00 ± 0.134	0.284	0.112	5 pCi/L	30 pCi/L	U	BD	098798-038	EPA 903.1
	Radium-228	0.306 ± 0.315	0.502	0.219	5 pCi/L	30 pCi/L	U	BD	098798-039	EPA 904.0
SWTA3-MW3	Americium-241	4.47 ± 8.99	15.5	7.50	NE	NE	U	BD	098800-033	EPA 901.1
03-Feb-16	Cesium-137	-0.958 ± 2.96	5.11	2.41	NE	NE	U	BD	098800-033	EPA 901.1
	Cobalt-60	2.28 ± 3.07	5.65	2.61	NE	NE	U	BD	098800-033	EPA 901.1
	Potassium-40	-42 ± 49.0	71.1	33.4	NE	NE	U	BD	098800-033	EPA 901.1
	Gross Alpha	1.64	NA	NA	15 pCi/L	NE	NA	None	098800-034	EPA 900.0
	Gross Beta	4.06 ± 1.17	1.42	0.688	4mrem/yr	NE		J	098800-034	EPA 900.0
	Radium-226	0.414 ± 0.249	0.319	0.130	5 pCi/L	30 pCi/L		J	098800-038	EPA 903.1
	Radium-228	0.283 ± 0.294	0.468	0.203	5 pCi/L	30 pCi/L	U	BD	098800-039	EPA 904.0
SWTA3-MW4	Americium-241	-16.8 ± 14.5	19.1	9.18	NE	NE	U	BD	098803-033	EPA 901.1
01-Feb-16	Cesium-137	1.77 ± 3.51	6.43	2.99	NE	NE	U	BD	098803-033	EPA 901.1
	Cobalt-60	0.958 ± 3.36	6.49	2.90	NE	NE	U	BD	098803-033	EPA 901.1
	Potassium-40	23.2 ± 49.8	54.1	23.6	NE	NE	U	BD	098803-033	EPA 901.1
	Gross Alpha	1.72	NA	NA	15 pCi/L	NE	NA	None	098803-034	EPA 900.0
	Gross Beta	4.68 ± 1.25	1.40	0.677	4mrem/yr	NE		J	098803-034	EPA 900.0
	Radium-226	0.483 ± 0.279	0.339	0.138	5 pCi/L	30 pCi/L		J	098803-038	EPA 903.1
	Radium-228	0.0262 ± 0.257	0.488	0.212	5 pCi/L	30 pCi/L	U	BD	098803-039	EPA 904.0
TRE-1	Americium-241	1.92 ± 10.3	16.3	7.96	NE	NE	U	BD	098772-033	EPA 901.1
25-Jan-16	Cesium-137	-3.16 ± 3.28	2.98	1.42	NE	NE	U	BD	098772-033	EPA 901.1
	Cobalt-60	-1.69 ± 2.08	3.23	1.50	NE	NE	U	BD	098772-033	EPA 901.1
	Potassium-40	-4.01 ± 35.7	44.8	21.3	NE	NE	U	BD	098772-033	EPA 901.1
	Gross Alpha	5.75	NA	NA	15 pCi/L	NE	NA	None	098772-034	EPA 900.0
	Gross Beta	11.2 ± 3.91	5.32	2.60	4mrem/yr	NE		J	098772-034	EPA 900.0
	Uranium-233/234	22.3 ± 2.50	0.152	0.0703	NE	NE			098772-035	HASL-300
	Uranium-235/236	0.583 ± 0.128	0.0977	0.0416	NE	NE			098772-035	HASL-300
	Uranium-238	5.77 ± 0.699	0.0957	0.042	NE	NE			098772-035	HASL-300
	Radium-226	0.155 ± 0.147	0.198	0.0602	5 pCi/L	30 pCi/L	U	BD	098772-038	EPA 903.1
	Radium-228	0.727 ± 0.400	0.502	0.221	5 pCi/L	30 pCi/L		J	098772-039	EPA 904.0

Refer to footnotes on page 2A-35.

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

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
Coyote Spring	22-Jan-16	11.28	2495.3	205.5	6.12	0.36	16.8	1.81
Greystone-MW2	21-Jan-16	14.04	999.0	169.5	6.96	0.19	70.6	7.24
MRN-2	04-Feb-16	16.36	373.6	253.9	7.78	0.28	72.7	7.08
MRN-3D	05-Feb-16	18.88	441.4	33.9	7.68	0.77	49.7	4.62
NWTA3-MW3D	08-Feb-16	19.35	359.9	37.7	7.88	0.56	49.3	4.45
PL-2	29-Jan-16	17.80	417.8	184.7	7.82	0.20	71.5	6.75
PL-4	28-Jan-16	18.31	455.0	156.5	7.53	1.02	81.0	7.67
SFR-2S	26-Jan-16	13.21	926.9	147.9	6.96	1.93	77.4	8.18
SFR-4T	27-Jan-16	16.55	3775.9	-134.9	8.09	0.53	8.6	0.84
SWTA3-MW2	02-Feb-16	16.11	393.5	248.1	7.79	0.42	44.8	4.36
SWTA3-MW3	03-Feb-16	18.96	420.0	22.1	7.78	1.11	47.0	4.43
SWTA3-MW4	01-Feb-16	15.77	405.9	241.0	7.87	1.11	49.9	4.97
TRE-1	25-Jan-16	15.88	1174.3	172.6	6.77	0.21	73.4	7.23

Refer to footnotes on page 2A-35.

Footnotes for Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task Analytical Results Tables

%	= Percent.
CaCO3	= 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

Activity	= 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 exceeds the established MCL or MAC.
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 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 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 nitrate). If no value exists, NE is used.

MAC = Maximum allowable concentration. MACs were established by the New Mexico Water Quality Control Commission (NMWQCC September 2004).

MCL = Maximum contaminant level. MCLs were established by the EPA Office of Water, National Primary Water Standards (EPA May 2009).

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 Long-Term Stewardship Consolidated Groundwater Monitoring Program Groundwater Surveillance Task Analytical Results Tables (Concluded)

[e]Lab 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	= Data rejected due to peak not meeting identification criteria.

[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

DOE, 1997, *EML [Environmental Measurements Laboratory] Procedures Manual,* 28th ed., Vol. 1, Rev. 0, HASL-300, Environmental Measurements Laboratory.

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.

Rice, E.W., R.B. Baird, A.D. Eaton, and L.S. Clesceri, 2012, *Standard Methods for the Examination of Water and Wastewater*, 22nd ed., Standard Method 2320B, Washington, D.C.

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

[h]Field Water Quality Measurements

Field measurements were collected prior to sampling.

°C	= Degrees Celsius.
% Sat	= Percent saturation.
μmhos/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
Long-Term Stewardship
Consolidated Groundwater Monitoring Program
Hydrographs and Charts

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Attachment 2B Hydrographs and Charts

2B-1 GMP Study Wells (1 of 6) 2B-5

2B-2 GMP Study Wells (2 of 6) 2B-6

2B-3 GMP Study Wells (3 of 6) 2B-7

2B-4 GMP Study Wells (4 of 6) 2B-8

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2B-6 GMP Study Wells (6 of 6) 2B-10

2B-7 Precipitation Data for SNL/NM, CY 2016 ..... 2B-11

2B-8 Annual Precipitation Data for SNL/NM, January 2006 to December 2016 ..... 2B-12

2B-9 Monthly Groundwater Pumped by KAFB Water Supply Wells, CY 2016 ..... 2B-13

2B-10 Groundwater Pumped by KAFB Water Supply Wells, CY 2016..... 2B-14

2B-11 Annual Groundwater Pumped by KAFB Water Supply Wells, 2006 to 2016..... 2B-15

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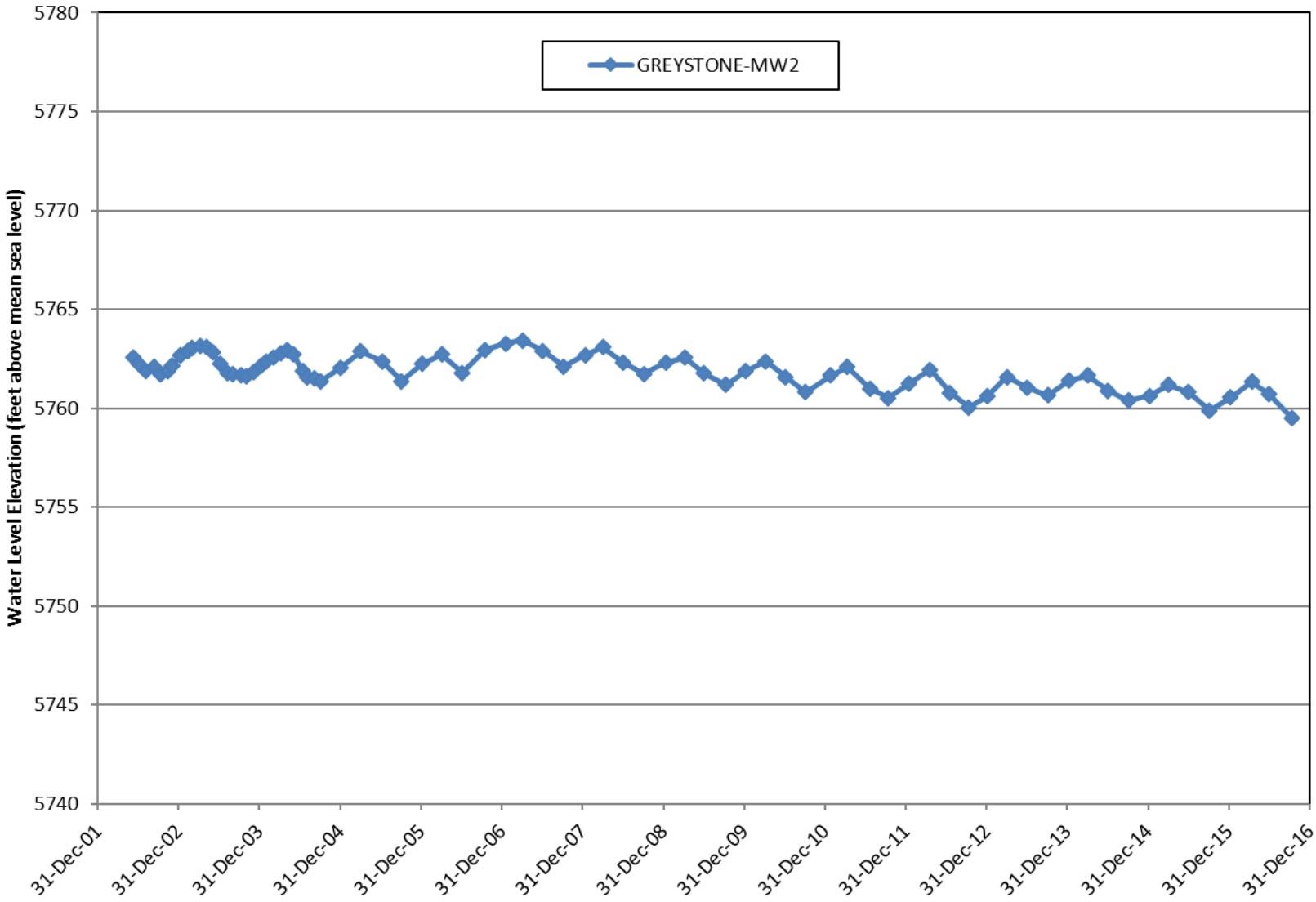

Figure 2B-1. GMP Study Wells (1 of 6)

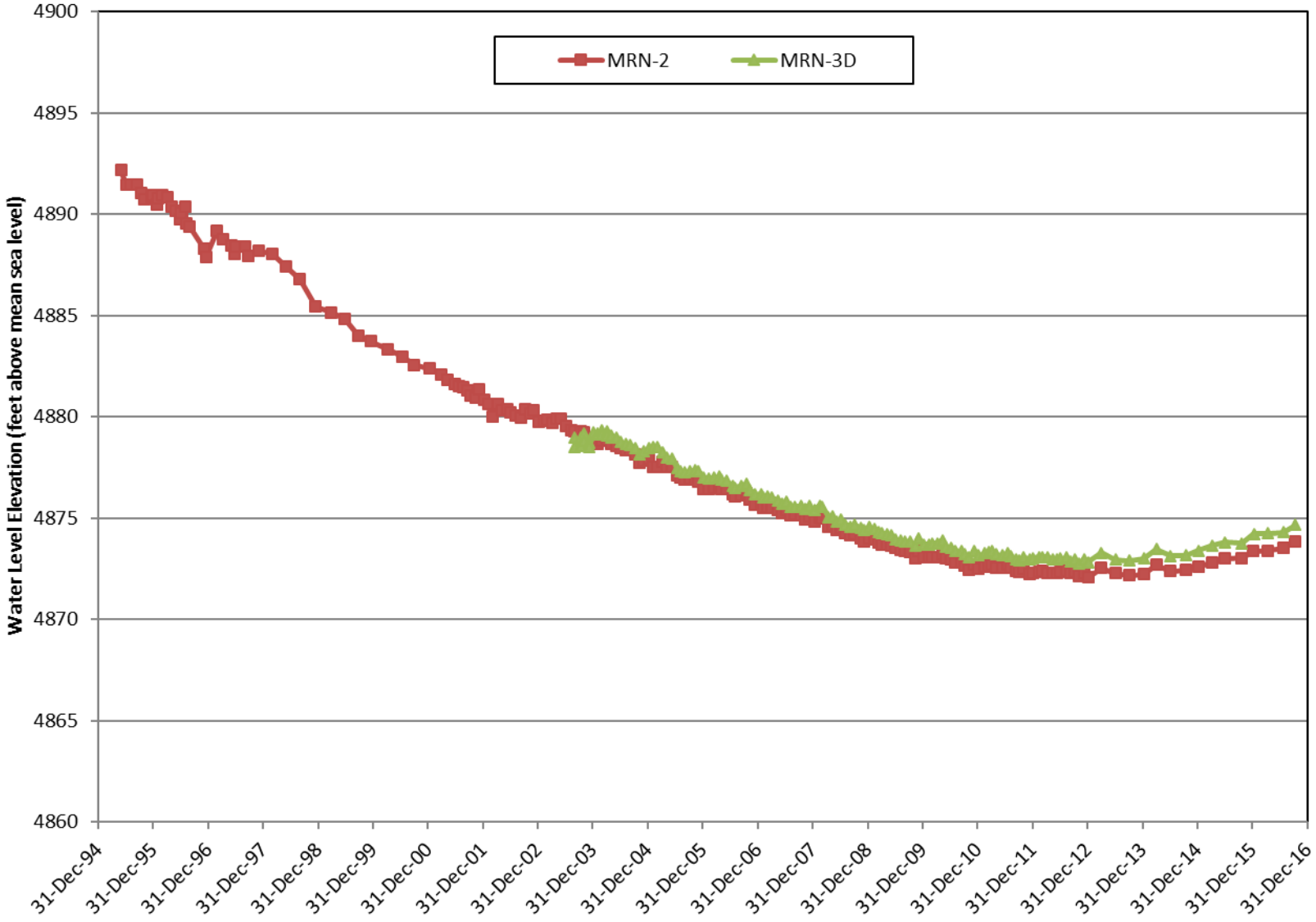

Figure 2B-2. GMP Study Wells (2 of 6)

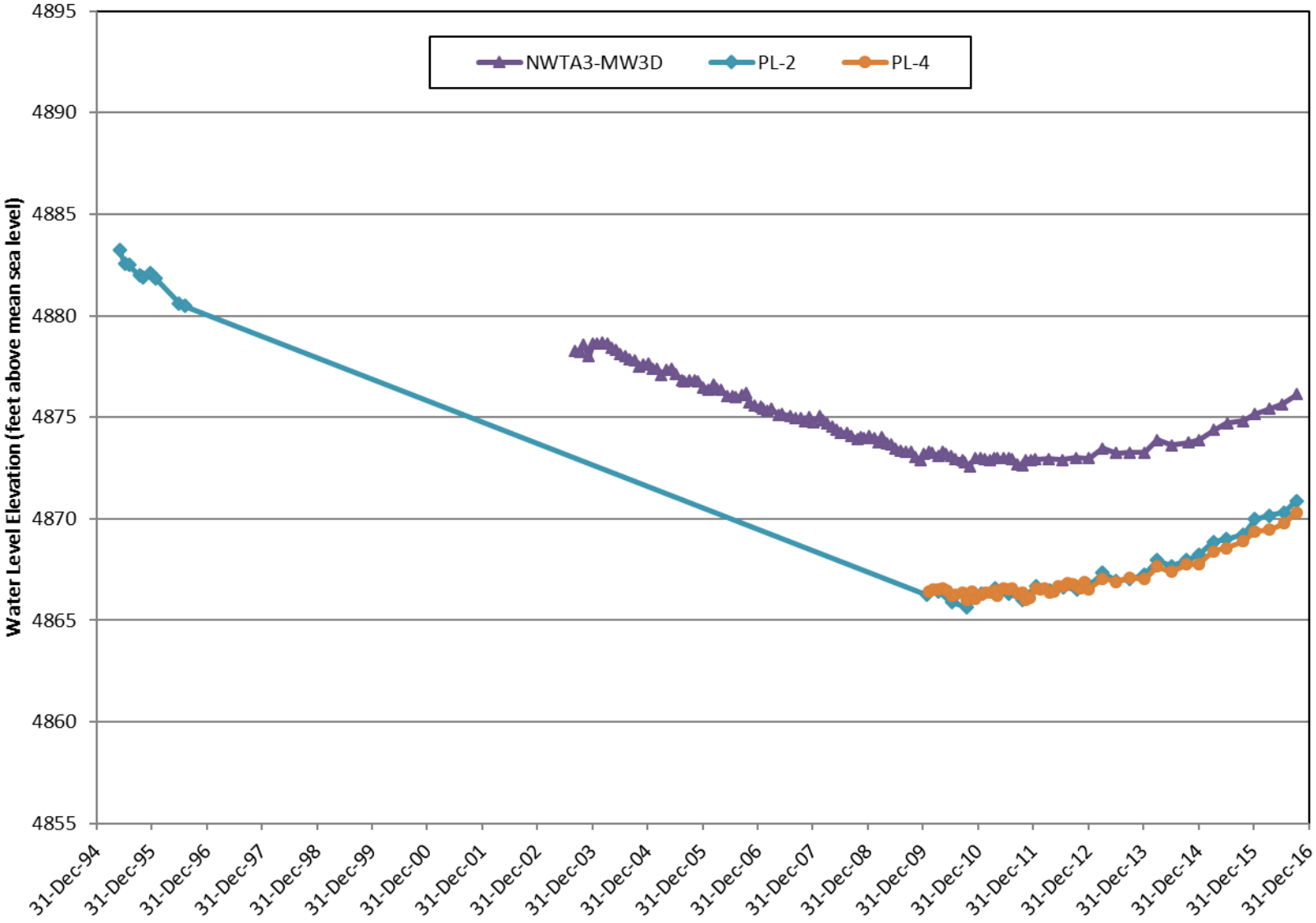

Figure 2B-3. GMP Study Wells (3 of 6)

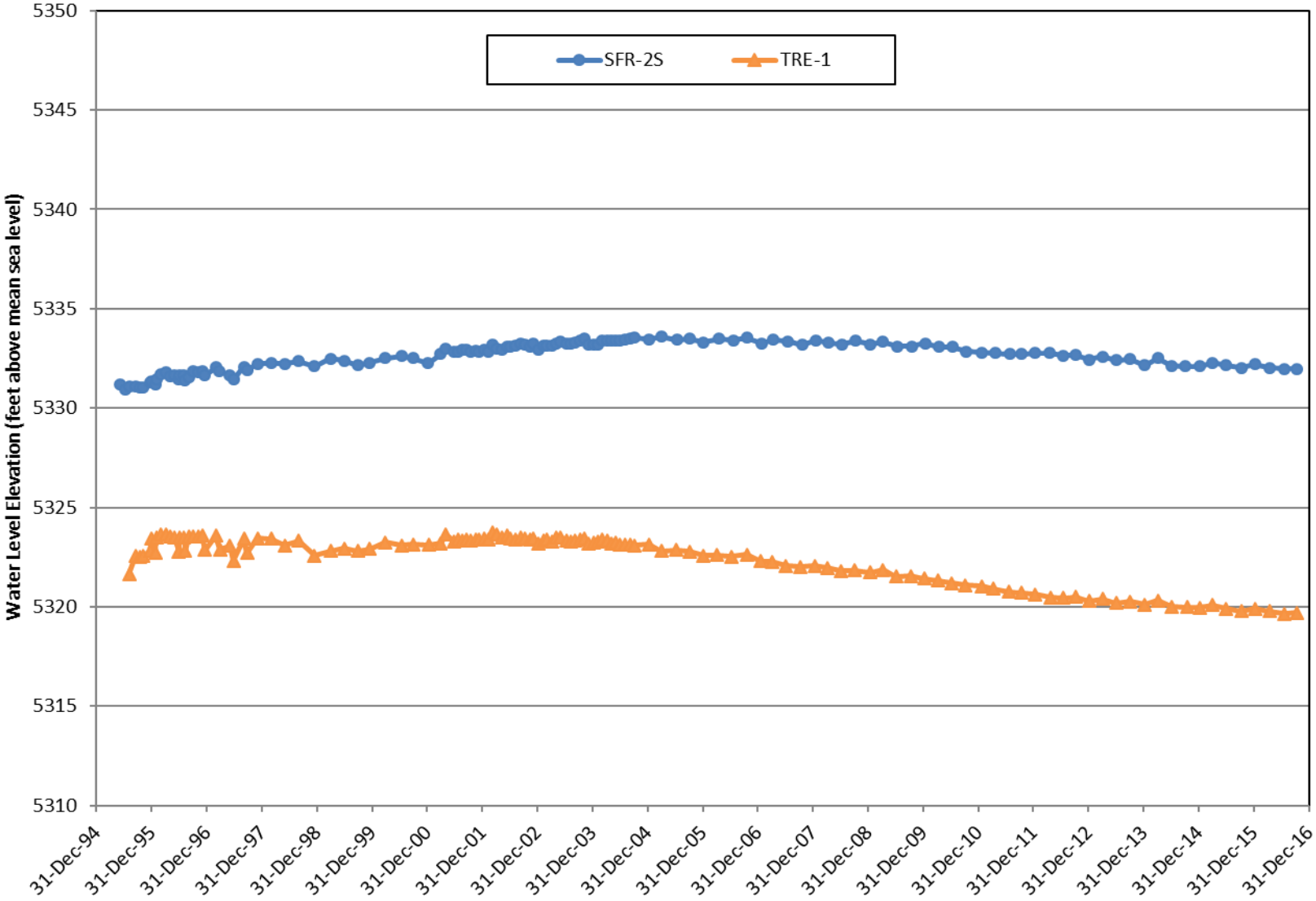

Figure 2B-4. GMP Study Wells (4 of 6)

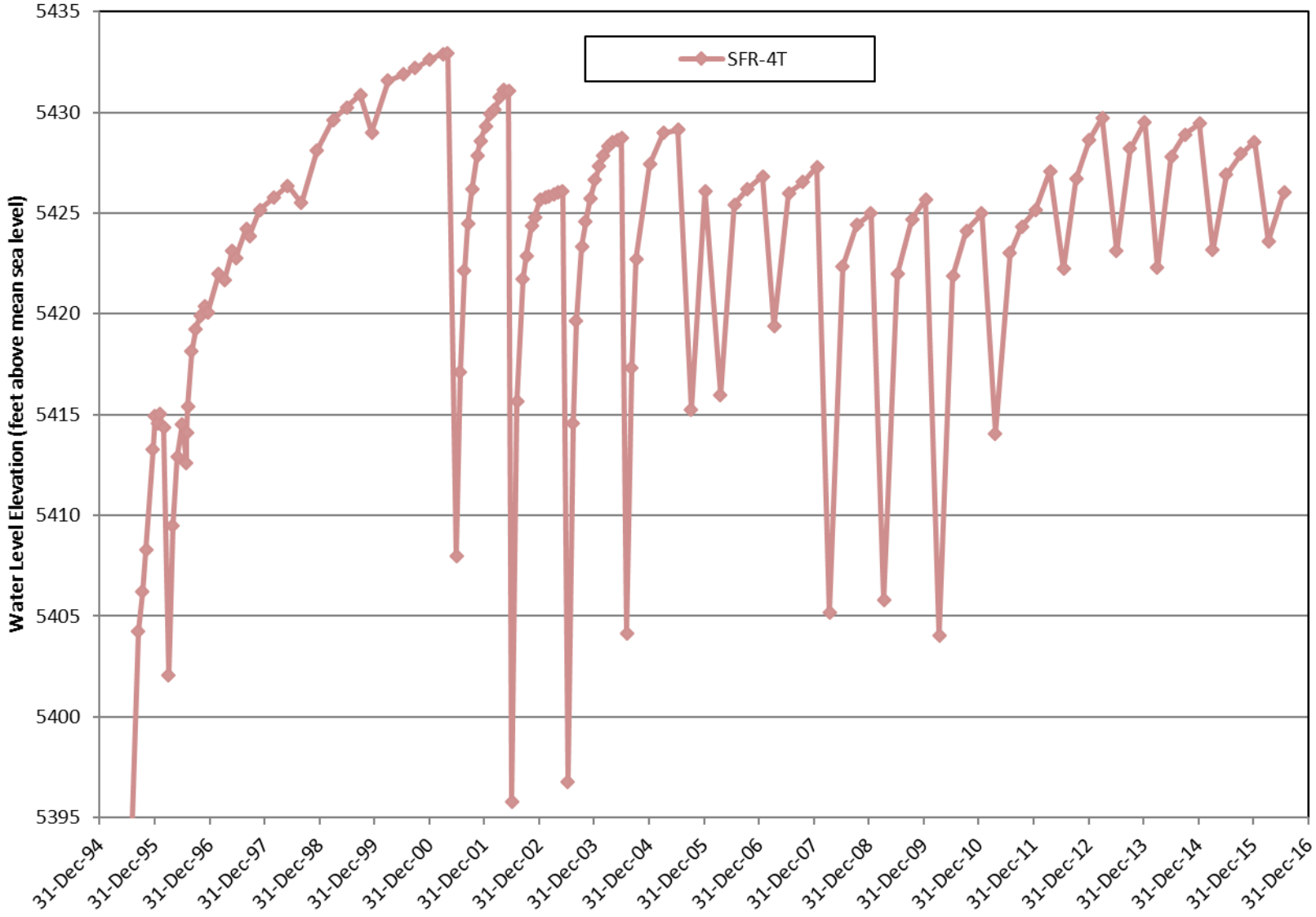

Figure 2B-5. GMP Study Wells (5 of 6)

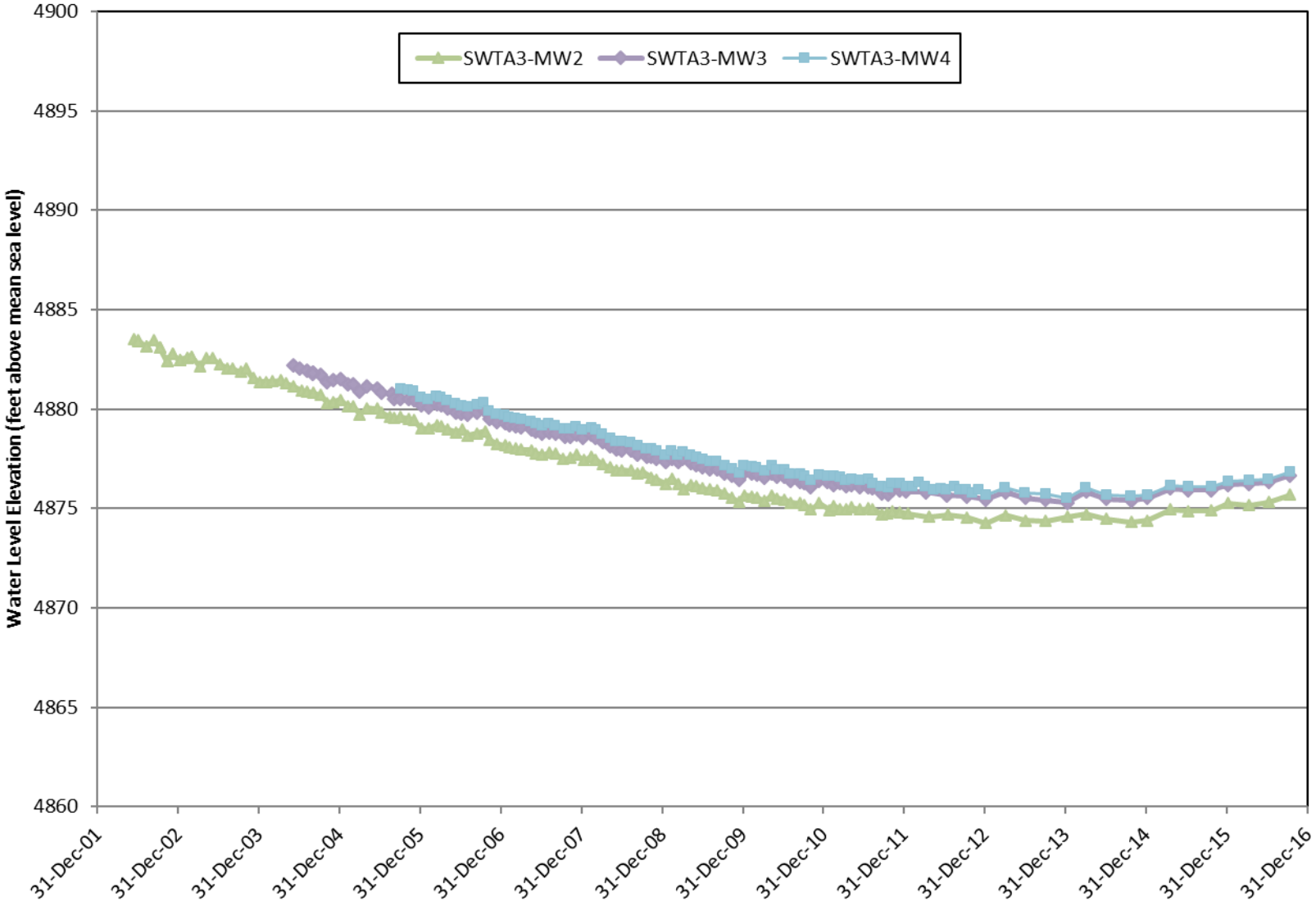

Figure 2B-6. GMP Study Wells (6 of 6)

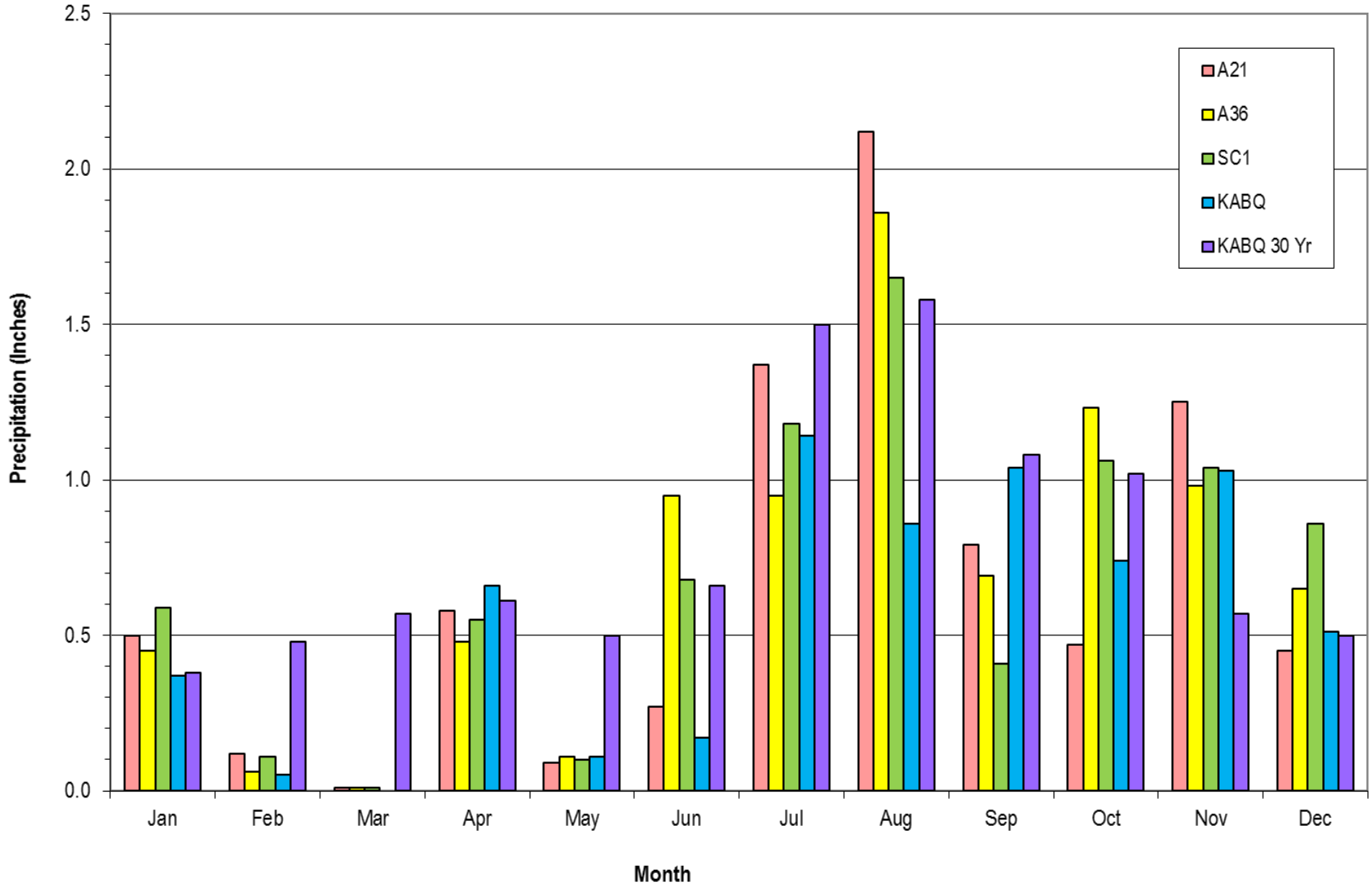

Figure 2B-7. Precipitation Data for SNL/NM, CY 2016

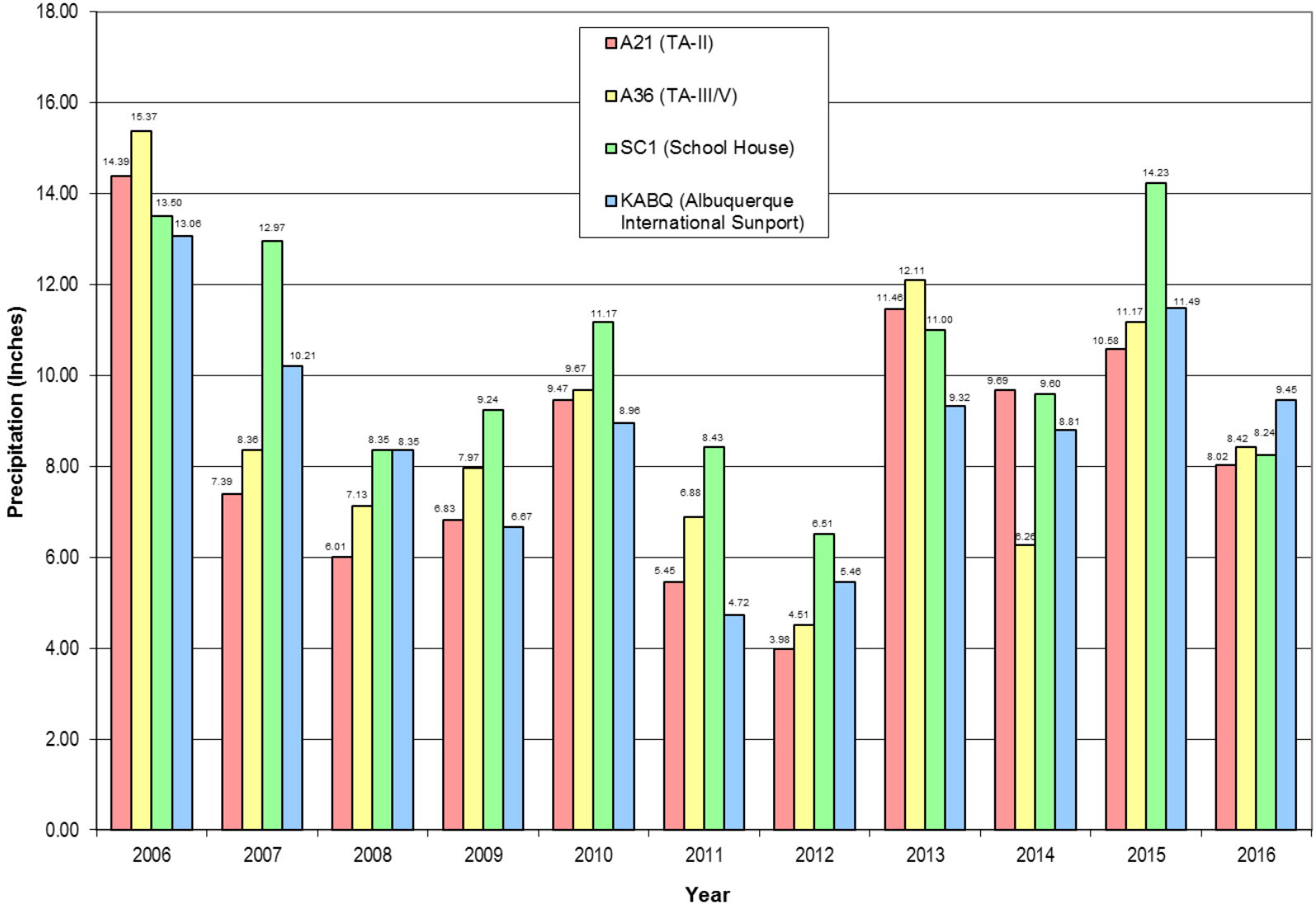

Figure 2B-8. Annual Precipitation Data for SNL/NM, January 2006 to December 2016

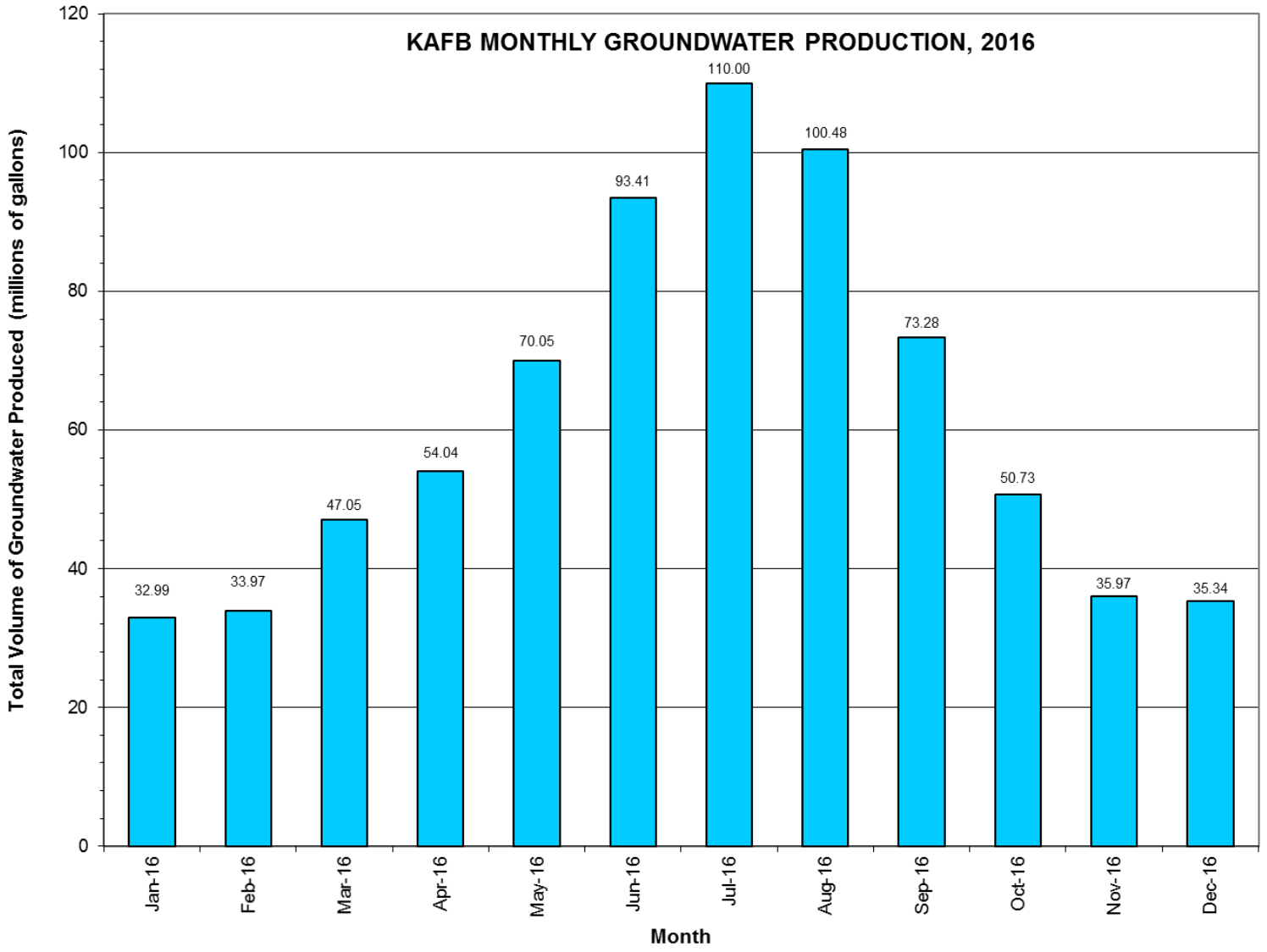

Figure 2B-9. Monthly Groundwater Pumped by KAFB Water Supply Wells, CY 2016

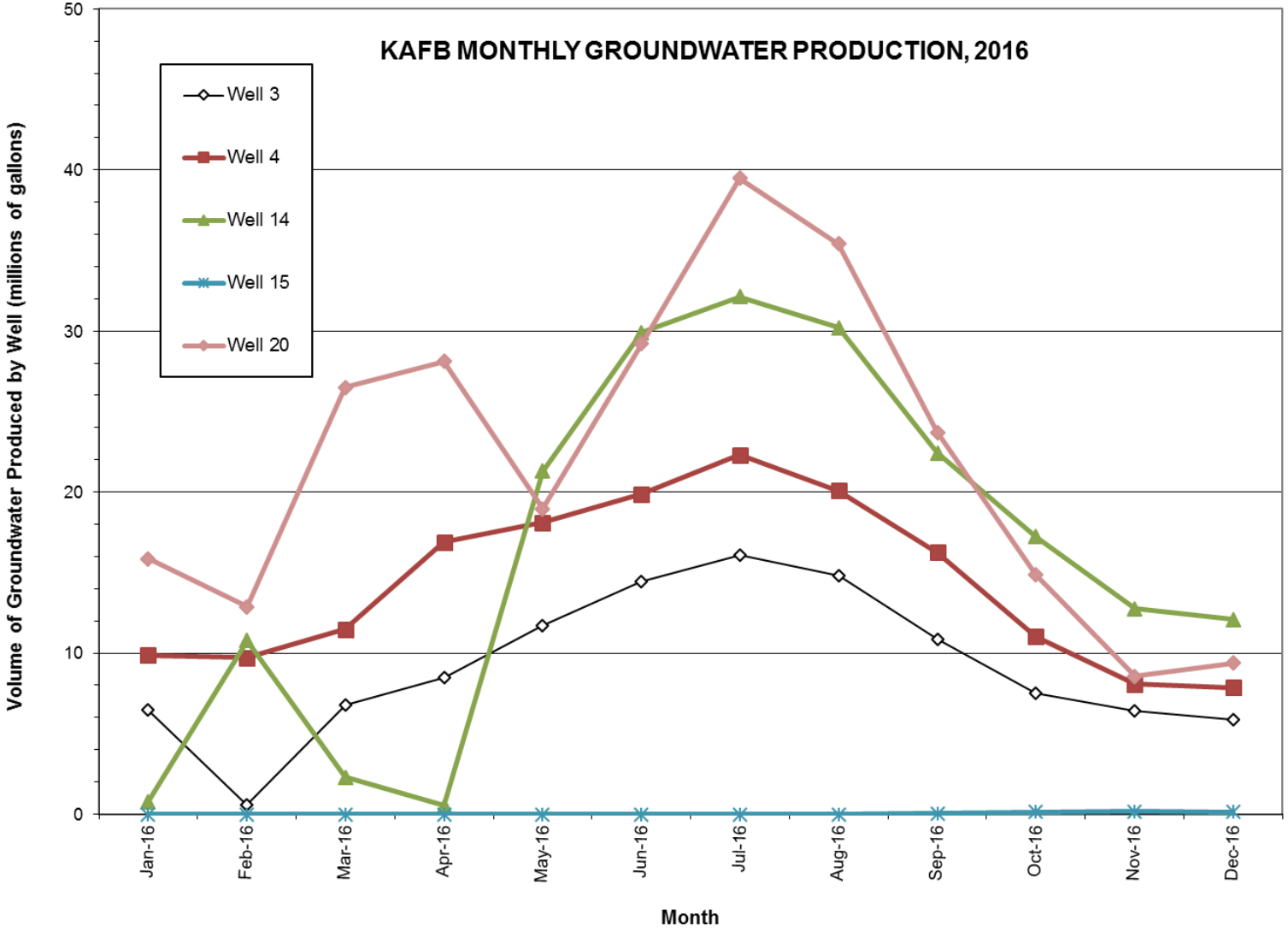

Figure 2B-10. Groundwater Pumped by KAFB Water Supply Wells, CY 2016

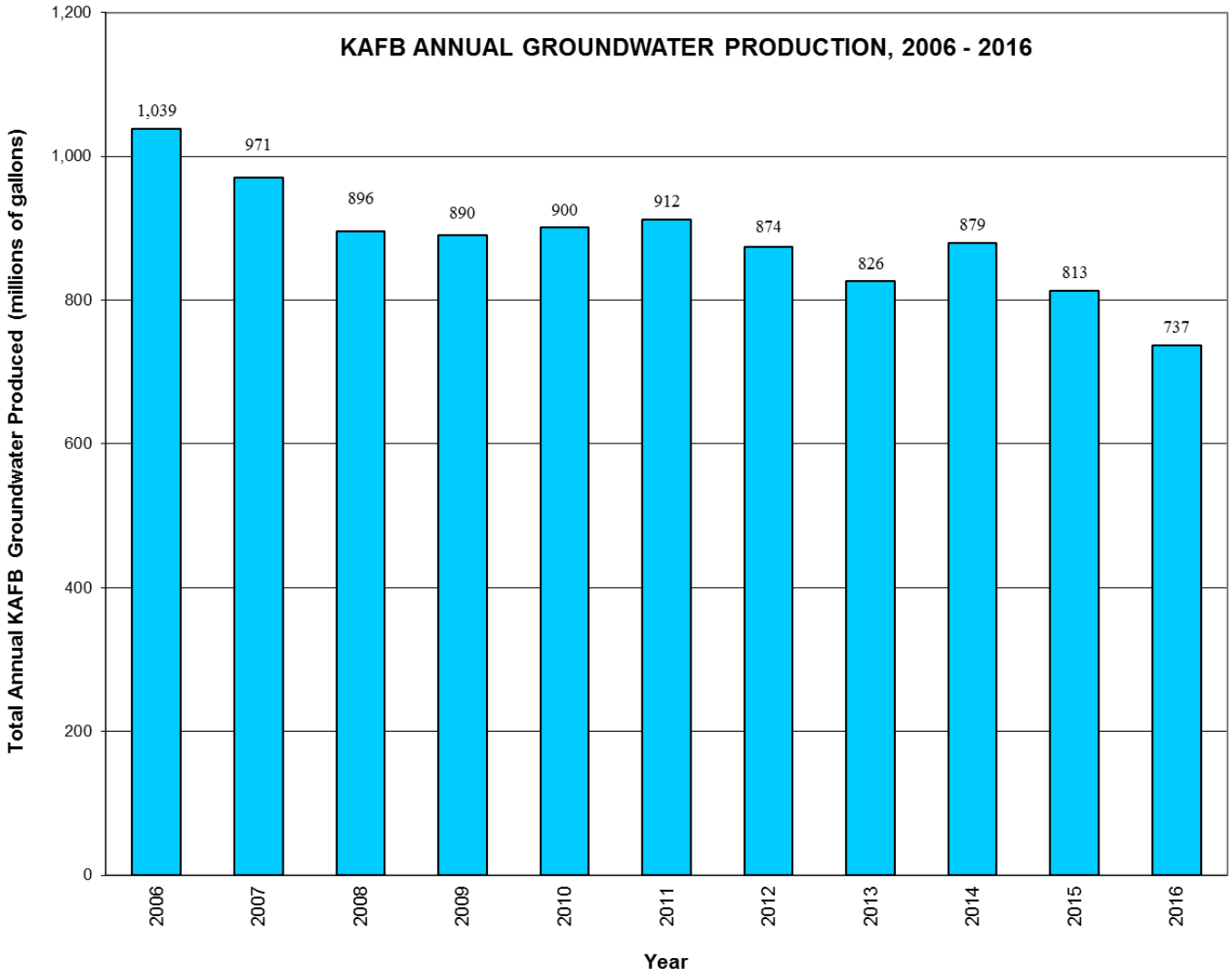

Figure 2B-11. Annual Groundwater Pumped by KAFB Water Supply Wells, 2006 to 2016

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Attachment 2C
Long-Term Stewardship
Consolidated Groundwater Monitoring Program
Plots

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Attachment 2C Plots

2C-1 Fluoride Concentrations, SFR-4T 2C-5

2C-2 Beryllium Concentrations, Coyote Springs 2C-6

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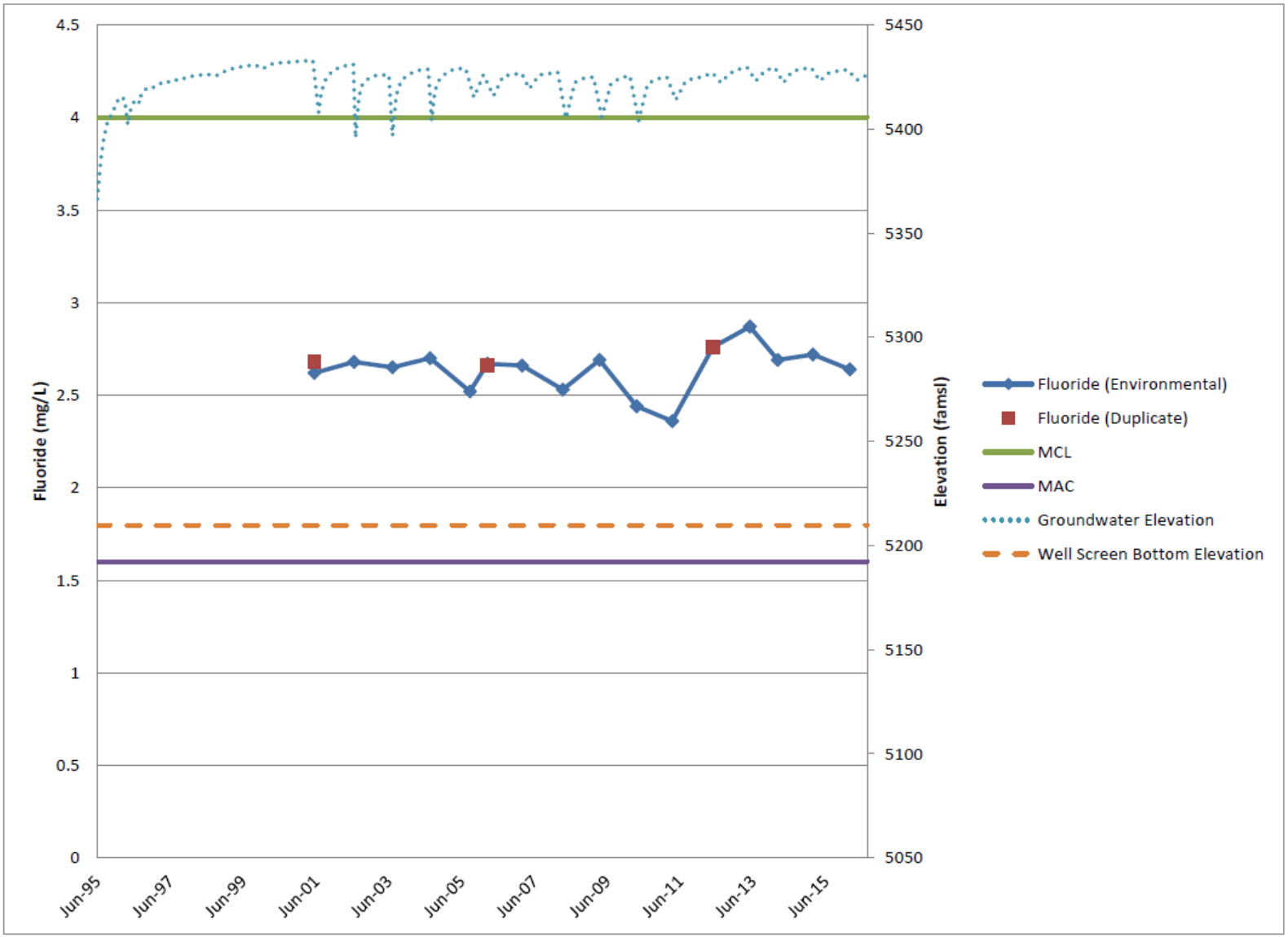

Figure 2C-1. Fluoride Concentrations, SFR-4T

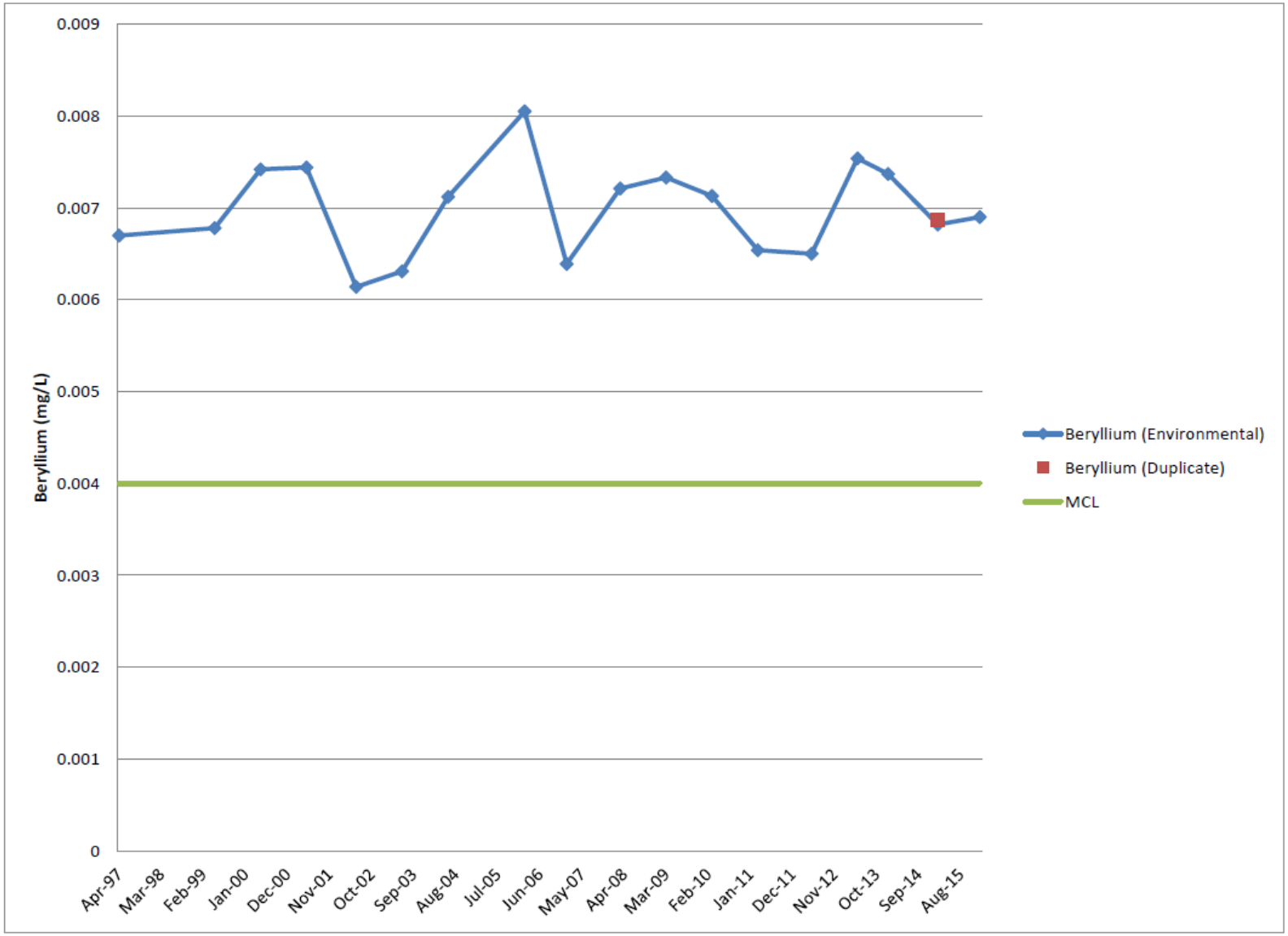

Figure 2C-2. Beryllium Concentrations, Coyote Springs

Chapter 2
Long-Term Stewardship
Consolidated Groundwater Monitoring Program
References

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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 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 Draft 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), and approved the CWL CMS Report and 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 *CWL Final Resource Conservation and Recovery Act (RCRA) 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.

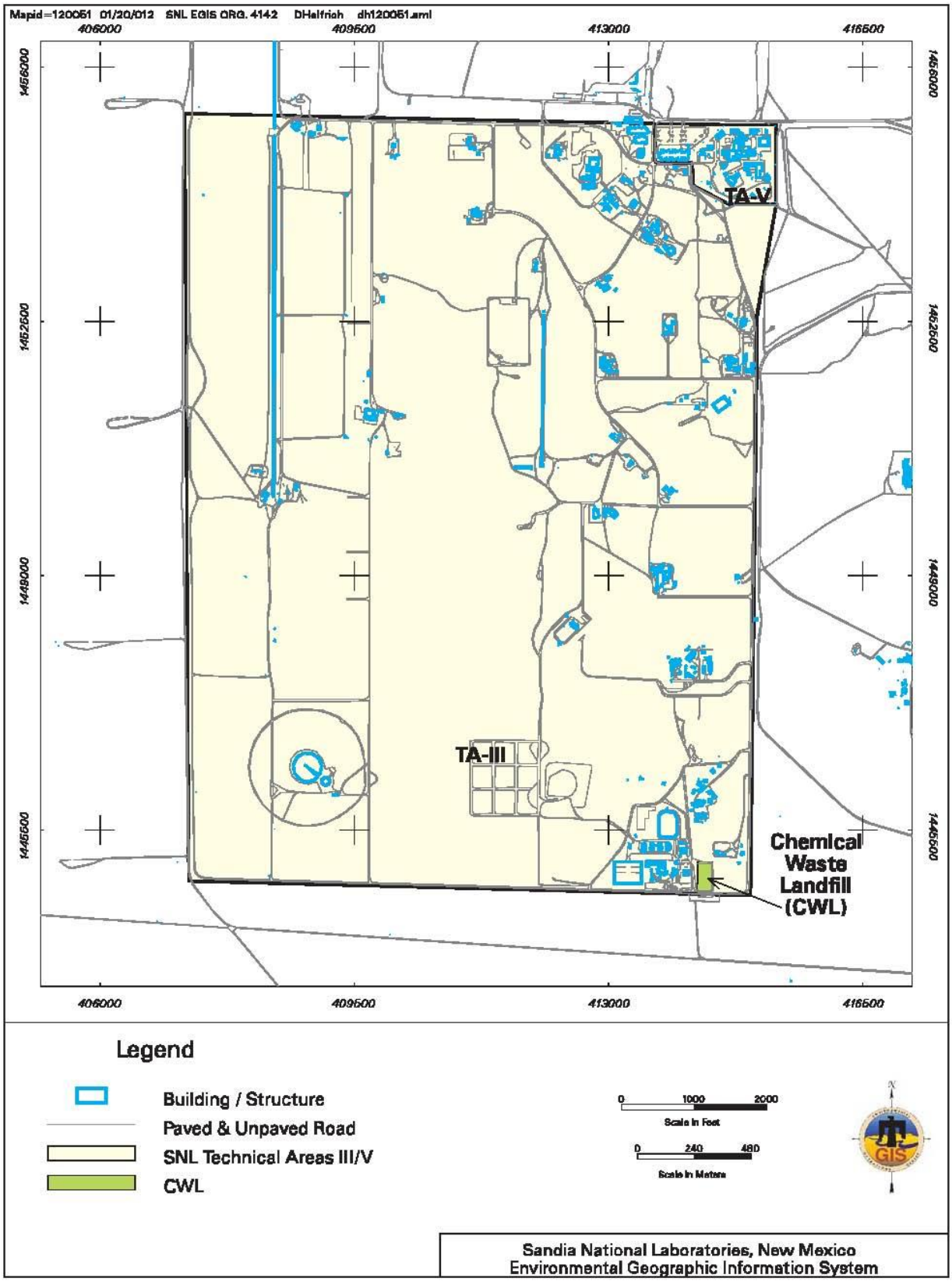

Figure 3-1. Location of the Chemical Waste Landfill within Technical Area-III

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) 2016, the *Chemical Waste Landfill Annual Post-Closure Care Report for Calendar Year 2015* (SNL March 2016) was submitted to NMED and approved (Kieling May 2016). The *Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2016* will be submitted to NMED in March 2017.

As stipulated in the CWL PCCP, the only regulatory standards that apply to CWL groundwater monitoring results are the PCCP-defined 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 2016* will present a comprehensive statistical evaluation of CWL CY 2016 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 (NMAC), incorporating Title 40, Code of Federal Regulations (CFR), 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. CWL Post-Closure Care Permit Monitoring Well Network and Calendar Year 2016 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

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

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.

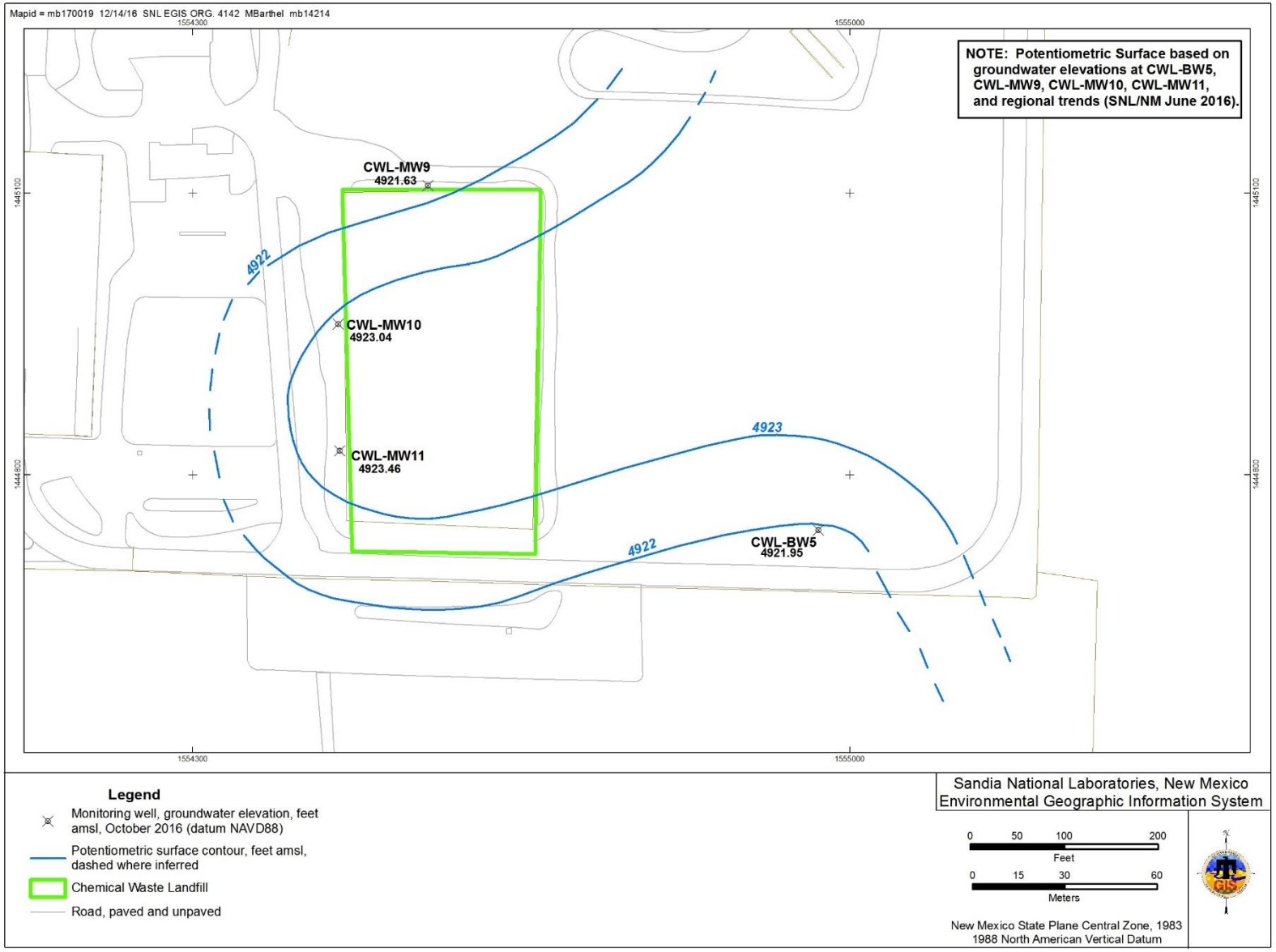

Figure 3-2. Localized Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2016

The Regional Aquifer beneath the CWL occurs within unconsolidated Santa Fe Group deposits (i.e., fine-grained alluvial-fan deposits). The depth to water is approximately 500 feet below ground surface. Groundwater flows generally westward, away from the Manzanita Mountains and toward the Rio Grande. Several water supply 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. The nearest water supply well, KAFB-4, is located approximately 4.6 miles north-northwest of the CWL.

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 feet per year (ft/yr). The groundwater elevation decline between October 2015 and October 2016 at the CWL wells ranged from 0.14 (CWL-MW9) to 0.33 (CWL-BW5) feet, with an average decline rate of 0.21 feet (Figure 3A-1 in Attachment 3A). This rate of decline has significantly decreased from the 2014 to 2015 average decline rate, which was 0.72 feet. Recharge from the infiltration of direct precipitation at the CWL is negligible due to high evapotranspiration, low precipitation, the thick sequence of unsaturated Santa Fe Group deposits above the water table, and the evapotranspirative 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 October 2016 potentiometric surface map shown in Figure 3-2 for the CWL groundwater monitoring network.

Table 3-2. Groundwater Elevations Measured in October 2016 at Monitoring Wells Completed in the Regional Aquifer at the CWL

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)
CWL-BW5	5434.79	4-Oct-2016	512.84	4921.95
CWL-MW9	5426.12	4-Oct-2016	504.49	4921.63
CWL-MW10	5424.58	4-Oct-2016	501.54	4923.04
CWL-MW11	5423.24	4-Oct-2016	499.78	4923.46

NOTES:
amsl = Above mean sea level.
btoc = Below top of casing.
BW = Background Well.
CWL = Chemical Waste Landfill.
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 presented on 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 in the potentiometric surface 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, Santa Fe Group alluvial-fan sediments that were predominantly deposited in an east to west direction. Slug testing of the four groundwater monitoring wells completed in 2012 indicates CWL-MW10 has the lowest average hydraulic conductivity (5 ft/yr) relative to the other wells. CWL-MW9 has the highest average hydraulic

conductivity at 16 ft/yr, and both CWL-MW11 and CWL-BW5 tested at 12 ft/yr. While actual flow paths in laterally discontinuous alluvial sediments are complex and highly dependent upon horizontal permeability, hydraulic conductivity testing indicates CWL-MW10 is installed within tighter, lower permeability sediments than CWL-MW9 to the north and CWL-BW5/CWL-MW11 to the south. This information is consistent with groundwater purging data; CWL-MW10 is the only well that purges dry during routine sampling. As the Regional Aquifer potentiometric surface (i.e. water table) declines and groundwater flows from the east to the west, the central part of the site (i.e., in the vicinity of CWL-MW10) reacts more slowly, creating a localized salient in the potentiometric surface (i.e., a very gentle ridge or localized high). Previous groundwater monitoring wells installed in this area (west of the central part of the CWL) have also exhibited these characteristics (low yield, low hydraulic conductivity).

Based on the potentiometric surface map, the horizontal gradient at the CWL was approximately 0.013 feet per foot in October 2016. Groundwater velocities were calculated using:

- The current potentiometric surface gradient,
- The hydraulic conductivity range (i.e., high and low values) from slug tests conducted on the four groundwater monitoring wells, and
- A porosity of 29 percent as determined from the laboratory analyses of CWL soil samples (SNL October 1995).

The 2016 calculated velocities ranged from approximately 1.8×10^{-4} to 2.8×10^{-3} feet per day. This is equivalent to approximately 0.07 to 1.02 ft/yr. 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 and ABCWUA water supply 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.

3.3 Scope of Activities

Semiannual groundwater sampling activities were conducted in January and July 2016 at the CWL in accordance with Attachment 2 of the CWL PCCP. In January, groundwater samples were analyzed for the enhanced list of VOCs, chromium, and nickel. The enhanced list of VOCs includes 1,1-dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane; chloroform; tetrachloroethene; TCE; and trichlorofluoromethane. In July, groundwater samples were analyzed for TCE, chromium, and nickel.

Table 3-3 lists the analytical parameters and CWL monitoring wells sampled. Attachment 3B contains the analytical results (Tables 3B-1 and 3B-2). In January and July, groundwater sampling activities were conducted in conformance with the CWL PCCP and procedures outlined in the *Chemical Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2016, 2nd Quarter Sampling* (SNL December 2015) *and the Chemical Waste Landfill Groundwater Monitoring Mini-Sampling and Analysis Plan for Fiscal Year 2016, 4th Quarter Sampling* (SNL June 2016).

Table 3-3. Analytical Parameters for the CWL Monitoring Wells, Calendar Year 2016

Parameters	Semiannual Event	Monitoring Wells
VOCs: TCE; 1,1,2-Trichloro-1,2,2-trifluoroethane; Tetrachloroethene; 1,1-Dichloroethene; Chloroform; and Trichlorofluoromethane	January	CWL-BW5, CWL-BW5 dup, CWL-MW9, CWL-MW10, and CWL-MW11
Metals: Chromium and Nickel		
VOCs: TCE	July	CWL-BW5, CWL-MW9, CWL-MW9 dup, CWL-MW10, and CWL-MW11
Metals: Chromium and Nickel		

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

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 May 2009).

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 conformance with the CWL PCCP and procedures specified in the *Chemical Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plans*, 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, oxidation-reduction potential (ORP), pH, and dissolved oxygen using an YSI™ EXO1 Water Quality Meter. Turbidity was measured with a Hach™ Model 2100Q turbidity meter. Attachment 3B, Table 3B-3 presents field water quality parameters and Figure 3A-1 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. 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 16 gallons were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 27 gallons). The average flow rate for the entire purging event was 0.17 gallons per minute (gpm), and the estimated flow

rate during the final four gallons was 0.13 gpm (equivalent to 0.63 and 0.47 liters per minute, respectively). During July, approximately 15 gallons were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 26 gallons). The average flow rate for the entire purging event was 0.096 gpm, and the estimated flow rate during the final four gallons was 0.01 gpm (equivalent to 0.36 and 0.04 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 Tables 3B-1 through 3B-3. Data qualifiers assigned by the analytical laboratory and the data validation process (SNL June 2014) are presented with the associated results in Tables 3B-1 and 3B-2.

For the purposes of this report, the CY 2016 analytical results were compared with established EPA MCLs where applicable. No detected constituents exceeded the respective MCLs. The following sections discuss the analytical results in greater detail.

3.6.1 Volatile Organic Compounds

The CY 2016 analytical results for the enhanced list of VOCs (January) and TCE (July) are summarized in Table 3B-1. TCE was detected above the method detection limit (MDL) in both samples from monitoring well CWL-MW10 at concentrations of 0.430 and 0.810 µg/L. These results are below the practical quantitation limit of 1.0 µg/L and the MCL of 5.0 µg/L. No other VOCs were detected.

3.6.2 Metals

Table 3B-2 summarizes the CY 2016 analytical results for chromium and nickel. Chromium was not detected above the MDL in any of the CY 2016 samples, except in the CWL-MW11 sample at 0.00292 milligrams per liter (mg/L). This result was below the chromium MCL of 0.10 mg/L. Nickel was detected in various samples (including one environmental duplicate sample) at concentrations from 0.000501 mg/L to 0.00271 mg/L. There is no established MCL for nickel.

3.6.3 Water Quality Parameters

Table 3B-3 lists the water quality parameters measured immediately prior to sample collection. These field parameters consist of temperature, specific conductivity, ORP, pH, turbidity, and dissolved oxygen.

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

Field QC samples included environmental duplicate samples, EBs, FBs, and TBs. The following sections discuss the analytical results for each QC sample type.

3.7.1.1 Environmental Duplicate Samples

One environmental duplicate sample was collected from monitoring well CWL-BW5 in January and one environmental duplicate sample was collected from monitoring well CWL-MW9 in July. The results were compared to the results for the corresponding environmental samples and relative percent difference (RPD) values were calculated for the detected parameters. For the sample pair (environmental sample and

environmental duplicate sample) collected at CWL-BW5 in January, no constituents were detected. The RPD value for the sample pair collected at CWL-MW9 in July show good correlation, with an RPD value of less than 1 for nickel. The RPD value is within the acceptable range of less than or equal to 35 for metals, as defined in Attachment 2 of the CWL PCCP.

3.7.1.2 Equipment Blank Samples

One EB sample was collected in January and analyzed for the enhanced list of VOCs, chromium, and nickel. One EB sample was collected in July and analyzed for TCE, chromium, and nickel. Chloroform, was detected above the associated MDL in the January EB sample. No corrective action was necessary since chloroform was not detected in the associated environmental or environmental duplicate samples (i.e., CWL-BW5 samples). No constituents were detected in the EB sample collected in July prior to sampling CWL-MW9.

3.7.1.3 Field Blank Samples

Three FB samples were collected in January and analyzed for the enhanced list of VOCs. Three FB samples were collected in July and analyzed for TCE only. The only detections were for chloroform in all three of the January FB samples. No corrective action was required because chloroform was not detected in any environmental or environmental duplicate samples.

3.7.1.4 Trip Blank Samples

Five TB samples were submitted with the January samples and analyzed for the enhanced list of VOCs, and five TB samples were submitted with July samples and analyzed for TCE. No VOCs were detected above their respective MDLs in any of the TB samples.

3.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with the groundwater samples. Additionally, batch matrix spike, matrix spike duplicate, and surrogate spike samples were analyzed. There were no significant issues identified with the laboratory QC sample results associated with the January and July sampling events.

3.8 Variances and Nonconformances

All analytical and field methods were performed according to the requirements specified in the CWL PCCP and associated *Mini-Sampling and Analysis Plans*. Variances and nonconformances are defined in the CWL PCCP Attachment 2, Section 2.22 for groundwater monitoring. There were no variances or nonconformances during the CY 2016 sampling activities.

All environmental sample, field QC sample, and laboratory QC sample results were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2014). The data were in compliance with analytical methods and laboratory procedures.

3.9 Summary and Conclusions

During CY 2016, groundwater samples were collected from the four CWL monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11) in January and July and analyzed for TCE, 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene, 1,1-dichloroethene, chloroform, trichlorofluoromethane, nickel, and chromium (January), and TCE, nickel, and chromium (July). Based on field and laboratory QC sample and data validation results, the CY 2016 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 MCLs.

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. The NMED may shorten or extend the post-closure care period under 20.4.1.500 NMAC, incorporating 40 CFR 264.117(a)(2).

In accordance with the CWL PCCP, groundwater monitoring will continue on a semiannual basis. 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

3A-1 CWL Groundwater Monitoring Wells 3A-5

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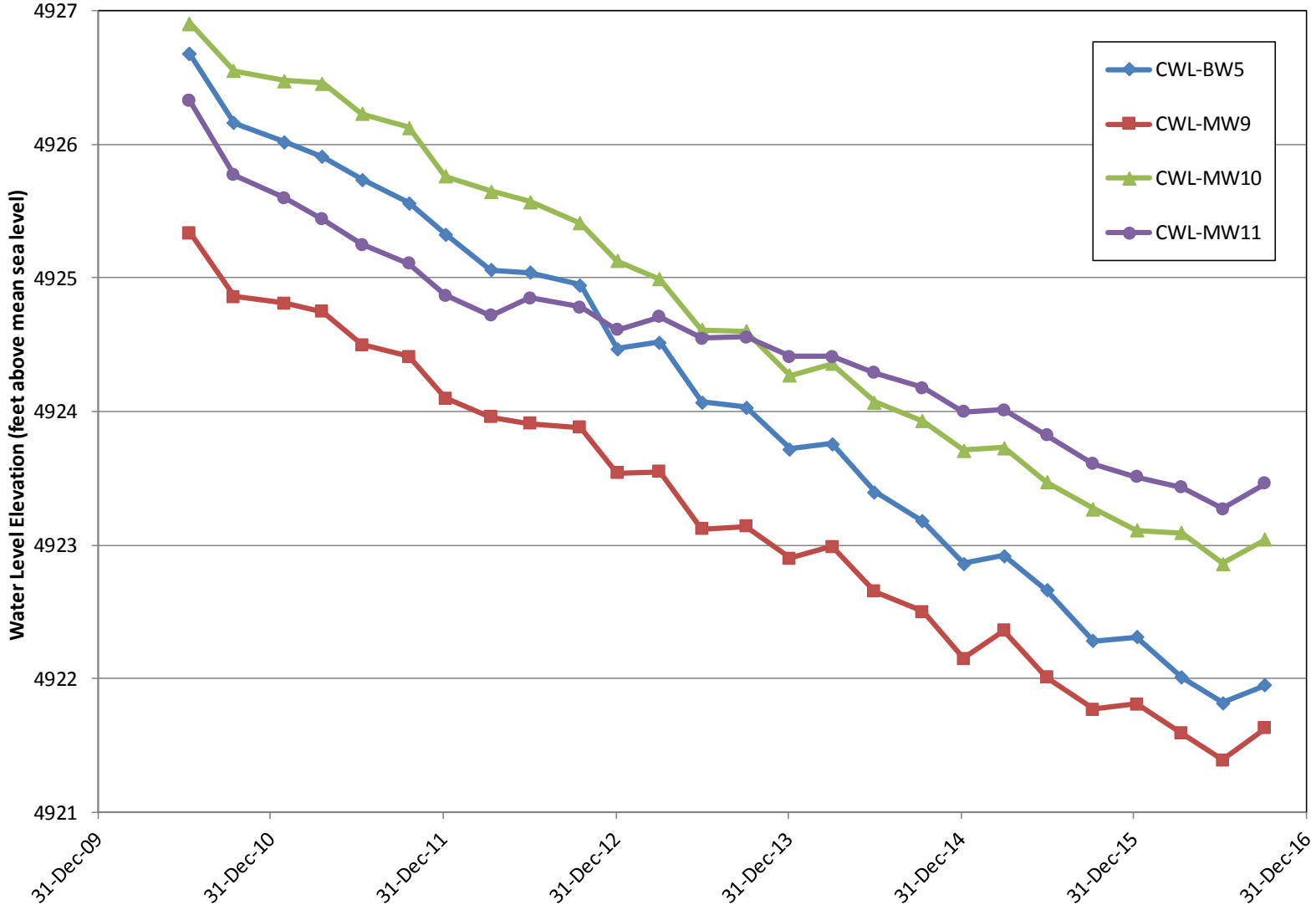

Figure 3A-1. CWL Groundwater Monitoring Wells

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Attachment 3B
Chemical Waste Landfill
Analytical Results Tables

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Attachment 3B Tables

3B-1 Summary of Volatile Organic Compound Results, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 3B-5

3B-2 Summary of Chromium and Nickel Results, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 3B-7

3B-3 Summary of Field Water Quality Measurements, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 3B-8

Footnotes for Chemical Waste Landfill Groundwater Analytical Results Tables 3B-9

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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 2016

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 12-Jan-16	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		098673-001	SW846-8260
	Chloroform	ND	0.300	1.00	NE	U		098673-001	SW846-8260
	Tetrachloroethene	ND	0.300	1.00	5.00	U		098673-001	SW846-8260
	Trichloroethene	ND	0.300	1.00	5.00	U		098673-001	SW846-8260
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		098673-001	SW846-8260
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		098673-001	SW846-8260
CWL-BW5 (Duplicate) 12-Jan-16	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		098674-001	SW846-8260
	Chloroform	ND	0.300	1.00	NE	U		098674-001	SW846-8260
	Tetrachloroethene	ND	0.300	1.00	5.00	U		098674-001	SW846-8260
	Trichloroethene	ND	0.300	1.00	5.00	U		098674-001	SW846-8260
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		098674-001	SW846-8260
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		098674-001	SW846-8260
CWL-MW9 13-Jan-16	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		098678-001	SW846-8260
	Chloroform	ND	0.300	1.00	NE	U		098678-001	SW846-8260
	Tetrachloroethene	ND	0.300	1.00	5.00	U		098678-001	SW846-8260
	Trichloroethene	ND	0.300	1.00	5.00	U		098678-001	SW846-8260
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		098678-001	SW846-8260
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		098678-001	SW846-8260
CWL-MW10 18-Jan-16	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		098687-001	SW846-8260
	Chloroform	ND	0.300	1.00	NE	U		098687-001	SW846-8260
	Tetrachloroethene	ND	0.300	1.00	5.00	U		098687-001	SW846-8260
	Trichloroethene	0.810	0.300	1.00	5.00	J		098687-001	SW846-8260
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		098687-001	SW846-8260
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		098687-001	SW846-8260
CWL-MW11 14-Jan-16	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		098683-001	SW846-8260
	Chloroform	ND	0.300	1.00	NE	U		098683-001	SW846-8260
	Tetrachloroethene	ND	0.300	1.00	5.00	U		098683-001	SW846-8260
	Trichloroethene	ND	0.300	1.00	5.00	U		098683-001	SW846-8260
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		098683-001	SW846-8260
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	NE	U		098683-001	SW846-8260

Refer to footnotes on page 3B-9.

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

Calendar Year 2016

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 12-Jul-16	Trichloroethene	ND	0.300	1.00	5.00	U		099976-001	SW846-8260
CWL-MW9 13-Jul-16	Trichloroethene	ND	0.300	1.00	5.00	U		099983-001	SW846-8260
CWL-MW9 (Duplicate) 13-Jul-16	Trichloroethene	ND	0.300	1.00	5.00	U		099984-001	SW846-8260
CWL-MW10 18-Jul-16	Trichloroethene	0.430	0.300	1.00	5.00	J		099992-001	SW846-8260
CWL-MW11 14-Jul-16	Trichloroethene	ND	0.300	1.00	5.00	U		099988-001	SW846-8260

Refer to footnotes on page 3B-9.

Table 3B-2
Summary of Chromium and Nickel Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.002	0.010	0.100	U		098673-015	SW846-6020
12-Jan-16	Nickel	ND	0.0005	0.002	NE	U	UJ	098673-015	SW846-6020
CWL-BW5 (Duplicate)	Chromium	ND	0.002	0.010	0.100	U		098674-015	SW846-6020
12-Jan-16	Nickel	ND	0.0005	0.002	NE	U	UJ	098674-015	SW846-6020
CWL-MW9	Chromium	ND	0.002	0.010	0.100	U		098678-015	SW846-6020
13-Jan-16	Nickel	ND	0.0005	0.002	NE	U	UJ	098678-015	SW846-6020
CWL-MW10	Chromium	ND	0.002	0.010	0.100	U		098687-015	SW846-6020
18-Jan-16	Nickel	0.000501	0.0005	0.002	NE	J	J-	098687-015	SW846-6020
CWL-MW11	Chromium	0.00292	0.002	0.010	0.100	J		098683-015	SW846-6020
14-Jan-16	Nickel	ND	0.0005	0.002	NE	U	UJ	098683-015	SW846-6020
CWL-BW5	Chromium	ND	0.002	0.010	0.100	U		099976-002	SW846-6020
12-Jul-16	Nickel	0.00271	0.0005	0.002	NE		J+	099976-002	SW846-6020
CWL-MW9	Chromium	ND	0.002	0.010	0.100	U		099983-002	SW846-6020
13-Jul-16	Nickel	0.00238	0.0005	0.002	NE		J+	099983-002	SW846-6020
CWL-MW9 (Duplicate)	Chromium	ND	0.002	0.010	0.100	U		099984-002	SW846-6020
13-Jul-16	Nickel	0.00238	0.0005	0.002	NE		J+	099984-002	SW846-6020
CWL-MW10	Chromium	ND	0.002	0.010	0.100	U		099992-002	SW846-6020
18-Jul-16	Nickel	0.000626	0.0005	0.002	NE	J		099992-002	SW846-6020
CWL-MW11	Chromium	ND	0.002	0.010	0.100	U		099988-002	SW846-6020
14-Jul-16	Nickel	ND	0.0005	0.002	NE	U		099988-002	SW846-6020

Refer to footnotes on page 3B-9.

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

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CWL-BW5	12-Jan-16	17.61	1028.9	185.5	6.86	0.36	77.8	7.38
CWL-MW9	13-Jan-16	16.11	892.9	174.1	6.93	0.15	42.8	4.23
CWL-MW10	18-Jan-16	16.97	897.9	2.1	7.02	3.26	21.8	2.07
CWL-MW11	14-Jan-16	17.28	948.9	172.5	6.91	0.32	62.1	5.95
CWL-BW5	12-Jul-16	24.17	1080.0	196.5	7.04	0.59	85.5	7.15
CWL-MW9	13-Jul-16	23.61	945.3	133.4	7.13	0.53	43.5	3.68
CWL-MW10	18-Jul-16	24.64	972.4	9.8	7.14	2.85	30.2	2.51
CWL-MW11	14-Jul-16	27.63	1089.0	198.8	7.13	0.75	64.9	5.13

Refer to footnotes on page 3B-9.

Footnotes for Chemical Waste Landfill Groundwater Analytical Results Tables

% = Percent.
BW = Background well.
CWL = Chemical Waste Landfill.
EPA = U.S. Environmental Protection Agency.
ID = Identifier.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
MW = Monitoring well.
No. = Number.

[a]Result
ND = Not detected (at MDL).

[b]MDL
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
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. MCLs were established by the EPA Office of Water, National Primary Drinking Water Standards (EPA May 2009).
NE = Not established.

[e]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = Estimated value, the analyte concentration fell above the effective MDL and below the PQL.
U = Analyte is absent or below the MDL.

[f]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
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.
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
EPA, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

[h]Field Water Quality Measurements
Field measurements were collected prior to sampling.
°C = Degrees Celsius.
% Sat = Percent saturation.
µmhos/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).

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Chapter 3
Chemical Waste Landfill
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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 (TA-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). Approximately 100,000 cubic feet of low-level radioactive, hazardous waste, and mixed waste were disposed of 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) and required a Corrective Measures Implementation (CMI) Plan (SNL November 2005). The MWL CMI Plan was approved by the NMED (Bearzi December 2008) and construction of the MWL ET cover was completed in 2009. The MWL CMI Report documenting cover construction in accordance with the CMI Plan was submitted to NMED (SNL January 2010) and was approved in October 2011 (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 (Beausoliel 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 (Flynn February 2016; Kieling February 2016), granting CAC with Controls status to the MWL and incorporating the MWL LTMMP into the SNL/NM RCRA Facility Operating 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) 2016, the third MWL Annual LTMM Report (SNL June 2016) was submitted to the NMED and approved (Kieling July 2016).

MWL groundwater monitoring results are directly compared to trigger levels defined in Table 5.2.4-1 of the MWL LTMMP, and subject to the trigger evaluation process defined in Figure 5.1-1 of the MWL LTMMP. The evaluation of MWL CY 2016 groundwater monitoring results will be presented in the *Mixed Waste Landfill Annual LTMM Report, April 2016 – March 2017*, which will be submitted to the NMED in June 2017.

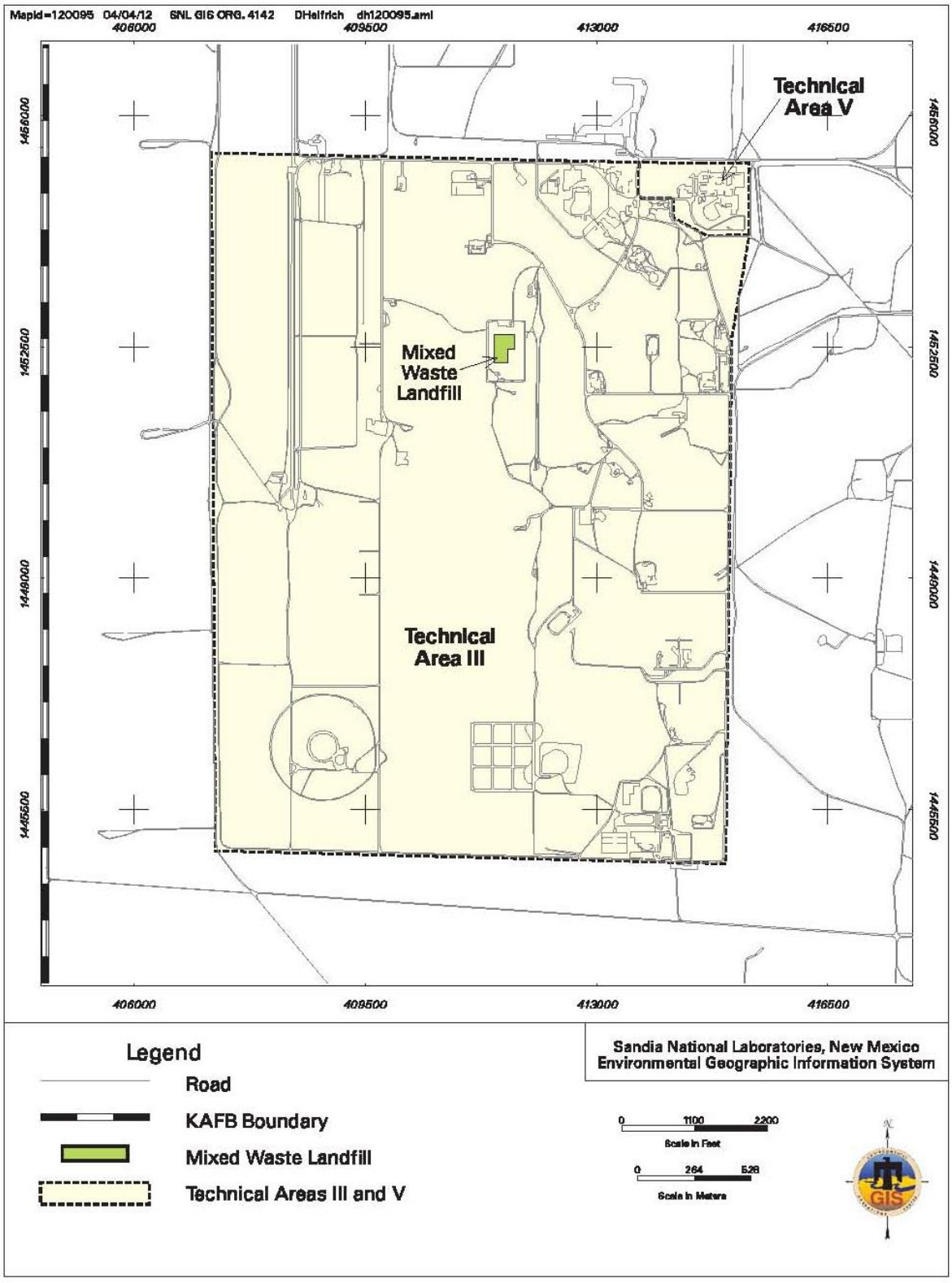

Figure 4-1. Location of the Mixed Waste Landfill within Technical Area-III

4.1.1 Monitoring History

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 are all screened across the top 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 6 degrees from vertical, and has 2 discrete screened intervals isolated by an inflatable packer. Wells MWL-MW5 and MWL-MW6 were also part of the original monitoring well network; their screen intervals are below the top of the Regional Aquifer.

Groundwater at the MWL has been extensively characterized and monitored since 1990 for major ion chemistry, volatile organic compounds (VOCs), semivolatile organic compounds, nitrate, metals, radionuclides, and perchlorate. More than 25 years of analytical data indicate that groundwater has not been contaminated 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 the groundwater elevation; sampling of these deeper wells is not required under the MWL LTMMP.

Table 4-1. MWL Monitoring Well Network and Calendar Year 2016 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

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 April and October.

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

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.

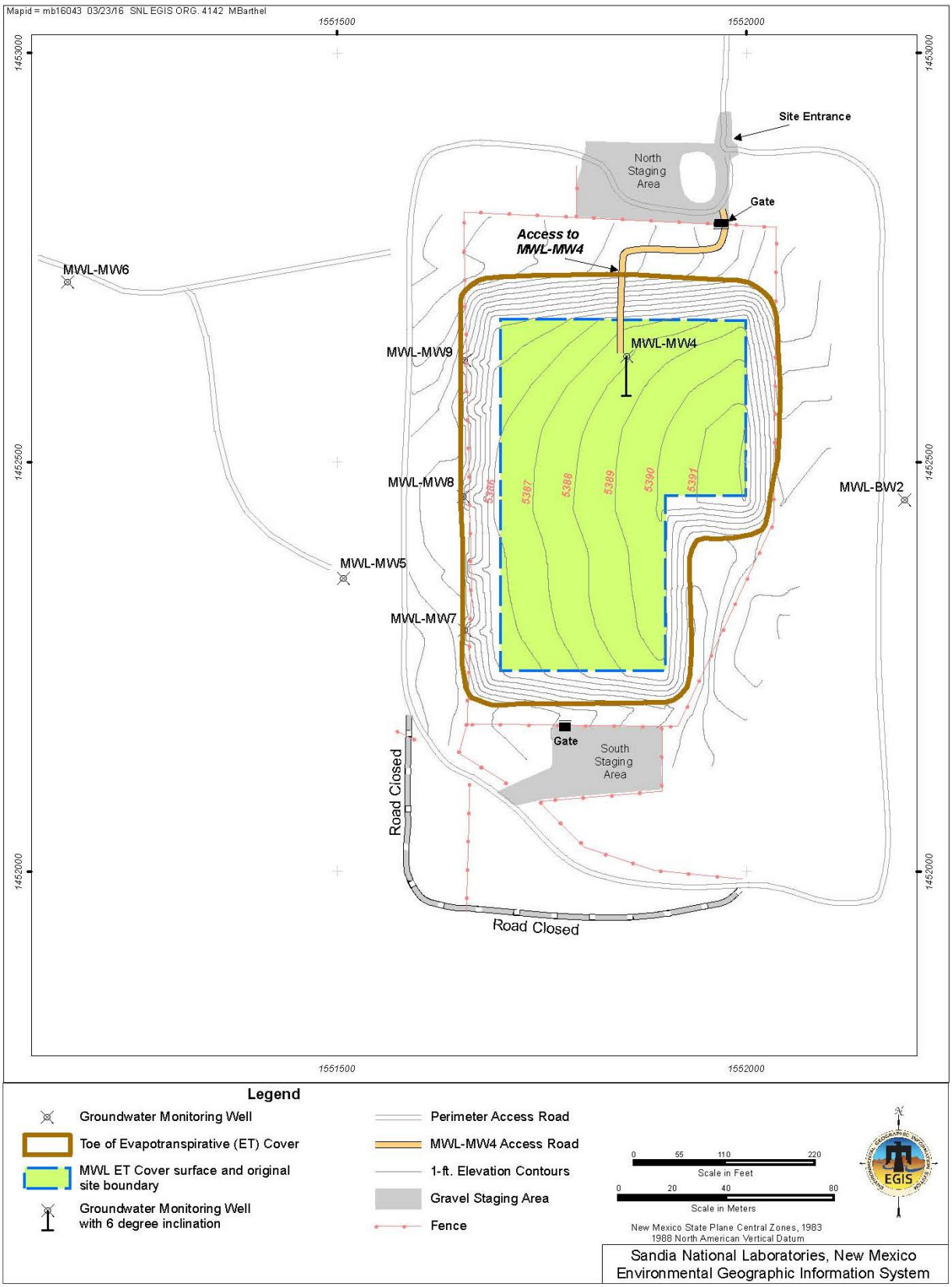

Figure 4-2. Location of Groundwater Monitoring Wells at the Mixed Waste Landfill

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. 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 deposits beneath the MWL.

Table 4-2 presents the data used to construct the October 2016 potentiometric surface map shown in Figure 4-3 for the MWL groundwater monitoring network. 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 4-3 is consistent with the base-wide potentiometric surface map presented on Plate 1, which shows the potentiometric surface contours beneath TA-III generally trend north to south with the inferred groundwater flow direction being generally westward. Several water supply 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 until 2016 as shown in Attachment 4A, Figures 4A-1 and 4A-2. The nearest water supply well, KAFB-4, is located approximately 3 miles north-northwest of the MWL.

Table 4-2. Groundwater Elevations Measured in October 2016 at Monitoring Wells Completed in the Regional Aquifer at the MWL

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)
MWL-BW2	5391.02	4-Oct-2016	480.68	4,910.34
MWL-MW4[a]	5391.70	4-Oct-2016	501.87	4,892.58[b]
MWL-MW5[c]	5382.56	4-Oct-2016	493.68	4,888.88
MWL-MW6[c]	5375.31	4-Oct-2016	487.35	4,887.96
MWL-MW7	5383.30	4-Oct-2016	490.03	4,893.27
MWL-MW8	5384.67	4-Oct-2016	491.58	4,893.09
MWL-MW9	5381.91	4-Oct-2016	491.91	4,890.00

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.
NAVD = North American Vertical Datum of 1988.
ID = Identifier.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.

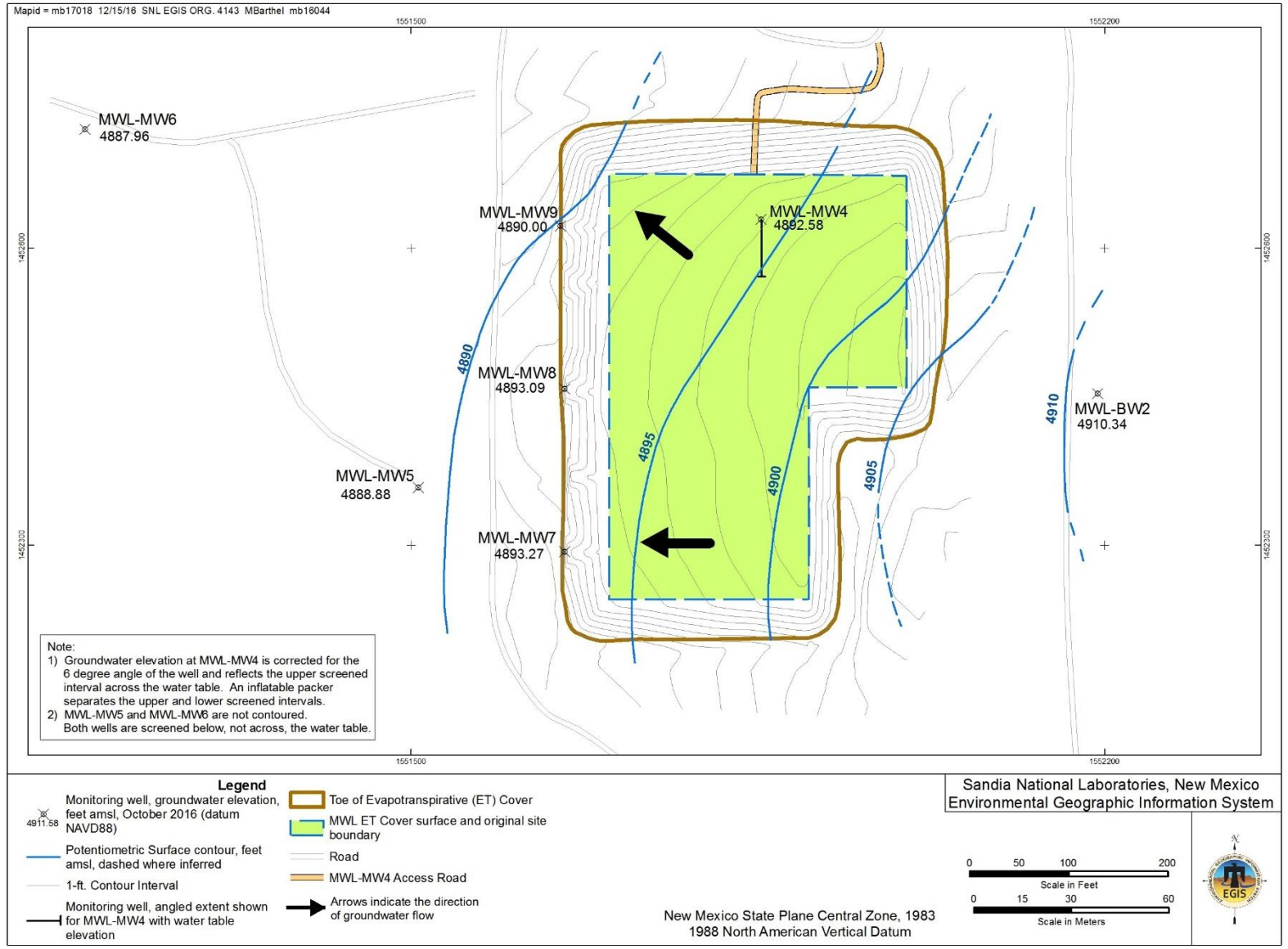

Figure 4-3. Localized Potentiometric Surface of the Regional Aquifer at the Mixed Waste Landfill, October 2016

Figures 4A-1 and 4A-2 show the rate of groundwater elevation decline at the existing MWL monitoring wells. Over the past two years the rate of decline has significantly slowed, and between 2015 and 2016 all wells except MWL-BW2 showed an increase ranging from 0.20 to 0.40 ft. From October 2015 to October 2016, the groundwater elevation declined in well MWL-BW2 only 0.17 feet, whereas for the same period between October 2014 and October 2015 the groundwater elevation decline was 0.51 ft. This water table rebound has been observed in wells located farther north on KAFB and is most likely related to a relaxation in groundwater removal from the Regional Aquifer by the Albuquerque Bernalillo County Water Utility Authority. Recharge from infiltration of direct precipitation at the MWL is negligible due to high evapotranspiration, low precipitation, the thick sequence of unsaturated Santa Fe Group 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.

4.2 Regulatory Criteria

The MWL is regulated as SWMU 76 under the Hazardous and Solid Waste Amendments module of the SNL/NM RCRA Permit, and corrective action at the MWL has been performed in accordance with the Compliance Order on Consent (Consent Order; NMED April 2004). 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.

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 April and October 2016 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 and gross beta activities; tritium; and radon-222.

Table 4-3 lists the analytical parameters and the MWL monitoring wells sampled. The CY 2016 sampling was conducted in accordance with MWL LTMMP requirements and procedures outlined in the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2016, 3rd Quarter Sampling* (SNL March 2016) and the *Mixed Waste Landfill Groundwater Monitoring Mini-Sampling and Analysis Plan for Fiscal Year 2017, 1st Quarter Sampling* (SNL September 2016).

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 supplies (EPA May 2009).

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.

Table 4-3. Analytical Parameters for the MWL Monitoring Wells, Calendar Year 2016

Analytical Parameter	Semiannual Event	
	April	October
Volatile Organic Compounds	MWL-BW2 (duplicate) MWL-MW7 MWL-MW8 MWL-MW9	MWL-BW2 MWL-MW7 (duplicate) MWL-MW8 MWL-MW9
Metals: Cadmium Chromium Nickel Uranium, total		
Radionuclides: Gamma Spectroscopy (short list[a]) Gross Alpha/Beta Activity Tritium Radon-222		

NOTES:
[a]Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).
BW = Background Well.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
VOC = Volatile organic compound.

4.4 Field Methods and Measurements

Groundwater sampling and depth-to-groundwater measurements were conducted in conformance with the MWL LTMMP and procedures specified in the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plans* (SNL March 2016 and September 2016), 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, oxidation-reduction potential (ORP), pH, and dissolved oxygen using an YSI™ Model EXO1 Water Quality Meter. Turbidity was measured with a Hach™ Model 2100Q turbidity meter. Attachment 4B, Table 4B-5 presents field water quality parameters and Figures 4A-1 and 4A-2 presents 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 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. The purging volume requirement was achieved for all of the monitoring wells during CY 2016 sampling activities.

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

Tables 4B-1, 4B-3, and 4B-4, present the analytical results for VOCs, metals, and radiological constituents, respectively. Table 4B-2 presents the laboratory method detection limits (MDLs) for the VOCs. Field water quality measurements are presented in Table 4B-5. Data qualifiers assigned by the analytical laboratory and the data validation process (SNL June 2014) are presented with the associated results in the Tables 4B-1, 4B-3, and 4B-4.

For the purposes of this report, all CY 2016 analytical results were compared with established EPA MCLs where applicable. No detected constituents exceeded the respective MCLs. The analytical results are discussed in greater detail in the following sections.

4.6.1 Volatile Organic Compounds

The CY 2016 analytical results for VOCs are summarized in Table 4B-1. No VOCs exceeded MDLs. Tetrachloroethene was the only VOC detected above the MDL in any of the groundwater samples; it was detected in the April sample from MWL-MW8 at a concentration of 0.31 micrograms per liter (µg/L). This result is below the practical quantitation limit of 1.0 µg/L and the MCL of 5.0 µg/L. Table 4B-2 presents the laboratory MDLs for VOCs.

4.6.2 Metals

The CY 2016 analytical results for cadmium, chromium, nickel, and total uranium are summarized in Table 4B-3. No metal concentrations were reported above established MCLs and all results are consistent with historical ranges.

4.6.3 Radiological Parameters

The CY 2016 analytical results for gamma-emitting radionuclides, gross alpha/beta activity, tritium, and radon-222 are summarized in Table 4B-4. 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 Code of Federal Regulations 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 assure that the samples are nonradioactive prior to shipment. Corrected gross alpha activity results are below the 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 MCL of 4 millirems per year. Tritium and short-list gamma spectroscopy radionuclides activities were below the laboratory minimum detectable activity levels in all groundwater samples. All samples were determined as nonradioactive.

4.6.4 Water Quality Parameters

Table 4B-5 presents the field water quality parameters measured immediately before sampling. These field parameters consist of temperature, specific conductivity, ORP, pH, turbidity, and dissolved oxygen.

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 duplicate environmental, 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-BW2 (April) and MWLMW7 (October) 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 laboratory MDL in both samples.

CY 2016 sample pair (environmental sample and environmental duplicate sample) results show good correlation, with calculated RPD values ranging from 1 to 8. Nickel and total uranium were detected above the laboratory MDL in the sample pair from MWL-BW2 (April), and only total uranium was detected above the laboratory MDL in the sample pair from MWL-MW7 (October). 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-BW2 (April) and one EB sample associated with monitoring well MWL-MW7 (October) were collected during the CY 2016 sampling events and submitted for all analyses.

Various constituents detected in the April EB sample at low concentrations included bromodichloromethane, chloroform, chromium, and dibromochloromethane. No corrective action was required because these constituents were not detected in the associated environmental samples. No constituents were detected in the EB sample from October.

4.7.1.3 Field Blank Samples

A total of 10 FB samples (5 in April, 5 in October) were collected during the CY 2016 sampling events and submitted for VOC analysis. For the April FB samples, bromodichloromethane, chloroform, and dibromochloromethane were detected in all five FB samples, and bromoform was detected in one FB sample. For the October FB samples, acetone was detected in two of the FB samples. No corrective action was required for April or October FB sample results because these compounds were not detected in associated environmental samples.

4.7.1.4 Trip Blank Samples

A total of 10 TB samples (5 in April, 5 in October) were submitted with the CY 2016 samples for analysis of VOCs. No VOCs were detected in these TB samples.

4.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with the groundwater samples. Additionally, batch matrix spike, matrix spike duplicate, and surrogate spike samples were analyzed. There were no significant data quality issues identified with the laboratory QC sample results associated with the April and October sampling events.

4.8 Variances and Nonconformances

All analytical and field methods were performed according to the requirements specified in the MWL LTMMP and associated Mini-Sampling and Analysis Plans. There were no variances and/or nonconformances from requirements during CY 2016 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 AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2014). All data were in compliance with analytical methods and laboratory procedures.

4.9 Summary and Conclusions

During CY 2016, groundwater samples were collected from the MWL compliance groundwater monitoring wells (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) in April and October in conformance 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 and gross beta activities; tritium; and radon-222. Based on the field and laboratory QC sample and data validation results, the CY 2016 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 MCLs.

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 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

4A-1 MWL Groundwater Monitoring Wells (1 of 2) 4A-5

4A-2 MWL Groundwater Monitoring Wells (2 of 2) 4A-6

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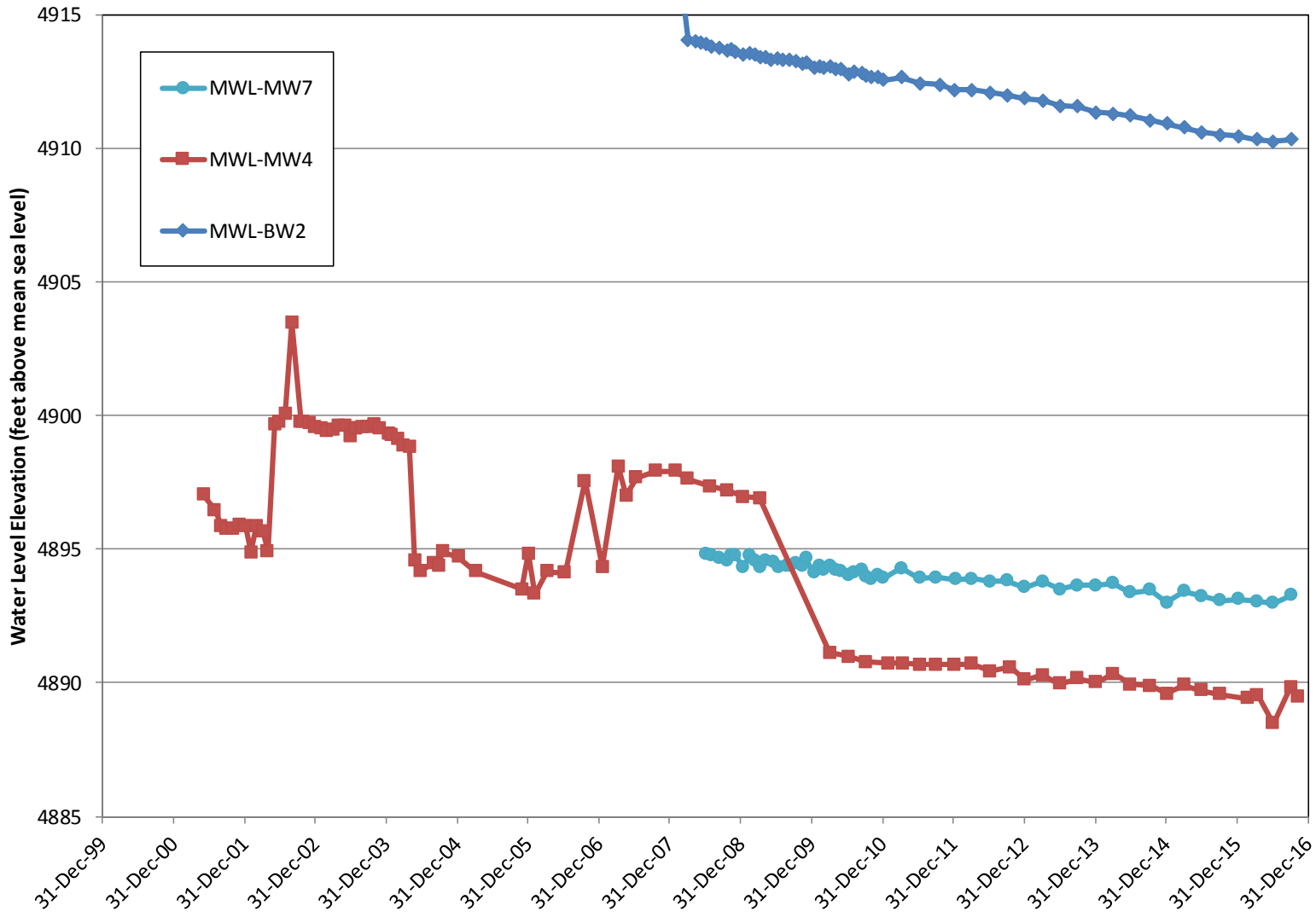

Note: GW Elevation corrected for 6°angle for MWL-MW4

Figure 4A-1. MWL Groundwater Monitoring Wells (1 of 2)

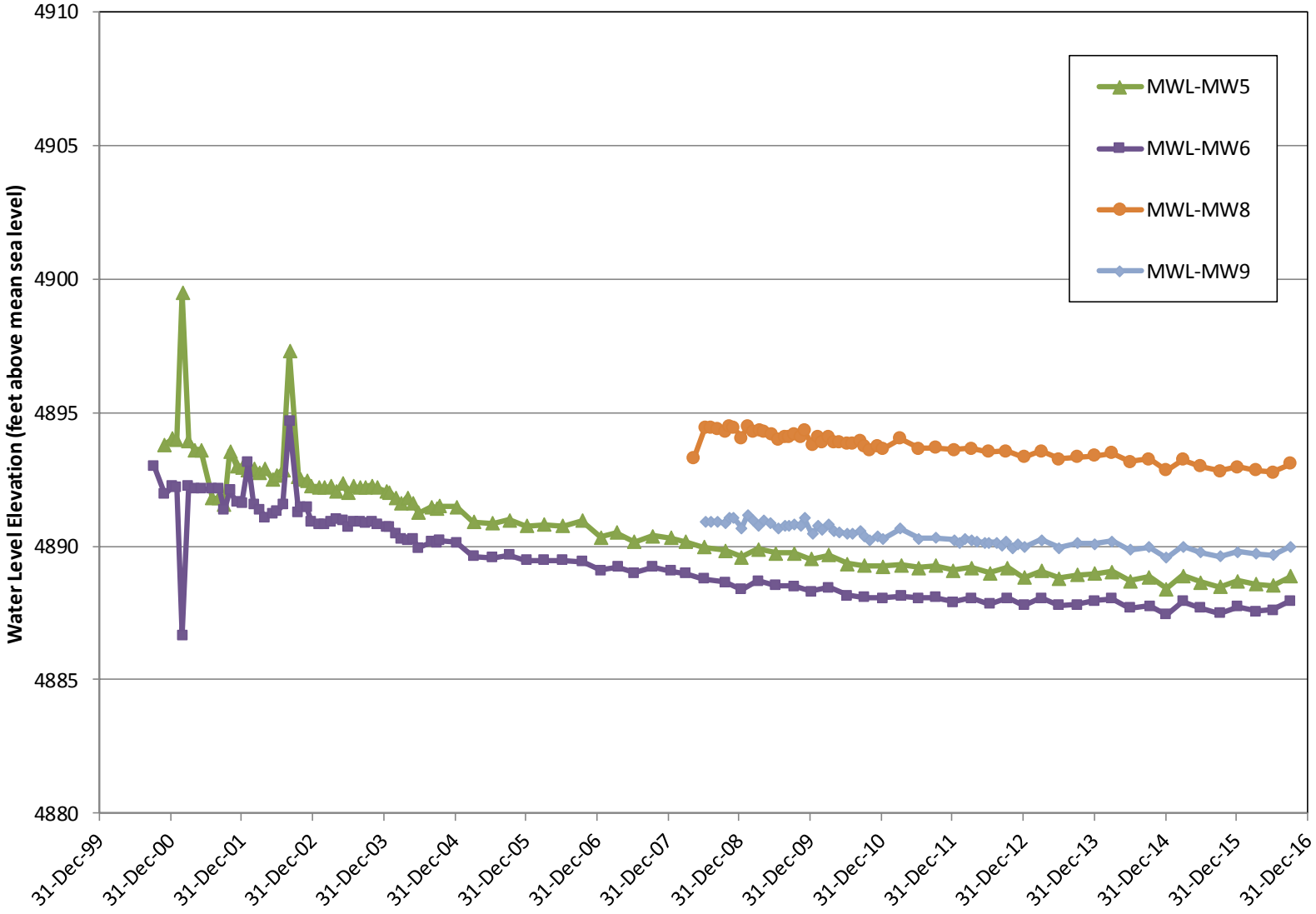

Figure 4A-2. MWL Groundwater Monitoring Wells (2 of 2)

Attachment 4B
Mixed Waste Landfill
Analytical Results Tables

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Attachment 4B Tables

4B-1 Summary of Detected Volatile Organic Compounds, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 4B-5

4B-2 Method Detection Limits for Volatile Organic Compounds (Method SW846-8260B), Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 4B-6

4B-3 Summary of Cadmium, Chromium, Nickel, and Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 4B-7

4B-4 Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 4B-9

4B-5 Summary of Field Water Quality Measurements, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 4B-12

Footnotes for Mixed Waste Landfill Groundwater Analytical Results Tables 4B-13

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Table 4B-1
Summary of Detected Volatile Organic Compounds,
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW8 26-Apr-16	Tetrachloroethene	0.310	0.300	1.00	5.00	J		099418-001	SW846-8260

Refer to footnotes on page 4B-13.

Table 4B-2
Method Detection Limits for Volatile Organic Compounds (Method[g] SW846-8260B), Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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

Calendar Year 2016

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	0.00011	0.001	0.005	U		099408-002	SW846-6020
20-Apr-16	Chromium	ND	0.002	0.010	0.10	U		099408-002	SW846-6020
	Nickel	0.00141	0.0005	0.002	NE	J		099408-002	SW846-6020
	Uranium	0.0074	0.000067	0.0002	0.030			099408-002	SW846-6020
MWL-BW2 (Duplicate)	Cadmium	ND	0.00011	0.001	0.005	U		099409-002	SW846-6020
20-Apr-16	Chromium	ND	0.002	0.010	0.10	U		099409-002	SW846-6020
	Nickel	0.0013	0.0005	0.002	NE	J		099409-002	SW846-6020
	Uranium	0.00764	0.000067	0.0002	0.030			099409-002	SW846-6020
MWL-MW7	Cadmium	ND	0.00011	0.001	0.005	U		099412-002	SW846-6020
21-Apr-16	Chromium	ND	0.002	0.010	0.10	U		099412-002	SW846-6020
	Nickel	0.00109	0.0005	0.002	NE	J		099412-002	SW846-6020
	Uranium	0.00801	0.000067	0.0002	0.030			099412-002	SW846-6020
MWL-MW8	Cadmium	ND	0.00011	0.001	0.005	U		099418-002	SW846-6020
26-Apr-16	Chromium	0.00208	0.002	0.010	0.10	J		099418-002	SW846-6020
	Nickel	0.0007	0.0005	0.002	NE	J		099418-002	SW846-6020
	Uranium	0.00803	0.000067	0.0002	0.030			099418-002	SW846-6020
MWL-MW9	Cadmium	ND	0.00011	0.001	0.005	U		099415-002	SW846-6020
25-Apr-16	Chromium	ND	0.002	0.010	0.10	U		099415-002	SW846-6020
	Nickel	0.000626	0.0005	0.002	NE	J		099415-002	SW846-6020
	Uranium	0.00925	0.000067	0.0002	0.030			099415-002	SW846-6020
MWL-BW2	Cadmium	ND	0.0003	0.001	0.005	U		100762-002	SW846-6020
25-Oct-16	Chromium	ND	0.003	0.010	0.10	U		100762-002	SW846-6020
	Nickel	ND	0.0005	0.002	NE	U		100762-002	SW846-6020
	Uranium	0.00652	0.000067	0.0002	0.030			100762-002	SW846-6020
MWL-MW7	Cadmium	ND	0.0003	0.001	0.005	U		100768-002	SW846-6020
26-Oct-16	Chromium	ND	0.003	0.010	0.10	U		100768-002	SW846-6020
	Nickel	ND	0.0005	0.002	NE	U		100768-002	SW846-6020
	Uranium	0.00728	0.000067	0.0002	0.030			100768-002	SW846-6020
MWL-MW7 (Duplicate)	Cadmium	ND	0.0003	0.001	0.005	U		100769-002	SW846-6020
26-Oct-16	Chromium	ND	0.003	0.010	0.10	U		100769-002	SW846-6020
	Nickel	ND	0.0005	0.002	NE	U		100769-002	SW846-6020
	Uranium	0.00733	0.000067	0.0002	0.030			100769-002	SW846-6020

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 2016

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	Cadmium	ND	0.0003	0.001	0.005	U		100775-002	SW846-6020
28-Oct-16	Chromium	ND	0.003	0.010	0.10	U		100775-002	SW846-6020
	Nickel	0.000858	0.0005	0.002	NE	J		100775-002	SW846-6020
	Uranium	0.00811	0.000067	0.0002	0.030			100775-002	SW846-6020
MWL-MW9	Cadmium	ND	0.0003	0.001	0.005	U		100772-002	SW846-6020
27-Oct-16	Chromium	ND	0.003	0.010	0.10	U		100772-002	SW846-6020
	Nickel	0.000727	0.0005	0.002	NE	J		100772-002	SW846-6020
	Uranium	0.00934	0.000067	0.0002	0.030			100772-002	SW846-6020

Refer to footnotes on page 4B-13.

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

Calendar Year 2016

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	-6.53 ± 13.6	20.3	9.89	NE	U	BD	099408-003	EPA 901.1
20-Apr-16	Cesium-137	1.56 ± 2.71	4.63	2.23	NE	U	BD	099408-003	EPA 901.1
	Cobalt-60	1.04 ± 2.19	3.96	1.85	NE	U	BD	099408-003	EPA 901.1
	Potassium-40	-9.0 ± 42.3	51.0	24.2	NE	U	BD	099408-003	EPA 901.1
	Gross Alpha	2.15	NA	NA	15 pCi/L	NA	None	099408-004	EPA 900.0
	Gross Beta	7.66 ± 1.99	2.15	1.05	4mrem/yr			099408-004	EPA 900.0
	Tritium	-41.5 ± 79.3	150	69.5	4mrem/yr	U	BD	099408-005	EPA 906.0
	Radon-222	454 ± 107	45.0	21.7	1000 pCi/L			099408-006	SM7500 Rn B
MWL-BW2 (Duplicate)	Americium-241	3.58 ± 8.14	12.1	5.91	NE	U	BD	099409-003	EPA 901.1
20-Apr-16	Cesium-137	-0.451 ± 3.29	3.52	1.68	NE	U	BD	099409-003	EPA 901.1
	Cobalt-60	-3.96 ± 3.66	3.70	1.73	NE	U	BD	099409-003	EPA 901.1
	Potassium-40	-40.2 ± 42.6	43.5	20.5	NE	U	BD	099409-003	EPA 901.1
	Gross Alpha	2.73	NA	NA	15 pCi/L	NA	None	099409-004	EPA 900.0
	Gross Beta	7.00 ± 1.61	1.50	0.725	4mrem/yr			099409-004	EPA 900.0
	Tritium	-58.3 ± 78.5	151	70.1	4mrem/yr	U	BD	099409-005	EPA 906.0
	Radon-222	462 ± 109	45.2	21.8	1000 pCi/L			099409-006	SM7500 Rn B
MWL-MW7	Americium-241	-3.19 ± 6.76	9.97	4.87	NE	U	BD	099412-003	EPA 901.1
21-Apr-16	Cesium-137	0.244 ± 1.92	3.39	1.63	NE	U	BD	099412-003	EPA 901.1
	Cobalt-60	-1.01 ± 2.20	3.13	1.46	NE	U	BD	099412-003	EPA 901.1
	Potassium-40	-1.91 ± 34.7	49.8	23.8	NE	U	BD	099412-003	EPA 901.1
	Gross Alpha	6.23	NA	NA	15 pCi/L	NA	None	099412-004	EPA 900.0
	Gross Beta	8.17 ± 1.75	1.42	0.684	4mrem/yr			099412-004	EPA 900.0
	Tritium	0.455 ± 83.1	150	69.7	4mrem/yr	U	BD	099412-005	EPA 906.0
	Radon-222	105 ± 34.5	38.0	18.3	1000 pCi/L		J	099412-006	SM7500 Rn B
MWL-MW8	Americium-241	-0.758 ± 19.0	22.8	11.2	NE	U	BD	099418-003	EPA 901.1
26-Apr-16	Cesium-137	1.39 ± 4.18	4.01	1.92	NE	U	BD	099418-003	EPA 901.1
	Cobalt-60	2.09 ± 2.59	4.49	2.12	NE	U	BD	099418-003	EPA 901.1
	Potassium-40	-30.1 ± 53.0	65.9	31.7	NE	U	BD	099418-003	EPA 901.1
	Gross Alpha	0.97	NA	NA	15 pCi/L	NA	None	099418-004	EPA 900.0
	Gross Beta	6.94 ± 1.58	1.45	0.702	4mrem/yr			099418-004	EPA 900.0
	Tritium	37.0 ± 86.5	150	69.8	4mrem/yr	U	BD	099418-005	EPA 906.0
	Radon-222	188 ± 70.3	83.2	39.4	1000 pCi/L		J	099418-006	SM7500 Rn B

Refer to footnotes on page 4B-13.

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

Calendar Year 2016

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	-7.16 ± 19.7	26.3	12.9	NE	U	BD	099415-003	EPA 901.1
25-Apr-16	Cesium-137	0.868 ± 2.23	3.99	1.91	NE	U	BD	099415-003	EPA 901.1
	Cobalt-60	0.132 ± 3.63	4.81	2.26	NE	U	BD	099415-003	EPA 901.1
	Potassium-40	2.32 ± 46.4	47.0	22.0	NE	U	BD	099415-003	EPA 901.1
	Gross Alpha	3.80	NA	NA	15 pCi/L	NA	None	099415-004	EPA 900.0
	Gross Beta	7.57 ± 1.58	1.15	0.548	4mrem/yr			099415-004	EPA 900.0
	Tritium	-17 ± 82.7	152	70.6	4mrem/yr	U	BD	099415-005	EPA 906.0
	Radon-222	366 ± 110	99.6	47.2	1000 pCi/L	H	J	099415-006	SM7500 Rn B
MWL-BW2	Americium-241	6.65 ± 8.86	13.1	6.41	NE	U	BD	100762-003	EPA 901.1
25-Oct-16	Cesium-137	-1.87 ± 3.07	3.13	1.50	NE	U	BD	100762-003	EPA 901.1
	Cobalt-60	0.812 ± 1.70	3.05	1.43	NE	U	BD	100762-003	EPA 901.1
	Potassium-40	34.7 ± 45.9	26.0	12.0	NE	X	R	100762-003	EPA 901.1
	Gross Alpha	4.36	NA	NA	15 pCi/L	NA	None	100762-004	EPA 900.0
	Gross Beta	6.91 ± 1.79	1.95	0.945	4mrem/yr			100762-004	EPA 900.0
	Tritium	72.5 ± 96.6	163	73.1	4mrem/yr	U	BD	100762-005	EPA 906.0
	Radon-222	448 ± 107	49.2	23.6	1000 pCi/L			100762-006	SM7500 Rn B
MWL-MW7	Americium-241	4.68 ± 10.6	16.8	8.18	NE	U	BD	100768-003	EPA 901.1
26-Oct-16	Cesium-137	-0.143 ± 1.93	3.25	1.55	NE	U	BD	100768-003	EPA 901.1
	Cobalt-60	-0.125 ± 1.73	3.05	1.41	NE	U	BD	100768-003	EPA 901.1
	Potassium-40	0.977 ± 48.9	32.0	14.9	NE	U	BD	100768-003	EPA 901.1
	Gross Alpha	5.32	NA	NA	15 pCi/L	NA	None	100768-004	EPA 900.0
	Gross Beta	6.02 ± 1.34	1.20	0.583	4mrem/yr			100768-004	EPA 900.0
	Tritium	59.7 ± 93.2	160	71.8	4mrem/yr	U	BD	100768-005	EPA 906.0
	Radon-222	154 ± 45.1	41.6	20.0	1000 pCi/L			100768-006	SM7500 Rn B
MWL-MW7 (Duplicate)	Americium-241	-3.23 ± 7.62	13.4	6.48	NE	U	BD	100769-003	EPA 901.1
26-Oct-16	Cesium-137	-0.495 ± 1.33	2.28	1.07	NE	U	BD	100769-003	EPA 901.1
	Cobalt-60	1.03 ± 1.51	2.80	1.30	NE	U	BD	100769-003	EPA 901.1
	Potassium-40	4.40 ± 39.5	24.3	11.2	NE	U	BD	100769-003	EPA 901.1
	Gross Alpha	1.50	NA	NA	15 pCi/L	NA	None	100769-004	EPA 900.0
	Gross Beta	5.48 ± 1.28	1.19	0.574	4mrem/yr			100769-004	EPA 900.0
	Tritium	31.4 ± 91.6	164	73.5	4mrem/yr	U	BD	100769-005	EPA 906.0
	Radon-222	141 ± 42.8	41.8	20.1	1000 pCi/L			100769-006	SM7500 Rn B

Refer to footnotes on page 4B-13.

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

Calendar Year 2016

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	Americium-241	6.10 ± 13.8	20.8	10.1	NE	U	BD	100775-003	EPA 901.1
28-Oct-16	Cesium-137	0.141 ± 1.87	3.18	1.52	NE	U	BD	100775-003	EPA 901.1
	Cobalt-60	1.56 ± 1.81	3.23	1.51	NE	U	BD	100775-003	EPA 901.1
	Potassium-40	-6.4 ± 35.3	39.6	18.8	NE	U	BD	100775-003	EPA 901.1
	Gross Alpha	3.92	NA	NA	15 pCi/L	NA	None	100775-004	EPA 900.0
	Gross Beta	5.51 ± 1.26	1.19	0.575	4mrem/yr			100775-004	EPA 900.0
	Tritium	40.7 ± 92.6	164	73.4	4mrem/yr	U	BD	100775-005	EPA 906.0
	Radon-222	157 ± 48.8	49.8	23.9	1000 pCi/L			100775-006	SM7500 Rn B
MWL-MW9	Americium-241	-0.122 ± 5.64	9.33	4.53	NE	U	BD	100772-003	EPA 901.1
27-Oct-16	Cesium-137	-0.966 ± 4.12	3.38	1.63	NE	U	BD	100772-003	EPA 901.1
	Cobalt-60	-0.581 ± 1.37	2.37	1.09	NE	U	BD	100772-003	EPA 901.1
	Potassium-40	27.7 ± 43.4	23.6	10.9	NE	X	R	100772-003	EPA 901.1
	Gross Alpha	3.04	NA	NA	15 pCi/L	NA	None	100772-004	EPA 900.0
	Gross Beta	5.76 ± 1.22	0.949	0.455	4mrem/yr			100772-004	EPA 900.0
	Tritium	37.7 ± 90.4	160	71.9	4mrem/yr	U	BD	100772-005	EPA 906.0
	Radon-222	362 ± 91.9	59.2	28.4	1000 pCi/L			100772-006	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 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
MWL-BW2	20-Apr-16	21.10	690.3	169.8	7.52	0.83	13.3	1.20
MWL-MW7	21-Apr-16	22.01	588.3	261.4	7.75	0.20	71.6	6.25
MWL-MW8	26-Apr-16	18.41	537.3	242.7	7.72	0.44	37.5	3.41
MWL-MW9	25-Apr-16	21.98	589.9	263.7	7.67	0.93	16.5	1.45
MWL-BW2	25-Oct-16	19.56	630.3	137.9	7.34	7.35	37.1	3.45
MWL-MW7	26-Oct-16	20.04	534.3	193.0	7.56	0.63	72.8	6.54
MWL-MW8	28-Oct-16	20.97	565.7	177.0	7.51	0.45	30.8	2.67
MWL-MW9	27-Oct-16	23.87	590.1	149.1	7.47	0.57	23.9	1.99

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.
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

Activity = Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Parts 9, 141, and 142, Table 1-4).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 4B-1 through 4B-3. MDA applies to Table 4B-4.

MDA = The minimum 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 4B-1 through 4B-3. Critical level applies to Table 4B-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 May 2009).

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.

[e]Lab Qualifier

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

H = Analytical holding time was exceeded.
J = Estimated value, the analyte concentration is below the PQL.
NA = Not applicable.
U = Analyte is absent or below the method detection limit.
X = Uncertain identification for gamma spectroscopy.

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

[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.
R = The data are unusable, and resampling or reanalysis are necessary for verification.
None = No data validation for corrected gross alpha activity.

[g]Analytical Method

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SM = Standard Method.

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.
% Sat = Percent saturation.
µmhos/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
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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-V Groundwater (TAVG) Area of Concern (AOC) based on detections above the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) in samples collected from monitoring wells. The EPA MCLs and State of New Mexico drinking water standards for TCE and nitrate are 5 micrograms per liter (μg/L) and 10 milligrams per liter (mg/L) (as nitrogen), 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). Unique features of the TAVG AOC include low concentrations of TCE and nitrate in an alluvial aquifer that is approximately 500 feet (ft) below ground surface (bgs).

5.1.1 Location

Technical Area (TA)-V is located in the west-central portion of Kirtland Air Force Base (KAFB), south of the City of Albuquerque (Figure 5-1; Plate 1). TA-V occupies approximately 35 acres in the northeast corner of TA-III at Sandia National Laboratories, New Mexico (SNL/NM).

The vadose zone at TA-V is 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 generally from east to west. To the west of TA-V, groundwater flow turns north in response to pumping from the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) supply wells located north of KAFB, and from the KAFB water supply 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 Facilities, and the Hot Cell Facilities. Historically, wastewater derived from TA-V facilities was disposed of to the Liquid Waste Disposal System (LWDS) drain field, two unlined LWDS surface impoundments, and TA-V seepage pits. Since the discovery of groundwater contamination in 1992, SNL/NM Environmental Restoration (ER) Operations personnel have conducted numerous groundwater investigations in the TAVG AOC (Attachment 5A). Many of these investigations were site-specific and conducted supporting various solid waste management unit (SWMU) assessments. Other investigations in the TAVG AOC were more regional studies conducted by the SNL/NM Site-Wide Hydrogeologic Characterization Project (SNL February 1998).

5.1.3 Monitoring History

Investigations of groundwater quality in the TAVG AOC have been conducted by SNL/NM personnel over the past 24 years. Groundwater monitoring at TA-V began in October 1992. TCE was first detected in monitoring well LWDS-MW1 in November 1993 and 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 during quarterly sampling events. Nitrate was first detected above the MCL of 10 mg/L in monitoring well LWDS-MW1 in December 1995. The New Mexico Environment Department (NMED)-specified background concentration for nitrate in groundwater is 4 mg/L (Dinwiddie September 1997).

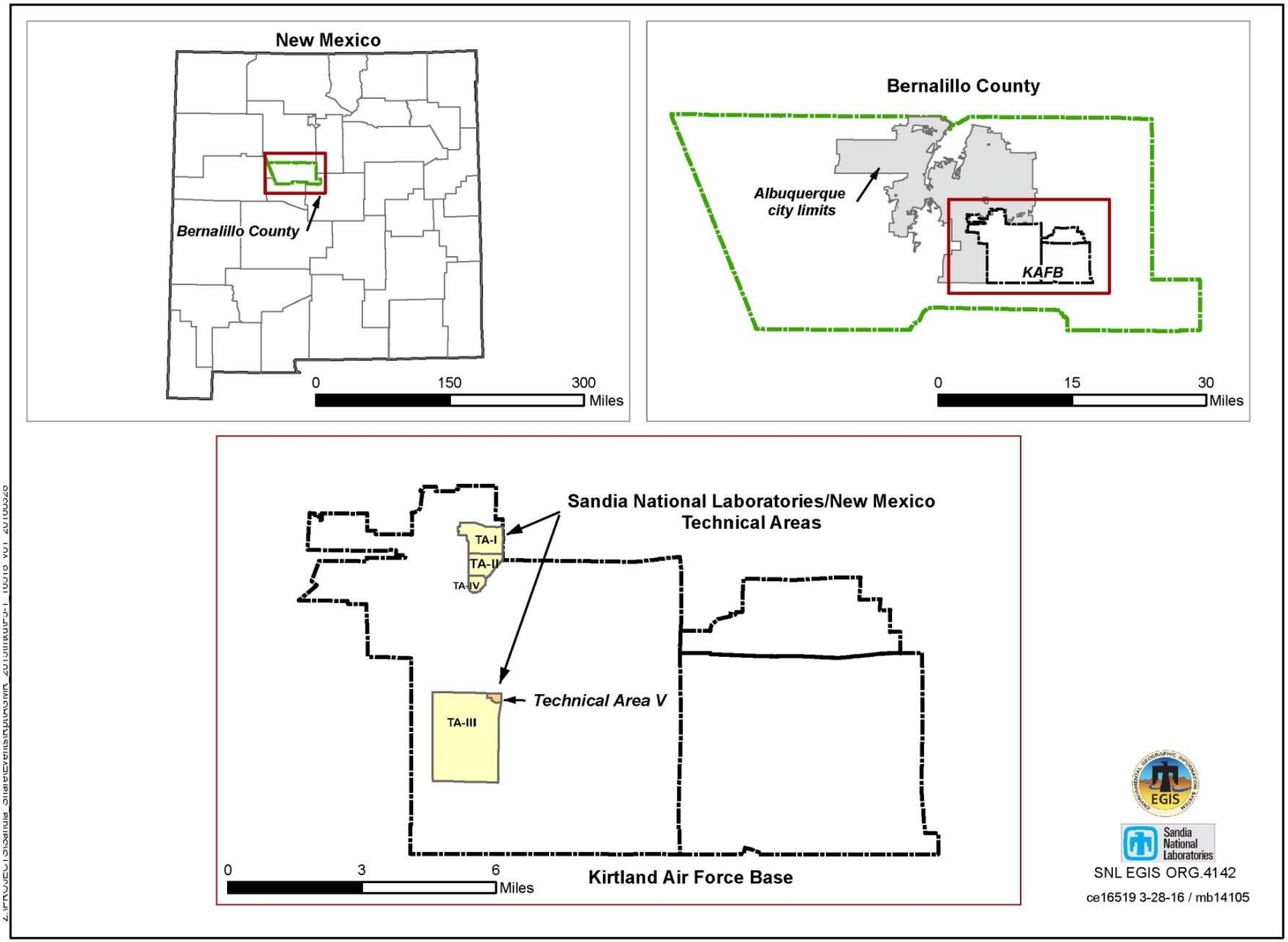

Figure 5-1. Location of SNL/NM and TA-V

Since the initial discoveries of TCE and nitrate, numerous characterization activities have been conducted at the TAVG AOC. Attachment 5A provides the historical timeline of the TAVG AOC investigation. The TAVG AOC monitoring network has been expanding with more and more monitoring wells installed since the 1990s. SNL/NM personnel installed four additional groundwater monitoring wells in November 2010 and three soil-vapor monitoring wells in March 2011 in accordance with NMED's requirements (NMED May 2010).

Soil-vapor samples were collected from the three soil-vapor monitoring wells for eight quarters and analyzed for volatile organic compounds (VOCs), including TCE. Soil-vapor samples were collected for three quarters in 2011, four quarters in 2012, and one quarter in 2013; the soil-vapor monitoring had been concluded in Calendar Year (CY) 2013 with the final quarterly sampling. All eight quarters' analytical results have been reported in Attachment 5D of the CY 2013 Annual Groundwater Monitoring Report (SNL June 2014).

In 2015, U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and SNL/NM personnel proposed two new groundwater monitoring wells to be installed south of the TA-V boundary (DOE October 2015). These new wells help define the extent of the TCE plume and the potentiometric surface along the southern boundary of TA-V. NMED approved the installation of these two new monitoring wells (NMED May 2016).

Installation of two new groundwater monitoring wells designated TAV-MW15 and TAV-MW16 began in December 2016. Once completed, they will be part of the TAVG AOC monitoring network. Groundwater monitoring results for TAVG AOC monitoring network continue to be summarized in the annual groundwater monitoring reports.

5.1.4 Current Monitoring Network

In CY 2016, 16 wells in the TAVG AOC were monitored for water quality and water levels (Figure 5-2; Table 5-1). The 16-well groundwater monitoring network has been in place since November 2010. Table XI-1 of the Compliance Order on Consent (Consent Order) specifies that the sampling frequency for groundwater monitoring at TA-V is quarterly (NMED April 2004).

5.1.5 Summary of Calendar Year 2016 Activities

The following activities took place for the TAVG AOC during CY 2016:

- Obtained quarterly water level measurements for all TAVG AOC wells.
- Prepared sampling and analysis plans (SAPs) and conducted semiannual and quarterly groundwater sampling events at 16 wells (Table 5-1) in February/March, May, July/August, and October/November 2016 (SNL January 2016, April 2016, July 2016, and September 2016).
- Prepared tables of analytical results (Attachment 5B), concentration versus time plots (Attachment 5C), and hydrographs (Attachment 5D) in support of this report.
- Installation of groundwater monitoring wells TAV-MW15 and TAV-MW16 began in December 2016.

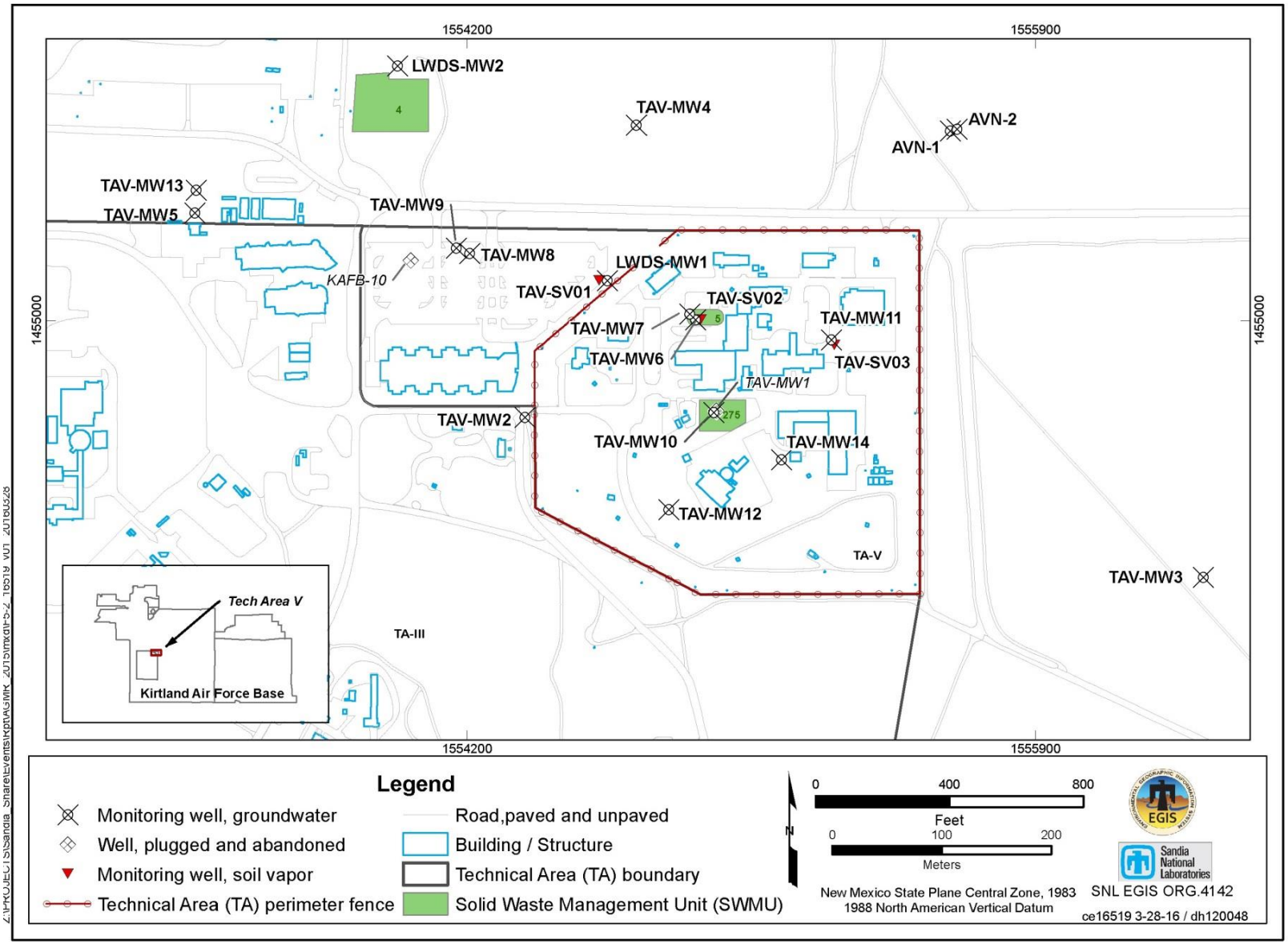

Figure 5-2. TAVG Monitoring Well Locations

Table 5-1. Groundwater Monitoring Wells at the TAVG AOC

Well	Installation Year	WQ	WL	Comments
LWDS-MW1	1993	√	√	Regional Aquifer, water table completion
LWDS-MW2	1992	√	√	Regional Aquifer, water table completion
AVN-1	1995	√	√	Regional Aquifer, deep completion (570–590 ft bgs)
AVN-2	1995	NA	NA	Regional Aquifer; water table completion (currently dry)
TAV-MW1	1995	NA	NA	Regional Aquifer, plugged and abandoned February 2008
TAV-MW2	1995	√	√	Regional Aquifer, water table completion
TAV-MW3	1997	√	√	Regional Aquifer, water table completion
TAV-MW4	1997	√	√	Regional Aquifer, water table completion
TAV-MW5	1997	√	√	Regional Aquifer, water table completion
TAV-MW6	2001	√	√	Regional Aquifer, water table completion
TAV-MW7	2001	√	√	Regional Aquifer, deep completion (597–617 ft bgs)
TAV-MW8	2001	√	√	Regional Aquifer, water table completion
TAV-MW9	2001	√	√	Regional Aquifer, deep completion (582–602 ft bgs)
TAV-MW10	2008	√	√	Regional Aquifer, replaced TAV-MW1
TAV-MW11	2010	√	√	Regional Aquifer, water table completion
TAV-MW12	2010	√	√	Regional Aquifer, water table completion
TAV-MW13	2010	√	√	Regional Aquifer, deep completion (525–545 ft bgs)
TAV-MW14	2010	√	√	Regional Aquifer, water table completion
TAV-MW15	Proposed in 2017	NA	NA	Regional Aquifer, water table completion
TAV-MW16	Proposed in 2017	NA	NA	Regional Aquifer, water table completion

NOTES: Check marks indicate water quality sampling and water level measurements were obtained during this reporting period.
AOC = Area of Concern.
AVN = Area V (North).
bgs = Below ground surface.
ft = Foot (feet).
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
NA = Not applicable.
TAV = Technical Area-V (monitoring well designation).
TAVG = Technical Area-V Groundwater.
WL = Water level.
WQ = Water quality.

5.1.6 Conceptual Site Model

This section presents a summary of the updated conceptual site model (SNL September 2015) that characterizes the geological and hydrogeological framework, contaminant source terms, and the distribution and migration of contaminants in the subsurface at TA-V.

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 and overlying alluvium that fill the Albuquerque Basin contain the regional Santa Fe Group 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 feet thick. The water table of the Santa Fe Group aquifer is located in the fine-grained lower unit of alluvial-fan deposits. The post-Santa Fe Group 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.

Prior to development of water resources in the Albuquerque area, groundwater flow direction in the Albuquerque Basin generally was 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 Santa Fe Group aquifer has been developed as a source for municipal and industrial water supplies, groundwater flow directions have been altered toward supply wells to the north of TA-V. Regional discharge occurs as groundwater moves out of the Albuquerque Basin into downgradient basins on 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 9.45 inches for the Albuquerque area (Chapter 2.6.2.1). Much of this precipitation is derived from summer thunderstorms that occur between July and October. The rate of 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 recharge is considered to be minimal as a mechanism for transporting contaminants through the 500-ft-thick vadose zone.

The Tijeras Arroyo and Arroyo del Coyote are located to the north and northeast of TA-V, respectively. The flow of surface water in the arroyo 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. The distance between these ephemeral channels and TA-V precludes a significant effect on the local groundwater flow and contaminant transport.

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 with depth. 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, the LWDS surface impoundments, and the TA-V seepage pits 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 has been observed at TA-V. Based on moisture content measurements of vadose-zone sediment samples, minimal moisture remains in the vadose zone from wastewater discharge at TA-V.

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 calculated hydraulic conductivities were 38.3 and 0.09 feet per day (ft/day), respectively. Slug tests were conducted at all 18 monitoring wells when the wells were installed (Table 5-1). Horizontal hydraulic conductivities ranged from 0.04 to 30.82 ft/day. The wide range of hydraulic conductivities derived from the aquifer tests at TA-V is attributed to the textural heterogeneities associated with the alluvial-fan lithofacies. Vertical hydraulic conductivity is typically estimated to be one-tenth to one-hundredth the horizontal hydraulic conductivity.

5.1.6.3 Local Direction of Groundwater Flow

Table 5-2 presents the water levels measured in the current 16 monitoring wells that were used to construct a map of the local aquifer potentiometric surface (Figure 5-3). Figure 5-3 is consistent with the base-wide potentiometric surface map on Plate 1. The potentiometric surface indicates that the groundwater flow is generally to the west, with localized flow paths to the south and southwest. The Regional Aquifer at TA-V demonstrates unconfined conditions. The horizontal gradient ranges from approximately 0.004 to 0.01 feet per foot (ft/ft) based on the October 2016 potentiometric surface map (Figure 5-3). The horizontal groundwater flow velocity at TA-V can be calculated from the range of horizontal hydraulic conductivities (0.04 to 30.8 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 from 0.29 to 225 feet per year (ft/yr).

Water table contours for previous years suggested that a subtle groundwater mound was present at monitoring wells TAV-MW8 and LWDS-MW1 with approximately 0.6 to 0.8 ft of additional head relative to nearby wells (SNL September 2012, June 2013, June 2014). The groundwater mound was most likely an artifact of laterally variable water level declines within a heterogeneous and anisotropic aquifer. An elevated hydraulic head still existed at wells TAV-MW8 and LWDS-MW1 relative to nearby wells in CY 2014 (SNL June 2015), CY 2015 (SNL June 2016), and in this reporting period (CY 2016), but a potentiometric mound could not be confidently inferred using a one-foot contour interval.

Figures 5D-1 through 5D-3 present water level fluctuations shown in hydrographs for the current 16-well groundwater monitoring network at TA-V. Groundwater levels have steadily declined at all TAVG monitoring wells. The water level declines are due to the combined pumping of the Regional Aquifer by the KAFB and ABCWUA water supply wells. The rates of decline range from 0.51 to 0.88 ft/yr with an average decline rate of 0.75 ft/yr. In general, the rates of decline are higher to the east than to the west, with the groundwater level declining fastest in monitoring well TAV-MW3 and slowest in monitoring well TAV-MW5. The dewatering of the aquifer is expected to continue as long as pumping of water supply wells in the region continues.

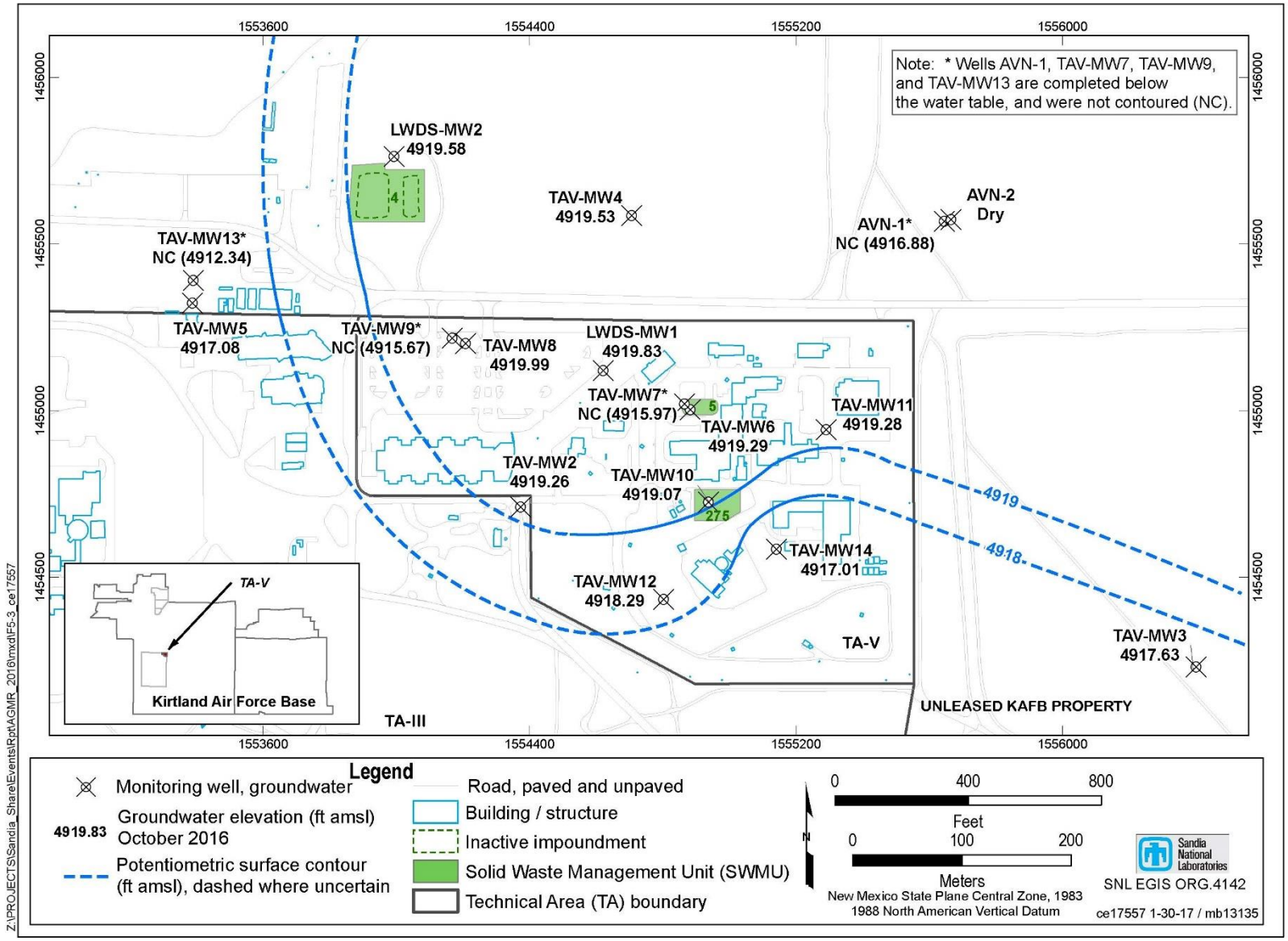

Figure 5-3. Localized Potentiometric Surface of the Regional Aquifer at the TAVG AOC (October 2016)

Table 5-2. Groundwater Elevations Measured in October 2016 at the TAVG AOC

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Water Elevation (feet amsl)
AVN-1	5443.00	11-Oct-16	526.12	4916.88
LWDS-MW1	5423.83	11-Oct-16	504.00	4919.83
LWDS-MW2	5412.41	11-Oct-16	492.83	4919.58
TAV-MW2	5427.33	14-Oct-16	508.07	4919.26
TAV-MW3	5464.26	14-Oct-16	546.63	4917.63
TAV-MW4	5427.89	11-Oct-16	508.36	4919.53
TAV-MW5	5408.71	14-Oct-16	491.63	4917.08
TAV-MW6	5431.17	11-Oct-16	511.88	4919.29
TAV-MW7	5430.40	11-Oct-16	514.43	4915.97
TAV-MW8	5417.00	11-Oct-16	497.01	4919.99
TAV-MW9	5416.27	11-Oct-16	500.60	4915.67
TAV-MW10	5437.03	11-Oct-16	517.96	4919.07
TAV-MW11	5440.12	11-Oct-16	520.84	4919.28
TAV-MW12	5435.72	11-Oct-16	517.43	4918.29
TAV-MW13	5409.02	14-Oct-16	496.68	4912.34
TAV-MW14	5441.52	11-Oct-16	524.51	4917.01

NOTES:
amsl = Above mean sea level.
AOC = Area of Concern.
AVN = Area V (North).
btoc = Below top of casing.
ID = Identifier.
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
NAVD 88 = North American Vertical Datum of 1988.
TAV = Technical Area-V.
TAVG = Technical Area-V Groundwater.

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

5.1.6.4 Contaminant Sources

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 discharged at TA-V occurred at SWMUs 4, 5, and 275 (Figure 5-2). Table 5-3 identifies the dates of disposal and the estimated disposal volumes. TCE and other organic solvents were presumably present in wastewater that was discharged to the LWDS drain field from 1962 to 1967, to the LWDS surface impoundments from 1967 to 1972, and to the TA-V seepage pits from the 1960s until the early 1980s, when disposal practices were modified to protect the environment. Wastewater continued to be discharged to the TA-V seepage pits from the early 1980s until 1992, but contained no organic solvents such as TCE. After 1992, wastewater was diverted to the ABCWUA sanitary sewer system.

Table 5-3. Wastewater Disposal History at TA-V

Disposal Site	Dates	Estimated Volume of Wastewater (gallons)
SWMU 5 LWDS Drain Field	1962–1967	6.5 million
SWMU 4 LWDS Surface Impoundments	1967–1972	12 million
SWMU 275 TA-V Seepage Pits	1960s–1992	30 to 50 million

NOTES:
LWDS = Liquid Waste Disposal System.
SWMU = Solid waste management unit.
TA-V = Technical Area-V.

Wastewater containing dissolved concentrations of TCE and other solvents moved through the vadose zone into the aquifer. Low concentrations of TCE present in the aquifer today are a result of these initial releases. Continued flushing of wastewater from early 1980s until 1992 likely removed significant sources of secondary contaminants and contained no solvents. Upon cessation of wastewater disposal, vertical pathways to the aquifer were drained by gravity.

Sampling and analysis were conducted in the vadose zone to characterize the presence of VOCs. Locations of investigations focused on possible release sites (SWMUs 4, 5, and 275). Groundwater sample results from monitoring well LWDS-MW2, located to the immediate north of the LWDS surface impoundments (SWMU 4) (Figure 5-2), indicated that wastewater discharge to 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 its MCL in this well. The large surface area of the surface impoundments could facilitate sufficient VOC and wastewater evaporation, which minimized the depth of VOC and wastewater percolation.

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). Solvent disposals to the seepage pits were eliminated in the early 1980s, but wastewater disposal continued until 1992. This likely flushed into the aquifer any residual COCs that may have been present in the vadose zone.

Nitrate in groundwater at TA-V may be derived from sanitary waste disposals to the subsurface. Sanitary waste disposals continued until 1992 when the discharges were routed to the ABCWUA sanitary sewer system. Nitrate is considered to be a conservative constituent with regard to transport because it is highly soluble in water, is not typically sorbed to sediments, and is not biotransformed under aerobic conditions. Therefore, any locally derived nitrate most likely was transported through the vadose zone with wastewater and sanitary discharges into the aquifer.

Nitrate concentrations in groundwater have exceeded the MCL in two upgradient wells (AVN-1 and AVN-2) northeast of TA-V (AVN-2 is currently dry). Nitrate in these wells is presumably derived from upgradient sources. Nitrate in groundwater could also be attributed to leaching of naturally occurring nitrate in the vadose zone by infiltration of large volumes of wastewater through nitrate-bearing soils.

5.1.6.5 Contaminant Distribution and Transport in Groundwater

Distribution and transport of COCs are discussed in this section. Vapor migration of VOCs in the vadose zone is a possible transport mechanism. VOC concentrations in soil vapor were measured at three soil-vapor monitoring wells (TAV-SV01, TAV-SV02, and TAV-SV03 shown in Figure 5-2) for eight quarters from April 2011 to March 2013. At each well, soil-vapor samples were collected from 10, 1-foot long stainless steel screens, set at 50 to 500 ft bgs, and analyzed for VOCs. All eight quarters' analytical results have been reported in Attachment 5D of the CY 2013 Annual Groundwater Monitoring Report (SNL June 2014). TCE is the most prevalent VOC in the vadose zone. The soil-vapor results showed that the vapor concentrations have stabilized in the vadose zone. 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 also 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.

TCE is present in low concentrations in the Regional Aquifer beneath TA-V. The highest TCE concentrations are present in three groundwater monitoring wells LWDS-MW1, TAV-MW6, and TAV--MW10 (Figure 5-4). Monitoring well TAV-MW6 is located at the LWDS drain field (SWMU 5) and monitoring well TAV-MW10 is located at the TA-V seepage pits (SWMU 275). Even though monitoring well LWDS-MW1 is not located at a potential source, maximum concentrations of TCE have occurred in well LWDS-MW1, suggesting TCE contamination has migrated westward in the localized direction of groundwater flow. The variability in hydraulic conductivities in saturated sediments has most likely influenced the distribution of TCE 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 COC concentrations were detected in groundwater. It is possible that the localized low conductivity zone near well LWDS-MW1 has acted as a barrier for contaminant transport in groundwater.

Using the hydraulic conductivities, a representative horizontal hydraulic gradient of 0.005 ft/ft, and an assumed effective porosity of 0.25, the linear groundwater flow velocities are calculated as 0.29, 8.3, and 30 ft/yr at the locations of monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10, respectively.

The current 16-well groundwater monitoring network was completed in November 2010. Since 2011, TCE has been consistently detected above the MCL of 5 μg/L in the following five monitoring wells: LWDS-MW1, TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14. TCE has also been detected below the MCL at four monitoring wells TAV-MW2, TAV-MW4, TAV-MW8, and TAV-MW11. TCE has never been detected in the remaining seven monitoring wells.

Figure 5-4 shows the 5, 10, and 15 μg/L TCE isoconcentration contours in groundwater for the fourth quarter of CY 2016. The 15 μg/L concentration contour enclosed monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10 in CY 2011, 2012, and 2013. In CY 2014, CY 2015, and this reporting period (CY 2016), TCE concentrations in well LWDS-MW1 were consistently above 15 μg/L, except in the third quarter when TCE concentration dropped to below 15 μg/L (Figure 5C-1). TCE concentrations in well TAV-MW6 and TAV-MW10 were above 15 μg/L only once (first quarter of CY 2014), but have been between 10 and 15 μg/L since (Figures 5C-2 and 5C-3).

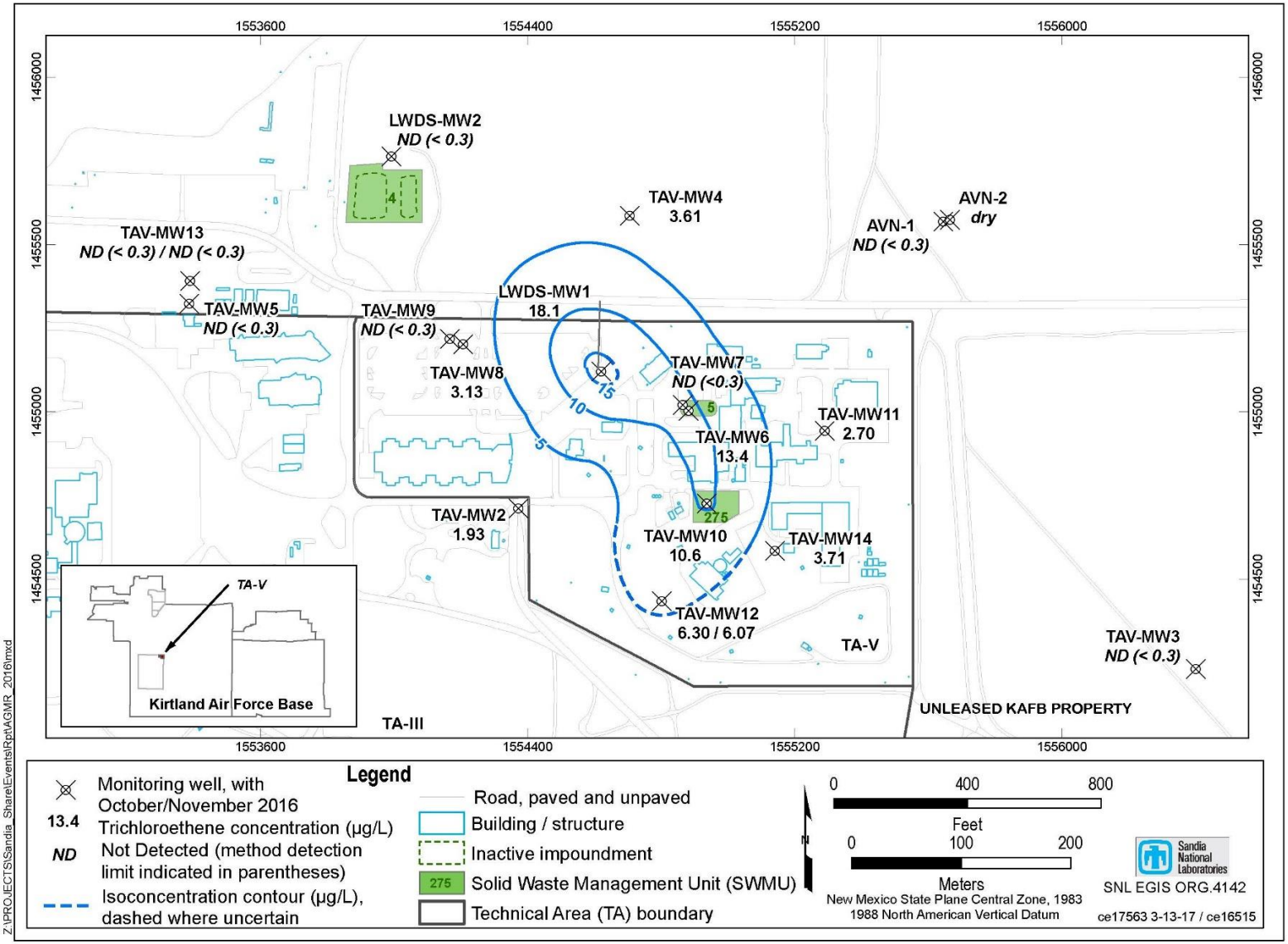

Figure 5-4. Distribution of TCE in Groundwater at TAVG AOC, October/November 2016

TCE concentrations in well TAV-MW12 have been between 5 and 10 μg/L since the well installation, except in the first quarter of CY 2014 (Figure 5C-4). TCE concentrations in wells TAV-MW14 have been between 5 and 10 μg/L since the well installation until the first quarter of CY 2016, and dropped below 5 μg/L for the rest three quarters of CY 2016 (Figure 5C-5). Figure 5-4 also shows that the concentrations of TCE decrease laterally from these wells.

Two groundwater monitoring wells, TAV-MW7 and TAV-MW9, are co-located with TAV-MW6 and TAV-MW8, respectively, but are screened approximately 90 ft deeper. TCE has been detected only in wells TAV-MW6 and TAV-MW8 that are screened across the groundwater table, but has not been detected in deeper wells TAV-MW7 and TAV-MW9.

Nitrate is present in groundwater in all monitoring wells at TA-V, generally at concentrations ranging from less than 5 mg/L to more than 10 mg/L. Nitrate concentrations have exceeded the MCL in samples from monitoring wells AVN-1, AVN-2 (currently dry), LWDS-MW1, TAV-MW6, TAV-MW10, and TAV-MW14; nitrate was detected above MCL at TAV-MW5 in a split sample collected in November 1998, but has not been detected above the MCL ever since.

Figure 5-5 shows the 10 mg/L nitrate isoconcentration contour for the fourth quarter of CY 2016 with regards to the locations of the historical wastewater and sanitary discharges within TA-V. The 10 mg/L nitrate contour is located within the 5 μg/L TCE contour. The general location of the 10 mg/L contour has not changed significantly over the past several years. It encloses wells LWDS-MW1 and TAV-MW10, but not well TAV-MW6. Concentrations of nitrate in wells LWDS-MW1 and TAV-MW10 have mostly exceeded the MCL of 10 mg/L, and have seldom exceeded the MCL in wells TAV-MW6 and TAV-MW14 (Figures 5C-7 through 5C-10).

Nitrate has also been detected in groundwater monitoring wells outside the TA-V boundary. Concentrations of nitrate at LWDS-MW2 have been slightly below the MCL. Concentrations of nitrate in upgradient monitoring well AVN-1 have occasionally exceeded the MCL of 10 mg/L (Figure 5C-6). AVN-1 and AVN-2 are co-located with AVN-1 screened 75 ft deeper than AVN-2 (currently dry), but showed similar nitrate concentrations. Monitoring well AVN-2 has been dry since 2005.

Contaminant transport mechanisms in groundwater include advection, dispersion, diffusion, sorption, and biodegradation. 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 sediment, 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), dilution, or biodegradation, the sorbed TCE portion will tend to desorb and reenter groundwater through equilibration processes. The comparatively stable TCE concentration contours can be attributed to the relatively slow processes of dispersion and diffusion, and the reversible sorption process.

Biodegradation of TCE was evaluated in 2005 (SNL July 2005). The anaerobic biodegradation assessment indicated that anaerobic reductive dechlorination is not occurring in groundwater at TA-V, nor is biologically mediated transformation of nitrate. This is likely due to the relatively high concentration of dissolved oxygen and low concentration of dissolved organic carbon as carbon and energy sources. A study of denitrification parameters and isotopic signatures conducted in 2013 also indicated that natural denitrification was insignificant (Madrid et al. June 2013).

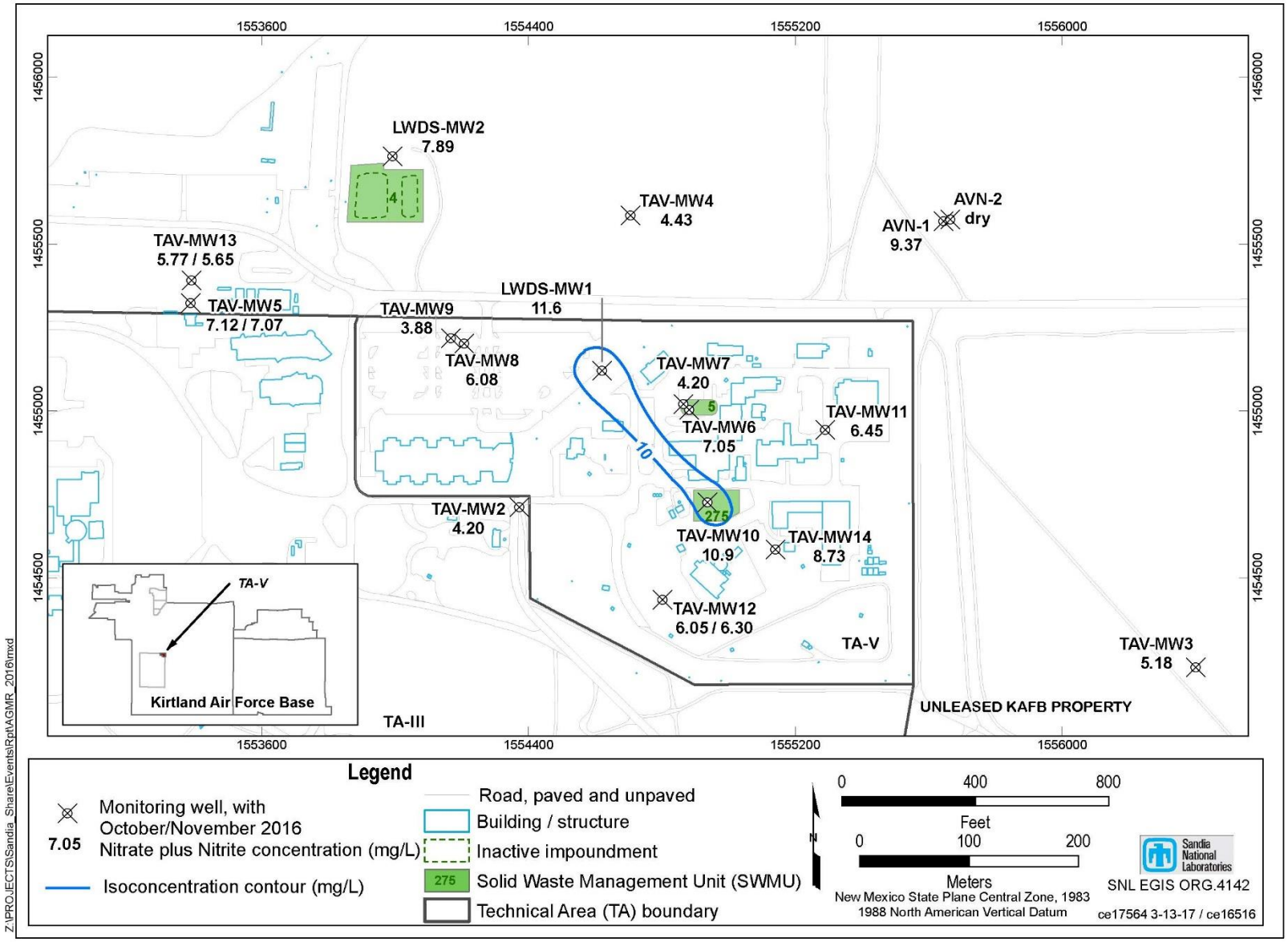

Figure 5-5. Distribution of Nitrate plus Nitrite in Groundwater at TAVG AOC, October/November 2016

5.1.7 Treatability Study of In-Situ Bioremediation

In 2015, personnel from the DOE/NNSA, DOE Headquarters Office of Environmental Management, SNL/NM, and NMED worked together to address the groundwater contamination at TAVG AOC. All parties agreed on a phased Treatability Study of in-situ bioremediation (ISB) to evaluate the effectiveness of ISB as a potential technology to treat the groundwater contamination at TAVG AOC.

5.1.7.1 In-Situ Bioremediation

The technical approach for the proposed Treatability Study is to induce biodegradation of TCE and nitrate by gravity injecting a nutrient-amended substrate solution and biodegradation bacteria into groundwater at one to three locations with the highest COC concentrations. 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 in the aquifer. 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 Treatability Study Work Plan (TSWP) to NMED on October 20, 2015 (DOE October 2015) and it was disapproved by NMED on December 3, 2015 (NMED December 2015). A Revised TSWP and response to the disapproval letter was submitted to NMED in March 2016 (DOE March 2016a). NMED approved the Revised TSWP in May 2016 (NMED May 2016).

For the phased Treatability Study, up to three injection wells (TAV-INJ1, TAV-INJ2, and TAV-INJ3) will be installed in the vicinity of the highest contaminant concentrations in groundwater detected in monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10. The proposed injection wells will be used to deliver substrate solution and biodegradation bacteria to groundwater. The substrate solution containing essential food and nutrients for biostimulation will be prepared in aboveground tanks. The substrate solution along with the biodegradation bacteria will be gravity-injected to groundwater via injection wells.

5.1.7.3 Discharge Permit

A Discharge Permit (DP) is required from the NMED Ground Water Quality Bureau (GWQB) for TA-V Treatability Study injection wells (NMED June 2016). The DP Application (DP-1845) was submitted in July 2016 (DOE July 2016a). After the application was determined administratively complete, NMED GWQB posted the Public Notice 1 on their website on August 26, 2016 and directed DOE/NNSA and SNL/NM personnel to proceed with the public notice requirements (NMED September 2016). The public notice requirements were completed and the affidavit of public notice completion was submitted to the NMED GWQB on November 16, 2016 (DOE November 2016). The DP Application is under review at the NMED GWQB. The TA-V Treatability Study of ISB will start with the installation of the first injection well (TAV-INJ1) after the DP is issued.

5.2 Regulatory Criteria

The NMED Hazardous Waste Bureau 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 ER SWMUs and AOCs are listed in the *RCRA Facility Operating Permit, NM5890110518* (NMED January 2015a). Groundwater characterization at TA-V was initiated to satisfy the requirements of the SNL/NM RCRA Permit for characterization of SWMUs associated with TA-V activities. The groundwater monitoring activities are not associated with a single SWMU, but are more regional in nature and have historically been voluntarily conducted by SNL/NM ER Operations.

In April 2004, the Consent Order became effective (NMED April 2004). The Consent Order transfers regulatory authority for corrective action requirements from the SNL/NM RCRA Permit to the Consent Order. The Consent Order identifies contamination in TA-V groundwater as a groundwater AOC. All corrective action requirements pertaining to the TAVG AOC are contained in the Consent Order. The TAVG AOC investigations must comply with requirements set forth in the Consent Order for site characterization and development of a Corrective Measures Evaluation (CME).

The DOE/NNSA and SNL/NM personnel submitted the Current Conceptual Model (CCM) and the CME Work Plan to the NMED 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 in July 2005 (SNL July 2005). NMED subsequently issued three Notices of Disapproval (NODs) for the CME Report in July 2008, August 2009, and December 2009, respectively (NMED 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 included the installation of four additional groundwater monitoring wells and three soil-vapor monitoring wells to meet NMED's characterization requirements (see Section 5.1.3). In May 2010, NMED issued a notice of conditional approval for the TA-V Groundwater Investigation Work Plan (NMED 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 installed. Accordingly, 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 by November 21, 2014 (DOE December 2013). NMED approved the request (NMED December 2013). Thereafter, a phased 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 approved the request (NMED January 2015b). An updated CCM was submitted to NMED on October 20, 2015 (DOE October 2015) and was approved by NMED on November 30, 2015 (NMED November 2015).

With the approval of the Revised TSWP in May 2016 (see Section 5.1.7.2) and to allow for implementation of the Treatability Study, DOE/NNSA and SNL/NM personnel requested, and NMED agreed to a milestone extension of the CME Report (DOE March 2016b; NMED April 2016). The results of the Treatability Study will be used to refine the CCM and CME reports for TAVG AOC, which are due by May 20, 2022 to NMED and are to replace all previous CCM and CME reports.

DOE/NNSA and SNL/NM personnel continue to present the TAVG monitoring data, along with data from other groundwater sites, in this SNL/NM Annual Groundwater Monitoring Report. 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, TAVG monitoring data are presented for both hazardous and radioactive constituents; however, the analytical data for radionuclides (gamma spectroscopy short-list, gross alpha, gross beta, 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 TAVG monitoring in CY 2016, including plans and reports. The field activities included groundwater level measurements and groundwater sampling. Table 5-4 summarizes the CY 2016 groundwater sampling events (four quarterly events). Table 5-5 lists the analytical parameters for each well for each sampling event.

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 duplicate, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Section 1.3.4 provides the purposes and details of QC samples.

5.4 Field Methods and Measurements

Section 1.3 details the monitoring procedures conducted for TAVG monitoring. The water level measurements obtained in 2016 were used to develop the potentiometric surface map presented in Figure 5-3 and the hydrographs presented in Figures 5D-1 through 5D-3.

5.5 Analytical Methods

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

5.6 Summary of Analytical Results

This section discusses monitoring results, exceedance of standards, and pertinent trends in concentrations for COCs in the TAVG AOC that exceed regulatory standards. Tables 5B-1 through 5B-9 present the analytical results and field measurements for all TAVG sampling events and Figures 5C-1 through 5C-9 present concentration trend plots for COCs that exceed the MCLs.

Table 5B-1 presents a summary of detected VOC results and Table 5B-2 lists the method detection limits (MDLs) for all analyzed VOCs. The VOCs detected at concentrations above the MDLs in groundwater samples from TAVG monitoring wells in CY 2016 include the following:

- Chloroform
- cis-1,2-Dichloroethene
- Methylene Chloride
- TCE

Four VOCs were detected during CY 2016. Two of these VOCs (cis-1,2-Dichloroethene and TCE) have promulgated MCLs. Only TCE exceeds its MCL of 5 μg/L (Table 5B-1). TCE was detected above the MCL in samples from five monitoring wells: LWDS-MW1, TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14. The maximum concentration of TCE detected during this reporting period is 19.2 μg/L in the sample collected from monitoring well LWDS-MW1 in February 2016. Figures 5C-1 through 5C-5 present TCE concentrations over the lifetime of the five wells. The highest concentrations of TCE have been consistently detected in monitoring well LWDS-MW1, followed by TAV-MW6 and TAV-MW10, then by TAV-MW12 and TAV-MW14.

Table 5-4. Groundwater Monitoring Well Network and Sampling Dates for the TAVG AOC, Calendar Year 2016

Date of Sampling Event	Wells Sampled	SAP
February/March 2016	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW4, TAV-MW6, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14	*TA-V Groundwater Monitoring Mini-SAP for Second Quarter, Fiscal Year 2016* (SNL January 2016)
May 2016	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14	*TA-V Groundwater Monitoring Mini-SAP for Third Quarter, Fiscal Year 2016* (SNL April 2016)
July/August 2016	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW4, TAV-MW6, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14	*TA-V Groundwater Monitoring Mini-SAP for Fourth Quarter, Fiscal Year 2016* (SNL July 2016)
October/November 2016	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14	*TA-V Groundwater Monitoring Mini-SAP for First Quarter, Fiscal Year 2017* (SNL September 2016)

NOTES:
AOC = Area of Concern.
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).
TAVG = Technical Area-V Groundwater.

Table 5-5. Parameters Sampled at TAVG Monitoring Wells for Each Sampling Event, Calendar Year 2016

February/March 2016		May 2016	
Parameter	**Well ID**	**Parameter**	**Well ID**
Alkalinity	AVN-1	Alkalinity	AVN-1
Calcium, total	AVN-1 (duplicate)	Anions (Bromide, Chloride, Fluoride, Sulfate)	LWDS-MW1
Chloride	LWDS-MW1	Gamma Spectroscopy (short list[a])	LWDS-MW2
Iron, dissolved	LWDS-MW2	Gross Alpha/Beta Activity	TAV-MW2
Magnesium, total	LWDS-MW2 (duplicate)	Iron, dissolved	TAV-MW3
Manganese, dissolved	TAV-MW2	Manganese, dissolved	TAV-MW3 (duplicate)
NPN	TAV-MW4	NPN	TAV-MW4
Potassium, total	TAV-MW6	Sulfides	TAV-MW5
Sodium, total	TAV-MW8	TAL Metals plus Total Uranium	TAV-MW6
Sulfate	TAV-MW10	Total Organic Carbon	TAV-MW7
Sulfides	TAV-MW11	Tritium	TAV-MW7 (duplicate)
Total Organic Carbon	TAV-MW11 (duplicate)	VOCs	TAV-MW8
VOCs	TAV-MW12		TAV-MW9
	TAV-MW13		TAV-MW10
	TAV-MW14		TAV-MW11
			TAV-MW12
			TAV-MW13
			TAV-MW14
			TAV-MW14 (dup)
July/August 2016		**October/November 2016**	
Parameter	**Well ID**	**Parameter**	**Well ID**
Alkalinity	AVN-1	Alkalinity	AVN-1
Calcium, total	LWDS-MW1	Calcium, total	LWDS-MW1
Chloride	LWDS-MW1 (duplicate)	Chloride	LWDS-MW2
Iron, dissolved	LWDS-MW2	Iron, dissolved	TAV-MW2
Magnesium, total	TAV-MW2	Magnesium, total	TAV-MW3
Manganese, dissolved	TAV-MW2 (duplicate)	Manganese, dissolved	TAV-MW4
NPN	TAV-MW4	NPN	TAV-MW5
Potassium, total	TAV-MW6	Potassium, total	TAV-MW5 (duplicate)
Sodium, total	TAV-MW6 (duplicate)	Sodium, total	TAV-MW6
Sulfate	TAV-MW8	Sulfate	TAV-MW7
Sulfides	TAV-MW10	Sulfides	TAV-MW8
Total Organic Carbon	TAV-MW11	Total Organic Carbon	TAV-MW9
VOCs	TAV-MW12	VOCs	TAV-MW10
	TAV-MW13		TAV-MW11
	TAV-MW14		TAV-MW12
			TAV-MW12 (duplicate)
			TAV-MW13
			TAV-MW13 (duplicate)
			TAV-MW14

NOTES:

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

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

Table 5B-3 presents the analytical results for nitrate plus nitrite (NPN) (reported as nitrogen). During this reporting period, NPN results exceed the MCL of 10 mg/L in samples from monitoring wells AVN-1, LWDS-MW1, TAV-MW6, TAV-MW10, and TAV-MW14. The maximum concentration of NPN detected during this reporting period is 15.2 mg/L in the sample collected from monitoring well TAV-MW10 in May 2016. Figures 5C-6 through 5C-10 present NPN concentrations over the lifetime of the five wells. NPN concentration exceeded the MCL for the second time in monitoring well TAV-MW6 in February 2016 and dropped below the MCL for the following three quarters in CY 2016. The last exceedance in well TAV-MW6 occurred in an environmental duplicate sample in November 2011. The NPN concentrations in monitoring wells LWDS-MW1 and TAV-MW10 typically exceeded the MCL, and those in monitoring well AVN-1 occasionally exceeded the MCL.

Table 5B-4 presents the analytical results for anions (bromide, chloride, fluoride, and sulfate), alkalinity, and sulfides. Only fluoride has a promulgated MCL, and none of the results exceed the MCL.

Table 5B-5 shows total organic carbon (TOC) results; no MCL is established for TOC.

Table 5B-6 presents unfiltered metal results and Table 5B-7 presents filtered metal results; no metal results exceed established MCLs.

Table 5B-8 presents gamma spectroscopy short-list, gross alpha, gross beta, and tritium results; all radionuclide results are below established 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 (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.

Field water quality parameters were measured during purging of each well prior to sampling and included temperature, specific conductivity, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. Table 5B-9 presents the measurements of these parameters.

5.7 Quality Control Results

Section 1.3 describes how field and laboratory QC samples were collected and prepared. Tables 5B-1 through 5B-8 presents data validation qualifiers with the analytical results. The following paragraphs discuss the results of the QC samples and impact on data quality for the quarterly sampling events.

Environmental duplicate sampling results for all wells and all sampling periods show good correlation (relative percent difference [RPD] values of less than 20 for VOCs and less than 35 for inorganic constituents) for all calculated parameters, except for the following:

- **February/March 2016 Sampling Event**—The RPD for filtered iron in well LWDS-MW2 was 59. Monitoring well LWDS-MW2 is constructed with a stainless steel well screen. Degradation of well screen or rust particulates in the samples potentially bias the results.

- **May 2016 Sampling Event**—The RPD for unfiltered iron in well TAV-MW3 was 48. The iron concentration is qualified an estimated value because the reported value is less than the associated practical quantitation limit (PQL).

- **October/November 2016 Sampling Event**—The RPD for sulfides and TOC in well TAV-MW5 were 54 and 36, respectively. Both concentrations are qualified as estimated values because sulfides were recovered outside control limits in the laboratory control sample and TOC was reported at value less than the associated PQL.

The results for the EB analyses are as follows:

- **February/March 2016 Sampling Event**—EB samples were collected prior to sampling monitoring wells AVN-1, LWDS-MW2, and TAV-MW11 and submitted for all analyses. Bromodichloromethane, chloride, chloroform, and dibromochloromethane were detected in EB samples. In addition, alkalinity and TOC were detected in the EB samples prior to sampling wells AVN-1 and LWDS-MW2. Sulfides were detected in the EB sample prior to sampling well TAV-MW11. No corrective action was required because these compounds were either not detected in associated samples or the concentrations in the samples are greater than five times the EB concentrations, except for TOC. TOC was detected in the EB sample prior to sampling wells AVN-1 and LWDS-MW2. TOC in AVN-1 and LWDS-MW2 samples was qualified as not detected during data validation because TOC was detected in associated EB samples at similar concentrations.

- **May 2016 Sampling Event**—EB samples were collected prior to sampling monitoring wells TAV-MW3, TAV-MW7, and TAV-MW14 and submitted for all analyses. Alkalinity, bromodichloromethane, bromoform, chloride, chloroform, copper, dibromochloromethane, NPN, and sodium were detected in EB samples. No corrective action was required because these compounds were either not detected in the associated samples or the concentrations in the samples are greater than five times the EB concentrations, except for copper. Copper was detected in the EB sample prior to sampling wells TAV-MW7 and TAV-MW14 at concentrations less than five times the associated sample concentrations. As a result, copper in TAV-MW7 and TAV-MW14 samples was qualified as not detected during data validation.

- **July/August 2016 Sampling Event**—EB samples were collected prior to sampling monitoring wells LWDS-MW1, TAV-MW2, and TAV-MW6 and submitted for all analyses. Bromodichloromethane, chloride, chloroform, and dibromochloromethane were detected in EB samples. In addition, bromoform was detected in the EB sample prior to sampling well LWDS-MW1. Methylene chloride and sulfate were detected in the EB sample prior to sampling wells LWDS-MW1 and TAV-MW6. Sodium was detected in the EB sample prior to sampling wells LWDS-MW1 and TAV-MW2. Sulfides were detected in the EB sample prior to sampling well TAV-MW2. No corrective action was required because these compounds were either not detected in the associated samples, or the concentrations in the samples are greater than five times the EB concentrations, except for methylene chloride and sulfides. Methylene chloride in LWDS-MW1 and TAV-MW6 samples and sulfides in TAV-MW2 sample were qualified as not detected during data validation because they were detected in associated EB samples at similar concentrations.

- **October/November 2016 Sampling Event**—EB samples were collected prior to sampling monitoring wells TAV-MW5, TAV-MW12, and TAV-MW13 and submitted for all analyses. Chloride and sulfate were detected in EB samples. In addition, acetone, toluene, and TCE were detected in the EB sample prior to sampling well TAV-MW5. Calcium was detected in the EB sample prior to sampling well TAV-MW13. TOC was detected in the EB sample prior to sampling wells TAV-MW12 and TAV-MW13. No corrective action was required because these compounds were either not detected in the associated samples

or the concentrations in the samples are greater than five times the EB concentrations, except for TOC. TOC in TAV-MW12 and TAV-MW13 samples were qualified as not detected during data validation because TOC was detected in associated EB samples at similar concentrations.

The results for the FB analyses are as follows:

- **February/March 2016 Sampling Event**—FB samples were collected at monitoring wells LWDS-MW1, TAV-MW2, and TAV-MW4. One additional FB sample was collected from the source deionized (DI) water used during the equipment decontamination process prior to sampling monitoring well TAV-MW11. Bromodichloromethane, chloroform, and dibromochloromethane were detected in all FB samples. No corrective action was required for bromodichloromethane and dibromochloromethane because they were not detected in the associated samples. Chloroform in TAV-MW4 sample was qualified as not detected during data validation because it was detected in the FB sample at a similar concentration.

- **May 2016 Sampling Event**—FB samples were collected at monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW8. One additional FB sample was collected from the source DI water used during the equipment decontamination process prior to sampling monitoring well TAV-MW7. Bromodichloromethane, chloroform, and dibromochloromethane were detected in all FB samples. No corrective action was required for bromodichloromethane and dibromochloromethane because they were not detected in the associated samples. Bromoform was detected in two FB samples collected at wells LWDS-MW1 and TAV-MW6. No corrective action was required because these compounds were not detected in associated samples.

- **July/August 2016 Sampling Event**—FB samples were collected at monitoring wells AVN-1, LWDS-MW2, and TAV-MW4. One additional FB sample was collected from the source DI water used during the equipment decontamination process prior to sampling monitoring well TAV-MW6. Bromodichloromethane, chloroform, dibromochloromethane, and methylene chloride were detected in various FB samples. No corrective was necessary for bromodichloromethane, dibromochloromethane, and methylene chloride because these compounds were not detected in associated samples. Chloroform was detected in the FB sample collected at well TAV-MW4, but was not qualified in the TAV-MW4 sample because this compound is historically detected at comparable concentrations.

- **October/November 2016 Sampling Event**—FB samples were collected at monitoring wells LWDS-MW1, TAV-MW8, and TAV-MW9. One additional FB sample was collected from the source DI water used during the equipment decontamination process prior to sampling monitoring well TAV-MW12. No VOCs were detected in FB samples for this sampling event.

The results for the TB analyses are as follows:

- **February/March 2016 Sampling Event**—A total of 15 VOC TB samples were submitted with the February/March 2016 samples. No VOCs were detected above associated laboratory MDLs.

- **May 2016 Sampling Event**—A total of 19 VOC TB samples were submitted with the May 2016 samples. No VOCs were detected above associated laboratory MDLs, except for

acetone. Acetone was detected in the TB sample associated with the EB sampling collected prior to sampling well TAV-MW7. Acetone in the EB sample was qualified as not detected during data validation because it was reported at a concentration less than ten times the associated TB concentration.

- **July/August 2016 Sampling Event**—A total of 15 VOC TB samples were submitted with the July/August 2016 samples. No VOCs were detected above associated laboratory MDLs.

- **October/November 2016 Sampling Event**—A total of 19 VOC TB samples were submitted with October/November 2016 samples. No VOCs were detected above associated laboratory MDLs, except for acetone. Acetone reported in three TB samples was qualified as not detected during data validation because it was detected in the associated laboratory method blank sample.

5.8 Variances and Nonconformances

No variances or nonconformances from requirements specified in the TAVG monitoring mini-SAPs were identified during CY 2016 sampling activities. However, the following observations and activities associated with these sampling events were noted:

- **All Sampling Events**—Monitoring well LWDS-MW1 was purged dry prior to minimum volume and stability requirements. Given the low yield of this well, it was allowed to recover and then sampled to collect a representative groundwater sample.

- **February/March 2016 Sampling Event**—Rust particulates accumulated on the sample pump and tubing bundle after sampling of monitoring wells AVN-1 and LWDS-MW2. Both wells are completed with stainless steel components.

- **May 2016 Event**—Rust particulates accumulated on the sample pump and tubing bundle after sampling of monitoring well AVN-1. The SNL/NM sampling team noted a strong odor (similar to mildew or rotten eggs) and a yellow coloration of groundwater collected from monitoring well TAV-MW9.

- **July/August 2016 Sampling Event**—Rust particulates accumulated on the sample pump and tubing bundle after sampling of monitoring well AVN-1.

- **October/November 2016 Sampling Event**—Rust particulates accumulated on the sample pump and tubing bundle after sampling of monitoring well AVN-1. The pH measurement obtained at well TAV-MW13 was not comparable to historical values (Table 5B-9). Field team members suspected a bad pH sensor and replaced the pH/ORP probe.

5.9 Summary and Conclusions

The conceptual site model of contaminant transport at TA-V includes contaminant releases from the two primary sources, migration through the vadose zone and movement into and along with groundwater. TCE was presumably present in wastewater that was discharged to the underground LWDS drain field during the period from 1962 to 1967, and to the buried TA-V seepage pits from the 1960s until the early 1980s. Wastewater discharged to the seepage pits from the early 1980s until 1992 contained no TCE.

Wastewater containing dissolved TCE and other organic solvents moved downward through the alluvial-fan lithofacies and into the Regional Aquifer. Wastewater containing no TCE continued to flush the

vadose zone beneath the seepage pits until 1992, which most likely removed significant portion of secondary contaminant sources. 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 before 1992. The combined effect of aquifer lithology, low groundwater flow velocities, dispersion, diffusion, and sorption are responsible for the current distribution of TCE in the Regional Aquifer.

TCE results in samples from monitoring wells LWDS-MW1, TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14 exceeded the MCL of 5 μg/L. The maximum concentration of TCE detected during this reporting period was 19.2 μg/L in the sample collected from monitoring well LWDS-MW1 in February 2016.

During this reporting period, NPN results in samples from monitoring wells AVN-1, LWDS-MW1, TAV-MW6, TAV-MW10, and TAV-MW14 exceeded the MCL of 10 mg/L. The maximum concentration of NPN detected during this reporting period is 15.2 mg/L in the sample collected from monitoring well TAV-MW10 in May 2016.

The analytical results for this reporting period 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 primary COCs for the TAVG AOC are TCE and nitrate.
- The primary sources of TCE and possibly 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). An upgradient source of nitrate may also be present.
- Based on historical use and disposal of organic solvents at TA-V, the extent of TCE in groundwater is attributed to wastewater releases containing TCE and the subsequent transport of TCE through the vadose zone into the groundwater.
- The distribution of low concentrations of TCE in the Regional Aquifer has remained relatively stable and is attributed to the combined effect of 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 concentration contour, which accounts for the nitrate contamination, has remained relatively stable. An upgradient source probably contributes to the nitrate in the two AVN wells to the northeast of TA-V.

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

- Continue obtaining periodic measurements of groundwater elevations in all active TAVG monitoring wells.
- Continue collecting groundwater samples at 18 (16 existing plus two being installed) TAVG monitoring wells. At a minimum, the analytes for groundwater sampling will consist of VOCs and NPN.

- Complete installation and development of monitoring wells TAV-MW15 and TAV-MW16.
- Submittal of a well installation report to NMED.
- Redevelop existing wells AVN-1, LWDS-MW2, TAV-MW2, TAV-MW9, TAV-MW11, and TAV-MW12.
- Continue reporting TAVG monitoring results in future SNL/NM Annual Groundwater Monitoring Reports.
-
- Implement a phased Treatability Study of ISB to address the groundwater contamination at TAVG AOC.
- Provide a summary of the phased Treatability Study of ISB at TAVG AOC.

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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 TAVG AOC

Month	Year	Event	Reference
May	1959	KAFB water supply well KAFB-10 is installed in the northwest corner of TA-V. Water from the well was used occasionally for fire protection and maintenance.	NMOSE May 1959
April	1992	The LWDS RFI Work Plan (SWMUs 4, 5, and 52) is submitted.	SNL March 1993
	1992–1993	Two groundwater monitoring wells are installed as part of the LWDS investigation. LWDS-MW2 installed October 1992, and LWDS-MW1 installed May 1993.	SNL September 1995
November	1993	LWDS-MW1 and LWDS-MW2 are sampled. The first sampling event of LWDS-MW1 in November 1993 reveals TCE near the then method detection limit of 5 μg/L, and the detection is confirmed during a later sampling event at values exceeding the MCL of 5 μg/L.	SNL March 1995
June	1994	Submit notification letter from DOE to EPA regarding TCE detection in LWDS-MW1.	DOE June 1994
March	1995	Groundwater sample analytical results for TAVG monitoring wells LWDS-MW1 and LWDS-MW2 reported in the CY 1994 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1995
June	1995	Report submitted discussing water quality issues reported in the CY 1994 SNL/NM Annual Groundwater Monitoring Report. TCE was consistently detected during 1994 in LWDS-MW1.	IT June 1995
January–June	1995	Wells AVN-1 and AVN-2 installed.	SNL 1995
April	1995	Wells TAV-MW1 and TAV-MW2 installed.	SNL March 1996
	1995	The LWDS RFI is performed and 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	Submit letter to the NMED with notification of single elevated nitrate detection for groundwater monitoring well LWDS-MW1. The result is 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 ungrouted 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 installed.	SNL March 1999a
September	1997	NMED issues an RSI stating that additional characterization at TA-V is needed. Numerous other issues are discussed pertaining to each of the LWDS sites (SWMUs 4, 5, and 52).	NMED September 1997
January	1998	Provide responses to the NMED September 1997 RSI.	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	Provide cross sections to NMED for the LWDS as required in the September 1997 RSI from NMED.	DOE October 1998

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the TAVG AOC *(Continued)*

Month	Year	Event	Reference
March	1999	Groundwater sampling analytical results for TAVG monitoring wells reported in the FY 1998 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1999b
March	1999	Submit a summary report detailing groundwater conditions for the TA-III/V area that includes sites from OU 1306 (TA-III) and OU 1307 (LWDS).	SNL March 1999a
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
March - May	2001	Wells TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9 installed.	SNL October 2001
November	2001	A summary of groundwater sampling results from TAVG monitoring wells for FYs 1999 and 2000 are compiled into a report. This is 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, is 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 issues 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	Submit the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Technical Area-V*. This document was required by the Consent Order.	SNL April 2004a
May	2004	Submit the *Corrective Measures Evaluation Work Plan, Technical Area-V Groundwate*r. This document was required by the Consent Order.	SNL April 2004b
October	2004	The NMED issues an approval with modifications to the TA-V CME Work Plan and the Current Conceptual Model of Groundwater Flow and Contaminant Transport.	NMED October 2004
December	2004	Submit responses to the NMED approval with modifications of October 2004. The responses are included in the revised *Corrective Measures Evaluation Work Plan, Technical Area-V Groundwater, Revision 0*.	SNL December 2004
July	2005	Submit 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

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the TAVG AOC *(Continued)*

Month	Year	Event	Reference
October	2005	Submit request to NMED 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	Request the removal of well AVN-2 from the TAVG monitoring network due to insufficient water for sampling caused by declining water levels. The well would be returned to service if water levels in the well recover.	DOE March 2006
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
January–March	2008	Well TAV-MW1 plugged and abandoned and 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 issues a NOD on the July 2005 CME Report for TAVG AOC.	NMED July 2008
September	2008	The 13 TAVG monitoring wells are resurveyed to establish new northing and easting coordinates and elevations for each well.	SNL October 2008
December	2008	Sandia, DOE/NNSA, and NMED personnel attend an MNA seminar presented by Savannah River National Laboratory personnel and also discuss technical issues and the need for additional characterization work at TA-V.	SRNL December 2008
April	2009	NMED requires characterization of perchlorate in groundwater in one well at TA-V.	NMED April 2009
April	2009	Submit 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 issues a second NOD on the July 2005 CME Report for TAVG AOC.	NMED August 2009
November	2009	Submit a response to the second NOD on the July 2005 CME Report for TAVG AOC.	SNL November 2009
December	2009	NMED issues a third NOD on the July 2005 CME Report for TAVG AOC.	NMED December 2009
February	2010	Submit a response to the third NOD on the July 2005 CME Report for TAVG AOC.	SNL February 2010
May	2010	NMED issues a notice of conditional approval for the TA-V Groundwater Investigation Work Plan associated with the responses to the NODs.	NMED May 2010

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the TAVG AOC *(Continued)*

Month	Year	Event	Reference
October	2010	Begin installation of groundwater monitoring wells TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14.	SNL February 2010
November	2010	Complete installation of groundwater monitoring wells TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14.	SNL June 2011
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	Submit a report on the geophysical log and slug test results for the new TAVG monitoring wells.	SNL November 2010
December	2010	NMED issues approval for the modification of soil-vapor monitoring well design.	NMED December 2010
March	2011	Complete installation of soil-vapor monitoring wells TAV-SV01, TAV-SV02, and TAV-SV03.	SNL June 2011
June	2011	Submit a Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation.	SNL June 2011
July	2011	DOE/NNSA and Sandia meet with NMED 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
September	2012	Groundwater sampling analytical results for TAVG monitoring wells reported in the CY 2011 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2012
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 approves the Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation.	NMED September 2013
December	2013	DOE/NNSA and Sandia request the 2005 CME Report be withdrawn and replaced with an updated CCM and CME Report.	DOE December 2013
December	2013	NMED approves the extension request for an updated CCM and CME report due by November 21, 2014.	NMED 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 IRR issues a memorandum to DOE/NNSA Sandia Field Office providing the review team's comments and recommendations on the proposed corrective measures for TAVG AOC based on a multi-agency meeting with NMED on July 17, 2014.	DOE September 2014
November	2014	DOE/NNSA and Sandia submit a two-year extension request for the CCM and CME Report.	DOE November 2014a

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the TAVG AOC *(Continued)*

Month	Year	Event	Reference
November	2014	DOE/IRR shares a memorandum that was submitted to the Deputy Assistant Secretary of the Office of Environmental Compliance regarding IRR team's recommendations for TAVG AOC.	DOE November 2014b
January	2015	NMED approves the extension request for an updated CCM and CME report due by November 30, 2016.	NMED January 2015a
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	DOE/NNSA and Sandia submit the CCM and a TSWP for In-Situ Bioremediation at TAVG AOC.	DOE October 2015
November	2015	NMED approves the CCM for TAVG AOC.	NMED November 2015
December	2015	NMED disapproves the TSWP and requests a revised TSWP and a response letter that addresses the disapproval comments by January 29, 2016.	NMED December 2015
January	2016	DOE/NNSA and Sandia request a two-month extension request for the revised TSWP and the response letter to NMED's disapproval letter.	DOE January 2016
March	2016	DOE/NNSA and Sandia submit the revised TSWP and the response to NMED's disapproval letter.	DOE March 2016a
March	2016	DOE/NNSA and Sandia request a milestone extension to update the CCM and CME reports.	DOE March 2016b
April	2016	NMED states the new due date for the CCM and CME reports for TAVG are May 20, 2022.	NMED April 2016
May	2016	NMED approves the Revised TSWP.	NMED May 2016b
May	2016	DOE/NNSA and Sandia submit the Notice of Intent to Discharge for TA-V Treatability Study injection wells.	DOE May 2016
May	2016	NMED states the TA-V Geophysical and Slug Test Results (SNL November 2010) will be superseded by the updated CCM and CME reports.	NMED May 2016a
June	2016	NMED requires a Discharge Permit for TA-V Treatability Study injection wells.	NMED 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	DOE/NNSA and Sandia submit the Discharge Permit Application for TA-V Treatability Study injection wells.	DOE July 2016a
July	2016	DOE/NNSA and Sandia submit the Permit to Drill applications for installing two groundwater monitoring wells TAV-MW15 and TAV-MW16, and one injection well TAV-INJ1.	DOE July 2016b
August	2016	NMOSE approves the Permit to Drill applications for wells TAV-MW15, TAV-MW16, and TAV-INJ1.	NMOSE August 2016

Refer to footnotes on page 5A-8.

Table 5A-1. Historical Timeline of the TAVG AOC *(Concluded)*

Month	Year	Event	Reference
September	2016	NMED determines the Discharge Permit Application is administratively complete.	NMED September 2016
November	2016	DOE/NNSA and Sandia completes the public notice requirements for the Discharge Permit.	DOE November 2016

NOTES:

AOC = Area of concern.
AVN = Area V (North).
CCM = Current Conceptual Model.
CME = Corrective Measures Evaluation.
Consent Order = Compliance Order on Consent.
CY = Calendar Year.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
FY = Fiscal Year.
IRR = Internal Remedy Review.
IT = IT Corporation.
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.
MNA = Monitored Natural Attenuation.
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.
SRNL = Savannah River National Laboratory.
SWMU = Solid Waste Management Unit.
TA = Technical Area.
TAV = Technical Area-V.
TAVG = Technical Area-V Groundwater.
TCE = Trichloroethene.
TSWP = Treatability Study Work Plan.

Attachment 5B
Technical Area-V
Analytical Results Tables

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Attachment 5B Tables

5B-1 Summary of Detected Volatile Organic Compounds, Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 5B-5

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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 2016

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	**19.2**	0.300	1.00	5.00			098885-001	SW846-8260
29-Feb-16	cis-1,2-Dichloroethene	4.22	0.300	1.00	70.0			098885-001	SW846-8260
TAV-MW2 15-Feb-16	Trichloroethene	1.86	0.300	1.00	5.00			098858-001	SW846-8260
TAV-MW4	Chloroform	0.900	0.300	1.00	NE	J	1.0U	098855-001	SW846-8260
11-Feb-16	Trichloroethene	3.64	0.300	1.00	5.00			098855-001	SW846-8260
TAV-MW6	Trichloroethene	**14.0**	0.300	1.00	5.00			098882-001	SW846-8260
25-Feb-16	cis-1,2-Dichloroethene	2.44	0.300	1.00	70.0			098882-001	SW846-8260
TAV-MW8 16-Feb-16	Trichloroethene	3.51	0.300	1.00	5.00			098860-001	SW846-8260
TAV-MW10	Trichloroethene	**12.7**	0.300	1.00	5.00			098887-001	SW846-8260
01-Mar-16	cis-1,2-Dichloroethene	2.35	0.300	1.00	70.0			098887-001	SW846-8260
TAV-MW11	Trichloroethene	3.53	0.300	1.00	5.00			098875-001	SW846-8260
22-Feb-16	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		098875-001	SW846-8260
TAV-MW11 (Duplicate)	Trichloroethene	3.64	0.300	1.00	5.00			098876-001	SW846-8260
22-Feb-16	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		098876-001	SW846-8260
TAV-MW12	Trichloroethene	**8.81**	0.300	1.00	5.00			098880-001	SW846-8260
24-Feb-16	cis-1,2-Dichloroethene	0.500	0.300	1.00	70.0	J		098880-001	SW846-8260
TAV-MW14	Trichloroethene	**6.05**	0.300	1.00	5.00			098878-001	SW846-8260
23-Feb-16	cis-1,2-Dichloroethene	0.770	0.300	1.00	70.0	J		098878-001	SW846-8260
LWDS-MW1	Trichloroethene	**15.6**	0.300	1.00	5.00			099641-001	SW846-8260
23-May-16	cis-1,2-Dichloroethene	3.21	0.300	1.00	70.0			099641-001	SW846-8260
TAV-MW2 11-May-16	Trichloroethene	1.90	0.300	1.00	5.00			099582-001	SW846-8260
TAV-MW4	Chloroform	0.890	0.300	1.00	NE	J		099580-001	SW846-8260
10-May-16	Trichloroethene	3.38	0.300	1.00	5.00			099580-001	SW846-8260
TAV-MW6	Trichloroethene	**12.1**	0.300	1.00	5.00			099646-001	SW846-8260
25-May-16	cis-1,2-Dichloroethene	2.09	0.300	1.00	70.0			099646-001	SW846-8260
TAV-MW8 12-May-16	Trichloroethene	3.14	0.300	1.00	5.00			099585-001	SW846-8260
TAV-MW10	Trichloroethene	**11.5**	0.300	1.00	5.00			099648-001	SW846-8260
31-May-16	cis-1,2-Dichloroethene	1.94	0.300	1.00	70.0			099648-001	SW846-8260
TAV-MW11 18-May-16	Trichloroethene	2.85	0.300	1.00	5.00			099633-001	SW846-8260
TAV-MW12 24-May-16	Trichloroethene	**7.14**	0.300	1.00	5.00			099643-001	SW846-8260

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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-MW14	Trichloroethene	4.22	0.300	1.00	5.00			099637-001	SW846-8260
19-May-16	cis-1,2-Dichloroethene	0.460	0.300	1.00	70.0	J		099637-001	SW846-8260
TAV-MW14 (Duplicate)	Trichloroethene	4.22	0.300	1.00	5.00			099638-001	SW846-8260
19-May-16	cis-1,2-Dichloroethene	0.460	0.300	1.00	70.0	J		099638-001	SW846-8260
AVN-1 01-Aug-16	Methylene Chloride	1.49	1.00	10.0	5.00	B, J	10U	100068-001	SW846-8260
LWDS-MW1	Methylene Chloride	1.53	1.00	10.0	5.00	J	10U	100080-001	SW846-8260
08-Aug-16	Trichloroethene	**14.5**	0.300	1.00	5.00			100080-001	SW846-8260
	cis-1,2-Dichloroethene	2.96	0.300	1.00	70.0			100080-001	SW846-8260
LWDS-MW1(Duplicate)	Methylene Chloride	2.27	1.00	10.0	5.00	J	10U	100081-001	SW846-8260
08-Aug-16	Trichloroethene	**14.9**	0.300	1.00	5.00			100081-001	SW846-8260
	cis-1,2-Dichloroethene	3.17	0.300	1.00	70.0			100081-001	SW846-8260
TAV-MW2 26-Jul-16	Trichloroethene	1.97	0.300	1.00	5.00			100059-001	SW846-8260
TAV-MW2 (Duplicate) 26-Jul-16	Trichloroethene	1.95	0.300	1.00	5.00			100060-001	SW846-8260
TAV-MW4	Chloroform	0.890	0.300	1.00	NE	J	J	100055-001	SW846-8260
25-Jul-16	Trichloroethene	3.50	0.300	1.00	5.00			100055-001	SW846-8260
TAV-MW6	Methylene Chloride	1.80	1.00	10.0	5.00	J	10U	100086-001	SW846-8260
09-Aug-16	Trichloroethene	**12.3**	0.300	1.00	5.00			100086-001	SW846-8260
	cis-1,2-Dichloroethene	2.10	0.300	1.00	70.0			100086-001	SW846-8260
TAV-MW6 (Duplicate)	Methylene Chloride	1.83	1.00	10.0	5.00	J	10U	100087-001	SW846-8260
09-Aug-16	Trichloroethene	**12.3**	0.300	1.00	5.00			100087-001	SW846-8260
	cis-1,2-Dichloroethene	2.11	0.300	1.00	70.0			100087-001	SW846-8260
TAV-MW8 27-Jul-16	Trichloroethene	3.45	0.300	1.00	5.00			100062-001	SW846-8260
TAV-MW10	Methylene Chloride	1.93	1.00	10.0	5.00	J		100089-001	SW846-8260
10-Aug-16	Trichloroethene	**10.4**	0.300	1.00	5.00			100089-001	SW846-8260
	cis-1,2-Dichloroethene	1.76	0.300	1.00	70.0			100089-001	SW846-8260
TAV-MW11	Methylene Chloride	1.45	1.00	10.0	5.00	B, J	10U	100070-001	SW846-8260
02-Aug-16	Trichloroethene	3.43	0.300	1.00	5.00			100070-001	SW846-8260
	cis-1,2-Dichloroethene	0.360	0.300	1.00	70.0	J		100070-001	SW846-8260

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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-MW12	Trichloroethene	**7.40**	0.300	1.00	5.00			100076-001	SW846-8260
04-Aug-16	cis-1,2-Dichloroethene	0.380	0.300	1.00	70.0	J		100076-001	SW846-8260
TAV-MW14	Methylene Chloride	1.25	1.00	10.0	5.00	B, J	10U	100072-001	SW846-8260
03-Aug-16	Trichloroethene	4.90	0.300	1.00	5.00			100072-001	SW846-8260
	cis-1,2-Dichloroethene	0.570	0.300	1.00	70.0	J		100072-001	SW846-8260
LWDS-MW1	Acetone	1.52	1.50	10.0	NE	B, J	10U	101030-001	SW846-8260
21-Nov-16	Trichloroethene	**18.1**	0.300	1.00	5.00			101030-001	SW846-8260
	cis-1,2-Dichloroethene	3.41	0.300	1.00	70.0			101030-001	SW846-8260
TAV-MW2 08-Nov-16	Trichloroethene	1.93	0.300	1.00	5.00			101009-001	SW846-8260
TAV-MW4	Chloroform	0.790	0.300	1.00	NE	J		101015-001	SW846-8260
14-Nov-16	Trichloroethene	3.61	0.300	1.00	5.00			101015-001	SW846-8260
TAV-MW6	Acetone	1.60	1.50	10.0	NE	B, J	10U	101032-001	SW846-8260
28-Nov-16	Trichloroethene	**13.4**	0.300	1.00	5.00			101032-001	SW846-8260
	cis-1,2-Dichloroethene	2.27	0.300	1.00	70.0			101032-001	SW846-8260
TAV-MW8 15-Nov-16	Trichloroethene	3.13	0.300	1.00	5.00			101018-001	SW846-8260
TAV-MW10	Acetone	3.71	1.50	10.0	NE	B, J	10U	101034-001	SW846-8260
29-Nov-16	Trichloroethene	**10.6**	0.300	1.00	5.00			101034-001	SW846-8260
	cis-1,2-Dichloroethene	1.78	0.300	1.00	70.0			101034-001	SW846-8260
TAV-MW11 09-Nov-16	Trichloroethene	2.70	0.300	1.00	5.00			101011-001	SW846-8260
TAV-MW12	Trichloroethene	**6.30**	0.300	1.00	5.00			101023-001	SW846-8260
16-Nov-16	cis-1,2-Dichloroethene	0.340	0.300	1.00	70.0	J		101023-001	SW846-8260
TAV-MW12 (Duplicate) 16-Nov-16	Trichloroethene	**6.07**	0.300	1.00	5.00			101024-001	SW846-8260
TAV-MW14	Trichloroethene	3.71	0.300	1.00	5.00			101027-001	SW846-8260
17-Nov-16	cis-1,2-Dichloroethene	0.370	0.300	1.00	70.0	J		101027-001	SW846-8260

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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 5B-71.

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

Calendar Year 2016

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 18-Feb-16	Nitrate plus nitrite	8.45	0.425	1.25	10.0			098869-018	EPA 353.2
AVN-1 (Duplicate) 18-Feb-16	Nitrate plus nitrite	8.68	0.425	1.25	10.0			098870-018	EPA 353.2
LWDS-MW1 29-Feb-16	Nitrate plus nitrite	**10.9**	0.425	1.25	10.0			098885-018	EPA 353.2
LWDS-MW2 17-Feb-16	Nitrate plus nitrite	8.74	0.170	0.500	10.0			098864-018	EPA 353.2
LWDS-MW2 (Duplicate) 17-Feb-16	Nitrate plus nitrite	8.44	0.170	0.500	10.0			098865-018	EPA 353.2
TAV-MW2 15-Feb-16	Nitrate plus nitrite	4.66	0.085	0.250	10.0			098858-018	EPA 353.2
TAV-MW4 11-Feb-16	Nitrate plus nitrite	4.89	0.170	0.500	10.0			098855-018	EPA 353.2
TAV-MW6 25-Feb-16	Nitrate plus nitrite	**10.8**	0.170	0.500	10.0			098882-018	EPA 353.2
TAV-MW8 16-Feb-16	Nitrate plus nitrite	7.28	0.170	0.500	10.0			098860-018	EPA 353.2
TAV-MW10 01-Mar-16	Nitrate plus nitrite	**12.3**	0.170	0.500	10.0	H	J	098887-R18	EPA 353.2
TAV-MW11 22-Feb-16	Nitrate plus nitrite	6.08	0.425	1.25	10.0			098875-018	EPA 353.2
TAV-MW11 (Duplicate) 22-Feb-16	Nitrate plus nitrite	8.25	0.170	0.500	10.0			098876-018	EPA 353.2
TAV-MW12 24-Feb-16	Nitrate plus nitrite	9.77	0.170	0.500	10.0			098880-018	EPA 353.2
TAV-MW13 10-Feb-16	Nitrate plus nitrite	6.15	0.170	0.500	10.0			098852-018	EPA 353.2
TAV-MW14 23-Feb-16	Nitrate plus nitrite	**11.8**	0.170	0.500	10.0			098878-018	EPA 353.2

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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 17-May-16	Nitrate plus nitrite	**11.2**	0.850	2.50	10.0			099631-006	EPA 353.2
LWDS-MW1 23-May-16	Nitrate plus nitrite	**11.0**	0.425	1.25	10.0			099641-006	EPA 353.2
LWDS-MW2 16-May-16	Nitrate plus nitrite	8.90	0.850	2.50	10.0			099629-006	EPA 353.2
TAV-MW2 11-May-16	Nitrate plus nitrite	4.43	0.170	0.500	10.0			099582-006	EPA 353.2
TAV-MW3 04-May-16	Nitrate plus nitrite	5.85	0.425	1.25	10.0			099569-006	EPA 353.2
TAV-MW3 (Duplicate) 04-May-16	Nitrate plus nitrite	5.95	0.170	0.500	10.0			099570-006	EPA 353.2
TAV-MW4 10-May-16	Nitrate plus nitrite	5.24	0.170	0.500	10.0			099580-006	EPA 353.2
TAV-MW5 02-May-16	Nitrate plus nitrite	7.85	0.425	1.25	10.0			099561-006	EPA 353.2
TAV-MW6 25-May-16	Nitrate plus nitrite	8.58	0.425	1.25	10.0			099646-006	EPA 353.2
TAV-MW7 09-May-16	Nitrate plus nitrite	4.23	0.170	0.500	10.0			099577-006	EPA 353.2
TAV-MW7 (Duplicate) 09-May-16	Nitrate plus nitrite	4.55	0.170	0.500	10.0			099578-006	EPA 353.2
TAV-MW8 12-May-16	Nitrate plus nitrite	7.36	0.170	0.500	10.0			099585-006	EPA 353.2
TAV-MW9 05-May-16	Nitrate plus nitrite	3.86	0.085	0.250	10.0			099572-006	EPA 353.2
TAV-MW10 31-May-16	Nitrate plus nitrite	**15.2**	0.425	1.25	10.0			099648-006	EPA 353.2
TAV-MW11 18-May-16	Nitrate plus nitrite	7.30	0.850	2.50	10.0			099633-006	EPA 353.2
TAV-MW12 24-May-16	Nitrate plus nitrite	7.75	0.425	1.25	10.0			099643-006	EPA 353.2
TAV-MW13 03-May-16	Nitrate plus nitrite	6.65	0.425	1.25	10.0			099563-006	EPA 353.2
TAV-MW14 19-May-16	Nitrate plus nitrite	**10.7**	0.850	2.50	10.0			099637-006	EPA 353.2
TAV-MW14 (Duplicate) 19-May-16	Nitrate plus nitrite	**10.7**	0.850	2.50	10.0			099638-006	EPA 353.2

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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 01-Aug-16	Nitrate plus nitrite	9.15	0.425	1.25	10.0			100068-006	EPA 353.2
LWDS-MW1 08-Aug-16	Nitrate plus nitrite	**12.1**	0.425	1.25	10.0			100080-006	EPA 353.2
LWDS-MW1 (Duplicate) 08-Aug-16	Nitrate plus nitrite	**11.8**	0.425	1.25	10.0			100081-006	EPA 353.2
LWDS-MW2 28-Jul-16	Nitrate plus nitrite	8.06	0.170	0.500	10.0			100065-006	EPA 353.2
TAV-MW2 26-Jul-16	Nitrate plus nitrite	4.56	0.170	0.500	10.0			100059-006	EPA 353.2
TAV-MW2 (Duplicate) 26-Jul-16	Nitrate plus nitrite	4.30	0.170	0.500	10.0			100060-006	EPA 353.2
TAV-MW4 25-Jul-16	Nitrate plus nitrite	5.45	0.170	0.500	10.0			100055-006	EPA 353.2
TAV-MW6 09-Aug-16	Nitrate plus nitrite	7.45	0.425	1.25	10.0			100086-006	EPA 353.2
TAV-MW6 (Duplicate) 09-Aug-16	Nitrate plus nitrite	7.53	0.425	1.25	10.0			100087-006	EPA 353.2
TAV-MW8 27-Jul-16	Nitrate plus nitrite	6.66	0.170	0.500	10.0			100062-006	EPA 353.2
TAV-MW10 10-Aug-16	Nitrate plus nitrite	**11.6**	0.425	1.25	10.0			100089-006	EPA 353.2
TAV-MW11 02-Aug-16	Nitrate plus nitrite	6.40	0.085	0.250	10.0			100070-006	EPA 353.2
TAV-MW12 04-Aug-16	Nitrate plus nitrite	6.50	0.085	0.250	10.0			100076-006	EPA 353.2
TAV-MW13 21-Jul-16	Nitrate plus nitrite	5.65	0.085	0.250	10.0			100052-006	EPA 353.2
TAV-MW14 03-Aug-16	Nitrate plus nitrite	8.83	0.425	1.25	10.0			100072-006	EPA 353.2

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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 10-Nov-16	Nitrate plus nitrite	9.37	0.170	0.500	10.0			101013-006	EPA 353.2
LWDS-MW1 21-Nov-16	Nitrate plus nitrite	**11.6**	0.170	0.500	10.0			101030-006	EPA 353.2
LWDS-MW2 07-Nov-16	Nitrate plus nitrite	7.89	0.170	0.500	10.0			101007-006	EPA 353.2
TAV-MW2 08-Nov-16	Nitrate plus nitrite	4.20	0.170	0.500	10.0			101009-006	EPA 353.2
TAV-MW3 03-Nov-16	Nitrate plus nitrite	5.18	0.170	0.500	10.0			101005-006	EPA 353.2
TAV-MW4 14-Nov-16	Nitrate plus nitrite	4.43	0.170	0.500	10.0			101015-006	EPA 353.2
TAV-MW5 31-Oct-16	Nitrate plus nitrite	7.12	0.170	0.500	10.0			100997-006	EPA 353.2
TAV-MW5 (Duplicate) 31-Oct-16	Nitrate plus nitrite	7.07	0.170	0.500	10.0			100998-006	EPA 353.2
TAV-MW6 28-Nov-16	Nitrate plus nitrite	7.05	0.425	1.25	10.0			101032-006	EPA 353.2
TAV-MW7 02-Nov-16	Nitrate plus nitrite	4.20	0.085	0.250	10.0			101003-006	EPA 353.2
TAV-MW8 15-Nov-16	Nitrate plus nitrite	6.08	0.170	0.500	10.0			101018-006	EPA 353.2
TAV-MW9 01-Nov-16	Nitrate plus nitrite	3.88	0.085	0.250	10.0			101001-006	EPA 353.2
TAV-MW10 29-Nov-16	Nitrate plus nitrite	**10.9**	0.425	1.25	10.0			101034-006	EPA 353.2
TAV-MW11 09-Nov-16	Nitrate plus nitrite	6.45	0.085	0.250	10.0			101011-006	EPA 353.2
TAV-MW12 16-Nov-16	Nitrate plus nitrite	6.05	0.425	1.25	10.0			101023-006	EPA 353.2
TAV-MW12 (Duplicate) 16-Nov-16	Nitrate plus nitrite	6.30	0.425	1.25	10.0			101024-006	EPA 353.2
TAV-MW13 27-Oct-16	Nitrate plus nitrite	5.77	0.170	0.500	10.0			100992-006	EPA 353.2
TAV-MW13 (Duplicate) 27-Oct-16	Nitrate plus nitrite	5.65	0.170	0.500	10.0			100993-006	EPA 353.2
TAV-MW14 17-Nov-16	Nitrate plus nitrite	8.73	0.425	1.25	10.0			101027-006	EPA 353.2

Refer to footnotes on page 5B-71.

Table 5B-4
Summary of Anions, Alkalinity, and Sulfide Results, Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Chloride	9.91	0.067	0.200	NE			098869-016	SW846 9056
18-Feb-16	Sulfate	30.9	0.266	0.800	NE			098869-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098869-029	SW846 9034
	Bicarbonate Alkalinity	155	0.725	1.00	NE			098869-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098869-022	SM 2320B
AVN-1 (Duplicate)	Chloride	9.95	0.067	0.200	NE			098870-016	SW846 9056
18-Feb-16	Sulfate	30.7	0.266	0.800	NE			098870-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098870-029	SW846 9034
	Bicarbonate Alkalinity	156	0.725	1.00	NE			098870-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098870-022	SM 2320B
LWDS-MW1	Chloride	79.0	0.670	2.00	NE			098885-016	SW846 9056
29-Feb-16	Sulfate	37.8	1.33	4.00	NE			098885-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	098885-029	SW846 9034
	Bicarbonate Alkalinity	196	0.725	1.00	NE			098885-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098885-022	SM 2320B
LWDS-MW2	Chloride	11.6	0.335	1.00	NE			098864-016	SW846 9056
17-Feb-16	Sulfate	38.1	0.665	2.00	NE			098864-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098864-029	SW846 9034
	Bicarbonate Alkalinity	175	0.725	1.00	NE			098864-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098864-022	SM 2320B
LWDS-MW2 (Duplicate)	Chloride	11.4	0.335	1.00	NE			098865-016	SW846 9056
17-Feb-16	Sulfate	38.2	0.665	2.00	NE			098865-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098865-029	SW846 9034
	Bicarbonate Alkalinity	179	0.725	1.00	NE			098865-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098865-022	SM 2320B
TAV-MW2	Chloride	56.4	0.670	2.00	NE		J	098858-016	SW846 9056
15-Feb-16	Sulfate	56.1	1.33	4.00	NE		J	098858-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098858-029	SW846 9034
	Bicarbonate Alkalinity	248	0.725	1.00	NE			098858-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098858-022	SM 2320B
TAV-MW4	Chloride	39.6	0.335	1.00	NE			098855-016	SW846 9056
11-Feb-16	Sulfate	32.9	0.665	2.00	NE			098855-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098855-029	SW846 9034
	Bicarbonate Alkalinity	180	0.725	1.00	NE			098855-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098855-022	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW6	Chloride	72.6	1.34	4.00	NE			098882-016	SW846 9056
25-Feb-16	Sulfate	41.5	2.66	8.00	NE			098882-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098882-029	SW846 9034
	Bicarbonate Alkalinity	192	0.725	1.00	NE			098882-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098882-022	SM 2320B
TAV-MW8	Chloride	44.3	0.335	1.00	NE			098860-016	SW846 9056
16-Feb-16	Sulfate	52.2	0.665	2.00	NE			098860-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098860-029	SW846 9034
	Bicarbonate Alkalinity	194	0.725	1.00	NE			098860-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098860-022	SM 2320B
TAV-MW10	Chloride	45.9	0.670	2.00	NE			098887-016	SW846 9056
01-Mar-16	Sulfate	45.1	1.33	4.00	NE			098887-016	SW846 9056
	Acid Soluble Sulfides	1.47	1.00	2.50	NE	J	J	098887-029	SW846 9034
	Bicarbonate Alkalinity	184	0.725	1.00	NE			098887-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098887-022	SM 2320B
TAV-MW11	Chloride	50.2	0.670	2.00	NE			098875-016	SW846 9056
22-Feb-16	Sulfate	40.9	1.33	4.00	NE			098875-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098875-029	SW846 9034
	Bicarbonate Alkalinity	175	1.45	2.00	NE			098875-022	SM 2320B
	Carbonate Alkalinity	ND	1.45	2.00	NE	U		098875-022	SM 2320B
TAV-MW11 (Duplicate)	Chloride	50.2	0.670	2.00	NE			098876-016	SW846 9056
22-Feb-16	Sulfate	41.1	1.33	4.00	NE			098876-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098876-029	SW846 9034
	Bicarbonate Alkalinity	177	0.725	1.00	NE			098876-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098876-022	SM 2320B
TAV-MW12	Chloride	41.0	0.670	2.00	NE			098880-016	SW846 9056
24-Feb-16	Sulfate	46.9	1.33	4.00	NE			098880-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098880-029	SW846 9034
	Bicarbonate Alkalinity	220	0.725	1.00	NE			098880-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098880-022	SM 2320B
TAV-MW13	Chloride	18.6	0.335	1.00	NE			098852-016	SW846 9056
10-Feb-16	Sulfate	49.7	0.665	2.00	NE			098852-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098852-029	SW846 9034
	Bicarbonate Alkalinity	200	0.725	1.00	NE			098852-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098852-022	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Chloride	50.2	0.670	2.00	NE			098878-016	SW846 9056
23-Feb-16	Sulfate	51.7	1.33	4.00	NE			098878-016	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		098878-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE			098878-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		098878-022	SM 2320B
AVN-1	Bromide	0.141	0.067	0.200	NE	J		099631-005	SW846 9056
17-May-16	Chloride	9.58	0.134	0.400	NE			099631-005	SW846 9056
	Fluoride	1.17	0.033	0.100	4.0			099631-005	SW846 9056
	Sulfate	31.6	0.266	0.800	NE			099631-005	SW846 9056
	Bicarbonate Alkalinity	154	0.725	1.00	NE			099631-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099631-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		099631-008	SW846 9034
LWDS-MW1	Bromide	0.793	0.067	0.200	NE			099641-005	SW846 9056
23-May-16	Chloride	76.0	1.34	4.00	NE			099641-005	SW846 9056
	Fluoride	0.488	0.033	0.100	4.0			099641-005	SW846 9056
	Sulfate	39.4	2.66	8.00	NE			099641-005	SW846 9056
	Bicarbonate Alkalinity	204	0.725	1.00	NE			099641-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099641-007	SM 2320B
	Acid Soluble Sulfides	1.67	1.00	2.50	NE	J		099641-008	SW846 9034
LWDS-MW2	Bromide	0.162	0.067	0.200	NE	J		099629-005	SW846 9056
16-May-16	Chloride	12.0	0.335	1.00	NE			099629-005	SW846 9056
	Fluoride	1.23	0.033	0.100	4.0			099629-005	SW846 9056
	Sulfate	39.4	0.665	2.00	NE			099629-005	SW846 9056
	Bicarbonate Alkalinity	174	0.725	1.00	NE			099629-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099629-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		099629-008	SW846 9034
TAV-MW2	Bromide	0.524	0.067	0.200	NE			099582-005	SW846 9056
11-May-16	Chloride	54.9	0.670	2.00	NE			099582-005	SW846 9056
	Fluoride	0.971	0.033	0.100	4.0			099582-005	SW846 9056
	Sulfate	55.4	1.33	4.00	NE			099582-005	SW846 9056
	Bicarbonate Alkalinity	251	0.725	1.00	NE			099582-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099582-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099582-008	SW846 9034

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.232	0.067	0.200	NE			099569-005	SW846 9056
04-May-16	Chloride	23.7	0.335	1.00	NE			099569-005	SW846 9056
	Fluoride	1.37	0.033	0.100	4.0			099569-005	SW846 9056
	Sulfate	65.6	0.665	2.00	NE			099569-005	SW846 9056
	Bicarbonate Alkalinity	193	0.725	1.00	NE			099569-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099569-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099569-008	SW846 9034
TAV-MW3 (Duplicate)	Bromide	0.231	0.067	0.200	NE			099570-005	SW846 9056
04-May-16	Chloride	23.9	0.335	1.00	NE			099570-005	SW846 9056
	Fluoride	1.37	0.033	0.100	4.0			099570-005	SW846 9056
	Sulfate	65.6	0.665	2.00	NE			099570-005	SW846 9056
	Bicarbonate Alkalinity	193	0.725	1.00	NE			099570-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099570-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099570-008	SW846 9034
TAV-MW4	Bromide	0.430	0.067	0.200	NE			099580-005	SW846 9056
10-May-16	Chloride	37.5	0.670	2.00	NE			099580-005	SW846 9056
	Fluoride	1.12	0.033	0.100	4.0			099580-005	SW846 9056
	Sulfate	33.5	1.33	4.00	NE			099580-005	SW846 9056
	Bicarbonate Alkalinity	177	0.725	1.00	NE			099580-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099580-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099580-008	SW846 9034
TAV-MW5	Bromide	0.191	0.067	0.200	NE	J		099561-005	SW846 9056
02-May-16	Chloride	17.2	0.335	1.00	NE			099561-005	SW846 9056
	Fluoride	1.11	0.033	0.100	4.0			099561-005	SW846 9056
	Sulfate	41.7	0.665	2.00	NE			099561-005	SW846 9056
	Bicarbonate Alkalinity	180	0.725	1.00	NE			099561-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099561-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099561-008	SW846 9034
TAV-MW6	Bromide	0.846	0.067	0.200	NE			099646-005	SW846 9056
25-May-16	Chloride	77.2	1.34	4.00	NE			099646-005	SW846 9056
	Fluoride	0.999	0.033	0.100	4.0			099646-005	SW846 9056
	Sulfate	41.4	2.66	8.00	NE			099646-005	SW846 9056
	Bicarbonate Alkalinity	198	0.330	1.00	NE	B		099646-007	SM 2320B
	Carbonate Alkalinity	ND	0.330	1.00	NE	U		099646-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099646-008	SW846 9034

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.245	0.067	0.200	NE			099577-005	SW846 9056
09-May-16	Chloride	27.6	0.335	1.00	NE			099577-005	SW846 9056
	Fluoride	1.02	0.033	0.100	4.0			099577-005	SW846 9056
	Sulfate	65.5	0.665	2.00	NE			099577-005	SW846 9056
	Bicarbonate Alkalinity	231	0.725	1.00	NE			099577-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099577-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099577-008	SW846 9034
TAV-MW7 (Duplicate)	Bromide	0.243	0.067	0.200	NE			099578-005	SW846 9056
09-May-16	Chloride	27.7	0.335	1.00	NE			099578-005	SW846 9056
	Fluoride	1.02	0.033	0.100	4.0			099578-005	SW846 9056
	Sulfate	65.2	0.665	2.00	NE			099578-005	SW846 9056
	Bicarbonate Alkalinity	231	0.725	1.00	NE			099578-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099578-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099578-008	SW846 9034
TAV-MW8	Bromide	0.347	0.067	0.200	NE			099585-005	SW846 9056
12-May-16	Chloride	41.3	0.670	2.00	NE			099585-005	SW846 9056
	Fluoride	1.31	0.033	0.100	4.0			099585-005	SW846 9056
	Sulfate	50.5	1.33	4.00	NE			099585-005	SW846 9056
	Bicarbonate Alkalinity	189	0.725	1.00	NE			099585-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099585-007	SM 2320B
	Acid Soluble Sulfides	1.13	1.00	2.50	NE	B, J	6.7U	099585-008	SW846 9034
TAV-MW9	Bromide	0.259	0.067	0.200	NE			099572-005	SW846 9056
05-May-16	Chloride	32.6	0.335	1.00	NE			099572-005	SW846 9056
	Fluoride	0.783	0.033	0.100	4.0			099572-005	SW846 9056
	Sulfate	58.6	0.665	2.00	NE			099572-005	SW846 9056
	Bicarbonate Alkalinity	229	0.725	1.00	NE			099572-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099572-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099572-008	SW846 9034
TAV-MW10	Bromide	0.366	0.067	0.200	NE			099648-005	SW846 9056
31-May-16	Chloride	45.6	0.670	2.00	NE			099648-005	SW846 9056
	Fluoride	1.31	0.033	0.100	4.0			099648-005	SW846 9056
	Sulfate	45.1	1.33	4.00	NE			099648-005	SW846 9056
	Bicarbonate Alkalinity	181	0.330	1.00	NE			099648-007	SM 2320B
	Carbonate Alkalinity	ND	0.330	1.00	NE	U		099648-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		099648-008	SW846 9034

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.542	0.067	0.200	NE			099633-005	SW846 9056
18-May-16	Chloride	52.0	0.670	2.00	NE			099633-005	SW846 9056
	Fluoride	1.29	0.033	0.100	4.0			099633-005	SW846 9056
	Sulfate	41.7	1.33	4.00	NE			099633-005	SW846 9056
	Bicarbonate Alkalinity	174	0.725	1.00	NE	B		099633-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099633-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		099633-008	SW846 9034
TAV-MW12	Bromide	0.254	0.067	0.200	NE			099643-005	SW846 9056
24-May-16	Chloride	41.2	0.670	2.00	NE			099643-005	SW846 9056
	Fluoride	1.13	0.033	0.100	4.0			099643-005	SW846 9056
	Sulfate	46.9	1.33	4.00	NE			099643-005	SW846 9056
	Bicarbonate Alkalinity	226	0.725	1.00	NE			099643-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099643-007	SM 2320B
	Acid Soluble Sulfides	2.67	1.00	2.50	NE			099643-008	SW846 9034
TAV-MW13	Bromide	0.194	0.067	0.200	NE	J		099563-005	SW846 9056
03-May-16	Chloride	18.8	0.335	1.00	NE			099563-005	SW846 9056
	Fluoride	1.07	0.033	0.100	4.0			099563-005	SW846 9056
	Sulfate	49.9	0.665	2.00	NE			099563-005	SW846 9056
	Bicarbonate Alkalinity	200	0.725	1.00	NE			099563-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099563-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	099563-008	SW846 9034
TAV-MW14	Bromide	0.340	0.067	0.200	NE			099637-005	SW846 9056
19-May-16	Chloride	51.3	0.670	2.00	NE			099637-005	SW846 9056
	Fluoride	1.35	0.033	0.100	4.0			099637-005	SW846 9056
	Sulfate	52.6	1.33	4.00	NE			099637-005	SW846 9056
	Bicarbonate Alkalinity	188	0.725	1.00	NE	B		099637-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099637-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		099637-008	SW846 9034
TAV-MW14 (Duplicate)	Bromide	0.352	0.067	0.200	NE			099638-005	SW846 9056
19-May-16	Chloride	51.4	0.670	2.00	NE			099638-005	SW846 9056
	Fluoride	1.35	0.033	0.100	4.0			099638-005	SW846 9056
	Sulfate	52.1	1.33	4.00	NE			099638-005	SW846 9056
	Bicarbonate Alkalinity	193	0.725	1.00	NE	B		099638-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099638-007	SM 2320B
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U		099638-008	SW846 9034

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Chloride	9.40	0.335	1.00	NE			100068-005	SW846 9056
01-Aug-16	Sulfate	30.7	0.665	2.00	NE			100068-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100068-008	SW846 9034
	Bicarbonate Alkalinity	160	1.45	4.00	NE			100068-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100068-007	SM 2320B
LWDS-MW1	Chloride	71.4	1.34	4.00	NE			100080-005	SW846 9056
08-Aug-16	Sulfate	36.9	2.66	8.00	NE			100080-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100080-008	SW846 9034
	Bicarbonate Alkalinity	205	0.725	2.00	NE			100080-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100080-007	SM 2320B
LWDS-MW1 (Duplicate)	Chloride	74.0	1.34	4.00	NE			100081-005	SW846 9056
08-Aug-16	Sulfate	37.9	2.66	8.00	NE			100081-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100081-008	SW846 9034
	Bicarbonate Alkalinity	206	0.725	2.00	NE			100081-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100081-007	SM 2320B
LWDS-MW2	Chloride	11.7	0.335	1.00	NE			100065-005	SW846 9056
28-Jul-16	Sulfate	37.9	0.665	2.00	NE			100065-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100065-008	SW846 9034
	Bicarbonate Alkalinity	180	0.725	2.00	NE	B		100065-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100065-007	SM 2320B
TAV-MW2	Chloride	55.0	0.670	2.00	NE			100059-005	SW846 9056
26-Jul-16	Sulfate	54.9	1.33	4.00	NE			100059-005	SW846 9056
	Acid Soluble Sulfides	3.77	1.00	2.50	NE	N	15UJ	100059-008	SW846 9034
	Bicarbonate Alkalinity	255	0.725	2.00	NE			100059-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100059-007	SM 2320B
TAV-MW2 (Duplicate)	Chloride	55.4	0.670	2.00	NE			100060-005	SW846 9056
26-Jul-16	Sulfate	55.9	1.33	4.00	NE			100060-005	SW846 9056
	Acid Soluble Sulfides	3.97	1.00	2.50	NE	N	15UJ	100060-008	SW846 9034
	Bicarbonate Alkalinity	253	0.725	2.00	NE			100060-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100060-007	SM 2320B
TAV-MW4	Chloride	37.4	0.670	2.00	NE			100055-005	SW846 9056
25-Jul-16	Sulfate	33.3	1.33	4.00	NE			100055-005	SW846 9056
	Acid Soluble Sulfides	5.87	1.00	2.50	NE	N	J-	100055-008	SW846 9034
	Bicarbonate Alkalinity	175	0.725	2.00	NE			100055-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100055-007	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW6	Chloride	73.6	1.34	4.00	NE			100086-005	SW846 9056
09-Aug-16	Sulfate	39.0	2.66	8.00	NE			100086-005	SW846 9056
	Acid Soluble Sulfides	1.40	1.00	2.50	NE	J	J-	100086-008	SW846 9034
	Bicarbonate Alkalinity	179	0.725	2.00	NE			100086-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100086-007	SM 2320B
TAV-MW6 (Duplicate)	Chloride	75.1	1.34	4.00	NE			100087-005	SW846 9056
09-Aug-16	Sulfate	39.3	2.66	8.00	NE			100087-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100087-008	SW846 9034
	Bicarbonate Alkalinity	198	0.725	2.00	NE			100087-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100087-007	SM 2320B
TAV-MW8	Chloride	42.6	0.670	2.00	NE			100062-005	SW846 9056
27-Jul-16	Sulfate	51.3	1.33	4.00	NE			100062-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100062-008	SW846 9034
	Bicarbonate Alkalinity	198	0.725	2.00	NE	B		100062-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100062-007	SM 2320B
TAV-MW10	Chloride	45.1	0.670	2.00	NE			100089-005	SW846 9056
10-Aug-16	Sulfate	44.2	1.33	4.00	NE			100089-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100089-008	SW846 9034
	Bicarbonate Alkalinity	188	0.725	2.00	NE			100089-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100089-007	SM 2320B
TAV-MW11	Chloride	52.3	0.670	2.00	NE			100070-005	SW846 9056
02-Aug-16	Sulfate	42.2	1.33	4.00	NE			100070-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100070-008	SW846 9034
	Bicarbonate Alkalinity	183	1.45	4.00	NE			100070-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100070-007	SM 2320B
TAV-MW12	Chloride	42.1	0.670	2.00	NE			100076-005	SW846 9056
04-Aug-16	Sulfate	48.4	1.33	4.00	NE			100076-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100076-008	SW846 9034
	Bicarbonate Alkalinity	227	1.45	4.00	NE			100076-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100076-007	SM 2320B
TAV-MW13	Chloride	19.1	0.335	1.00	NE			100052-005	SW846 9056
21-Jul-16	Sulfate	48.7	0.665	2.00	NE	B		100052-005	SW846 9056
	Acid Soluble Sulfides	5.98	1.00	2.50	NE	N	J-	100052-008	SW846 9034
	Bicarbonate Alkalinity	204	0.725	2.00	NE	B		100052-007	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100052-007	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Chloride	51.7	0.670	2.00	NE			100072-005	SW846 9056
03-Aug-16	Sulfate	52.7	1.33	4.00	NE			100072-005	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100072-008	SW846 9034
	Bicarbonate Alkalinity	200	1.45	4.00	NE			100072-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100072-007	SM 2320B
AVN-1	Chloride	9.93	0.067	0.200	NE			101013-004	SW846 9056
10-Nov-16	Sulfate	30.6	0.266	0.800	NE			101013-004	SW846 9056
	Acid Soluble Sulfides	1.34	1.00	2.50	NE	J	J-	101013-008	SW846 9034
	Bicarbonate Alkalinity	159	1.45	4.00	NE			101013-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101013-007	SM 2320B
LWDS-MW1	Chloride	76.9	1.34	4.00	NE			101030-004	SW846 9056
21-Nov-16	Sulfate	39.7	2.66	8.00	NE			101030-004	SW846 9056
	Acid Soluble Sulfides	1.54	1.00	2.50	NE	J	J-	101030-008	SW846 9034
	Bicarbonate Alkalinity	210	1.45	4.00	NE			101030-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101030-007	SM 2320B
LWDS-MW2	Chloride	11.9	0.335	1.00	NE			101007-004	SW846 9056
07-Nov-16	Sulfate	37.8	0.665	2.00	NE			101007-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101007-008	SW846 9034
	Bicarbonate Alkalinity	182	1.45	4.00	NE			101007-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101007-007	SM 2320B
TAV-MW2	Chloride	55.7	0.670	2.00	NE			101009-004	SW846 9056
08-Nov-16	Sulfate	56.3	1.33	4.00	NE			101009-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101009-008	SW846 9034
	Bicarbonate Alkalinity	256	1.45	4.00	NE			101009-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101009-007	SM 2320B
TAV-MW3	Chloride	22.7	0.670	2.00	NE			101005-004	SW846 9056
03-Nov-16	Sulfate	60.8	1.33	4.00	NE			101005-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101005-008	SW846 9034
	Bicarbonate Alkalinity	205	1.45	4.00	NE			101005-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101005-007	SM 2320B
TAV-MW4	Chloride	37.9	0.670	2.00	NE			101015-004	SW846 9056
14-Nov-16	Sulfate	33.7	1.33	4.00	NE			101015-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101015-008	SW846 9034
	Bicarbonate Alkalinity	186	1.45	4.00	NE			101015-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101015-007	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-4 *(Continued)*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Chloride	16.4	0.670	2.00	NE			100997-004	SW846 9056
31-Oct-16	Sulfate	38.9	1.33	4.00	NE			100997-004	SW846 9056
	Acid Soluble Sulfides	2.34	1.00	2.50	NE	J	J-	100997-008	SW846 9034
	Bicarbonate Alkalinity	193	1.45	4.00	NE			100997-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100997-007	SM 2320B
TAV-MW5 (Duplicate)	Chloride	16.6	0.670	2.00	NE			100998-004	SW846 9056
31-Oct-16	Sulfate	39.0	1.33	4.00	NE			100998-004	SW846 9056
	Acid Soluble Sulfides	1.34	1.00	2.50	NE	J	J-	100998-008	SW846 9034
	Bicarbonate Alkalinity	195	1.45	4.00	NE			100998-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100998-007	SM 2320B
TAV-MW6	Chloride	77.2	1.34	4.00	NE			101032-004	SW846 9056
28-Nov-16	Sulfate	41.1	2.66	8.00	NE			101032-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	N, U	UJ	101032-008	SW846 9034
	Bicarbonate Alkalinity	205	1.45	4.00	NE			101032-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101032-007	SM 2320B
TAV-MW7	Chloride	26.0	0.670	2.00	NE			101003-004	SW846 9056
02-Nov-16	Sulfate	60.2	1.33	4.00	NE			101003-004	SW846 9056
	Acid Soluble Sulfides	2.34	1.00	2.50	NE	J	J-	101003-008	SW846 9034
	Bicarbonate Alkalinity	237	1.45	4.00	NE			101003-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101003-007	SM 2320B
TAV-MW8	Chloride	49.4	0.670	2.00	NE			101018-004	SW846 9056
15-Nov-16	Sulfate	51.4	1.33	4.00	NE			101018-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101018-008	SW846 9034
	Bicarbonate Alkalinity	199	1.45	4.00	NE			101018-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101018-007	SM 2320B
TAV-MW9	Chloride	31.9	0.670	2.00	NE			101001-004	SW846 9056
01-Nov-16	Sulfate	57.2	1.33	4.00	NE			101001-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101001-008	SW846 9034
	Bicarbonate Alkalinity	253	1.45	4.00	NE			101001-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101001-007	SM 2320B
TAV-MW10	Chloride	47.6	0.670	2.00	NE			101034-004	SW846 9056
29-Nov-16	Sulfate	45.6	1.33	4.00	NE			101034-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	N, U	UJ	101034-008	SW846 9034
	Bicarbonate Alkalinity	187	1.45	4.00	NE			101034-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101034-007	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-4 *(Concluded))*
Summary of Anions, Alkalinity, and Sulfide Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Chloride	52.9	0.670	2.00	NE			101011-004	SW846 9056
09-Nov-16	Sulfate	41.5	1.33	4.00	NE			101011-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101011-008	SW846 9034
	Bicarbonate Alkalinity	184	1.45	4.00	NE			101011-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101011-007	SM 2320B
TAV-MW12	Chloride	41.4	0.670	2.00	NE			101023-004	SW846 9056
16-Nov-16	Sulfate	48.1	1.33	4.00	NE			101023-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101023-008	SW846 9034
	Bicarbonate Alkalinity	222	1.45	4.00	NE			101023-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101023-007	SM 2320B
TAV-MW12 (Duplicate)	Chloride	41.1	0.670	2.00	NE			101024-004	SW846 9056
16-Nov-16	Sulfate	48.4	1.33	4.00	NE			101024-004	SW846 9056
	Acid Soluble Sulfides	1.04	1.00	2.50	NE	J	J-	101024-008	SW846 9034
	Bicarbonate Alkalinity	230	1.45	4.00	NE			101024-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101024-007	SM 2320B
TAV-MW13	Chloride	18.8	0.335	1.00	NE			100992-004	SW846 9056
27-Oct-16	Sulfate	48.6	0.665	2.00	NE			100992-004	SW846 9056
	Acid Soluble Sulfides	2.88	1.00	2.50	NE		J-	100992-008	SW846 9034
	Bicarbonate Alkalinity	207	1.45	4.00	NE			100992-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100992-007	SM 2320B
TAV-MW13 (Duplicate)	Chloride	19.0	0.335	1.00	NE			100993-004	SW846 9056
27-Oct-16	Sulfate	49.7	0.665	2.00	NE			100993-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	100993-008	SW846 9034
	Bicarbonate Alkalinity	204	1.45	4.00	NE			100993-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100993-007	SM 2320B
TAV-MW14	Chloride	51.6	0.670	2.00	NE			101027-004	SW846 9056
17-Nov-16	Sulfate	52.7	1.33	4.00	NE			101027-004	SW846 9056
	Acid Soluble Sulfides	ND	1.00	2.50	NE	U	UJ	101027-008	SW846 9034
	Bicarbonate Alkalinity	200	1.45	4.00	NE			101027-007	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		101027-007	SM 2320B

Refer to footnotes on page 5B-71.

Table 5B-5
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	0.416	0.330	1.00	NE	J	2.0U	098869-004	SW846 9060
18-Feb-16	Total Organic Carbon #2	0.431	0.330	1.00	NE	J	1.91U	098869-004	SW846 9060
	Total Organic Carbon #3	0.440	0.330	1.00	NE	J	1.91U	098869-004	SW846 9060
	Total Organic Carbon #4	0.432	0.330	1.00	NE	J	1.94U	098869-004	SW846 9060
	Total Organic Carbon Average	0.430	0.330	1.00	NE	J	1.94U	098869-004	SW846 9060
AVN-1 (Duplicate)	Total Organic Carbon #1	0.426	0.330	1.00	NE	J	2.0U	098870-004	SW846 9060
18-Feb-16	Total Organic Carbon #2	0.443	0.330	1.00	NE	J	1.91U	098870-004	SW846 9060
	Total Organic Carbon #3	0.445	0.330	1.00	NE	J	1.91U	098870-004	SW846 9060
	Total Organic Carbon #4	0.446	0.330	1.00	NE	J	1.94U	098870-004	SW846 9060
	Total Organic Carbon Average	0.440	0.330	1.00	NE	J	1.94U	098870-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.599	0.330	1.00	NE	J		098885-004	SW846 9060
29-Feb-16	Total Organic Carbon #2	0.625	0.330	1.00	NE	J		098885-004	SW846 9060
	Total Organic Carbon #3	0.629	0.330	1.00	NE	J		098885-004	SW846 9060
	Total Organic Carbon #4	0.627	0.330	1.00	NE	J		098885-004	SW846 9060
	Total Organic Carbon Average	0.620	0.330	1.00	NE	J		098885-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	0.393	0.330	1.00	NE	J	2.14U	098864-004	SW846 9060
17-Feb-16	Total Organic Carbon #2	0.419	0.330	1.00	NE	J	2.08U	098864-004	SW846 9060
	Total Organic Carbon #3	0.429	0.330	1.00	NE	J	2.08U	098864-004	SW846 9060
	Total Organic Carbon #4	0.424	0.330	1.00	NE	J	2.07U	098864-004	SW846 9060
	Total Organic Carbon Average	0.416	0.330	1.00	NE	J	2.09U	098864-004	SW846 9060
LWDS-MW2 (Duplicate)	Total Organic Carbon #1	0.408	0.330	1.00	NE	J	2.14U	098865-004	SW846 9060
17-Feb-16	Total Organic Carbon #2	0.424	0.330	1.00	NE	J	2.08U	098865-004	SW846 9060
	Total Organic Carbon #3	0.426	0.330	1.00	NE	J	2.08U	098865-004	SW846 9060
	Total Organic Carbon #4	0.431	0.330	1.00	NE	J	2.07U	098865-004	SW846 9060
	Total Organic Carbon Average	0.422	0.330	1.00	NE	J	2.09U	098865-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.630	0.330	1.00	NE	J		098858-004	SW846 9060
15-Feb-16	Total Organic Carbon #2	0.647	0.330	1.00	NE	J		098858-004	SW846 9060
	Total Organic Carbon #3	0.658	0.330	1.00	NE	J		098858-004	SW846 9060
	Total Organic Carbon #4	0.661	0.330	1.00	NE	J		098858-004	SW846 9060
	Total Organic Carbon Average	0.649	0.330	1.00	NE	J		098858-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.533	0.330	1.00	NE	J		098855-004	SW846 9060
11-Feb-16	Total Organic Carbon #2	0.561	0.330	1.00	NE	J		098855-004	SW846 9060
	Total Organic Carbon #3	0.553	0.330	1.00	NE	J		098855-004	SW846 9060
	Total Organic Carbon #4	0.541	0.330	1.00	NE	J		098855-004	SW846 9060
	Total Organic Carbon Average	0.547	0.330	1.00	NE	J		098855-004	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW6	Total Organic Carbon #1	0.504	0.330	1.00	NE	J		098882-004	SW846 9060
25-Feb-16	Total Organic Carbon #2	0.526	0.330	1.00	NE	J		098882-004	SW846 9060
	Total Organic Carbon #3	0.523	0.330	1.00	NE	J		098882-004	SW846 9060
	Total Organic Carbon #4	0.521	0.330	1.00	NE	J		098882-004	SW846 9060
	Total Organic Carbon Average	0.518	0.330	1.00	NE	J		098882-004	SW846 9060
TAV-MW8	Total Organic Carbon #1	0.574	0.330	1.00	NE	J		098860-004	SW846 9060
16-Feb-16	Total Organic Carbon #2	0.492	0.330	1.00	NE	J		098860-004	SW846 9060
	Total Organic Carbon #3	0.475	0.330	1.00	NE	J		098860-004	SW846 9060
	Total Organic Carbon #4	0.479	0.330	1.00	NE	J		098860-004	SW846 9060
	Total Organic Carbon Average	0.505	0.330	1.00	NE	J		098860-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	0.547	0.330	1.00	NE	J		098887-004	SW846 9060
01-Mar-16	Total Organic Carbon #2	0.526	0.330	1.00	NE	J		098887-004	SW846 9060
	Total Organic Carbon #3	0.530	0.330	1.00	NE	J		098887-004	SW846 9060
	Total Organic Carbon #4	0.520	0.330	1.00	NE	J		098887-004	SW846 9060
	Total Organic Carbon Average	0.531	0.330	1.00	NE	J		098887-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.426	0.330	1.00	NE	J		098875-004	SW846 9060
22-Feb-16	Total Organic Carbon #2	0.447	0.330	1.00	NE	J		098875-004	SW846 9060
	Total Organic Carbon #3	0.451	0.330	1.00	NE	J		098875-004	SW846 9060
	Total Organic Carbon #4	0.448	0.330	1.00	NE	J		098875-004	SW846 9060
	Total Organic Carbon Average	0.443	0.330	1.00	NE	J		098875-004	SW846 9060
TAV-MW11 (Duplicate)	Total Organic Carbon #1	0.515	0.330	1.00	NE	J		098876-004	SW846 9060
22-Feb-16	Total Organic Carbon #2	0.520	0.330	1.00	NE	J		098876-004	SW846 9060
	Total Organic Carbon #3	0.536	0.330	1.00	NE	J		098876-004	SW846 9060
	Total Organic Carbon #4	0.534	0.330	1.00	NE	J		098876-004	SW846 9060
	Total Organic Carbon Average	0.526	0.330	1.00	NE	J		098876-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.593	0.330	1.00	NE	J		098880-004	SW846 9060
24-Feb-16	Total Organic Carbon #2	0.604	0.330	1.00	NE	J		098880-004	SW846 9060
	Total Organic Carbon #3	0.614	0.330	1.00	NE	J		098880-004	SW846 9060
	Total Organic Carbon #4	0.609	0.330	1.00	NE	J		098880-004	SW846 9060
	Total Organic Carbon Average	0.605	0.330	1.00	NE	J		098880-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.455	0.330	1.00	NE	J		098852-004	SW846 9060
10-Feb-16	Total Organic Carbon #2	0.448	0.330	1.00	NE	J		098852-004	SW846 9060
	Total Organic Carbon #3	0.466	0.330	1.00	NE	J		098852-004	SW846 9060
	Total Organic Carbon #4	0.469	0.330	1.00	NE	J		098852-004	SW846 9060
	Total Organic Carbon Average	0.460	0.330	1.00	NE	J		098852-004	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	0.542	0.330	1.00	NE	J		098878-004	SW846 9060
23-Feb-16	Total Organic Carbon #2	0.576	0.330	1.00	NE	J		098878-004	SW846 9060
	Total Organic Carbon #3	0.580	0.330	1.00	NE	J		098878-004	SW846 9060
	Total Organic Carbon #4	0.575	0.330	1.00	NE	J		098878-004	SW846 9060
	Total Organic Carbon Average	0.568	0.330	1.00	NE	J		098878-004	SW846 9060
AVN-1	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099631-002	SW846 9060
17-May-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		099631-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		099631-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		099631-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		099631-002	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.454	0.330	1.00	NE	J		099641-002	SW846 9060
23-May-16	Total Organic Carbon #2	0.478	0.330	1.00	NE	J		099641-002	SW846 9060
	Total Organic Carbon #3	0.464	0.330	1.00	NE	J		099641-002	SW846 9060
	Total Organic Carbon #4	0.480	0.330	1.00	NE	J		099641-002	SW846 9060
	Total Organic Carbon Average	0.469	0.330	1.00	NE	J		099641-002	SW846 9060
LWDS-MW2	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099629-002	SW846 9060
16-May-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		099629-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		099629-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		099629-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		099629-002	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.380	0.330	1.00	NE	J		099582-002	SW846 9060
11-May-16	Total Organic Carbon #2	0.441	0.330	1.00	NE	J		099582-002	SW846 9060
	Total Organic Carbon #3	0.474	0.330	1.00	NE	J		099582-002	SW846 9060
	Total Organic Carbon #4	0.488	0.330	1.00	NE	J		099582-002	SW846 9060
	Total Organic Carbon Average	0.446	0.330	1.00	NE	J		099582-002	SW846 9060
TAV-MW3	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099569-002	SW846 9060
04-May-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		099569-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		099569-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		099569-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		099569-002	SW846 9060
TAV-MW3 (Duplicate)	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099570-002	SW846 9060
04-May-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		099570-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		099570-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		099570-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		099570-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099580-002	SW846 9060
10-May-16	Total Organic Carbon #2	0.358	0.330	1.00	NE	J		099580-002	SW846 9060
	Total Organic Carbon #3	0.351	0.330	1.00	NE	J		099580-002	SW846 9060
	Total Organic Carbon #4	0.354	0.330	1.00	NE	J		099580-002	SW846 9060
	Total Organic Carbon Average	0.344	0.330	1.00	NE	J		099580-002	SW846 9060
TAV-MW5	Total Organic Carbon #1	0.581	0.330	1.00	NE	J		099561-002	SW846 9060
02-May-16	Total Organic Carbon #2	0.541	0.330	1.00	NE	J		099561-002	SW846 9060
	Total Organic Carbon #3	0.524	0.330	1.00	NE	J		099561-002	SW846 9060
	Total Organic Carbon #4	0.482	0.330	1.00	NE	J		099561-002	SW846 9060
	Total Organic Carbon Average	0.532	0.330	1.00	NE	J		099561-002	SW846 9060
TAV-MW6	Total Organic Carbon #1	0.378	0.330	1.00	NE	J		099646-002	SW846 9060
25-May-16	Total Organic Carbon #2	0.395	0.330	1.00	NE	J		099646-002	SW846 9060
	Total Organic Carbon #3	0.391	0.330	1.00	NE	J		099646-002	SW846 9060
	Total Organic Carbon #4	0.394	0.330	1.00	NE	J		099646-002	SW846 9060
	Total Organic Carbon Average	0.390	0.330	1.00	NE	J		099646-002	SW846 9060
TAV-MW7	Total Organic Carbon #1	0.352	0.330	1.00	NE	J		099577-002	SW846 9060
09-May-16	Total Organic Carbon #2	0.424	0.330	1.00	NE	J		099577-002	SW846 9060
	Total Organic Carbon #3	0.419	0.330	1.00	NE	J		099577-002	SW846 9060
	Total Organic Carbon #4	0.452	0.330	1.00	NE	J		099577-002	SW846 9060
	Total Organic Carbon Average	0.412	0.330	1.00	NE	J		099577-002	SW846 9060
TAV-MW7 (Duplicate)	Total Organic Carbon #1	0.382	0.330	1.00	NE	J		099578-002	SW846 9060
09-May-16	Total Organic Carbon #2	0.437	0.330	1.00	NE	J		099578-002	SW846 9060
	Total Organic Carbon #3	0.438	0.330	1.00	NE	J		099578-002	SW846 9060
	Total Organic Carbon #4	0.431	0.330	1.00	NE	J		099578-002	SW846 9060
	Total Organic Carbon Average	0.422	0.330	1.00	NE	J		099578-002	SW846 9060
TAV-MW8	Total Organic Carbon #1	0.369	0.330	1.00	NE	J		099585-002	SW846 9060
12-May-16	Total Organic Carbon #2	0.417	0.330	1.00	NE	J		099585-002	SW846 9060
	Total Organic Carbon #3	0.415	0.330	1.00	NE	J		099585-002	SW846 9060
	Total Organic Carbon #4	0.436	0.330	1.00	NE	J		099585-002	SW846 9060
	Total Organic Carbon Average	0.409	0.330	1.00	NE	J		099585-002	SW846 9060
TAV-MW9	Total Organic Carbon #1	2.04	0.330	1.00	NE			099572-002	SW846 9060
05-May-16	Total Organic Carbon #2	2.13	0.330	1.00	NE			099572-002	SW846 9060
	Total Organic Carbon #3	2.18	0.330	1.00	NE			099572-002	SW846 9060
	Total Organic Carbon #4	2.18	0.330	1.00	NE			099572-002	SW846 9060
	Total Organic Carbon Average	2.14	0.330	1.00	NE			099572-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	0.353	0.330	1.00	NE	J		099648-002	SW846 9060
31-May-16	Total Organic Carbon #2	0.370	0.330	1.00	NE	J		099648-002	SW846 9060
	Total Organic Carbon #3	0.361	0.330	1.00	NE	J		099648-002	SW846 9060
	Total Organic Carbon #4	0.357	0.330	1.00	NE	J		099648-002	SW846 9060
	Total Organic Carbon Average	0.360	0.330	1.00	NE	J		099648-002	SW846 9060
TAV-MW11	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099633-002	SW846 9060
18-May-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		099633-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		099633-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		099633-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		099633-002	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.452	0.330	1.00	NE	J		099643-002	SW846 9060
24-May-16	Total Organic Carbon #2	0.425	0.330	1.00	NE	J		099643-002	SW846 9060
	Total Organic Carbon #3	0.395	0.330	1.00	NE	J		099643-002	SW846 9060
	Total Organic Carbon #4	0.421	0.330	1.00	NE	J		099643-002	SW846 9060
	Total Organic Carbon Average	0.423	0.330	1.00	NE	J		099643-002	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.468	0.330	1.00	NE	J		099563-002	SW846 9060
03-May-16	Total Organic Carbon #2	0.497	0.330	1.00	NE	J		099563-002	SW846 9060
	Total Organic Carbon #3	0.498	0.330	1.00	NE	J		099563-002	SW846 9060
	Total Organic Carbon #4	0.491	0.330	1.00	NE	J		099563-002	SW846 9060
	Total Organic Carbon Average	0.488	0.330	1.00	NE	J		099563-002	SW846 9060
TAV-MW14	Total Organic Carbon #1	ND	0.330	1.00	NE	U		099637-002	SW846 9060
19-May-16	Total Organic Carbon #2	0.351	0.330	1.00	NE	J		099637-002	SW846 9060
	Total Organic Carbon #3	0.367	0.330	1.00	NE	J		099637-002	SW846 9060
	Total Organic Carbon #4	0.358	0.330	1.00	NE	J		099637-002	SW846 9060
	Total Organic Carbon Average	0.347	0.330	1.00	NE	J		099637-002	SW846 9060
TAV-MW14 (Duplicate)	Total Organic Carbon #1	0.354	0.330	1.00	NE	J		099638-002	SW846 9060
19-May-16	Total Organic Carbon #2	0.340	0.330	1.00	NE	J		099638-002	SW846 9060
	Total Organic Carbon #3	0.365	0.330	1.00	NE	J		099638-002	SW846 9060
	Total Organic Carbon #4	0.357	0.330	1.00	NE	J		099638-002	SW846 9060
	Total Organic Carbon Average	0.354	0.330	1.00	NE	J		099638-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	0.449	0.330	1.00	NE	J		100068-002	SW846 9060
01-Aug-16	Total Organic Carbon #2	0.485	0.330	1.00	NE	J		100068-002	SW846 9060
	Total Organic Carbon #3	0.486	0.330	1.00	NE	J		100068-002	SW846 9060
	Total Organic Carbon #4	0.497	0.330	1.00	NE	J		100068-002	SW846 9060
	Total Organic Carbon Average	0.479	0.330	1.00	NE	J		100068-002	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.629	0.330	1.00	NE	J		100080-002	SW846 9060
08-Aug-16	Total Organic Carbon #2	0.680	0.330	1.00	NE	J		100080-002	SW846 9060
	Total Organic Carbon #3	0.661	0.330	1.00	NE	J		100080-002	SW846 9060
	Total Organic Carbon #4	0.671	0.330	1.00	NE	J		100080-002	SW846 9060
	Total Organic Carbon Average	0.660	0.330	1.00	NE	J		100080-002	SW846 9060
LWDS-MW1 (Duplicate)	Total Organic Carbon #1	0.630	0.330	1.00	NE	J		100081-002	SW846 9060
08-Aug-16	Total Organic Carbon #2	0.658	0.330	1.00	NE	J		100081-002	SW846 9060
	Total Organic Carbon #3	0.670	0.330	1.00	NE	J		100081-002	SW846 9060
	Total Organic Carbon #4	0.636	0.330	1.00	NE	J		100081-002	SW846 9060
	Total Organic Carbon Average	0.648	0.330	1.00	NE	J		100081-002	SW846 9060
LWDS-MW2	Total Organic Carbon #1	0.425	0.330	1.00	NE	J		100065-002	SW846 9060
28-Jul-16	Total Organic Carbon #2	0.444	0.330	1.00	NE	J		100065-002	SW846 9060
	Total Organic Carbon #3	0.446	0.330	1.00	NE	J		100065-002	SW846 9060
	Total Organic Carbon #4	0.446	0.330	1.00	NE	J		100065-002	SW846 9060
	Total Organic Carbon Average	0.440	0.330	1.00	NE	J		100065-002	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.513	0.330	1.00	NE	J		100059-002	SW846 9060
26-Jul-16	Total Organic Carbon #2	0.535	0.330	1.00	NE	J		100059-002	SW846 9060
	Total Organic Carbon #3	0.553	0.330	1.00	NE	J		100059-002	SW846 9060
	Total Organic Carbon #4	0.566	0.330	1.00	NE	J		100059-002	SW846 9060
	Total Organic Carbon Average	0.542	0.330	1.00	NE	J		100059-002	SW846 9060
TAV-MW2 (Duplicate)	Total Organic Carbon #1	0.492	0.330	1.00	NE	J		100060-002	SW846 9060
26-Jul-16	Total Organic Carbon #2	0.532	0.330	1.00	NE	J		100060-002	SW846 9060
	Total Organic Carbon #3	0.534	0.330	1.00	NE	J		100060-002	SW846 9060
	Total Organic Carbon #4	0.536	0.330	1.00	NE	J		100060-002	SW846 9060
	Total Organic Carbon Average	0.523	0.330	1.00	NE	J		100060-002	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.508	0.330	1.00	NE	J		100055-002	SW846 9060
25-Jul-16	Total Organic Carbon #2	0.511	0.330	1.00	NE	J		100055-002	SW846 9060
	Total Organic Carbon #3	0.510	0.330	1.00	NE	J		100055-002	SW846 9060
	Total Organic Carbon #4	0.518	0.330	1.00	NE	J		100055-002	SW846 9060
	Total Organic Carbon Average	0.512	0.330	1.00	NE	J		100055-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW6 09-Aug-16	Total Organic Carbon #1	0.465	0.330	1.00	NE	J		100086-002	SW846 9060
	Total Organic Carbon #2	0.484	0.330	1.00	NE	J		100086-002	SW846 9060
	Total Organic Carbon #3	0.495	0.330	1.00	NE	J		100086-002	SW846 9060
	Total Organic Carbon #4	0.483	0.330	1.00	NE	J		100086-002	SW846 9060
	Total Organic Carbon Average	0.482	0.330	1.00	NE	J		100086-002	SW846 9060
TAV-MW6 (Duplicate) 09-Aug-16	Total Organic Carbon #1	0.509	0.330	1.00	NE	J		100087-002	SW846 9060
	Total Organic Carbon #2	0.541	0.330	1.00	NE	J		100087-002	SW846 9060
	Total Organic Carbon #3	0.556	0.330	1.00	NE	J		100087-002	SW846 9060
	Total Organic Carbon #4	0.548	0.330	1.00	NE	J		100087-002	SW846 9060
	Total Organic Carbon Average	0.538	0.330	1.00	NE	J		100087-002	SW846 9060
TAV-MW8 27-Jul-16	Total Organic Carbon #1	0.458	0.330	1.00	NE	J		100062-002	SW846 9060
	Total Organic Carbon #2	0.473	0.330	1.00	NE	J		100062-002	SW846 9060
	Total Organic Carbon #3	0.469	0.330	1.00	NE	J		100062-002	SW846 9060
	Total Organic Carbon #4	0.471	0.330	1.00	NE	J		100062-002	SW846 9060
	Total Organic Carbon Average	0.468	0.330	1.00	NE	J		100062-002	SW846 9060
TAV-MW10 10-Aug-16	Total Organic Carbon #1	0.462	0.330	1.00	NE	J		100089-002	SW846 9060
	Total Organic Carbon #2	0.488	0.330	1.00	NE	J		100089-002	SW846 9060
	Total Organic Carbon #3	0.488	0.330	1.00	NE	J		100089-002	SW846 9060
	Total Organic Carbon #4	0.490	0.330	1.00	NE	J		100089-002	SW846 9060
	Total Organic Carbon Average	0.482	0.330	1.00	NE	J		100089-002	SW846 9060
TAV-MW11 02-Aug-16	Total Organic Carbon #1	0.484	0.330	1.00	NE	J		100070-002	SW846 9060
	Total Organic Carbon #2	0.526	0.330	1.00	NE	J		100070-002	SW846 9060
	Total Organic Carbon #3	0.551	0.330	1.00	NE	J		100070-002	SW846 9060
	Total Organic Carbon #4	0.555	0.330	1.00	NE	J		100070-002	SW846 9060
	Total Organic Carbon Average	0.529	0.330	1.00	NE	J		100070-002	SW846 9060
TAV-MW12 04-Aug-16	Total Organic Carbon #1	0.500	0.330	1.00	NE	J		100076-002	SW846 9060
	Total Organic Carbon #2	0.520	0.330	1.00	NE	J		100076-002	SW846 9060
	Total Organic Carbon #3	0.528	0.330	1.00	NE	J		100076-002	SW846 9060
	Total Organic Carbon #4	0.518	0.330	1.00	NE	J		100076-002	SW846 9060
	Total Organic Carbon Average	0.516	0.330	1.00	NE	J		100076-002	SW846 9060
TAV-MW13 21-Jul-16	Total Organic Carbon #1	0.449	0.330	1.00	NE	J		100052-002	SW846 9060
	Total Organic Carbon #2	0.466	0.330	1.00	NE	J		100052-002	SW846 9060
	Total Organic Carbon #3	0.484	0.330	1.00	NE	J		100052-002	SW846 9060
	Total Organic Carbon #4	0.470	0.330	1.00	NE	J		100052-002	SW846 9060
	Total Organic Carbon Average	0.467	0.330	1.00	NE	J		100052-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	0.498	0.330	1.00	NE	J		100072-002	SW846 9060
03-Aug-16	Total Organic Carbon #2	0.559	0.330	1.00	NE	J		100072-002	SW846 9060
	Total Organic Carbon #3	0.562	0.330	1.00	NE	J		100072-002	SW846 9060
	Total Organic Carbon #4	0.559	0.330	1.00	NE	J		100072-002	SW846 9060
	Total Organic Carbon Average	0.544	0.330	1.00	NE	J		100072-002	SW846 9060
AVN-1	Total Organic Carbon #1	ND	0.330	1.00	NE	U		101013-002	SW846 9060
10-Nov-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		101013-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		101013-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		101013-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		101013-002	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.378	0.330	1.00	NE	J		101030-002	SW846 9060
21-Nov-16	Total Organic Carbon #2	0.434	0.330	1.00	NE	J		101030-002	SW846 9060
	Total Organic Carbon #3	0.449	0.330	1.00	NE	J		101030-002	SW846 9060
	Total Organic Carbon #4	0.461	0.330	1.00	NE	J		101030-002	SW846 9060
	Total Organic Carbon Average	0.430	0.330	1.00	NE	J		101030-002	SW846 9060
LWDS-MW2	Total Organic Carbon #1	0.428	0.330	1.00	NE	J		101007-002	SW846 9060
07-Nov-16	Total Organic Carbon #2	0.475	0.330	1.00	NE	J		101007-002	SW846 9060
	Total Organic Carbon #3	0.482	0.330	1.00	NE	J		101007-002	SW846 9060
	Total Organic Carbon #4	0.496	0.330	1.00	NE	J		101007-002	SW846 9060
	Total Organic Carbon Average	0.470	0.330	1.00	NE	J		101007-002	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.330	0.330	1.00	NE	J		101009-002	SW846 9060
08-Nov-16	Total Organic Carbon #2	0.382	0.330	1.00	NE	J		101009-002	SW846 9060
	Total Organic Carbon #3	0.408	0.330	1.00	NE	J		101009-002	SW846 9060
	Total Organic Carbon #4	0.408	0.330	1.00	NE	J		101009-002	SW846 9060
	Total Organic Carbon Average	0.382	0.330	1.00	NE	J		101009-002	SW846 9060
TAV-MW3	Total Organic Carbon #1	0.455	0.330	1.00	NE	J		101005-002	SW846 9060
03-Nov-16	Total Organic Carbon #2	0.512	0.330	1.00	NE	J		101005-002	SW846 9060
	Total Organic Carbon #3	0.511	0.330	1.00	NE	J		101005-002	SW846 9060
	Total Organic Carbon #4	0.518	0.330	1.00	NE	J		101005-002	SW846 9060
	Total Organic Carbon Average	0.499	0.330	1.00	NE	J		101005-002	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.384	0.330	1.00	NE	J		101015-002	SW846 9060
14-Nov-16	Total Organic Carbon #2	0.480	0.330	1.00	NE	J		101015-002	SW846 9060
	Total Organic Carbon #3	0.491	0.330	1.00	NE	J		101015-002	SW846 9060
	Total Organic Carbon #4	0.509	0.330	1.00	NE	J		101015-002	SW846 9060
	Total Organic Carbon Average	0.466	0.330	1.00	NE	J		101015-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Continued)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 31-Oct-16	Total Organic Carbon #1	ND	0.330	1.00	NE	U		100997-002	SW846 9060
	Total Organic Carbon #2	0.340	0.330	1.00	NE	J		100997-002	SW846 9060
	Total Organic Carbon #3	0.345	0.330	1.00	NE	J		100997-002	SW846 9060
	Total Organic Carbon #4	0.331	0.330	1.00	NE	J		100997-002	SW846 9060
	Total Organic Carbon Average	0.333	0.330	1.00	NE	J		100997-002	SW846 9060
TAV-MW5 (Duplicate) 31-Oct-16	Total Organic Carbon #1	0.436	0.330	1.00	NE	J		100998-002	SW846 9060
	Total Organic Carbon #2	0.479	0.330	1.00	NE	J		100998-002	SW846 9060
	Total Organic Carbon #3	0.502	0.330	1.00	NE	J		100998-002	SW846 9060
	Total Organic Carbon #4	0.493	0.330	1.00	NE	J		100998-002	SW846 9060
	Total Organic Carbon Average	0.478	0.330	1.00	NE	J		100998-002	SW846 9060
TAV-MW6 28-Nov-16	Total Organic Carbon #1	0.810	0.330	1.00	NE	J		101032-002	SW846 9060
	Total Organic Carbon #2	0.706	0.330	1.00	NE	J		101032-002	SW846 9060
	Total Organic Carbon #3	0.652	0.330	1.00	NE	J		101032-002	SW846 9060
	Total Organic Carbon #4	0.618	0.330	1.00	NE	J		101032-002	SW846 9060
	Total Organic Carbon Average	0.697	0.330	1.00	NE	J		101032-002	SW846 9060
TAV-MW7 02-Nov-16	Total Organic Carbon #1	0.483	0.330	1.00	NE	J		101003-002	SW846 9060
	Total Organic Carbon #2	0.536	0.330	1.00	NE	J		101003-002	SW846 9060
	Total Organic Carbon #3	0.559	0.330	1.00	NE	J		101003-002	SW846 9060
	Total Organic Carbon #4	0.557	0.330	1.00	NE	J		101003-002	SW846 9060
	Total Organic Carbon Average	0.534	0.330	1.00	NE	J		101003-002	SW846 9060
TAV-MW8 15-Nov-16	Total Organic Carbon #1	0.527	0.330	1.00	NE	J		101018-002	SW846 9060
	Total Organic Carbon #2	0.587	0.330	1.00	NE	J		101018-002	SW846 9060
	Total Organic Carbon #3	0.611	0.330	1.00	NE	J		101018-002	SW846 9060
	Total Organic Carbon #4	0.619	0.330	1.00	NE	J		101018-002	SW846 9060
	Total Organic Carbon Average	0.586	0.330	1.00	NE	J		101018-002	SW846 9060
TAV-MW9 01-Nov-16	Total Organic Carbon #1	0.760	0.330	1.00	NE	J		101001-002	SW846 9060
	Total Organic Carbon #2	0.823	0.330	1.00	NE	J		101001-002	SW846 9060
	Total Organic Carbon #3	0.857	0.330	1.00	NE	J		101001-002	SW846 9060
	Total Organic Carbon #4	0.867	0.330	1.00	NE	J		101001-002	SW846 9060
	Total Organic Carbon Average	0.827	0.330	1.00	NE	J		101001-002	SW846 9060
TAV-MW10 29-Nov-16	Total Organic Carbon #1	ND	0.330	1.00	NE	U		101034-002	SW846 9060
	Total Organic Carbon #2	ND	0.330	1.00	NE	U		101034-002	SW846 9060
	Total Organic Carbon #3	0.332	0.330	1.00	NE	J		101034-002	SW846 9060
	Total Organic Carbon #4	0.333	0.330	1.00	NE	J		101034-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		101034-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-5 *(Concluded)*
Summary of Total Organic Carbon Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Total Organic Carbon #1	ND	0.330	1.00	NE	U		101011-002	SW846 9060
09-Nov-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		101011-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		101011-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		101011-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		101011-002	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.508	0.330	1.00	NE	J		101023-002	SW846 9060
16-Nov-16	Total Organic Carbon #2	0.598	0.330	1.00	NE	J		101023-002	SW846 9060
	Total Organic Carbon #3	0.607	0.330	1.00	NE	J		101023-002	SW846 9060
	Total Organic Carbon #4	0.618	0.330	1.00	NE	J	4.2U	101023-002	SW846 9060
	Total Organic Carbon Average	0.583	0.330	1.00	NE	J	2.2U	101023-002	SW846 9060
TAV-MW12 (Duplicate)	Total Organic Carbon #1	ND	0.330	1.00	NE	U		101024-002	SW846 9060
16-Nov-16	Total Organic Carbon #2	0.391	0.330	1.00	NE	J		101024-002	SW846 9060
	Total Organic Carbon #3	0.393	0.330	1.00	NE	J		101024-002	SW846 9060
	Total Organic Carbon #4	0.412	0.330	1.00	NE	J	4.2U	101024-002	SW846 9060
	Total Organic Carbon Average	0.377	0.330	1.00	NE	J	2.2U	101024-002	SW846 9060
TAV-MW13	Total Organic Carbon #1	ND	0.330	1.00	NE	U		100992-002	SW846 9060
27-Oct-16	Total Organic Carbon #2	ND	0.330	1.00	NE	U		100992-002	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		100992-002	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		100992-002	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		100992-002	SW846 9060
TAV-MW13 (Duplicate)	Total Organic Carbon #1	0.605	0.330	1.00	NE	J	1.8U	100993-002	SW846 9060
27-Oct-16	Total Organic Carbon #2	0.652	0.330	1.00	NE	J	1.7U	100993-002	SW846 9060
	Total Organic Carbon #3	0.662	0.330	1.00	NE	J	1.7U	100993-002	SW846 9060
	Total Organic Carbon #4	1.37	0.330	1.00	NE			100993-002	SW846 9060
	Total Organic Carbon Average	0.822	0.330	1.00	NE	J	1.7U	100993-002	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.496	0.330	1.00	NE	J		101027-002	SW846 9060
17-Nov-16	Total Organic Carbon #2	0.549	0.330	1.00	NE	J		101027-002	SW846 9060
	Total Organic Carbon #3	0.572	0.330	1.00	NE	J		101027-002	SW846 9060
	Total Organic Carbon #4	0.566	0.330	1.00	NE	J		101027-002	SW846 9060
	Total Organic Carbon Average	0.546	0.330	1.00	NE	J		101027-002	SW846 9060

Refer to footnotes on page 5B-71.

Table 5B-6
Summary of Unfiltered Metals Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Calcium	43.0	0.060	0.200	NE	B		098869-017	SW846 6020
18-Feb-16	Magnesium	10.2	0.010	0.030	NE			098869-017	SW846 6020
	Potassium	3.41	0.080	0.300	NE			098869-017	SW846 6020
	Sodium	41.4	0.080	0.250	NE			098869-017	SW846 6020
AVN-1 (Duplicate)	Calcium	43.0	0.060	0.200	NE	B		098870-017	SW846 6020
18-Feb-16	Magnesium	10.2	0.010	0.030	NE			098870-017	SW846 6020
	Potassium	3.39	0.080	0.300	NE			098870-017	SW846 6020
	Sodium	40.7	0.080	0.250	NE			098870-017	SW846 6020
LWDS-MW1	Calcium	77.1	0.300	1.00	NE	B		098885-017	SW846 6020
29-Feb-16	Magnesium	19.2	0.010	0.030	NE			098885-017	SW846 6020
	Potassium	3.12	0.080	0.300	NE			098885-017	SW846 6020
	Sodium	78.6	0.400	1.25	NE			098885-017	SW846 6020
LWDS-MW2	Calcium	46.0	0.060	0.200	NE	B		098864-017	SW846 6020
17-Feb-16	Magnesium	14.0	0.010	0.030	NE			098864-017	SW846 6020
	Potassium	2.82	0.080	0.300	NE			098864-017	SW846 6020
	Sodium	45.8	0.080	0.250	NE			098864-017	SW846 6020
LWDS-MW2 (Duplicate)	Calcium	44.7	0.060	0.200	NE	B		098865-017	SW846 6020
17-Feb-16	Magnesium	13.6	0.010	0.030	NE			098865-017	SW846 6020
	Potassium	2.73	0.080	0.300	NE			098865-017	SW846 6020
	Sodium	44.8	0.080	0.250	NE			098865-017	SW846 6020
TAV-MW2	Calcium	72.5	0.300	1.00	NE	B		098858-017	SW846 6020
15-Feb-16	Magnesium	22.5	0.010	0.030	NE			098858-017	SW846 6020
	Potassium	3.74	0.080	0.300	NE			098858-017	SW846 6020
	Sodium	69.5	0.400	1.25	NE			098858-017	SW846 6020
TAV-MW4	Calcium	53.0	0.600	2.00	NE	B		098855-017	SW846 6020
11-Feb-16	Magnesium	15.2	0.050	0.150	NE			098855-017	SW846 6020
	Potassium	3.38	0.080	0.300	NE			098855-017	SW846 6020
	Sodium	46.5	0.400	1.25	NE			098855-017	SW846 6020
TAV-MW6	Calcium	73.0	0.300	1.00	NE	B		098882-017	SW846 6020
25-Feb-16	Magnesium	19.2	0.010	0.030	NE			098882-017	SW846 6020
	Potassium	3.67	0.080	0.300	NE			098882-017	SW846 6020
	Sodium	70.3	0.800	2.50	NE			098882-017	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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	Calcium	58.2	0.300	1.00	NE	B		098860-017	SW846 6020
16-Feb-16	Magnesium	17.1	0.010	0.030	NE			098860-017	SW846 6020
	Potassium	3.76	0.080	0.300	NE			098860-017	SW846 6020
	Sodium	59.8	0.400	1.25	NE			098860-017	SW846 6020
TAV-MW10	Calcium	60.2	0.300	1.00	NE	B		098887-017	SW846 6020
01-Mar-16	Magnesium	15.2	0.010	0.030	NE			098887-017	SW846 6020
	Potassium	3.94	0.080	0.300	NE			098887-017	SW846 6020
	Sodium	57.1	0.400	1.25	NE			098887-017	SW846 6020
TAV-MW11	Calcium	64.0	0.300	1.00	NE	B		098875-017	SW846 6020
22-Feb-16	Magnesium	15.4	0.010	0.030	NE			098875-017	SW846 6020
	Potassium	3.76	0.080	0.300	NE			098875-017	SW846 6020
	Sodium	58.1	0.800	2.50	NE			098875-017	SW846 6020
TAV-MW11 (Duplicate)	Calcium	62.1	0.300	1.00	NE	B		098876-017	SW846 6020
22-Feb-16	Magnesium	15.3	0.010	0.030	NE			098876-017	SW846 6020
	Potassium	3.73	0.080	0.300	NE			098876-017	SW846 6020
	Sodium	58.1	0.800	2.50	NE			098876-017	SW846 6020
TAV-MW12	Calcium	66.2	0.300	1.00	NE	B		098880-017	SW846 6020
24-Feb-16	Magnesium	19.0	0.010	0.030	NE			098880-017	SW846 6020
	Potassium	3.88	0.080	0.300	NE			098880-017	SW846 6020
	Sodium	63.6	0.800	2.50	NE			098880-017	SW846 6020
TAV-MW13	Calcium	52.5	0.600	2.00	NE	B		098852-017	SW846 6020
10-Feb-16	Magnesium	16.5	0.050	0.150	NE			098852-017	SW846 6020
	Potassium	3.68	0.080	0.300	NE			098852-017	SW846 6020
	Sodium	51.3	0.800	2.50	NE			098852-017	SW846 6020
TAV-MW14	Calcium	69.1	0.300	1.00	NE	B		098878-017	SW846 6020
23-Feb-16	Magnesium	18.3	0.010	0.030	NE			098878-017	SW846 6020
	Potassium	4.23	0.080	0.300	NE			098878-017	SW846 6020
	Sodium	65.1	0.800	2.50	NE			098878-017	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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]
AVN-1	Aluminum	0.0709	0.015	0.050	NE			099631-003	SW846 6020
17-May-16	Antimony	ND	0.001	0.003	0.006	U		099631-003	SW846 6020
	Arsenic	0.00264	0.0017	0.005	0.010	B, J	0.011U	099631-003	SW846 6020
	Barium	0.0797	0.0006	0.002	2.00			099631-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099631-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099631-003	SW846 6020
	Calcium	46.7	0.060	0.200	NE			099631-003	SW846 6020
	Chromium	0.0195	0.002	0.010	0.100			099631-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099631-003	SW846 6020
	Copper	0.00168	0.00035	0.001	NE			099631-003	SW846 6020
	Iron	0.138	0.033	0.100	NE			099631-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099631-003	SW846 6020
	Magnesium	11.1	0.010	0.030	NE			099631-003	SW846 6020
	Manganese	0.00142	0.001	0.005	NE	J		099631-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099631-003	SW846 7470
	Nickel	0.00222	0.0005	0.002	NE			099631-003	SW846 6020
	Potassium	3.68	0.080	0.300	NE			099631-003	SW846 6020
	Selenium	0.00215	0.0015	0.005	0.050	J		099631-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099631-003	SW846 6020
	Sodium	43.7	0.080	0.250	NE			099631-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099631-003	SW846 6020
	Uranium	0.00209	0.000067	0.0002	0.030			099631-003	SW846 6020
	Vanadium	0.00984	0.0045	0.010	NE	J		099631-003	SW846 6010
	Zinc	0.00517	0.0035	0.010	NE	J		099631-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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]
LWDS-MW1	Aluminum	0.0267	0.015	0.050	NE	J		099641-003	SW846 6020
23-May-16	Antimony	ND	0.001	0.003	0.006	U		099641-003	SW846 6020
	Arsenic	0.00376	0.0017	0.005	0.010	J		099641-003	SW846 6020
	Barium	0.0779	0.0006	0.002	2.00			099641-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099641-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099641-003	SW846 6020
	Calcium	66.2	0.600	2.00	NE			099641-003	SW846 6020
	Chromium	0.00205	0.002	0.010	0.100	J		099641-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099641-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099641-003	SW846 6020
	Iron	0.0354	0.033	0.100	NE	J		099641-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099641-003	SW846 6020
	Magnesium	20.4	0.010	0.030	NE	B		099641-003	SW846 6020
	Manganese	0.00136	0.001	0.005	NE	J		099641-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099641-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099641-003	SW846 6020
	Potassium	3.12	0.080	0.300	NE			099641-003	SW846 6020
	Selenium	0.00545	0.0015	0.005	0.050			099641-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099641-003	SW846 6020
	Sodium	65.0	0.800	2.50	NE			099641-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099641-003	SW846 6020
	Uranium	0.00283	0.000067	0.0002	0.030			099641-003	SW846 6020
	Vanadium	0.00486	0.0045	0.010	NE	J		099641-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099641-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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]
LWDS-MW2	Aluminum	0.0154	0.015	0.050	NE	J		099629-003	SW846 6020
16-May-16	Antimony	ND	0.001	0.003	0.006	U		099629-003	SW846 6020
	Arsenic	0.00243	0.0017	0.005	0.010	B, J	0.011U	099629-003	SW846 6020
	Barium	0.0683	0.0006	0.002	2.00			099629-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099629-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099629-003	SW846 6020
	Calcium	47.8	0.060	0.200	NE			099629-003	SW846 6020
	Chromium	0.00324	0.002	0.010	0.100	J		099629-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099629-003	SW846 6020
	Copper	0.00129	0.00035	0.001	NE			099629-003	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099629-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099629-003	SW846 6020
	Magnesium	14.3	0.010	0.030	NE			099629-003	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099629-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099629-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099629-003	SW846 6020
	Potassium	2.92	0.080	0.300	NE			099629-003	SW846 6020
	Selenium	0.00232	0.0015	0.005	0.050	J		099629-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099629-003	SW846 6020
	Sodium	47.0	0.080	0.250	NE			099629-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099629-003	SW846 6020
	Uranium	0.00297	0.000067	0.0002	0.030			099629-003	SW846 6020
	Vanadium	0.00804	0.0045	0.010	NE	J		099629-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099629-003	SW846 6020

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Table 5B-6 *(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]
TAV-MW2	Aluminum	0.0567	0.015	0.050	NE			099582-003	SW846 6020
11-May-16	Antimony	ND	0.001	0.003	0.006	U		099582-003	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		099582-003	SW846 6020
	Barium	0.0652	0.0006	0.002	2.00			099582-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099582-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099582-003	SW846 6020
	Calcium	69.5	0.600	2.00	NE			099582-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099582-003	SW846 6020
	Cobalt	0.000177	0.0001	0.001	NE	J	0.00053U	099582-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099582-003	SW846 6020
	Iron	0.160	0.033	0.100	NE			099582-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099582-003	SW846 6020
	Magnesium	22.1	0.010	0.030	NE			099582-003	SW846 6020
	Manganese	0.00667	0.001	0.005	NE			099582-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099582-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099582-003	SW846 6020
	Potassium	3.76	0.080	0.300	NE			099582-003	SW846 6020
	Selenium	0.0025	0.0015	0.005	0.050	J		099582-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099582-003	SW846 6020
	Sodium	65.6	0.800	2.50	NE			099582-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099582-003	SW846 6020
	Uranium	0.00577	0.000067	0.0002	0.030			099582-003	SW846 6020
	Vanadium	0.00549	0.0045	0.010	NE	J		099582-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099582-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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]
TAV-MW3	Aluminum	0.0969	0.015	0.050	NE			099569-003	SW846 6020
04-May-16	Antimony	ND	0.001	0.003	0.006	U		099569-003	SW846 6020
	Arsenic	0.00234	0.0017	0.005	0.010	J		099569-003	SW846 6020
	Barium	0.0582	0.0006	0.002	2.00			099569-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099569-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099569-003	SW846 6020
	Calcium	61.9	0.600	2.00	NE			099569-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099569-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099569-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099569-003	SW846 6020
	Iron	0.0757	0.033	0.100	NE	J		099569-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099569-003	SW846 6020
	Magnesium	16.8	0.010	0.030	NE			099569-003	SW846 6020
	Manganese	0.00523	0.001	0.005	NE			099569-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099569-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099569-003	SW846 6020
	Potassium	4.84	0.080	0.300	NE			099569-003	SW846 6020
	Selenium	0.00188	0.0015	0.005	0.050	J		099569-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099569-003	SW846 6020
	Sodium	60.1	0.800	2.50	NE		J	099569-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099569-003	SW846 6020
	Uranium	0.00368	0.000067	0.0002	0.030			099569-003	SW846 6020
	Vanadium	0.00596	0.0045	0.010	NE	J		099569-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099569-003	SW846 6020

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Table 5B-6 *(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]
TAV-MW3 (Duplicate)	Aluminum	0.099	0.015	0.050	NE			099570-003	SW846 6020
04-May-16	Antimony	ND	0.001	0.003	0.006	U		099570-003	SW846 6020
	Arsenic	0.00241	0.0017	0.005	0.010	J		099570-003	SW846 6020
	Barium	0.0587	0.0006	0.002	2.00			099570-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099570-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099570-003	SW846 6020
	Calcium	63.0	0.600	2.00	NE			099570-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099570-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099570-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099570-003	SW846 6020
	Iron	0.123	0.033	0.100	NE			099570-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099570-003	SW846 6020
	Magnesium	17.4	0.010	0.030	NE			099570-003	SW846 6020
	Manganese	0.00546	0.001	0.005	NE			099570-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099570-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099570-003	SW846 6020
	Potassium	5.06	0.080	0.300	NE			099570-003	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		099570-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099570-003	SW846 6020
	Sodium	61.8	0.800	2.50	NE		J	099570-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099570-003	SW846 6020
	Uranium	0.00381	0.000067	0.0002	0.030			099570-003	SW846 6020
	Vanadium	0.0066	0.0045	0.010	NE	J		099570-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099570-003	SW846 6020

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Table 5B-6 *(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]
TAV-MW4	Aluminum	0.0234	0.015	0.050	NE	J		099580-003	SW846 6020
10-May-16	Antimony	ND	0.001	0.003	0.006	U		099580-003	SW846 6020
	Arsenic	0.00192	0.0017	0.005	0.010	J		099580-003	SW846 6020
	Barium	0.0955	0.0006	0.002	2.00			099580-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099580-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099580-003	SW846 6020
	Calcium	49.6	0.060	0.200	NE			099580-003	SW846 6020
	Chromium	0.0282	0.002	0.010	0.100			099580-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099580-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099580-003	SW846 6020
	Iron	0.105	0.033	0.100	NE			099580-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099580-003	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			099580-003	SW846 6020
	Manganese	0.00126	0.001	0.005	NE	J		099580-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099580-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099580-003	SW846 6020
	Potassium	3.27	0.080	0.300	NE			099580-003	SW846 6020
	Selenium	0.00302	0.0015	0.005	0.050	J		099580-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099580-003	SW846 6020
	Sodium	44.2	0.080	0.250	NE			099580-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099580-003	SW846 6020
	Uranium	0.00299	0.000067	0.0002	0.030			099580-003	SW846 6020
	Vanadium	0.0068	0.0045	0.010	NE	J		099580-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099580-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW5	Aluminum	0.0334	0.015	0.050	NE	J		099561-003	SW846 6020
02-May-16	Antimony	ND	0.001	0.003	0.006	U		099561-003	SW846 6020
	Arsenic	0.00247	0.0017	0.005	0.010	J		099561-003	SW846 6020
	Barium	0.0758	0.0006	0.002	2.00			099561-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099561-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099561-003	SW846 6020
	Calcium	54.8	0.600	2.00	NE			099561-003	SW846 6020
	Chromium	0.00312	0.002	0.010	0.100	J		099561-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099561-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099561-003	SW846 6020
	Iron	0.0342	0.033	0.100	NE	J		099561-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099561-003	SW846 6020
	Magnesium	16.2	0.010	0.030	NE			099561-003	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099561-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099561-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099561-003	SW846 6020
	Potassium	3.20	0.080	0.300	NE			099561-003	SW846 6020
	Selenium	0.00197	0.0015	0.005	0.050	J		099561-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099561-003	SW846 6020
	Sodium	56.2	0.800	2.50	NE		J	099561-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099561-003	SW846 6020
	Uranium	0.0035	0.000067	0.0002	0.030			099561-003	SW846 6020
	Vanadium	0.00724	0.0045	0.010	NE	J		099561-003	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		099561-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW6	Aluminum	0.043	0.015	0.050	NE	J		099646-003	SW846 6020
25-May-16	Antimony	ND	0.001	0.003	0.006	U		099646-003	SW846 6020
	Arsenic	0.00402	0.0017	0.005	0.010	J		099646-003	SW846 6020
	Barium	0.0663	0.0006	0.002	2.00			099646-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099646-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099646-003	SW846 6020
	Calcium	64.5	0.600	2.00	NE			099646-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099646-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099646-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099646-003	SW846 6020
	Iron	0.0483	0.033	0.100	NE	J		099646-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099646-003	SW846 6020
	Magnesium	19.1	0.010	0.030	NE	B		099646-003	SW846 6020
	Manganese	0.00149	0.001	0.005	NE	J		099646-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099646-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099646-003	SW846 6020
	Potassium	3.70	0.080	0.300	NE			099646-003	SW846 6020
	Selenium	0.00453	0.0015	0.005	0.050	J		099646-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099646-003	SW846 6020
	Sodium	63.8	0.800	2.50	NE			099646-003	SW846 6020
	Thallium	0.000864	0.00045	0.002	0.002	B, J	0.0050U	099646-003	SW846 6020
	Uranium	0.00369	0.000067	0.0002	0.030			099646-003	SW846 6020
	Vanadium	0.00691	0.0045	0.010	NE	J		099646-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099646-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW7	Aluminum	ND	0.015	0.050	NE	U		099577-003	SW846 6020
09-May-16	Antimony	ND	0.001	0.003	0.006	U		099577-003	SW846 6020
	Arsenic	0.00189	0.0017	0.005	0.010	J		099577-003	SW846 6020
	Barium	0.0583	0.0006	0.002	2.00			099577-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099577-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099577-003	SW846 6020
	Calcium	59.3	0.600	2.00	NE			099577-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099577-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099577-003	SW846 6020
	Copper	0.000627	0.00035	0.001	NE	J	0.010U	099577-003	SW846 6020
	Iron	0.101	0.033	0.100	NE			099577-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099577-003	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			099577-003	SW846 6020
	Manganese	0.00409	0.001	0.005	NE	J		099577-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099577-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099577-003	SW846 6020
	Potassium	4.19	0.080	0.300	NE			099577-003	SW846 6020
	Selenium	0.00208	0.0015	0.005	0.050	J		099577-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099577-003	SW846 6020
	Sodium	57.2	0.800	2.50	NE			099577-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099577-003	SW846 6020
	Uranium	0.00459	0.000067	0.0002	0.030			099577-003	SW846 6020
	Vanadium	0.00661	0.0045	0.010	NE	J		099577-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099577-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW7 (Duplicate)	Aluminum	0.0205	0.015	0.050	NE	J		099578-003	SW846 6020
09-May-16	Antimony	ND	0.001	0.003	0.006	U		099578-003	SW846 6020
	Arsenic	0.00175	0.0017	0.005	0.010	J		099578-003	SW846 6020
	Barium	0.0588	0.0006	0.002	2.00			099578-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099578-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099578-003	SW846 6020
	Calcium	57.7	0.600	2.00	NE			099578-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099578-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099578-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099578-003	SW846 6020
	Iron	0.108	0.033	0.100	NE			099578-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099578-003	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			099578-003	SW846 6020
	Manganese	0.00442	0.001	0.005	NE	J		099578-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099578-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099578-003	SW846 6020
	Potassium	4.21	0.080	0.300	NE			099578-003	SW846 6020
	Selenium	0.00211	0.0015	0.005	0.050	J		099578-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099578-003	SW846 6020
	Sodium	56.0	0.800	2.50	NE			099578-003	SW846 6020
	Thallium	0.000523	0.00045	0.002	0.002	J	0.0029U	099578-003	SW846 6020
	Uranium	0.00473	0.000067	0.0002	0.030			099578-003	SW846 6020
	Vanadium	0.00671	0.0045	0.010	NE	J		099578-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099578-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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	Aluminum	0.0972	0.015	0.050	NE			099585-003	SW846 6020
12-May-16	Antimony	ND	0.001	0.003	0.006	U		099585-003	SW846 6020
	Arsenic	0.00171	0.0017	0.005	0.010	J		099585-003	SW846 6020
	Barium	0.0599	0.0006	0.002	2.00			099585-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099585-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099585-003	SW846 6020
	Calcium	56.1	0.600	2.00	NE			099585-003	SW846 6020
	Chromium	0.00251	0.002	0.010	0.100	J		099585-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099585-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099585-003	SW846 6020
	Iron	0.161	0.033	0.100	NE			099585-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099585-003	SW846 6020
	Magnesium	16.7	0.010	0.030	NE			099585-003	SW846 6020
	Manganese	0.00251	0.001	0.005	NE	J		099585-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099585-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099585-003	SW846 6020
	Potassium	3.91	0.080	0.300	NE			099585-003	SW846 6020
	Selenium	0.00269	0.0015	0.005	0.050	J		099585-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099585-003	SW846 6020
	Sodium	56.0	0.800	2.50	NE			099585-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099585-003	SW846 6020
	Uranium	0.00331	0.000067	0.0002	0.030			099585-003	SW846 6020
	Vanadium	0.00659	0.0045	0.010	NE	J		099585-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099585-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW9	Aluminum	0.0697	0.015	0.050	NE			099572-003	SW846 6020
05-May-16	Antimony	ND	0.001	0.003	0.006	U		099572-003	SW846 6020
	Arsenic	0.00214	0.0017	0.005	0.010	J		099572-003	SW846 6020
	Barium	0.0804	0.0006	0.002	2.00			099572-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099572-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099572-003	SW846 6020
	Calcium	64.5	0.600	2.00	NE			099572-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099572-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099572-003	SW846 6020
	Copper	0.00075	0.00035	0.001	NE	J		099572-003	SW846 6020
	Iron	0.0824	0.033	0.100	NE	J		099572-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099572-003	SW846 6020
	Magnesium	21.6	0.010	0.030	NE			099572-003	SW846 6020
	Manganese	0.0108	0.001	0.005	NE			099572-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099572-003	SW846 7470
	Nickel	0.00108	0.0005	0.002	NE	J		099572-003	SW846 6020
	Potassium	4.52	0.080	0.300	NE			099572-003	SW846 6020
	Selenium	0.00177	0.0015	0.005	0.050	J		099572-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099572-003	SW846 6020
	Sodium	61.7	0.800	2.50	NE		J	099572-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099572-003	SW846 6020
	Uranium	0.00575	0.000067	0.0002	0.030			099572-003	SW846 6020
	Vanadium	0.00696	0.0045	0.010	NE	J		099572-003	SW846 6020
	Zinc	0.0134	0.0035	0.010	NE			099572-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW10	Aluminum	ND	0.015	0.050	NE	U		099648-003	SW846 6020
31-May-16	Antimony	ND	0.001	0.003	0.006	U		099648-003	SW846 6020
	Arsenic	0.00233	0.0017	0.005	0.010	J		099648-003	SW846 6020
	Barium	0.059	0.0006	0.002	2.00			099648-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099648-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099648-003	SW846 6020
	Calcium	56.7	0.600	2.00	NE			099648-003	SW846 6020
	Chromium	0.00214	0.002	0.010	0.100	J		099648-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099648-003	SW846 6020
	Copper	0.000587	0.00035	0.001	NE	J		099648-003	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099648-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099648-003	SW846 6020
	Magnesium	16.7	0.010	0.030	NE			099648-003	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099648-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099648-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099648-003	SW846 6020
	Potassium	4.14	0.080	0.300	NE			099648-003	SW846 6020
	Selenium	0.00269	0.0015	0.005	0.050	J		099648-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099648-003	SW846 6020
	Sodium	57.8	0.800	2.50	NE			099648-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099648-003	SW846 6020
	Uranium	0.00308	0.000067	0.0002	0.030			099648-003	SW846 6020
	Vanadium	0.00654	0.0045	0.010	NE	J		099648-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099648-003	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW11	Aluminum	ND	0.015	0.050	NE	U		099633-003	SW846 6020
18-May-16	Antimony	ND	0.001	0.003	0.006	U		099633-003	SW846 6020
	Arsenic	0.00206	0.0017	0.005	0.010	B, J	0.011U	099633-003	SW846 6020
	Barium	0.0685	0.0006	0.002	2.00			099633-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099633-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099633-003	SW846 6020
	Calcium	58.7	0.600	2.00	NE			099633-003	SW846 6020
	Chromium	0.00332	0.002	0.010	0.100	J		099633-003	SW846 6020
	Cobalt	0.000121	0.0001	0.001	NE	J	0.00058U	099633-003	SW846 6020
	Copper	0.00185	0.00035	0.001	NE			099633-003	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099633-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099633-003	SW846 6020
	Magnesium	17.1	0.010	0.030	NE			099633-003	SW846 6020
	Manganese	0.0017	0.001	0.005	NE	J		099633-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099633-003	SW846 7470
	Nickel	0.000687	0.0005	0.002	NE	J		099633-003	SW846 6020
	Potassium	4.09	0.080	0.300	NE			099633-003	SW846 6020
	Selenium	0.00418	0.0015	0.005	0.050	J		099633-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099633-003	SW846 6020
	Sodium	57.8	0.800	2.50	NE			099633-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099633-003	SW846 6020
	Uranium	0.00289	0.000067	0.0002	0.030			099633-003	SW846 6020
	Vanadium	0.00774	0.0045	0.010	NE	J		099633-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099633-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW12	Aluminum	0.109	0.015	0.050	NE			099643-003	SW846 6020
24-May-16	Antimony	ND	0.001	0.003	0.006	U		099643-003	SW846 6020
	Arsenic	0.00258	0.0017	0.005	0.010	J		099643-003	SW846 6020
	Barium	0.0778	0.0006	0.002	2.00			099643-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099643-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099643-003	SW846 6020
	Calcium	62.4	0.600	2.00	NE			099643-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099643-003	SW846 6020
	Cobalt	0.000201	0.0001	0.001	NE	J		099643-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099643-003	SW846 6020
	Iron	0.109	0.033	0.100	NE			099643-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099643-003	SW846 6020
	Magnesium	18.9	0.010	0.030	NE	B		099643-003	SW846 6020
	Manganese	0.0212	0.001	0.005	NE			099643-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099643-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099643-003	SW846 6020
	Potassium	3.92	0.080	0.300	NE			099643-003	SW846 6020
	Selenium	0.00203	0.0015	0.005	0.050	J		099643-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099643-003	SW846 6020
	Sodium	61.7	0.800	2.50	NE			099643-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099643-003	SW846 6020
	Uranium	0.00533	0.000067	0.0002	0.030			099643-003	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		099643-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099643-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099563-003	SW846 6020
03-May-16	Antimony	ND	0.001	0.003	0.006	U		099563-003	SW846 6020
	Arsenic	0.0023	0.0017	0.005	0.010	J		099563-003	SW846 6020
	Barium	0.0732	0.0006	0.002	2.00			099563-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099563-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099563-003	SW846 6020
	Calcium	54.7	0.600	2.00	NE			099563-003	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099563-003	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099563-003	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099563-003	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099563-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099563-003	SW846 6020
	Magnesium	17.5	0.010	0.030	NE			099563-003	SW846 6020
	Manganese	0.00301	0.001	0.005	NE	J		099563-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099563-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099563-003	SW846 6020
	Potassium	3.98	0.080	0.300	NE			099563-003	SW846 6020
	Selenium	0.00221	0.0015	0.005	0.050	J		099563-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099563-003	SW846 6020
	Sodium	53.4	0.800	2.50	NE		J	099563-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099563-003	SW846 6020
	Uranium	0.00397	0.000067	0.0002	0.030			099563-003	SW846 6020
	Vanadium	0.00699	0.0045	0.010	NE	J		099563-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099563-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.332	0.015	0.050	NE			099637-003	SW846 6020
19-May-16	Antimony	ND	0.001	0.003	0.006	U		099637-003	SW846 6020
	Arsenic	0.00212	0.0017	0.005	0.010	B, J	0.011U	099637-003	SW846 6020
	Barium	0.0576	0.0006	0.002	2.00			099637-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099637-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099637-003	SW846 6020
	Calcium	62.1	0.600	2.00	NE			099637-003	SW846 6020
	Chromium	0.00276	0.002	0.010	0.100	J		099637-003	SW846 6020
	Cobalt	0.000123	0.0001	0.001	NE	J	0.00058U	099637-003	SW846 6020
	Copper	0.000508	0.00035	0.001	NE	J	0.0090U	099637-003	SW846 6020
	Iron	0.340	0.033	0.100	NE			099637-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099637-003	SW846 6020
	Magnesium	20.2	0.010	0.030	NE			099637-003	SW846 6020
	Manganese	0.00601	0.001	0.005	NE			099637-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099637-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099637-003	SW846 6020
	Potassium	4.64	0.080	0.300	NE			099637-003	SW846 6020
	Selenium	0.0036	0.0015	0.005	0.050	J		099637-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099637-003	SW846 6020
	Sodium	64.2	0.800	2.50	NE			099637-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099637-003	SW846 6020
	Uranium	0.00401	0.000067	0.0002	0.030			099637-003	SW846 6020
	Vanadium	0.00766	0.0045	0.010	NE	J		099637-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099637-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 (Duplicate)	Aluminum	0.323	0.015	0.050	NE			099638-003	SW846 6020
19-May-16	Antimony	ND	0.001	0.003	0.006	U		099638-003	SW846 6020
	Arsenic	0.00209	0.0017	0.005	0.010	B, J	0.011U	099638-003	SW846 6020
	Barium	0.0586	0.0006	0.002	2.00			099638-003	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099638-003	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099638-003	SW846 6020
	Calcium	65.2	0.600	2.00	NE			099638-003	SW846 6020
	Chromium	0.00283	0.002	0.010	0.100	J		099638-003	SW846 6020
	Cobalt	0.000123	0.0001	0.001	NE	J	0.00058U	099638-003	SW846 6020
	Copper	0.000484	0.00035	0.001	NE	J	0.0090U	099638-003	SW846 6020
	Iron	0.335	0.033	0.100	NE			099638-003	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099638-003	SW846 6020
	Magnesium	21.2	0.010	0.030	NE			099638-003	SW846 6020
	Manganese	0.00621	0.001	0.005	NE			099638-003	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099638-003	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099638-003	SW846 6020
	Potassium	4.79	0.080	0.300	NE			099638-003	SW846 6020
	Selenium	0.00331	0.0015	0.005	0.050	J		099638-003	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099638-003	SW846 6020
	Sodium	69.0	0.800	2.50	NE			099638-003	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099638-003	SW846 6020
	Uranium	0.00414	0.000067	0.0002	0.030			099638-003	SW846 6020
	Vanadium	0.00793	0.0045	0.010	NE	J		099638-003	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099638-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Continued)*
Summary of Unfiltered Metals Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Calcium	42.1	0.060	0.200	NE			100068-004	SW846 6020
01-Aug-16	Magnesium	9.75	0.010	0.030	NE			100068-004	SW846 6020
	Potassium	3.30	0.080	0.300	NE			100068-004	SW846 6020
	Sodium	41.3	0.080	0.250	NE		J	100068-004	SW846 6020
LWDS-MW1	Calcium	70.3	0.600	2.00	NE			100080-004	SW846 6020
08-Aug-16	Magnesium	20.2	0.010	0.030	NE			100080-004	SW846 6020
	Potassium	3.20	0.080	0.300	NE			100080-004	SW846 6020
	Sodium	67.4	0.800	2.50	NE			100080-004	SW846 6020
LWDS-MW1 (Duplicate)	Calcium	69.9	0.600	2.00	NE			100081-004	SW846 6020
08-Aug-16	Magnesium	19.8	0.010	0.030	NE			100081-004	SW846 6020
	Potassium	3.07	0.080	0.300	NE			100081-004	SW846 6020
	Sodium	66.6	0.800	2.50	NE			100081-004	SW846 6020
LWDS-MW2	Calcium	44.5	0.060	0.200	NE			100065-004	SW846 6020
28-Jul-16	Magnesium	12.7	0.010	0.030	NE			100065-004	SW846 6020
	Potassium	2.68	0.080	0.300	NE			100065-004	SW846 6020
	Sodium	42.7	0.080	0.250	NE			100065-004	SW846 6020
TAV-MW2	Calcium	76.9	0.600	2.00	NE			100059-004	SW846 6020
26-Jul-16	Magnesium	22.5	0.010	0.030	NE			100059-004	SW846 6020
	Potassium	3.83	0.080	0.300	NE			100059-004	SW846 6020
	Sodium	69.3	0.800	2.50	NE			100059-004	SW846 6020
TAV-MW2 (Duplicate)	Calcium	70.4	0.600	2.00	NE			100060-004	SW846 6020
26-Jul-16	Magnesium	22.1	0.010	0.030	NE			100060-004	SW846 6020
	Potassium	3.65	0.080	0.300	NE			100060-004	SW846 6020
	Sodium	64.5	0.800	2.50	NE			100060-004	SW846 6020
TAV-MW4	Calcium	53.2	0.600	2.00	NE			100055-004	SW846 6020
25-Jul-16	Magnesium	14.3	0.010	0.030	NE			100055-004	SW846 6020
	Potassium	3.08	0.080	0.300	NE			100055-004	SW846 6020
	Sodium	46.2	0.080	0.250	NE			100055-004	SW846 6020
TAV-MW6	Calcium	66.9	0.600	2.00	NE			100086-004	SW846 6020
09-Aug-16	Magnesium	19.8	0.010	0.030	NE			100086-004	SW846 6020
	Potassium	3.89	0.080	0.300	NE			100086-004	SW846 6020
	Sodium	61.8	0.800	2.50	NE			100086-004	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW6 (Duplicate)	Calcium	65.7	0.600	2.00	NE			100087-004	SW846 6020
09-Aug-16	Magnesium	19.2	0.010	0.030	NE			100087-004	SW846 6020
	Potassium	3.77	0.080	0.300	NE			100087-004	SW846 6020
	Sodium	60.7	0.800	2.50	NE			100087-004	SW846 6020
TAV-MW8	Calcium	59.4	0.600	2.00	NE			100062-004	SW846 6020
27-Jul-16	Magnesium	16.3	0.010	0.030	NE			100062-004	SW846 6020
	Potassium	3.69	0.080	0.300	NE			100062-004	SW846 6020
	Sodium	58.2	0.800	2.50	NE			100062-004	SW846 6020
TAV-MW10	Calcium	62.3	0.600	2.00	NE			100089-004	SW846 6020
10-Aug-16	Magnesium	15.7	0.010	0.030	NE			100089-004	SW846 6020
	Potassium	4.27	0.080	0.300	NE			100089-004	SW846 6020
	Sodium	57.8	0.800	2.50	NE			100089-004	SW846 6020
TAV-MW11	Calcium	58.2	0.600	2.00	NE			100070-004	SW846 6020
02-Aug-16	Magnesium	15.9	0.010	0.030	NE			100070-004	SW846 6020
	Potassium	3.70	0.080	0.300	NE			100070-004	SW846 6020
	Sodium	57.3	0.800	2.50	NE		J	100070-004	SW846 6020
TAV-MW12	Calcium	63.2	0.600	2.00	NE			100076-004	SW846 6020
04-Aug-16	Magnesium	20.6	0.010	0.030	NE			100076-004	SW846 6020
	Potassium	3.96	0.080	0.300	NE			100076-004	SW846 6020
	Sodium	64.5	0.800	2.50	NE		J	100076-004	SW846 6020
TAV-MW13	Calcium	51.3	0.600	2.00	NE			100052-004	SW846 6020
21-Jul-16	Magnesium	15.7	0.010	0.030	NE			100052-004	SW846 6020
	Potassium	3.60	0.080	0.300	NE			100052-004	SW846 6020
	Sodium	50.6	0.800	2.50	NE			100052-004	SW846 6020
TAV-MW14	Calcium	65.2	0.600	2.00	NE			100072-004	SW846 6020
03-Aug-16	Magnesium	20.8	0.010	0.030	NE			100072-004	SW846 6020
	Potassium	4.35	0.080	0.300	NE			100072-004	SW846 6020
	Sodium	65.4	0.800	2.50	NE		J	100072-004	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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]
AVN-1	Calcium	46.1	0.080	0.200	NE			101013-005	SW846 6020
10-Nov-16	Magnesium	10.7	0.010	0.030	NE			101013-005	SW846 6020
	Potassium	3.40	0.080	0.300	NE			101013-005	SW846 6020
	Sodium	41.6	0.080	0.250	NE			101013-005	SW846 6020
LWDS-MW1	Calcium	68.7	0.800	2.00	NE			101030-005	SW846 6020
21-Nov-16	Magnesium	21.1	0.010	0.030	NE			101030-005	SW846 6020
	Potassium	3.16	0.080	0.300	NE			101030-005	SW846 6020
	Sodium	66.6	0.800	2.50	NE			101030-005	SW846 6020
LWDS-MW2	Calcium	48.9	0.080	0.200	NE			101007-005	SW846 6020
07-Nov-16	Magnesium	13.9	0.010	0.030	NE			101007-005	SW846 6020
	Potassium	2.88	0.080	0.300	NE			101007-005	SW846 6020
	Sodium	44.8	0.080	0.250	NE			101007-005	SW846 6020
TAV-MW2	Calcium	69.7	0.800	2.00	NE			101009-005	SW846 6020
08-Nov-16	Magnesium	21.7	0.010	0.030	NE			101009-005	SW846 6020
	Potassium	3.74	0.080	0.300	NE			101009-005	SW846 6020
	Sodium	62.3	0.800	2.50	NE			101009-005	SW846 6020
TAV-MW3	Calcium	57.1	0.800	2.00	NE	B		101005-005	SW846 6020
03-Nov-16	Magnesium	15.1	0.010	0.030	NE			101005-005	SW846 6020
	Potassium	4.53	0.080	0.300	NE			101005-005	SW846 6020
	Sodium	55.3	0.800	2.50	NE			101005-005	SW846 6020
TAV-MW4	Calcium	53.2	0.800	2.00	NE			101015-005	SW846 6020
14-Nov-16	Magnesium	14.3	0.010	0.030	NE			101015-005	SW846 6020
	Potassium	3.38	0.080	0.300	NE			101015-005	SW846 6020
	Sodium	48.5	0.800	2.50	NE			101015-005	SW846 6020
TAV-MW5	Calcium	48.5	0.080	0.200	NE	B		100997-005	SW846 6020
31-Oct-16	Magnesium	14.4	0.010	0.030	NE			100997-005	SW846 6020
	Potassium	2.94	0.080	0.300	NE			100997-005	SW846 6020
	Sodium	47.4	0.080	0.250	NE			100997-005	SW846 6020
TAV-MW5 (Duplicate)	Calcium	48.6	0.080	0.200	NE	B		100998-005	SW846 6020
31-Oct-16	Magnesium	14.6	0.010	0.030	NE			100998-005	SW846 6020
	Potassium	2.99	0.080	0.300	NE			100998-005	SW846 6020
	Sodium	47.9	0.080	0.250	NE			100998-005	SW846 6020

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Table 5B-6 *(Continued)*
Summary of Unfiltered Metals 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-MW6	Calcium	63.8	0.800	2.00	NE			101032-005	SW846 6020
28-Nov-16	Magnesium	19.8	0.010	0.030	NE			101032-005	SW846 6020
	Potassium	3.72	0.080	0.300	NE			101032-005	SW846 6020
	Sodium	63.0	0.800	2.50	NE			101032-005	SW846 6020
TAV-MW7	Calcium	58.6	0.800	2.00	NE	B		101003-005	SW846 6020
02-Nov-16	Magnesium	18.7	0.010	0.030	NE			101003-005	SW846 6020
	Potassium	4.02	0.080	0.300	NE			101003-005	SW846 6020
	Sodium	57.2	0.800	2.50	NE			101003-005	SW846 6020
TAV-MW8	Calcium	58.2	0.800	2.00	NE			101018-005	SW846 6020
15-Nov-16	Magnesium	16.1	0.010	0.030	NE			101018-005	SW846 6020
	Potassium	3.85	0.080	0.300	NE			101018-005	SW846 6020
	Sodium	58.8	0.800	2.50	NE			101018-005	SW846 6020
TAV-MW9	Calcium	66.2	0.800	2.00	NE	B		101001-005	SW846 6020
01-Nov-16	Magnesium	20.5	0.010	0.030	NE			101001-005	SW846 6020
	Potassium	4.22	0.080	0.300	NE			101001-005	SW846 6020
	Sodium	64.2	0.800	2.50	NE			101001-005	SW846 6020
TAV-MW10	Calcium	55.5	0.800	2.00	NE			101034-005	SW846 6020
29-Nov-16	Magnesium	16.0	0.010	0.030	NE			101034-005	SW846 6020
	Potassium	4.17	0.080	0.300	NE			101034-005	SW846 6020
	Sodium	57.4	0.800	2.50	NE			101034-005	SW846 6020
TAV-MW11	Calcium	55.1	0.800	2.00	NE			101011-005	SW846 6020
09-Nov-16	Magnesium	16.8	0.010	0.030	NE			101011-005	SW846 6020
	Potassium	3.90	0.080	0.300	NE			101011-005	SW846 6020
	Sodium	51.6	0.800	2.50	NE			101011-005	SW846 6020
TAV-MW12	Calcium	63.5	0.800	2.00	NE			101023-005	SW846 6020
16-Nov-16	Magnesium	18.8	0.010	0.030	NE			101023-005	SW846 6020
	Potassium	4.11	0.080	0.300	NE			101023-005	SW846 6020
	Sodium	64.2	0.800	2.50	NE			101023-005	SW846 6020
TAV-MW12 (Duplicate)	Calcium	63.6	0.800	2.00	NE			101024-005	SW846 6020
16-Nov-16	Magnesium	18.5	0.010	0.030	NE			101024-005	SW846 6020
	Potassium	3.88	0.080	0.300	NE			101024-005	SW846 6020
	Sodium	64.5	0.800	2.50	NE			101024-005	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-6 *(Concluded)*
Summary of Unfiltered Metals Results,
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Calcium	54.3	0.400	1.00	NE			100992-005	SW846 6020
27-Oct-16	Magnesium	15.0	0.010	0.030	NE	B		100992-005	SW846 6020
	Potassium	3.60	0.080	0.300	NE			100992-005	SW846 6020
	Sodium	48.7	0.080	0.250	NE			100992-005	SW846 6020
TAV-MW13 (Duplicate)	Calcium	54.0	0.400	1.00	NE			100993-005	SW846 6020
27-Oct-16	Magnesium	15.1	0.010	0.030	NE	B		100993-005	SW846 6020
	Potassium	3.56	0.080	0.300	NE			100993-005	SW846 6020
	Sodium	51.0	0.400	1.25	NE			100993-005	SW846 6020
TAV-MW14	Calcium	60.4	0.800	2.00	NE			101027-005	SW846 6020
17-Nov-16	Magnesium	17.7	0.010	0.030	NE			101027-005	SW846 6020
	Potassium	4.49	0.080	0.300	NE			101027-005	SW846 6020
	Sodium	63.9	0.800	2.50	NE			101027-005	SW846 6020

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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	Iron	0.0934	0.033	0.100	NE	J		098869-009	SW846 6020
18-Feb-16	Manganese	ND	0.001	0.005	NE	U		098869-009	SW846 6020
AVN-1 (Duplicate)	Iron	0.090	0.033	0.100	NE	J		098870-009	SW846 6020
18-Feb-16	Manganese	ND	0.001	0.005	NE	U		098870-009	SW846 6020
LWDS-MW1	Iron	0.0977	0.033	0.100	NE	J		098885-009	SW846 6020
29-Feb-16	Manganese	ND	0.001	0.005	NE	U		098885-009	SW846 6020
LWDS-MW2	Iron	0.101	0.033	0.100	NE			098864-009	SW846 6020
17-Feb-16	Manganese	ND	0.001	0.005	NE	U		098864-009	SW846 6020
LWDS-MW2 (Duplicate)	Iron	0.185	0.033	0.100	NE			098865-009	SW846 6020
17-Feb-16	Manganese	ND	0.001	0.005	NE	U		098865-009	SW846 6020
TAV-MW2	Iron	0.147	0.033	0.100	NE			098858-009	SW846 6020
15-Feb-16	Manganese	ND	0.001	0.005	NE	U		098858-009	SW846 6020
TAV-MW4	Iron	0.092	0.033	0.100	NE	B, J	0.22U	098855-009	SW846 6020
11-Feb-16	Manganese	ND	0.001	0.005	NE	U	UJ	098855-009	SW846 6020
TAV-MW6	Iron	0.132	0.033	0.100	NE	B	0.17U	098882-009	SW846 6020
25-Feb-16	Manganese	ND	0.001	0.005	NE	U		098882-009	SW846 6020
TAV-MW8	Iron	0.115	0.033	0.100	NE			098860-009	SW846 6020
16-Feb-16	Manganese	ND	0.001	0.005	NE	U		098860-009	SW846 6020
TAV-MW10	Iron	0.0829	0.033	0.100	NE	J		098887-009	SW846 6020
01-Mar-16	Manganese	ND	0.001	0.005	NE	U		098887-009	SW846 6020
TAV-MW11	Iron	0.110	0.033	0.100	NE	B	0.17U	098875-009	SW846 6020
22-Feb-16	Manganese	ND	0.001	0.005	NE	U		098875-009	SW846 6020
TAV-MW11 (Duplicate)	Iron	0.114	0.033	0.100	NE	B	0.17U	098876-009	SW846 6020
22-Feb-16	Manganese	ND	0.001	0.005	NE	U		098876-009	SW846 6020
TAV-MW12	Iron	0.125	0.033	0.100	NE	B	0.17U	098880-009	SW846 6020
24-Feb-16	Manganese	ND	0.001	0.005	NE	U		098880-009	SW846 6020
TAV-MW13	Iron	0.103	0.033	0.100	NE	B	0.22U	098852-009	SW846 6020
10-Feb-16	Manganese	ND	0.001	0.005	NE	U	UJ	098852-009	SW846 6020
TAV-MW14	Iron	0.129	0.033	0.100	NE	B	0.17U	098878-009	SW846 6020
23-Feb-16	Manganese	ND	0.001	0.005	NE	U		098878-009	SW846 6020

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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	Iron	ND	0.033	0.100	NE	U		099631-004	SW846 6020
17-May-16	Manganese	ND	0.001	0.005	NE	U		099631-004	SW846 6020
LWDS-MW1	Iron	ND	0.033	0.100	NE	U		099641-004	SW846 6020
23-May-16	Manganese	ND	0.001	0.005	NE	U		099641-004	SW846 6020
LWDS-MW2	Iron	ND	0.033	0.100	NE	U		099629-004	SW846 6020
16-May-16	Manganese	ND	0.001	0.005	NE	U		099629-004	SW846 6020
TAV-MW2	Iron	0.118	0.033	0.100	NE			099582-004	SW846 6020
11-May-16	Manganese	ND	0.001	0.005	NE	U		099582-004	SW846 6020
TAV-MW3	Iron	ND	0.033	0.100	NE	U		099569-004	SW846 6020
04-May-16	Manganese	ND	0.001	0.005	NE	U		099569-004	SW846 6020
TAV-MW3 (Duplicate)	Iron	ND	0.033	0.100	NE	U		099570-004	SW846 6020
04-May-16	Manganese	ND	0.001	0.005	NE	U		099570-004	SW846 6020
TAV-MW4	Iron	0.0899	0.033	0.100	NE	J		099580-004	SW846 6020
10-May-16	Manganese	ND	0.001	0.005	NE	U		099580-004	SW846 6020
TAV-MW5	Iron	ND	0.033	0.100	NE	U		099561-004	SW846 6020
02-May-16	Manganese	ND	0.001	0.005	NE	U		099561-004	SW846 6020
TAV-MW6	Iron	ND	0.033	0.100	NE	U		099646-004	SW846 6020
25-May-16	Manganese	ND	0.001	0.005	NE	U		099646-004	SW846 6020
TAV-MW7	Iron	0.0966	0.033	0.100	NE	J		099577-004	SW846 6020
09-May-16	Manganese	ND	0.001	0.005	NE	U		099577-004	SW846 6020
TAV-MW7 (Duplicate)	Iron	0.101	0.033	0.100	NE			099578-004	SW846 6020
09-May-16	Manganese	ND	0.001	0.005	NE	U		099578-004	SW846 6020
TAV-MW8	Iron	0.0981	0.033	0.100	NE	J		099585-004	SW846 6020
12-May-16	Manganese	ND	0.001	0.005	NE	U		099585-004	SW846 6020
TAV-MW9	Iron	ND	0.033	0.100	NE	U		099572-004	SW846 6020
05-May-16	Manganese	0.00348	0.001	0.005	NE	J		099572-004	SW846 6020
TAV-MW10	Iron	ND	0.033	0.100	NE	U		099648-004	SW846 6020
31-May-16	Manganese	ND	0.001	0.005	NE	U		099648-004	SW846 6020
TAV-MW11	Iron	ND	0.033	0.100	NE	U		099633-004	SW846 6020
18-May-16	Manganese	ND	0.001	0.005	NE	U		099633-004	SW846 6020

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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	Iron	ND	0.033	0.100	NE	U		099643-004	SW846 6020
24-May-16	Manganese	ND	0.001	0.005	NE	U		099643-004	SW846 6020
TAV-MW13	Iron	ND	0.033	0.100	NE	U		099563-004	SW846 6020
03-May-16	Manganese	ND	0.001	0.005	NE	U		099563-004	SW846 6020
TAV-MW14	Iron	ND	0.033	0.100	NE	U		099637-004	SW846 6020
19-May-16	Manganese	ND	0.001	0.005	NE	U		099637-004	SW846 6020
TAV-MW14 (Duplicate)	Iron	ND	0.033	0.100	NE	U		099638-004	SW846 6020
19-May-16	Manganese	ND	0.001	0.005	NE	U		099638-004	SW846 6020
AVN-1	Iron	ND	0.033	0.100	NE	U		100068-003	SW846 6020
01-Aug-16	Manganese	ND	0.001	0.005	NE	U		100068-003	SW846 6020
LWDS-MW1	Iron	ND	0.033	0.100	NE	U		100080-003	SW846 6020
08-Aug-16	Manganese	ND	0.001	0.005	NE	U		100080-003	SW846 6020
LWDS-MW1 (Duplicate)	Iron	ND	0.033	0.100	NE	U		100081-003	SW846 6020
08-Aug-16	Manganese	ND	0.001	0.005	NE	U		100081-003	SW846 6020
LWDS-MW2	Iron	ND	0.033	0.100	NE	U		100065-003	SW846 6020
28-Jul-16	Manganese	ND	0.001	0.005	NE	U		100065-003	SW846 6020
TAV-MW2	Iron	ND	0.033	0.100	NE	U		100059-003	SW846 6020
26-Jul-16	Manganese	ND	0.001	0.005	NE	U		100059-003	SW846 6020
TAV-MW2 (Duplicate)	Iron	ND	0.033	0.100	NE	U		100060-003	SW846 6020
26-Jul-16	Manganese	ND	0.001	0.005	NE	U		100060-003	SW846 6020
TAV-MW4	Iron	ND	0.033	0.100	NE	U		100055-003	SW846 6020
25-Jul-16	Manganese	ND	0.001	0.005	NE	U		100055-003	SW846 6020
TAV-MW6	Iron	ND	0.033	0.100	NE	U		100086-003	SW846 6020
09-Aug-16	Manganese	ND	0.001	0.005	NE	U		100086-003	SW846 6020
TAV-MW6 (Duplicate)	Iron	ND	0.033	0.100	NE	U		100087-003	SW846 6020
09-Aug-16	Manganese	ND	0.001	0.005	NE	U		100087-003	SW846 6020
TAV-MW8	Iron	ND	0.033	0.100	NE	U		100062-003	SW846 6020
27-Jul-16	Manganese	ND	0.001	0.005	NE	U		100062-003	SW846 6020
TAV-MW10	Iron	ND	0.033	0.100	NE	U		100089-003	SW846 6020
10-Aug-16	Manganese	ND	0.001	0.005	NE	U		100089-003	SW846 6020

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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	Iron	ND	0.033	0.100	NE	U		100070-003	SW846 6020
02-Aug-16	Manganese	ND	0.001	0.005	NE	U		100070-003	SW846 6020
TAV-MW12	Iron	ND	0.033	0.100	NE	U		100076-003	SW846 6020
04-Aug-16	Manganese	ND	0.001	0.005	NE	U		100076-003	SW846 6020
TAV-MW13	Iron	ND	0.033	0.100	NE	U		100052-003	SW846 6020
21-Jul-16	Manganese	ND	0.001	0.005	NE	U		100052-003	SW846 6020
TAV-MW14	Iron	ND	0.033	0.100	NE	U		100072-003	SW846 6020
03-Aug-16	Manganese	ND	0.001	0.005	NE	U		100072-003	SW846 6020
AVN-1	Iron	ND	0.033	0.100	NE	U		101013-003	SW846 6020
10-Nov-16	Manganese	ND	0.001	0.005	NE	U		101013-003	SW846 6020
LWDS-MW1	Iron	ND	0.033	0.100	NE	U		101030-003	SW846 6020
21-Nov-16	Manganese	ND	0.001	0.005	NE	U		101030-003	SW846 6020
LWDS-MW2	Iron	ND	0.033	0.100	NE	U		101007-003	SW846 6020
07-Nov-16	Manganese	ND	0.001	0.005	NE	U		101007-003	SW846 6020
TAV-MW2	Iron	ND	0.033	0.100	NE	U		101009-003	SW846 6020
08-Nov-16	Manganese	ND	0.001	0.005	NE	U		101009-003	SW846 6020
TAV-MW3	Iron	0.0997	0.033	0.100	NE	J		101005-003	SW846 6020
03-Nov-16	Manganese	ND	0.001	0.005	NE	U		101005-003	SW846 6020
TAV-MW4	Iron	ND	0.033	0.100	NE	U		101015-003	SW846 6020
14-Nov-16	Manganese	ND	0.001	0.005	NE	U		101015-003	SW846 6020
TAV-MW5	Iron	0.0834	0.033	0.100	NE	J		100997-003	SW846 6020
31-Oct-16	Manganese	ND	0.001	0.005	NE	U		100997-003	SW846 6020
TAV-MW5 (Duplicate)	Iron	0.0875	0.033	0.100	NE	J		100998-003	SW846 6020
31-Oct-16	Manganese	ND	0.001	0.005	NE	U		100998-003	SW846 6020
TAV-MW6	Iron	ND	0.033	0.100	NE	U		101032-003	SW846 6020
28-Nov-16	Manganese	ND	0.001	0.005	NE	U		101032-003	SW846 6020
TAV-MW7	Iron	0.109	0.033	0.100	NE			101003-003	SW846 6020
02-Nov-16	Manganese	ND	0.001	0.005	NE	U		101003-003	SW846 6020
TAV-MW8	Iron	ND	0.033	0.100	NE	U		101018-003	SW846 6020
15-Nov-16	Manganese	ND	0.001	0.005	NE	U		101018-003	SW846 6020

Refer to footnotes on page 5B-71.

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

Calendar Year 2016

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	Iron	0.116	0.033	0.100	NE			101001-003	SW846 6020
01-Nov-16	Manganese	0.00155	0.001	0.005	NE	J		101001-003	SW846 6020
TAV-MW10	Iron	ND	0.033	0.100	NE	U		101034-003	SW846 6020
29-Nov-16	Manganese	ND	0.001	0.005	NE	U		101034-003	SW846 6020
TAV-MW11	Iron	ND	0.033	0.100	NE	U		101011-003	SW846 6020
09-Nov-16	Manganese	ND	0.001	0.005	NE	U		101011-003	SW846 6020
TAV-MW12	Iron	ND	0.033	0.100	NE	U		101023-003	SW846 6020
16-Nov-16	Manganese	ND	0.001	0.005	NE	U		101023-003	SW846 6020
TAV-MW12 (Duplicate)	Iron	ND	0.033	0.100	NE	U		101024-003	SW846 6020
16-Nov-16	Manganese	ND	0.001	0.005	NE	U		101024-003	SW846 6020
TAV-MW13	Iron	0.0657	0.033	0.100	NE	J		100992-003	SW846 6020
27-Oct-16	Manganese	ND	0.001	0.005	NE	U		100992-003	SW846 6020
TAV-MW13 (Duplicate)	Iron	0.0639	0.033	0.100	NE	J		100993-003	SW846 6020
27-Oct-16	Manganese	ND	0.001	0.005	NE	U		100993-003	SW846 6020
TAV-MW14	Iron	ND	0.033	0.100	NE	U		101027-003	SW846 6020
17-Nov-16	Manganese	ND	0.001	0.005	NE	U		101027-003	SW846 6020

Refer to footnotes on page 5B-71.

Table 5B-8
Summary of Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium Results, Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Americium-241	-9.3 ± 13.6	19.6	9.58	NE	U	BD	099631-009	EPA 901.1
17-May-16	Cesium-137	3.20 ± 2.88	4.54	2.18	NE	U	BD	099631-009	EPA 901.1
	Cobalt-60	-3.91 ± 4.57	3.95	1.84	NE	U	BD	099631-009	EPA 901.1
	Potassium-40	-42 ± 45.7	50.2	23.8	NE	U	BD	099631-009	EPA 901.1
	Gross Alpha	3.12	NA	NA	15 pCi/L	NA	None	099631-010	EPA 900.0
	Gross Beta	3.98 ± 1.01	1.04	0.495	4 mrem/yr			099631-010	EPA 900.0
	Tritium	-38 ± 110	192	93.2	NE	U	BD	099631-011	EPA 906.0
LWDS-MW1	Americium-241	20.0 ± 19.5	22.6	11.0	NE	U	BD	099641-009	EPA 901.1
23-May-16	Cesium-137	0.266 ± 2.15	3.86	1.84	NE	U	BD	099641-009	EPA 901.1
	Cobalt-60	-0.919 ± 2.39	4.17	1.94	NE	U	BD	099641-009	EPA 901.1
	Potassium-40	1.72 ± 47.3	56.2	26.7	NE	U	BD	099641-009	EPA 901.1
	Gross Alpha	4.68	NA	NA	15 pCi/L	NA	None	099641-010	EPA 900.0
	Gross Beta	4.98 ± 1.70	2.19	1.05	4 mrem/yr		J	099641-010	EPA 900.0
	Tritium	-30.1 ± 114	199	96.6	NE	U	BD	099641-011	EPA 906.0
LWDS-MW2	Americium-241	2.58 ± 13.3	14.8	7.20	NE	U	BD	099629-009	EPA 901.1
16-May-16	Cesium-137	1.17 ± 1.85	3.29	1.57	NE	U	BD	099629-009	EPA 901.1
	Cobalt-60	-1.14 ± 2.38	3.41	1.58	NE	U	BD	099629-009	EPA 901.1
	Potassium-40	-10.3 ± 33.1	45.3	21.4	NE	U	BD	099629-009	EPA 901.1
	Gross Alpha	3.45	NA	NA	15 pCi/L	NA	None	099629-010	EPA 900.0
	Gross Beta	3.76 ± 1.06	1.21	0.581	4 mrem/yr			099629-010	EPA 900.0
	Tritium	38.0 ± 112	191	92.7	NE	U	BD	099629-011	EPA 906.0
TAV-MW2	Americium-241	-1.56 ± 9.66	14.9	7.32	NE	U	BD	099582-009	EPA 901.1
11-May-16	Cesium-137	-0.56 ± 1.81	3.01	1.45	NE	U	BD	099582-009	EPA 901.1
	Cobalt-60	3.78 ± 2.44	3.78	1.62	NE	U	BD	099582-009	EPA 901.1
	Potassium-40	-35.2 ± 37.7	42.2	20.3	NE	U	BD	099582-009	EPA 901.1
	Gross Alpha	7.93	NA	NA	15 pCi/L	NA	None	099582-010	EPA 900.0
	Gross Beta	7.81 ± 1.87	1.78	0.855	4 mrem/yr			099582-010	EPA 900.0
	Tritium	-19.6 ± 105	183	88.6	NE	U	BD	099582-011	EPA 906.0
TAV-MW3	Americium-241	2.58 ± 3.30	4.84	2.37	NE	U	BD	099569-009	EPA 901.1
04-May-16	Cesium-137	-1.75 ± 2.22	3.38	1.62	NE	U	BD	099569-009	EPA 901.1
	Cobalt-60	-0.839 ± 2.15	3.68	1.73	NE	U	BD	099569-009	EPA 901.1
	Potassium-40	-5.78 ± 36.4	49.1	23.5	NE	U	BD	099569-009	EPA 901.1
	Gross Alpha	2.72	NA	NA	15 pCi/L	NA	None	099569-010	EPA 900.0
	Gross Beta	6.19 ± 1.57	1.65	0.801	4 mrem/yr			099569-010	EPA 900.0
	Tritium	9.11 ± 110	190	91.9	NE	U	BD	099569-011	EPA 906.0

Refer to footnotes on page 5B-71.

Table 5B-8 *(Continued)*
Summary of Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium Results, Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW4	Americium-241	4.28 ± 11.1	16.9	8.23	NE	U	BD	099580-009	EPA 901.1
10-May-16	Cesium-137	2.52 ± 3.60	2.95	1.42	NE	U	BD	099580-009	EPA 901.1
	Cobalt-60	0.692 ± 1.75	3.14	1.48	NE	U	BD	099580-009	EPA 901.1
	Potassium-40	66.1 ± 27.8	28.7	13.5	NE		J	099580-009	EPA 901.1
	Gross Alpha	2.17	NA	NA	15 pCi/L	NA	None	099580-010	EPA 900.0
	Gross Beta	3.79 ± 0.976	0.952	0.452	4 mrem/yr			099580-010	EPA 900.0
	Tritium	10.0 ± 112	193	93.3	NE	U	BD	099580-011	EPA 906.0
TAV-MW5	Americium-241	-1.02 ± 10.5	16.3	7.96	NE	U	BD	099561-009	EPA 901.1
02-May-16	Cesium-137	-0.66 ± 3.07	3.71	1.79	NE	U	BD	099561-009	EPA 901.1
	Cobalt-60	-0.795 ± 2.00	3.35	1.58	NE	U	BD	099561-009	EPA 901.1
	Potassium-40	35.8 ± 47.1	33.4	15.7	NE	X	R	099561-009	EPA 901.1
	Gross Alpha	2.14	NA	NA	15 pCi/L	NA	None	099561-010	EPA 900.0
	Gross Beta	4.91 ± 1.43	1.74	0.845	4 mrem/yr		J	099561-010	EPA 900.0
	Tritium	68.2 ± 110	186	90.1	NE	U	BD	099561-011	EPA 906.0
TAV-MW6	Americium-241	7.16 ± 12.6	18.9	9.18	NE	U	BD	099646-009	EPA 901.1
25-May-16	Cesium-137	-0.273 ± 2.00	3.41	1.62	NE	U	BD	099646-009	EPA 901.1
	Cobalt-60	-0.628 ± 2.00	3.03	1.39	NE	U	BD	099646-009	EPA 901.1
	Potassium-40	-38 ± 41.1	47.3	22.4	NE	U	BD	099646-009	EPA 901.1
	Gross Alpha	0.37	NA	NA	15 pCi/L	NA	None	099646-010	EPA 900.0
	Gross Beta	4.68 ± 1.37	1.51	0.718	4 mrem/yr			099646-010	EPA 900.0
	Tritium	43.5 ± 118	201	97.5	NE	U	BD	099646-011	EPA 906.0
TAV-MW7	Americium-241	9.10 ± 8.97	14.4	7.02	NE	U	BD	099577-009	EPA 901.1
09-May-16	Cesium-137	0.0475 ± 1.69	3.01	1.44	NE	U	BD	099577-009	EPA 901.1
	Cobalt-60	-1.15 ± 1.79	2.93	1.36	NE	U	BD	099577-009	EPA 901.1
	Potassium-40	-35.1 ± 36.9	40.8	19.4	NE	U	BD	099577-009	EPA 901.1
	Gross Alpha	5.30	NA	NA	15 pCi/L	NA	None	099577-010	EPA 900.0
	Gross Beta	4.89 ± 1.14	1.02	0.489	4 mrem/yr		7.8U	099577-010	EPA 900.0
	Tritium	62.1 ± 113	190	92.2	NE	U	BD	099577-011	EPA 906.0
TAV-MW8	Americium-241	-2.58 ± 6.02	10.1	4.94	NE	U	BD	099585-009	EPA 901.1
12-May-16	Cesium-137	-0.378 ± 1.60	2.68	1.28	NE	U	BD	099585-009	EPA 901.1
	Cobalt-60	-0.0124 ± 1.55	2.72	1.27	NE	U	BD	099585-009	EPA 901.1
	Potassium-40	-1.09 ± 30.0	35.4	16.8	NE	U	BD	099585-009	EPA 901.1
	Gross Alpha	1.82	NA	NA	15 pCi/L	NA	None	099585-010	EPA 900.0
	Gross Beta	4.01 ± 1.20	1.47	0.711	4 mrem/yr		J	099585-010	EPA 900.0
	Tritium	63.1 ± 116	197	95.5	NE	U	BD	099585-011	EPA 906.0

Refer to footnotes on page 5B-71.

Table 5B-8 *(Continued)*
Summary of Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium Results, Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW9	Americium-241	5.54 ± 6.01	8.66	4.24	NE	U	BD	099572-009	EPA 901.1
05-May-16	Cesium-137	0.966 ± 1.75	3.02	1.46	NE	U	BD	099572-009	EPA 901.1
	Cobalt-60	0.458 ± 1.67	2.97	1.41	NE	U	BD	099572-009	EPA 901.1
	Potassium-40	2.93 ± 37.5	28.9	13.7	NE	U	BD	099572-009	EPA 901.1
	Gross Alpha	2.52	NA	NA	15 pCi/L	NA	None	099572-010	EPA 900.0
	Gross Beta	5.17 ± 1.43	1.65	0.798	4 mrem/yr			099572-010	EPA 900.0
	Tritium	122 ± 117	192	92.9	NE	U	BD	099572-011	EPA 906.0
TAV-MW10	Americium-241	-0.952 ± 12.6	17.1	8.32	NE	U	BD	099648-009	EPA 901.1
31-May-16	Cesium-137	1.28 ± 2.07	3.67	1.75	NE	U	BD	099648-009	EPA 901.1
	Cobalt-60	0.0301 ± 2.29	3.60	1.67	NE	U	BD	099648-009	EPA 901.1
	Potassium-40	-33.7 ± 36.6	43.7	20.5	NE	U	BD	099648-009	EPA 901.1
	Gross Alpha	5.34	NA	NA	15 pCi/L	NA	None	099648-010	EPA 900.0
	Gross Beta	6.22 ± 1.85	2.30	1.11	4 mrem/yr	*	J	099648-010	EPA 900.0
	Tritium	65.5 ± 118	199	96.4	NE	U	BD	099648-011	EPA 906.0
TAV-MW11	Americium-241	-12.8 ± 14.6	19.2	9.33	NE	U	BD	099633-009	EPA 901.1
18-May-16	Cesium-137	-1.8 ± 3.45	4.22	2.03	NE	U	BD	099633-009	EPA 901.1
	Cobalt-60	-0.331 ± 1.98	3.47	1.62	NE	U	BD	099633-009	EPA 901.1
	Potassium-40	51.0 ± 31.2	32.8	15.2	NE	U	R	099633-009	EPA 901.1
	Gross Alpha	2.97	NA	NA	15 pCi/L	NA	None	099633-010	EPA 900.0
	Gross Beta	4.44 ± 1.21	1.33	0.640	4 mrem/yr			099633-010	EPA 900.0
	Tritium	-26.7 ± 110	192	93.2	NE	U	BD	099633-011	EPA 906.0
TAV-MW12	Americium-241	0.919 ± 7.38	13.1	6.40	NE	U	BD	099643-009	EPA 901.1
24-May-16	Cesium-137	3.35 ± 4.06	3.14	1.50	NE	X	R	099643-009	EPA 901.1
	Cobalt-60	0.572 ± 1.89	3.47	1.62	NE	U	BD	099643-009	EPA 901.1
	Potassium-40	-12.3 ± 37.5	41.7	19.8	NE	U	BD	099643-009	EPA 901.1
	Gross Alpha	4.15	NA	NA	15 pCi/L	NA	None	099643-010	EPA 900.0
	Gross Beta	6.10 ± 1.56	1.64	0.790	4 mrem/yr			099643-010	EPA 900.0
	Tritium	48.2 ± 116	197	95.6	NE	U	BD	099643-011	EPA 906.0
TAV-MW13	Americium-241	-2.77 ± 6.82	9.81	4.80	NE	U	BD	099563-009	EPA 901.1
03-May-16	Cesium-137	-0.294 ± 1.55	2.69	1.29	NE	U	BD	099563-009	EPA 901.1
	Cobalt-60	0.184 ± 1.89	2.94	1.39	NE	U	BD	099563-009	EPA 901.1
	Potassium-40	33.2 ± 50.8	25.3	11.8	NE	X	R	099563-009	EPA 901.1
	Gross Alpha	0.05	NA	NA	15 pCi/L	NA	None	099563-010	EPA 900.0
	Gross Beta	9.16 ± 2.01	1.28	0.612	4 mrem/yr			099563-010	EPA 900.0
	Tritium	42.9 ± 113	193	93.3	NE	U	BD	099563-011	EPA 906.0

Refer to footnotes on page 5B-71.

Table 5B-8 *(Continued)*
Summary of Gross Alpha, Gross Beta, Gamma Spectroscopy, and Tritium Results, Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW14	Americium-241	17.4 ± 20.0	27.7	13.5	NE	U	BD	099637-009	EPA 901.1
19-May-16	Cesium-137	-2.09 ± 3.30	3.85	1.84	NE	U	BD	099637-009	EPA 901.1
	Cobalt-60	-0.428 ± 2.20	3.86	1.81	NE	U	BD	099637-009	EPA 901.1
	Potassium-40	6.48 ± 44.5	50.3	24.0	NE	U	BD	099637-009	EPA 901.1
	Gross Alpha	5.16	NA	NA	15 pCi/L	NA	None	099637-010	EPA 900.0
	Gross Beta	6.57 ± 1.52	1.29	0.613	4 mrem/yr			099637-010	EPA 900.0
	Tritium	91.5 ± 119	199	96.6	NE	U	BD	099637-011	EPA 906.0 M

Refer to footnotes on page 5B-71.

Table 5B-9
Summary of Field Water Quality Measurements[h],
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
AVN-1	18-Feb-16	21.40	415.6	204.0	7.78	0.77	42.7	3.77
LWDS-MW1	29-Feb-16	19.66	693.8	238.7	7.64	1.11	79.8	7.29
LWDS-MW2	17-Feb-16	19.28	440.5	211.0	7.71	0.27	47.9	4.41
TAV-MW2	15-Feb-16	17.25	639.5	264.1	7.43	1.68	56.3	5.41
TAV-MW4	11-Feb-16	19.52	495.3	229.5	7.67	0.44	73.0	6.69
TAV-MW6	25-Feb-16	19.89	660.3	282.5	7.56	3.08	75.6	6.88
TAV-MW8	16-Feb-16	18.77	560.6	242.0	7.60	0.96	68.9	6.41
TAV-MW10	01-Mar-16	20.06	605.6	249.5	7.61	0.12	78.1	7.08
TAV-MW11	22-Feb-16	19.90	563.4	275.2	7.65	0.11	77.2	7.02
TAV-MW12	24-Feb-16	19.30	598.3	279.0	7.57	6.42	57.3	5.27
TAV-MW13	10-Feb-16	19.95	508.3	154.8	7.60	0.21	26.0	2.36
TAV-MW14	23-Feb-16	16.85	584.2	286.3	7.63	3.26	73.9	7.12
AVN-1	17-May-16	19.06	395.2	312.2	7.54	1.82	41.9	3.80
LWDS-MW1	23-May-16	22.87	747.9	313.5	7.38	0.60	85.1	7.30
LWDS-MW2	16-May-16	20.66	453.9	313.3	7.44	0.34	49.9	4.48
TAV-MW2	11-May-16	21.53	701.6	329.4	7.17	2.42	61.9	5.45
TAV-MW3	04-May-16	21.67	563.6	283.1	7.44	2.01	68.5	6.01
TAV-MW4	10-May-16	21.46	513.1	297.3	7.43	0.91	74.6	6.57
TAV-MW5	02-May-16	19.71	474.9	293.5	7.74	0.55	55.3	5.00
TAV-MW6	25-May-16	22.21	702.9	345.8	7.29	3.45	7.84	6.81
TAV-MW7	09-May-16	20.23	588.0	250.7	7.29	0.89	3.6	0.33
TAV-MW8	12-May-16	21.84	596.9	308.1	7.38	5.72	74.0	6.49
TAV-MW9	05-May-16	20.97	602.1	151.1	7.14	1.64	12.0	1.07
TAV-MW10	31-May-16	22.63	639.3	348.6	7.35	0.26	81.9	7.07
TAV-MW11	18-May-16	18.43	543.4	321.8	7.44	0.28	76.1	7.12
TAV-MW12	24-May-16	22.81	646.8	336.7	7.30	25.2	56.8	4.56
TAV-MW13	03-May-16	21.72	528.9	280.3	7.39	0.46	28.3	2.48
TAV-MW14	19-May-16	19.90	621.3	355.8	7.43	4.16	78.9	7.19

Refer to footnotes on page 5B-71.

Table 5B-9 *(Concluded)*
Summary of Field Water Quality Measurements[h],
Technical Area-V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
AVN-1	01-Aug-16	23.03	404.0	174.9	7.96	1.21	43.1	3.68
LWDS-MW1	08-Aug-16	21.43	675.6	148.9	7.79	0.99	83.9	7.41
LWDS-MW2	28-Jul-16	22.45	440.1	206.1	7.80	0.59	52.1	4.51
TAV-MW2	26-Jul-16	22.95	680.7	217.2	7.48	1.54	64.9	5.55
TAV-MW4	25-Jul-16	22.46	491.6	193.0	7.69	3.39	79.1	6.83
TAV-MW6	09-Aug-16	21.66	649.9	213.5	7.74	2.34	78.4	6.89
TAV-MW8	27-Jul-16	23.44	580.4	220.8	7.67	1.08	77.7	6.60
TAV-MW10	10-Aug-16	21.89	590.0	221.0	7.80	0.28	82.7	7.19
TAV-MW11	02-Aug-16	21.95	552.4	227.5	7.80	0.26	83.1	7.26
TAV-MW12	04-Aug-16	23.28	614.3	222.2	7.68	10.1	61.1	5.20
TAV-MW13	21-Jul-16	21.48	494.7	203.8	7.60	0.57	28.0	2.47
TAV-MW14	03-Aug-16	22.96	626.2	228.6	7.81	1.09	85.8	7.29
AVN-1	10-Nov-16	20.30	421.6	250.1	7.78	1.28	40.1	3.61
LWDS-MW1	21-Nov-16	18.85	708.1	264.2	7.57	1.77	80.3	7.45
LWDS-MW2	07-Nov-16	20.23	469.5	239.1	7.67	0.63	48.4	4.36
TAV-MW2	08-Nov-16	19.15	694.0	266.8	7.39	2.33	61.2	5.60
TAV-MW3	03-Nov-16	18.59	547.9	244.1	7.62	1.13	64.5	6.03
TAV-MW4	14-Nov-16	20.26	521.1	271.9	7.65	1.45	75.1	6.78
TAV-MW5	31-Oct-16	21.03	513.8	139.2	7.59	0.34	54.9	4.85
TAV-MW6	28-Nov-16	17.76	659.9	274.2	7.62	0.70	74.1	7.03
TAV-MW7	02-Nov-16	21.30	627.1	143.1	7.45	2.22	1.1	0.10
TAV-MW8	15-Nov-16	20.15	602.1	277.5	7.59	2.58	70.2	6.35
TAV-MW9	01-Nov-16	20.46	647.7	155.6	7.37	0.98	10.9	0.98
TAV-MW10	29-Nov-16	17.35	583.5	296.4	7.69	0.43	76.0	7.25
TAV-MW11	09-Nov-16	20.91	600.6	267.0	7.61	0.41	81.1	7.23
TAV-MW12	16-Nov-16	20.09	630.6	275.6	7.54	5.87	56.8	5.16
TAV-MW13	27-Oct-16	21.42	525.2	283.7	8.82	0.27	39.3	3.45
TAV-MW14	17-Nov-16	20.08	644.4	279.6	7.70	1.48	78.3	7.09

Refer to footnotes on page 5B-71.

Footnotes for Technical Area-V Analytical Results Tables

% = Percent.
AVN = Area V (North).
CFR = Code of Federal Regulations.
EPA = U.S. Environmental Protection Agency.
ID = Identifier.
LWDS = Liquid Waste Disposal System.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
mrem/yr = Millirem per year.
MW = Monitoring well.
No. = Number.
pCi/L = Picocuries per liter.
TAV = Technical Area-V (well).

[a]Result

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 exceeds the established MCL.
ND = Not detected (at MDL). Activities of zero or less are considered to be not detected.

[b]MDL or MDA

The MDL applies to Tables 5B-1 through 5B-7. MDA applies to Table 5B-8.

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 5B-1 through 5B-7. Critical Level applies to Table 5B-8.

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 May 2009).

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 Analytical Results Tables (Concluded)

[e]Lab Qualifier

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

B = 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 method detection limit.
X = Data rejected due to peak not meeting identification criteria.

[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 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 not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method

EPA, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

EPA, 1984, "Methods for Chemical Analysis of Water and Wastes." EPA 600-4-79-020.

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

Rice, E.W., R.B. Baird, A.D. Eaton, and L.S. Clesceri 2012, *Standard Methods for the Examination of Water and Wastewater*, 22nd ed., Method 2320B, Washington, D.C.

SM = Standard Method.

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.
% sat = Percent saturation.
μmhos/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

5C-1 Trichloroethene Concentrations, LWDS-MW1 ..... 5C-5

5C-2 Trichloroethene Concentrations, TAV-MW6 ..... 5C-6

5C-3 Trichloroethene Concentrations, TAV-MW10 ..... 5C-7

5C-4 Trichloroethene Concentrations, TAV-MW12 ..... 5C-8

5C-5 Trichloroethene Concentrations, TAV-MW14 ..... 5C-9

5C-6 Nitrate Plus Nitrite Concentrations, AVN-1 ..... 5C-10

5C-7 Nitrate Plus Nitrite Concentrations, LWDS-MW1 ..... 5C-11

5C-8 Nitrate Plus Nitrite Concentrations, TAV-MW6 ..... 5C-12

5C-9 Nitrate Plus Nitrite Concentrations, TAV-MW10 ..... 5C-13

5C-10 Nitrate Plus Nitrite Concentrations, TAV-MW14 ..... 5C-14

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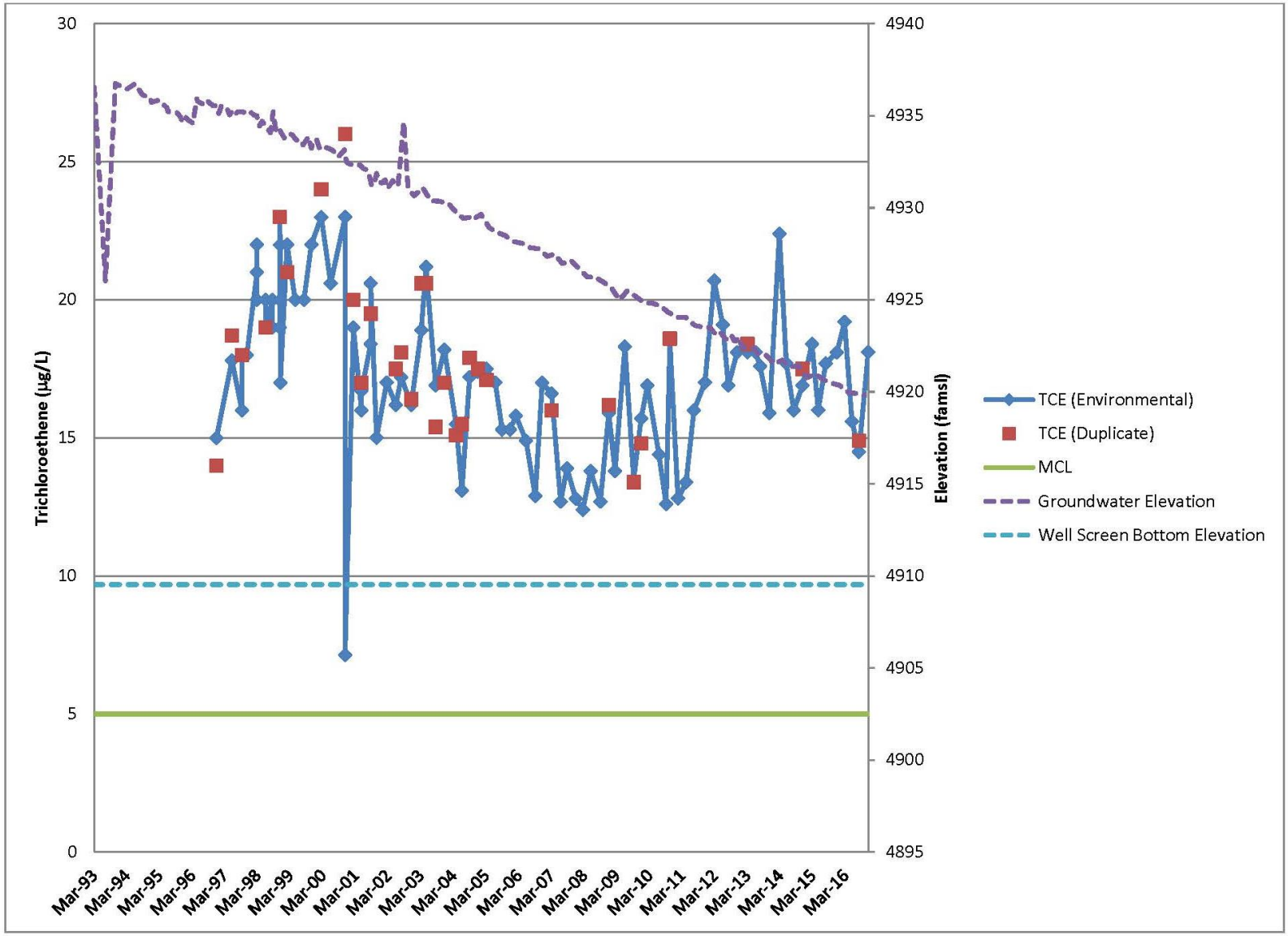
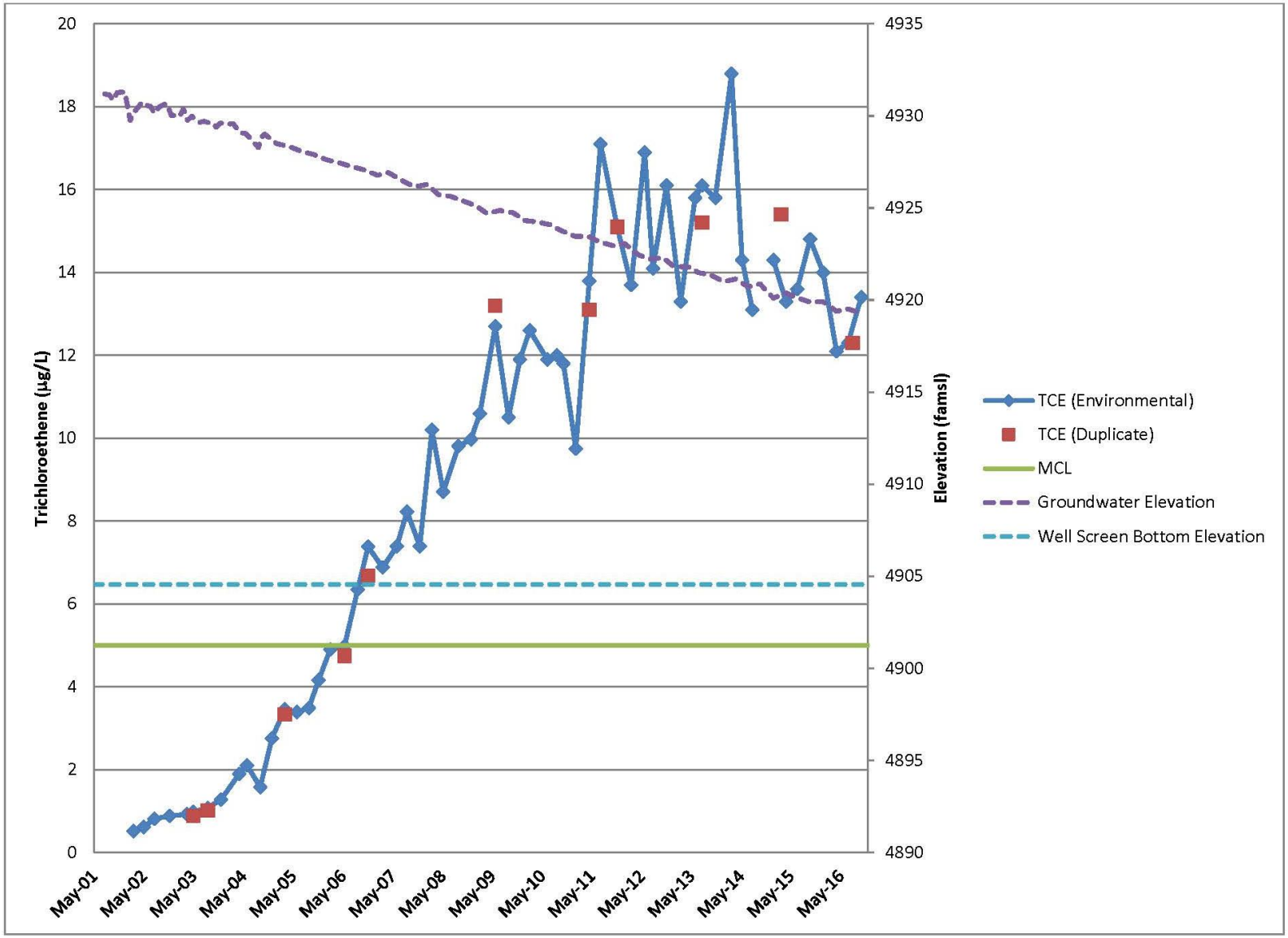


Figure 5C-1. Trichloroethene Concentrations, LWDS-MW1



Note: TCE was not detected in the sample collected in November 2014.

Figure 5C-2. Trichloroethene Concentrations, TAV-MW6

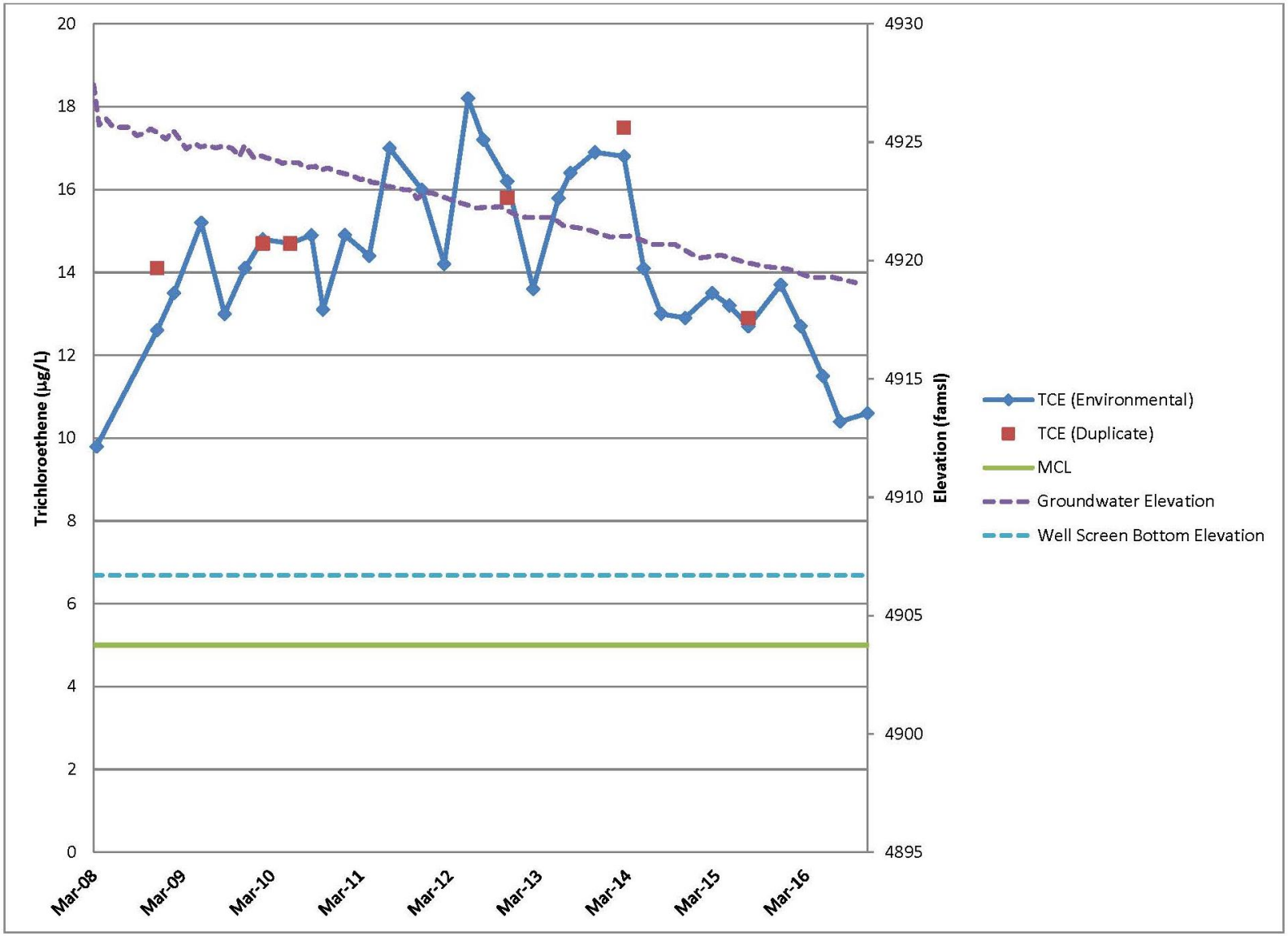


Figure 5C-3. Trichloroethene Concentrations, TAV-MW10

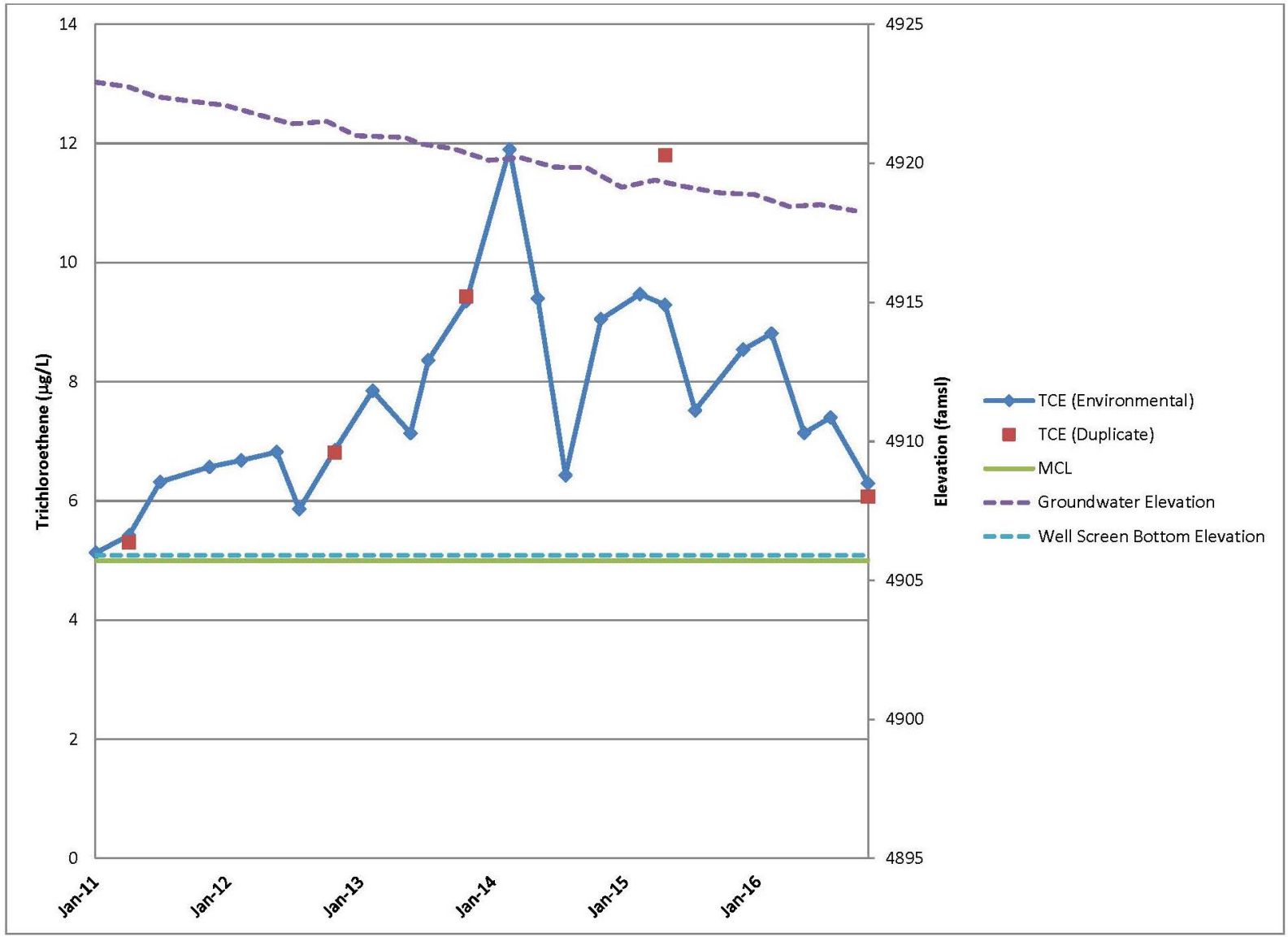
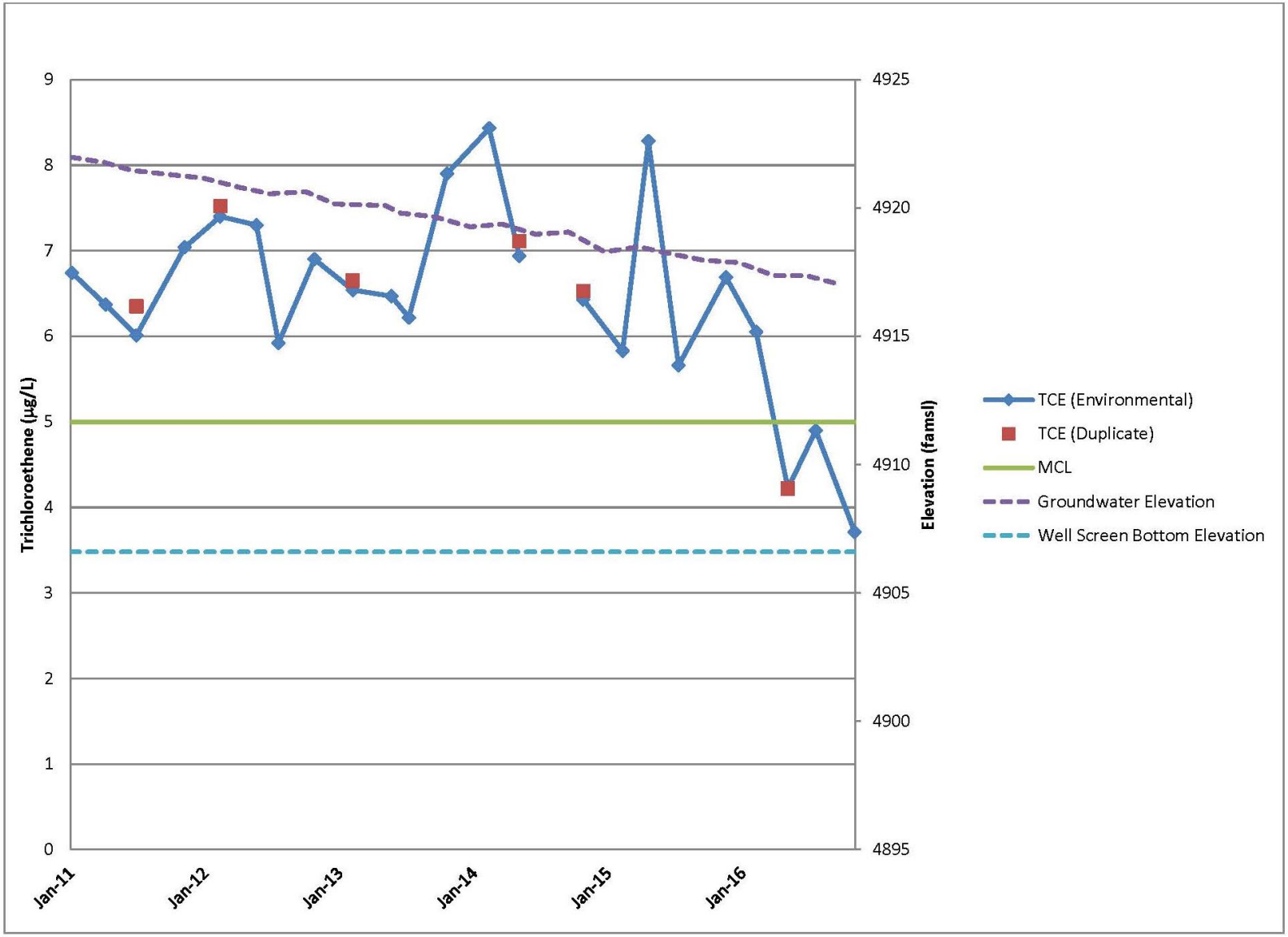


Figure 5C-4. Trichloroethene Concentrations, TAV-MW12



Note: TCE was not detected in the sample collected in August 2014.

Figure 5C-5. Trichloroethene Concentrations, TAV-MW14

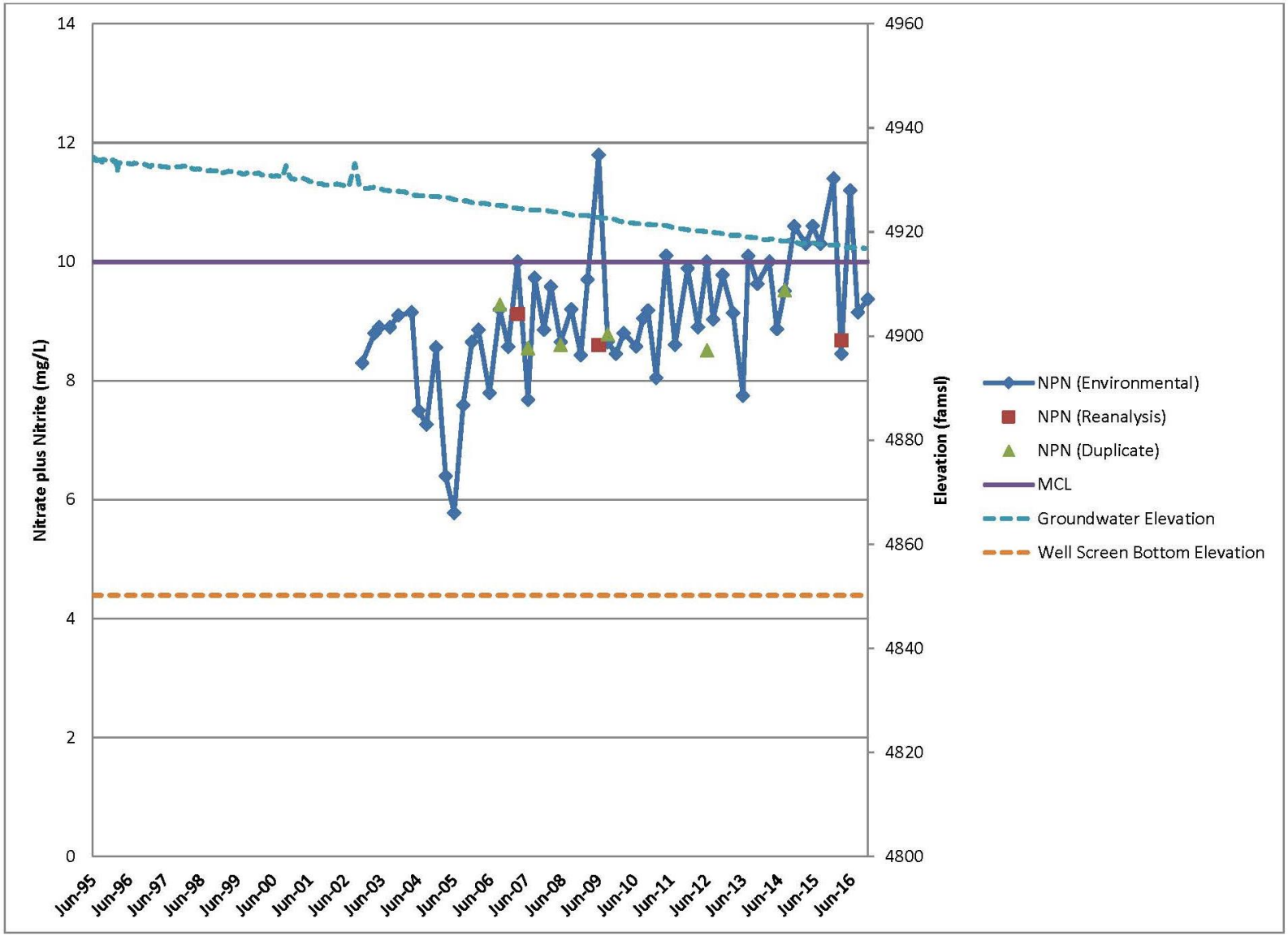


Figure 5C-6. Nitrate Plus Nitrite Concentrations, AVN-1

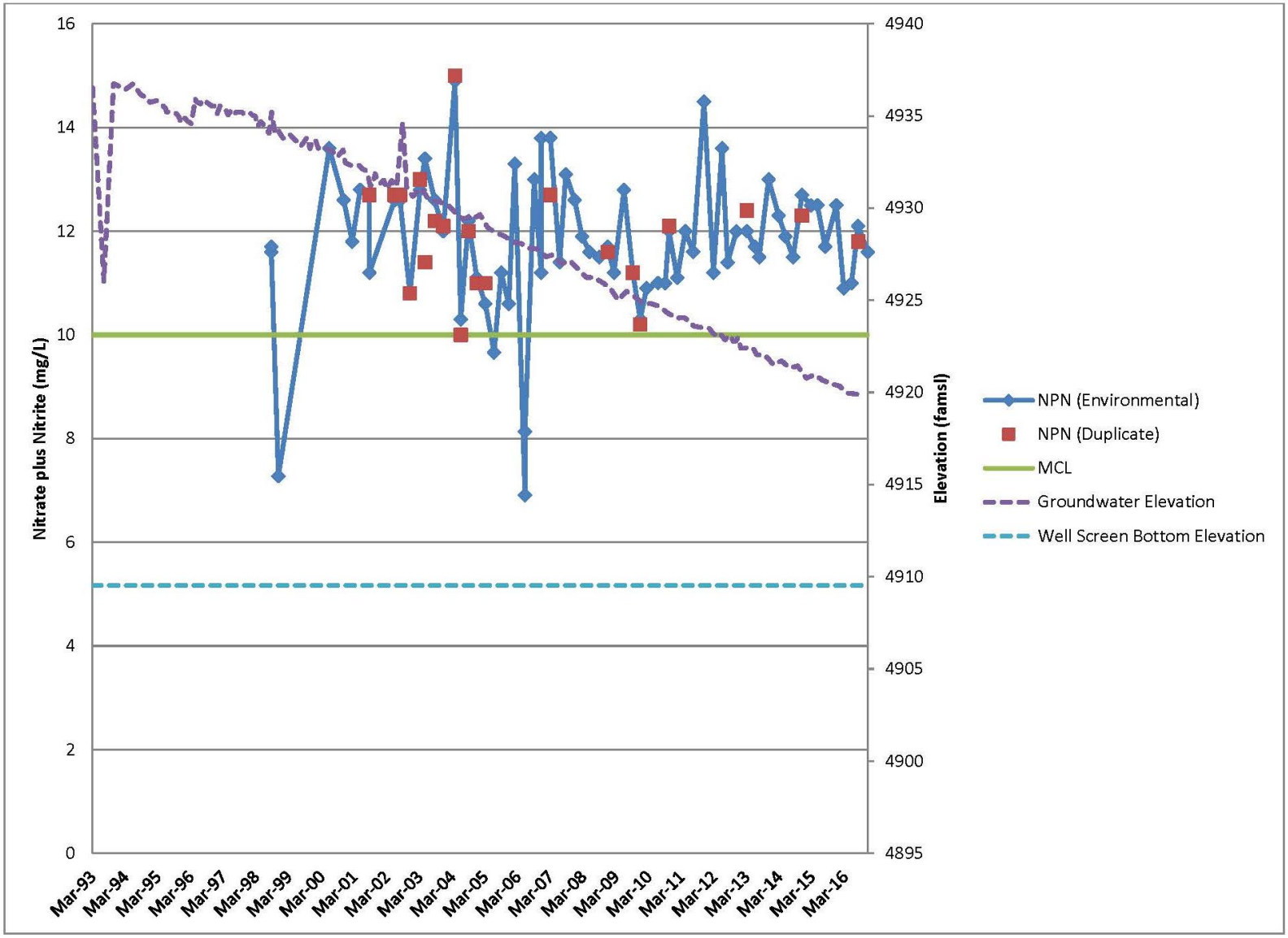


Figure 5C-7. Nitrate Plus Nitrite Concentrations, LWDS-MW1

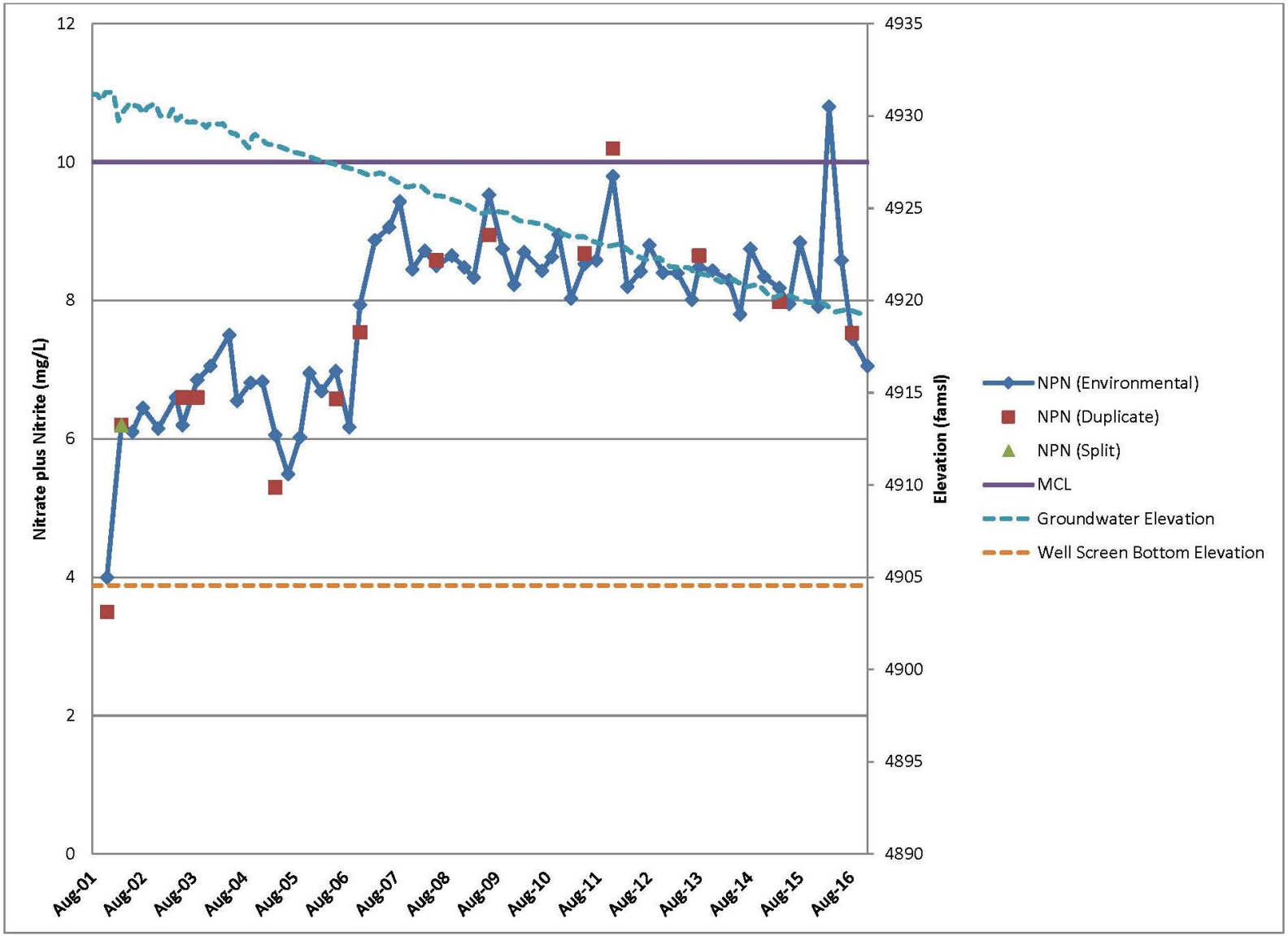


Figure 5C-8. Nitrate Plus Nitrite Concentrations, TAV-MW6

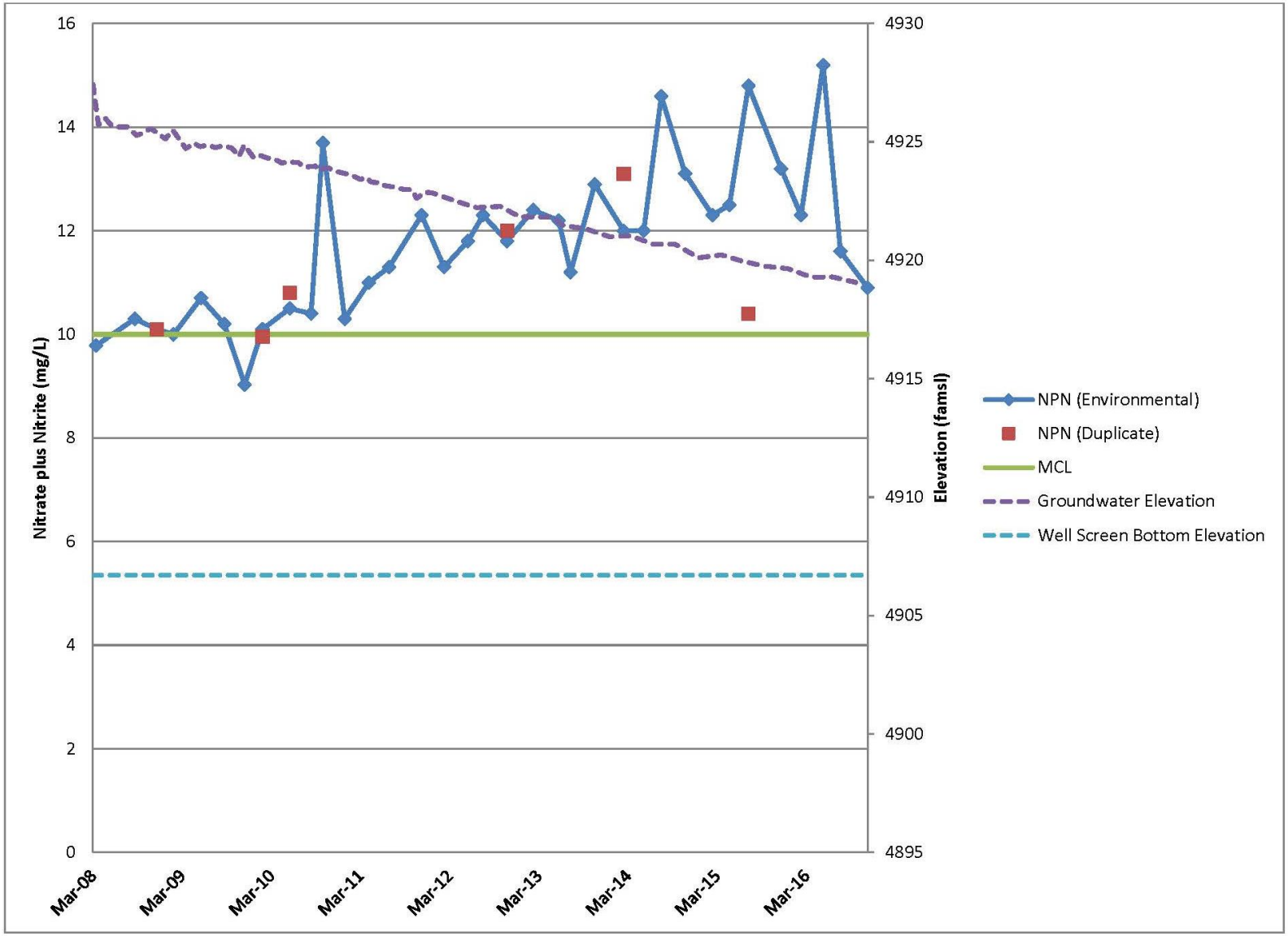


Figure 5C-9. Nitrate Plus Nitrite Concentrations, TAV-MW10

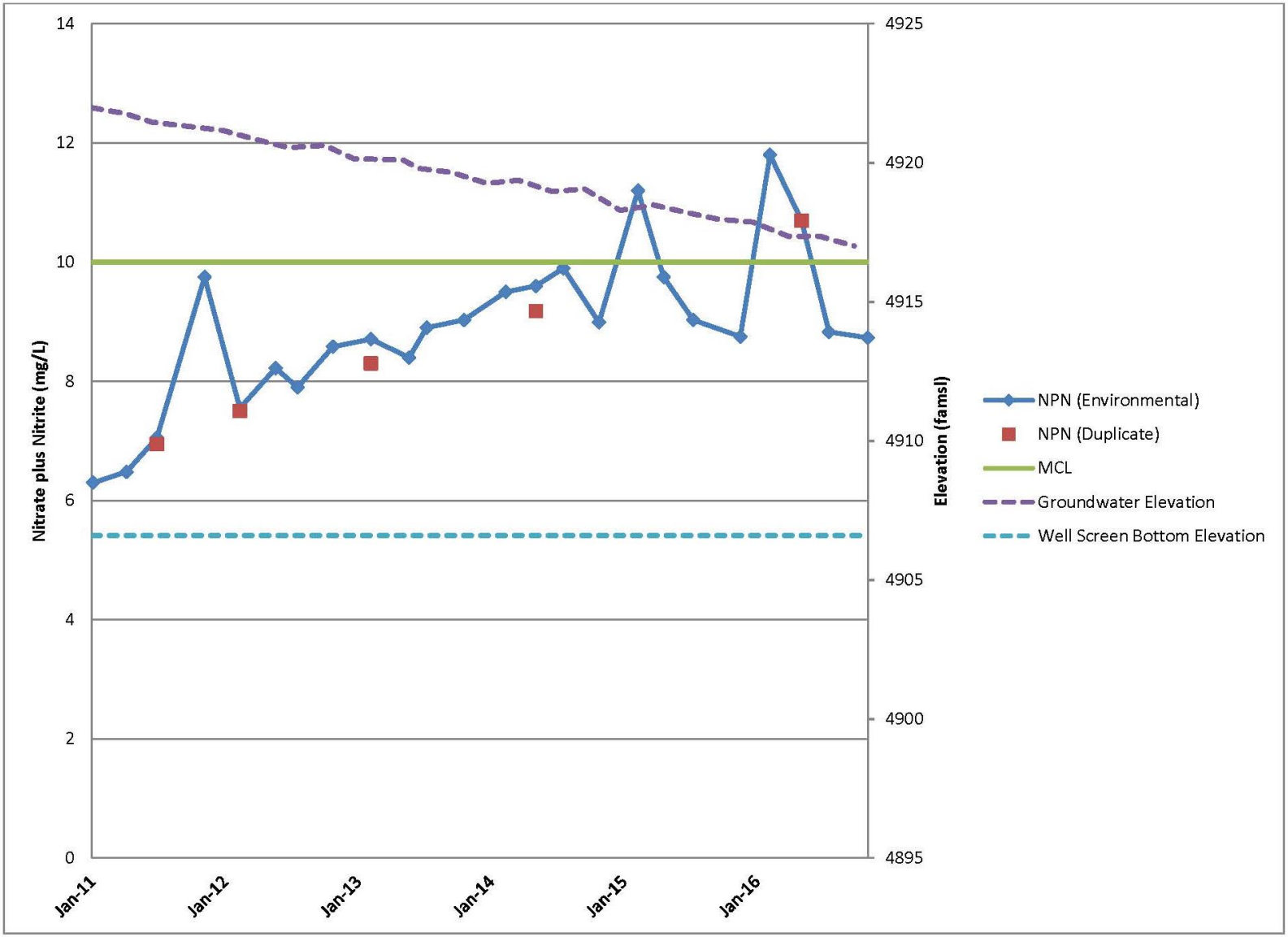


Figure 5C-10. Nitrate Plus Nitrite Concentrations, TAV-MW14

Attachment 5D
Technical Area-V
Hydrographs

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Attachment 5D Hydrographs

5D-1 TAVG AOC Wells (1 of 3)..... 5D-5

5D-2 TAVG AOC Wells (2 of 3)..... 5D-6

5D-3 TAVG AOC Wells (3 of 3)..... 5D-7

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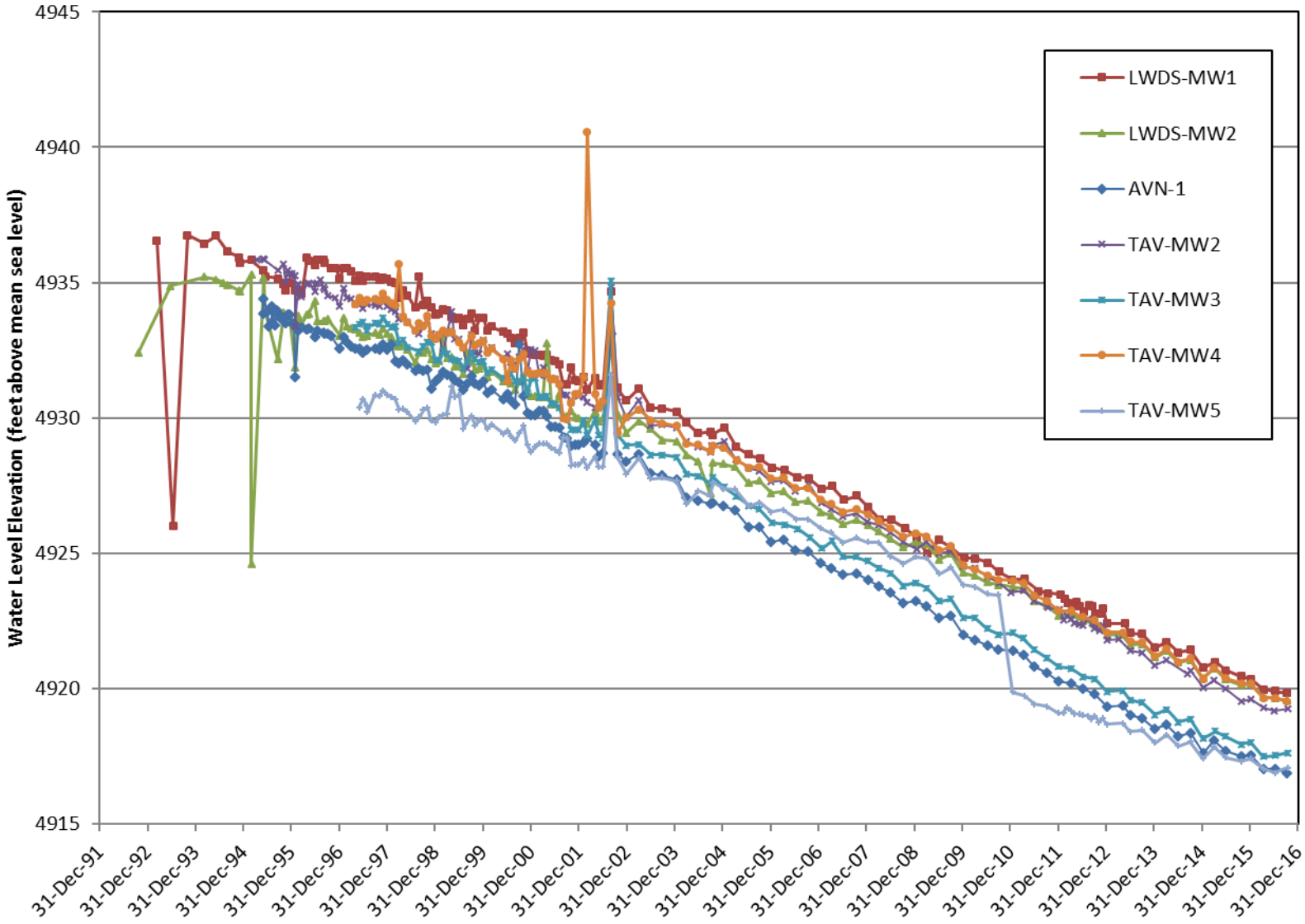

Figure 5D-1. TAVG AOC Wells (1 of 3)

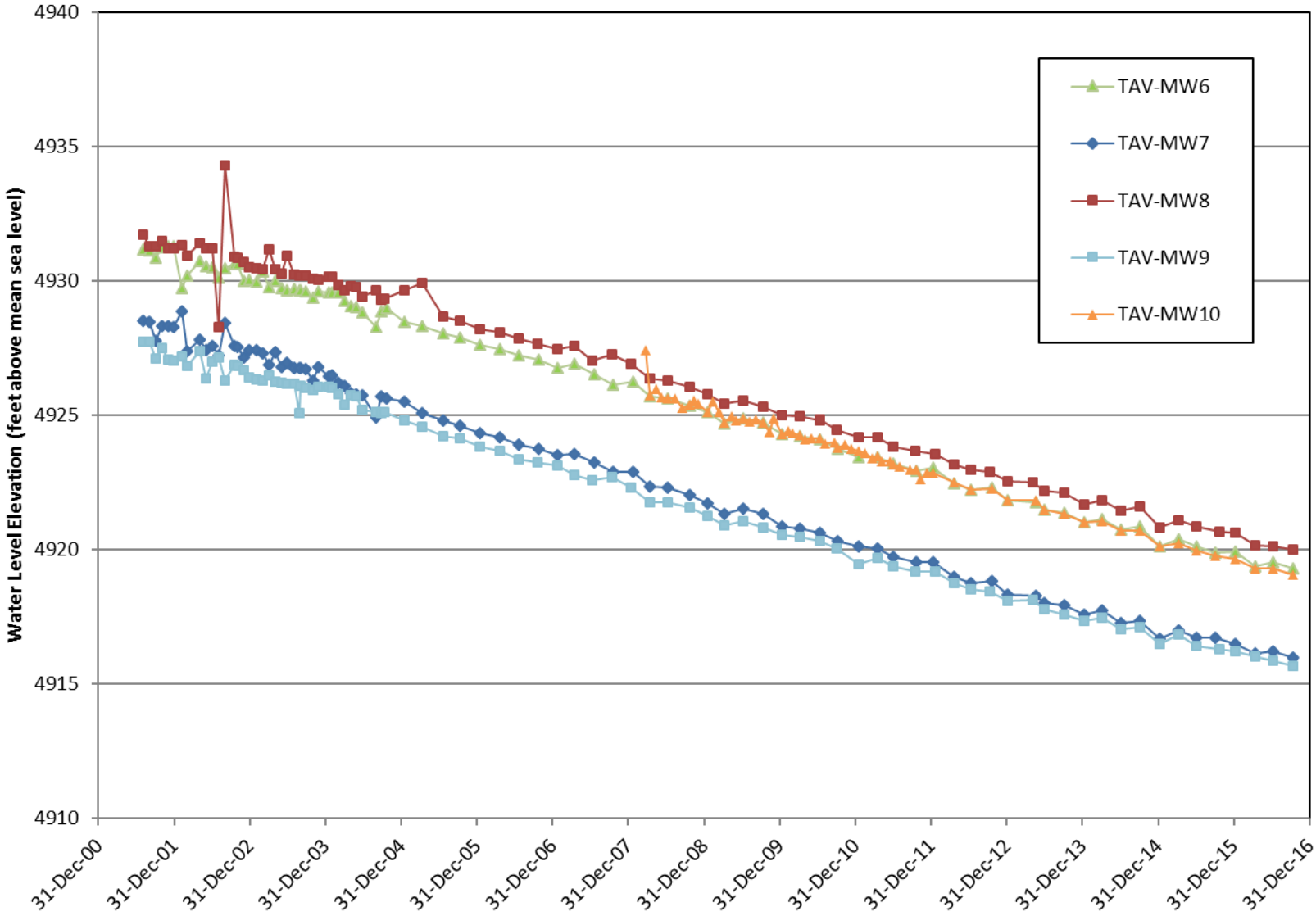

Figure 5D-2. TAVG AOC Wells (2 of 3)

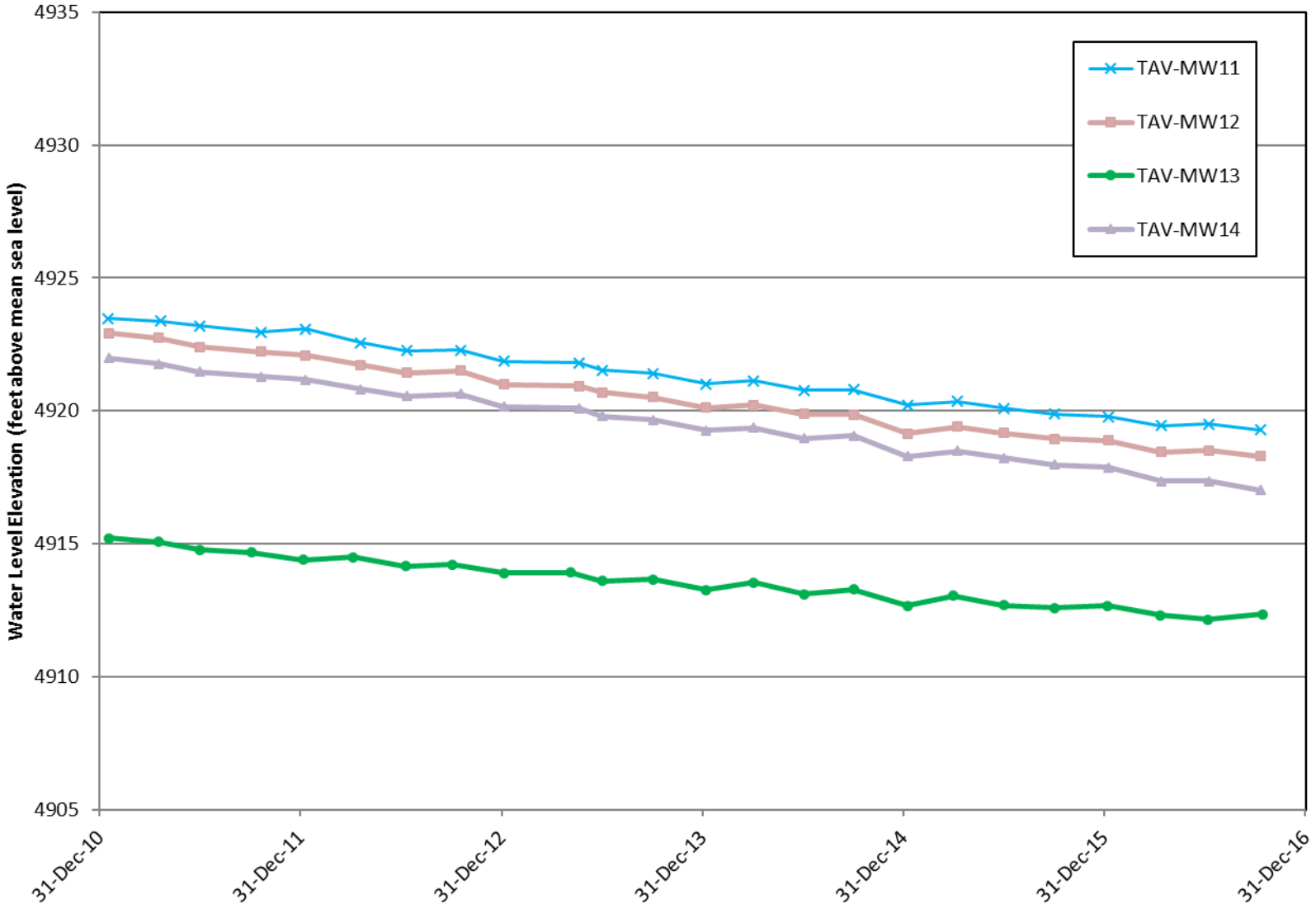

Figure 5D-3. TAVG AOC Wells (3 of 3)

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Chapter 5
Technical Area-V
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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 (the Consent Order) (NMED April 2004) because two chemicals, nitrate and trichloroethene (TCE), had groundwater concentrations that exceeded the respective 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). At the time the Consent Order was issued, nitrate and TCE were specified as constituents of concern (COCs) because [1] the Perched Groundwater System 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.

In the TAG AOC, the historical maximum nitrate concentration has been 49 milligrams per liter (mg/L) and the maximum TCE concentration has been 10.5 micrograms per liter (µg/L). The U.S. Environmental Protection Agency (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. TCE concentrations in the Perched Groundwater System have decreased and have been below the MCL since September 2015 and have continued to remain below the MCL in the Regional Aquifer since monitoring began in 1992. Therefore, TCE is no longer considered to be a COC. Nitrate is currently the only COC in the TAG AOC.

In 2004, the Consent Order became effective. The Consent Order identified the TAG AOC as an area of groundwater contamination requiring further characterization and corrective action. In response to the Consent Order, the TAG Corrective Measures Evaluation (CME) Work Plan was submitted to the NMED in July 2004 (SNL July 2004; SNL November 2004). NMED approved the work plan later that same year (NMED October 2004). After fulfilling the requirements of the CME Work Plan, the CME Report was submitted to the NMED (SNL August 2005). However, review of the 2005 CME Report was not finalized by the NMED. In order to move the project forward, an updated and combined Current Conceptual Model/CME (CCM/CME) Report was submitted to NMED in December 2016.

6.1.1 Location

The TAG AOC covers approximately 1.82 square miles (sq mi) and three SNL/NM Technical Areas (TAs) (TA-I, TA-II, and TA-IV). 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). The operations identified as potentially responsible for groundwater contamination within the TAG Study Area include the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA), SNL/NM, KAFB, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), and the COA. 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 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, and a major sanitary-sewer line operated by the ABCWUA trends along the floor of Tijeras Arroyo and across the southeast corner of the TAG AOC.

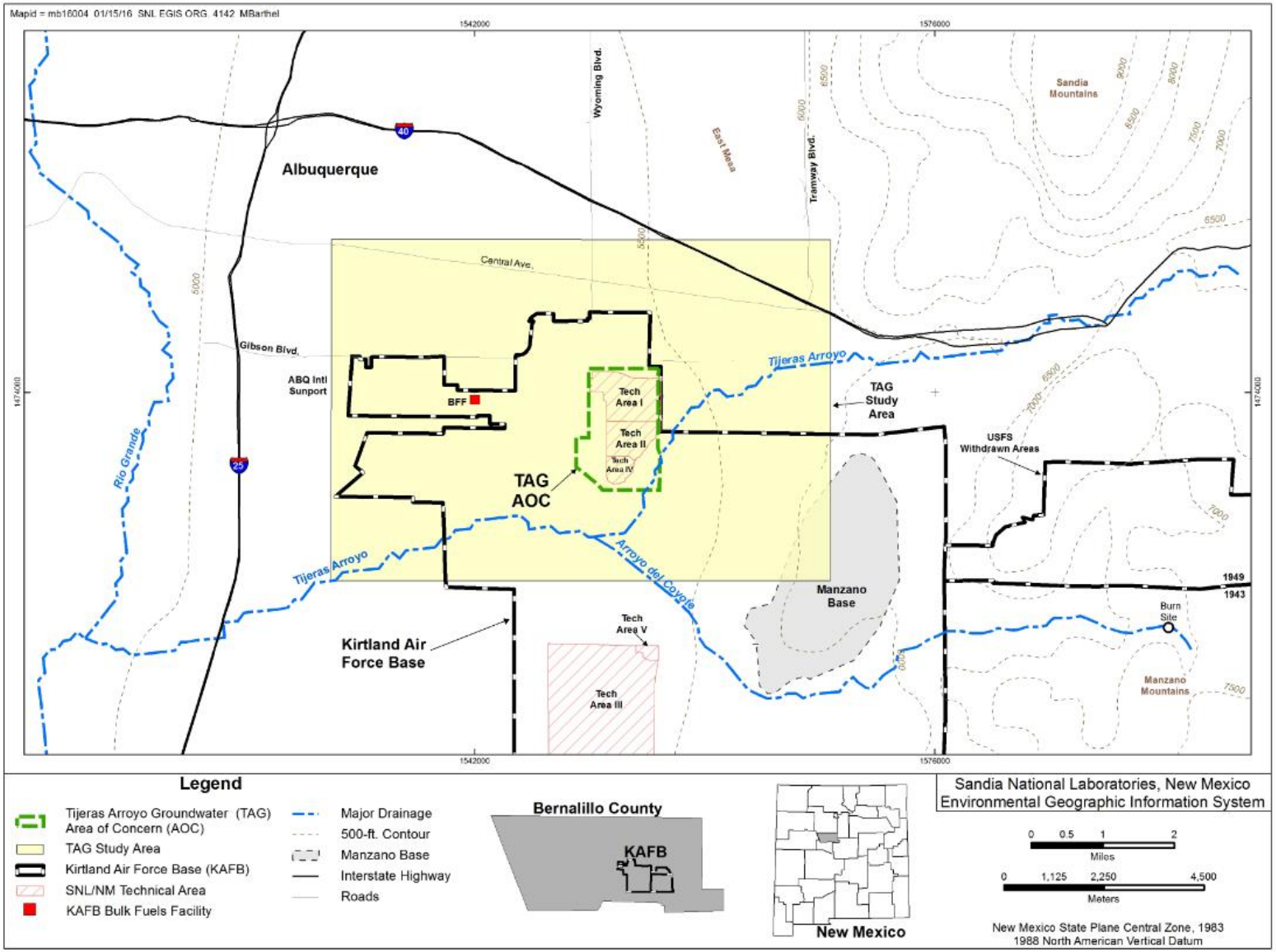


Figure 6-1. Location of the TAG AOC

6.1.2 Site History

The SNL/NM 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 1988). 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 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 evacuated and removed. The NMED 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 in the vicinity of the TAG AOC. Their initial findings were incorporated in the TAG Investigation Report. 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 (BFF) 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 BFF do not impact groundwater quality beneath the TAG AOC.

Beginning in 1992, groundwater quality has been evaluated as part of the overall TA-II investigation of the Regional Aquifer with the installation of three groundwater monitoring wells. During this initial investigation, the Perched Groundwater System 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 a SNL/NM well in the vicinity of Tijeras Arroyo was reported. The October 1994 sample from monitoring well TA2-W-01 contained TCE at 1 µg/L. This TCE detection in the Perched Groundwater System prompted SNL/NM personnel to further investigate groundwater contamination in the area. The first TCE exceedance of the MCL occurred in November 1995; groundwater from Perched Groundwater System monitoring well TA2-W-19 contained TCE at 8.1 µg/L.

6.1.4 Current Monitoring Network

Currently, 20 monitoring wells in the TAG AOC are sampled by SNL/NM personnel for water quality (Table 6-1). As shown on Figure 6-2, water levels are measured by either SNL/NM personnel or the COA at 30 monitoring wells in the vicinity of the TAG AOC. Additional monitoring wells owned by KAFB are utilized by the TAG investigation for understanding the hydrogeologic setting.

6.1.5 Summary of Calendar Year 2016 Activities

The following activities were conducted for the TAG AOC during Calendar Year (CY) 2016:

- Quarterly water-level measurements were obtained from the TAG monitoring wells.
- 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 March, June, August/September, and December 2016. Water sample collection at well WYO-4 was not successful.
- Semiannual groundwater samples were collected at four wells (TA1-W-06, TA2-W-01, TA2-W-27, and TJA-6) in March 2016 and August/September 2016.
- Annual groundwater samples were collected at 10 wells (PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, and WYO-3) in August/September 2016.

6.1.6 Summary of Future Activities

The following activities are anticipated for the TAG AOC during the next reporting period (CY 2017) unless the NMED-Hazardous Waste Bureau (HWB) requests otherwise after reviewing the updated TAG CCM and CME Report (SNL December 2016):

- Quarterly water level measurements for TAG wells.
- Quarterly groundwater sampling at seven wells: TA2-W-19, TA2-W-26, TA2-W-28, TJA-2, TJA-3, TJA-4, and TJA-7.
- Semiannual groundwater sampling at four wells: TA1-W-06, TA2-W-01, TA2-W-27, and TJA-6.
- Annual groundwater sampling at nine wells: PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-08, TA2-NW1-595, and WYO-3.

Table 6-1. Groundwater Monitoring Conducted by SNL/NM and the COA in the Vicinity of the TAG AOC during CY 2016

Well ID	Installation Year	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	✓	✓	Regional Aquifer
TA1-W-01	1997	✓	✓	Regional Aquifer
TA1-W-02	1998	✓	✓	Regional Aquifer
TA1-W-03	1998	✓	✓	Perched Groundwater System
TA1-W-04	1998	✓	✓	Regional Aquifer
TA1-W-05	1998	✓	✓	Regional Aquifer
TA1-W-06	1998	✓	✓	Perched Groundwater System
TA1-W-07	1998		✓	Perched Groundwater System
TA1-W-08	2001	✓	✓	Perched Groundwater System
TA2-NW1-325	1993		✓	Perched Groundwater System
TA2-NW1-595	1993	✓	✓	Regional Aquifer
TA2-W-01	1994	✓	✓	Perched Groundwater System
TA2-W-19	1995	✓	✓	Perched Groundwater System
TA2-W-24	1998		✓	Regional Aquifer
TA2-W-25	1997		✓	Regional Aquifer
TA2-W-26	1998	✓	✓	Perched Groundwater System
TA2-W-27	1998	✓	✓	Perched Groundwater System
TA2-W-28	2014	✓	✓	Perched Groundwater System, replaced TA2-SW1-320
TJA-2	1994	✓	✓	Perched Groundwater System
TJA-3	1998	✓	✓	Regional Aquifer
TJA-4	1998	✓	✓	Regional Aquifer – merging (intermediate) zone
TJA-5	1998		✓	Perched Groundwater System
TJA-6	2001	✓	✓	Regional Aquifer
TJA-7	2001	✓	✓	Perched Groundwater System
WYO-3	2001	✓	✓	Regional Aquifer, replaced WYO-1
WYO-4	2001		✓	Perched Groundwater System, replaced WYO-2
Total	----	20	30	Both water-bearing units

NOTES:
Check mark indicates water quality (WQ) sample or water level (WL) measurement was obtained in the TAG AOC.
AOC = Area of Concern.
COA = City of Albuquerque ownership
CY = Calendar Year.
ID = Identifier.
NW = Northwest.
PGS = Parade Ground South.
SW = Southwest.
TA1 = Technical Area-I.
TA2 = Technical Area-II.
TAG = Tijeras Arroyo Groundwater.
TJA = Tijeras Arroyo.
W = Well.
WL = Water level.
WQ = Water quality.
WYO = Wyoming.

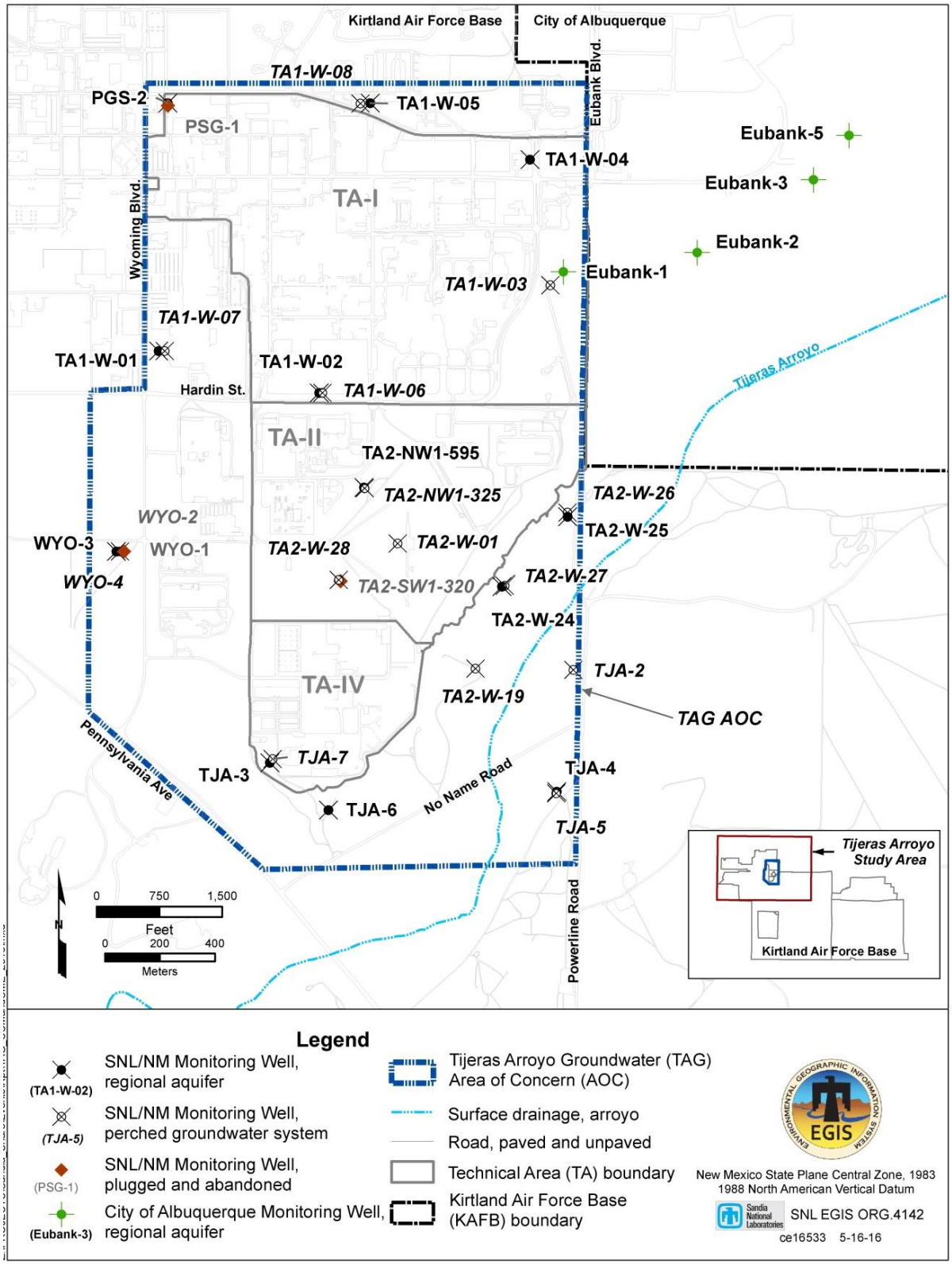


Figure 6-2. Groundwater Monitoring Wells Maintained by SNL/NM and the COA in the Vicinity of the TAG AOC

6.1.7 Conceptual Site Model

The updated CCM and CME Report presented a Conceptual Site Model (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, June 2003). The TAG AOC is underlain by two primary water-bearing units of interest: 1) a Perched Groundwater System, and 2) the underlying Regional Aquifer. Figure 6-3 depicts the TAG CSM and Table 6-2 summarizes the hydrogeologic characteristics of the two water-bearing units.

The Perched Groundwater System has a limited lateral extent that encompasses approximately 4.43 sq mi across the TAG AOC and adjacent north-central KAFB. The zone of saturation in the Perched Groundwater System varies from approximately 10 to 20 ft in thickness, depending on the well location. The Perched Groundwater System is not used as a potable water supply source. The Perched Groundwater System is a thin dissipating water-bearing unit that formed as a result of historical anthropogenic discharges of wastewater and septic water. Groundwater in the Perched Groundwater System migrates toward the southeast and merges with the underlying Regional Aquifer southeast of Tijeras Arroyo near Powerline Road. Declining water level trends indicate that nearly the entire extent of the Perched Groundwater System will naturally dewater in the TAG AOC by the year 2057. Some areas in the TAG AOC will dewater much sooner.

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). A driving force for downward migration of nitrate through the vadose zone to groundwater no longer exists. There is no current or anticipated use of groundwater from the Perched Groundwater System in the vicinity of the TAG AOC. The nearest receptor for the Regional Aquifer along the modeled flow path is the ABCWUA Ridgecrest Well Field located. Computer modeling predicts any nitrate reaching the well field after a travel time of 130 years would be attenuated by over two orders of magnitude. Thus, there is no foreseeable risk to human health or threat to beneficial use of groundwater from historical SNL/NM operations.

Figure 6-4 shows the variety of recharge sources (active and inactive) that are located in the vicinity of the TAG AOC. These recharge sources likely impacted the Perched Groundwater System:

- Landscape watering of grassy areas such as the Parade Ground north of TA-I,
- A buried ancestral Tijeras Arroyo channel with relatively older groundwater, flowing from Tijeras Canyon,
- Ongoing surface water and base flow along Tijeras Arroyo,
- Possible leaking water lines and sewer lines,
- Wastewater outfalls (now inactive),
- Buried septic systems (now inactive),
- The KAFB former Sewage Lagoons (now inactive), and
- The Tijeras Arroyo Golf Course operated by KAFB.

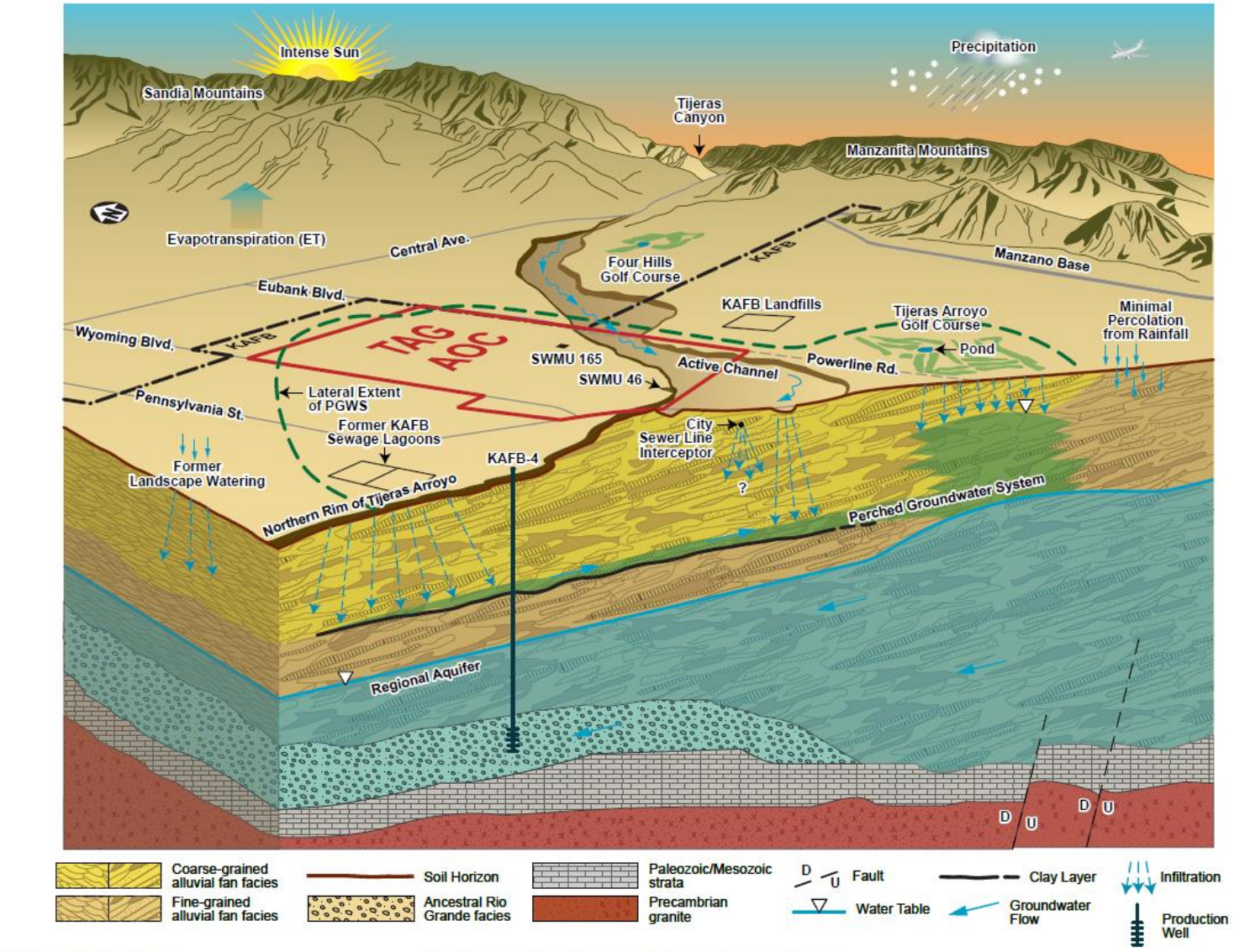


Figure 6-3. TAG Conceptual Site Model (SNL December 2016)

Table 6-2. Comparison of Hydrogeologic Characteristics for the Perched Groundwater System and the Regional Aquifer in the TAG AOC

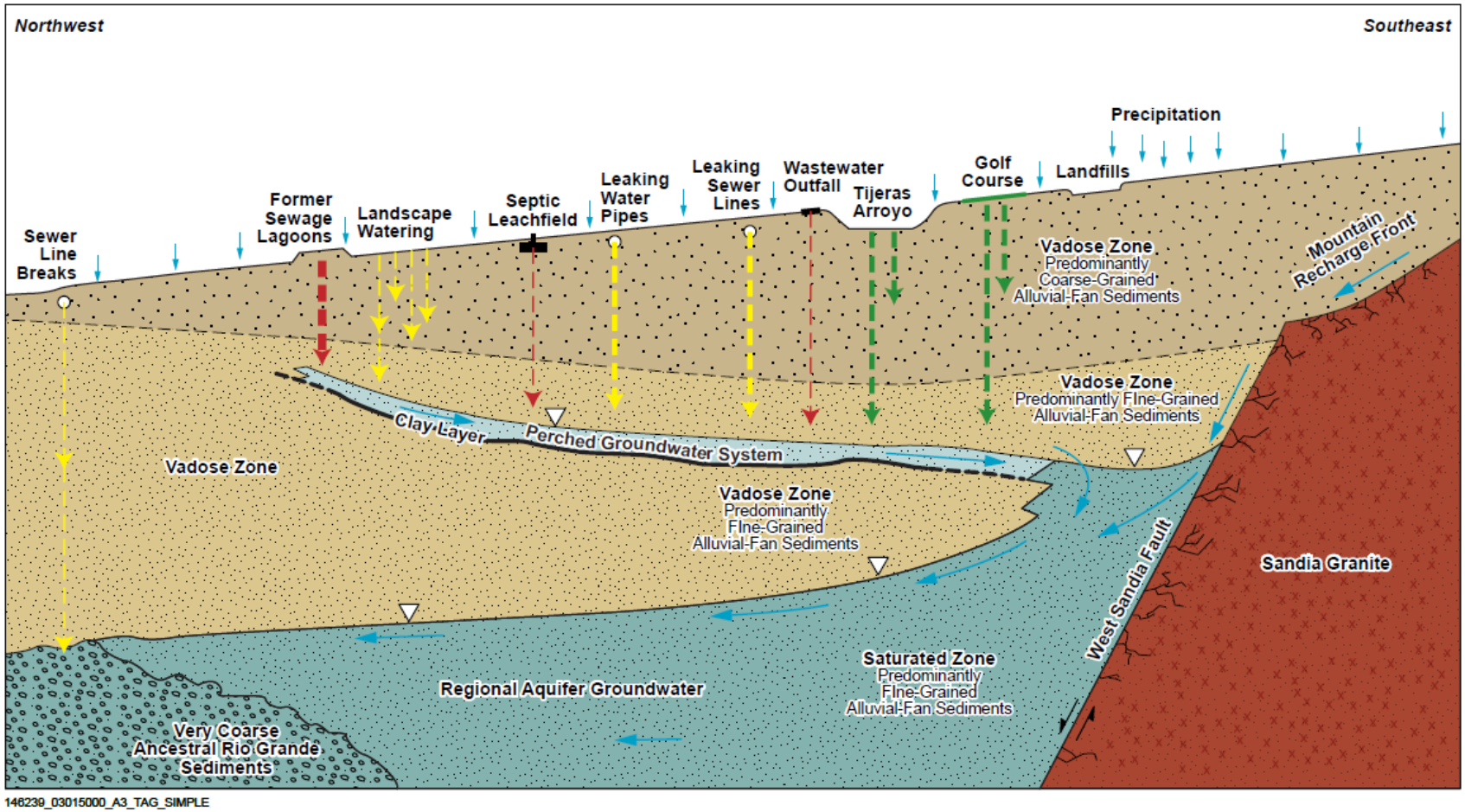
Characteristic	Perched Groundwater System	Regional Aquifer
Potentiometric Surface	Surface is inferred to slope primarily to the southeast.	Surface is inferred to slope primarily to the west and northwest.
Pressure Head	Unconfined (water table) conditions.	Unconfined to semi-confined conditions.
Lithofacies 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 0.01 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.
Effective porosity	0.25 (25 percent)	0.25 (25 percent)
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 supply purposes.	Utilized for water supply by KAFB, ABCWUA, and VA.
Lateral extent	Approximately 4.43 sq mi across north-central KAFB.	Laterally extensive across the Albuquerque Basin.
Saturated Thickness	Saturated interval ranging from approximately 10 to 20 ft in thickness.	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.
Water Levels	Steadily declining groundwater elevations across the entire TAG AOC, except in southeast corner (well TJA-5), annual declining rate ranges from 0.06 to 1.17 ft/yr. Steadily declining water levels in the northwest, but increasing in the southeast part of the TAG AOC.	Increasing water across entire TAG AOC, except for southwest corner. Variable rate ranges from a declining 0.07 to an increasing 2.65 ft/yr. Increasing water levels in the north, declining water levels in the center, and increasing in the southeastern part of the TAG AOC.

Refer to footnotes on page 6-10.

Table 6-2. Comparison of Hydrogeologic Characteristics for the Perched Groundwater System and the Regional Aquifer in the TAG AOC *(Concluded)*

Characteristic	Perched Groundwater System	Regional Aquifer
Recharge	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.	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 variations such as multiple East to West trending anastomosing lenses; possible eastward stratigraphic dip of the alluvial-fan sediments toward basin bounding faults.	Combined drawdown of KAFB, ABCWUA, and VA production wells. North to South trending paleochannels with high conductivities.

NOTES:
Table was revised using the updated TAG CCM/CME Report (SNL December 2016).
ABCWUA = Albuquerque Bernalillo County Water Utility Authority.
AOC = Area of Concern.
ARG = Ancestral Rio Grande (lithofacies).
ft = Foot (feet).
ft/ft = Feet per foot.
ft/yr = Feet per year.
KAFB = Kirtland Air Force Base.
SNL = Sandia National Laboratories.
TAG = Tijeras Arroyo Groundwater.
VA = Veterans Administration.



Groundwater Flow Model for TAG Area Showing Principal Recharge Features, View to Northeast, Not to Scale. Width of a 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 has stopped.

Figure 6-4. Recharge Features in the Vicinity of the TAG AOC (SNL December 2016)

The Regional Aquifer is more laterally extensive than the Perched Groundwater System, 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 Perched Groundwater System. The gradient in the Regional Aquifer averages approximately 0.018 feet per foot (ft/ft) across the TAG AOC, but is steeper near production wells operated by KAFB, the ABCWUA, and the Veterans Administration (VA). The Regional Aquifer is recharged on the eastern side of the study area by natural sources including mountain-front flow, Tijeras Arroyo, and the Perched Groundwater System. 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 aqueous geochemical signatures of the Perched Groundwater System and the Regional Aquifer are distinctive. Figure 6-5 presents two Piper diagrams depicting the most comprehensive set of geochemical data for the Perched Groundwater System and the Regional Aquifer. The geochemical signature of the Perched Groundwater System 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 Perched Groundwater System 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.

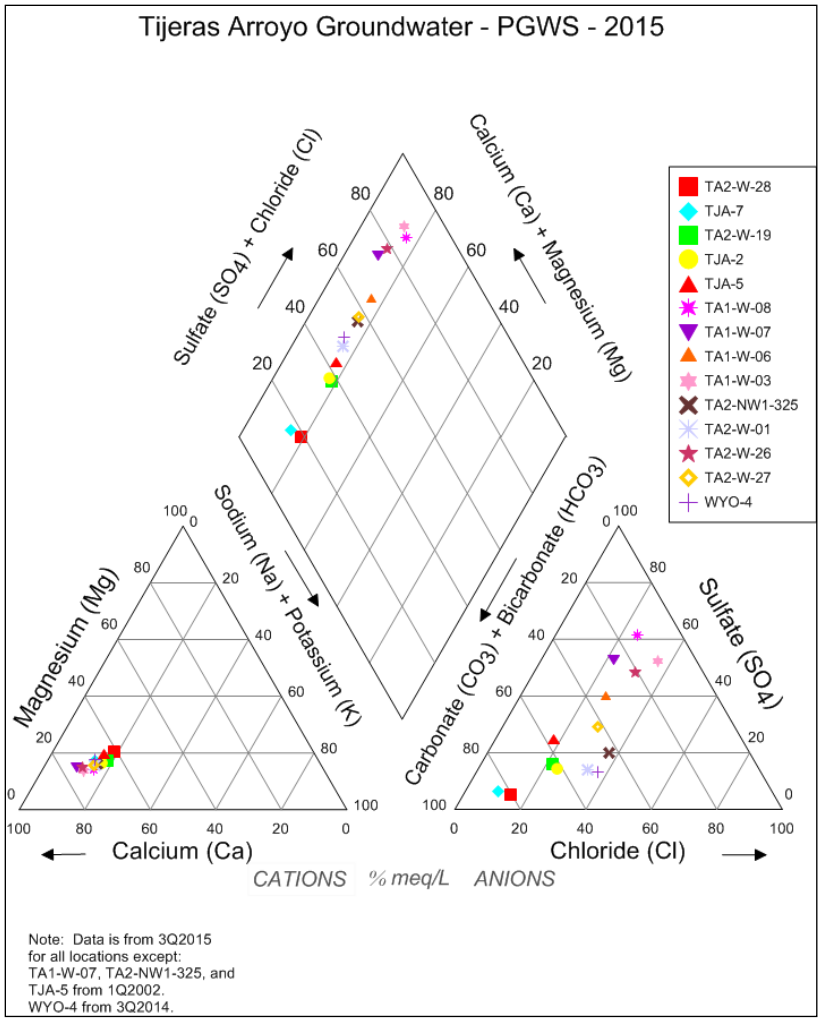
6.1.7.1 Regional Hydrogeologic Conditions

Tijeras Arroyo is the most significant surface water drainage feature on KAFB and trends southwest across KAFB and eventually drains into the Rio Grande, approximately 5.6 miles west of KAFB. Surface 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 9.45 inches (Chapter 2.6.2.1). During most rainfall events, rainfall quickly infiltrates into the soil in the study area. 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 consists 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.

6.1.7.2 Hydrogeologic Conditions at the TAG AOC

Across the TAG AOC, the Perched Groundwater System is encountered at approximately 270 to 340 ft bgs, and the Regional Aquifer system is encountered at approximately 440 to 570 ft bgs. Groundwater in the Perched Groundwater System mixes with the Regional Aquifer southeast of Tijeras Arroyo in a merging zone where the



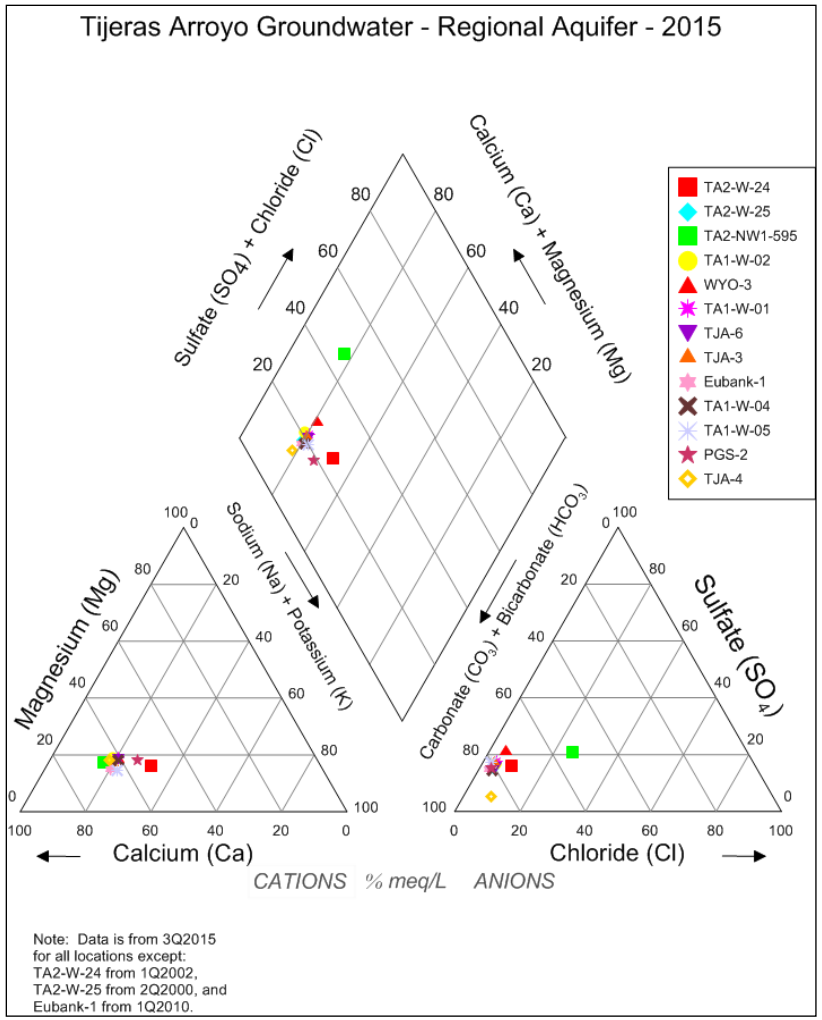


Figure 6-5. Piper Diagrams for Groundwater Samples Collected from Monitoring Wells Screened in the Perched Groundwater System and the Regional Aquifer (SNL December 2016)

alluvial-fan sediments are slightly more permeable. 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 2016 potentiometric surface for the Perched Groundwater System, which has an estimated lateral extent of approximately 4.43 sq mi. Groundwater elevations are listed in Table 6-3. The direction of groundwater flow in the Perched Groundwater System 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 Perched Groundwater System 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. The vertical gradient is downward as indicated by the merging of the two groundwater water-bearing units near the southeast corner of the TAG AOC.

Figure 6-7 presents the October 2016 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 0.01 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.

6.1.7.4 Groundwater Elevations

The 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 Perched Groundwater System or the Regional Aquifer.

Historically, water levels in the Perched Groundwater System have fluctuated across the TAG AOC. In the vicinity of the KAFB former 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 Perched Groundwater has been nearly eliminated; SNL 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). Declining water level trends indicate that nearly the entire extent of the Perched Groundwater System will naturally dewater in the TAG AOC within approximately 42 years. 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. Monitoring well TA1-W-03 exhibits the greatest rate.

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. Increased demand occurs in the summer months. Since late 2008, hydrographs for Regional Aquifer wells in the northern part of the TAG AOC 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 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 per year. 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 (Balleau Groundwater, Inc. [BGW] February 2001).

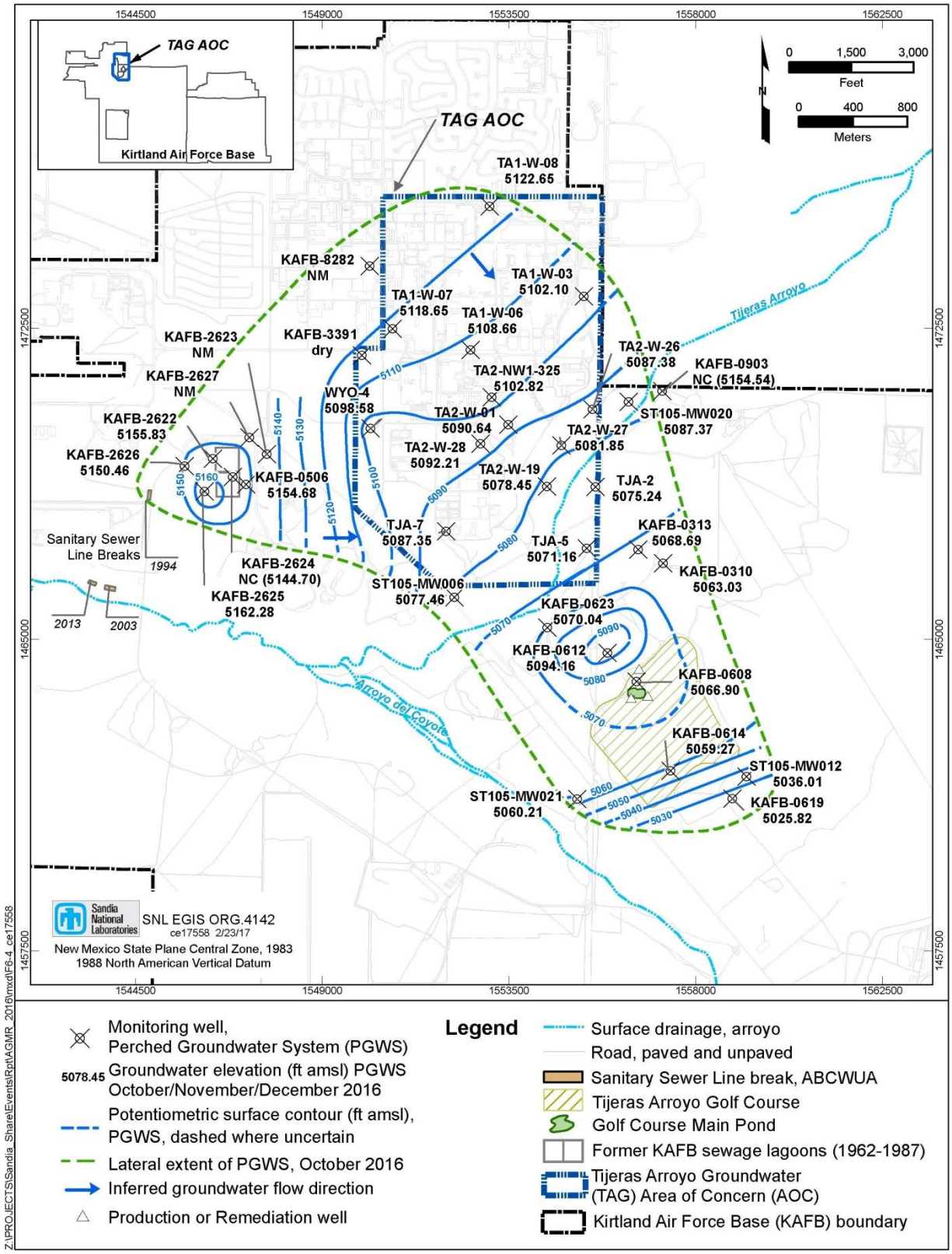


Figure 6-6. TAG AOC Potentiometric Surface Map for the Perched Groundwater System (October 2016)

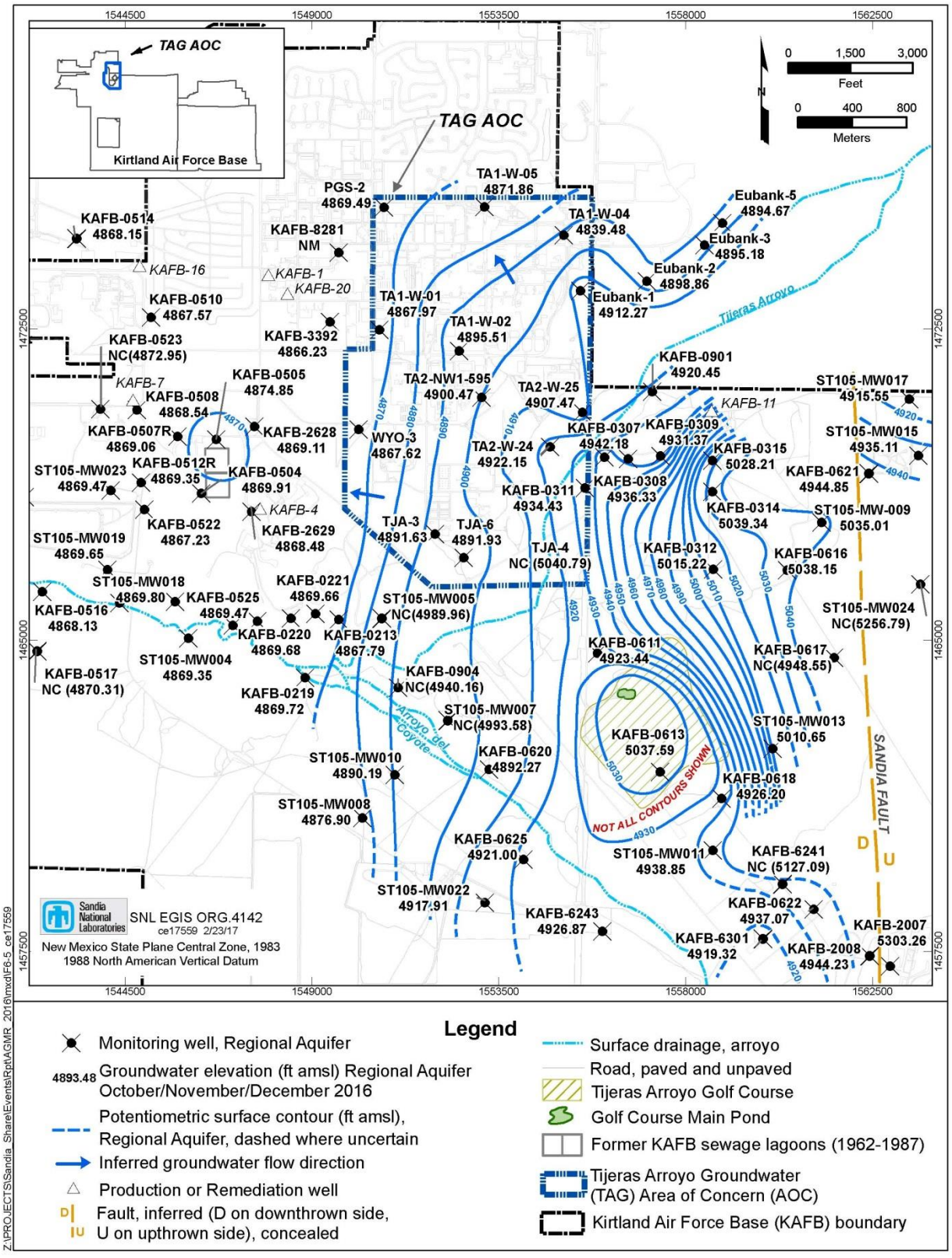


Figure 6-7. Localized Potentiometric Surface Map of the TAG AOC Regional Aquifer (October 2016)

Table 6-3. Groundwater Elevations Measured in 2016 at Monitoring Wells in the Vicinity of the TAG AOC

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Screened Unit in SFG sediments
Eubank-1	5460.02	6-Oct-2016	547.75	4912.27	Regional Aquifer
Eubank-2	5474.39	18-Oct-2016	575.53	4898.86	Regional Aquifer
Eubank-3	5498.73	31-Oct-2016	603.55	4895.18	Regional Aquifer
Eubank-5	5507.40	27-Oct-2016	612.73	4894.67	Regional Aquifer
PGS-2	5408.29	11-Oct-2016	538.80	4869.49	Regional Aquifer
TA1-W-01	5403.82	6-Oct-2016	535.85	4867.97	Regional Aquifer
TA1-W-02	5416.62	7-Oct-2016	521.11	4895.51	Regional Aquifer
TA1-W-03	5457.03	6-Oct-2016	354.93	5102.10	PGWS
TA1-W-04	5460.98	6-Oct-2016	567.50	4893.48	Regional Aquifer
TA1-W-05	5433.84	7-Oct-2016	561.98	4871.86	Regional Aquifer
TA1-W-06	5417.10	10-Oct-2016	308.44	5108.66	PGWS
TA1-W-07	5404.92	6-Oct-2016	286.27	5118.65	PGWS
TA1-W-08	5434.19	7-Oct-2016	311.54	5122.65	PGWS
TA2-NW1-325	5421.94	6-Oct-2016	319.12	5102.82	PGWS
TA2-NW1-595	5421.26	6-Oct-2016	520.79	4900.47	Regional Aquifer
TA2-W-01	5419.99	6-Oct-2016	329.35	5090.64	PGWS
TA2-W-19	5351.21	6-Oct-2016	272.76	5078.45	PGWS
TA2-W-24	5363.66	6-Oct-2016	441.51	4922.15	Regional Aquifer
TA2-W-25	5374.86	6-Oct-2016	467.39	4907.47	Regional Aquifer
TA2-W-26	5375.77	6-Oct-2016	288.39	5087.38	PGWS
TA2-W-27	5362.85	6-Oct-2016	281.00	5081.85	PGWS
TA2-W-28	5412.41	6-Oct-2016	320.20	5092.21	PGWS
TJA-2	5353.20	6-Oct-2016	277.96	5075.24	PGWS
TJA-3	5390.56	6-Oct-2016	498.93	4891.63	Regional Aquifer
TJA-4	5341.16	6-Oct-2016	300.37	5040.79	merging zone
TJA-5	5341.33	6-Oct-2016	270.17	5071.16	PGWS
TJA-6	5343.16	11-Oct-2016	451.23	4891.93	Regional Aquifer
TJA-7	5391.27	6-Oct-2016	303.92	5087.35	PGWS
WYO-3	5392.09	6-Oct-2016	524.47	4867.62	Regional Aquifer
WYO-4	5392.57	6-Oct-2016	293.99	5098.58	PGWS
KAFB-0213	5281.50	29-Nov-16	413.71	4867.79	Regional Aquifer
KAFB-0219	5263.69	29-Nov-16	393.97	4869.72	Regional Aquifer
KAFB-0220	5265.10	29-Nov-16	395.42	4869.68	Regional Aquifer
KAFB-0221	5274.36	29-Nov-2016	404.70	4869.66	Regional Aquifer
KAFB-0307	5364.53	2-Dec-2016	422.35	4942.18	Regional Aquifer
KAFB-0308	5381.65	2-Dec-2016	445.32	4936.33	Regional Aquifer
KAFB-0309	5411.80	2-Dec-2016	480.43	4931.37	Regional Aquifer
KAFB-0310	5416.48	2-Dec-2016	353.45	5063.03	PGWS
KAFB-0311	5353.29	2-Dec-2016	418.86	4934.43	Regional Aquifer
KAFB-0312	5432.17	2-Dec-2016	416.95	5015.22	Regional Aquifer
KAFB-0313	5418.98	2-Dec-2016	350.29	5068.69	PGWS
KAFB-0314	5455.75	2-Dec-2016	416.41	5039.34	Regional Aquifer
KAFB-0315	5466.11	2-Dec-2016	437.90	5028.21	Regional Aquifer
KAFB-0504	5357.87	29-Nov-2016	487.96	4869.91	Regional Aquifer

Refer to footnotes on page 6-19.

Table 6-3. Groundwater Elevations Measured in 2016 at Monitoring Wells in the Vicinity of the TAG AOC *(Continued)*

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Screened Unit in SFG sediments
KAFB-0505	5362.81	29-Nov-2016	487.96	4874.85	Regional Aquifer
KAFB-0506	5363.47	29-Nov-2016	208.79	5154.68	PGWS
KAFB-0507R	5358.21	29-Nov-2016	489.15	4869.06	Regional Aquifer
KAFB-0508	5351.88	28-Nov-2016	483.34	4868.54	Regional Aquifer
KAFB-0510	5367.10	28-Nov-2016	499.53	4867.57	Regional Aquifer
KAFB-0512R	5302.73	29-Nov-2016	433.38	4869.35	Regional Aquifer
KAFB-0516	5205.64	30-Nov-2016	337.51	4868.13	Regional Aquifer
KAFB-0517	5197.10	29-Nov-2016	326.79	4870.31	Regional Aquifer
KAFB-0522	5267.48	29-Nov-2016	400.25	4867.23	Regional Aquifer
KAFB-0523	5352.62	28-Nov-2016	479.67	4872.95	Regional Aquifer
KAFB-0525	5229.75	29-Nov-2016	360.28	4869.47	Regional Aquifer
KAFB-0602	5365.47	30-Nov-2016	n.m.	n.m.	PGWS
KAFB-0608	5361.17	30-Nov-2016	294.27	5066.90	PGWS
KAFB-0610	5359.47	30-Nov-2016	n.m.	n.m.	PGWS
KAFB-0611	5386.09	30-Nov-2016	462.65	4923.44	Regional Aquifer
KAFB-0612	5385.45	30-Nov-2016	291.29	5094.16	PGWS
KAFB-0613	5390.78	30-Nov-2016	353.19	5037.59	Regional Aquifer
KAFB-0614	5390.89	30-Nov-2016	331.62	5059.27	PGWS
KAFB-0616	5481.07	1-Dec-2016	442.92	5038.15	Regional Aquifer
KAFB-0617	5505.78	1-Dec-2016	557.23	4948.55	Regional Aquifer
KAFB-0618	5410.05	30-Nov-2016	483.85	4926.20	Regional Aquifer
KAFB-0619	5410.78	30-Nov-2016	384.96	5025.82	PGWS
KAFB-0620	5334.64	29-Nov-2016	442.37	4892.27	Regional Aquifer
KAFB-0621	5569.89	1-Dec-2016	625.04	4944.85	Regional Aquifer
KAFB-0622	5488.64	30-Nov-2016	551.57	4937.07	Regional Aquifer
KAFB-0623	5328.94	30-Nov-2016	258.90	5070.04	PGWS
KAFB-0625	5392.90	29-Nov-2016	471.90	4921.00	Regional Aquifer
KAFB-0901	5390.07	2-Dec-2016	469.62	4920.45	Regional Aquifer
KAFB-0903	5391.63	2-Dec-2016	237.09	5154.54	merging zone
KAFB-0904	5291.75	29-Nov-2016	351.59	4940.16	Regional Aquifer
KAFB-2007	5564.48	1-Dec-2016	261.22	5303.26	Regional Aquifer
KAFB-2008	5541.74	1-Dec-2016	597.51	4944.23	Regional Aquifer
KAFB-2622	5358.14	29-Nov-2016	202.31	5155.83	PGWS
KAFB-2623	5367.48	29-Nov-2016	n.m.	n.m.	PGWS
KAFB-2624	5362.27	29-Nov-2016	217.57	5144.70	PGWS
KAFB-2625	5359.26	29-Nov-2016	196.98	5162.28	PGWS
KAFB-2626	5357.51	29-Nov-2016	207.05	5150.46	PGWS
KAFB-2627	5367.47	29-Nov-2016	n.m.	n.m.	PGWS
KAFB-2628	5369.64	29-Nov-2016	500.53	4869.11	Regional Aquifer
KAFB-2629	5361.53	29-Nov-2016	493.05	n.m.	Regional Aquifer
KAFB-3391	5396.60	30-Nov-2016	dry	dry	PGWS
KAFB-3392	5394.51	30-Nov-2016	528.28	4866.23	Regional Aquifer
KAFB-6243	5426.22	29-Nov-2016	449.35	4926.87	Regional Aquifer

Refer to footnotes on page 6-19.

Table 6-3. Groundwater Elevations Measured in 2016 at Monitoring Wells in the Vicinity of the TAG AOC *(Concluded)*

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Screened Unit in SFG sediments
KAFB-6301	5459.64	30-Nov-2016	540.32	4919.32	Regional Aquifer
KAFB-8281	5401.03	30-Nov-2016	n.m.	n.m.	Regional Aquifer
KAFB-8282	5402.92	30-Nov-2016	n.m.	n.m.	PGWS
ST105-MW004	5234.61	29-Nov-2016	365.26	4869.35	Regional Aquifer
ST105-MW005	5287.57	29-Nov-2016	297.61	4989.96	Regional Aquifer
ST105-MW006	5313.26	29-Nov-2016	235.80	5077.46	PGWS
ST105-MW007	5311.18	29-Nov-2016	317.60	4993.58	Regional Aquifer
ST105-MW008	5358.94	29-Nov-2016	482.04	4876.90	Regional Aquifer
ST105-MW009	5519.71	1-Dec-2016	484.70	5035.01	Regional Aquifer
ST105-MW010	5334.70	29-Nov-2016	444.51	4890.19	Regional Aquifer
ST105-MW011	5422.66	30-Nov-2016	483.81	4938.85	Regional Aquifer
ST105-MW012	5419.90	30-Nov-2016	383.89	5036.01	PGWS
ST105-MW013	5447.27	28-Nov-2016	436.62	5010.65	Regional Aquifer
ST105-MW015	5623.95	1-Dec-2016	688.84	4935.11	Regional Aquifer
ST105-MW017	5621.97	1-Dec-2016	706.42	4915.55	Regional Aquifer
ST105-MW018	5221.68	29-Nov-2016	351.88	4869.80	Regional Aquifer
ST105-MW019	5217.94	29-Nov-2016	348.29	4869.65	Regional Aquifer
ST105-MW020	5383.72	2-Dec-2016	296.35	5087.37	PGWS
ST105-MW021	5390.90	29-Nov-2016	330.69	5060.21	PGWS
ST105-MW022	5386.66	29-Nov-2016	468.75	4917.91	Regional Aquifer
ST105-MW023	5275.86	29-Nov-2016	406.39	4869.47	Regional Aquifer
ST105-MW024	5595.67	1-Dec-2016	338.88	5256.79	Regional Aquifer

NOTES:
amsl = Above mean sea level.
btoc = Below top of casing (the measurement point).
ID = Identifier.
KAFB = Kirtland Air Force Base.
MW = Monitoring Well.
NAVD 88 = North American Vertical Datum of 1988.
NW = Northwest.
PGS = Parade Ground South.
PGWS = Perched Groundwater System.
SFG = Santa Fe Group
TA = Technical Area.
TJA = Tijeras Arroyo.
W = Well.
WYO = Wyoming.

6.1.7.5 Contaminant Sources

Environmental investigations for potential release sites were summarized in the TAG Investigation Report. The potential release sites were again evaluated in the TAG CCM and CME Report. 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 operated by SNL/NM personnel 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.

Table 6-4. SNL/NM SWMUs in the TAG AOC with the Greatest Potential for Having Impacted Groundwater (SNL December 2016)

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

AOC = Area of Concern.
SWMU = Solid waste management unit.
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.

Stable (non-radioactive) 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 Perched Groundwater System 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).

6.1.7.6 Contaminant Behavior

Soil and soil-vapor samples collected from the vadose zone (land surface to the Perched Groundwater System) 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 have been installed in the vicinity of 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 the aqueous phase (i.e., wastewater). All anthropogenic sources of SNL/NM recharge (i.e., wastewater and septic water) have been removed from service and no longer contribute water to the vadose zone.

Based on soil-vapor data, the mass of TCE that could possibly contribute to groundwater contamination is minimal. In addition, the stability of soil-vapor concentrations over time indicates that TCE in soil vapor is immobile. 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 Perched Groundwater System 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 to be a continuing source of 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 Perched Groundwater System by the high volumes of septic water and wastewater disposed of at various locations. Nitrate is extremely soluble in water and cannot exist as a separate phase (i.e., as a vapor or as a non-aqueous phase liquid). Absence of water saturation in core samples collected in the vadose zone above the Perched Groundwater System coupled with cessation of significant recharge activities indicates there are no residual sources of 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 Perched Groundwater System and does not indicate a single contaminant release site. Based on the historic disposal of septic waters at SNL/NM, the occurrence of nitrate is most likely associated with multiple release sites. The maximum historical concentration of nitrate plus nitrite (NPN) in the Perched Groundwater System within the TAG AOC is 27.8 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 approximately 10 ft deeper (Table 1) and coincidentally has also had a maximum NPN concentration of 27.8 mg/L. This maximum occurred at well TA2-W-28 in November 2015.

In 2015, KAFB issued an updated nitrate abatement report that described their potential nitrate release sites and the distribution of nitrate in groundwater. In a cooperative effort, KAFB and SNL/NM personnel are studying the distribution of nitrate in the Perched Groundwater System. Higher NPN concentrations (up to 70 mg/L) have been detected in KAFB wells located immediately to the south of the TAG AOC. These elevated nitrate concentrations may be related to the KAFB golf course or to the ABCWUA sanitary sewer line. Off-base and farther upgradient sources of nitrate are also being investigated.

Even though TCE is no longer considered a COC for the TAG AOC, the following discussion is provided for continuity purposes with previous AGMRs. Historically, only three Perched Groundwater System monitoring wells (WYO-4, TA2-W-19, and TA2-W-26) have yielded groundwater samples that exceeded the TCE MCL. The maximum historical concentration of TCE in the Perched Groundwater System has been 10.5 µg/L, which corresponds to a sample collected from monitoring well WYO-4 in November 2014. Monitoring well WYO-4 is located on the western edge of the TAG AOC in an area upgradient of SNL/NM operations. The latest sample (October 2015) had a TCE concentration of 3.82 µg/L, which is below the MCL. The steadily declining water levels indicate that the thin zone of saturation in the Perched Groundwater System is decreasing in the vicinity of well WYO-4. As a result, it has not been possible to collect a groundwater sample at WYO-4 since October 2015 (see section 6.3). Importantly, WYO-4 is the only well in the last seven years to have yielded TCE concentrations above the MCL.

Monitoring wells TA2-W-19 and TA2-W-26 are located on the Tijeras Arroyo floodplain. Monitoring well TA2-W-19 is located approximately 0.9 miles southeast of well WYO-4 whereas monitoring TA2-W-26 is located approximately 1 mile east of well WYO-4. The historical maximum TCE concentration for monitoring well TA2-W-19 was 6.23 µg/L, occurring in October 2007. Since November 2009, TCE concentrations have consistently been below the MCL at well TA2-W-19. The historical maximum TCE concentration for monitoring well TA2-W-26 was 9.6 µg/L, occurring in March 1998. Since March 2002, TCE concentrations have consistently been below the MCL at well TA2-W-26.

For the Regional Aquifer in the TAG AOC, the historical maximum NPN concentration of 49 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 mostly associated to KAFB operations such as the Tijeras Arroyo Golf Course.

Potential downgradient receptors are the ABCWUA, KAFB, and VA production wells located to the north and northwest of the TAG AOC. The production wells are screened in the Regional Aquifer. 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).

As noted in Section 6.1.7, no foreseeable risk to human health or threat to the beneficial use of groundwater from historical SNL/NM operations is predicted.

6.2 Regulatory Criteria

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

All corrective action requirements pertaining to the TAG AOC are contained in the Consent Order. 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 1996b). Beginning in October 2000, meetings of the TAG High Performing Team (HPT) served as a forum for discussing groundwater issues. During these meetings, members of the HPT (staff from SNL/NM, KAFB, COA, the NMED, 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 by SNL/NM personnel 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. The work plan presented a comprehensive scope of work for groundwater investigations that are being jointly conducted by SNL/NM personnel, KAFB, and the COA. Based on the requirements of the work plan, SNL/NM personnel resumed quarterly groundwater sampling in July 2003 using conventional groundwater purging/sampling techniques.

In April 2004, the Consent Order became effective. The Consent Order identified TAG as an AOC requiring further characterization and corrective action. In response to the Consent Order, the TAG CME Work Plan was submitted to the NMED in July 2004. After fulfilling the requirements of the CME Work Plan, the CME Report was submitted to the NMED in 2005. The 2005 CME Report has not been formally reviewed.

Table XI-1 of the Consent Order specifies the minimum sampling frequency for the groundwater monitoring and sampling schedule for TAG as: "Six events – after the TAG HPT Characterization Plans approved by the Department and starting no later than first quarter of Calendar Year 2004 . . . ." The six quarterly sampling events required by the work plan were completed at the end of Fiscal Year 2005. Having fulfilled these requirements, DOE/NNSA and SNL/NM personnel have continued groundwater monitoring and TAG wells have been sampled quarterly, semiannually, or annually. All sampling continues to follow the procedures outlined in the NMED-approved work plan. The TAG Investigation Report specifies that data would continue to be presented in annual reports, such as this Annual

Groundwater Monitoring Report. The outline of this report is based on the required elements of a "Periodic Monitoring Report" as described in Section X.D. of the Consent Order.

In this *Annual Groundwater Monitoring Report*, the TAG analytical data include both hazardous and radioactive constituents; however, the analytical 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.

6.3 Scope of Activities

Section 6.1.5 lists the CY 2016 activities for the TAG AOC including the measurement of groundwater levels and the collection of groundwater samples. The four groundwater sampling events are summarized in Table 6-5 with the corresponding analytical parameters for each well being listed in Table 6-6. During CY 2016, a total of 20 monitoring wells were sampled. These wells consisted of 10 Perched Groundwater System wells and 10 Regional Aquifer wells. The list of wells for the CY 2016 sampling events were consistent with the previous year except that monitoring well WYO-4 could not be sampled in 2016 due to declining water levels in the Perched Groundwater System and the low yield of the sediments.

In CY 2016, the collection of water samples from monitoring well WYO-4 was unsuccessful even though special attention was directed at this well. The well was purged dry on March 18, 2016 with the pump intake set at only 1 ft above the lowest slot. However, the well did not yield sufficient water to continue purging through the approximately 300 ft length of tubing. The well was again purged dry on June 10, 2016 with the pump intake set as low as possible (a mere 0.53 ft) above the lowest slot; prior to pump operation the water column consisted of 3.45 ft of water in the screen. Based upon these two sampling attempts, SNL/NM personnel decided that the Bennett pump system will not be inserted in well WYO-4 at future quarterly events unless the water column increases to at least 5 ft. However, such an increase is unlikely because nearly all of the anthropogenic water inputs to the Perched Groundwater System have been eliminated. The WYO-4 hydrograph shows a declining water level of approximately 0.7 ft/year. Water levels were measured in August 2016 and December 2016 at WYO-4 and the water column was less than 5 ft.

Monitoring well WYO-4 was inspected by video logging on June 24, 2016 to evaluate if biofouling or silting of the well screen was responsible for the reduction in well yield. On that date, the water column in the well screen was 3.29 ft. The well casing was observed to be in good condition and the water was clear. No biofouling or silting of the screen was observed. As suspected, the collection of samples by pumping is not possible due to hydrogeologic factors, not well maintenance concerns. Previous slug testing has shown that the well screen is set in sediments with a low hydraulic conductivity (0.0532 ft/day), which is nearly two orders of magnitude lower than the other SNL/NM wells in the TAG AOC. The video logging confirmed that groundwater recharge to the well is limited by the low hydraulic conductivity of the sediments. The decreasing thickness of the zone of saturation in the Perched Groundwater System is also a factor responsible for unsuccessful sample collection.

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

Table 6-5. Groundwater Monitoring Well Network and Sampling Dates for the TAG AOC in CY 2016

Date of Sampling Event	Wells Sampled		SAP
March 2016	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 FY16, 2nd Quarter Sampling* (SNL February 2016)
June 2016	TA2-W-19 TA2-W-26 TA2-W-28 TJA-2	TJA-3 TJA-4 TJA-7	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY16, 3rd Quarter Sampling* (SNL May 2016)
August/September 2016	PGS-2 TA1-W-01 TA1-W-02 TA1-W-03 TA1-W-04 TA1-W-05 TA1-W-06 TA1-W-08 TA2-NW1-595 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 WYO-3	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY16, 4th Quarter Sampling* (SNL July 2016)
December 2016	TA2-W-19 TA2-W-26 TA2-W-28 TJA-2	TJA-3 TJA-4 TJA-7	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY17, 1st Quarter Sampling* (SNL October 2016)

NOTES:
AOC = Area of Concern.
CY = Calendar Year.
FY = Fiscal Year.
NW = Northwest.
PGS = Parade Ground South.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.
TJA = Tijeras Arroyo.
W = Well.
WYO = Wyoming.

Table 6-6. Parameters Sampled at TAG AOC Monitoring Wells for Each Sampling Event in CY 2016

Parameter	March 2016		
NPN	TA1-W-06	TA2-W-28	TJA-6 (dup)
VOCs	TA1-W-06 (dup)	TJA-2	TJA-7
	TA-W-01	TJA-3	
	TA2-W-19	TJA-3 (dup)	
	TA2-W-26	TJA-4	
	TA2-W-27	TJA-6	
Parameter	**June 2016**		
NPN	TA2-W-19	TJA-2	
VOCs	TA2-W-19 (dup)	TJA-3	
	TA2-W-26	TJA-4	
	TA2-W-28	TJA-7	
		TJA-7 (dup)	
Parameter	**August/September 2016**		
Alkalinity	PGS-2	TA1-W-05 (dup)	TJA-2
Anions	PGS-2 (dup)	TA1-W-06	TJA-3
Gamma Spectroscopy	TA1-W-01	TA1-W-08	TJA-4
(short list[a])	TA1-W-02	TA2-NW1-595	TJA-6
Gross Alpha/Beta activity	TA1-W-03	TA2-NW1-595 (dup)	TJA-7
NPN	TA1-W-03 (dup)	TA2-W-01	WYO-3
TAL Metals, plus Total	TA1-W-04	TA2-W-19	
Uranium	TA1-W-05	TA2-W-26	
Tritium		TA2-W-27	
VOCs		TA2-W-28	
Parameter	**December 2016**		
NPN	TA2-W-19	TJA-3	
VOCs	TA2-W-26	TJA-4	
	TA2-W-26 (dup)	TJA-7	
	TA2-W-28		
	TA2-W-28 (dup)		
	TJA-2		

NOTES:
[a]Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).
AOC = Area of Concern.
CY = Calendar Year.
dup = Environmental/Laboratory duplicate sample.
NPN = Nitrate plus nitrite (reported as nitrogen).
NW = Northwest.
PGS = Parade Ground South.
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.
TAL = Target Analyte List.
TJA = Tijeras Arroyo.
VOC = Volatile organic compound.
W = Well.
WYO = Wyoming.

6.4 Field Methods and Measurements

Section 1.3 describes in detail the procedures used for groundwater monitoring. Specific information is discussed below.

6.5 Analytical Methods

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

6.6 Summary of Analytical Results

This section discusses analytical results and pertinent trends in COC concentrations in the TAG AOC that exceeded drinking-water standards. Attachment 6C (Tables 6C-1 through 6C-7) 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.

Table 6C-1 presents a summary of detected VOC results and Table 6C-2 lists the method detection limits (MDLs) for all VOCs. Eight VOCs were detected during CY 2016 in the TAG AOC with all being reported at low concentrations near the respective detection limits and below the respective MCLs. The VOCs detected in CY 2016 groundwater samples were:

- 1,1-Dichloroethane,
- 1,1-Dichloroethene,
- Acetone,
- Chloroform,
- cis-1,2-Dichloroethene,
- Methylene chloride,
- Tetrachloroethene, and
- TCE.

Figure 6-8 shows the monitoring well locations with the corresponding maximum TCE concentrations in CY 2016 for the Perched Groundwater System and the Regional Aquifer. Figure 6-9 shows the monitoring well locations with the corresponding maximum NPN concentrations in CY 2016 for the Perched Groundwater System and the Regional Aquifer.

Table 6-7 lists the monitoring wells where MCLs were exceeded. For the Perched Groundwater System, four monitoring wells exceeded the MCL for nitrate (measured as NPN) while none of the monitoring wells exceeded the TCE MCL. For the Regional Aquifer, one monitoring well exceeded the MCL for nitrate, but no wells exceeded the TCE MCL. Additional details for contaminant values and trends are discussed below.

Since groundwater monitoring began at the TAG AOC in 1992, TCE has not been detected above the MCL at any of the monitoring wells that are screened in the Regional Aquifer. TCE was previously considered to be a COC for the Perched Groundwater System due to sporadic detections that were slightly above the MCL. As noted in Section 6.1.7.7, three monitoring wells (WYO-4, TA2-W-19, and TA2-W-26) have yielded groundwater samples with TCE concentrations exceeding the MCL of 5 µg/L. The maximum TCE concentration in monitoring well WYO-4 was greater than the maximum TCE concentrations reported for either well TA2-W-19 or well TA2-W-26. The historical maximum TCE concentrations at monitoring well WYO-4 was 10.5 µg/L, occurring in November 2014.

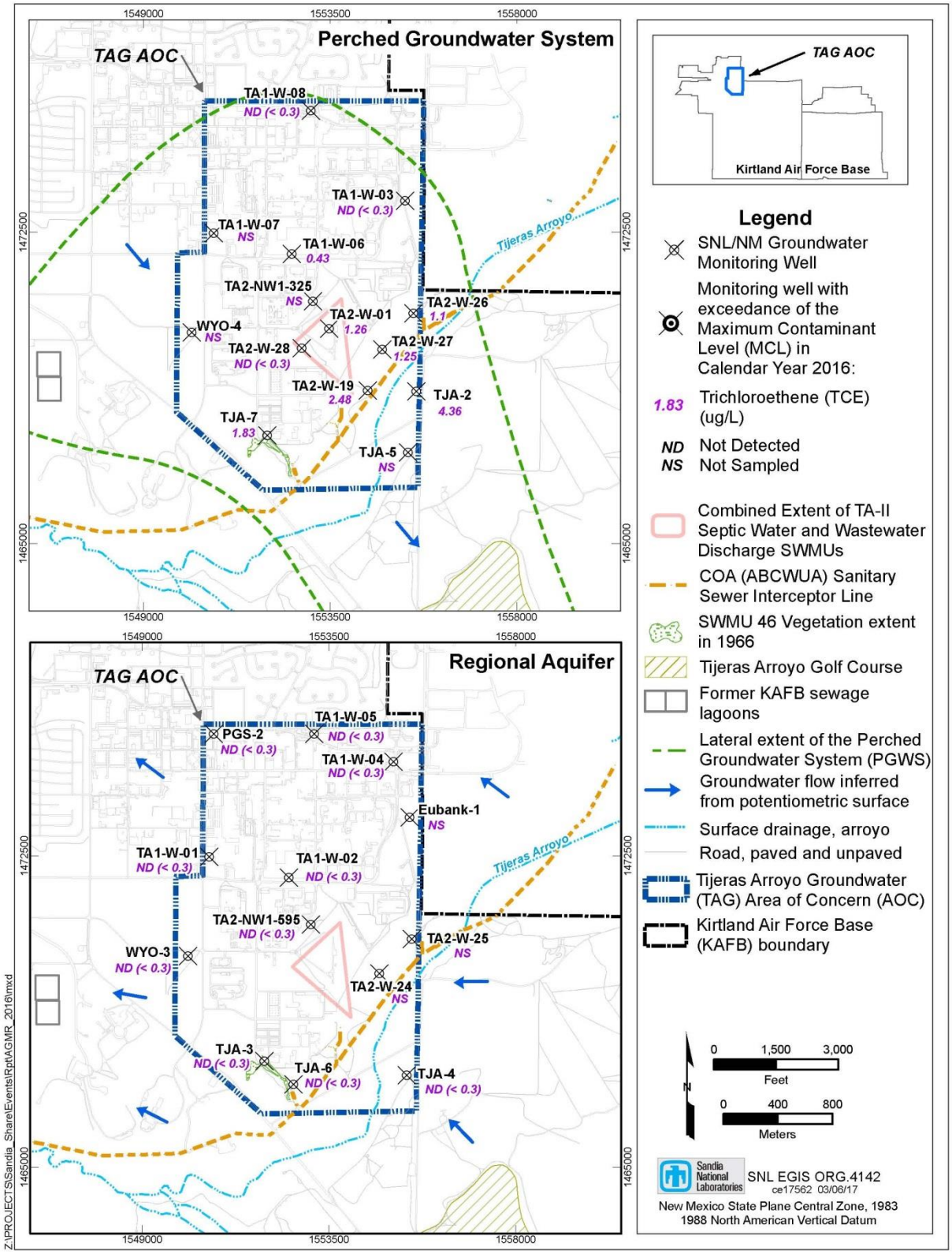


Figure 6-8. Maximum Concentrations of TCE in the Perched Groundwater System and the Regional Aquifer at the TAG AOC for CY 2016

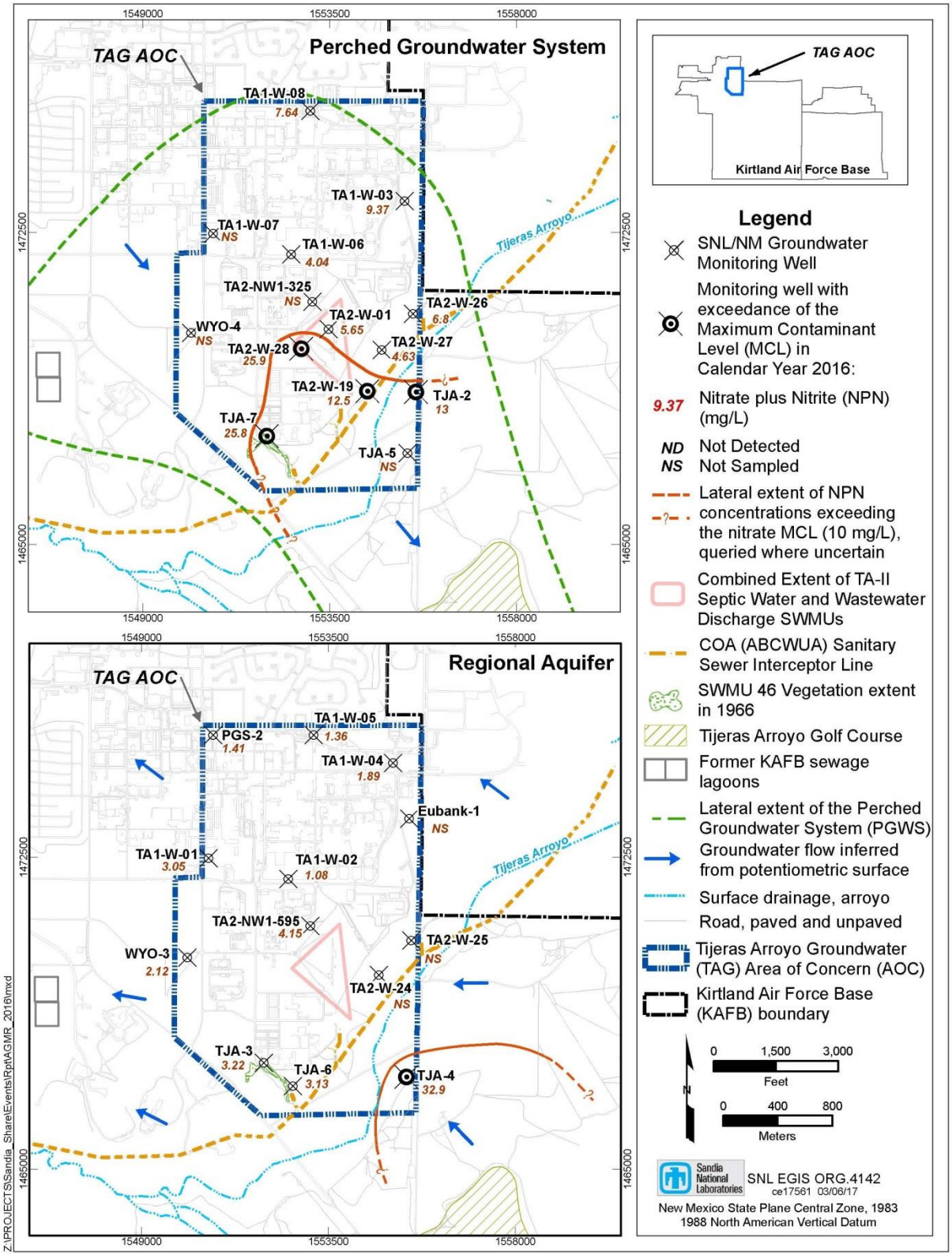


Figure 6-9. Maximum Concentrations of NPN in the Perched Groundwater System and the Regional Aquifer at the TAG AOC for CY 2016

Table 6-7. Matrix Summarizing the Monitoring Wells where Contaminant Concentrations in Groundwater Samples Exceeded the Respective MCLs for CY 2016

Aquifer	Number of Monitoring Wells Exceeding the TCE MCL of 5 µg/L	Maximum TCE Concentration in CY 2016 (µg/L)	Number of Monitoring Wells Exceeding the Nitrate MCL of 10 mg/L	Maximum NPN Concentration in CY 2016 (mg/L)
Perched Groundwater System	None	4.36	4 wells (TA2-W-19, TA2-W-28, TJA-2, and TJA-7)	25.9
Regional Aquifer	None	ND	1 well (TJA-4)	32.9

NOTES:
µg/L = Microgram(s) per liter.
CY = Calendar Year.
MCL = Maximum Contaminant Level.
mg/L = Milligram(s) per liter.
ND = Not detected.
NPN = Nitrate plus nitrite (reported as nitrogen).
TA2 = Technical Area-II.
TCE = Trichloroethene.
TJA = Tijeras Arroyo.

Monitoring well WYO-4 is located on the western edge of the TAG AOC in an area upgradient of SNL/NM operations. The last sample (October 2015) had a TCE concentration of 3.82 µg/L, which is below the MCL. Due to declining groundwater levels, there has been no further collection of water samples at WYO-4 as the thin zone of saturation in the Perched Groundwater System decreases. A specific TCE source in the vicinity of well WYO-4 has not been identified. KAFB has investigated the nearby Contractor's Yard. TCE also might be associated with historical aircraft maintenance and dismantlement activities.

In CY 2016, no TCE concentrations in groundwater samples from the Perched Groundwater System exceeded the MCL of 5 µg/L. The maximum TCE concentration was 4.36 µg/L and corresponded to Perched Groundwater System monitoring well TJA-2 (Table 6C-1). None of the Regional Aquifer monitoring wells had TCE concentrations that exceeded the detection limit of 0.3 µg/L in CY 2016.

Five monitoring wells (TA2-W-19, TA2-W-28, TJA-2, TJA-4, and TJA-7) consistently had NPN results in CY 2016 that exceeded the nitrate MCL of 10 mg/L in each of the quarterly events (Table 6C-3). Of these five wells, four wells (TA2-W-19, TA2-W-28, TJA-2, and TJA-7) are screened in the Perched Groundwater System and had NPN concentrations in CY 2016 ranging from 11.0 to 25.9 mg/L. Figures 6D-1 through 6D-4 show the NPN concentration trend plots for these four Perched Groundwater System wells, respectively, demonstrating that NPN concentrations have generally exceeded the MCL for the duration of the four wells. The NPN concentrations for monitoring wells TA2-W-19 and TJA-2 have consistently exceeded the nitrate MCL since May 2009. As groundwater levels consistently decline at the two wells, the trend of NPN concentrations is relatively stable or slightly increasing. Monitoring well TA2-W-28 (the replacement well for TA2-SW1-320) continues to show a generally stable trend while the groundwater level declines. The NPN plot for well TJA-7 shows a stable NPN concentration trend while the groundwater level has decreased since 2009.

The fifth monitoring well (TJA-4) also had NPN concentrations exceeding the nitrate MCL in CY 2016. This well is located at the far southeast corner of the TAG AOC and yielded the greatest NPN concentration (32.9 mg/L) of all the TAG AOC. The NPN plot shows a slightly increasing trend (Figure 6D-5). Monitoring well TJA-4 has historically been categorized as a Regional Aquifer monitoring well because its water level continues to rebound in a manner similar to other monitoring wells that are clearly screened in the Regional Aquifer. However, well TJA-4 is screened in a merging zone between the two water-bearing units and its potentiometric surface cannot be reasonably contoured with the

potentiometric surfaces for either the Perched Groundwater System or the Regional Aquifer. Saturation of this 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.

Table 6C-4 presents the analytical results for anions and alkalinity; no anion concentrations exceeded the established MCLs. Table 6C-5 presents the analytical results for Target Analyte List (TAL) metals; no metal results exceeded the established MCLs.

Table 6C-6 presents the analytical results for tritium, gross alpha, gross beta, and gamma spectroscopy. 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 (i.e., the total uranium concentration determined by metals analysis described above) and the gross alpha activity measurements were corrected by subtracting the total uranium activity from the uncorrected gross alpha activity results. Radiological results were further reviewed by an SNL/NM 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.

Table 6C-7 presents the field parameter measurements obtained during purging and immediately before collecting each groundwater sample. The parameters were temperature, specific conductivity, oxidation-reduction potential, pH, turbidity, and dissolved oxygen.

6.7 Quality Control Results

Section 1.3 describes field and laboratory QC samples collected and prepared for analysis. Tables 6C-1 through 6C-6 provide data validation qualifiers and analytical results. The results of QC samples and the influence on data quality for the TAG sampling events are discussed below.

For CY 2016, the duplicate sample results for all monitoring wells in each sampling events showed good correlation as based on the calculated relative percent difference (RPD) unit-less values. As discussed below, the calculated RPD values for the NPN sample pairs ranged from 1 to 16; thus, are less than the goal of 35. The calculated RPD values for the TCE sample pairs ranged from 2 to 12; thus, are less than the goal of 20. The calculated RPD values for the metals sample pairs ranged from 1 to 26; thus, are less than the goal of 35.

The calculated RPD values for the duplicate analyses per quarter are as follows:

- **March 2016 Sampling Event**—Environmental duplicate samples for NPN analyses were collected from three monitoring wells (TA1-W-06, TJA-3, and TJA-6). The NPN RPD values were 9, 1, and 5, respectively.

- **June 2016 Sampling Event**—Environmental duplicate samples for NPN and VOC analyses were collected from two monitoring wells (TA2-W-19 and TJA-7). The NPN RPD values for wells TA2-W-19 and TJA-7 were 2 and 16, respectively. TCE was the only VOC detected in both wells. The TCE RPD value for both wells was 2.

- **August/September 2016 Sampling Event**—Environmental duplicate samples for NPN, general chemistry, and metal analyses were collected from four monitoring wells (PGS-2, TA1-W-03, TA1-W-05, and TA2-NW1-595). The NPN RPD values ranged from 1 to 8. The general chemistry RPD values ranged from 1 to 11. The metal RPD values ranged from 1 to 26.

- **December 2016 Sampling Event**—Environmental duplicate samples for NPN analyses were collected from two monitoring wells (TA2-W-26 and TA2-W-28). The NPN RPD values were 1 and 6, respectively. A duplicate for VOC analyses was also collected from TA2-W-28. The TCE RPD value was 12.

The results for the EB analyses per quarter are as follows:

- **March 2016 Sampling Event**—EB samples were collected prior to sampling wells TA1-W-06, TJA-3, and TJA-6. The three EB samples were submitted for VOC and NPN analysis. The VOCs bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs in the EB samples. Acetone was reported in the EB sample for well TJA-6. NPN was detected in the EB samples for wells TA1-W-06 and TJA-3. No corrective action was required because these compounds were not detected in the associated environmental samples or the reported values in the environmental samples are greater than five times the corresponding EB concentrations.

- **June 2016 Sampling Event**—EB samples were collected prior to sampling wells TA2-W-01, TJA-7, and WYO-4. The three EB samples were submitted for VOC and NPN analysis. Five VOCs (acetone, bromodichloromethane, bromoform, chloroform, and dibromochloromethane) and NPN were detected above laboratory MDLs in the EB samples. No corrective action was required because these parameters were not detected in environmental samples or the reported values in environmental samples are greater than five times the corresponding EB concentrations.

- **August/September 2016 Sampling Event**—EB samples were collected prior to sampling wells PGS-2, TA1-W-03, TA1-W-05, and TA2-NW1-595. The four EB samples were submitted for VOC, NPN, metals, and radionuclide analysis. Three VOCs (bromodichloromethane, chloroform, and dibromochloromethane), NPN, and five anions/metals (calcium, chloride, copper, sodium, and sulfate) were detected above laboratory MDLs in the EB samples. No corrective action was required since these parameters were not detected in environmental samples, or the reported values in environmental samples are greater than five times the corresponding EB concentrations, except for chloroform. Chloroform was reported in the EB sample prior to sampling well TA1-W-03 at a concentration greater than the associated environmental samples. Chloroform was qualified as not detected during data validation in both TA1-W-03 environmental and environmental duplicate samples.

- **December 2016 Sampling Event**—EB samples were collected prior to the sampling of monitoring wells TA2-W-26 and TA2-W-28. The two EB samples were submitted for VOC analysis. No VOCs were detected above laboratory MDLs in the EB samples. Acetone was qualified as not detected during data validation in both EB samples due to associated laboratory method blank contamination.

The results for the FB analyses per quarter are as follows:

- **March 2016 Sampling Event**—FB samples for VOC analysis were collected at monitoring wells TA1-W-06, TJA-2, and TJA-7 by pouring deionized (DI) water into sample containers at the sampling point to simulate the transfer of environmental samples from the sampling system to the sample container. An additional FB sample was collected from the source-DI water used during the equipment decontamination process prior to sampling monitoring well TA1-W-06. Three VOCs (bromodichloromethane, chloroform, and dibromochloromethane) were detected in all four FB samples. No corrective action

was required, because these compounds were not detected in the associated environmental samples.

- **June 2016 Sampling Event**—FB samples were collected at monitoring wells TJA-2 and TJA-4 by pouring DI water into sample containers at the sampling point to simulate the transfer of environmental samples from the sampling system to the sample container. An additional FB sample was collected from the source-DI water used during the equipment decontamination process prior to sampling monitoring well TA2-W-19. Four VOCs (bromodichloromethane, bromoform, chloroform, and dibromochloromethane) were detected above the laboratory MDLs in all three FB samples. The VOC carbon disulfide was also detected in the sample associated with the source DI water. No corrective action was required, because these five VOCs were not detected in the associated environmental samples.

- **August/September 2016 Sampling Event**—FB samples were collected at monitoring wells TA1-W-01, TA1-W-05, and TA2-W-28 by pouring DI water into sample containers at the sampling point to simulate the transfer of environmental samples from the sampling system to the sample container. An additional FB sample was collected from the source-DI water used during the equipment decontamination process prior to sampling monitoring well PGS-2. Three VOCs (bromodichloromethane, chloroform, and dibromochloromethane) were detected above the laboratory MDLs in all four FB samples. No corrective action was required, because this compound was not detected in the associated environmental samples.

- **December 2016 Sampling Event**—FB samples were collected at wells TJA-3 and TJA-4 by pouring DI water into sample containers at the sampling point to simulate the transfer of environmental samples from the sampling system to the sample container. An additional FB sample was collected from the source-DI water used during the equipment decontamination process prior to sampling monitoring well TA2-W-26. Carbon disulfide was detected in two FB samples. No corrective action was required because this compound was not detected in associated environmental samples.

The results for the TB analyses per quarter are as follows:

- **March 2016 Sampling Event**—Of 12 TB samples submitted, only one VOC was detected, and that detection was applicable to only a single well. Acetone was detected for the TB sample associated with well TA2-W-26. No corrective action was required since this VOC was not detected in the associated environmental sample. No other VOCs were detected above the laboratory MDL in the 12 TB samples for this event.

- **June 2016 Sampling Event**—No VOCs were detected above laboratory MDLs in any of the 10 TB samples.

- **August/September 2016 Sampling Event**—No VOCs were detected above laboratory MDLs in any of the 24 TB samples except for methylene chloride. Methylene chloride was detected in TB samples submitted with environmental samples from wells TA1-W-02, TA1-W-03, TA1-W-04, and WYO-3, and EB samples collected prior to TA1-W-05 and TA2-NW1-595. Methylene chloride in each environmental sample was qualified as not detected during data validation, since methylene chloride was reported at a concentration less than 10 times of the corresponding TB sample result.

- **December 2016 Sampling Event**—No VOCs were detected above laboratory MDLs in any of the 10 TB samples except for acetone. Acetone was qualified as not detected during data validation in nine TB samples due to associated method blank contamination.

6.8 Variances and Nonconformances

No variances or nonconformances from field or sampling requirements, as specified in the TAG Investigation Mini-Sampling and Analysis Plans (SAPs) (SNL February 2016, May 2016, July 2016, and October 2016) were noted during sampling activities. However, specific issues associated with the sampling events are noted as follows:

- **All Four Sampling Events**—No variances or nonconformances with the TAG Mini-SAP were identified for CY 2016. Standard purging requirements were fulfilled at all monitoring wells during CY 2016. The dry-out (purged dry) issue at well WYO-4 was anticipated and was not considered to be a variance or nonconformance.

- **March 2016 Sampling Event**—No variances or nonconformances with the TAG Mini-SAP were identified. The dry-out issue at well WYO-4 was anticipated and was not considered to be a variance or nonconformance. No other variances or nonconformances were identified at the other monitoring wells. It should be noted that monitoring well WYO-4 was not sampled due to insufficient sample volume. On March 18, 2016, the well purged to dryness before groundwater reached the surface. The portable Bennet pump was operated at the lowest possible rate.

  June 2016 Sampling Event— No variances or nonconformances with the TAG Mini-SAP were identified. On June 10, 2016, monitoring well WYO-4 purged dry after evacuating approximately 1.5 liters. No water quality measurements were recorded and an environmental sample could not be collected, due to insufficient volume. The portable Bennet pump was operated at the lowest possible rate.

- **August/September 2016 Sampling Event**— No variances or nonconformances with the TAG Mini-SAP were identified. Monitoring well WYO-4 was not sampled because the water column present in the well was not sufficient. Previous sampling events had been unsuccessful because the water column in the well was less than 5 ft.

- **December 2016 Sampling Event**—No variances or nonconformances with the TAG Mini-SAP were identified.

6.9 Summary and Conclusions

This section provides a brief summary of activities, contaminants, the CSM, and CY 2017 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 20 monitoring wells for water quality analysis and 30 monitoring wells for groundwater level measurements. For this reporting period, monitoring wells were sampled in March, June, August/September, and December 2016. Depending on their locations and historical concentrations of COCs, the monitoring wells were sampled quarterly, semiannually, or annually during this reporting period. The groundwater samples for each event were analyzed for VOCs and NPN. Additional analytes (anions, alkalinity, Target Analyte List metals [plus total uranium,] gross alpha/beta activity, tritium, and radionuclides by gamma spectroscopy) were analyzed for the August/September event. Analytical results were compared with EPA MCLs for drinking water (EPA May 2009).

In CY 2016, NPN was the only analyte that exceeded an MCL in TAG AOC groundwater samples. NPN concentrations exceeded the nitrate MCL of 10 mg/L in samples from four monitoring wells (TA2-W-28, TA2-W-19, TJA-2, and TJA-7) that are screened in the Perched Groundwater System 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 Perched Groundwater System was 25.9 mg/L, and the maximum NPN concentration for the Regional Aquifer was 32.9 mg/L.

In CY 2016, no exceedances of the TCE MCL (5 µg/L) were detected in groundwater samples collected from the TAG AOC monitoring wells. The maximum TCE concentration for the Perched Groundwater System was 4.36 µg/L and corresponds to monitoring well TJA-2. TCE was not detected in any groundwater samples from the Regional Aquifer monitoring wells.

The following conclusions are based on a comprehensive review of available information for current and historical groundwater analyses for the TAG AOC:

- In the Perched Groundwater System, the distribution of NPN concentrations exceeding the nitrate MCL is restricted to the southeast corner of the TAG AOC and likely reflects multiple release sites.
- In the Regional Aquifer, the distribution of NPN concentrations exceeding the nitrate MCL is restricted to the extreme southeast corner of the TAG AOC and are probably attributable to release sites that are located outside of the TAG AOC.
- In the Perched Groundwater System, TCE concentrations no longer exceed the MCL in the TAG AOC.
- In the Regional Aquifer, TCE has historically not been detected in the TAG AOC.
- TCE is no longer considered to be a COC for 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 sewage lagoons, wastewater outfalls, buried septic systems, landfills, sewer lines, and the golf course.
- The CSM presented in Section 6.1.7 was updated using the recent TAG CCM and CME Report.
- From this point forward, nitrate is considered to be the sole COC because this is the only contaminant that exceeds an MCL.

Ongoing environmental studies in the TAG AOC include the following:

- Continue collection of groundwater samples at 20 monitoring wells on a quarterly, semiannual, or annual basis. At a minimum, the analytes for groundwater sampling per well will consist of VOCs and NPN.
- Continue quarterly measurements of groundwater elevations in 30 monitoring wells.
- Maintain contact with the KAFB Environmental Compliance Program personnel with respect to the results of their nitrate abatement studies.

- Obtain groundwater results relevant to the TAG AOC from KAFB, U.S. Geological Survey, and the COA, as available.

- Report future results in the CY 2017 SNL/NM Annual Groundwater Monitoring Report.

- Prepare a Corrective Measures Implementation Plan upon receiving NMED-HWB approval of the TAG CCM and CME Report that was submitted in December 2016.

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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; 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.enm.edu
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 Technical Area I (TA-I).	Furman April 1988
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
1947	Wastewater and septic-water discharges begin at Technical Area II (TA-II). (All discharges to the ground surface or buried leach fields cease 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 cease 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 are allowed.	SNL November 2005
1984	DOE created a Comprehensive Environmental Assessment and Response Program (CEARP) to evaluate potential release sites at SNL/NM.	DOE September 1987
1988	The SNL/NM Environmental Restoration (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 well TA2-SW1-320. The presence of the Regional Aquifer was previously known from base-wide studies.	SNL March 1995a
1993	Installed groundwater monitoring wells TA2-NW1-325 and TA2-NW1-595.	SNL March 1995a
1994	Installed groundwater monitoring wells TA2-W-01 and TJA-2.	SNL March 1995a
1994	First detection of trichloroethene (TCE) in a groundwater sample from a SNL/NM well in the vicinity of Tijeras Arroyo. The October 1994 sample from monitoring well TA2-W-01 contained TCE at 1 microgram per liter (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 1996b
1995	First TCE exceedance of the U.S. Environmental Protection Agency Maximum Contaminant Level (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 1996a, 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 New Mexico Environment Department – Hazardous Waste Bureau (NMED-HWB).	SNL March 1996a

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, and 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 KAFB 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 United States Geological Survey (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 (TAG) Investigation.	Collins December 2000
2000	At NMED direction, the TAG High Performing Team held its first meeting in Albuquerque, NM.	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 AOC	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 finite element 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. 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 September 2003
2003	Installed soil-vapor wells 159-VW-01, 165-VW-01, 1004-VW-01, and 1052-VW-01.	SNL/NM October 2003
2003	Last meeting of TAG HPT was held in October 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 (the Consent Order) identified the TAG investigation as an Area of Concern (AOC). The Consent Order requires the preparation of a Corrective Measures Evaluation (CME) report for the TAG AOC.	NMED April 2004
2004	TAG CME Work Plan was submitted to the NMED-HWB.	SNL July 2004, SNL November 2004, SNL December 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 October 2004
2005	TAG CME Report was submitted to NMED-HWB. Report includes 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 issued a Notice of Disapproval (NOD) on the TAG Investigation Report.	NMED August 2008
2009	DOE/NNSA and Sandia submitted a Response to the NMED August 2008 NOD for the TAG Investigation Report.	SNL February 2009
2009	NMED-HWB issued a second NOD concerning the TAG Investigation Report.	NMED August 2009
2010	DOE/NNSA and Sandia submitted a Response to the NMED-HWB second NOD concerning the TAG Investigation Report.	SNL January 2010
2010	NMED-HWB issued a Notice of Approval for the TAG Investigation Report.	NMED February 2010
2012	Decommissioned soil-vapor monitoring wells 159-VW-01, 165-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 Sandia, 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 requires that an "Updated CCM and CME Report" for the TAG AOC will be submitted in December 2016.	NMED April 2016

Refer to footnotes on page 6A-6.

Table 6A-1. Historical Timeline of the Tijeras Arroyo Groundwater Area of Concern
(Concluded)

Year	Event	Reference
2016	DOE/NNSA and Sandia submitted an "Updated CCM and CME Report – December 2016" for the TAG AOC to NMED-HWB in November 2016. DOE-NNSA transmittal letter was dated 23 Nov 2016.	DOE December 2016, DOE November 2016
2016	SNL/NM continues to conduct groundwater sampling across the TAG AOC.	This report

NOTES:

µg/L = Microgram(s) per liter.
AOC = Area of Concern.
BGW = Balleau Groundwater Inc.
CME = Corrective Measures Evaluation.
CY = Calendar Year.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
FEMWATER = Finite Element Model of Water.
HWB = Hazardous Waste Bureau.
IT = IT Corporation.
TJA = Tijeras Arroyo.
KAFB = Kirtland Air Force Base.
MCL = Maximum Contaminant Level.
NMED = New Mexico Environment Department.
NOD = Notice of Disapproval.
NNSA = National Nuclear Security Administration.
NW = Northwest.
Sandia = Sandia Corporation.
SNL = Sandia National Laboratories.
SNL/NM = Sandia National Laboratories, New Mexico.
SV = Soil vapor.
SW = southwest.
SWMU = Solid Waste Management Unit.
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.
TCE = Trichloroethene.
USGS = U.S. Geological Survey.
VW = Vapor Well.
W = Well.
WYO = Wyoming.

Attachment 6B
Tijeras Arroyo Groundwater
Hydrographs

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Attachment 6B Hydrographs

6B-1 TAG AOC Monitoring Wells (1 of 10) 6B-5

6B-2 TAG AOC Monitoring Wells (2 of 10) 6B-6

6B-3 TAG AOC Monitoring Wells (3 of 10) 6B-7

6B-4 TAG AOC Monitoring Wells (4 of 10) 6B-8

6B-5 TAG AOC Monitoring Wells (5 of 10) 6B-9

6B-6 TAG AOC Monitoring Wells (6 of 10) 6B-10

6B-7 TAG AOC Monitoring Wells (7 of 10) 6B-11

6B-8 TAG AOC Monitoring Wells (8 of 10) 6B-12

6B-9 TAG AOC Monitoring Wells (9 of 10) 6B-13

6B-10 TAG AOC Monitoring Wells (10 of 10) 6B-14

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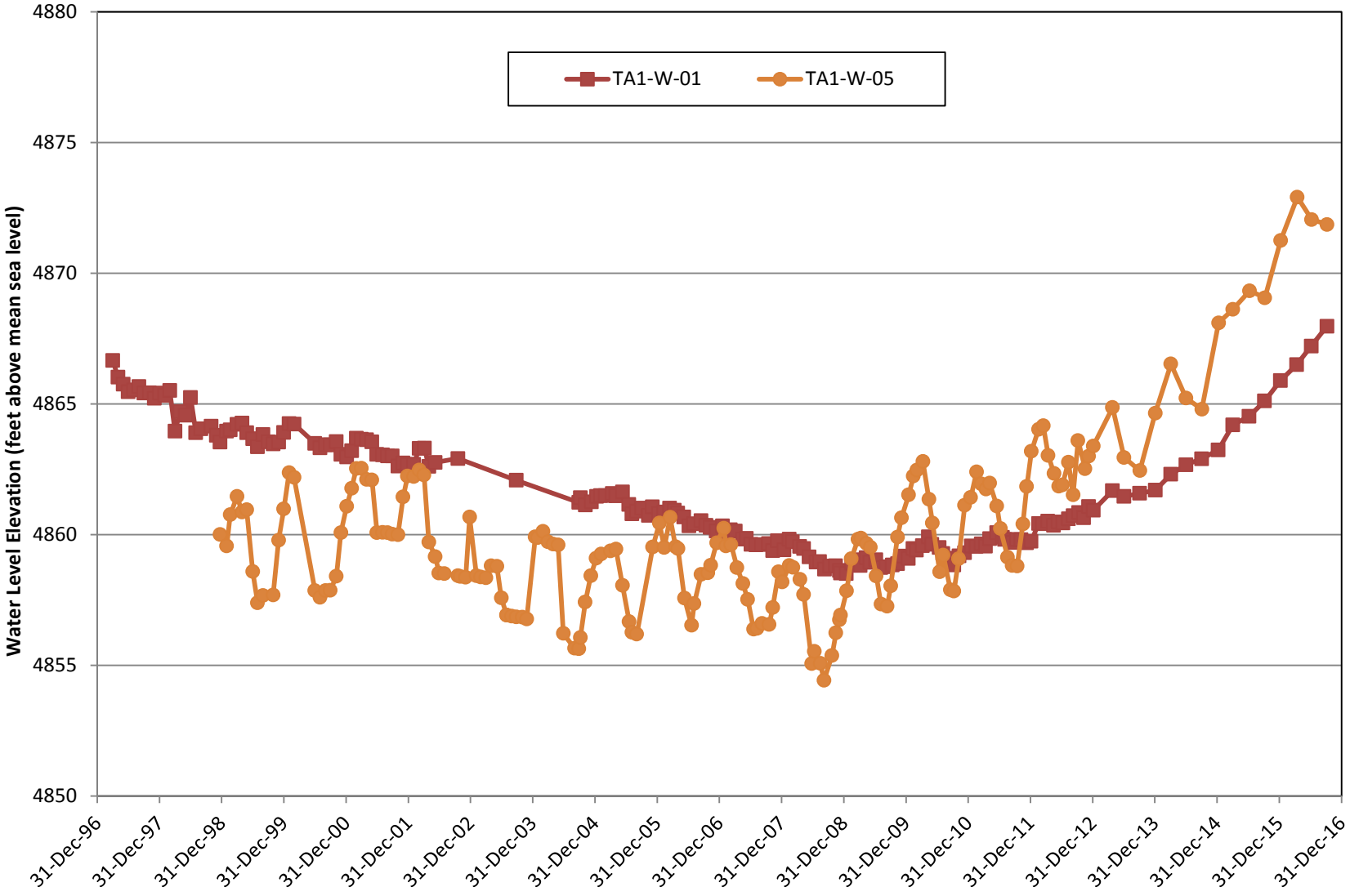

Figure 6B-1. TAG AOC Monitoring Wells (1 of 10)

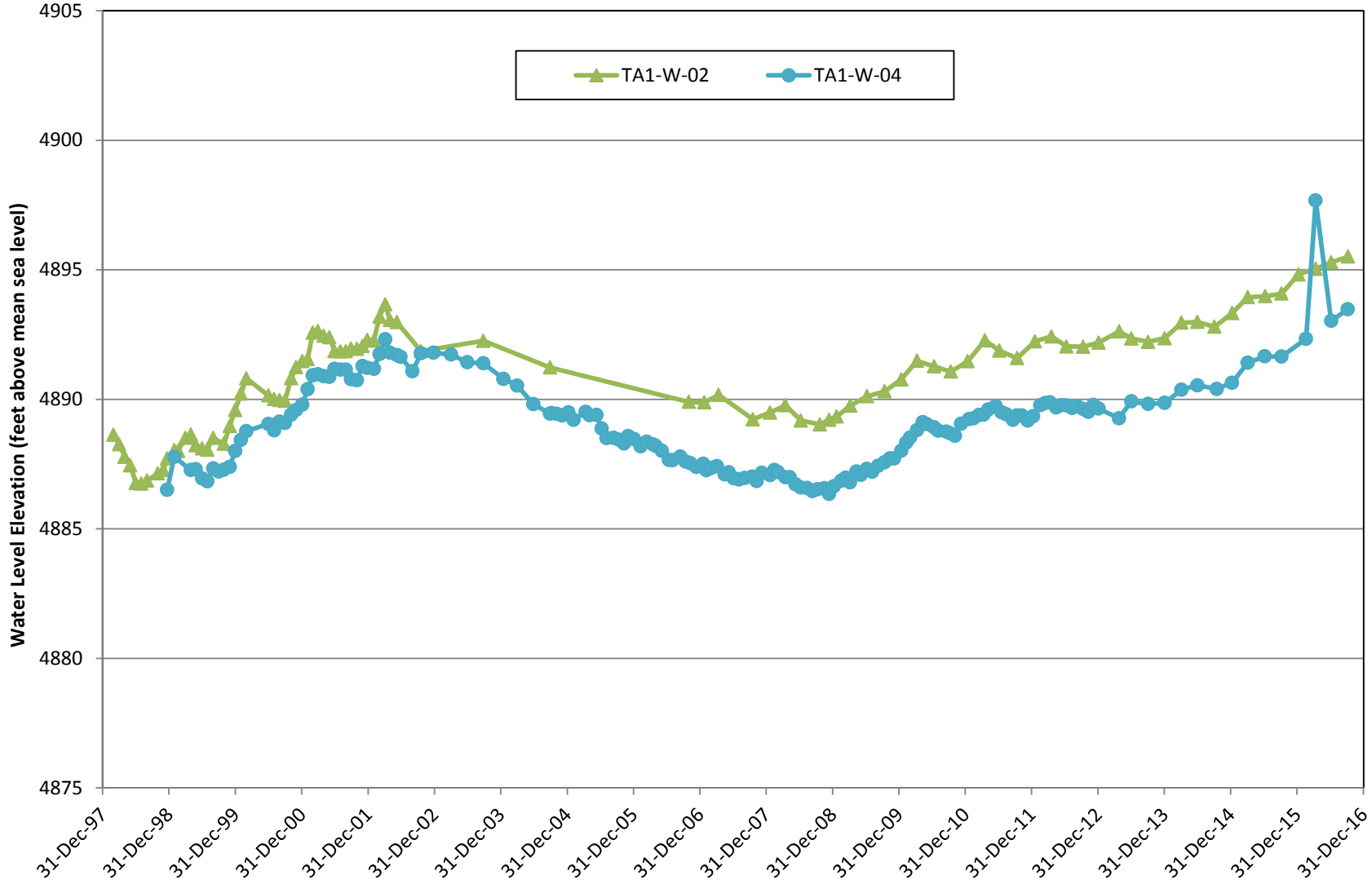

Figure 6B-2. TAG AOC Monitoring Wells (2 of 10)

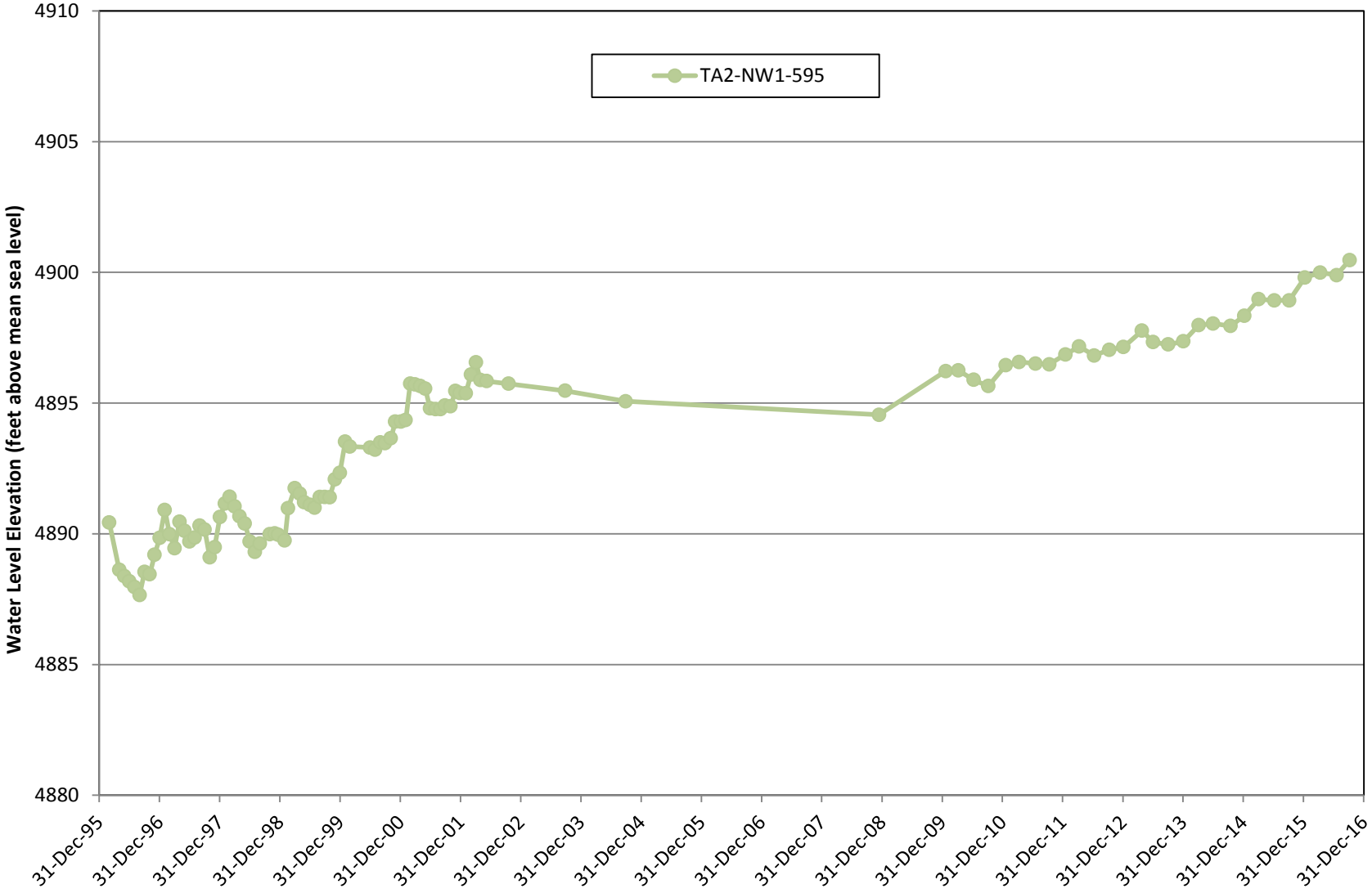

Figure 6B-3. TAG AOC Monitoring Wells (3 of 10)

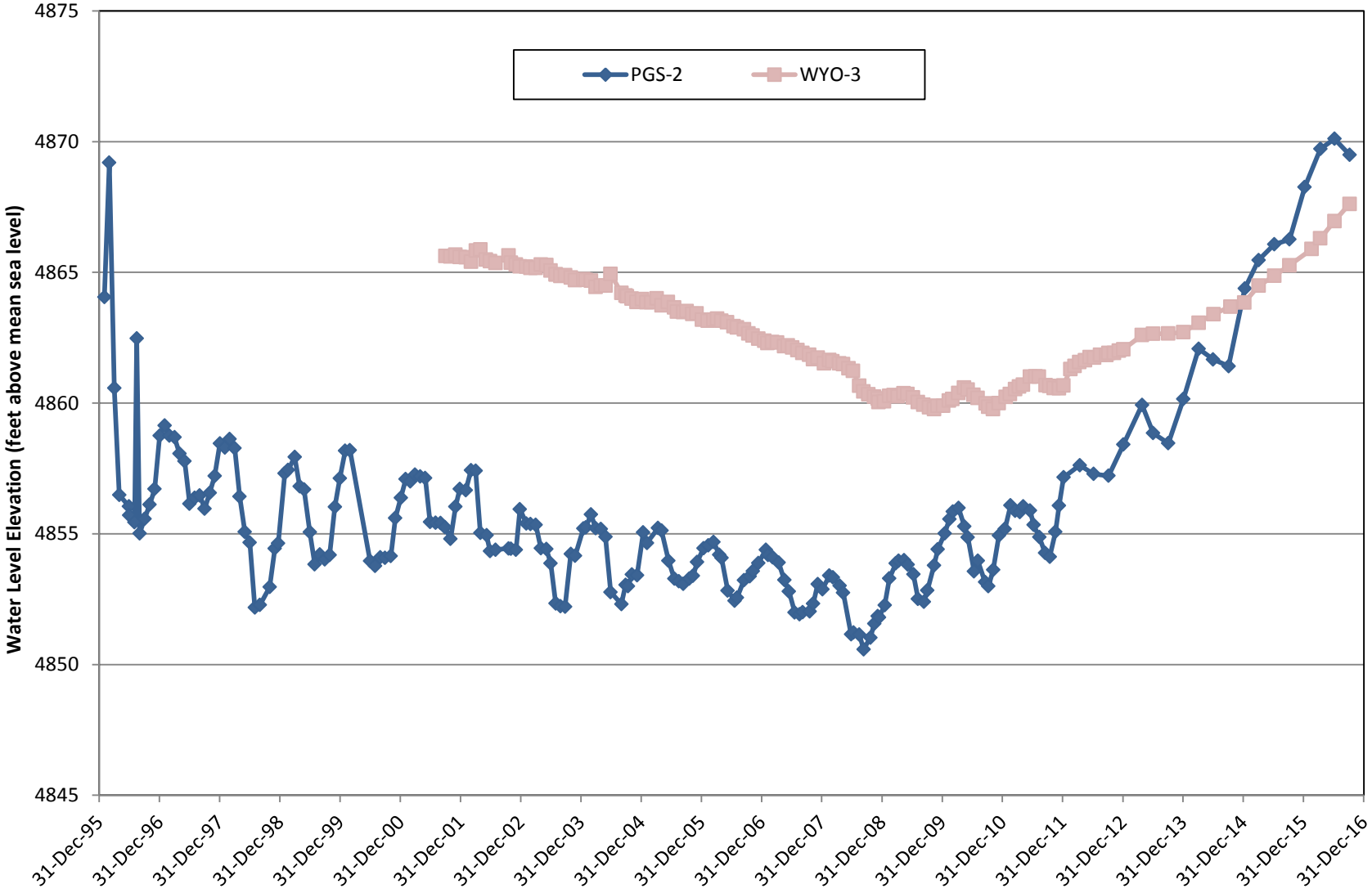

Figure 6B-4. TAG AOC Monitoring Wells (4 of 10)

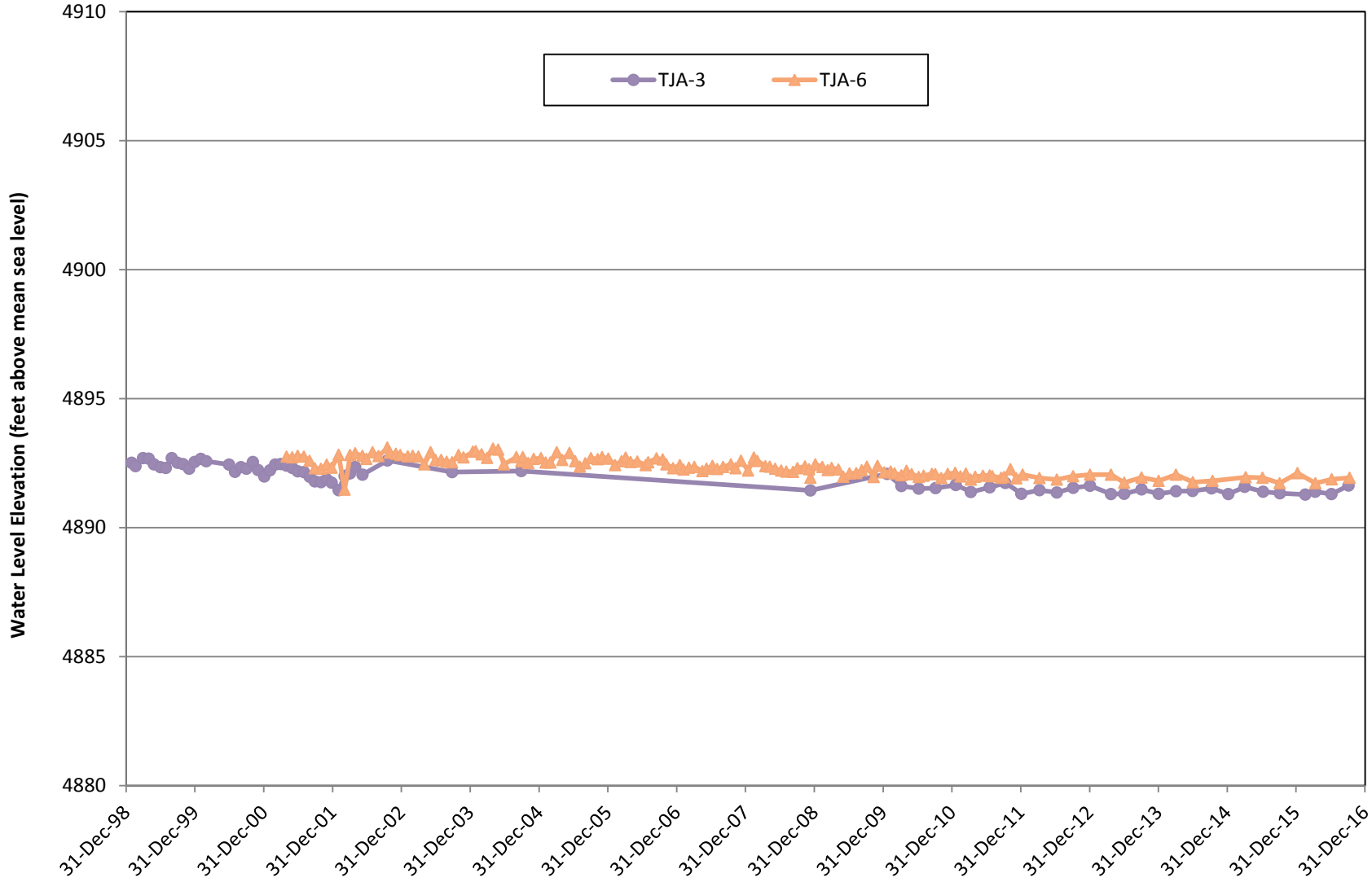

Figure 6B-5. TAG AOC Monitoring Wells (5 of 10)

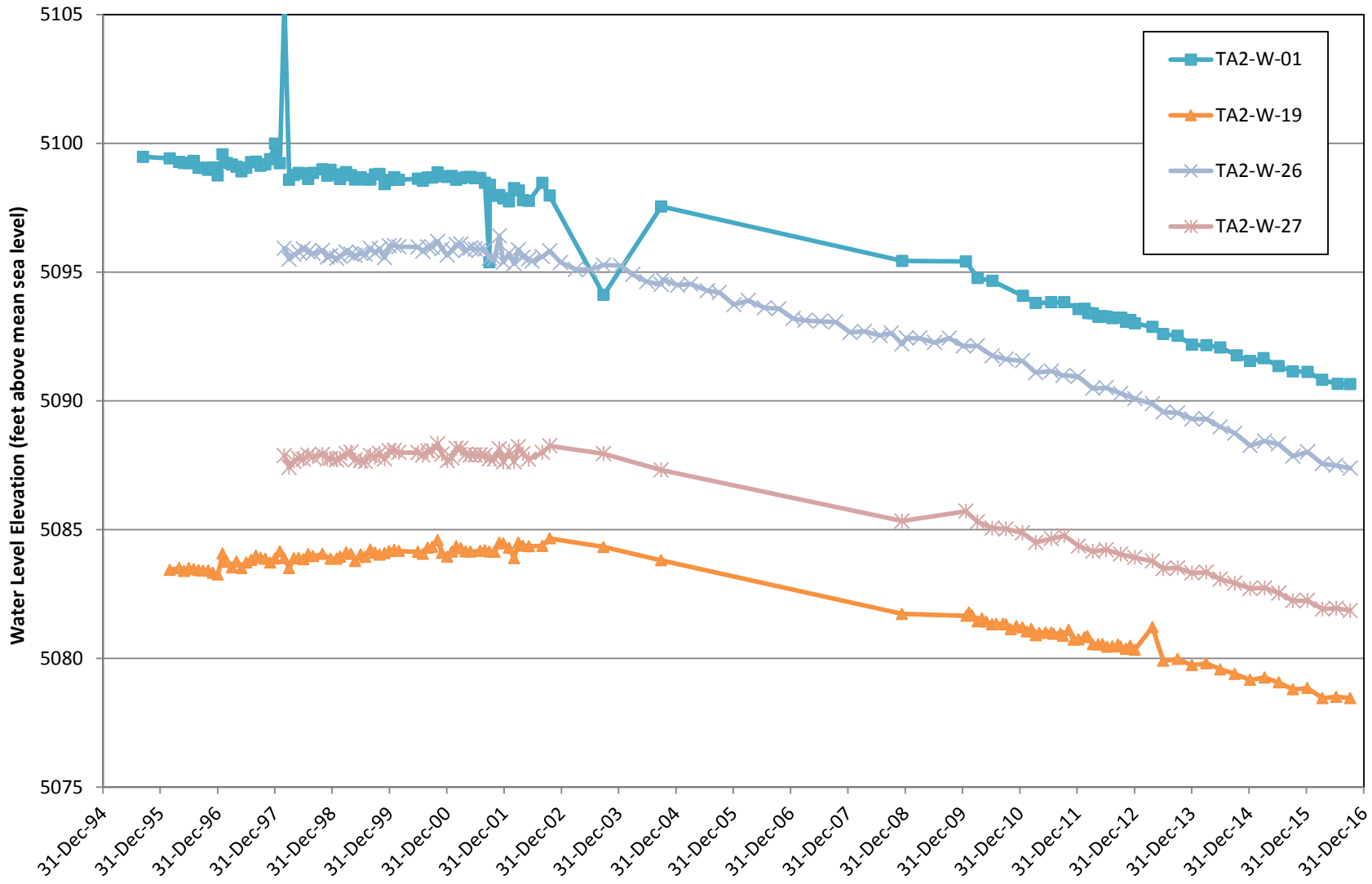

Figure 6B-6. TAG AOC Monitoring Wells (6 of 10)

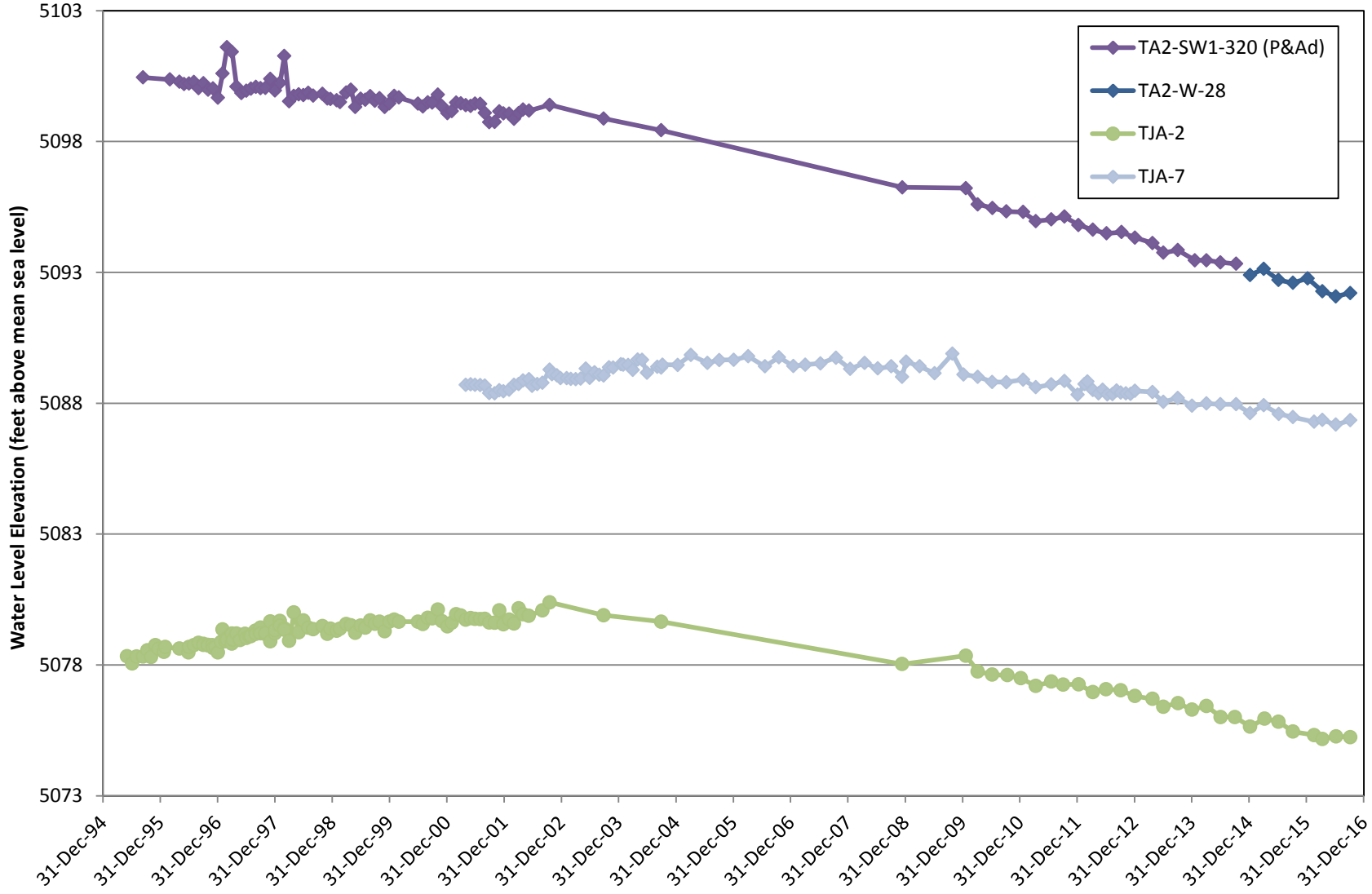

Figure 6B-7. TAG AOC Monitoring Wells (7 of 10)

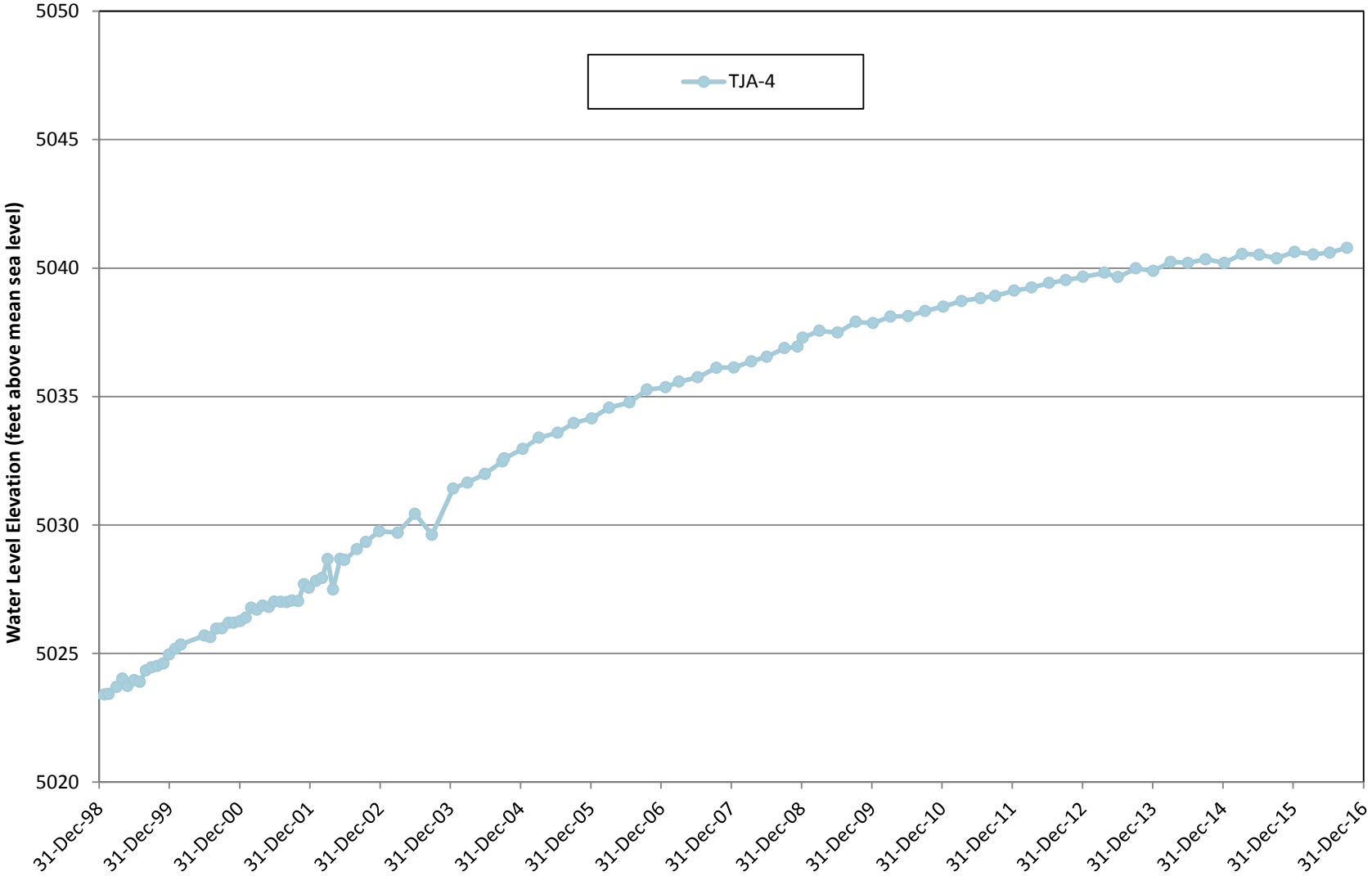

Figure 6B-8. TAG AOC Monitoring Wells (8 of 10)

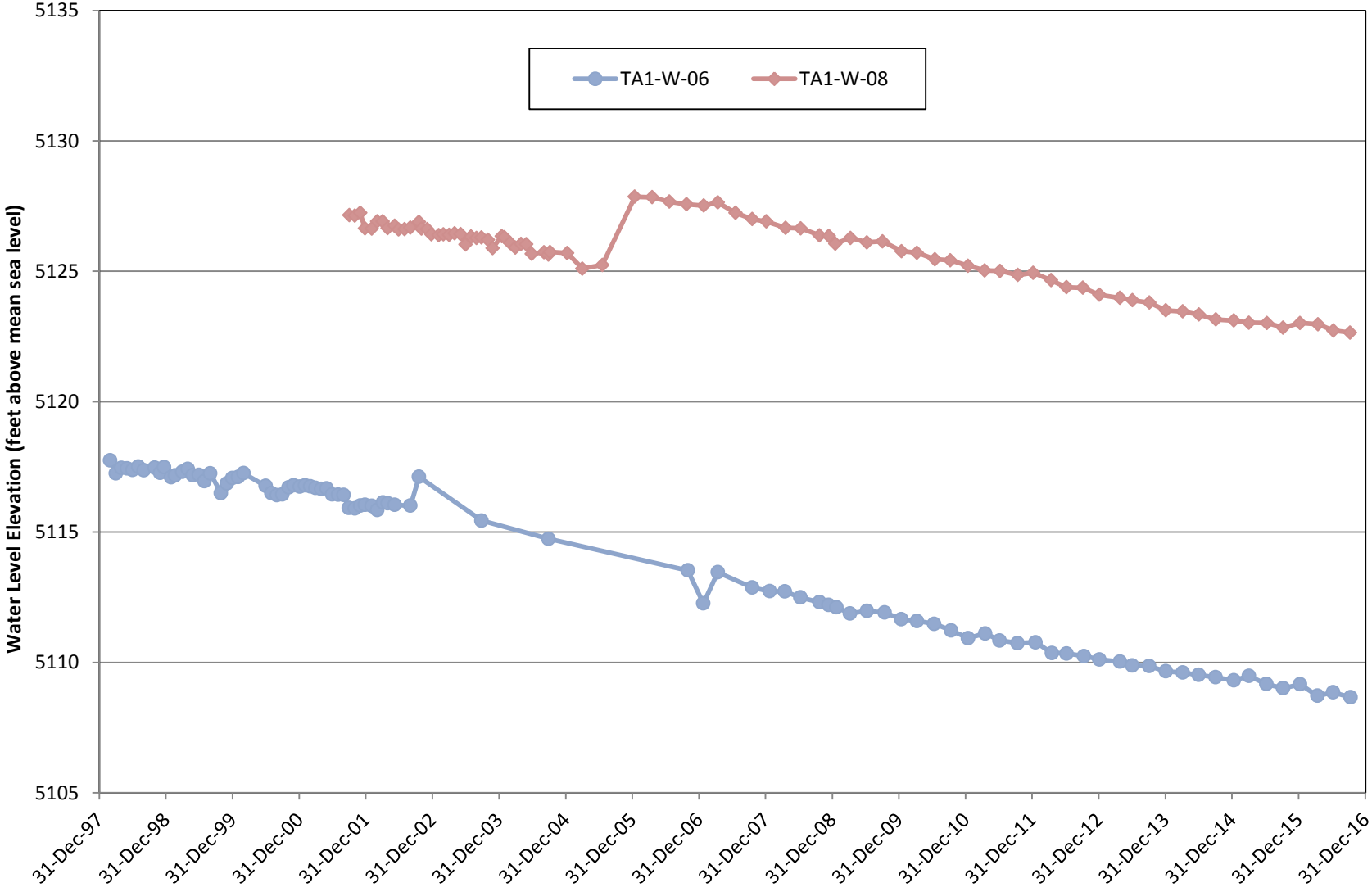

Figure 6B-9. TAG AOC Monitoring Wells (9 of 10)

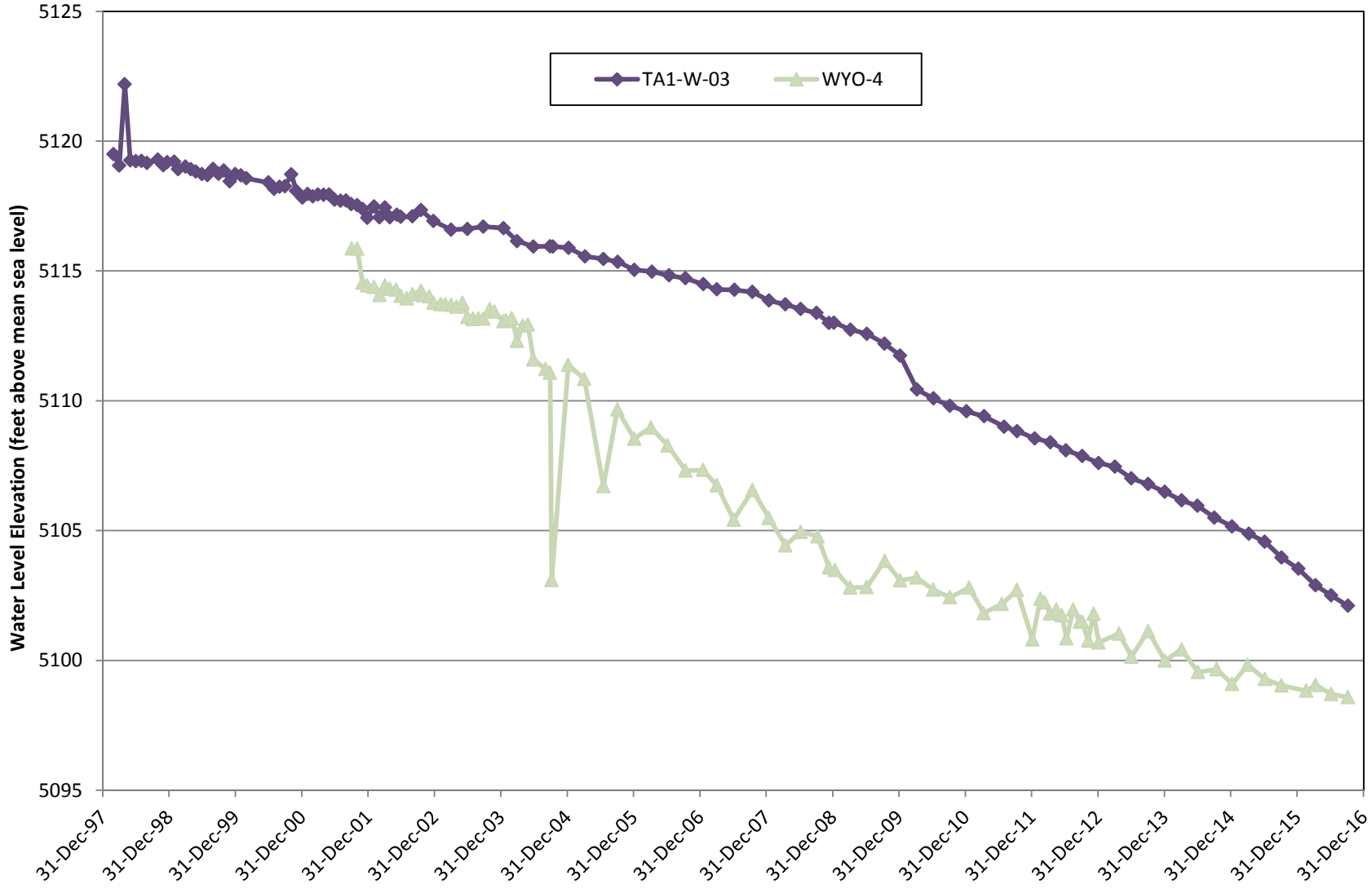

Figure 6B-10. TAG AOC Monitoring Wells (10 of 10)

Attachment 6C
Tijeras Arroyo Groundwater
Analytical Results Tables

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Attachment 6C Tables

6C-1 Summary of Detected Volatile Organic Compounds, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico, Calendar Year 2016..... 6C-5

6C-2 Method Detection Limits for Volatile Organic Compounds (EPA Method SW846-8260), Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 6C-8

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6C-5 Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico, Calendar Year 2016..... 6C-17

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6C-7 Summary of Field Water Quality Measurements, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico, Calendar Year 2016..... 6C-45

Footnotes for Tijeras Arroyo Groundwater Analytical Results Tables..... 6C-47

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Table 6C-1
Summary of Detected Volatile Organic Compounds,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 10-Mar-16	Trichloroethene	0.330	0.300	1.00	5.00	J	J	099083-001	SW846-8260
TA1-W-06 (Duplicate) 10-Mar-16	1,1-Dichloroethene	0.650	0.300	1.00	7.00	J	J	099084-001	SW846-8260
TA2-W-01	Tetrachloroethene	0.310	0.300	1.00	5.00	J	J	098936-001	SW846-8260
08-Mar-16	Trichloroethene	1.12	0.300	1.00	5.00		J	098936-001	SW846-8260
TA2-W-19	1,1-Dichloroethane	0.320	0.300	1.00	NE	J		098949-001	SW846-8260
15-Mar-16	Trichloroethene	2.29	0.300	1.00	5.00			098949-001	SW846-8260
	cis-1,2-Dichloroethene	0.320	0.300	1.00	70.0	J		098949-001	SW846-8260
TA2-W-26	Tetrachloroethene	0.920	0.300	1.00	5.00	J		098947-001	SW846-8260
14-Mar-16	Trichloroethene	0.970	0.300	1.00	5.00	J		098947-001	SW846-8260
	cis-1,2-Dichloroethene	0.350	0.300	1.00	70.0	J		098947-001	SW846-8260
TA2-W-27	Tetrachloroethene	1.23	0.300	1.00	5.00		J-	098938-001	SW846-8260
09-Mar-16	Trichloroethene	1.10	0.300	1.00	5.00		J	098938-001	SW846-8260
TJA-2	1,1-Dichloroethane	0.470	0.300	1.00	NE	J		098952-001	SW846-8260
16-Mar-16	Trichloroethene	3.92	0.300	1.00	5.00			098952-001	SW846-8260
	cis-1,2-Dichloroethene	0.430	0.300	1.00	70.0	J		098952-001	SW846-8260
TJA-7 23-Mar-16	Trichloroethene	1.34	0.300	1.00	5.00			098961-001	SW846-8260
TA2-W-19	1,1-Dichloroethane	0.320	0.300	1.00	NE	J		099798-001	SW846-8260
07-Jun-16	Trichloroethene	2.48	0.300	1.00	5.00			099798-001	SW846-8260
TA2-W-19 (Duplicate)	1,1-Dichloroethane	0.320	0.300	1.00	NE	J		099799-001	SW846-8260
07-Jun-16	Trichloroethene	2.54	0.300	1.00	5.00			099799-001	SW846-8260
	cis-1,2-Dichloroethene	0.320	0.300	1.00	70.0	J		099799-001	SW846-8260
TA2-W-26	Chloroform	0.320	0.300	1.00	NE	J		099793-001	SW846-8260
06-Jun-16	Tetrachloroethene	1.01	0.300	1.00	5.00			099793-001	SW846-8260
	Trichloroethene	1.10	0.300	1.00	5.00			099793-001	SW846-8260
	cis-1,2-Dichloroethene	0.380	0.300	1.00	70.0	J		099793-001	SW846-8260
TJA-2	1,1-Dichloroethane	0.460	0.300	1.00	NE	J		099802-001	SW846-8260
08-Jun-16	Trichloroethene	4.02	0.300	1.00	5.00			099802-001	SW846-8260
	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		099802-001	SW846-8260
TJA-7 14-Jun-16	Trichloroethene	1.83	0.300	1.00	5.00			099811-001	SW846-8260
TJA-7 (Duplicate) 14-Jun-16	Trichloroethene	1.86	0.300	1.00	5.00			099812-001	SW846-8260

Refer to footnotes on page 6C-47.

Table 6C-1 *(Continued)*
Summary of Detected Volatile Organic Compounds,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-02 15-Aug-16	Methylene chloride	1.15	1.00	10.0	5.00	B, J	10U	100404-001	SW846-8260
TA1-W-03 26-Aug-16	Chloroform	0.390	0.300	1.00	NE	J	1.0U	100445-001	SW846-8260
	Methylene chloride	1.42	1.00	10.0	5.00	J	10U	100445-001	SW846-8260
TA1-W-03 (Duplicate) 26-Aug-16	Chloroform	0.450	0.300	1.00	NE	J	1.0U	100446-001	SW846-8260
	Methylene chloride	1.56	1.00	10.0	5.00	J	10U	100446-001	SW846-8260
TA1-W-04 16-Aug-16	Methylene chloride	1.11	1.00	10.0	5.00	B, J	10U	100409-001	SW846-8260
TA1-W-06 31-Aug-16	1,1-Dichloroethene	0.970	0.300	1.00	7.00	J		100466-001	SW846-8260
	Chloroform	0.360	0.300	1.00	NE	J		100466-001	SW846-8260
	Trichloroethene	0.430	0.300	1.00	5.00	J		100466-001	SW846-8260
TA2-W-01 12-Sep-16	Tetrachloroethene	0.440	0.300	1.00	5.00	J		100471-001	SW846-8260
	Trichloroethene	1.26	0.300	1.00	5.00			100471-001	SW846-8260
TA2-W-19 15-Sep-16	Trichloroethene	1.95	0.300	1.00	5.00			100477-001	SW846-8260
TA2-W-26 14-Sep-16	Chloroform	0.310	0.300	1.00	NE	J		100475-001	SW846-8260
	Tetrachloroethene	0.680	0.300	1.00	5.00	J		100475-001	SW846-8260
	Trichloroethene	0.800	0.300	1.00	5.00	J		100475-001	SW846-8260
TA2-W-27 08-Sep-16	Tetrachloroethene	1.62	0.300	1.00	5.00			100469-001	SW846-8260
	Trichloroethene	1.25	0.300	1.00	5.00			100469-001	SW846-8260
TJA-2 19-Sep-16	1,1-Dichloroethane	0.520	0.300	1.00	NE	J		100479-001	SW846-8260
	Trichloroethene	4.36	0.300	1.00	5.00			100479-001	SW846-8260
	cis 1,2-Dichloroethene	0.480	0.300	1.00	70.0	J		100479-001	SW846-8260
TJA-7 21-Sep-16	Trichloroethene	1.77	0.300	1.00	5.00			100486-001	SW846-8260
TA2-W-19 12-Dec-16	1,1-Dichloroethane	0.310	0.300	1.00	NE	J		101242-001	SW846-8260
	Trichloroethene	2.04	0.300	1.00	5.00			101242-001	SW846-8260
TA2-W-26 02-Dec-16	Acetone	4.79	1.50	10.0	NE	B, J	10U	101239-001	SW846-8260
	Tetrachloroethene	0.920	0.300	1.00	5.00	J		101239-001	SW846-8260
	Trichloroethene	0.980	0.300	1.00	5.00	J		101239-001	SW846-8260
	cis-1,2-Dichloroethene	0.390	0.300	1.00	70.0	J		101239-001	SW846-8260

Refer to footnotes on page 6C-47.

Table 6C-1 *(Concluded)*
Summary of Detected Volatile Organic Compounds,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-26 (Duplicate) 02-Dec-16	Acetone	4.86	1.50	10.0	NE	B, J	10U	101240-001	SW846-8260
	Chloroform	0.300	0.300	1.00	NE	J		101240-001	SW846-8260
	Tetrachloroethene	1.00	0.300	1.00	5.00			101240-001	SW846-8260
	Trichloroethene	1.10	0.300	1.00	5.00			101240-001	SW846-8260
	cis-1,2-Dichloroethene	0.410	0.300	1.00	70.0	J		101240-001	SW846-8260
TA2-W-28 (Duplicate) 13-Dec-16	Acetone	1.52	1.50	10.0	NE	B, J	10U	101247-001	SW846-8260
TJA-2 14-Dec-16	1,1-Dichloroethane	0.440	0.300	1.00	NE	J		101249-001	SW846-8260
	Trichloroethene	4.04	0.300	1.00	5.00			101249-001	SW846-8260
	cis-1,2-Dichloroethene	0.420	0.300	1.00	70.0	J		101249-001	SW846-8260
TJA-3 01-Dec-16	Acetone	4.01	1.50	10.0	NE	B, J	10U	101233-001	SW846-8260
TJA-4 19-Dec-16	Acetone	1.56	1.50	10.0	NE	B, J	10U	101254-001	SW846-8260
TJA-7 15-Dec-16	Trichloroethene	1.81	0.300	1.00	5.00			101251-001	SW846-8260

Refer to footnotes on page 6C-47.

Table 6C-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260), Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 6C-47.

Table 6C-3
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 10-Mar-16	Nitrate plus nitrite	4.04	0.085	0.250	10.0			099083-002	EPA 353.2
TA1-W-06 (Duplicate) 10-Mar-16	Nitrate plus nitrite	3.68	0.085	0.250	10.0			099084-002	EPA 353.2
TA2-W-01 08-Mar-16	Nitrate plus nitrite	5.65	0.085	0.250	10.0			098936-002	EPA 353.2
TA2-W-19 15-Mar-16	Nitrate plus nitrite	**12.5**	0.170	0.500	10.0			098949-002	EPA 353.2
TA2-W-26 14-Mar-16	Nitrate plus nitrite	6.80	0.170	0.500	10.0			098947-002	EPA 353.2
TA2-W-27 09-Mar-16	Nitrate plus nitrite	4.63	0.085	0.250	10.0			098938-002	EPA 353.2
TA2-W-28 17-Mar-16	Nitrate plus nitrite	**25.9**	0.850	2.50	10.0			098954-002	EPA 353.2
TJA-2 16-Mar-16	Nitrate plus nitrite	**12.6**	0.170	0.500	10.0			098952-002	EPA 353.2
TJA-3 07-Mar-16	Nitrate plus nitrite	3.15	0.085	0.250	10.0			098933-002	EPA 353.2
TJA-3 (Duplicate) 07-Mar-16	Nitrate plus nitrite	3.12	0.085	0.250	10.0			098934-002	EPA 353.2
TJA-4 22-Mar-16	Nitrate plus nitrite	**26.6**	1.70	5.00	10.0			098958-002	EPA 353.2
TJA-6 03-Mar-16	Nitrate plus nitrite	3.13	0.085	0.250	10.0			098921-002	EPA 353.2
TJA-6 (Duplicate) 03-Mar-16	Nitrate plus nitrite	3.29	0.085	0.250	10.0			098922-002	EPA 353.2
TJA-7 23-Mar-16	Nitrate plus nitrite	**24.2**	0.850	2.50	10.0			098961-002	EPA 353.2
TA2-W-19 07-Jun-16	Nitrate plus nitrite	**12.4**	0.170	0.500	10.0			099798-002	EPA 353.2
TA2-W-19 (Duplicate) 07-Jun-16	Nitrate plus nitrite	**12.7**	0.170	0.500	10.0			099798-002	EPA 353.2
TA2-W-26 06-Jun-16	Nitrate plus nitrite	6.70	0.170	0.500	10.0			099793-002	EPA 353.2

Refer to footnotes on page 6C-47.

Table 6C-3 *(Continued)*
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 09-Jun-16	Nitrate plus nitrite	**23.1**	0.850	2.50	10.0			099804-002	EPA 353.2
TJA-2 08-Jun-16	Nitrate plus nitrite	**13.0**	0.170	0.500	10.0			099802-002	EPA 353.2
TJA-3 02-Jun-16	Nitrate plus nitrite	3.22	0.085	0.250	10.0			099791-002	EPA 353.2
TJA-4 15-Jun-16	Nitrate plus nitrite	**29.8**	0.340	1.00	10.0			099814-002	EPA 353.2
TJA-7 14-Jun-16	Nitrate plus nitrite	**25.8**	0.425	1.25	10.0			099811-002	EPA 353.2
TJA-7 (Duplicate) 14-Jun-16	Nitrate plus nitrite	**22.0**	0.340	1.00	10.0			099812-002	EPA 353.2
PGS-2 19-Aug-16	Nitrate plus nitrite	1.41	0.085	0.250	10.0			100416-004	EPA 353.2
PGS-2 (Duplicate) 19-Aug-16	Nitrate plus nitrite	1.40	0.085	0.250	10.0			100417-004	EPA 353.2
TA1-W-01 22-Aug-16	Nitrate plus nitrite	3.05	0.085	0.250	10.0			100420-004	EPA 353.2
TA1-W-02 15-Aug-16	Nitrate plus nitrite	1.08	0.017	0.050	10.0			100404-004	EPA 353.2
TA1-W-03 26-Aug-16	Nitrate plus nitrite	9.37	0.170	0.500	10.0			100445-004	EPA 353.2
TA1-W-03 (Duplicate) 26-Aug-16	Nitrate plus nitrite	8.66	0.170	0.500	10.0			100446-004	EPA 353.2
TA1-W-04 16-Aug-16	Nitrate plus nitrite	1.89	0.085	0.250	10.0			100409-004	EPA 353.2
TA1-W-05 29-Aug-16	Nitrate plus nitrite	1.36	0.085	0.250	10.0			100452-004	EPA 353.2
TA1-W-05 (Duplicate) 29-Aug-16	Nitrate plus nitrite	1.33	0.085	0.250	10.0			100453-004	EPA 353.2
TA1-W-06 31-Aug-16	Nitrate plus nitrite	3.42	0.085	0.250	10.0			100466-004	EPA 353.2
TA1-W-08 24-Aug-16	Nitrate plus nitrite	7.64	0.170	0.500	10.0			100427-004	EPA 353.2

Refer to footnotes on page 6C-47.

Table 6C-3 *(Continued)*
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 23-Aug-16	Nitrate plus nitrite	4.15	0.170	0.500	10.0			100424-004	EPA 353.2
TA2-NW1-595 (Duplicate) 23-Aug-16	Nitrate plus nitrite	4.47	0.170	0.500	10.0			100425-004	EPA 353.2
TA2-W-01 12-Sep-16	Nitrate plus nitrite	4.87	0.170	0.500	10.0			100471-004	EPA 353.2
TA2-W-19 15-Sep-16	Nitrate plus nitrite	**11.0**	0.170	0.500	10.0			100477-004	EPA 353.2
TA2-W-26 14-Sep-16	Nitrate plus nitrite	6.52	0.170	0.500	10.0			100475-004	EPA 353.2
TA2-W-27 08-Sep-16	Nitrate plus nitrite	4.15	0.085	0.250	10.0			100469-004	EPA 353.2
TA2-W-28 20-Sep-16	Nitrate plus nitrite	**19.8**	0.850	2.50	10.0			100484-004	EPA 353.2
TJA-2 19-Sep-16	Nitrate plus nitrite	**11.1**	0.425	1.25	10.0			100479-004	EPA 353.2
TJA-3 13-Sep-16	Nitrate plus nitrite	2.78	0.085	0.250	10.0			100473-004	EPA 353.2
TJA-4 22-Sep-16	Nitrate plus nitrite	**29.3**	1.70	5.00	10.0			100488-004	EPA 353.2
TJA-6 30-Aug-16	Nitrate plus nitrite	2.45	0.085	0.250	10.0			100462-004	EPA 353.2
TJA-7 21-Sep-16	Nitrate plus nitrite	**22.5**	0.850	2.50	10.0			100486-004	EPA 353.2
WYO-3 17-Aug-16	Nitrate plus nitrite	2.12	0.085	0.250	10.0			100411-004	EPA 353.2

Refer to footnotes on page 6C-47.

Table 6C-3 *(Concluded)*
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 12-Dec-16	Nitrate plus nitrite	**12.0**	0.170	0.500	10.0			101242-002	EPA 353.2
TA2-W-26 02-Dec-16	Nitrate plus nitrite	5.48	0.170	0.500	10.0			101239-002	EPA 353.2
TA2-W-26 (Duplicate) 02-Dec-16	Nitrate plus nitrite	5.40	0.170	0.500	10.0			101240-002	EPA 353.2
TA2-W-28 13-Dec-16	Nitrate plus nitrite	**20.3**	0.850	2.50	10.0			101246-002	EPA 353.2
TA2-W-28 (Duplicate) 13-Dec-16	Nitrate plus nitrite	**21.6**	0.850	2.50	10.0			101247-002	EPA 353.2
TJA-2 14-Dec-16	Nitrate plus nitrite	**11.1**	0.170	0.500	10.0			101249-002	EPA 353.2
TJA-3 01-Dec-16	Nitrate plus nitrite	2.45	0.085	0.250	10.0			101233-002	EPA 353.2
TJA-4 19-Dec-16	Nitrate plus nitrite	**32.9**	0.850	2.50	10.0			101254-002	EPA 353.2
TJA-7 15-Dec-16	Nitrate plus nitrite	**22.1**	0.850	2.50	10.0			101251-002	EPA 353.2

Refer to footnotes on page 6C-47.

Table 6C-4
Summary of Anions and Alkalinity Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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]
PGS-2	Bromide	0.214	0.067	0.200	NE			100416-003	SW846 9056
19-Aug-16	Chloride	13.7	0.670	2.00	NE			100416-003	SW846 9056
	Fluoride	0.140	0.033	0.100	4.0			100416-003	SW846 9056
	Sulfate	80.1	1.33	4.00	NE			100416-003	SW846 9056
	Bicarbonate Alkalinity	195	0.725	2.00	NE			100416-005	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100416-005	SM 2320B
PGS-2 (Duplicate)	Bromide	0.202	0.067	0.200	NE			100417-003	SW846 9056
19-Aug-16	Chloride	13.9	0.670	2.00	NE			100417-003	SW846 9056
	Fluoride	0.125	0.033	0.100	4.0			100417-003	SW846 9056
	Sulfate	80.4	1.33	4.00	NE			100417-003	SW846 9056
	Bicarbonate Alkalinity	197	0.725	2.00	NE			100417-005	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100417-005	SM 2320B
TA1-W-01	Bromide	0.197	0.067	0.200	NE	J		100420-003	SW846 9056
22-Aug-16	Chloride	13.3	0.670	2.00	NE			100420-003	SW846 9056
	Fluoride	0.438	0.033	0.100	4.0			100420-003	SW846 9056
	Sulfate	74.3	1.33	4.00	NE			100420-003	SW846 9056
	Bicarbonate Alkalinity	179	1.45	4.00	NE			100420-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100420-005	SM 2320B
TA1-W-02	Bromide	0.169	0.067	0.200	NE	J		100404-003	SW846 9056
15-Aug-16	Chloride	15.1	0.670	2.00	NE			100404-003	SW846 9056
	Fluoride	0.318	0.033	0.100	4.0			100404-003	SW846 9056
	Sulfate	78.5	1.33	4.00	NE			100404-003	SW846 9056
	Bicarbonate Alkalinity	173	0.725	2.00	NE			100404-005	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100404-005	SM 2320B
TA1-W-03	Bromide	3.14	0.134	0.400	NE			100445-003	SW846 9056
26-Aug-16	Chloride	230	6.70	20.0	NE			100445-003	SW846 9056
	Fluoride	0.187	0.033	0.100	4.0			100445-003	SW846 9056
	Sulfate	429	13.3	40.0	NE			100445-003	SW846 9056
	Bicarbonate Alkalinity	76.3	1.45	4.00	NE			100445-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100445-005	SM 2320B
TA1-W-03 (Duplicate)	Bromide	3.11	0.134	0.400	NE			100446-003	SW846 9056
26-Aug-16	Chloride	233	6.70	20.0	NE			100446-003	SW846 9056
	Fluoride	0.177	0.033	0.100	4.0			100446-003	SW846 9056
	Sulfate	440	13.3	40.0	NE			100446-003	SW846 9056
	Bicarbonate Alkalinity	76.3	1.45	4.00	NE			100446-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100446-005	SM 2320B

Refer to footnotes on page 6C-47.

Table 6C-4 *(Continued)*
Summary of Anions and Alkalinity Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.135	0.067	0.200	NE	J		100409-003	SW846 9056
16-Aug-16	Chloride	13.2	0.335	1.00	NE			100409-003	SW846 9056
	Fluoride	0.269	0.033	0.100	4.0			100409-003	SW846 9056
	Sulfate	70.5	0.665	2.00	NE			100409-003	SW846 9056
	Bicarbonate Alkalinity	180	0.725	2.00	NE			100409-005	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100409-005	SM 2320B
TA1-W-05	Bromide	0.157	0.067	0.200	NE	J		100452-003	SW846 9056
29-Aug-16	Chloride	10.5	0.670	2.00	NE			100452-003	SW846 9056
	Fluoride	0.271	0.033	0.100	4.0			100452-003	SW846 9056
	Sulfate	96.5	1.33	4.00	NE			100452-003	SW846 9056
	Bicarbonate Alkalinity	213	1.45	4.00	NE			100452-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100452-005	SM 2320B
TA1-W-06	Bromide	1.22	0.067	0.200	NE			100466-003	SW846 9056
31-Aug-16	Chloride	95.7	1.34	4.00	NE			100466-003	SW846 9056
	Fluoride	0.279	0.033	0.100	4.0			100466-003	SW846 9056
	Sulfate	201	2.66	8.00	NE			100466-003	SW846 9056
	Bicarbonate Alkalinity	92.4	1.45	4.00	NE			100466-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100466-005	SM 2320B
TA1-W-08	Bromide	2.62	0.134	0.400	NE			100427-003	SW846 9056
24-Aug-16	Chloride	202	6.70	20.0	NE			100427-003	SW846 9056
	Fluoride	0.244	0.033	0.100	4.0			100427-003	SW846 9056
	Sulfate	682	13.3	40.0	NE			100427-003	SW846 9056
	Bicarbonate Alkalinity	84.3	1.45	4.00	NE			100427-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100427-005	SM 2320B
TA2-NW1-595	Bromide	1.85	0.067	0.200	NE			100424-003	SW846 9056
23-Aug-16	Chloride	43.5	0.670	2.00	NE			100424-003	SW846 9056
	Fluoride	0.261	0.033	0.100	4.0			100424-003	SW846 9056
	Sulfate	48.2	1.33	4.00	NE			100424-003	SW846 9056
	Bicarbonate Alkalinity	136	1.45	4.00	NE			100424-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100424-005	SM 2320B
TA2-NW1-595 (Duplicate)	Bromide	1.79	0.067	0.200	NE			100425-003	SW846 9056
23-Aug-16	Chloride	43.4	0.670	2.00	NE			100425-003	SW846 9056
	Fluoride	0.256	0.033	0.100	4.0			100425-003	SW846 9056
	Sulfate	48.4	1.33	4.00	NE			100425-003	SW846 9056
	Bicarbonate Alkalinity	289	1.45	4.00	NE			100425-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100425-005	SM 2320B

Refer to footnotes on page 6C-47.

Table 6C-4 *(Continued)*
Summary of Anions and Alkalinity Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	1.41	0.067	0.200	NE			100471-003	SW846 9056
12-Sep-16	Chloride	96.1	1.34	4.00	NE			100471-003	SW846 9056
	Fluoride	0.293	0.033	0.100	4.0			100471-003	SW846 9056
	Sulfate	55.8	2.66	8.00	NE			100471-003	SW846 9056
	Bicarbonate Alkalinity	102	1.45	4.00	NE			100471-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100471-005	SM 2320B
TA2-W-19	Bromide	0.817	0.067	0.200	NE			100477-003	SW846 9056
15-Sep-16	Chloride	60.8	0.670	2.00	NE			100477-003	SW846 9056
	Fluoride	0.315	0.033	0.100	4.0			100477-003	SW846 9056
	Sulfate	56.7	1.33	4.00	NE			100477-003	SW846 9056
	Bicarbonate Alkalinity	114	1.45	4.00	NE			100477-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100477-005	SM 2320B
TA2-W-26	Bromide	2.59	0.067	0.200	NE			100475-003	SW846 9056
14-Sep-16	Chloride	203	3.35	10.0	NE			100475-003	SW846 9056
	Fluoride	0.248	0.033	0.100	4.0			100475-003	SW846 9056
	Sulfate	436	6.65	20.0	NE			100475-003	SW846 9056
	Bicarbonate Alkalinity	85.0	1.45	4.00	NE			100475-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100475-005	SM 2320B
TA2-W-27	Bromide	1.98	0.067	0.200	NE	N	J-	100469-003	SW846 9056
08-Sep-16	Chloride	101	1.34	4.00	NE			100469-003	SW846 9056
	Fluoride	0.279	0.033	0.100	4.0			100469-003	SW846 9056
	Sulfate	137	2.66	8.00	NE			100469-003	SW846 9056
	Bicarbonate Alkalinity	102	1.45	4.00	NE			100469-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100469-005	SM 2320B
TA2-W-28	Bromide	0.494	0.067	0.200	NE			100484-003	SW846 9056
20-Sep-16	Chloride	33.5	0.335	1.00	NE			100484-003	SW846 9056
	Fluoride	0.335	0.033	0.100	4.0			100484-003	SW846 9056
	Sulfate	15.6	0.133	0.400	NE			100484-003	SW846 9056
	Bicarbonate Alkalinity	119	1.45	4.00	NE			100484-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100484-005	SM 2320B
TJA-2	Bromide	0.866	0.067	0.200	NE			100479-003	SW846 9056
19-Sep-16	Chloride	64.7	0.670	2.00	NE			100479-003	SW846 9056
	Fluoride	0.317	0.033	0.100	4.0			100479-003	SW846 9056
	Sulfate	51.2	1.33	4.00	NE			100479-003	SW846 9056
	Bicarbonate Alkalinity	119	0.330	1.00	NE			100479-005	SM 2320B
	Carbonate Alkalinity	ND	0.330	1.00	NE	U		100479-005	SM 2320B

Refer to footnotes on page 6C-47.

Table 6C-4 *(Concluded)*
Summary of Anions and Alkalinity Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.165	0.067	0.200	NE	J		100473-003	SW846 9056
13-Sep-16	Chloride	12.2	0.335	1.00	NE			100473-003	SW846 9056
	Fluoride	0.301	0.033	0.100	4.0			100473-003	SW846 9056
	Sulfate	79.7	0.665	2.00	NE			100473-003	SW846 9056
	Bicarbonate Alkalinity	176	1.45	4.00	NE			100473-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100473-005	SM 2320B
TJA-4	Bromide	0.349	0.067	0.200	NE			100488-003	SW846 9056
22-Sep-16	Chloride	21.2	0.335	1.00	NE			100488-003	SW846 9056
	Fluoride	0.294	0.033	0.100	4.0			100488-003	SW846 9056
	Sulfate	17.5	0.133	0.400	NE			100488-003	SW846 9056
	Bicarbonate Alkalinity	142	1.45	4.00	NE			100488-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100488-005	SM 2320B
TJA-6	Bromide	0.198	0.067	0.200	NE	J		100462-003	SW846 9056
30-Aug-16	Chloride	13.3	0.670	2.00	NE			100462-003	SW846 9056
	Fluoride	0.367	0.033	0.100	4.0			100462-003	SW846 9056
	Sulfate	60.8	1.33	4.00	NE			100462-003	SW846 9056
	Bicarbonate Alkalinity	161	1.45	4.00	NE			100462-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100462-005	SM 2320B
TJA-7	Bromide	0.413	0.067	0.200	NE			100486-003	SW846 9056
21-Sep-16	Chloride	24.0	0.335	1.00	NE			100486-003	SW846 9056
	Fluoride	0.294	0.033	0.100	4.0			100486-003	SW846 9056
	Sulfate	22.4	0.665	2.00	NE			100486-003	SW846 9056
	Bicarbonate Alkalinity	135	1.45	4.00	NE			100486-005	SM 2320B
	Carbonate Alkalinity	ND	1.45	4.00	NE	U		100486-005	SM 2320B
WYO-3	Bromide	0.217	0.067	0.200	NE			100411-003	SW846 9056
17-Aug-16	Chloride	16.3	0.670	2.00	NE			100411-003	SW846 9056
	Fluoride	0.424	0.033	0.100	4.0			100411-003	SW846 9056
	Sulfate	92.8	1.33	4.00	NE			100411-003	SW846 9056
	Bicarbonate Alkalinity	154	0.725	2.00	NE			100411-005	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		100411-005	SM 2320B

Refer to footnotes on page 6C-47.

Table 6C-5
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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]
PGS-2	Aluminum	1.20	0.015	0.050	NE			100416-002	SW846 6020
19-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100416-002	SW846 6020
	Arsenic	0.00209	0.0017	0.005	0.010	J		100416-002	SW846 6020
	Barium	0.0735	0.0006	0.002	2.00			100416-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100416-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100416-002	SW846 6020
	Calcium	74.9	0.800	2.00	NE			100416-002	SW846 6020
	Chromium	0.0397	0.003	0.010	0.100			100416-002	SW846 6020
	Cobalt	0.000469	0.0001	0.001	NE	J		100416-002	SW846 6020
	Copper	0.00202	0.00035	0.001	NE		J+	100416-002	SW846 6020
	Iron	0.679	0.033	0.100	NE			100416-002	SW846 6020
	Lead	0.00126	0.0005	0.002	NE	J		100416-002	SW846 6020
	Magnesium	12.4	0.010	0.030	NE			100416-002	SW846 6020
	Manganese	0.0218	0.001	0.005	NE			100416-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100416-002	SW846 7470
	Nickel	0.0559	0.0005	0.002	NE			100416-002	SW846 6020
	Potassium	3.06	0.080	0.300	NE			100416-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100416-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100416-002	SW846 6020
	Sodium	35.1	0.080	0.250	NE			100416-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100416-002	SW846 6020
	Uranium	0.00203	0.000067	0.0002	0.030	B		100416-002	SW846 6020
	Vanadium	0.00527	0.0045	0.010	NE	J		100416-002	SW846 6020
	Zinc	0.00832	0.0035	0.010	NE	J	0.027U	100416-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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]
PGS-2 (Duplicate)	Aluminum	0.922	0.015	0.050	NE			100417-002	SW846 6020
19-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100417-002	SW846 6020
	Arsenic	0.0017	0.0017	0.005	0.010	J		100417-002	SW846 6020
	Barium	0.0677	0.0006	0.002	2.00			100417-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100417-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100417-002	SW846 6020
	Calcium	71.0	0.800	2.00	NE			100417-002	SW846 6020
	Chromium	0.031	0.003	0.010	0.100			100417-002	SW846 6020
	Cobalt	0.000418	0.0001	0.001	NE	J		100417-002	SW846 6020
	Copper	0.00187	0.00035	0.001	NE		J+	100417-002	SW846 6020
	Iron	0.525	0.033	0.100	NE			100417-002	SW846 6020
	Lead	0.00107	0.0005	0.002	NE	J		100417-002	SW846 6020
	Magnesium	12.5	0.010	0.030	NE			100417-002	SW846 6020
	Manganese	0.0182	0.001	0.005	NE			100417-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100417-002	SW846 7470
	Nickel	0.053	0.0005	0.002	NE			100417-002	SW846 6020
	Potassium	3.07	0.080	0.300	NE			100417-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100417-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100417-002	SW846 6020
	Sodium	35.6	0.080	0.250	NE			100417-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100417-002	SW846 6020
	Uranium	0.00197	0.000067	0.0002	0.030	B		100417-002	SW846 6020
	Vanadium	0.005	0.0045	0.010	NE	J		100417-002	SW846 6020
	Zinc	0.00907	0.0035	0.010	NE	J	0.027U	100417-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100420-002	SW846 6020
22-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100420-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100420-002	SW846 6020
	Barium	0.0546	0.0006	0.002	2.00			100420-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100420-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100420-002	SW846 6020
	Calcium	70.3	0.800	2.00	NE			100420-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100420-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100420-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100420-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100420-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100420-002	SW846 6020
	Magnesium	13.4	0.010	0.030	NE			100420-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100420-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100420-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100420-002	SW846 6020
	Potassium	2.37	0.080	0.300	NE			100420-002	SW846 6020
	Selenium	0.00233	0.002	0.005	0.050	J		100420-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100420-002	SW846 6020
	Sodium	26.7	0.080	0.250	NE			100420-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100420-002	SW846 6020
	Uranium	0.00339	0.000067	0.0002	0.030			100420-002	SW846 6020
	Vanadium	0.00636	0.0045	0.010	NE	J		100420-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100420-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.0295	0.015	0.050	NE	J		100404-002	SW846 6020
15-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100404-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100404-002	SW846 6020
	Barium	0.0479	0.0006	0.002	2.00			100404-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100404-002	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		100404-002	SW846 6020
	Calcium	71.9	0.600	2.00	NE			100404-002	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		100404-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100404-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100404-002	SW846 6020
	Iron	0.0343	0.033	0.100	NE	J		100404-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100404-002	SW846 6020
	Magnesium	12.0	0.010	0.030	NE			100404-002	SW846 6020
	Manganese	0.00124	0.001	0.005	NE	J		100404-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100404-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100404-002	SW846 6020
	Potassium	2.06	0.080	0.300	NE			100404-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100404-002	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		100404-002	SW846 6020
	Sodium	21.2	0.080	0.250	NE			100404-002	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		100404-002	SW846 6020
	Uranium	0.00319	0.000067	0.0002	0.030			100404-002	SW846 6020
	Vanadium	0.00522	0.0045	0.010	NE	J		100404-002	SW846 6020
	Zinc	0.00373	0.0035	0.010	NE	J		100404-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-03	Aluminum	0.397	0.015	0.050	NE			100445-002	SW846 6020
26-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100445-002	SW846 6020
	Arsenic	0.00179	0.0017	0.005	0.010	J		100445-002	SW846 6020
	Barium	0.0347	0.0006	0.002	2.00			100445-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100445-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100445-002	SW846 6020
	Calcium	273	0.800	2.00	NE			100445-002	SW846 6020
	Chromium	0.00911	0.003	0.010	0.100	J		100445-002	SW846 6020
	Cobalt	0.000276	0.0001	0.001	NE	J		100445-002	SW846 6020
	Copper	0.00224	0.00035	0.001	NE		J-	100445-002	SW846 6020
	Iron	0.711	0.033	0.100	NE			100445-002	SW846 6020
	Lead	0.000605	0.0005	0.002	NE	J		100445-002	SW846 6020
	Magnesium	32.3	0.010	0.030	NE			100445-002	SW846 6020
	Manganese	0.0117	0.001	0.005	NE		J+	100445-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100445-002	SW846 7470
	Nickel	0.00413	0.0005	0.002	NE			100445-002	SW846 6020
	Potassium	2.88	0.080	0.300	NE			100445-002	SW846 6020
	Selenium	0.0311	0.002	0.005	0.050			100445-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100445-002	SW846 6020
	Sodium	49.2	0.080	0.250	NE			100445-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100445-002	SW846 6020
	Uranium	0.00123	0.000067	0.0002	0.030			100445-002	SW846 6020
	Vanadium	0.00452	0.0045	0.010	NE	J		100445-002	SW846 6020
	Zinc	0.00897	0.0035	0.010	NE	J		100445-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-03 (Duplicate)	Aluminum	0.335	0.015	0.050	NE			100446-002	SW846 6020
26-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100446-002	SW846 6020
	Arsenic	0.00191	0.0017	0.005	0.010	J		100446-002	SW846 6020
	Barium	0.0343	0.0006	0.002	2.00			100446-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100446-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100446-002	SW846 6020
	Calcium	285	0.800	2.00	NE			100446-002	SW846 6020
	Chromium	0.0102	0.003	0.010	0.100			100446-002	SW846 6020
	Cobalt	0.000248	0.0001	0.001	NE	J		100446-002	SW846 6020
	Copper	0.00199	0.00035	0.001	NE		J-	100446-002	SW846 6020
	Iron	0.695	0.033	0.100	NE			100446-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100446-002	SW846 6020
	Magnesium	32.4	0.010	0.030	NE			100446-002	SW846 6020
	Manganese	0.0104	0.001	0.005	NE		J+	100446-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100446-002	SW846 7470
	Nickel	0.00352	0.0005	0.002	NE			100446-002	SW846 6020
	Potassium	2.92	0.080	0.300	NE			100446-002	SW846 6020
	Selenium	0.0315	0.002	0.005	0.050			100446-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100446-002	SW846 6020
	Sodium	47.7	0.080	0.250	NE			100446-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100446-002	SW846 6020
	Uranium	0.00129	0.000067	0.0002	0.030			100446-002	SW846 6020
	Vanadium	0.00451	0.0045	0.010	NE	J		100446-002	SW846 6020
	Zinc	0.00824	0.0035	0.010	NE	J		100446-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100409-002	SW846 6020
16-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100409-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100409-002	SW846 6020
	Barium	0.0536	0.0006	0.002	2.00			100409-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100409-002	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		100409-002	SW846 6020
	Calcium	73.1	0.600	2.00	NE			100409-002	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		100409-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100409-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100409-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100409-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100409-002	SW846 6020
	Magnesium	11.5	0.010	0.030	NE			100409-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100409-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100409-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100409-002	SW846 6020
	Potassium	2.17	0.080	0.300	NE			100409-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100409-002	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		100409-002	SW846 6020
	Sodium	22.3	0.080	0.250	NE			100409-002	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		100409-002	SW846 6020
	Uranium	0.00316	0.000067	0.0002	0.030			100409-002	SW846 6020
	Vanadium	0.00528	0.0045	0.010	NE	J		100409-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100409-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100452-002	SW846 6020
29-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100452-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100452-002	SW846 6020
	Barium	0.0393	0.0006	0.002	2.00			100452-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100452-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100452-002	SW846 6020
	Calcium	84.2	0.800	2.00	NE			100452-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100452-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100452-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100452-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100452-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100452-002	SW846 6020
	Magnesium	12.0	0.010	0.030	NE			100452-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100452-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100452-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100452-002	SW846 6020
	Potassium	2.25	0.080	0.300	NE			100452-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100452-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100452-002	SW846 6020
	Sodium	31.8	0.080	0.250	NE			100452-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100452-002	SW846 6020
	Uranium	0.00337	0.000067	0.0002	0.030			100452-002	SW846 6020
	Vanadium	0.00481	0.0045	0.010	NE	J		100452-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100452-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA1-W-06	Aluminum	0.0206	0.015	0.050	NE	J		100466-002	SW846 6020
31-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100466-002	SW846 6020
	Arsenic	0.00185	0.0017	0.005	0.010	J		100466-002	SW846 6020
	Barium	0.0276	0.0006	0.002	2.00			100466-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100466-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100466-002	SW846 6020
	Calcium	129	0.800	2.00	NE			100466-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100466-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100466-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	100466-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100466-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100466-002	SW846 6020
	Magnesium	16.9	0.010	0.030	NE			100466-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100466-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100466-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100466-002	SW846 6020
	Potassium	2.24	0.080	0.300	NE			100466-002	SW846 6020
	Selenium	0.00896	0.002	0.005	0.050			100466-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100466-002	SW846 6020
	Sodium	32.5	0.080	0.250	NE			100466-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100466-002	SW846 6020
	Uranium	0.00117	0.000067	0.0002	0.030			100466-002	SW846 6020
	Vanadium	0.00575	0.0045	0.010	NE	J		100466-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100466-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100427-002	SW846 6020
24-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100427-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100427-002	SW846 6020
	Barium	0.0206	0.0006	0.002	2.00			100427-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100427-002	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		100427-002	SW846 6020
	Calcium	308	6.00	20.0	NE			100427-002	SW846 6020
	Chromium	0.00242	0.002	0.010	0.100	J		100427-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100427-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	100427-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100427-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100427-002	SW846 6020
	Magnesium	40.7	0.010	0.030	NE			100427-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100427-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100427-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100427-002	SW846 6020
	Potassium	3.22	0.080	0.300	NE			100427-002	SW846 6020
	Selenium	0.0312	0.0015	0.005	0.050			100427-002	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		100427-002	SW846 6020
	Sodium	80.5	0.800	2.50	NE			100427-002	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		100427-002	SW846 6020
	Uranium	0.00166	0.000067	0.0002	0.030			100427-002	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		100427-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100427-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA2-NW1-595	Aluminum	ND	0.015	0.050	NE	U		100424-002	SW846 6020
23-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100424-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100424-002	SW846 6020
	Barium	0.0459	0.0006	0.002	2.00			100424-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100424-002	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		100424-002	SW846 6020
	Calcium	106	1.20	4.00	NE			100424-002	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		100424-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100424-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	100424-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100424-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100424-002	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			100424-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100424-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100424-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100424-002	SW846 6020
	Potassium	2.39	0.080	0.300	NE			100424-002	SW846 6020
	Selenium	0.00734	0.0015	0.005	0.050			100424-002	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		100424-002	SW846 6020
	Sodium	29.9	0.080	0.250	NE			100424-002	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		100424-002	SW846 6020
	Uranium	0.00214	0.000067	0.0002	0.030			100424-002	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		100424-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100424-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA2-NW1-595 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		100425-002	SW846 6020
23-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100425-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100425-002	SW846 6020
	Barium	0.0471	0.0006	0.002	2.00			100425-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100425-002	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		100425-002	SW846 6020
	Calcium	98.1	0.600	2.00	NE			100425-002	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		100425-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100425-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	100425-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100425-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100425-002	SW846 6020
	Magnesium	16.9	0.010	0.030	NE			100425-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100425-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100425-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100425-002	SW846 6020
	Potassium	2.39	0.080	0.300	NE			100425-002	SW846 6020
	Selenium	0.00789	0.0015	0.005	0.050			100425-002	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		100425-002	SW846 6020
	Sodium	30.7	0.080	0.250	NE			100425-002	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		100425-002	SW846 6020
	Uranium	0.00214	0.000067	0.0002	0.030			100425-002	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		100425-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100425-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA2-W-01	Aluminum	0.0466	0.015	0.050	NE	J		100471-002	SW846 6020
12-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100471-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100471-002	SW846 6020
	Barium	0.0709	0.0006	0.002	2.00			100471-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100471-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100471-002	SW846 6020
	Calcium	87.4	0.800	2.00	NE			100471-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100471-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100471-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100471-002	SW846 6020
	Iron	0.0377	0.033	0.100	NE	J		100471-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100471-002	SW846 6020
	Magnesium	12.7	0.010	0.030	NE			100471-002	SW846 6020
	Manganese	0.00293	0.001	0.005	NE	J		100471-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100471-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100471-002	SW846 6020
	Potassium	1.84	0.080	0.300	NE			100471-002	SW846 6020
	Selenium	0.00703	0.002	0.005	0.050			100471-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100471-002	SW846 6020
	Sodium	22.3	0.080	0.250	NE			100471-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100471-002	SW846 6020
	Uranium	0.00103	0.000067	0.0002	0.030			100471-002	SW846 6020
	Vanadium	0.00593	0.0045	0.010	NE	J		100471-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100471-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA2-W-19	Aluminum	ND	0.015	0.050	NE	U		100477-002	SW846 6020
15-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100477-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100477-002	SW846 6020
	Barium	0.0491	0.0006	0.002	2.00			100477-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100477-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100477-002	SW846 6020
	Calcium	79.3	0.800	2.00	NE			100477-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100477-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100477-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100477-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100477-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100477-002	SW846 6020
	Magnesium	12.5	0.010	0.030	NE			100477-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100477-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100477-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100477-002	SW846 6020
	Potassium	1.90	0.080	0.300	NE			100477-002	SW846 6020
	Selenium	0.0047	0.002	0.005	0.050	J		100477-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100477-002	SW846 6020
	Sodium	23.3	0.080	0.250	NE			100477-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100477-002	SW846 6020
	Uranium	0.00121	0.000067	0.0002	0.030			100477-002	SW846 6020
	Vanadium	0.00666	0.0045	0.010	NE	J		100477-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100477-002	SW846 6020

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Table 6C-5 *(Continued)*
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Tijeras Arroyo Groundwater, 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]
TA2-W-26	Aluminum	0.0275	0.015	0.050	NE	J		100475-002	SW846 6020
14-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100475-002	SW846 6020
	Arsenic	0.00224	0.0017	0.005	0.010	J		100475-002	SW846 6020
	Barium	0.0603	0.0006	0.002	2.00			100475-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100475-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100475-002	SW846 6020
	Calcium	247	0.800	2.00	NE			100475-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100475-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100475-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	R	100475-002	SW846 6020
	Iron	0.0421	0.033	0.100	NE	J		100475-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100475-002	SW846 6020
	Magnesium	28.4	0.010	0.030	NE			100475-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100475-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100475-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100475-002	SW846 6020
	Potassium	2.55	0.080	0.300	NE			100475-002	SW846 6020
	Selenium	0.0209	0.002	0.005	0.050			100475-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100475-002	SW846 6020
	Sodium	41.9	0.080	0.250	NE			100475-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100475-002	SW846 6020
	Uranium	0.00126	0.000067	0.0002	0.030			100475-002	SW846 6020
	Vanadium	0.00533	0.0045	0.010	NE	J		100475-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100475-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA2-W-27	Aluminum	ND	0.015	0.050	NE	U		100469-002	SW846 6020
08-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100469-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100469-002	SW846 6020
	Barium	0.0577	0.0006	0.002	2.00			100469-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100469-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100469-002	SW846 6020
	Calcium	114	0.800	2.00	NE			100469-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100469-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100469-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	100469-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100469-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100469-002	SW846 6020
	Magnesium	15.0	0.010	0.030	NE			100469-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100469-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100469-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100469-002	SW846 6020
	Potassium	2.05	0.080	0.300	NE			100469-002	SW846 6020
	Selenium	0.00787	0.002	0.005	0.050			100469-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100469-002	SW846 6020
	Sodium	27.7	0.080	0.250	NE			100469-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100469-002	SW846 6020
	Uranium	0.00105	0.000067	0.0002	0.030			100469-002	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		100469-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100469-002	SW846 6020

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Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, 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]
TA2-W-28	Aluminum	0.0515	0.015	0.050	NE			100484-002	SW846 6020
20-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100484-002	SW846 6020
	Arsenic	0.00173	0.0017	0.005	0.010	J		100484-002	SW846 6020
	Barium	0.210	0.0006	0.002	2.00			100484-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100484-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100484-002	SW846 6020
	Calcium	62.4	0.800	2.00	NE			100484-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100484-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100484-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100484-002	SW846 6020
	Iron	0.0539	0.033	0.100	NE	J		100484-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100484-002	SW846 6020
	Magnesium	11.2	0.010	0.030	NE			100484-002	SW846 6020
	Manganese	0.00172	0.001	0.005	NE	J		100484-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100484-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100484-002	SW846 6020
	Potassium	1.93	0.080	0.300	NE			100484-002	SW846 6020
	Selenium	0.00325	0.002	0.005	0.050	J		100484-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100484-002	SW846 6020
	Sodium	19.1	0.080	0.250	NE			100484-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100484-002	SW846 6020
	Uranium	0.00127	0.000067	0.0002	0.030			100484-002	SW846 6020
	Vanadium	0.00457	0.0045	0.010	NE	J		100484-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100484-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	ND	0.015	0.050	NE	U		100479-002	SW846 6020
19-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100479-002	SW846 6020
	Arsenic	0.00185	0.0017	0.005	0.010	J		100479-002	SW846 6020
	Barium	0.0459	0.0006	0.002	2.00			100479-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100479-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100479-002	SW846 6020
	Calcium	73.8	0.800	2.00	NE			100479-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100479-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100479-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100479-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100479-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100479-002	SW846 6020
	Magnesium	11.4	0.010	0.030	NE			100479-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100479-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100479-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100479-002	SW846 6020
	Potassium	1.79	0.080	0.300	NE			100479-002	SW846 6020
	Selenium	0.00445	0.002	0.005	0.050	J		100479-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100479-002	SW846 6020
	Sodium	22.5	0.080	0.250	NE			100479-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100479-002	SW846 6020
	Uranium	0.00114	0.000067	0.0002	0.030			100479-002	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		100479-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100479-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100473-002	SW846 6020
13-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100473-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100473-002	SW846 6020
	Barium	0.0415	0.0006	0.002	2.00			100473-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100473-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100473-002	SW846 6020
	Calcium	73.1	0.800	2.00	NE			100473-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100473-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100473-002	SW846 6020
	Copper	0.000649	0.00035	0.001	NE	J		100473-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100473-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100473-002	SW846 6020
	Magnesium	11.7	0.010	0.030	NE			100473-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100473-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100473-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100473-002	SW846 6020
	Potassium	1.87	0.080	0.300	NE			100473-002	SW846 6020
	Selenium	0.00205	0.002	0.005	0.050	J		100473-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100473-002	SW846 6020
	Sodium	25.1	0.080	0.250	NE			100473-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100473-002	SW846 6020
	Uranium	0.00247	0.000067	0.0002	0.030			100473-002	SW846 6020
	Vanadium	0.0055	0.0045	0.010	NE	J		100473-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100473-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100488-002	SW846 6020
22-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100488-002	SW846 6020
	Arsenic	0.00179	0.0017	0.005	0.010	J		100488-002	SW846 6020
	Barium	0.186	0.0006	0.002	2.00			100488-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100488-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100488-002	SW846 6020
	Calcium	65.2	0.800	2.00	NE			100488-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100488-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100488-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100488-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100488-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100488-002	SW846 6020
	Magnesium	13.6	0.010	0.030	NE			100488-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100488-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100488-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100488-002	SW846 6020
	Potassium	3.17	0.080	0.300	NE			100488-002	SW846 6020
	Selenium	0.00314	0.002	0.005	0.050	J		100488-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100488-002	SW846 6020
	Sodium	25.9	0.080	0.250	NE			100488-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100488-002	SW846 6020
	Uranium	0.00263	0.000067	0.0002	0.030			100488-002	SW846 6020
	Vanadium	ND	0.0045	0.010	NE	U		100488-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100488-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.0322	0.015	0.050	NE	J		100462-002	SW846 6020
30-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100462-002	SW846 6020
	Arsenic	0.00171	0.0017	0.005	0.010	J		100462-002	SW846 6020
	Barium	0.0707	0.0006	0.002	2.00			100462-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100462-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100462-002	SW846 6020
	Calcium	62.9	0.800	2.00	NE			100462-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100462-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100462-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100462-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100462-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100462-002	SW846 6020
	Magnesium	12.2	0.010	0.030	NE			100462-002	SW846 6020
	Manganese	0.00103	0.001	0.005	NE	J		100462-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100462-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100462-002	SW846 6020
	Potassium	2.28	0.080	0.300	NE			100462-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100462-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100462-002	SW846 6020
	Sodium	23.6	0.080	0.250	NE			100462-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100462-002	SW846 6020
	Uranium	0.0031	0.000067	0.0002	0.030			100462-002	SW846 6020
	Vanadium	0.00755	0.0045	0.010	NE	J		100462-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100462-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.0417	0.015	0.050	NE	J		100486-002	SW846 6020
21-Sep-16	Antimony	ND	0.001	0.003	0.006	U		100486-002	SW846 6020
	Arsenic	0.00185	0.0017	0.005	0.010	J		100486-002	SW846 6020
	Barium	0.231	0.0006	0.002	2.00			100486-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100486-002	SW846 6020
	Cadmium	ND	0.0003	0.001	0.005	U		100486-002	SW846 6020
	Calcium	69.5	0.800	2.00	NE			100486-002	SW846 6020
	Chromium	ND	0.003	0.010	0.100	U		100486-002	SW846 6020
	Cobalt	0.000948	0.0001	0.001	NE	J		100486-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100486-002	SW846 6020
	Iron	0.0364	0.033	0.100	NE	J		100486-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100486-002	SW846 6020
	Magnesium	12.3	0.010	0.030	NE			100486-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100486-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100486-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100486-002	SW846 6020
	Potassium	2.00	0.080	0.300	NE			100486-002	SW846 6020
	Selenium	0.00436	0.002	0.005	0.050	J		100486-002	SW846 6020
	Silver	ND	0.0004	0.001	NE	U		100486-002	SW846 6020
	Sodium	19.8	0.080	0.250	NE			100486-002	SW846 6020
	Thallium	ND	0.0006	0.002	0.002	U		100486-002	SW846 6020
	Uranium	0.00163	0.000067	0.0002	0.030			100486-002	SW846 6020
	Vanadium	0.00499	0.0045	0.010	NE	J		100486-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100486-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-5 *(Concluded)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		100411-002	SW846 6020
17-Aug-16	Antimony	ND	0.001	0.003	0.006	U		100411-002	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		100411-002	SW846 6020
	Barium	0.0491	0.0006	0.002	2.00			100411-002	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		100411-002	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		100411-002	SW846 6020
	Calcium	71.8	0.600	2.00	NE			100411-002	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		100411-002	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		100411-002	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		100411-002	SW846 6020
	Iron	ND	0.033	0.100	NE	U		100411-002	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		100411-002	SW846 6020
	Magnesium	12.0	0.010	0.030	NE			100411-002	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		100411-002	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		100411-002	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		100411-002	SW846 6020
	Potassium	2.27	0.080	0.300	NE			100411-002	SW846 6020
	Selenium	ND	0.002	0.005	0.050	U		100411-002	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		100411-002	SW846 6020
	Sodium	24.9	0.080	0.250	NE			100411-002	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		100411-002	SW846 6020
	Uranium	0.00317	0.000067	0.0002	0.030			100411-002	SW846 6020
	Vanadium	0.00694	0.0045	0.010	NE	J		100411-002	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		100411-002	SW846 6020

Refer to footnotes on page 6C-47.

Table 6C-6
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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]
PGS-2	Americium-241	-0.198 ± 7.17	13.1	6.31	NE	U	BD	100416-006	EPA 901.1
19-Aug-16	Cesium-137	1.64 ± 1.57	2.64	1.25	NE	U	BD	100416-006	EPA 901.1
	Cobalt-60	-0.515 ± 1.34	2.37	1.09	NE	U	BD	100416-006	EPA 901.1
	Potassium-40	6.37 ± 38.9	24.1	11.1	NE	U	BD	100416-006	EPA 901.1
	Gross Alpha	1.53	NA	NA	15 pCi/L	NA	None	100416-007	EPA 900.0
	Gross Beta	2.88 ± 0.824	0.922	0.441	4mrem/yr			100416-007	EPA 900.0
	Tritium	2.85 ± 96.3	175	80.6	NE	U	BD	100416-008	EPA 906.0
PGS-2 (Duplicate)	Americium-241	-0.884 ± 5.46	8.97	4.35	NE	U	BD	100417-006	EPA 901.1
19-Aug-16	Cesium-137	-1.27 ± 3.64	3.57	1.72	NE	U	BD	100417-006	EPA 901.1
	Cobalt-60	-0.925 ± 1.46	2.40	1.11	NE	U	BD	100417-006	EPA 901.1
	Potassium-40	39.8 ± 39.4	24.1	11.1	NE	X	R	100417-006	EPA 901.1
	Gross Alpha	2.53	NA	NA	15 pCi/L	NA	None	100417-007	EPA 900.0
	Gross Beta	3.19 ± 0.995	1.27	0.613	4mrem/yr		J	100417-007	EPA 900.0
	Tritium	2.61 ± 96.2	175	80.5	NE	U	BD	100417-008	EPA 906.0
TA1-W-01	Americium-241	2.13 ± 5.23	7.20	3.50	NE	U	BD	100420-006	EPA 901.1
22-Aug-16	Cesium-137	1.59 ± 1.54	2.52	1.20	NE	U	BD	100420-006	EPA 901.1
	Cobalt-60	1.02 ± 1.41	2.58	1.21	NE	U	BD	100420-006	EPA 901.1
	Potassium-40	19.8 ± 39.1	21.9	10.1	NE	U	BD	100420-006	EPA 901.1
	Gross Alpha	3.12	NA	NA	15 pCi/L	NA	None	100420-007	EPA 900.0
	Gross Beta	2.90 ± 1.22	1.74	0.851	4mrem/yr		J	100420-007	EPA 900.0
	Tritium	-104 ± 86.0	176	80.8	NE	U	BD	100420-008	EPA 906.0
TA1-W-02	Americium-241	0.876 ± 5.02	8.11	3.94	NE	U	BD	100404-006	EPA 901.1
15-Aug-16	Cesium-137	0.773 ± 1.62	2.82	1.34	NE	U	BD	100404-006	EPA 901.1
	Cobalt-60	1.91 ± 2.14	3.02	1.40	NE	U	BD	100404-006	EPA 901.1
	Potassium-40	18.7 ± 52.7	26.8	12.3	NE	U	BD	100404-006	EPA 901.1
	Gross Alpha	2.02	NA	NA	15 pCi/L	NA	None	100404-007	EPA 900.0
	Gross Beta	1.50 ± 0.705	0.959	0.459	4mrem/yr		J	100404-007	EPA 900.0
	Tritium	-56.9 ± 88.7	171	79.0	NE	U	BD	100404-008	EPA 906.0
TA1-W-03	Americium-241	-5.29 ± 8.17	12.6	6.16	NE	U	BD	100445-006	EPA 901.1
26-Aug-16	Cesium-137	0.918 ± 1.76	3.17	1.52	NE	U	BD	100445-006	EPA 901.1
	Cobalt-60	1.43 ± 1.79	3.15	1.48	NE	U	BD	100445-006	EPA 901.1
	Potassium-40	10.2 ± 43.9	27.9	13.0	NE	U	BD	100445-006	EPA 901.1
	Gross Alpha	1.89	NA	NA	15 pCi/L	NA	None	100445-007	EPA 900.0
	Gross Beta	9.35 ± 2.64	2.97	1.43	4mrem/yr			100445-007	EPA 900.0
	Tritium	-29.3 ± 91.6	173	79.2	NE	U	BD	100445-008	EPA 906.0

Refer to footnotes on page 6C-47.

Table 6C-6 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-03 (Duplicate)	Gross Alpha	0.09	NA	NA	15 pCi/L	NA	None	100446-007	EPA 900.0
26-Aug-16	Gross Beta	5.18 ± 2.02	2.66	1.26	4mrem/yr		J	100446-007	EPA 900.0
	Tritium	11.3 ± 93.8	169	77.8	NE	U	BD	100446-008	EPA 906.0
TA1-W-04	Americium-241	1.70 ± 2.83	4.20	2.05	NE	U	BD	100409-006	EPA 901.1
16-Aug-16	Cesium-137	-0.617 ± 1.87	3.29	1.56	NE	U	BD	100409-006	EPA 901.1
	Cobalt-60	-0.708 ± 2.03	3.46	1.60	NE	U	BD	100409-006	EPA 901.1
	Potassium-40	-11.3 ± 46.4	47.3	22.3	NE	U	BD	100409-006	EPA 901.1
	Gross Alpha	0.06	NA	NA	15 pCi/L	NA	None	100409-007	EPA 900.0
	Gross Beta	2.29 ± 0.844	1.13	0.542	4mrem/yr		J	100409-007	EPA 900.0
	Tritium	-55.7 ± 89.3	172	79.4	NE	U	BD	100409-008	EPA 906.0
TA1-W-05	Americium-241	2.80 ± 8.18	13.6	6.58	NE	U	BD	100452-006	EPA 901.1
29-Aug-16	Cesium-137	0.747 ± 1.71	2.74	1.30	NE	U	BD	100452-006	EPA 901.1
	Cobalt-60	-0.692 ± 1.61	2.76	1.26	NE	U	BD	100452-006	EPA 901.1
	Potassium-40	8.67 ± 39.1	27.0	12.3	NE	U	BD	100452-006	EPA 901.1
	Gross Alpha	0.28	NA	NA	15 pCi/L	NA	None	100452-007	EPA 900.0
	Gross Beta	2.91 ± 0.870	0.969	0.464	4mrem/yr			100452-007	EPA 900.0
	Tritium	-79.1 ± 86.4	173	79.2	NE	U	BD	100452-008	EPA 906.0
TA1-W-06	Americium-241	4.26 ± 6.73	11.4	5.54	NE	U	BD	100466-006	EPA 901.1
31-Aug-16	Cesium-137	0.00283 ± 1.31	2.32	1.11	NE	U	BD	100466-006	EPA 901.1
	Cobalt-60	0.319 ± 1.41	2.47	1.15	NE	U	BD	100466-006	EPA 901.1
	Potassium-40	23.4 ± 40.7	20.0	9.21	NE	X	R	100466-006	EPA 901.1
	Gross Alpha	0.53	NA	NA	15 pCi/L	NA	None	100466-007	EPA 900.0
	Gross Beta	2.68 ± 1.58	2.48	1.21	4mrem/yr		J	100466-007	EPA 900.0
	Tritium	-18.5 ± 91.7	171	78.5	NE	U	BD	100466-008	EPA 906.0
TA1-W-08	Americium-241	3.38 ± 3.06	4.06	1.98	NE	U	BD	100427-006	EPA 901.1
24-Aug-16	Cesium-137	0.0534 ± 1.81	3.29	1.56	NE	U	BD	100427-006	EPA 901.1
	Cobalt-60	1.53 ± 1.92	3.50	1.62	NE	U	BD	100427-006	EPA 901.1
	Potassium-40	-19.4 ± 44.9	43.2	20.3	NE	U	BD	100427-006	EPA 901.1
	Gross Alpha	-6.97	NA	NA	15 pCi/L	NA	None	100427-007	EPA 900.0
	Gross Beta	2.55 ± 3.06	5.08	2.47	4mrem/yr	U	BD	100427-007	EPA 900.0
	Tritium	-54.7 ± 91.2	176	81.0	NE	U	BD	100427-008	EPA 906.0

Refer to footnotes on page 6C-47.

Table 6C-6 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-NW1-595	Americium-241	-0.131 ± 12.8	19.7	9.56	NE	U	BD	100424-006	EPA 901.1
23-Aug-16	Cesium-137	-0.129 ± 1.59	2.74	1.30	NE	U	BD	100424-006	EPA 901.1
	Cobalt-60	-0.105 ± 1.49	2.71	1.25	NE	U	BD	100424-006	EPA 901.1
	Potassium-40	6.06 ± 29.2	23.2	10.6	NE	U	BD	100424-006	EPA 901.1
	Gross Alpha	0.55	NA	NA	15 pCi/L	NA	None	100424-007	EPA 900.0
	Gross Beta	2.45 ± 1.35	2.05	0.992	4mrem/yr		J	100424-007	EPA 900.0
	Tritium	-13.7 ± 93.5	173	79.5	NE	U	BD	100424-008	EPA 906.0
TA2-NW1-595 (Duplicate)	Americium-241	0.121 ± 9.33	15.1	7.31	NE	U	BD	100425-006	EPA 901.1
23-Aug-16	Cesium-137	0.187 ± 1.46	2.58	1.23	NE	U	BD	100425-006	EPA 901.1
	Cobalt-60	0.706 ± 1.38	2.58	1.20	NE	U	BD	100425-006	EPA 901.1
	Potassium-40	-23.6 ± 38.6	35.8	16.9	NE	U	BD	100425-006	EPA 901.1
	Gross Alpha	-0.27	NA	NA	15 pCi/L	NA	None	100425-007	EPA 900.0
	Gross Beta	2.95 ± 1.43	2.11	1.02	4mrem/yr		J	100425-007	EPA 900.0
	Tritium	-42.2 ± 92.2	176	80.8	NE	U	BD	100425-008	EPA 906.0
TA2-W-01	Americium-241	2.79 ± 9.34	16.0	7.72	NE	U	BD	100471-006	EPA 901.1
12-Sep-16	Cesium-137	0.0769 ± 1.64	2.94	1.39	NE	U	BD	100471-006	EPA 901.1
	Cobalt-60	-0.848 ± 1.39	2.35	1.05	NE	U	BD	100471-006	EPA 901.1
	Potassium-40	-41 ± 39.1	39.1	18.3	NE	U	BD	100471-006	EPA 901.1
	Gross Alpha	-1.02	NA	NA	15 pCi/L	NA	None	100471-007	EPA 900.0
	Gross Beta	3.43 ± 0.993	1.21	0.588	4mrem/yr		J	100471-007	EPA 900.0
	Tritium	-81.4 ± 78.3	159	72.8	NE	U	BD	100471-008	EPA 906.0
TA2-W-19	Americium-241	8.95 ± 8.59	13.6	6.61	NE	U	BD	100477-006	EPA 901.1
15-Sep-16	Cesium-137	0.594 ± 1.58	2.84	1.35	NE	U	BD	100477-006	EPA 901.1
	Cobalt-60	0.197 ± 1.60	2.82	1.31	NE	U	BD	100477-006	EPA 901.1
	Potassium-40	4.01 ± 37.3	44.0	21.0	NE	U	BD	100477-006	EPA 901.1
	Gross Alpha	1.24	NA	NA	15 pCi/L	NA	None	100477-007	EPA 900.0
	Gross Beta	1.59 ± 0.781	1.14	0.553	4mrem/yr		J	100477-007	EPA 900.0
	Tritium	-73 ± 80.1	161	73.6	NE	U	BD	100477-008	EPA 906.0
TA2-W-26	Americium-241	0.940 ± 9.96	15.7	7.59	NE	U	BD	100475-006	EPA 901.1
14-Sep-16	Cesium-137	-0.167 ± 2.97	3.77	1.81	NE	U	BD	100475-006	EPA 901.1
	Cobalt-60	0.579 ± 1.61	2.96	1.37	NE	U	BD	100475-006	EPA 901.1
	Potassium-40	-11.2 ± 33.6	40.0	18.9	NE	U	BD	100475-006	EPA 901.1
	Gross Alpha	1.80	NA	NA	15 pCi/L	NA	None	100475-007	EPA 900.0
	Gross Beta	2.17 ± 1.95	3.16	1.54	4mrem/yr	U	BD	100475-007	EPA 900.0
	Tritium	-108 ± 78.0	165	75.3	NE	U	BD	100475-008	EPA 906.0

Refer to footnotes on page 6C-47.

Table 6C-6 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-27	Americium-241	7.62 ± 6.67	9.35	4.56	NE	U	BD	100469-006	EPA 901.1
08-Sep-16	Cesium-137	-1.38 ± 1.76	2.69	1.28	NE	U	BD	100469-006	EPA 901.1
	Cobalt-60	2.78 ± 2.12	3.01	1.40	NE	U	BD	100469-006	EPA 901.1
	Potassium-40	-27.5 ± 33.7	40.0	19.0	NE	U	BD	100469-006	EPA 901.1
	Gross Alpha	-0.54	NA	NA	15 pCi/L	NA	None	100469-007	EPA 900.0
	Gross Beta	1.66 ± 1.26	2.00	0.971	4mrem/yr	U	BD	100469-007	EPA 900.0
	Tritium	-16.5 ± 84.9	159	72.6	NE	U	BD	100469-008	EPA 906.0
TA2-W-28	Americium-241	2.54 ± 5.58	8.70	4.22	NE	U	BD	100484-006	EPA 901.1
20-Sep-16	Cesium-137	-0.349 ± 1.62	2.76	1.31	NE	U	BD	100484-006	EPA 901.1
	Cobalt-60	0.0941 ± 1.42	2.64	1.21	NE	U	BD	100484-006	EPA 901.1
	Potassium-40	33.3 ± 41.1	25.1	11.5	NE	X	R	100484-006	EPA 901.1
	Gross Alpha	1.29	NA	NA	15 pCi/L	NA	None	100484-007	EPA 900.0
	Gross Beta	3.09 ± 1.12	1.47	0.703	4mrem/yr		J	100484-007	EPA 900.0
	Tritium	-110 ± 106	193	92.9	NE	U	BD	100484-008	EPA 906.0
TJA-2	Americium-241	-4.71 ± 9.91	14.5	7.04	NE	U	BD	100479-006	EPA 901.1
19-Sep-16	Cesium-137	2.60 ± 2.67	3.65	1.74	NE	U	BD	100479-006	EPA 901.1
	Cobalt-60	0.984 ± 1.84	3.36	1.56	NE	U	BD	100479-006	EPA 901.1
	Potassium-40	-27 ± 40.8	45.6	21.6	NE	U	BD	100479-006	EPA 901.1
	Gross Alpha	-0.27	NA	NA	15 pCi/L	NA	None	100479-007	EPA 900.0
	Gross Beta	1.61 ± 1.45	2.36	1.15	4mrem/yr	U	BD	100479-007	EPA 900.0
	Tritium	-133 ± 111	203	97.6	NE	U	BD	100479-008	EPA 906.0
TJA-3	Americium-241	4.40 ± 6.81	11.1	5.39	NE	U	BD	100473-006	EPA 901.1
13-Sep-16	Cesium-137	0.000241 ± 3.65	4.18	2.01	NE	U	BD	100473-006	EPA 901.1
	Cobalt-60	0.800 ± 1.61	3.03	1.40	NE	U	BD	100473-006	EPA 901.1
	Potassium-40	-27.9 ± 36.9	40.8	19.2	NE	U	BD	100473-006	EPA 901.1
	Gross Alpha	1.22	NA	NA	15 pCi/L	NA	None	100473-007	EPA 900.0
	Gross Beta	1.39 ± 0.681	0.986	0.473	4mrem/yr		J	100473-007	EPA 900.0
	Tritium	-52.3 ± 82.9	162	74.1	NE	U	BD	100473-008	EPA 906.0
TJA-4	Americium-241	3.94 ± 9.54	14.6	7.11	NE	U	BD	100488-006	EPA 901.1
22-Sep-16	Cesium-137	-0.0438 ± 1.98	3.58	1.71	NE	U	BD	100488-006	EPA 901.1
	Cobalt-60	0.372 ± 1.82	3.29	1.53	NE	U	BD	100488-006	EPA 901.1
	Potassium-40	-14 ± 36.8	39.9	18.8	NE	U	BD	100488-006	EPA 901.1
	Gross Alpha	1.99	NA	NA	15 pCi/L	NA	None	100488-007	EPA 900.0
	Gross Beta	2.28 ± 0.86	1.07	0.507	4mrem/yr		J	100488-007	EPA 900.0
	Tritium	18.8 ± 113	196	94.5	NE	U	BD	100488-008	EPA 906.0

Refer to footnotes on page 6C-47.

Table 6C-6 *(Concluded)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

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]
TJA-6	Americium-241	-2.54 ± 6.13	9.48	4.60	NE	U	BD	100462-006	EPA 901.1
30-Aug-16	Cesium-137	-0.552 ± 1.48	2.46	1.16	NE	U	BD	100462-006	EPA 901.1
	Cobalt-60	0.324 ± 1.73	2.79	1.29	NE	U	BD	100462-006	EPA 901.1
	Potassium-40	-30.6 ± 42.4	42.6	20.3	NE	U	BD	100462-006	EPA 901.1
	Gross Alpha	0.17	NA	NA	15 pCi/L	NA	None	100462-007	EPA 900.0
	Gross Beta	2.22 ± 1.39	2.15	1.05	4mrem/yr		J	100462-007	EPA 900.0
	Tritium	-58.6 ± 87.3	170	78.1	NE	U	BD	100462-008	EPA 906.0
TJA-7	Americium-241	-9.77 ± 13.1	21.2	10.2	NE	U	BD	100486-006	EPA 901.1
21-Sep-16	Cesium-137	1.50 ± 2.07	3.32	1.56	NE	U	BD	100486-006	EPA 901.1
	Cobalt-60	2.69 ± 3.16	3.53	1.62	NE	U	BD	100486-006	EPA 901.1
	Potassium-40	30.3 ± 52.5	34.2	15.7	NE	U	BD	100486-006	EPA 901.1
	Gross Alpha	2.93	NA	NA	15 pCi/L	NA	None	100486-007	EPA 900.0
	Gross Beta	1.91 ± 0.659	0.798	0.379	4mrem/yr		J	100486-007	EPA 900.0
	Tritium	-42.8 ± 114	202	97.4	NE	U	BD	100486-008	EPA 906.0
WYO-3	Americium-241	4.41 ± 14.1	22.3	10.8	NE	U	BD	100411-006	EPA 901.1
17-Aug-16	Cesium-137	-1.61 ± 2.79	3.04	1.44	NE	U	BD	100411-006	EPA 901.1
	Cobalt-60	0.238 ± 1.82	3.37	1.56	NE	U	BD	100411-006	EPA 901.1
	Potassium-40	6.73 ± 41.9	46.3	21.9	NE	U	BD	100411-006	EPA 901.1
	Gross Alpha	2.13	NA	NA	15 pCi/L	NA	None	100411-007	EPA 900.0
	Gross Beta	2.71 ± 0.904	1.19	0.574	4mrem/yr		J	100411-007	EPA 900.0
	Tritium	-63.1 ± 89.7	175	80.3	NE	U	BD	100411-008	EPA 906.0

Refer to footnotes on page 6C-47.

Table 6C-7
Summary of Field Water Quality Measurements[h],
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% SAT)	Dissolved Oxygen (mg/L)
TA1-W-06	10-Mar-16	17.26	746.9	315.6	7.75	0.45	81.9	7.84
TA2-W-01	08-Mar-16	19.41	579.6	301.7	7.77	0.20	85.2	7.81
TA2-W-19	15-Mar-16	18.64	517.8	314.3	7.73	0.39	90.5	8.45
TA2-W-26	14-Mar-16	17.00	1236.9	309.8	7.62	0.82	82.3	7.93
TA2-W-27	09-Mar-16	18.66	719.8	294.5	7.71	0.41	90.2	8.40
TA2-W-28	17-Mar-16	18.50	450.8	334.6	7.89	0.97	79.4	7.42
TJA-2	16-Mar-16	17.35	512.6	303.9	7.72	0.44	87.7	8.43
TJA-3	07-Mar-16	18.44	448.3	198.1	7.60	0.13	76.8	7.16
TJA-4	22-Mar-16	17.85	498.1	334.1	7.62	0.19	58.1	5.50
TJA-6	03-Mar-16	20.51	436.6	275.5	7.65	1.14	63.9	5.73
TJA-7	23-Mar-16	17.12	450.1	313.2	7.71	1.20	82.9	7.98
TA2-W-19	07-Jun-16	21.50	551.0	359.3	7.46	0.36	96.8	8.56
TA2-W-26	06-Jun-16	20.70	1341.6	367.9	7.32	0.99	85.1	7.59
TA2-W-28	09-Jun-16	21.27	472.9	379.3	7.63	1.38	80.9	7.17
TJA-2	08-Jun-16	20.82	551.2	372.3	7.41	0.56	90.9	8.12
TJA-3	02-Jun-16	20.91	474.4	307.9	7.27	0.17	77.3	6.88
TJA-4	15-Jun-16	20.98	529.7	298.4	7.45	0.23	59.1	5.27
TJA-7	14-Jun-16	21.32	495.4	351.6	7.33	2.55	87.9	7.76
PGS-2	19-Aug-16	20.51	475.5	192.5	8.19	19.6	29.7	2.67
TA1-W-01	22-Aug-16	21.80	460.5	213.6	7.87	0.71	72.1	6.31
TA1-W-02	15-Aug-16	22.20	453.2	189.6	7.81	1.28	60.5	5.30
TA1-W-03	26-Aug-16	20.77	1473.1	174.1	7.91	19.5	123.4	10.95
TA1-W-04	16-Aug-16	20.45	430.0	197.7	7.82	0.28	69.3	6.23
TA1-W-05	29-Aug-16	20.57	514.2	229.1	7.75	0.20	84.7	7.59
TA1-W-06	31-Aug-16	19.53	736.8	250.8	8.03	0.64	83.6	7.65
TA1-W-08	24-Aug-16	18.86	1665.3	236.0	7.81	0.44	81.2	7.51
TA2-NW1-595	23-Aug-16	20.99	653.3	244.9	7.84	0.17	90.6	8.06
TA2-W-01	12-Sep-16	21.06	565.1	246.9	7.96	2.16	85.9	7.63
TA2-W-19	15-Sep-16	20.32	502.6	245.6	8.07	0.38	94.6	8.54
TA2-W-26	14-Sep-16	19.74	1250.0	251.3	7.87	0.93	84.9	7.69
TA2-W-27	08-Sep-16	19.07	678.4	231.6	8.03	0.54	89.8	8.30

Refer to footnotes on page 6C-47.

Table 6C-7 *(Concluded)*
Summary of Field Water Quality Measurements[h],
Tijeras Arroyo Groundwater, Sandia National Laboratories/New Mexico

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% SAT)	Dissolved Oxygen (mg/L)
TA2-W-28	20-Sep-16	19.74	426.1	255.4	8.19	3.49	82.3	7.51
TJA-2	19-Sep-16	19.03	498.4	249.9	7.96	0.40	90.6	8.34
TJA-3	13-Sep-16	21.55	451.2	249.5	7.92	0.18	79.8	7.03
TJA-4	22-Sep-16	20.43	492.7	231.9	8.08	0.23	57.8	5.19
TJA-6	30-Aug-16	20.80	413.1	230.7	7.99	0.94	65.9	5.83
TJA-7	21-Sep-16	19.64	447.0	234.2	8.07	1.01	87.1	7.96
WYO-3	17-Aug-16	22.23	459.9	239.1	8.03	0.31	83.3	7.24
TA2-W-19	12-Dec-16	18.49	536.4	281.8	7.79	0.40	98.9	9.25
TA2-W-26	02-Dec-16	16.07	1276.9	278.9	7.62	1.57	78.4	7.71
TA2-W-28	13-Dec-16	18.05	457.4	282.0	7.93	1.81	80.7	7.62
TJA-2	14-Dec-16	16.70	522.1	290.7	7.76	0.48	86.5	8.39
TJA-3	01-Dec-16	18.82	472.0	279.0	7.64	0.54	69.1	6.41
TJA-4	19-Dec-16	17.09	507.1	278.3	7.70	0.23	56.1	5.41
TJA-7	15-Dec-16	18.65	484.2	265.1	7.76	0.62	84.9	7.91

Refer to footnotes on page 6C-47.

Footnotes for Tijeras Arroyo 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.

[a]Result

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 exceeds 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 Tables 6C-1 through 6C-5. MDA applies to Table 6C-6.

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 through 6C-5. Critical Level applies to Table 6C-6.

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

MAC = Maximum Allowable Concentration. MACs were established by the New Mexico Water Quality Control Commission (NMWQCC September 2004).

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards (EPA May 2009).

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]Lab 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 = Data rejected due to peak not meeting identification criteria.

[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 value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method

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SM = Standard Method.

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.
% sat = Percent saturation.
μmhos/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

6D-1 Nitrate plus Nitrite Concentrations, TA2-W-19 ..... 6D-5

6D-2 Nitrate plus Nitrite Concentrations, TA2-SW1-320 and TA2-W-28 ..... 6D-6

6D-3 Nitrate plus Nitrite Concentrations, TJA-2 ..... 6D-7

6D-4 Nitrate plus Nitrite Concentrations, TJA-7 ..... 6D-8

6D-5 Nitrate plus Nitrite Concentrations, TJA-4 ..... 6D-9

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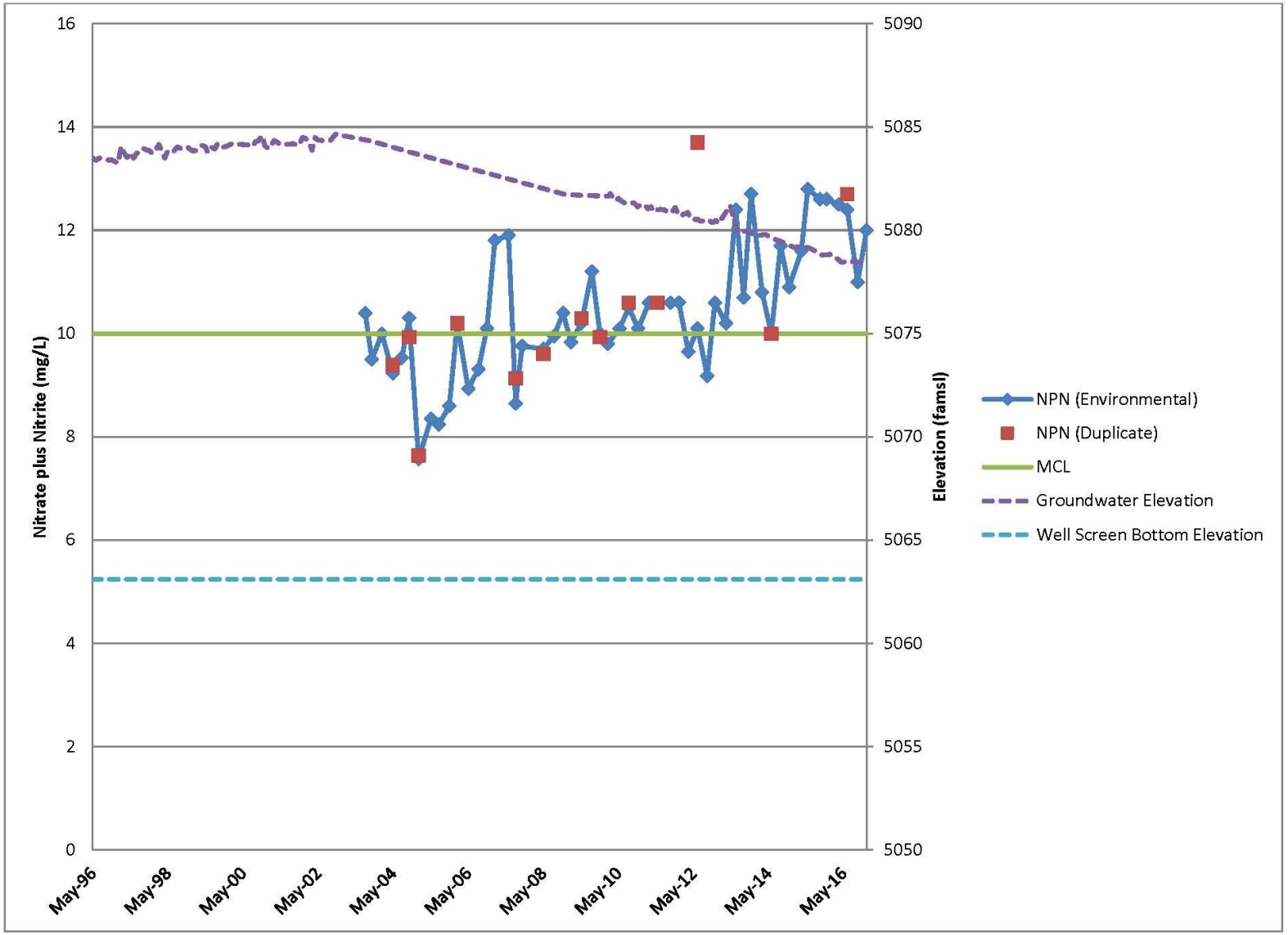

Figure 6D-1. Nitrate plus Nitrite Concentrations, TA2-W-19

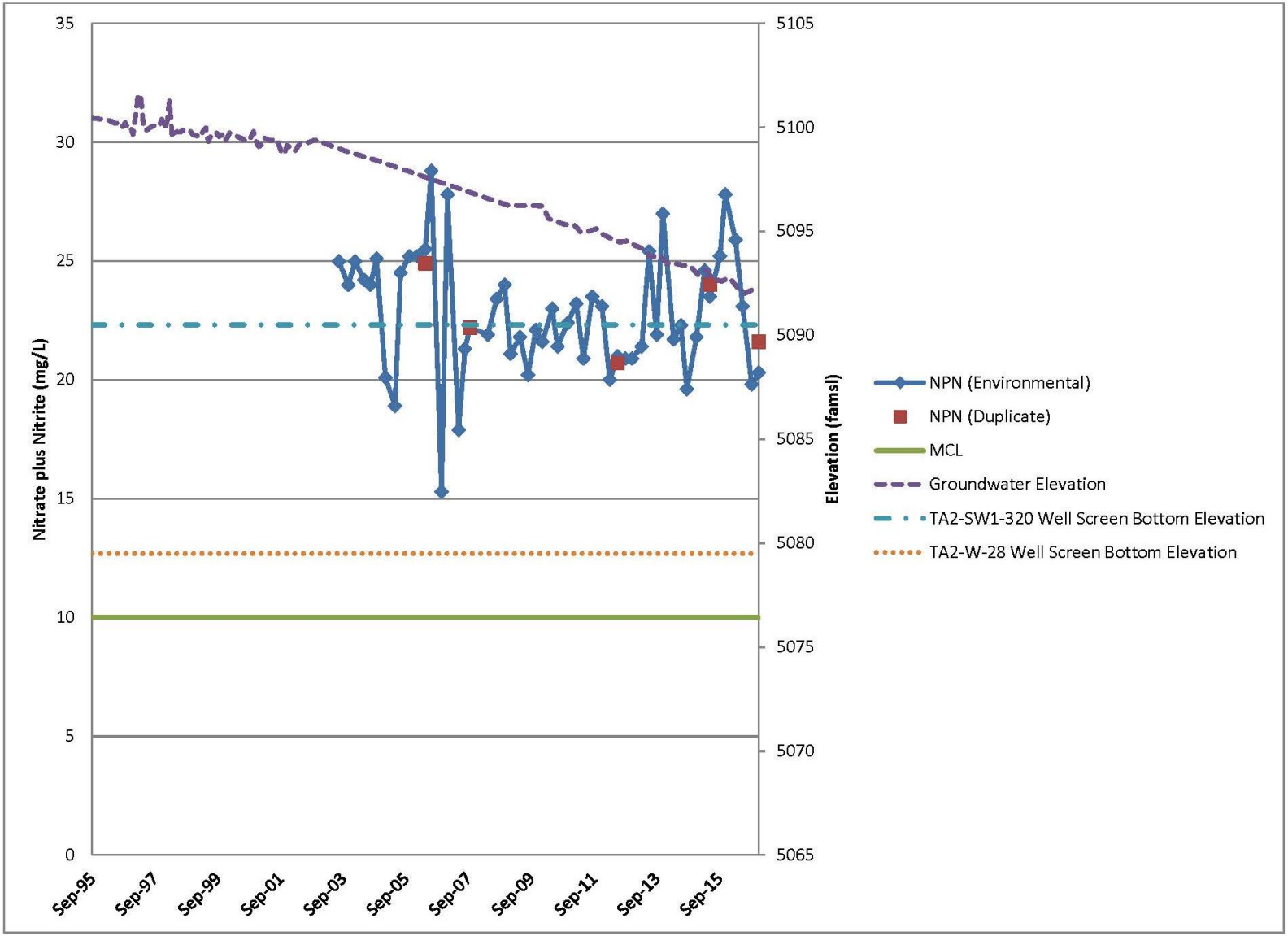

Figure 6D-2. Nitrate plus Nitrite Concentrations, TA2-SW1-320 and TA2-W-28

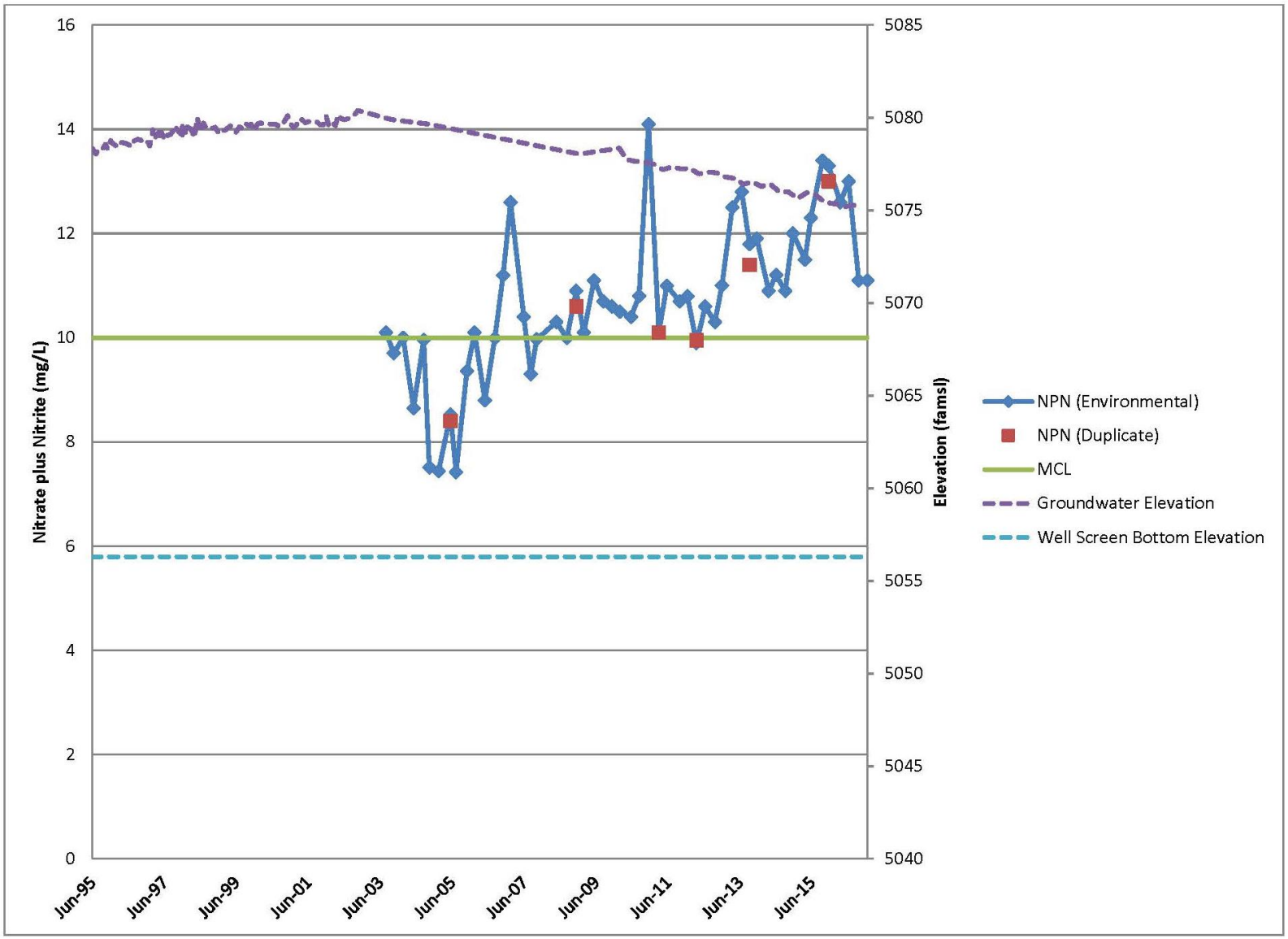

Figure 6D-3. Nitrate plus Nitrite Concentrations, TJA-2

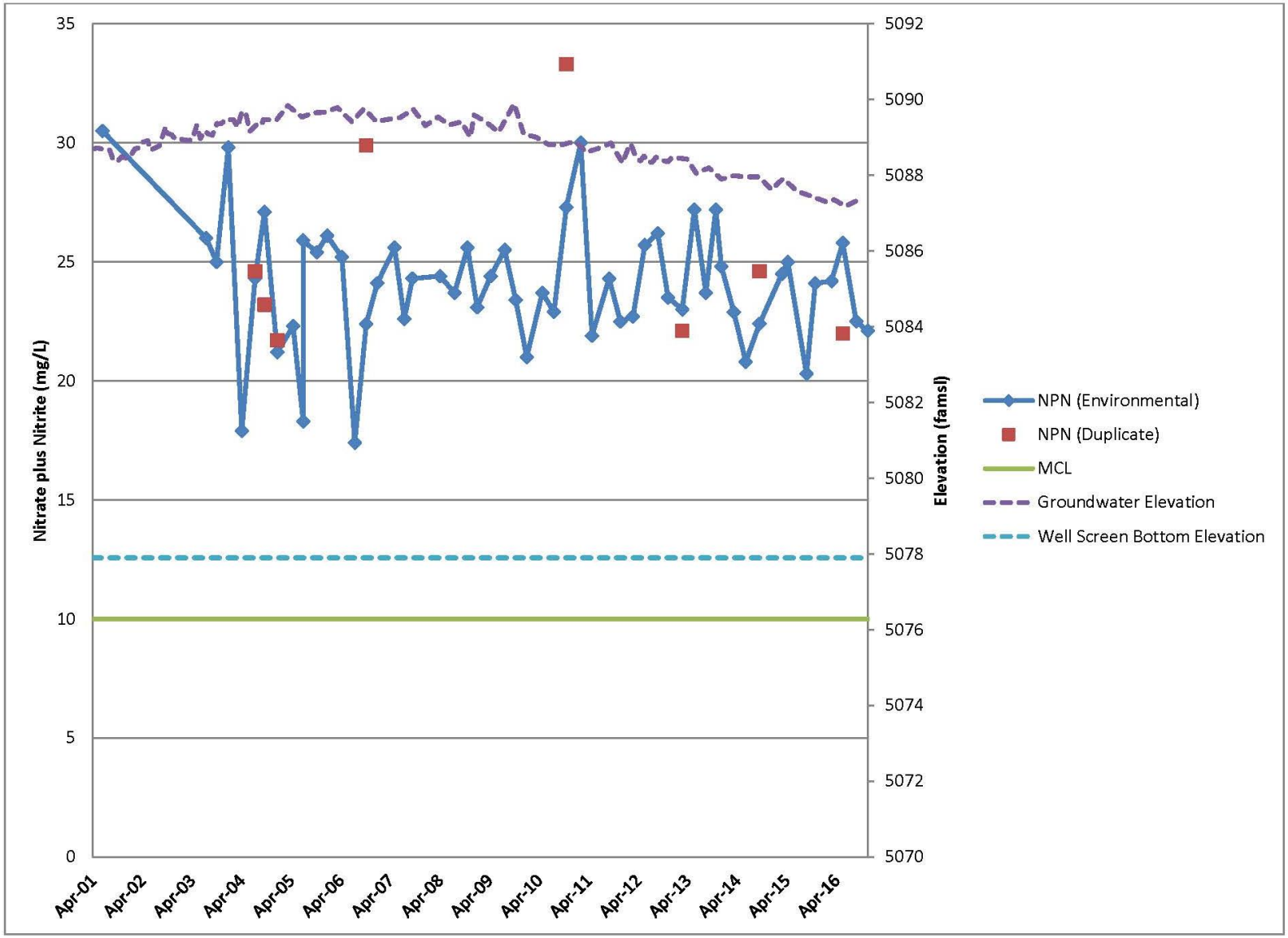

Figure 6D-4. Nitrate plus Nitrite Concentrations, TJA-7

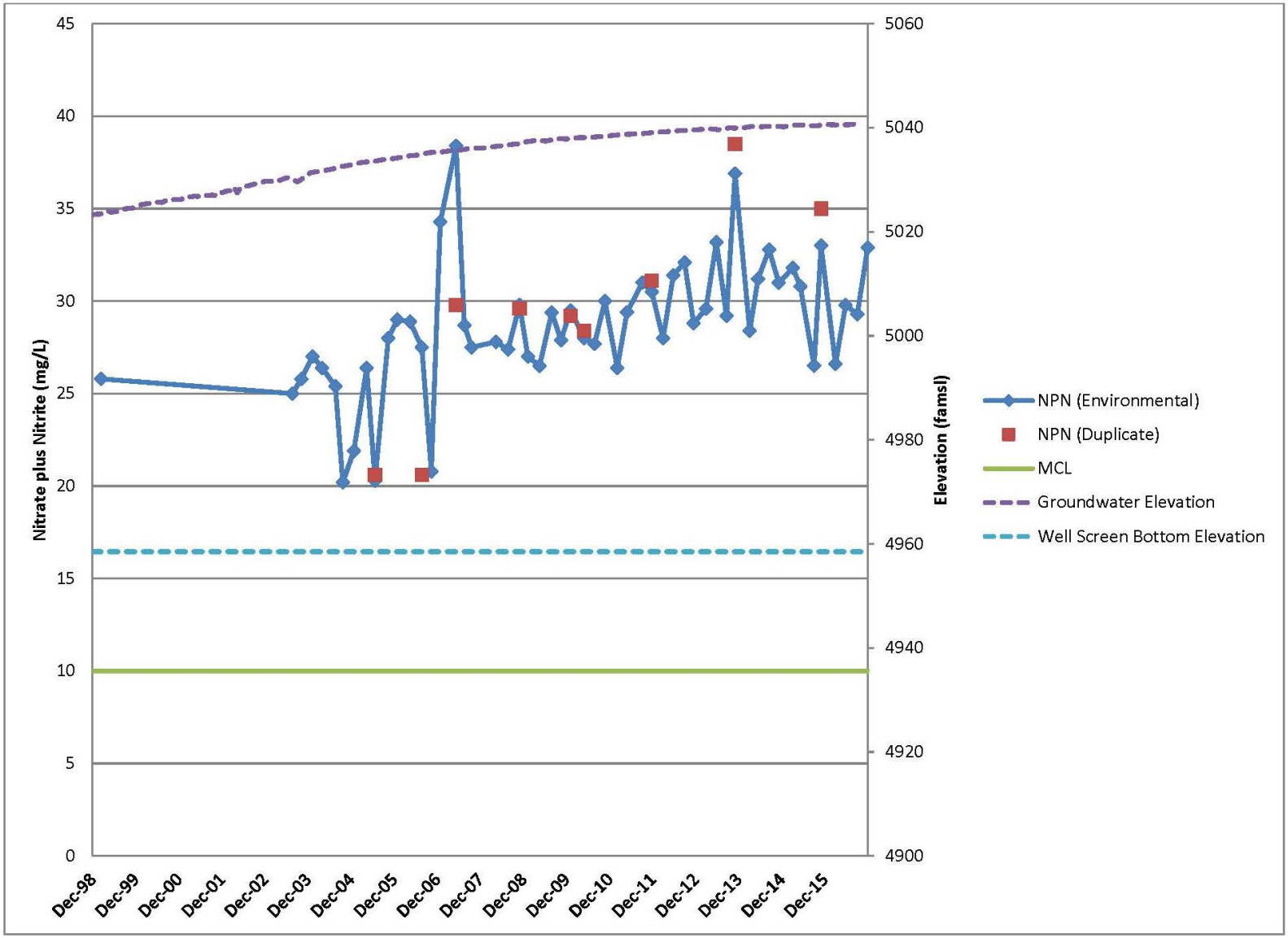

Figure 6D-5. Nitrate plus Nitrite Concentrations, TJA-4

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Tijeras Arroyo Groundwater References

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7.0 Burn Site Groundwater Area of Concern

7.1 Introduction

Unique features of the Burn Site Groundwater (BSG) Area of Concern (AOC), located in the Manzanita Mountains (Figure 7-1), include 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 41.9 milligrams per liter (mg/L). The EPA MCL and State of New Mexico drinking water standard for nitrate is 10 mg/L (as nitrogen).

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/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 located 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. The majority 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 occurred between 1967 and 1975 and was completely phased out by the 1980s.

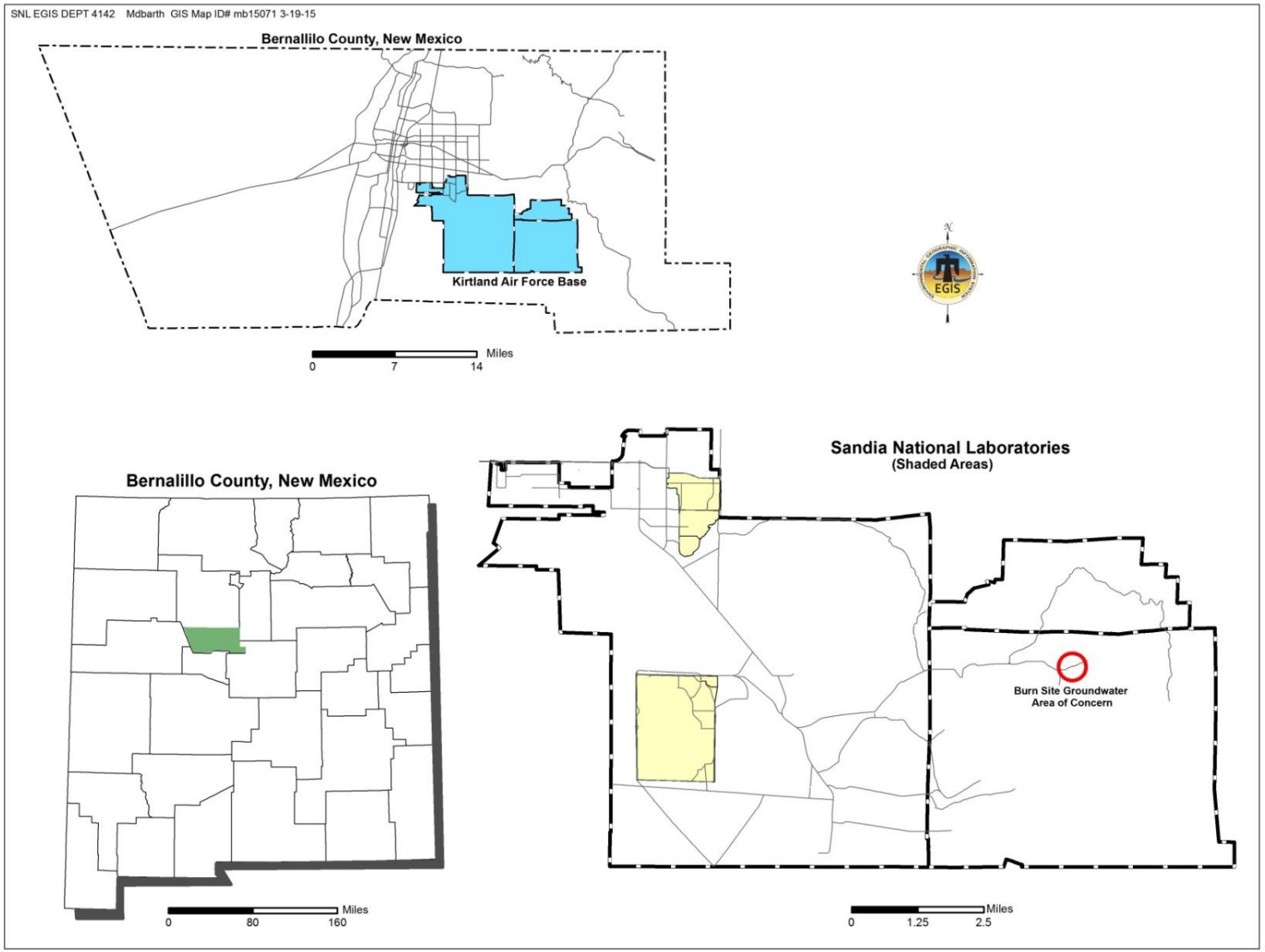

Figure 7-1. Location of the Burn Site Groundwater Area of Concern

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, JP-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 nonpotable production well used for fire suppression) contained elevated concentrations of nitrate (maximum of 27 mg/L in August 1996). In 1997, the NMED, 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 MCL. Two more monitoring wells, CYN-MW3 and CYN-MW4, were installed between 1999 and 2001 to further characterize the study area. Based on regulatory requirements, monitoring wells CYN-MW6, CYN-MW7, and CYN-MW8 were installed in 2006. Figure 7-2 shows the current BSG AOC groundwater monitoring network.

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		√	Nonpotable 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, replacement for CYN-MW6

NOTES:
Check marks in the WQ and WL columns indicate WQ sampling and WL measurements were obtained during this reporting period.
CYN = Canyons.
MW = Monitoring well.
WL = Water level.
WQ = Water quality.

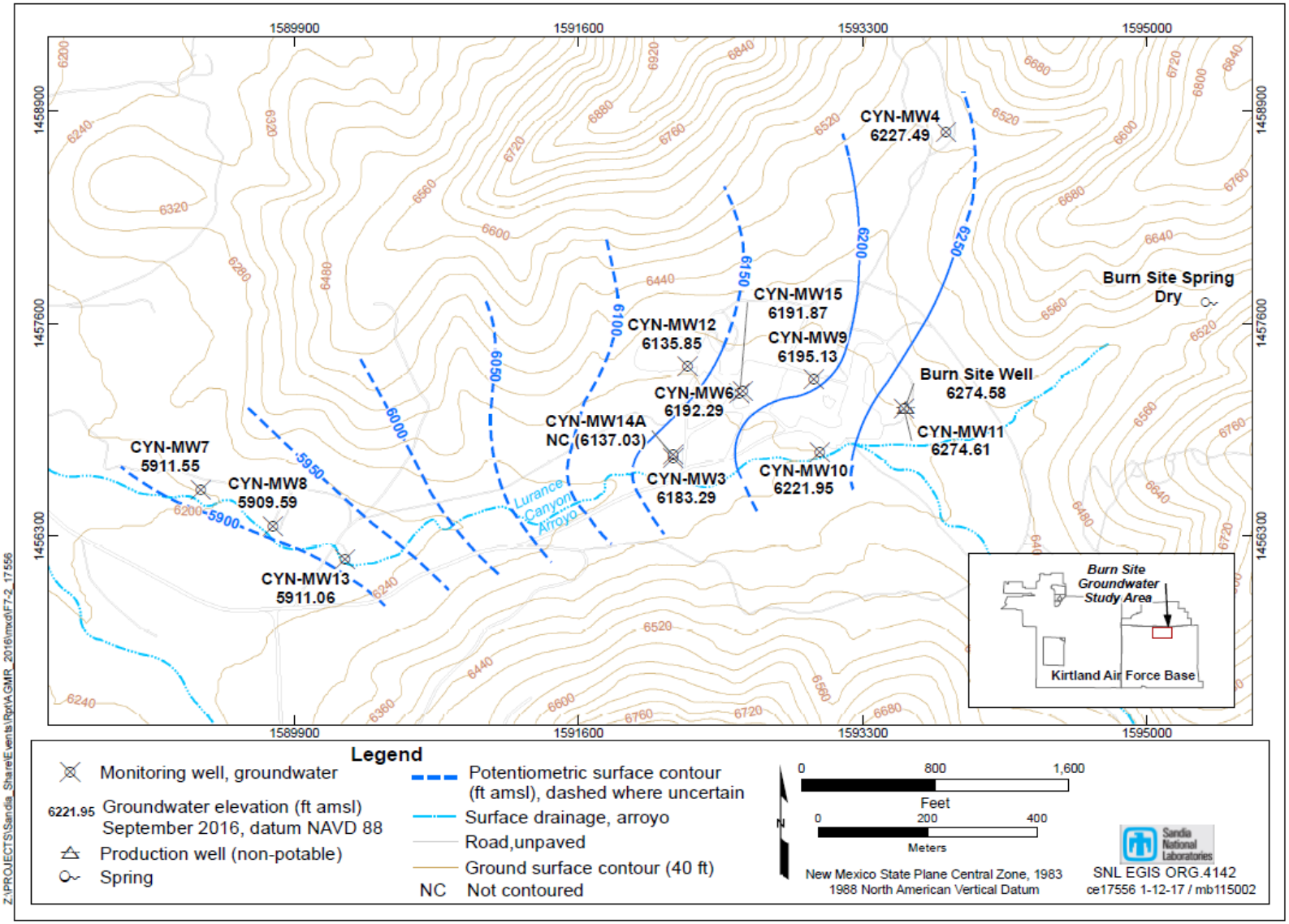

Figure 7-2. Localized Potentiometric Surface of the Burn Site Groundwater Area of Concern (September 2016)

Previous monitoring reports include analytical results for monitoring well CYN-MW5. Groundwater monitoring well CYN-MW5 was installed in 2001 as part of the investigation of Drain and Septic System (DSS) sites. This monitoring well was sampled for eight quarters as part of the DSS 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 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). The BSG Conceptual Site Model provides a comprehensive list of groundwater monitoring data sources used to support the summary of investigations.

In April 2004, the Consent Order became effective, and the Consent Order specifies 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), diesel range organics (DRO), and other parameters. Groundwater monitoring programs have continued as outlined in the IMWP.

Based on a letter received from the NMED (NMED April 2009), DOE/NNSA and SNL/NM personnel are 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 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 new wells were sampled for the first time in September 2010.

In February 2012, a work plan was submitted 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 had been 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. 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.

In August 2013, DOE/NNSA submitted an Extension Request to the NMED for the Burn Site Groundwater CME Report to March 31, 2013 (DOE August 2013). DOE/NNSA requested the extension for consideration of recently collected groundwater sample analytical results from replacement well CYN-MW13 that could impact the 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 2013b), 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 two nearby boreholes. A deeper-than-planned well, CYN-MW14A, was installed near CYN-MW3. The replacement well CYN-MW15 was installed as planned near well CYN-MW6.

7.1.4 Current Monitoring Network

Currently 12 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, and CYN-MW15 (Figure 7-2). However, monitoring well CYN-MW3 was dry, and CYN-MW6 did not produce adequate water volume during both Calendar Year (CY) 2016 sampling events.

7.1.5 Summary of Calendar Year 2016 Activities

The following activities were performed for the BSG AOC during CY 2016:

- 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 2016.
- Prepared tables of analytical results (Attachment 7B), concentration versus time graphs (Attachment 7C), and hydrographs (Attachment 7D) in support of this report.
- Submitted the Aquifer Pumping Test Work Plan to the NMED (SNL June 2016a) and approved by the NMED (NMED June 2016).

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 Formation and Madera Group. 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*.

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, 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 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 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 faults that are mostly downfaulted to the east. 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).

The BSG AOC canyon floor consists of unconsolidated alluvium over bedrock. These deposits typically are sand and gravel derived from erosion of upslope colluvium and bedrock. These alluvial deposits range in thickness from 21 to 55 ft as evidenced in boreholes drilled at the BSG AOC. The alluvial deposits pinch-out nearby along the steep canyon slopes.

7.1.6.2 Hydrogeologic Conditions at the BSG

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 groundwater bearing 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. July and August are typically the wettest months; approximately 55 percent of annual precipitation falls during summer thunderstorms from July to October (National Weather Service 2008). The average annual precipitation in this drainage basin is estimated to range between 12 and 16 inches (SNL April 2008a). 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 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 fairly 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 of these 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 September 2016 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. No water supply 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. Groundwater levels in the Paleozoic and Precambrian bedrock near the BSG AOC are not influenced by water supply 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 apparent horizontal groundwater gradient based on BSG monitoring wells varies from approximately 0.08 to 0.18 feet per foot (ft/ft). Figure 7-2 shows the potentiometric surface, which infers an average horizontal gradient of approximately 0.1 ft/ft in the semiconfined to confined bedrock fracture system. The horizontal gradient west of the BSG AOC flattens substantially (Plate 1).

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 estimated to be approximately 160 feet per year (SNL April 2008a). 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.

Table 7-2. Groundwater Elevations Measured in September 2016 at Monitoring Wells Completed in the Fractured Bedrock System at the Burn Site Groundwater Area of Concern

Well ID	Measurement Point (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Water Elevation (feet amsl)
Burn Site Well	6374.66	30-Sep-2016	100.08	6274.58
CYN-MW3	6313.26	30-Sep-2016	129.97	6183.29
CYN-MW4	6455.48	30-Sep-2016	227.99	6227.49
CYN-MW6	6343.37	30-Sep-2016	151.08	6192.29
CYN-MW7	6216.35	30-Sep-2016	304.80	5911.55
CYN-MW8	6230.11	30-Sep-2016	320.52	5909.59
CYN-MW9	6360.67	30-Sep-2016	165.54	6195.13
CYN-MW10	6345.45	30-Sep-2016	123.50	6221.95
CYN-MW11	6374.41	30-Sep-2016	99.80	6274.61
CYN-MW12	6345.16	30-Sep-2016	209.31	6135.85
CYN-MW13	6237.79	30-Sep-2016	326.73	5911.06
CYN-MW14A	6315.85	30-Sep-2016	178.82	6137.03
CYN-MW15	6344.44	30-Sep-2016	152.57	6191.87

NOTES:
amsl = Above mean sea level.
btoc = Below top of casing.
CYN = Canyons.
ID = Identifier.
MW = Monitoring well.
NAVD 88 = North American Vertical Datum of 1988.
WQ = Water quality.

Water levels have been routinely monitored in BSG monitoring wells since 1999. Figures 7D-1 through 7D-9 (Attachment 7D) show groundwater levels in BSG wells that are completed in bedrock. Until recently, no substantial seasonal variations in water levels were evident 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 BSG monitoring wells in the upper portion of the canyon, most notably at monitoring wells CYN-MW9, CYN-MW10, and CYN-MW11, showed significant increases in groundwater levels in the past two years, apparently in response to intense thunderstorms in the 2014 and 2015 monsoon seasons. Water levels in these three wells rebounded by 14.79 to 19.65 ft between July 2014 and October 2015.

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 1997). 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.

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 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 nitrate. SWMU 94 testing also involved burn tests involving 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 MCL of 10 mg/L in groundwater samples from the Burn Site Well. Nitrate concentrations in groundwater samples from monitoring wells CYN-MW4, CYN-MW7, and CYN-MW8 have not exceeded the MCL. Since the installation of the 10 monitoring wells shown in Table 7-3, nitrate concentrations that exceed the MCL have consistently been detected in groundwater samples. In CY 2016, there were new maximum values of nitrate in monitoring wells CYN-MW12 and CYN-MW15.

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 south-southwest
CYN-MW3	14.7	1,400 ft west
CYN-MW6	39.9	1,000 ft west
CYN-MW9	41.9	600 ft west-northwest
CYN-MW10	21.8	600 ft west-southwest
CYN-MW11	18.5	10 ft south
CYN-MW12	16.9[b]	1,300 ft west-northwest
CYN-MW13	39.5	3,400 ft south-southwest
CYN-MW14A	15.7	1,400 ft west
CYN-MW15	29.8[b]	1,000 ft west

NOTES:
[a]MCL for nitrate is 10 mg/L.
[b]New maximum in CY 2016.
CYN = Canyons.
ft = Feet.
MCL = Maximum Contaminant Level.
mg/L = Milligrams per liter.
MW = Monitoring well.
NPN = Nitrate plus nitrite (as nitrogen).

Potential downgradient receptors for the nitrate plume are Coyote Springs, approximately 3 miles west of the AOC, and the Albuquerque Bernalillo County Water Utility Authority and KAFB well fields, located approximately 7 to 12 miles to the west-northwest of the study area. Numerical simulations suggest nitrate concentrations in groundwater would decrease to below the MCL by the time the nitrate reaches Coyote Springs, and to far below MDLs in the Regional Aquifer through dispersion and dilution as the plume 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 Albuquerque Bernalillo County Water Utility Authority and KAFB well fields (SNL May 2005).

7.2 Regulatory Criteria

The NMED Hazardous Waste Bureau 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 ER SWMUs and AOCs are listed in the *RCRA Facility Operating Permit, NM5890110518* (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 SNL/NM 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 for Sandia National Laboratories/New Mexico Burn Site* was submitted to the NMED. The Current Conceptual Model 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 for Sandia National Laboratories/New Mexico Burn Site* 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 CME Report. The April 2008 CME Work Plan was developed to address the concerns outlined in the 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 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 November 30, 2009 (DOE July 2009). The results of the discussions have been incorporated into the BSG Characterization Work Plan, 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 installed four groundwater monitoring wells 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 requested an additional extension to the delivery date of the Burn Site Groundwater CME Report to March 31, 2016

(DOE January 2014). In June, 2015, NMED approved the DOE/NNSA's proposed extension request (NMED June 2014b).

In this report, 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 plans and reports. The field activities completed during CY 2016 include groundwater monitoring and hydrologic tests (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 presents the water level information used to create the potentiometric surface map and Attachment 7D, Figures 7D-1 through 7D-9 presents the hydrographs.

Table 7-4. Groundwater Monitoring Well Network and Sampling Dates for the Burn Site Groundwater Area of Concern, Calendar Year 2016

Date of Sampling Event	Wells Sampled		SAP
April 2016	CYN-MW4 CYN-MW7 CYN-MW8 CYN-MW9 CYN-MW10	CYN-MW11 CYN-MW12 CYN-MW13 CYN-MW14A CYN-MW15	*Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter Fiscal Year 2016* (SNL March 2016)
October 2016	CYN-MW4 CYN-MW7 CYN-MW8 CYN-MW9 CYN-MW10	CYN-MW11 CYN-MW12 CYN-MW13 CYN-MW14A CYN-MW15	*Burn Site Groundwater Monitoring, Mini-SAP for First Quarter Fiscal Year 2017* (SNL September 2016)

NOTES:
CYN = Canyons.
MW = Monitoring well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.

Table 7-5. Parameters Sampled at Burn Site Groundwater Area of Concern Wells for Each Sampling Event, Calendar Year 2016

Parameter	April 2016	
Alkalinity	CYN-MW4	CYN-MW-12
Ammonia as nitrogen	CYN-MW7	CYN-MW12 (duplicate)
Anions	CYN-MW8	CYN-MW13
Cations	CYN-MW8 (duplicate)	CYN-MW14A
DRO	CYN-MW9	CYN-MW15
Gamma Spectroscopy (short list[a])	CYN-MW10	
GRO	CYN-MW10 (duplicate)	
Gross Alpha/Beta Activity	CYN-MW11	
HE compounds		
Isotopic Uranium		
NPN		
Perchlorate[b]		
TAL Metals		
Total Kjeldahl as nitrogen		
Tritium		
VOCs		
Parameter	**October 2016**	
DRO	CYN-MW4	CYN-MW12
GRO	CYN-MW7	CYN-MW13
NPN	CYN-MW7 (duplicate)	CYN-MW14A
Perchlorate[b]	CYN-MW8	CYN-MW-15
	CYN-MW9	CYN-MW15 (duplicate)
	CYN-MW9 (duplicate)	
	CYN-MW10	
	CYN-MW11	

NOTES:
[a]Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).
[b]Perchlorate analysis performed on samples from monitoring well CYN-MW15 only.
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.

7.5 Analytical Methods

Section 1.3.2 (Tables 1-5 and 1-6) describes all groundwater samples analyzed by the off-site laboratory using EPA-specified protocols.

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 2016 BSG sampling events. Tables 7B-1 through 7B-12 footnotes explain the data qualifiers.

No VOCs or HE compounds were detected. Table 7B-1 lists the MDLs for all analyzed VOCs and Table 7B-2 lists the MDLs for all analyzed HE compounds.

Table 7B-3 presents the analytical results for nitrate plus nitrite (NPN) (reported as nitrogen) and Figure 7-3 presents the BSG AOC NPN concentration contours. NPN results exceed the MCL of 10 mg/L in samples from monitoring wells CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, and CYN-MW15. NPN concentrations in samples from the other BSG monitoring wells are less than the MCL (Table 7B-3). For CY 2016, the NPN concentrations for wells exceeding the MCL are summarized as follows:

- Monitoring well CYN-MW9 had reported concentrations of 38.4 mg/L (April 2016), 31.6 mg/L (October 2016), and 31.3 mg/L (October 2016, environmental duplicate sample). The historical range of NPN concentrations for monitoring well CYN-MW9 is approximately 29 to 42 mg/L with an overall consistent trend with high variability over the life of the well (Figure 7C-1).

- Monitoring well CYN-MW10 had reported concentrations of 21.5 mg/L (April 2016), 21.4 mg/L (April 2016, environmental duplicate sample), and 21.0 mg/L (November 2015). The historical range of NPN concentrations for monitoring well CYN-MW10 is approximately 4 to 22 mg/L with a slightly decreasing trend until June 2014, increasing trend in 2015, and then leveling off in 2016 (Figure 7C-2).

- Monitoring well CYN-MW11 had reported concentrations of 14.4 mg/L (April 2016), and 11.7 mg/L (October 2016). The historical range of NPN concentrations for monitoring well CYN-MW11 is approximately 9 to 18 mg/L with a consistent trend until June 2014, then an increasing trend in 2015, and then decreasing in 2016 (Figure 7C-3).

- Monitoring well CYN-MW12 had reported concentrations of 15.5 mg/L (April 2016), 16.9 mg/L (April 2016, environmental duplicate sample) and 15.8 mg/L (October 2016). The historical range of NPN concentrations for monitoring well CYN-MW12 is approximately 11 to 17 mg/L with an overall consistent trend with high variability over the life of the well (Figure 7C-4).

- Monitoring well CYN-MW13 had reported concentrations of 38.8 mg/L (April 2016) and 35.5 mg/L (October 2016). The historical range of NPN concentrations for monitoring well CYN-MW13 is approximately 34 to 40 mg/L with an overall consistent trend over the life of the well (Figure 7C-5).

- Monitoring well CYN-MW14A had reported concentrations of 13.2 mg/L (April 2016), and 11.6 mg/L (October 2016). The historical range of NPN concentrations for monitoring well CYN-MW14A is approximately 10 to 16 mg/L with a decreasing trend over the life of the well (Figure 7C-6).

- CYN-MW15 had reported concentrations of 29.8 mg/L (April 2016), 21.3 mg/L (October 2016), and 22.1 mg/L (October 2016, environmental duplicate sample). Monitoring well CYN-MW15 replaced well CYN-MW6 in December 2014; Figure 7C-7 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 an overall consistent trend with high variability over the life of the well (Figure 7C-7).

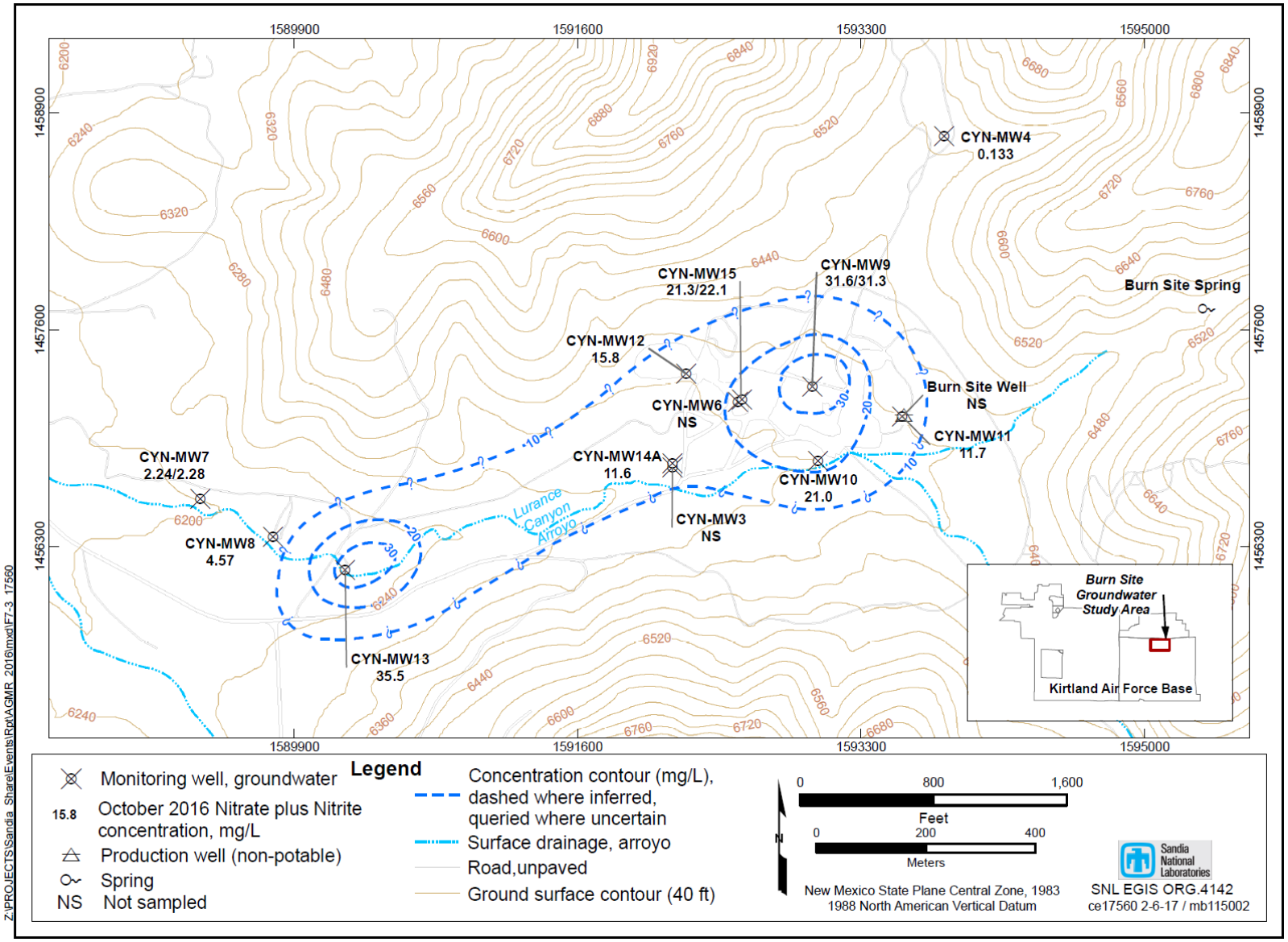

Figure 7-3. Nitrate plus Nitrite Concentration Contour Map for the Burn Site Groundwater Area of Concern, October 2016

Table 7B-4 lists the results for DRO and GRO. No DRO or GRO MCLs have been established for groundwater. No detections of GRO were reported for any of the samples collected during the CY 2016 sampling events. One detection of DRO was reported in the sample collected from monitoring well CYN-MW9 at 68.1 µg/L (April 2016) (Table 7B-4).

Table 7B-5 lists the results for perchlorate. Perchlorate was detected for the first time for a sample and an environmental duplicate sample collected from well CYN-MW15 at 0.00398 to 0.00418 mg/L (October 2016). The analytical results were verified using a different analytical method. No MCL has been established for perchlorate.

Table 7B-6 presents the analytical results for anions. None of the analytes exceed MCLs, where established.

Table 7B-7 presents the analytical results for alkalinity. No MCLs exist for alkalinity parameters.

Table 7B-8 presents the analytical results for ammonia and Total Kjeldahl Nitrogen. No MCLs exist for ammonia and Total Kjeldahl Nitrogen.

Table 7B-9 presents total metal results. No metals exceed established MCLs.

Table 7B-10 presents filtered metal results. No metals exceed established MCLs.

Table 7B-11 presents the results of groundwater samples analyzed for tritium, gross alpha/beta activity, isotopic uranium, and radionuclides by gamma spectroscopy. All radionuclide activity results are below established 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 (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 samples are nonradioactive. Corrected gross alpha activity results are below the MCL of 15 picocuries per liter (pCi/L) for all samples. The original April 2016 results for gross alpha from wells CYN-MW4 and CYN-MW8 did not agree with historical data. SNL/NM personnel requested GEL Laboratories, Inc. reanalyze gross alpha and isotopic uranium. The activities from the reanalysis are reported since the original results were qualified as not usable during validation.

Field water quality parameters are measured during purging of each monitoring well prior to sampling and include temperature, specific conductivity, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. Table 7B-12 presents these parameter measurements obtained immediately prior to sample collection.

7.7 Quality Control Results

Section 1.3 describes 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 2016 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:

- **April 2016 Sampling Events at Monitoring Wells CYN-MW8, CYN-MW10, and CYN-MW12**—The EB samples were collected prior to sampling these wells and analyzed for all parameters. Bromodichloromethane, chloroform, chloride, copper, dibromochloromethane, NPN, and sodium were detected above the laboratory MDLs. No corrective action was necessary, because these analytes were not detected in samples or were detected in samples at concentrations greater than five times the associated EB result.

- **October 2016 Sampling Events at Monitoring Wells CYN-MW7, CYN-MW9, and CYN-MW15**—No DRO, GRO, NPN, or perchlorate were detected in EB samples.

The results of the FB sample analyses are as follows:

- **April 2016 Sampling Event at Monitoring Wells CYN-MW9, CYN-MW11, and CYN-MW15**—Bromodichloromethane, chloroform, and dibromochloromethane were detected above associated laboratory MDLs in all VOC FB samples. No corrective action was required because these compounds were not detected in associated samples. GRO was not detected in any of the FB samples.

- **October 2016 Sampling Event at Monitoring Well CYN-MW15**—GRO was not detected in the FB samples.

The results of the TB sample analyses are as follows:

- **April 2016 Sampling Event**—A total of 13 VOC and 13 GRO TB samples were submitted during this sampling event. No VOCs or GRO were detected above laboratory MDLs in any TB sample.

- **October 2016 Sampling Event**—A total of 13 GRO TB samples were submitted during this sampling event. No GRO was detected above laboratory MDLs in any TB sample.

7.8 Project Field Notes and Comments

No variances or issues from requirements in the Burn Site Groundwater Monitoring mini-SAPs were identified during sampling activities for the April and October 2016 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, the Conceptual Site Model, and plans for studies to be completed during CY 2017 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 nonpotable Burn Site Well.

Monitoring wells were sampled during April and October 2016. The samples were analyzed for VOCs, HE compounds, DRO, GRO, NPN, Target Analyte List metals (plus total uranium), anions, alkalinity, cations, perchlorate, and gross alpha/beta activity, tritium, and radionuclides by gamma spectroscopy.

NPN was the only COC that exceeded a drinking water standard. NPN was detected at concentrations exceeding the MCL of 10 mg/L in samples from seven BSG AOC monitoring wells: CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, and CYN-MW15. The maximum concentration reported in CY 2016 is 38.8 mg/L in the sample collected from monitoring well CYN-MW13 during the April 2016 sampling event.

The analytical results for this reporting period are mostly consistent with historical concentrations. The notable exceptions are new maximum concentrations of nitrate in wells CYN-MW12 and CYN-MW15.

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 2017. At a minimum, the analytes for groundwater sampling per well will consist of nitrate, DRO, and GRO.

- Continue periodic measurements of groundwater elevations in 12 monitoring wells and the Burn Site Well.

- Report future BSG investigation results in the CY 2017 SNL/NM Annual Groundwater Monitoring Report.

- Conduct an Aquifer Pumping Test at BSG AOC wells.

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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 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	1998	Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report containing description of BSG hydrogeology submitted.	SNL February 1998
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 agree 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
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
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

Refer to footnotes on page 7A-5.

Table 7A-1. Historical Timeline of the Burn Site Groundwater Area of Concern
(Continued)

Month	Year	Event	Reference
February	2005	NMED requires 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 sends an RSI for the Interim Measures Work Plan.	NMED July 2005
August	2005	Response for RSI is submitted to NMED.	SNL August 2005
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
April	2008	BSG CCM resubmitted.	SNL April 2008a
April	2008	BSG CME Work Plan resubmitted.	SNL April 2008b
March	2008	GWPP Fiscal Year 2007 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2008
April	2009	NMED requires supplemental characterization of soil and groundwater in the BSG AOC.	NMED April 2009
November	2009	BSG Characterization Work Plan submitted.	SNL November 2009
June	2009	GWPP Calendar Year 2008 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL June 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, BSG.	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

Refer to footnotes on page 7A-5.

Table 7A-1. Historical Timeline of the Burn Site Groundwater Area of Concern
(Concluded)

Month	Year	Event	Reference
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	DOE/NNSA submitted an Extension Request to the NMED for the Burn Site Groundwater 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 2013a
October	2013	In October 2013, DOE Office of Environmental Management submitted an Internal Remedy Review of the Burn Site Groundwater 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 2013b
January	2014	DOE/NNSA requested an extension to the delivery date of the Burn Site Groundwater 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 Burn Site Groundwater 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
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
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
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

NOTES:

AOC = Area of Concern.
BSG = Burn Site Groundwater.
CAC = Corrective Action Complete.
CCM = Current Conceptual Site 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.

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Attachment 7B
Burn Site Groundwater
Analytical Results Tables

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Attachment 7B Tables

7B-1 Method Detection Limits for Volatile Organic Compounds (EPA Method SW846-8260B), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-5

7B-2 Method Detection Limits for High Explosive Compounds (EPA Method SW846-8321A), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-6

7B-3 Summary of Nitrate plus Nitrite Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-7

7B-4 Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-9

7B-5 Summary of Perchlorate Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-11

7B-6 Summary of Anion Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-12

7B-7 Summary of Alkalinity Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-14

7B-8 Summary of Ammonia and Total Kjeldahl Nitrogen Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-15

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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 2016 ..... 7B-28

7B-12 Summary of Field Water Quality Measurements, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2016 ..... 7B-32

Footnotes for Burn Site Groundwater Analytical Results Tables 7B-33

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Table 7B-1
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	1.00
1,2-Dichloroethane	0.300	Methylcyclohexane	0.300
1,2-Dichloropropane	0.300	Methylene chloride	1.50
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-33.

Table 7B-2
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0808–0.0904
1,3-Dinitrobenzene	0.0808–0.0904
2,4,6-Trinitrotoluene	0.0808–0.0904
2,4-Dinitrotoluene	0.0808–0.0904
2,6-Dinitrotoluene	0.0808–0.0904
2-Amino-4,6-dinitrotoluene	0.0808–0.0904
2-Nitrotoluene	0.0828–0.0927
3-Nitrotoluene	0.0808–0.0904
4-Amino-2,6-dinitrotoluene	0.0808–0.0904
4-Nitrotoluene	0.152–0.169
HMX	0.0808–0.0904
Nitro-benzene	0.0808–0.0904
Pentaerythritol tetranitrate	0.101–0.113
RDX	0.0808–0.0904
Tetryl	0.0808–0.0904

Refer to footnotes on page 7B-33.

Table 7B-3
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 04-Apr-16	Nitrate plus nitrite	0.134	0.017	0.050	10.0			099128-003	EPA 353.2
CYN-MW7 04-Apr-16	Nitrate plus nitrite	2.87	0.085	0.250	10.0			099130-007	EPA 353.2
CYN-MW8 05-Apr-16	Nitrate plus nitrite	6.40	0.085	0.250	10.0			099135-007	EPA 353.2
CYN-MW8 (Duplicate) 05-Apr-16	Nitrate plus nitrite	6.35	0.085	0.250	10.0			099136-007	EPA 353.2
CYN-MW9 07-Apr-16	Nitrate plus nitrite	**38.4**	0.850	2.50	10.0			099154-007	EPA 353.2
CYN-MW10 06-Apr-16	Nitrate plus nitrite	**21.5**	0.850	2.50	10.0			099143-007	EPA 353.2
CYN-MW10 (Duplicate) 06-Apr-16	Nitrate plus nitrite	**21.4**	0.850	2.50	10.0			099144-003	EPA 353.2
CYN-MW11 08-Apr-16	Nitrate plus nitrite	**14.4**	0.850	2.50	10.0			099159-007	EPA 353.2
CYN-MW12 07-Apr-16	Nitrate plus nitrite	**15.5**	0.850	2.50	10.0			099150-007	EPA 353.2
CYN-MW12 (Duplicate) 07-Apr-16	Nitrate plus nitrite	**16.9**	0.850	2.50	10.0			099151-003	EPA 353.2
CYN-MW13 08-Apr-16	Nitrate plus nitrite	**38.8**	0.850	2.50	10.0			099156-007	EPA 353.2
CYN-MW14A 06-Apr-16	Nitrate plus nitrite	**13.2**	0.850	2.50	10.0			099146-007	EPA 353.2
CYN-MW15 05-Apr-16	Nitrate plus nitrite	**29.8**	0.425	1.25	10.0		J	099139-007	EPA 353.2

Refer to footnotes on page 7B-33.

Table 7B-3 *(Concluded)*
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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 03-Oct-16	Nitrate plus nitrite	0.133	0.017	0.050	10.0			100665-003	EPA 353.2
CYN-MW7 12-Oct-16	Nitrate plus nitrite	2.24	0.085	0.250	10.0			100672-003	EPA 353.2
CYN-MW7 (Duplicate) 12-Oct-16	Nitrate plus nitrite	2.28	0.085	0.250	10.0			100673-003	EPA 353.2
CYN-MW8 14-Oct-16	Nitrate plus nitrite	4.57	0.085	0.250	10.0			100688-003	EPA 353.2
CYN-MW9 19-Oct-16	Nitrate plus nitrite	**31.6**	0.850	2.50	10.0			100712-003	EPA 353.2
CYN-MW9 (Duplicate) 19-Oct-16	Nitrate plus nitrite	**31.3**	0.850	2.50	10.0			100713-003	EPA 353.2
CYN-MW10 17-Oct-16	Nitrate plus nitrite	**21.0**	0.425	1.25	10.0			100690-003	EPA 353.2
CYN-MW11 19-Oct-16	Nitrate plus nitrite	**11.7**	0.170	0.500	10.0			100677-003	EPA 353.2
CYN-MW12 03-Oct-16	Nitrate plus nitrite	**15.8**	0.850	2.50	10.0		J	100688-003	EPA 353.2
CYN-MW13 21-Oct-16	Nitrate plus nitrite	**35.5**	0.425	1.25	10.0			100716-003	EPA 353.2
CYN-MW14A 17-Oct-16	Nitrate plus nitrite	**11.6**	0.425	1.25	10.0			100708-003	EPA 353.2
CYN-MW15 21-Oct-16	Nitrate plus nitrite	**21.3**	0.425	1.25	10.0			100705-003	EPA 353.2
CYN-MW15 (Duplicate) 21-Oct-16	Nitrate plus nitrite	**22.1**	0.425	1.25	10.0			100706-003	EPA 353.2

Refer to footnotes on page 7B-33.

Table 7B-4
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW4	Diesel Range Organics	ND	57.5	230	NE	h, U	UJ	099128-002	SW846 8015D
04-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099128-007	SW846 8015A/B
CYN-MW7	Diesel Range Organics	ND	50.0	200	NE	h, U	UJ	099130-002	SW846 8015D
04-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099130-003	SW846 8015A/B
CYN-MW8	Diesel Range Organics	ND	57.5	230	NE	h, U	UJ	099135-002	SW846 8015D
05-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099135-003	SW846 8015A/B
CYN-MW8 (Duplicate)	Diesel Range Organics	ND	53.2	213	NE	h, U	UJ	099136-002	SW846 8015D
05-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099136-003	SW846 8015A/B
CYN-MW9	Diesel Range Organics	68.1	51.5	206	NE	J		099154-002	SW846 8015D
07-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099154-003	SW846 8015A/B
CYN-MW10	Diesel Range Organics	ND	53.2	213	NE	U		099143-002	SW846 8015D
06-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099143-003	SW846 8015A/B
CYN-MW10 (Duplicate)	Diesel Range Organics	ND	51.5	206	NE	U		099144-001	SW846 8015D
06-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099144-002	SW846 8015A/B
CYN-MW11	Diesel Range Organics	ND	53.2	213	NE	U	UJ	099159-002	SW846 8015D
08-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099159-003	SW846 8015A/B
CYN-MW12	Diesel Range Organics	ND	51.5	206	NE	U		099150-002	SW846 8015D
07-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099150-003	SW846 8015A/B
CYN-MW12 (Duplicate)	Diesel Range Organics	ND	53.2	213	NE	U		099151-001	SW846 8015D
07-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099151-002	SW846 8015A/B
CYN-MW13	Diesel Range Organics	ND	49.0	196	NE	U		099156-002	SW846 8015D
08-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099156-003	SW846 8015A/B
CYN-MW14A	Diesel Range Organics	ND	57.5	230	NE	U		099146-002	SW846 8015D
06-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099146-003	SW846 8015A/B
CYN-MW15	Diesel Range Organics	ND	53.2	213	NE	h, U	UJ	099139-002	SW846 8015D
05-Apr-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		099139-003	SW846 8015A/B

Refer to footnotes on page 7B-33.

Table 7B-4 *(Concluded)*
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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-MW4	Diesel Range Organics	ND	52.1	208	NE	U		100665-002	SW846 8015D
03-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100665-001	SW846 8015A/B
CYN-MW7	Diesel Range Organics	ND	51.5	206	NE	U		100672-002	SW846 8015D
12-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100672-001	SW846 8015A/B
CYN-MW7 (Duplicate)	Diesel Range Organics	ND	51.5	206	NE	U		100673-002	SW846 8015D
12-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100673-001	SW846 8015A/B
CYN-MW8	Diesel Range Organics	ND	50.0	200	NE	U		100688-002	SW846 8015D
14-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100688-001	SW846 8015A/B
CYN-MW9	Diesel Range Organics	ND	51.0	204	NE	U		100712-002	SW846 8015D
19-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100712-001	SW846 8015A/B
CYN-MW9 (Duplicate)	Diesel Range Organics	ND	52.6	211	NE	U		100713-002	SW846 8015D
19-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100713-001	SW846 8015A/B
CYN-MW10 17-Oct-16	Diesel Range Organics	ND	50.0	200	NE	U		100690-002	SW846 8015D
CYN-MW10 24-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100805-001	SW846 8015A/B
CYN-MW11	Diesel Range Organics	ND	52.1	208	NE	U		100677-002	SW846 8015D
19-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100677-001	SW846 8015A/B
CYN-MW12	Diesel Range Organics	ND	50.5	202	NE	U		100688-002	SW846 8015D
03-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100688-001	SW846 8015A/B
CYN-MW13	Diesel Range Organics	ND	50.0	200	NE	U		100716-002	SW846 8015D
21-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100716-001	SW846 8015A/B
CYN-MW14A	Diesel Range Organics	ND	51.5	206	NE	U		100708-002	SW846 8015D
17-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100708-001	SW846 8015A/B
CYN-MW15	Diesel Range Organics	ND	54.3	217	NE	U		100705-002	SW846 8015D
21-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100705-001	SW846 8015A/B
CYN-MW15 (Duplicate)	Diesel Range Organics	ND	54.9	220	NE	U		100706-002	SW846 8015D
21-Oct-16	Gasoline Range Organics	ND	16.7	50.0	NE	U		100706-001	SW846 8015A/B

Refer to footnotes on page 7B-33.

Table 7B-5
Summary of Perchlorate Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2015

Well ID	Perchlorate 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-Apr-16	ND	0.004	0.012	NE	U		099139-008	EPA 314.0
CYN-MW15 21-Oct-16	0.00409	0.004	0.012	NE	J		100705-004	EPA 314.0
CYN-MW15 21-Oct-16	0.00398	0.00025	0.001	NE			100705-R04	SW846 6850
CYN-MW15 (Duplicate) 21-Oct-16	0.00418	0.004	0.012	NE	J		100706-004	EPA 314.0
CYN-MW15 (Duplicate) 21-Oct-16	0.00401	0.00025	0.001	NE			100706-R04	SW846 6850

Refer to footnotes on page 7B-33.

Table 7B-6
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.350	0.067	0.200	NE			099128-004	SW846 9056
04-Apr-16	Chloride	23.5	0.670	2.00	NE			099128-004	SW846 9056
	Fluoride	0.740	0.033	0.100	4.0			099128-004	SW846 9056
	Sulfate	132	1.33	4.00	NE			099128-004	SW846 9056
CYN-MW7	Bromide	0.608	0.067	0.200	NE			099130-006	SW846 9056
04-Apr-16	Chloride	40.6	0.670	2.00	NE			099130-006	SW846 9056
	Fluoride	1.25	0.033	0.100	4.0			099130-006	SW846 9056
	Sulfate	83.6	1.33	4.00	NE			099130-006	SW846 9056
CYN-MW8	Bromide	0.756	0.067	0.200	NE			099135-006	SW846 9056
05-Apr-16	Chloride	56.8	0.670	2.00	NE			099135-006	SW846 9056
	Fluoride	1.34	0.033	0.100	4.0			099135-006	SW846 9056
	Sulfate	121	1.33	4.00	NE			099135-006	SW846 9056
CYN-MW9	Bromide	0.500	0.067	0.200	NE			099154-006	SW846 9056
07-Apr-16	Chloride	48.6	1.34	4.00	NE			099154-006	SW846 9056
	Fluoride	0.499	0.033	0.100	4.0			099154-006	SW846 9056
	Sulfate	119	2.66	8.00	NE			099154-006	SW846 9056
CYN-MW10	Bromide	0.725	0.067	0.200	NE			099143-006	SW846 9056
06-Apr-16	Chloride	49.7	1.34	4.00	NE			099143-006	SW846 9056
	Fluoride	0.519	0.033	0.100	4.0			099143-006	SW846 9056
	Sulfate	173	2.66	8.00	NE			099143-006	SW846 9056
CYN-MW11	Bromide	1.06	0.067	0.200	NE			099159-006	SW846 9056
08-Apr-16	Chloride	76.3	1.34	4.00	NE			099159-006	SW846 9056
	Fluoride	0.581	0.033	0.100	4.0			099159-006	SW846 9056
	Sulfate	192	2.66	8.00	NE			099159-006	SW846 9056
CYN-MW12	Bromide	0.899	0.067	0.200	NE			099150-006	SW846 9056
07-Apr-16	Chloride	81.9	1.34	4.00	NE			099150-006	SW846 9056
	Fluoride	0.929	0.033	0.100	4.0			099150-006	SW846 9056
	Sulfate	213	2.66	8.00	NE			099150-006	SW846 9056
CYN-MW13	Bromide	0.321	0.067	0.200	NE			099156-006	SW846 9056
08-Apr-16	Chloride	18.3	0.670	2.00	NE			099156-006	SW846 9056
	Fluoride	1.53	0.033	0.100	4.0			099156-006	SW846 9056
	Sulfate	75.3	1.33	4.00	NE			099156-006	SW846 9056

Refer to footnotes on page 7B-33.

Table 7B-6 *(Concluded)*
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Bromide	0.843	0.067	0.200	NE			099146-006	SW846 9056
06-Apr-16	Chloride	69.9	1.34	4.00	NE			099146-006	SW846 9056
	Fluoride	0.944	0.033	0.100	4.0			099146-006	SW846 9056
	Sulfate	190	2.66	8.00	NE			099146-006	SW846 9056
CYN-MW15	Bromide	1.21	0.067	0.200	NE			099139-006	SW846 9056
05-Apr-16	Chloride	120	1.34	4.00	NE			099139-006	SW846 9056
	Fluoride	0.676	0.033	0.100	4.0			099139-006	SW846 9056
	Sulfate	216	2.66	8.00	NE			099139-006	SW846 9056

Refer to footnotes on page 7B-33.

Table 7B-7
Summary of Alkalinity Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2015

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	158	0.725	1.00	NE			099128-005	SM 2320B
04-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099128-005	SM 2320B
CYN-MW7	Bicarbonate Alkalinity	181	0.725	1.00	NE			099130-008	SM 2320B
04-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099130-008	SM 2320B
CYN-MW8	Bicarbonate Alkalinity	260	0.725	1.00	NE			099135-008	SM 2320B
05-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099135-008	SM 2320B
CYN-MW9	Bicarbonate Alkalinity	298	0.725	1.00	NE			099154-008	SM 2320B
07-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099154-008	SM 2320B
CYN-MW10	Bicarbonate Alkalinity	178	0.725	1.00	NE			099143-008	SM 2320B
06-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099143-008	SM 2320B
CYN-MW11	Bicarbonate Alkalinity	64.9	0.725	1.00	NE			099159-008	SM 2320B
08-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099159-008	SM 2320B
CYN-MW12	Bicarbonate Alkalinity	249	0.725	1.00	NE			099150-008	SM 2320B
07-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099150-008	SM 2320B
CYN-MW13	Bicarbonate Alkalinity	117	0.725	1.00	NE			099156-008	SM 2320B
08-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099156-008	SM 2320B
CYN-MW14A	Bicarbonate Alkalinity	162	0.725	1.00	NE			099146-008	SM 2320B
06-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099146-008	SM 2320B
CYN-MW15	Bicarbonate Alkalinity	294	0.725	1.00	NE			099139-016	SM 2320B
05-Apr-16	Carbonate Alkalinity	ND	0.725	1.00	NE	U		099139-016	SM 2320B

Refer to footnotes on page 7B-33.

Table 7B-8
Summary of Ammonia and Total Kjeldahl Nitrogen Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2015

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	Ammonia as Nitrogen	0.0212	0.017	0.050	NE	*, h, H, J	J-	099128-R10	EPA 350.1
04-Apr-16	Total Kjeldahl Nitrogen	0.0496	0.033	0.100	NE	h, H, J	NJ-	099128-R11	EPA 351.2
CYN-MW7	Ammonia as Nitrogen	0.121	0.017	0.050	NE	*, h, H	J-	099130-R09	EPA 350.1
04-Apr-16	Total Kjeldahl Nitrogen	ND	0.033	0.100	NE	h, H, U	UJ	099130-R10	EPA 351.2
CYN-MW8	Ammonia as Nitrogen	0.062	0.017	0.050	NE	*, h, H	J-	099135-R09	EPA 350.1
05-Apr-16	Total Kjeldahl Nitrogen	ND	0.033	0.100	NE	h, H, U	UJ	099135-R11	EPA 351.2
CYN-MW9	Ammonia as Nitrogen	0.0964	0.017	0.050	NE		J-	099154-009	EPA 350.1
07-Apr-16	Total Kjeldahl Nitrogen	0.105	0.033	0.100	NE	B	0.21UJ	099154-011	EPA 351.2
CYN-MW10	Ammonia as Nitrogen	0.0332	0.017	0.050	NE	J	J-	099143-009	EPA 350.1
06-Apr-16	Total Kjeldahl Nitrogen	0.263	0.033	0.100	NE	B		099143-011	EPA 351.2
CYN-MW11	Ammonia as Nitrogen	0.0237	0.017	0.050	NE	*, h, H, J	J-	099159-R09	EPA 350.1
08-Apr-16	Total Kjeldahl Nitrogen	0.197	0.033	0.100	NE	h, H	NJ-	099159-R11	EPA 351.2
CYN-MW12	Ammonia as Nitrogen	0.0596	0.017	0.050	NE		J-	099150-009	EPA 350.1
07-Apr-16	Total Kjeldahl Nitrogen	0.186	0.033	0.100	NE	B	0.21U	099150-011	EPA 351.2
CYN-MW13	Ammonia as Nitrogen	0.0629	0.017	0.050	NE		J-	099156-009	EPA 350.1
08-Apr-16	Total Kjeldahl Nitrogen	ND	0.165	0.500	NE	U	UJ	099156-011	EPA 351.2
CYN-MW14A	Ammonia as Nitrogen	0.138	0.017	0.050	NE			099146-009	EPA 350.1
06-Apr-16	Total Kjeldahl Nitrogen	0.227	0.033	0.100	NE	B		099146-011	EPA 351.2
CYN-MW15	Ammonia as Nitrogen	ND	0.017	0.050	NE	U	UJ	099139-009	EPA 350.1
05-Apr-16	Total Kjeldahl Nitrogen	0.242	0.033	0.100	NE	B	0.40U	099139-011	EPA 351.2

Refer to footnotes on page 7B-33.

Table 7B-9
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099128-008	SW846 6020
04-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099128-008	SW846 6020
	Arsenic	0.00196	0.0017	0.005	0.010	J		099128-008	SW846 6020
	Barium	0.0431	0.0006	0.002	2.00			099128-008	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099128-008	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099128-008	SW846 6020
	Calcium	67.3	0.600	2.00	NE			099128-008	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099128-008	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099128-008	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		099128-008	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099128-008	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099128-008	SW846 6020
	Magnesium	32.2	0.010	0.030	NE			099128-008	SW846 6020
	Manganese	0.00167	0.001	0.005	NE	J		099128-008	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099128-008	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099128-008	SW846 6020
	Potassium	6.01	0.080	0.300	NE		J	099128-008	SW846 6020
	Selenium	0.0171	0.0015	0.005	0.050			099128-008	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099128-008	SW846 6020
	Sodium	42.2	0.080	0.250	NE			099128-008	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099128-008	SW846 6020
	Vanadium	0.00908	0.0045	0.010	NE	B, J	0.037U	099128-008	SW846 6020
	Zinc	0.00545	0.0035	0.010	NE	J		099128-008	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099130-004	SW846 6020
04-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099130-004	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		099130-004	SW846 6020
	Barium	0.114	0.0006	0.002	2.00			099130-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099130-004	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099130-004	SW846 6020
	Calcium	106	0.600	2.00	NE			099130-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099130-004	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099130-004	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	099130-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099130-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099130-004	SW846 6020
	Magnesium	21.0	0.010	0.030	NE			099130-004	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099130-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099130-004	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099130-004	SW846 6020
	Potassium	2.63	0.080	0.300	NE		J	099130-004	SW846 6020
	Selenium	0.00522	0.0015	0.005	0.050			099130-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099130-004	SW846 6020
	Sodium	41.0	0.080	0.250	NE			099130-004	SW846 6020
	Thallium	0.000614	0.00045	0.002	0.002	B, J	0.0050UJ	099130-004	SW846 6020
	Vanadium	0.00979	0.0045	0.010	NE	B, J	0.037U	099130-004	SW846 6020
	Zinc	0.00749	0.0035	0.010	NE	J		099130-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099135-004	SW846 6020
05-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099135-004	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		099135-004	SW846 6020
	Barium	0.057	0.0006	0.002	2.00			099135-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099135-004	SW846 6020
	Cadmium	0.000283	0.00011	0.001	0.005	J	J+	099135-004	SW846 6020
	Calcium	118	0.600	2.00	NE			099135-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099135-004	SW846 6020
	Cobalt	0.000121	0.0001	0.001	NE	J		099135-004	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	099135-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099135-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099135-004	SW846 6020
	Magnesium	24.3	0.010	0.030	NE			099135-004	SW846 6020
	Manganese	0.00223	0.001	0.005	NE	J	J+	099135-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099135-004	SW846 7470
	Nickel	0.000522	0.0005	0.002	NE	J		099135-004	SW846 6020
	Potassium	2.35	0.080	0.300	NE		J	099135-004	SW846 6020
	Selenium	0.00685	0.0015	0.005	0.050			099135-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099135-004	SW846 6020
	Sodium	44.3	0.080	0.250	NE			099135-004	SW846 6020
	Thallium	0.00102	0.00045	0.002	0.002	B, J	0.0050UJ	099135-004	SW846 6020
	Vanadium	0.0103	0.0045	0.010	NE	B	0.037U	099135-004	SW846 6020
	Zinc	0.00808	0.0035	0.010	NE	J		099135-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099154-004	SW846 6020
07-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099154-004	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		099154-004	SW846 6020
	Barium	0.0548	0.0006	0.002	2.00			099154-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099154-004	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099154-004	SW846 6020
	Calcium	145	0.600	2.00	NE			099154-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099154-004	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099154-004	SW846 6020
	Copper	0.000527	0.00035	0.001	NE	J	J-	099154-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099154-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099154-004	SW846 6020
	Magnesium	39.3	0.010	0.030	NE			099154-004	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099154-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099154-004	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099154-004	SW846 6020
	Potassium	2.23	0.080	0.300	NE			099154-004	SW846 6020
	Selenium	0.00586	0.0015	0.005	0.050			099154-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099154-004	SW846 6020
	Sodium	41.4	0.080	0.250	NE			099154-004	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099154-004	SW846 6020
	Vanadium	0.0078	0.0045	0.010	NE	B, J	0.032U	099154-004	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099154-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099143-004	SW846 6020
06-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099143-004	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		099143-004	SW846 6020
	Barium	0.0704	0.0006	0.002	2.00			099143-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099143-004	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099143-004	SW846 6020
	Calcium	136	0.600	2.00	NE			099143-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099143-004	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099143-004	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	099143-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099143-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099143-004	SW846 6020
	Magnesium	36.9	0.010	0.030	NE			099143-004	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099143-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099143-004	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099143-004	SW846 6020
	Potassium	2.07	0.080	0.300	NE			099143-004	SW846 6020
	Selenium	0.00796	0.0015	0.005	0.050			099143-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099143-004	SW846 6020
	Sodium	39.8	0.080	0.250	NE			099143-004	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099143-004	SW846 6020
	Vanadium	0.00939	0.0045	0.010	NE	B, J	0.032U	099143-004	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099143-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099159-004	SW846 6020
08-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099159-004	SW846 6020
	Arsenic	0.00188	0.0017	0.005	0.010	J		099159-004	SW846 6020
	Barium	0.0774	0.0006	0.002	2.00			099159-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099159-004	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099159-004	SW846 6020
	Calcium	140	0.600	2.00	NE			099159-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099159-004	SW846 6020
	Cobalt	0.000102	0.0001	0.001	NE	J		099159-004	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	099159-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099159-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099159-004	SW846 6020
	Magnesium	41.8	0.010	0.030	NE			099159-004	SW846 6020
	Manganese	0.135	0.001	0.005	NE			099159-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099159-004	SW846 7470
	Nickel	0.000506	0.0005	0.002	NE	J		099159-004	SW846 6020
	Potassium	3.18	0.080	0.300	NE			099159-004	SW846 6020
	Selenium	0.00572	0.0015	0.005	0.050			099159-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099159-004	SW846 6020
	Sodium	38.9	0.080	0.250	NE			099159-004	SW846 6020
	Thallium	0.000848	0.00045	0.002	0.002	B, J	0.0063U	099159-004	SW846 6020
	Vanadium	0.00476	0.0045	0.010	NE	J		099159-004	SW846 6020
	Zinc	0.0168	0.0035	0.010	NE			099159-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.0177	0.015	0.050	NE	J		099150-004	SW846 6020
07-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099150-004	SW846 6020
	Arsenic	0.0019	0.0017	0.005	0.010	J		099150-004	SW846 6020
	Barium	0.0345	0.0006	0.002	2.00			099150-004	SW846 6020
	Beryllium	0.000634	0.0002	0.0005	0.004			099150-004	SW846 6020
	Cadmium	0.000761	0.00011	0.001	0.005	J	J+	099150-004	SW846 6020
	Calcium	157	0.600	2.00	NE			099150-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099150-004	SW846 6020
	Cobalt	0.000629	0.0001	0.001	NE	J		099150-004	SW846 6020
	Copper	0.000725	0.00035	0.001	NE	J	0.0065UJ	099150-004	SW846 6020
	Iron	0.0465	0.033	0.100	NE	J		099150-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099150-004	SW846 6020
	Magnesium	41.4	0.010	0.030	NE			099150-004	SW846 6020
	Manganese	0.0169	0.001	0.005	NE		J+	099150-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099150-004	SW846 7470
	Nickel	0.000851	0.0005	0.002	NE	J		099150-004	SW846 6020
	Potassium	2.62	0.080	0.300	NE			099150-004	SW846 6020
	Selenium	0.00888	0.0015	0.005	0.050			099150-004	SW846 6020
	Silver	0.00045	0.0002	0.001	NE	J		099150-004	SW846 6020
	Sodium	40.1	0.080	0.250	NE			099150-004	SW846 6020
	Thallium	0.00139	0.00045	0.002	0.002	B, J	0.0055UJ	099150-004	SW846 6020
	Vanadium	0.00915	0.0045	0.010	NE	B, J	0.032U	099150-004	SW846 6020
	Zinc	0.0142	0.0035	0.010	NE			099150-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099156-004	SW846 6020
08-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099156-004	SW846 6020
	Arsenic	0.00173	0.0017	0.005	0.010	J		099156-004	SW846 6020
	Barium	0.0927	0.0006	0.002	2.00			099156-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099156-004	SW846 6020
	Cadmium	0.000138	0.00011	0.001	0.005	J	J+	099156-004	SW846 6020
	Calcium	114	0.600	2.00	NE			099156-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099156-004	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099156-004	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	099156-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099156-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099156-004	SW846 6020
	Magnesium	20.6	0.010	0.030	NE			099156-004	SW846 6020
	Manganese	0.00782	0.001	0.005	NE			099156-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099156-004	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099156-004	SW846 6020
	Potassium	2.15	0.080	0.300	NE			099156-004	SW846 6020
	Selenium	0.00282	0.0015	0.005	0.050	J		099156-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099156-004	SW846 6020
	Sodium	24.4	0.080	0.250	NE			099156-004	SW846 6020
	Thallium	0.00112	0.00045	0.002	0.002	B, J	0.0063U	099156-004	SW846 6020
	Vanadium	0.00467	0.0045	0.010	NE	J		099156-004	SW846 6020
	Zinc	0.009	0.0035	0.010	NE	J		099156-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099146-004	SW846 6020
06-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099146-004	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		099146-004	SW846 6020
	Barium	0.0466	0.0006	0.002	2.00			099146-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099146-004	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099146-004	SW846 6020
	Calcium	144	0.600	2.00	NE			099146-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099146-004	SW846 6020
	Cobalt	0.0038	0.0001	0.001	NE			099146-004	SW846 6020
	Copper	0.000628	0.00035	0.001	NE	J	J-	099146-004	SW846 6020
	Iron	ND	0.033	0.100	NE	U		099146-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099146-004	SW846 6020
	Magnesium	35.3	0.010	0.030	NE			099146-004	SW846 6020
	Manganese	0.0133	0.001	0.005	NE		J+	099146-004	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		099146-004	SW846 7470
	Nickel	0.000588	0.0005	0.002	NE	J		099146-004	SW846 6020
	Potassium	2.54	0.080	0.300	NE			099146-004	SW846 6020
	Selenium	0.0101	0.0015	0.005	0.050			099146-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099146-004	SW846 6020
	Sodium	39.4	0.080	0.250	NE			099146-004	SW846 6020
	Thallium	0.000599	0.00045	0.002	0.002	B, J	0.0055UJ	099146-004	SW846 6020
	Vanadium	0.00923	0.0045	0.010	NE	B, J	0.032U	099146-004	SW846 6020
	Zinc	0.0166	0.0035	0.010	NE			099146-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-9 *(Concluded)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	0.015	0.050	NE	U		099139-004	SW846 6020
05-Apr-16	Antimony	ND	0.001	0.003	0.006	U		099139-004	SW846 6020
	Arsenic	0.00245	0.0017	0.005	0.010	J		099139-004	SW846 6020
	Barium	0.0699	0.0006	0.002	2.00			099139-004	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		099139-004	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		099139-004	SW846 6020
	Calcium	187	0.600	2.00	NE			099139-004	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		099139-004	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		099139-004	SW846 6020
	Copper	0.00132	0.00035	0.001	NE		J-	099139-004	SW846 6020
	Iron	0.061	0.033	0.100	NE	J		099139-004	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		099139-004	SW846 6020
	Magnesium	56.3	0.010	0.030	NE			099139-004	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		099139-004	SW846 6020
	Mercury	0.000088	0.000067	0.0002	0.002	J		099139-004	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		099139-004	SW846 6020
	Potassium	2.84	0.080	0.300	NE		J	099139-004	SW846 6020
	Selenium	0.0124	0.0015	0.005	0.050			099139-004	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		099139-004	SW846 6020
	Sodium	45.6	0.080	0.250	NE			099139-004	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		099139-004	SW846 6020
	Vanadium	0.011	0.0045	0.010	NE	B	0.037U	099139-004	SW846 6020
	Zinc	ND	0.0035	0.010	NE	U		099139-004	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-10
Summary of Filtered Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Calcium	73.5	0.600	2.00	NE			099128-009	SW846 6020
04-Apr-16	Magnesium	35.5	0.010	0.030	NE			099128-009	SW846 6020
	Potassium	6.51	0.080	0.300	NE		J	099128-009	SW846 6020
	Sodium	45.5	0.080	0.250	NE			099128-009	SW846 6020
CYN-MW7	Calcium	103	0.600	2.00	NE			099130-005	SW846 6020
04-Apr-16	Magnesium	20.2	0.010	0.030	NE			099130-005	SW846 6020
	Potassium	2.54	0.080	0.300	NE		J	099130-005	SW846 6020
	Sodium	39.5	0.080	0.250	NE			099130-005	SW846 6020
CYN-MW8	Calcium	114	0.600	2.00	NE			099135-005	SW846 6020
05-Apr-16	Magnesium	24.4	0.010	0.030	NE			099135-005	SW846 6020
	Potassium	2.34	0.080	0.300	NE		J	099135-005	SW846 6020
	Sodium	46.6	0.080	0.250	NE			099135-005	SW846 6020
CYN-MW9	Calcium	148	0.600	2.00	NE			099154-005	SW846 6020
07-Apr-16	Magnesium	40.1	0.010	0.030	NE			099154-005	SW846 6020
	Potassium	2.41	0.080	0.300	NE			099154-005	SW846 6020
	Sodium	43.9	0.080	0.250	NE			099154-005	SW846 6020
CYN-MW10	Calcium	154	0.600	2.00	NE			099143-005	SW846 6020
06-Apr-16	Magnesium	38.9	0.010	0.030	NE			099143-005	SW846 6020
	Potassium	2.04	0.080	0.300	NE			099143-005	SW846 6020
	Sodium	39.1	0.080	0.250	NE			099143-005	SW846 6020
CYN-MW11	Calcium	142	0.600	2.00	NE			099159-005	SW846 6020
08-Apr-16	Magnesium	41.5	0.010	0.030	NE			099159-005	SW846 6020
	Potassium	3.03	0.080	0.300	NE			099159-005	SW846 6020
	Sodium	38.2	0.080	0.250	NE			099159-005	SW846 6020
CYN-MW12	Calcium	154	0.600	2.00	NE			099150-005	SW846 6020
07-Apr-16	Magnesium	39.8	0.010	0.030	NE			099150-005	SW846 6020
	Potassium	2.46	0.080	0.300	NE			099150-005	SW846 6020
	Sodium	38.1	0.080	0.250	NE			099150-005	SW846 6020
CYN-MW13	Calcium	108	0.600	2.00	NE			099156-005	SW846 6020
08-Apr-16	Magnesium	21.1	0.010	0.030	NE			099156-005	SW846 6020
	Potassium	2.16	0.080	0.300	NE			099156-005	SW846 6020
	Sodium	25.3	0.080	0.250	NE			099156-005	SW846 6020

Refer to footnotes on page 7B-33.

Table 7B-10 *(Concluded)*
Summary of Filtered Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

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	Calcium	147	0.600	2.00	NE			099146-005	SW846 6020
06-Apr-16	Magnesium	36.0	0.010	0.030	NE			099146-005	SW846 6020
	Potassium	2.57	0.080	0.300	NE			099146-005	SW846 6020
	Sodium	40.1	0.080	0.250	NE			099146-005	SW846 6020
CYN-MW15	Calcium	199	0.600	2.00	NE			099139-005	SW846 6020
05-Apr-16	Magnesium	56.5	0.100	0.300	NE			099139-005	SW846 6020
	Potassium	2.77	0.080	0.300	NE		J	099139-005	SW846 6020
	Sodium	46.6	0.080	0.250	NE			099139-005	SW846 6020

Refer to footnotes on page 7B-33.

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 2016

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-MW4	Americium-241	7.13 ± 13.5	20.5	9.93	NE	U	BD	099128-012	EPA 901.1
04-Apr-16	Cesium-137	-0.464 ± 1.79	3.02	1.43	NE	U	BD	099128-012	EPA 901.1
	Cobalt-60	-1.46 ± 1.94	3.12	1.44	NE	U	BD	099128-012	EPA 901.1
	Potassium-40	27.8 ± 42.7	31.7	14.6	NE	U	BD	099128-012	EPA 901.1
	Gross Alpha	6.64	NA	NA	15 pCi/L	NA	None	099128-R13	EPA 900.0
	Gross Beta	13.9 ± 3.38	2.80	136	4mrem/yr			099128-R13	EPA 900.0
	Uranium-233/234	33.1 ± 3.06	0.0781	0.035	NE			099128-R14	HASL-300
	Uranium-235/236	0.893 ± 0.131	0.103	0.0473	NE			099128-R14	HASL-300
	Uranium-238	5.17 ± 0.528	0.101	0.0465	NE			099128-R14	HASL-300
	Tritium	-26 ± 87.5	168	76.0	NE	U	BD	099128-015	EPA 906.0
CYN-MW7	Americium-241	9.04 ± 9.76	14.6	7.13	NE	U	BD	099130-012	EPA 901.1
04-Apr-16	Cesium-137	-2.94 ± 3.64	4.26	2.06	NE	U	BD	099130-012	EPA 901.1
	Cobalt-60	-0.524 ± 3.60	3.37	1.58	NE	U	BD	099130-012	EPA 901.1
	Potassium-40	19.5 ± 50.0	33.6	15.7	NE	U	BD	099130-012	EPA 901.1
	Gross Alpha	12.59	NA	NA	15 pCi/L	NA	None	099130-013	EPA 900.0
	Gross Beta	6.95 ± 2.18	2.79	1.36	4mrem/yr		J	099130-013	EPA 900.0
	Uranium-233/234	12.7 ± 1.18	0.0727	0.0339	NE			099130-014	HASL-300
	Uranium-235/236	0.350 ± 0.0643	0.0498	0.0218	NE			099130-014	HASL-300
	Uranium-238	1.86 ± 0.203	0.0474	0.0212	NE			099130-014	HASL-300
	Tritium	10.9 ± 89.0	162	73.6	NE	U	BD	099130-015	EPA 906.0
CYN-MW8	Americium-241	11.8 ± 20.2	25.8	12.7	NE	U	BD	099135-012	EPA 901.1
05-Apr-16	Cesium-137	3.67 ± 3.22	4.55	2.20	NE	U	BD	099135-012	EPA 901.1
	Cobalt-60	0.201 ± 2.62	4.70	2.23	NE	U	BD	099135-012	EPA 901.1
	Potassium-40	4.10 ± 45.7	61.0	29.3	NE	U	BD	099135-012	EPA 901.1
	Gross Alpha	0.13	NA	NA	15 pCi/L	NA	None	099135-R13	EPA 900.0
	Gross Beta	8.70 ± 2.08	1.90	0.913	4mrem/yr			099135-R13	EPA 900.0
	Uranium-233/234	24.1 ± 2.36	0.101	0.0455	NE			099135-R14	HASL-300
	Uranium-235/236	0.789 ± 0.133	0.133	0.0614	NE			099135-R14	HASL-300
	Uranium-238	3.18 ± 0.374	0.131	0.0603	NE			099135-R14	HASL-300
	Tritium	3.92 ± 87.8	162	73.3	NE	U	BD	099135-015	EPA 906.0

Refer to footnotes on page 7B-33.

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 2016

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-MW9	Americium-241	0.371 ± 10.5	16.4	8.01	NE	U	BD	099154-012	EPA 901.1
07-Apr-16	Cesium-137	-1.0 ± 1.94	3.14	1.51	NE	U	BD	099154-012	EPA 901.1
	Cobalt-60	-1.54 ± 3.21	3.60	1.71	NE	U	BD	099154-012	EPA 901.1
	Potassium-40	26.1 ± 44.9	30.1	14.1	NE	U	BD	099154-012	EPA 901.1
	Gross Alpha	5.99	NA	NA	15 pCi/L	NA	None	099154-013	EPA 900.0
	Gross Beta	3.63 ± 2.48	3.94	1.92	4mrem/yr	U	BD	099154-013	EPA 900.0
	Uranium-233/234	5.87 ± 0.598	0.0916	0.0427	NE			099154-014	HASL-300
	Uranium-235/236	0.180 ± 0.0484	0.0627	0.0275	NE		J	099154-014	HASL-300
	Uranium-238	1.96 ± 0.227	0.0596	0.0267	NE			099154-014	HASL-300
	Tritium	-5.36 ± 89.4	167	75.6	NE	U	BD	099154-015	EPA 906.0
CYN-MW10	Americium-241	4.35 ± 12.2	19.5	9.50	NE	U	BD	099143-012	EPA 901.1
06-Apr-16	Cesium-137	-1.16 ± 2.10	3.52	1.67	NE	U	BD	099143-012	EPA 901.1
	Cobalt-60	1.34 ± 2.26	4.13	1.93	NE	U	BD	099143-012	EPA 901.1
	Potassium-40	2.91 ± 44.2	39.0	18.1	NE	U	BD	099143-012	EPA 901.1
	Gross Alpha	3.37	NA	NA	15 pCi/L	NA	None	099143-013	EPA 900.0
	Gross Beta	3.54 ± 2.08	3.25	1.58	4mrem/yr		J	099143-013	EPA 900.0
	Uranium-233/234	4.64 ± 0.469	0.0829	0.0386	NE			099143-014	HASL-300
	Uranium-235/236	0.171 ± 0.0465	0.0568	0.0249	NE			099143-014	HASL-300
	Uranium-238	1.82 ± 0.207	0.054	0.0241	NE			099143-014	HASL-300
	Tritium	3.24 ± 91.7	169	76.6	NE	U	BD	099143-015	EPA 906.0
CYN-MW11	Americium-241	-12.2 ± 20.1	28.0	13.7	NE	U	BD	099159-012	EPA 901.1
08-Apr-16	Cesium-137	-2.61 ± 3.61	4.26	2.03	NE	U	BD	099159-012	EPA 901.1
	Cobalt-60	-7.9 ± 6.02	4.65	2.16	NE	U	BD	099159-012	EPA 901.1
	Potassium-40	10.4 ± 52.1	46.7	21.7	NE	U	BD	099159-012	EPA 901.1
	Gross Alpha	4.33	NA	NA	15 pCi/L	NA	None	099159-013	EPA 900.0
	Gross Beta	3.88 ± 2.89	4.65	2.28	4mrem/yr	U	BD	099159-013	EPA 900.0
	Uranium-233/234	4.53 ± 0.451	0.077	0.0359	NE			099159-014	HASL-300
	Uranium-235/236	0.270 ± 0.0569	0.0527	0.0231	NE			099159-014	HASL-300
	Uranium-238	1.67 ± 0.189	0.0501	0.0224	NE			099159-014	HASL-300
	Tritium	22.4 ± 93.8	169	76.6	NE	U	BD	099159-015	EPA 906.0

Refer to footnotes on page 7B-33.

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 2016

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-MW12	Americium-241	-1.83 ± 6.36	10.7	5.26	NE	U	BD	099150-012	EPA 901.1
07-Apr-16	Cesium-137	-2.13 ± 2.18	3.24	1.56	NE	U	BD	099150-012	EPA 901.1
	Cobalt-60	-0.851 ± 2.03	3.42	1.62	NE	U	BD	099150-012	EPA 901.1
	Potassium-40	-23.1 ± 39.0	42.4	20.3	NE	U	BD	099150-012	EPA 901.1
	Gross Alpha	7.83	NA	NA	15 pCi/L	NA	None	099150-013	EPA 900.0
	Gross Beta	4.31 ± 3.52	5.69	2.77	4mrem/yr	U	BD	099150-013	EPA 900.0
	Uranium-233/234	9.64 ± 0.924	0.0801	0.0373	NE			099150-014	HASL-300
	Uranium-235/236	0.268 ± 0.0572	0.0548	0.024	NE			099150-014	HASL-300
	Uranium-238	2.36 ± 0.256	0.0521	0.0233	NE			099150-014	HASL-300
	Tritium	43.3 ± 92.5	162	73.4	NE	U	BD	099150-015	EPA 906.0
CYN-MW13	Americium-241	1.48 ± 8.66	11.8	5.77	NE	U	BD	099156-012	EPA 901.1
08-Apr-16	Cesium-137	1.68 ± 1.89	3.18	1.52	NE	U	BD	099156-012	EPA 901.1
	Cobalt-60	-2.4 ± 3.80	3.61	1.69	NE	U	BD	099156-012	EPA 901.1
	Potassium-40	14.7 ± 45.7	29.0	13.4	NE	U	BD	099156-012	EPA 901.1
	Gross Alpha	3.83	NA	NA	15 pCi/L	NA	None	099156-013	EPA 900.0
	Gross Beta	5.13 ± 2.05	2.93	1.43	4mrem/yr		J	099156-013	EPA 900.0
	Uranium-233/234	6.92 ± 0.679	0.0816	0.038	NE			099156-014	HASL-300
	Uranium-235/236	0.255 ± 0.0562	0.0559	0.0245	NE			099156-014	HASL-300
	Uranium-238	1.40 ± 0.167	0.0531	0.0238	NE			099156-014	HASL-300
	Tritium	54.2 ± 98.9	172	77.6	NE	U	BD	099156-015	EPA 906.0
CYN-MW14A	Americium-241	1.79 ± 20.4	30.8	15.2	NE	U	BD	099146-012	EPA 901.1
06-Apr-16	Cesium-137	-0.159 ± 2.99	4.42	2.14	NE	U	BD	099146-012	EPA 901.1
	Cobalt-60	0.366 ± 2.73	4.74	2.26	NE	U	BD	099146-012	EPA 901.1
	Potassium-40	17.6 ± 71.4	47.2	22.4	NE	U	BD	099146-012	EPA 901.1
	Gross Alpha	4.87	NA	NA	15 pCi/L	NA	None	099146-013	EPA 900.0
	Gross Beta	7.79 ± 3.49	5.18	2.52	4mrem/yr		J	099146-013	EPA 900.0
	Uranium-233/234	10.3 ± 0.995	0.0828	0.0386	NE			099146-014	HASL-300
	Uranium-235/236	0.368 ± 0.0701	0.0567	0.0249	NE			099146-014	HASL-300
	Uranium-238	2.46 ± 0.268	0.0539	0.0241	NE			099146-014	HASL-300
	Tritium	69.2 ± 100	171	77.2	NE	U	BD	099146-015	EPA 906.0

Refer to footnotes on page 7B-33.

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 2016

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-MW15	Americium-241	0.445 ± 10.9	19.1	9.34	NE	U	BD	099139-012	EPA 901.1
05-Apr-16	Cesium-137	-0.214 ± 2.36	3.60	1.73	NE	U	BD	099139-012	EPA 901.1
	Cobalt-60	-1.11 ± 3.45	4.03	1.90	NE	U	BD	099139-012	EPA 901.1
	Potassium-40	-30.3 ± 45.9	50.1	23.9	NE	U	BD	099139-012	EPA 901.1
	Gross Alpha	5.57	NA	NA	15 pCi/L	NA	None	099139-013	EPA 900.0
	Gross Beta	31.2 ± 6.69	6.00	2.92	4mrem/yr			099139-013	EPA 900.0
	Uranium-233/234	10.8 ± 1.05	0.0883	0.0411	NE			099139-014	HASL-300
	Uranium-235/236	0.354 ± 0.0712	0.0605	0.0265	NE			099139-014	HASL-300
	Uranium-238	2.88 ± 0.311	0.0575	0.0257	NE			099139-014	HASL-300
	Tritium	18.1 ± 92.8	168	76.1	NE	U	BD	099139-015	EPA 906.0

Refer to footnotes on page 7B-33.

Table 7B-12
Summary of Field Water Quality Measurements[h],
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2016

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CYN-MW4	04-Apr-16	18.53	651.3	306.5	7.48	0.59	33.9	3.11
CYN-MW7	04-Apr-16	19.33	708.1	232.7	7.39	0.42	51.3	4.71
CYN-MW8	05-Apr-16	18.70	791.4	227.1	7.43	0.51	41.3	3.84
CYN-MW9	07-Apr-16	17.79	952.3	303.7	7.22	0.27	60.9	5.75
CYN-MW10	06-Apr-16	15.81	883.5	301.3	7.57	0.14	71.1	7.00
CYN-MW11	08-Apr-16	14.71	907.4	106.1	7.45	0.77	10.3	1.05
CYN-MW12	07-Apr-16	18.11	1007.8	226.9	7.27	0.72	12.5	1.17
CYN-MW13	08-Apr-16	16.24	657.3	289.3	7.47	0.14	30.7	3.02
CYN-MW14A	06-Apr-16	16.49	899.8	219.9	7.42	0.29	14.7	1.42
CYN-MW15	05-Apr-16	16.89	1161.1	280.9	7.17	0.33	13.7	1.33
CYN-MW4	03-Oct-16	18.62	651.0	241.1	7.16	0.63	52.3	4.89
CYN-MW7	12-Oct-16	19.70	700.4	273.3	7.01	0.39	71.4	6.51
CYN-MW8	14-Oct-16	18.11	769.5	292.1	7.18	0.40	45.8	4.32
CYN-MW9	19-Oct-16	17.39	913.5	205.2	6.90	0.35	61.0	5.83
CYN-MW10	17-Oct-16	16.58	844.9	237.4	7.60	0.33	72.4	7.03
CYN-MW10	24-Oct-16	16.88	856.9	203.7	7.36	0.37	72.5	7.00
CYN-MW11	19-Oct-16	16.90	918.4	80.1	8.40	0.49	10.4	0.99
CYN-MW12	03-Oct-16	19.02	6640.3	207.9	7.23	0.34	14.1	1.28
CYN-MW13	21-Oct-16	18.92	661.1	177.5	7.23	0.34	35.9	3.31
CYN-MW14A	17-Oct-16	18.77	919.3	287.4	6.76	0.29	20.3	1.88
CYN-MW15	21-Oct-16	16.82	1188.9	269.5	8.50	0.78	19.6	1.89

Refer to footnotes on page 7B-33.

Footnotes for Burn Site Groundwater Analytical Results Tables

%	= Percent.
CFR	= Code of Federal Regulations.
CYN	= Canyons.
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.
MW	= Monitoring well.
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

Activity	= 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 to be not detected.

[b]MDL or MDA

The MDL applies to Tables 7B-3 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-3 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 May 2009).

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 Burn Site Groundwater Analytical Results Tables *(Concluded)*

[e]Lab Qualifier

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

* = Recovery or relative percent difference not within acceptance limits and/or spike amount not compatible with the sample or the duplicate relative percent differences are not applicable where the concentration fails below the effective PQL.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
h = Prep holding time exceeded.
H = Analytical holding time was exceeded.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
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.
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 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.

[g]Analytical Method

DOE, Environmental Measurements Laboratory, 1997, "EML Procedures Manual," 28th ed., Vol. 1, Rev. 0, HASL-300.
EPA, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
EPA, 1984, "Methods for Chemical Analysis of Water and Wastes." EPA 600-4-79-020.
EPA, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
Rice, E.W., R.B. Baird, A.D. Eaton, and L.S. Clesceri, 2012, *Standard Methods for the Examination of Water and Wastewater*, 22nd ed., Method 2320B, Washington, D.C.

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

[h]Field Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.
% Sat = Percent saturation.
μmhos/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

7C-1 Nitrate plus Nitrite Concentrations, CYN-MW9 ..... 7C-5

7C-2 Nitrate plus Nitrite Concentrations, CYN-MW10 ..... 7C-6

7C-3 Nitrate plus Nitrite Concentrations, CYN-MW11 ..... 7C-7

7C-4 Nitrate plus Nitrite Concentrations, CYN-MW12 ..... 7C-8

7C-5 Nitrate plus Nitrite Concentrations, CYN-MW13 ..... 7C-9

7C-6 Nitrate plus Nitrite Concentrations, CYN-MW14A 7C-10

7C-7 Nitrate plus Nitrite Concentrations, CYN-MW15 (Includes Historical CYN-MW6 Data) 7C-11

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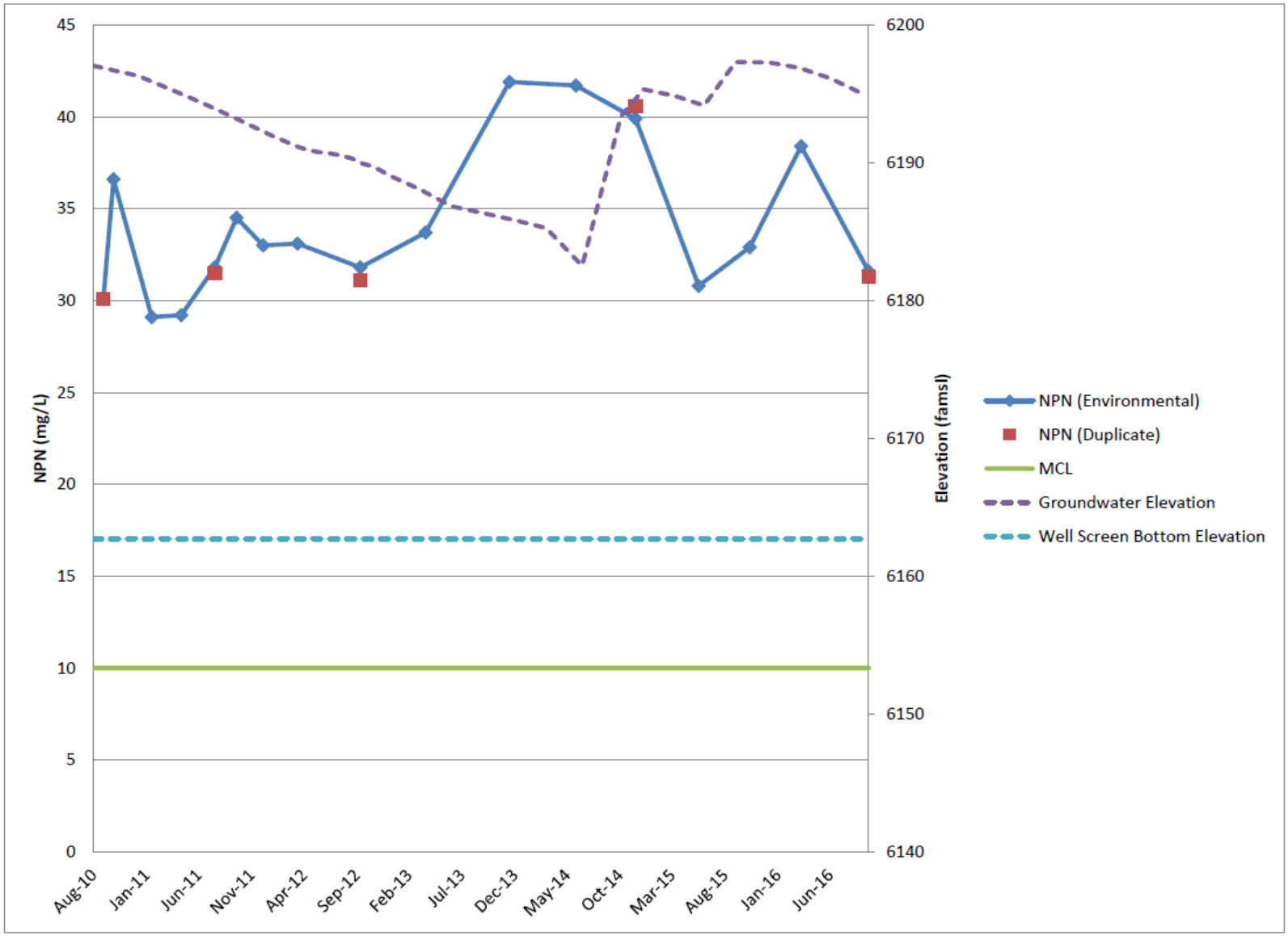

Figure 7C-1. Nitrate plus Nitrite Concentrations, CYN-MW9

Figure 7C-2. Nitrate plus Nitrite Concentrations, CYN-MW10

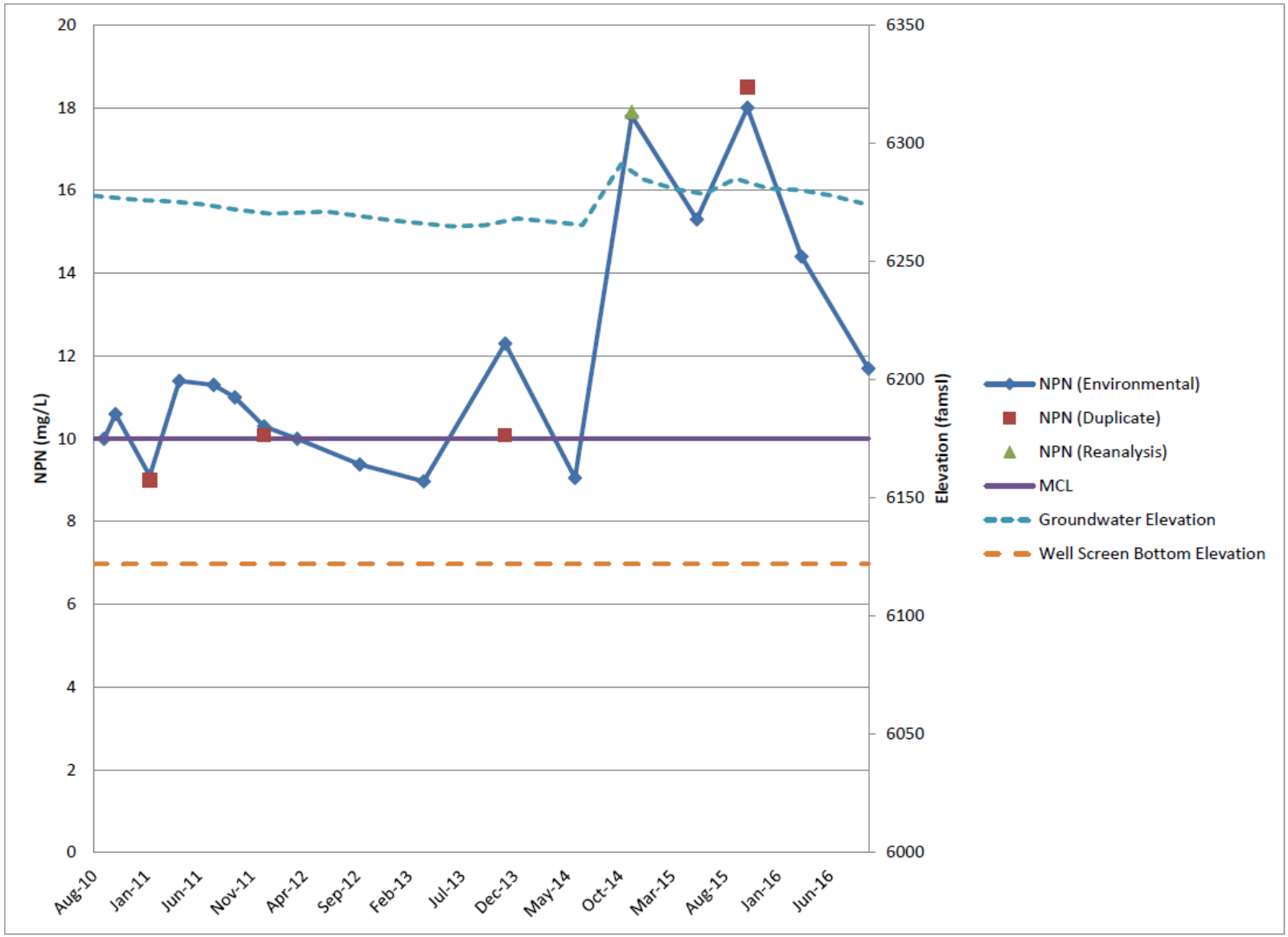

Figure 7C-3. Nitrate plus Nitrite Concentrations, CYN-MW11

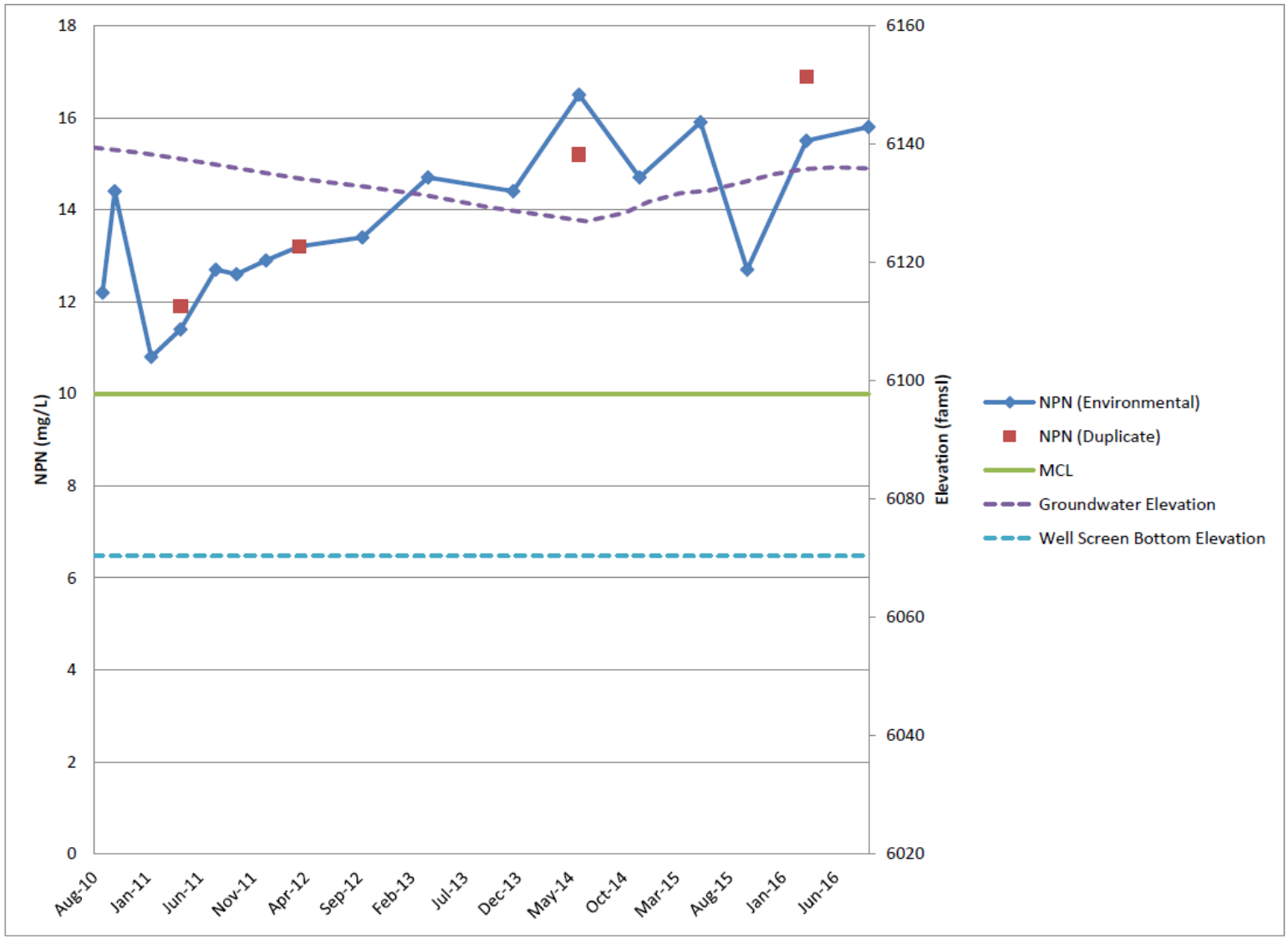

Figure 7C-4. Nitrate plus Nitrite Concentrations, CYN-MW12

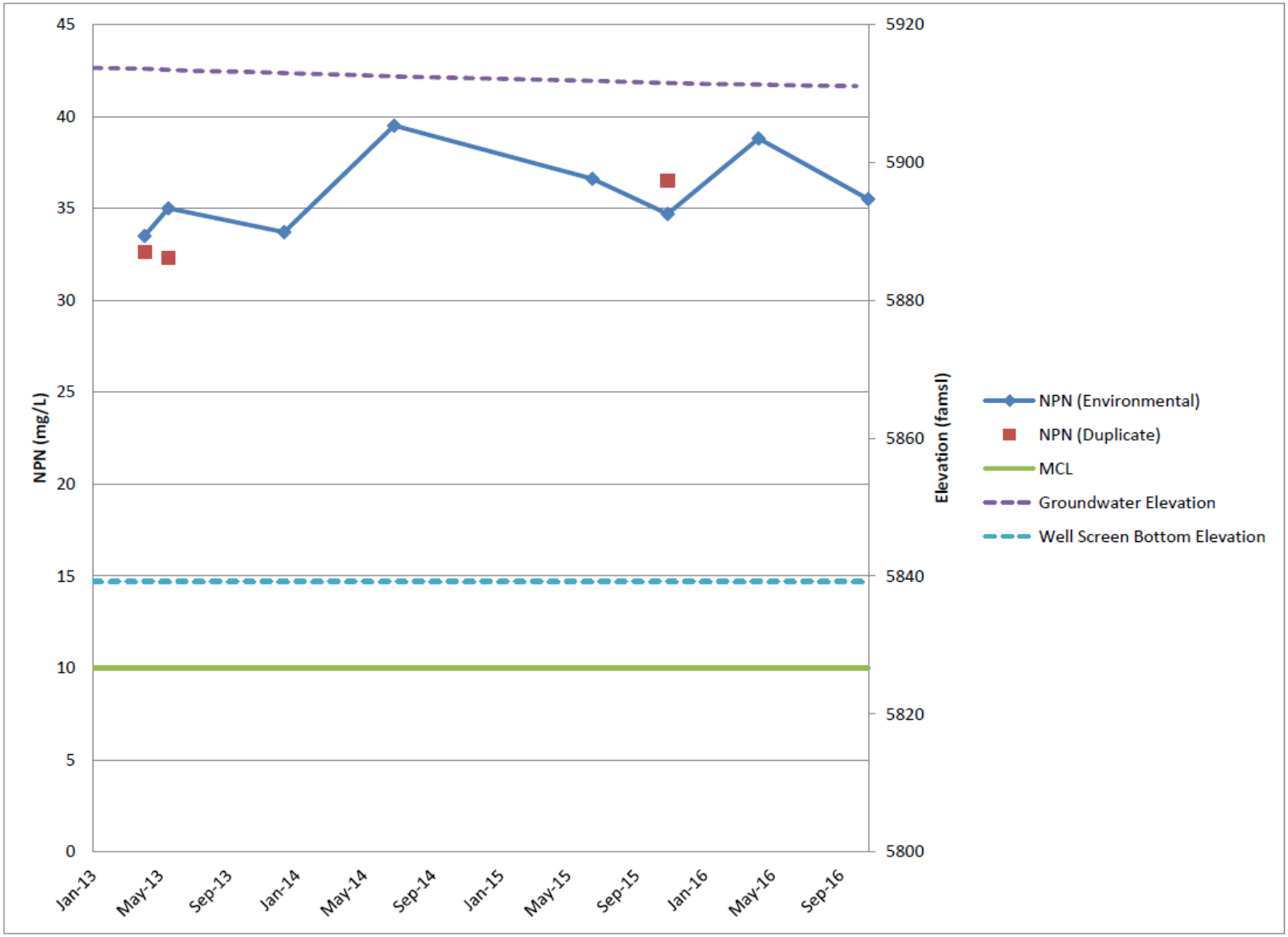

Figure 7C-5. Nitrate plus Nitrite Concentrations, CYN-MW13

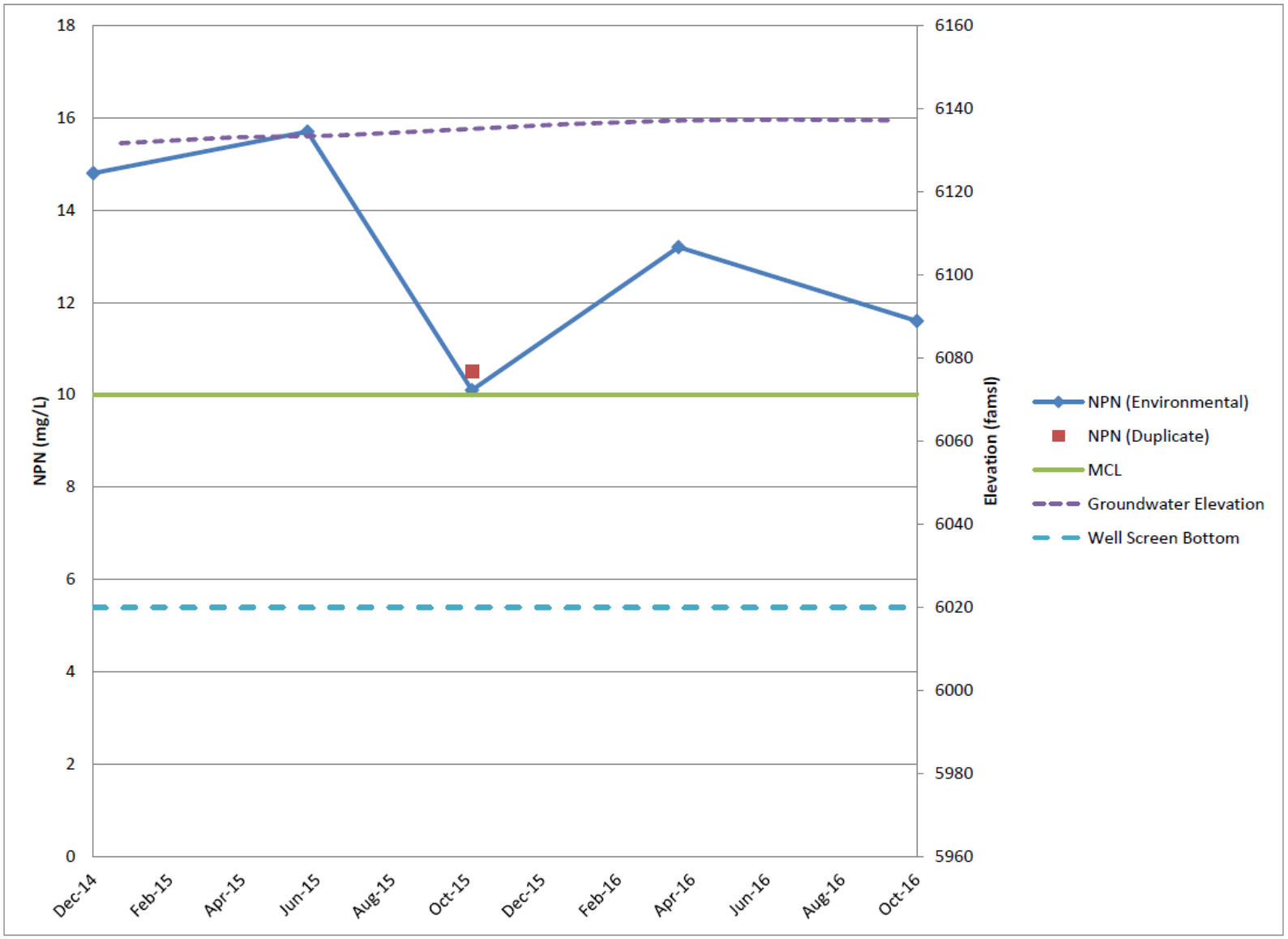

Figure 7C-6. Nitrate plus Nitrite Concentrations, CYN-MW14A

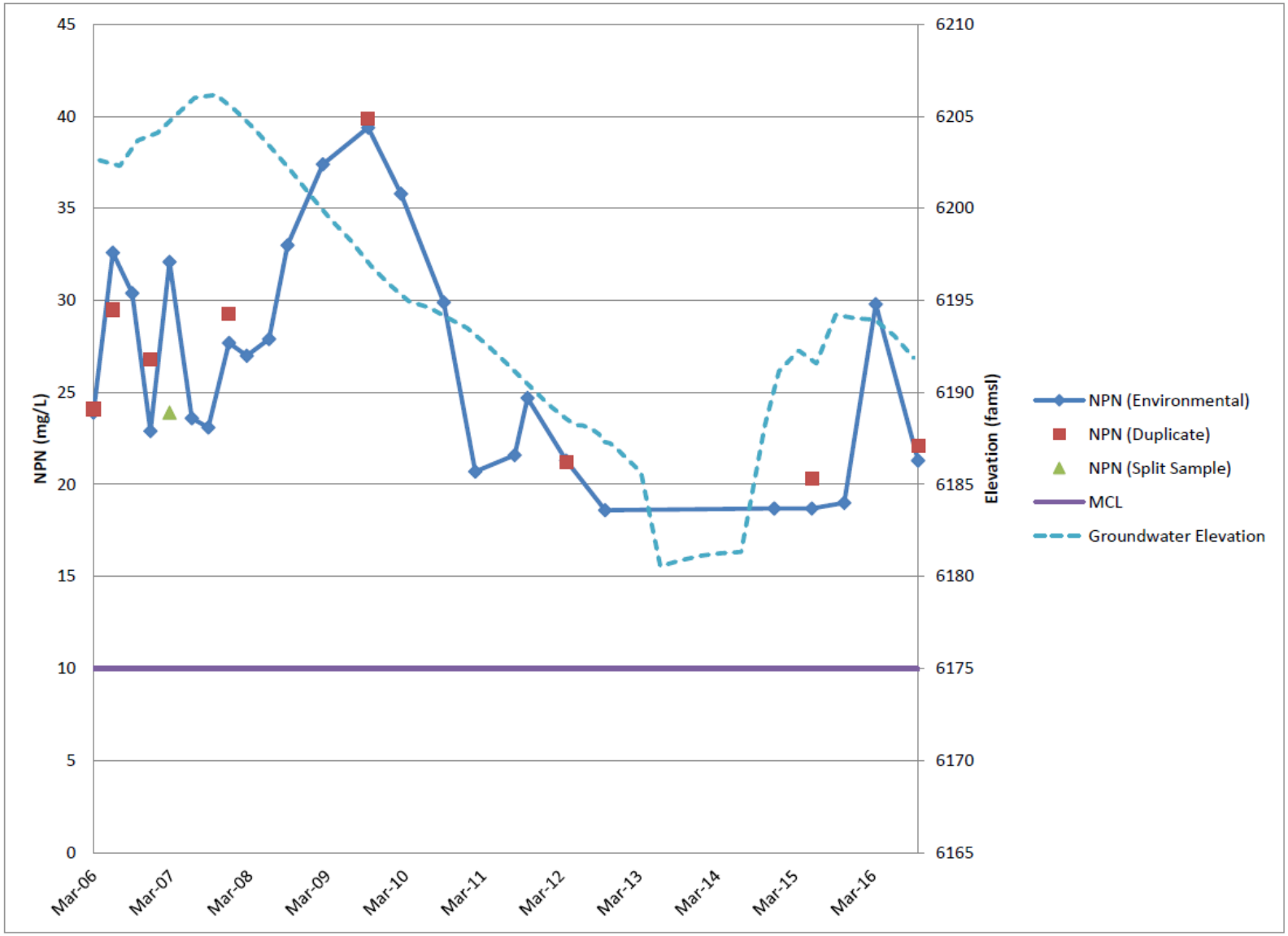

Figure 7C-7. Nitrate plus Nitrite Concentrations, CYN-MW15 (Includes Historical CYN-MW6 Data)

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Attachment 7D
Burn Site Groundwater
Hydrographs

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Attachment 7D Hydrographs

7D-1 BSG Area of Concern Wells (1 of 9) 7D-5

7D-2 BSG Area of Concern Wells (2 of 9) 7D-6

7D-3 BSG Area of Concern Wells (3 of 9) 7D-7

7D-4 BSG Area of Concern Wells (4 of 9) 7D-8

7D-5 BSG Area of Concern Wells (5 of 9) 7D-9

7D-6 BSG Area of Concern Wells (6 of 9) 7D-10

7D-7 BSG Area of Concern Wells (7 of 9) 7D-11

7D-8 BSG Area of Concern Wells (8 of 9) 7D-12

7D-9 BSG Area of Concern Wells (9 of 9) 7D-13

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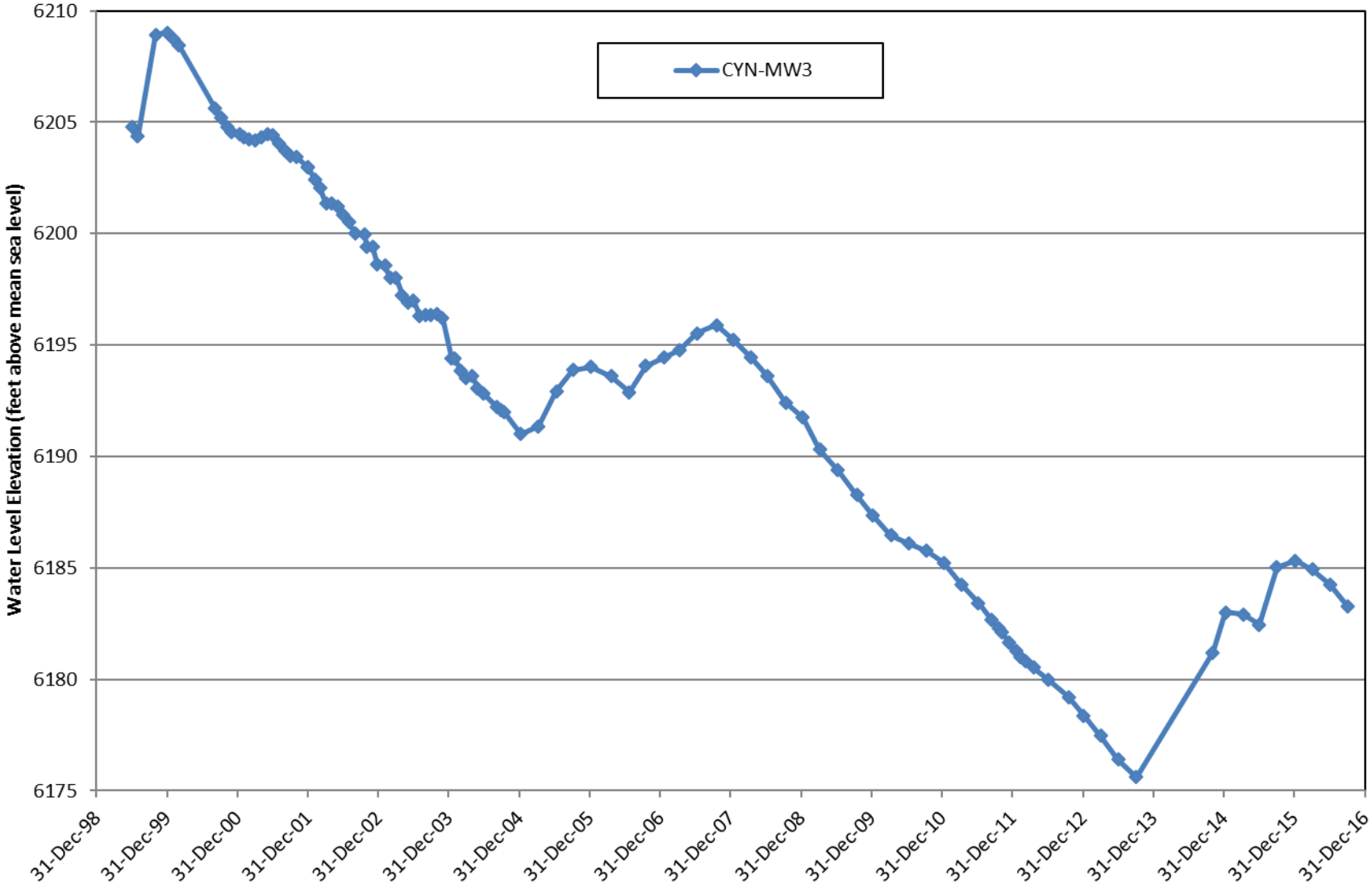

Figure 7D-1. BSG Area of Concern Wells (1 of 9)

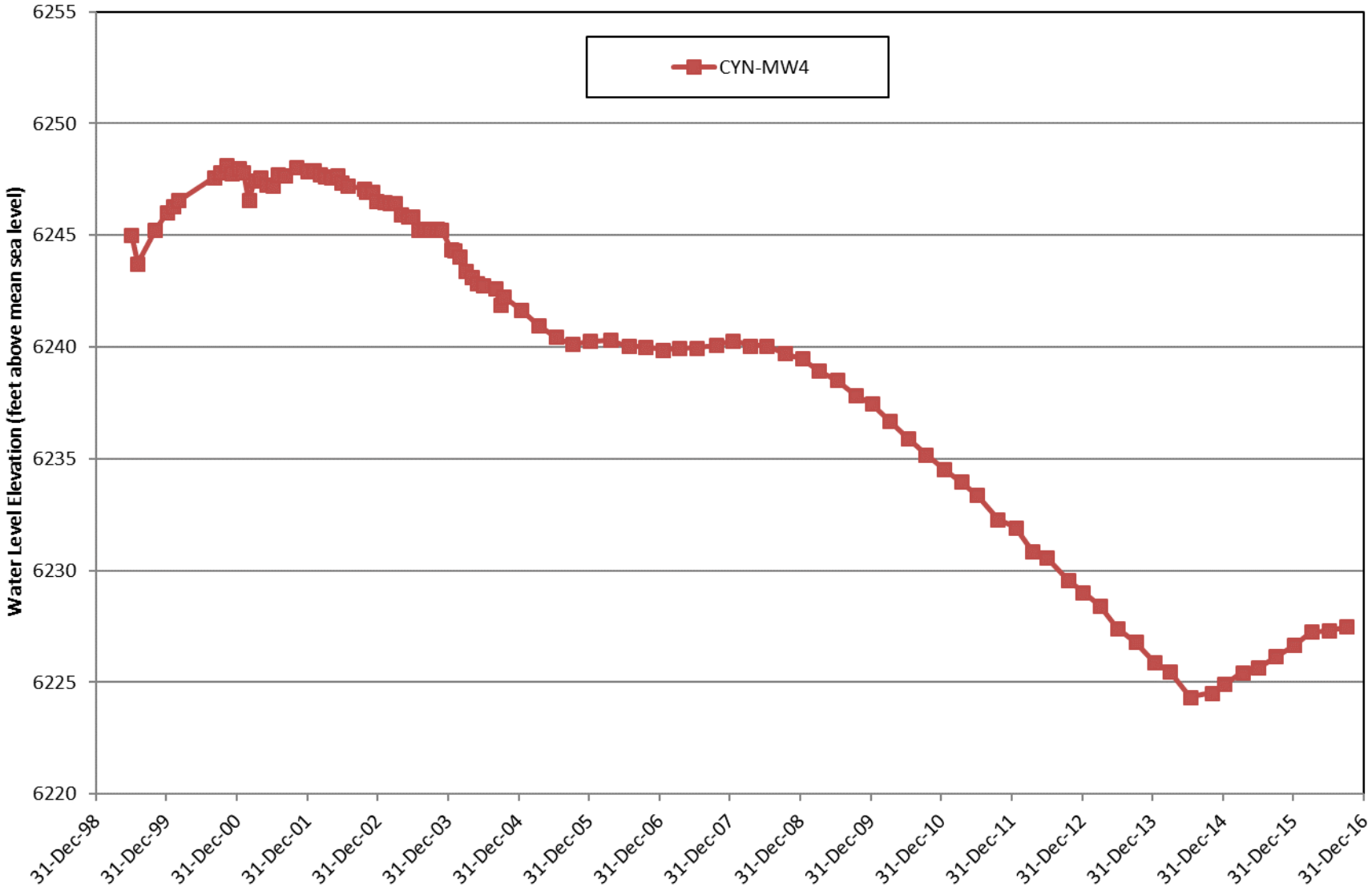

Figure 7D-2. BSG Area of Concern Wells (2 of 9)

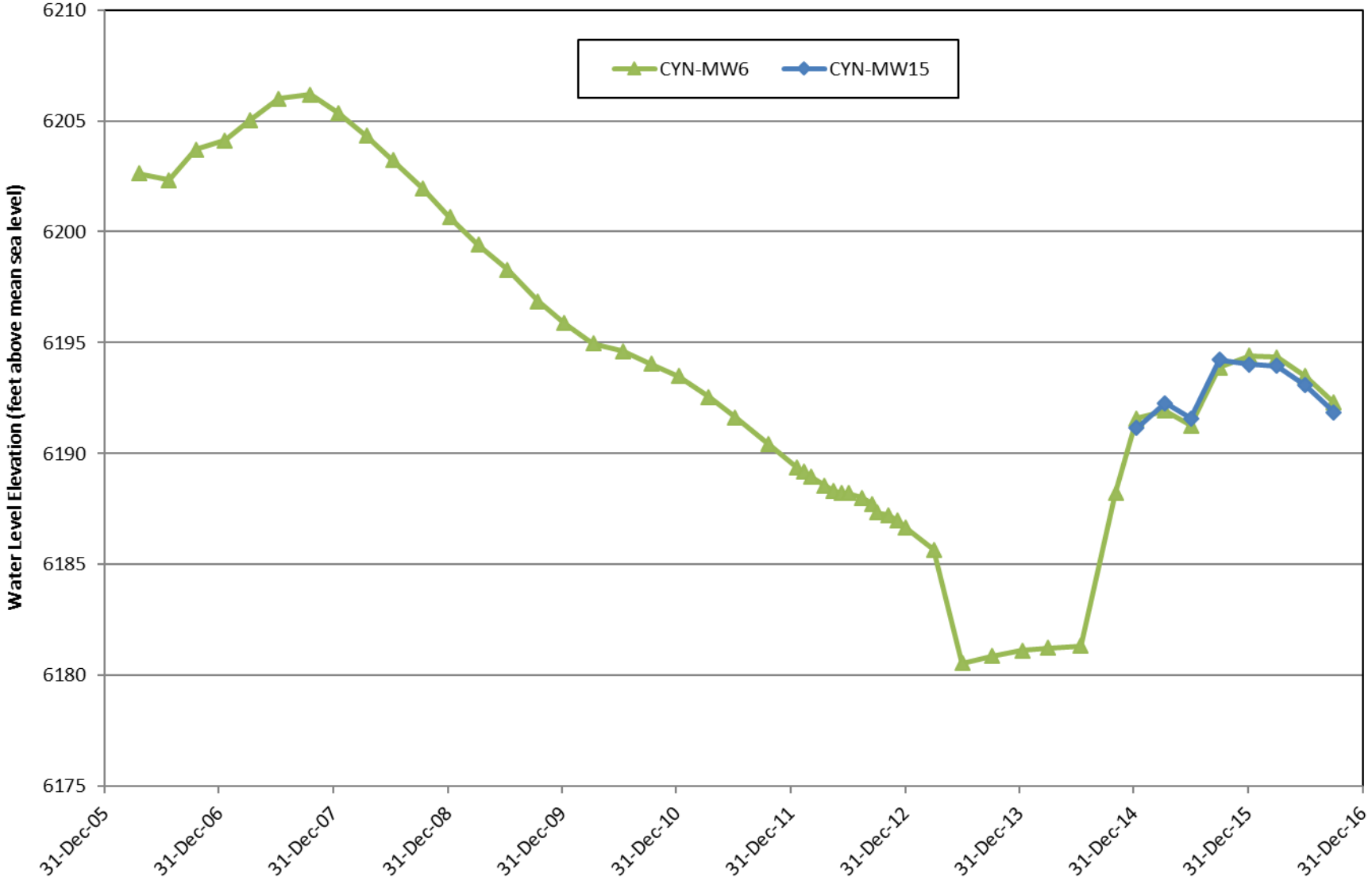

Figure 7D-3. BSG Area of Concern Wells (3 of 9)

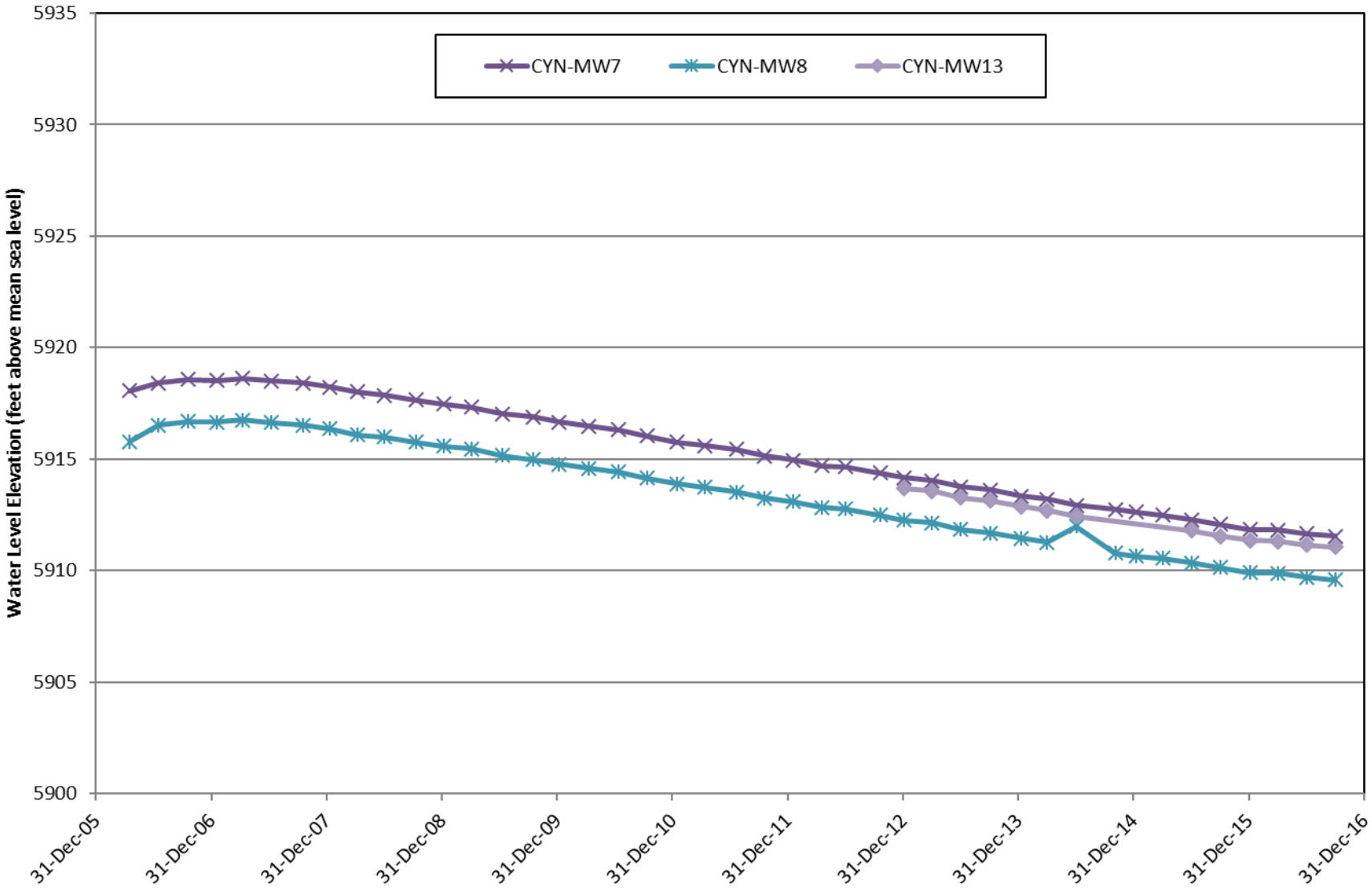

Figure 7D-4. BSG Area of Concern Wells (4 of 9)

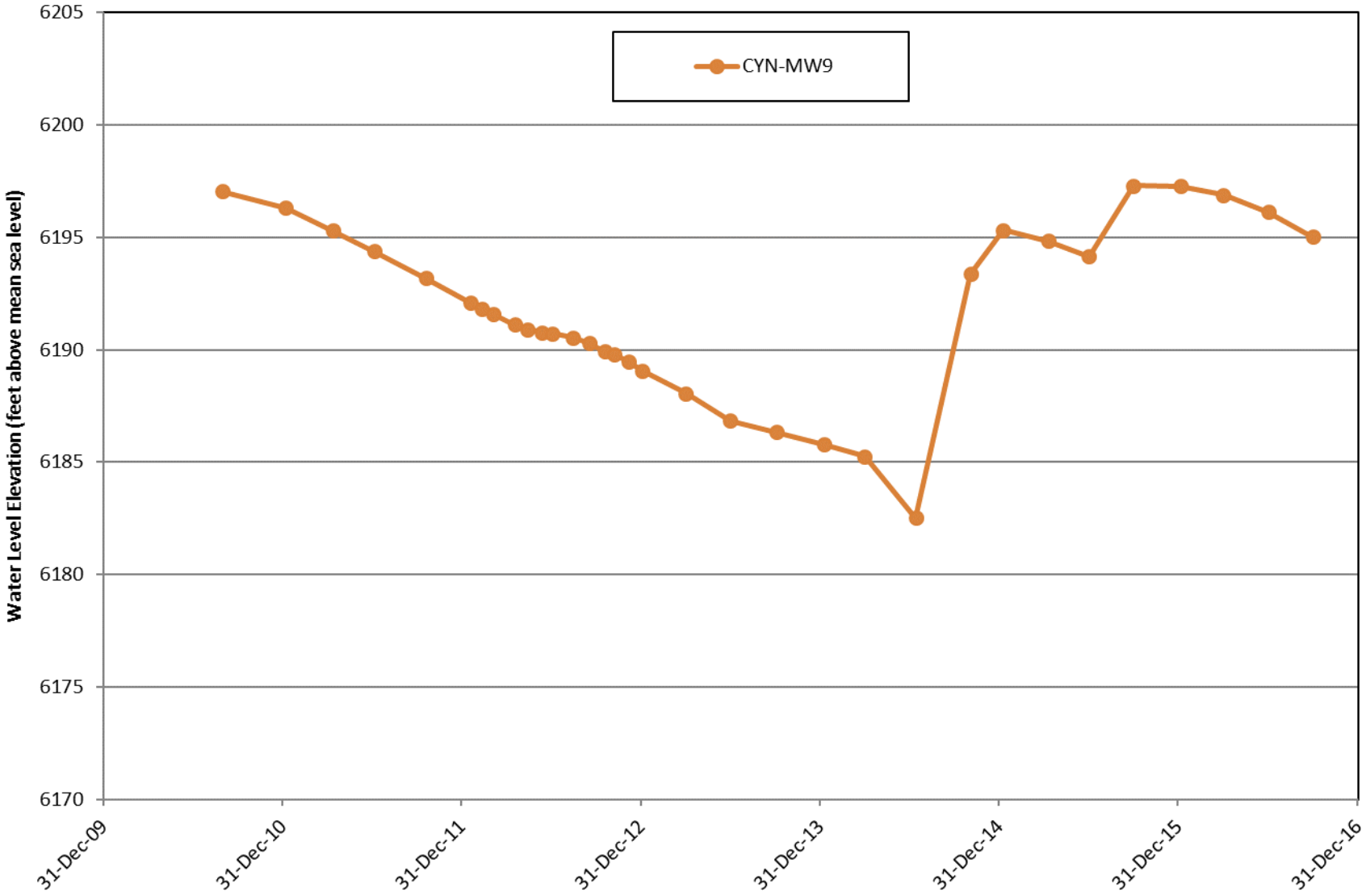

Figure 7D-5. BSG Area of Concern Wells (5 of 9)

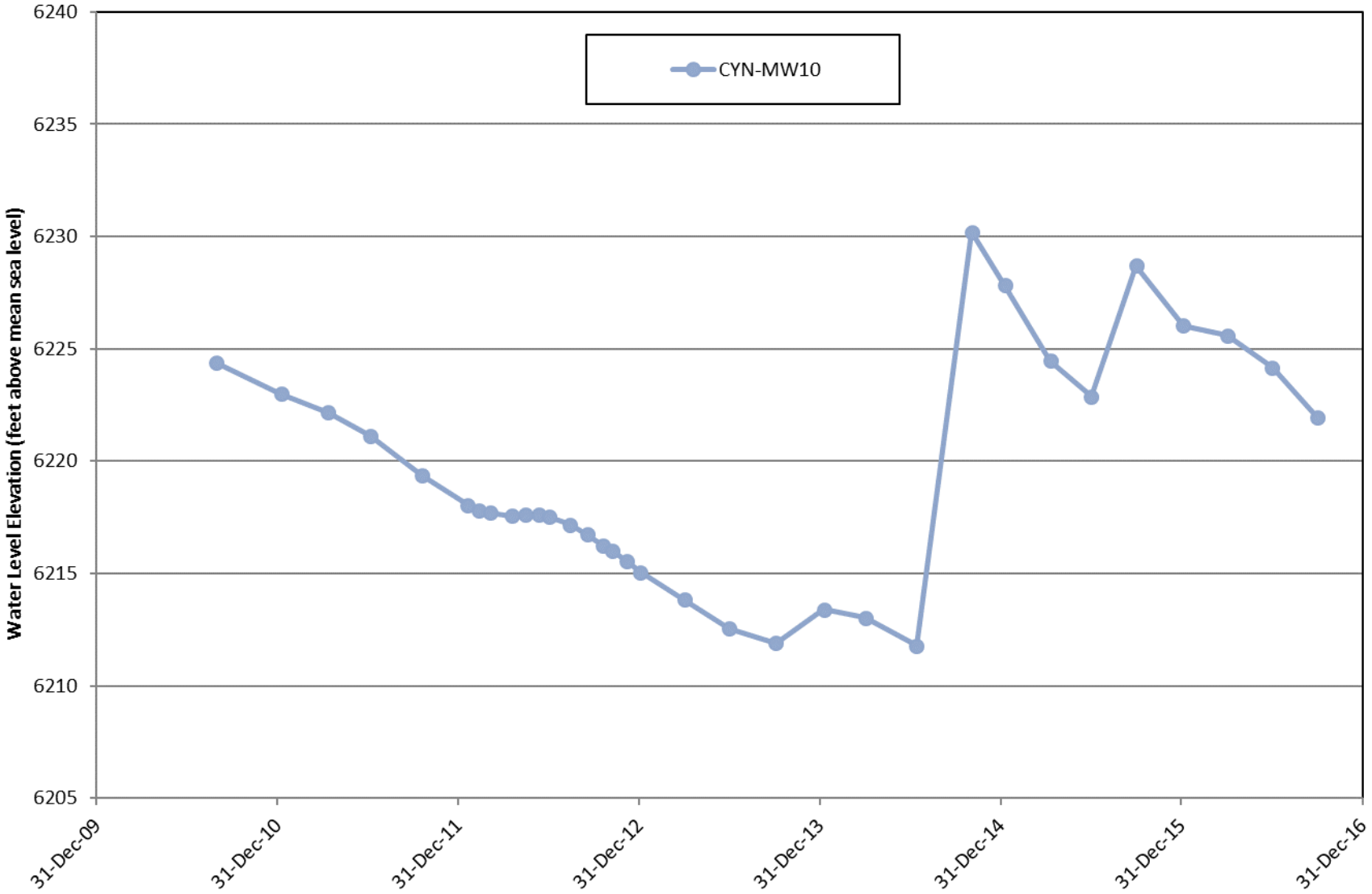

Figure 7D-6. BSG Area of Concern Wells (6 of 9)

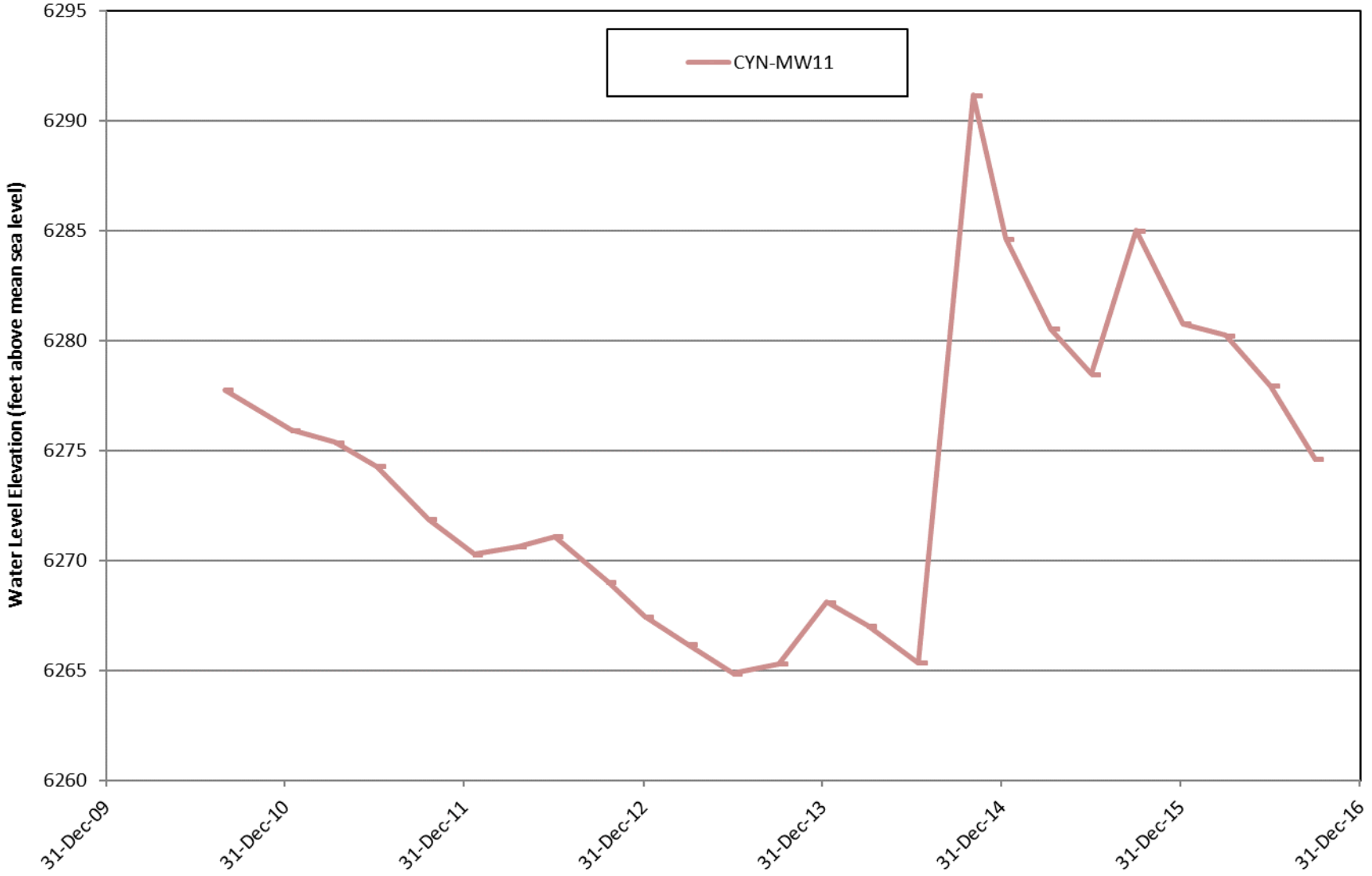

Figure 7D-7. BSG Area of Concern Wells (7 of 9)

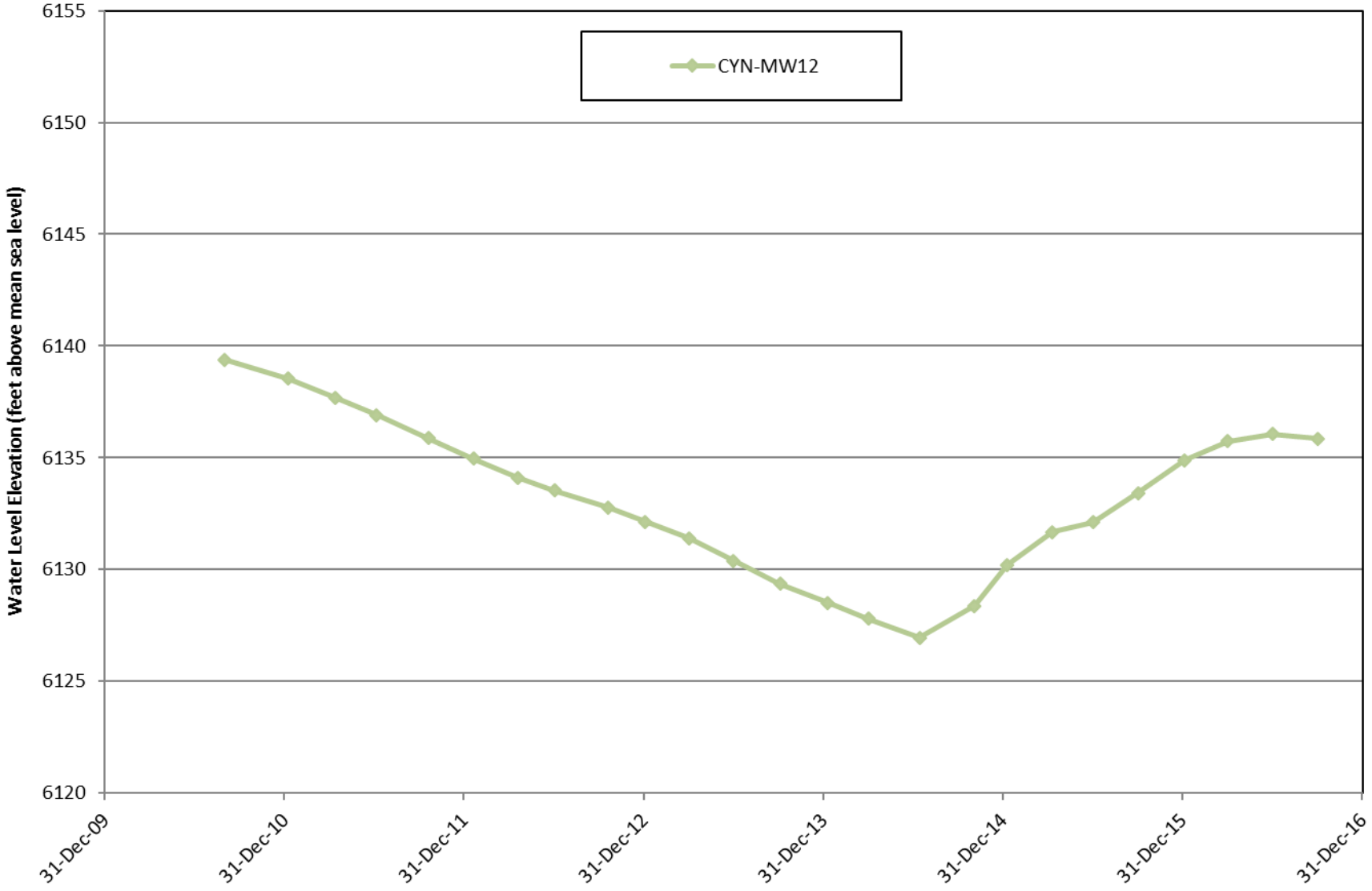

Figure 7D-8. BSG Area of Concern Wells (8 of 9)

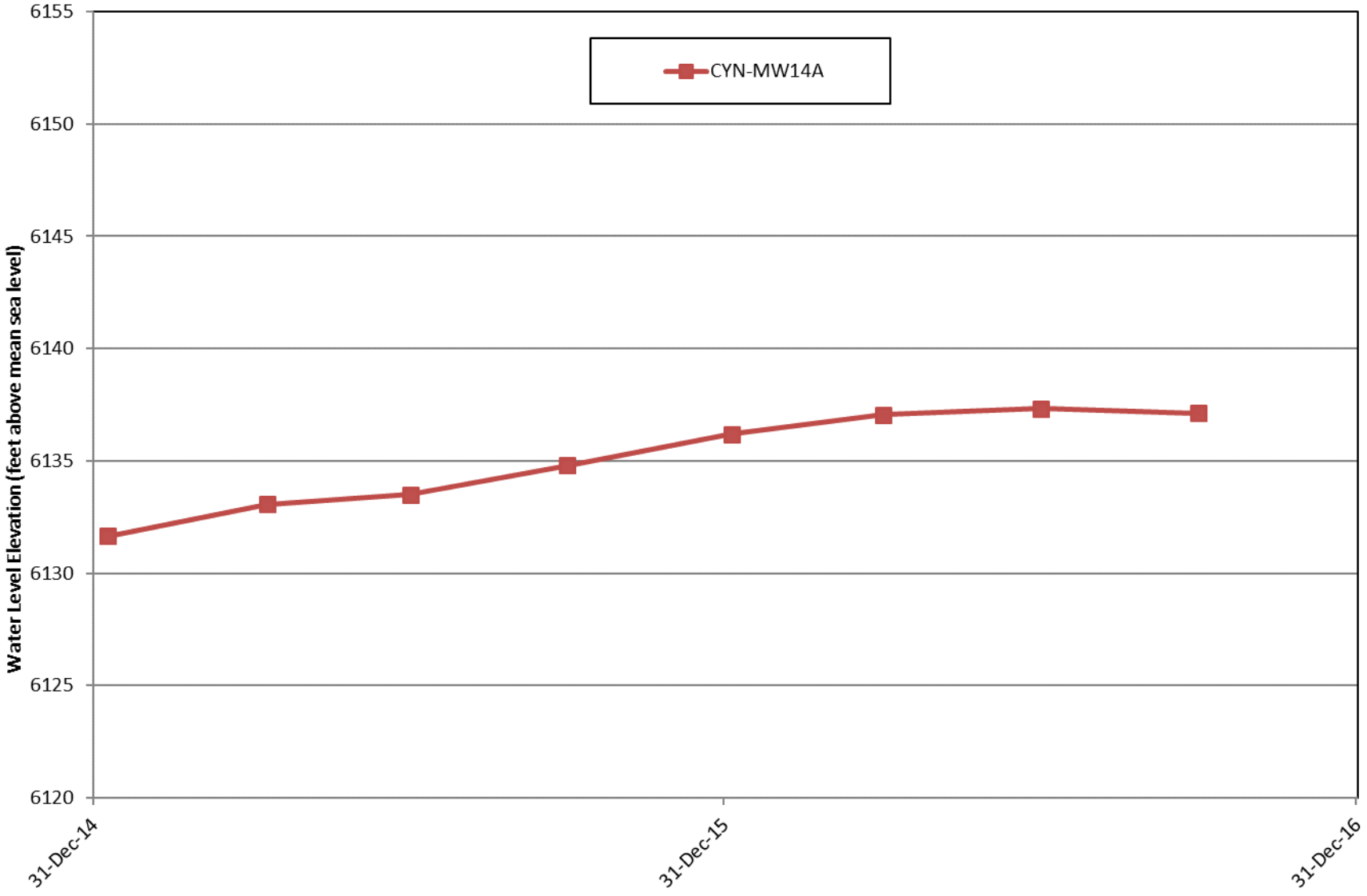

Figure 7D-9. BSG Area of Concern Wells (9 of 9)

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Chapter 7
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Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet 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													
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	
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

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet 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-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	
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
Greystone-MW2	MW	5814.20	5811.4	60.0	80.0	5751.4	5731.4	85.0	4.8	PVC	Alluvium	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	505.5	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	
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	

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Coyote Test Field and Vicinity													
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	
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
SFR-1D	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	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 [e]													
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	13-Aug-1998	
TA1-W-08	MW	5434.19	5434.7	302.0	322.0	5132.7	5112.7	327.0	4.5	PVC	PGWS – SFG sediments	03-Aug-2001	
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	
TA2-NW1-595 [f]	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

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Tijeras Arroyo Groundwater (Continued)													
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	09-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	01-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	05-Dec-2014	
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	31-Aug-1998	
TJA-4	MW	5341.16	5338.5	360.0	380.0	4978.5	4958.5	385.7	5.0	PVC	merging zone – SFG sediments	04-Aug-1998	
TJA-5	MW	5341.33	5338.5	267.0	287.0	5071.5	5051.5	292.7	5.0	PVC	PGWS – SFG sediments	7-Aug-1998	
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	07-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	27-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	27-Aug-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	31-Jul-2001	
WYO-4	MW	5392.57	5390.2	275.0	295.0	5115.2	5095.2	300.0	4.5	PVC	PGWS – SFG sediments	22-Jul-2001	
PGS-1	MW	5407.41	5407.9	503.0	513.0	4904.9	4894.9	538.0	5.0	SS	Regional Aquifer – SFG sediments	09-Aug-1994	Apr-1998
PGS-2 [g]	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	
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-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	5464.26	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	
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	

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Technical Area V (Continued)													
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			516.0	541.0				4.8	PVC	Proposed location, pending survey		
TAV-MW16	MW			527.0	552.0				4.8	PVC	Proposed location, pending survey		
Albuquerque Bernalillo County Water Utility Authority, Lovelace Respiratory Research Institute, New Mexico Environment Department, Isleta Pueblo, and Unites States Geological Survey													
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	
IP-1	MW	5622.18	5620.7	78.0	98.0	5542.7	5522.7	98.0	2.0	PVC	Regional Aquifer – SFG sediments	17-Jul-1994	
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	
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	
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	
MVMWJ	MW	5118.04	5118.6	200.0	220.0	4918.6	4898.6	225.0	2.0	PVC	Regional Aquifer – SFG sediments	30-Sep-1988	
MVMWK	MW	5186.05	5186.5	unk	unk	unk	unk	unk	unk	unk	Regional Aquifer – SFG sediments	30-Sep-1988	
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	
4HILLS-1	MW	5671.34	5692.6	24.0	64.0	5668.6	5628.6	69.0	4.0	PVC	Regional Aquifer – SFG sediments	Mar-2000?	
Kirtland Air Force Base [h]													
EOD Well	MW	5829.70	5828.7	206.0	247.0	5622.7	5581.7	206.0	6.0	S/OH	Bedrock (granite)	1970?	
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	5281.50	5297.3	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	

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Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base (Continued)													
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	
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	492.0	512.0	4863.7	4843.7	517.0	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-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-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-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	
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	

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Kirtland Air Force Base (Continued)													
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 [i]	MW	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-0903	MW	5391.63	5389.4	225.0	250.0	5164.4	5139.4	251.0	4.0	PVC	merging zone – 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-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		
KAFB-2004	MW	5592.08	5592.5?	278.0	308.0	5314.5	5284.5	309.0	4.0	PVC	Regional Aquifer – SFG sediments	17-Feb-2002	
KAFB-2005	MW	5624.27	5624.6	126.0	156.0	5498.6	5468.6	158.5	4.0	PVC	Regional Aquifer – SFG sediments	10-May-2006	
KAFB-2006	MW	5590.88	5591.0?	303.0	333.0	5288.0	5258.0	335.0	4.0	PVC	Regional Aquifer – SFG sediments	10-May-2006	
KAFB-2007	MW	5564.48	5562.1	273.0	303.0	5289.1	5259.1	305.5	4.0	PVC	Regional Aquifer – SFG sediments	13-May-2006	
KAFB-2008	MW	5541.74	5539.5	650.0	680.0	4889.5	4859.5	688.0	5.0	unk	Regional Aquifer – SFG sediments	unk	
KAFB-2009	MW	5655.63	5653.4	74.0	104.0	5579.4	5549.4	110.0	4.0	unk	Regional Aquifer – SFG sediments	unk	
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	unk	
KAFB-2625	MW	5359.26	5357.4	185.0	205.0	5172.4	5152.4	207.0	4.0	PVC	PGWS – SFG sediments	unk	
KAFB-2626	MW	5357.51	5355.6	185.0	205.0	5170.6	5150.6	208.0	4.0	PVC	PGWS – SFG sediments	unk	
KAFB-2627	MW	5367.47	5365.5	195.0	215.0	5170.5	5150.5	217.5	4.0	PVC	PGWS – SFG sediments	unk	
KAFB-2628	MW	5369.64	5367.4	506.0	530.0	4861.4	4837.4	535.0	5.0	PVC	Regional Aquifer – SFG sediments	unk	
KAFB-2629	MW	5361.53	5359.0	499.5	519.5	4859.7	4839.7	523.5	5.0	PVC	Regional Aquifer – SFG sediments	unk	
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	

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base (Continued)													
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-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	5426.22	5421.0	488.0	513.0	4933.0	4908.0	516.0	4.0	unk	Regional Aquifer – SFG sediments	unk	
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	479	4869.0	4844.0	480	4	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	unk	
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	
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	unk	
ST105-MW001	MW	5279.34	5276.6	408.0	428.0	4868.6	4848.6	433.0	4.0	PVC	Regional Aquifer – SFG sediments	11-Mar-2103	
ST105-MW002	MW	5180.32	5177.8	308.8	328.8	4869.0	4849.0	333.8	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	5234.1	365.0	385.0	4869.1	4849.1	390.0	4.0	PVC	Regional Aquifer – SFG sediments	20-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	27-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	2-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	461.0	476.0	4895.5	4880.5	481.0	4.0	PVC	Regional Aquifer – SFG sediments	20-Feb-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	7-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	9-Apr-2013	
ST105-MW012	MW	5419.90	5417.1	376.0	396.0	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	453.6	4.0	PVC	Regional Aquifer – SFG sediments	16-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	7-May-2013	
ST105-MW017	MW	5621.97	5619.6	702.0	722.0	4917.6	4897.6	727.0	4.0	PVC	Regional Aquifer – SFG sediments	14-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	9-Mar-2013	
ST105-MW019	MW	5217.94	5215.2	345.0	365.0	4870.2	4850.2	370.0	4.0	PVC	Regional Aquifer – SFG sediments	6-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	24-Apr-2013	
ST105-MW021	MW	5390.90	5388.4	322.0	342.0	5066.4	5046.4	347.0	4.0	PVC	PGWS – SFG sediments	5-Apr-2013	
ST105-MW022	MW	5386.66	5383.9	472.0	492.0	4911.9	4891.9	497.0	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	28-Oct-2013	
ST105-MW024	MW	5595.67	5593.3	442.0	462.0	5151.3	5131.3	467.0	4.0	PVC	Regional Aquifer – SFG sediments	12-Nov-2013	
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?	

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet bgs)	Casing, Inner Diameter (inches)	Casing Material	Lithology of Screened Interval	Installation Date	P&A Date, If Applicable
Kirtland Air Force Base (Continued)													
Site 58 MW-3	MW	5717.88	5717.9	52.0	72.0	5665.9	5645.9	72.0	2.0	PVC	Colluvium and Bedrock (granite)	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 and Bedrock (granite)	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?	
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	4.0	PVC	Bedrock (schist and granite)	20-Feb-1986	Inactive 2003
Greystone Well	P	5822.87	5820.8	44	54	5776.8	5766.8	54	4.0	PVC/S	Alluvium	Jan-2002	12-Sep-2002
KAFB-1	P	unk	5386.5	550	1199	4836.5	4187.5	1199	12.0	S	Regional Aquifer – SFG sediments	1-Aug-1949	Dec 2016
KAFB-2	P	5327.06	5327.1	494	1000	4833.1	4327.1	1000	12.0	S	Regional Aquifer – SFG sediments	Jan-1951	Dec 2016
KAFB-3	P	unk	5356.9	452	900	4904.9	4456.9	920	14.0	S	Regional Aquifer – SFG sediments	01-Oct-1949	
KAFB-4	P	unk	5360.2	494	1000	4866.2	4360.2	1000	14.0	S	Regional Aquifer – SFG sediments	01-Dec-1949	
KAFB-5	P	unk	5439.0	504	1004	4935.0	4435.0	1004	14.0	S	Regional Aquifer – SFG sediments	1-Jul-1952	1983?
KAFB-6	P	unk	5423.5	504	1002	4919.5	4421.5	1006	14.0	S	Regional Aquifer – SFG sediments	1-Jul-1952	1985
KAFB-7	Inj	unk	5350.4	448	976	4902.4	4374.4	976	16.0	S	Regional Aquifer – SFG sediments	1-Feb-1955	
KAFB-8	P	5372.00	5372.0	440	975	4932.0	4397.0	1000	14.0	S	Regional Aquifer – SFG sediments	1-Feb-1955	2000
KAFB-9	P	5501.19	5501.2	unk	unk	unk	4851.2?	650	10.0	S	Regional Aquifer – SFG sediments	1-Oct-1949	1970
KAFB-10	P	5418.65	5418.7	495	970	4923.7	4448.7	970	12.75	S	Regional Aquifer – SFG sediments	27-May-1959	Apr-1996
KAFB-11	P	5470.67	5481.0	670	1327	4811.0	4154.0	1327	16.0	S	Regional Aquifer – SFG sediments	10-Apr-1972	Dec 2016
KAFB-12	P	5322.87	5324.2	446	1032	4878.2	4292.2	1032	16.0	S	Regional Aquifer – SFG sediments	1-Oct-1952	Before 2002
KAFB-13	P	5305.67	5307.0	413	953	4894.0	4354.0	977	14.0	S	Regional Aquifer – SFG sediments	1-Mar-1956	Before 1991
KAFB-14	P	5324.67	5324.2	380	1000	4944.2	4324.2	1000	16.0	S	Regional Aquifer – SFG sediments	01-Jan-1969	
KAFB-15	P	unk	5347.0	697	993	4650.0	4354.0	1600	18.0	S	Regional Aquifer – SFG sediments	2000?	
KAFB-16	P	unk	5370.0	697	993	4673.0	4377.0	1600	18.0	S	Regional Aquifer – SFG sediments	2000?	
KAFB-17 (Heliport #1)	Px	unk	5275.0?	unk	unk	unk	4525.0?	750	6.0	SS	Regional Aquifer – SFG sediments	1996?	
KAFB-18 [j]	P	5965.70	5965.7	160	320	5805.7	5645.7	320	5.0	PVC	Bedrock (metarhyolite)	19-Aug-1987	
KAFB-19 (HERTF)	P	unk	6229.7	449	500	5780.7	5729.7	500	5.0	S/OH?	Bedrock (granite)	13-Jul-1990	Before 2015
KAFB-20	P	unk	5389.0	710	1180	4679.0	4209.0	1240	20.0	S	Regional Aquifer – SFG sediments	2010?	
RG-1598-S-4 [k]	Px	5369.90	5368.4	290	440	5078.4	4928.4	455	12.0	SS	PGWS – SFG sediments	14-Oct-1998	
KAFB-0602	Ext	5365.47	5364.2	437	457	4927.2	4907.2	467	4.0	PVC/SS	PGWS – SFG sediments	20-Mar-1990	
KAFB-0608	Ext	5361.17	5359.9	307	327	5052.9	5032.9	338	4.0	PVC/SS	PGWS – SFG sediments	28-Mar-1990	
KAFB-0609	Ext	5365.87	5364.7	316	336	5048.7	5028.7	345	4.0	PVC/SS	PGWS – SFG sediments	31-Mar-1990	22-Jun-2014
KAFB-0610	Ext	5359.47	5357.3	333	353	5024.3	5004.3	363	4.0	PVC/SS	PGWS – SFG sediments	04-Apr-1990	
KAFB-106228	Ext	5322.08		440.0	540.0			545.0	8.0	SS	Regional Aquifer – SFG sediments	2-June-2015	

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM[a], KAFB, and Surrounding Areas *(Continued)*

Well ID	Type	Measuring Point [b,c] (feet amsl, NAVD 88)	Ground Surface [c] (feet amsl, NAVD 88)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Top of Screen (feet amsl)	Bottom of Screen (feet amsl)	Casing Total Depth (feet 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-106233	Ext	5312.30		430.0	532.1			537.1	8.0	SS	Regional Aquifer – SFG sediments	30-Sep-2015	
KAFB-106234	Ext	5322.51		439.7	539.7			544.7	8.0	SS	Regional Aquifer – SFG sediments	9-Oct-2015	
KAFB-106239	Ext			470.0	570.0			575.0	8.0	SS	Regional Aquifer – SFG sediments	Dec 2016	
Lake Christian West [l]	Px	5716.61	5714.8	60	72	5654.8	5642.8	72	6.0	S	SFG sediments or sandstone	before 1990	after 2004
Ridgecrest-1	P	unk	5444.7	636	1260	4808.7	4184.7	1260	16.0	S	Regional Aquifer – SFG sediments	13-Jan-1964	
Ridgecrest-2	P	unk	5418.7	730	1500	4688.7	3918.7	1543	16.0	S	Regional Aquifer – SFG sediments	1-Jan-1977	
Ridgecrest-3	P	unk	5387.7	621	1436	4766.7	3951.7	1449	16.0	S	Regional Aquifer – SFG sediments	01-May-1974	
Ridgecrest-4	P	unk	5346.7	573	1413	4773.7	3933.7	1450	unk	S	Regional Aquifer – SFG sediments	01-Mar-1974	
Ridgecrest-5	P	unk	5356.7	650	1450	4706.7	3906.7	1450	20.0	S	Regional Aquifer – SFG sediments	8-Dec-1990	
School House Well	P	5796.33	5799.0	103	107	5696.0	5692.0	103	6.0	S/OH	Bedrock (Sandia Formation) sandstone?	1930s?	
TSA-1	P	6063.68	6060.2	190	210	5870.2	5850.2	300	6.0	S	Bedrock (metamorphics)	10-Nov-1987	Aug-2001
VA-2	P	unk	5346.3?	590	990	4756.3	4356.3	1010	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	

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 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] Merging zone refers to isolated layers of saturation near Tijeras Arroyo, typically between the Perched Groundwater System and the Regional Aquifer. A merging zone is occasionally present above the Perched Groundwater System.

[f] Monitoring well TA2-NW1-595 has two screens: 535 to 555 feet bgs, and 585 to 595 feet bgs. Groundwater samples are collected from the upper screen.

[g] Monitoring well PGS-2 has three screens: 535 to 565 feet bgs, 585 to 595 feet bgs, and 625 to 645 feet bgs. Groundwater samples are collected from the upper screen.

[h] 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 in the SNL/NM groundwater areas of concern.

[i] Monitoring well KAFB-0626 was constructed with a FLUTe monitoring system with four sampling ports labeled as KAFB-0626A through KAFB-0626D. Sample tubing (0.25-inch diameter) for the four ports was installed in a 5-inch diameter PVC casing. Groundwater elevations cannot be measured. Port KAFB-0626A is set at 425 feet bgs. Port KAFB-06262B is set at 471 feet bgs. Port KAFB-06262C is set at 515 feet bgs. Port KAFB-06262D is set at 629 feet bgs. Each port has an interval of silica sand that is separated by bentonite chips.

[j] KAFB-18 is also known as the Optical Range Well or the Starfire Optical Range well.

[k] The production-nonpotable well RG-1598-S-4 is also known as the Golf Course Main Pond well. Some KAFB documents also use the identifier RG-1589-S-4. Pumped water is used for irrigating the KAFB Tijeras Arroyo Golf Course.

[l] Lake Christian West is also known as well KAFB-1903. Well was used for nonpotable purposes including the filling of a U.S. Air Force high-explosives testing pond located approximately 1,600 feet to the east of the well.

Table 1. Inventory of Base-Wide Groundwater Monitoring, Production, and Extraction Wells Located at SNL/NM, KAFB, and Surrounding Areas *(Concluded)*

Notes (Continued):

amsl = Above mean sea level.
ASL PD = Albuquerque Seismological Laboratory Production.
AVN = Area V (North).
BFF = Bulk Fuels Facility at KAFB.
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).
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 BFF and the KAFB Tijeras Arroyo Golf Course.
FLUTe = Flexible Liner Underground Technologies, LLC.
HERTF = High Energy Research Test Facility.
ID = Identifier.
Inj = Injection well.
IP = Isleta Pueblo.
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.
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 used for nonpotable purposes such as irrigating the golf course.
PGS = Parade Ground South.
PGWS = Perched Groundwater System.
PL = Power Line Road, located northwest of Technical Area III. The better-known Power Line Road is near the 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).
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.
SS = Stainless steel.
STW = Solar Tower (West).
SWTA = 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.
VA = Veterans Administration.
WYO = Wyoming.
YALE = Yale Boulevard area.

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Table 2. Base-Wide Groundwater Elevations for Monitoring Wells Located at SNL/NM and the KAFB Vicinity for Calendar Year 2016

Well ID	Measuring Point [a, b] (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Groundwater Elevation (rounded, feet amsl)	Not Contoured on Plate 1 (if applicable for Regional Aquifer and Bedrock Wells)	Data Source	Well Owner	Screened Unit
AVN-1	5443.00	11-Oct-2016	526.12	4916.88	4917		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
Burn Site Well	6374.66	30-Sep-2016	100.08	6274.58	6275		SNL/NM	SNL/NM	Bedrock (schist and granite)
CCBA-MW1	5902.34	16-Oct-2016	48.07	5854.27	5854		SNL/NM	SNL/NM	Alluvium and bedrock (granite)
CCBA-MW2	5939.28	10-Oct-2016	72.14	5867.14	5867		SNL/NM	SNL/NM	Bedrock (granite)
CTF-MW1	6082.63	10-Oct-2016	239.74	5842.89	5843		SNL/NM	SNL/NM	Bedrock (granite)
CTF-MW2	5578.60	13-Oct-2016	43.85	5534.75	5535		SNL/NM	SNL/NM	Bedrock (granite)
CTF-MW3	5522.82	14-Oct-2016	309.31	5213.51	5214		SNL/NM	SNL/NM	Bedrock (granite)
CWL-BW5	5434.79	4-Oct-2016	512.84	4921.95	4922		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
CWL-MW9	5426.12	4-Oct-2016	504.49	4921.63	4922		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
CWL-MW10	5424.58	4-Oct-2016	501.54	4923.04	4923		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
CWL-MW11	5423.24	4-Oct-2016	499.78	4923.46	4923		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
CYN-MW3	6313.26	30-Sep-2016	129.97	6183.29	6183		SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW4	6455.48	30-Sep-2016	227.99	6227.49	6227		SNL/NM	SNL/NM	Bedrock (quartzite)
CYN-MW5	5984.23	10-Oct-2016	108.46	5875.77	5876		SNL/NM	SNL/NM	Bedrock (quartzite)
CYN-MW6	6343.37	30-Sep-2016	151.08	6192.29	6192		SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW7	6216.35	30-Sep-2016	304.80	5911.55	5912		SNL/NM	SNL/NM	Bedrock (granitic gneiss)
CYN-MW8	6230.11	30-Sep-2016	320.52	5909.59	5910		SNL/NM	SNL/NM	Bedrock (granitic gneiss)
CYN-MW9	6360.67	30-Sep-2016	165.54	6195.13	6195		SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW10	6345.45	30-Sep-2016	123.50	6221.95	6222		SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW11	6374.41	30-Sep-2016	99.80	6274.61	6275		SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW12	6345.16	30-Sep-2016	209.31	6135.85	6136		SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW13	6237.79	30-Sep-2016	326.73	5911.06	5911		SNL/NM	SNL/NM	Bedrock (granitic gneiss)
CYN-MW14A	6315.85	30-Sep-2016	178.82	6137.03	6137	NC - deeper fracture	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW15	6344.44	30-Sep-2016	152.57	6191.87	6192		SNL/NM	SNL/NM	Bedrock (metamorphics)
Greystone-MW2	5814.20	10-Oct-2016	54.68	5759.52	5760	NC - alluvium	SNL/NM	SNL/NM	Alluvium
LWDS-MW1	5423.83	11-Oct-2016	504.00	4919.83	4920		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
LWDS-MW2	5412.41	11-Oct-2016	492.83	4919.58	4920		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MRN-2	5308.18	11-Oct-2016	434.31	4873.87	4874		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MRN-3D	5309.34	11-Oct-2016	434.69	4874.65	4875		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-BW2	5391.02	4-Oct-2016	480.68	4910.34	4910		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-MW4	5391.70	4-Oct-2016	501.87 corr.	4892.58	4893		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-MW5	5382.56	4-Oct-2016	493.68	4888.88	4889		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-MW6	5375.31	4-Oct-2016	487.35	4887.96	4888		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-MW7	5383.30	5-Oct-2016	490.03	4893.27	4893		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-MW8	5384.67	4-Oct-2016	491.58	4893.09	4893		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
MWL-MW9	5381.91	4-Oct-2016	491.91	4890.00	4890		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
NWTA3-MW2	5337.49	12-Oct-2016	465.70	4871.79	4872		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
NWTA3-MW3D	5340.80	23-Oct-2015	464.66	4876.14	4876		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
OBS-MW1	5871.42	10-Oct-2016	71.98	5799.44	5799		SNL/NM	SNL/NM	Bedrock (granite)
OBS-MW2	5863.16	10-Oct-2016	174.70	5688.46	5688		SNL/NM	SNL/NM	Bedrock (granite)
OBS-MW3	5865.50	11-Oct-2016	69.37	5796.13	5796		SNL/NM	SNL/NM	Bedrock (granite)
PGS-2	5408.29	11-Oct-2016	538.80	4869.49	4869		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
PL-2	5336.01	11-Oct-2016	465.14	4870.87	4871		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
PL-4	5334.98	11-Oct-2016	464.67	4870.31	4870		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SFR-1D	5399.13	10-Oct-2016	139.80	5259.33	5259		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments

Table 2. Base-Wide Groundwater Elevations for Monitoring Wells Located at SNL/NM and the KAFB Vicinity for Calendar Year 2016 *(Continued)*

Well ID	Measuring Point [a, b] (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Groundwater Elevation (rounded, feet amsl)	Not Contoured on Plate 1 (if applicable for Regional Aquifer and Bedrock Wells)	Data Source	Well Owner	Screened Unit
SFR-1S	5399.16	10-Oct-2016	89.94	5309.22	5309		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SFR-2S	5432.77	11-Oct-2016	100.79	5331.98	5332		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SFR-3D	5497.94	11-Oct-2016	162.02	5335.92	5336		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SFR-3P	5499.63	11-Oct-2016	162.21	5337.42	5337		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SFR-3S	5498.24	11-Oct-2016	161.19	5337.05	5337		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SFR-3T	5498.66	11-Oct-2016	68.91	5429.75	5430		SNL/NM	SNL/NM	Bedrock (sandstone)
SFR-4P	5573.33	11-Oct-2016	148.76	5424.57	5425		SNL/NM	SNL/NM	Bedrock (sandstone)
SWTA3-MW2	5325.60	12-Oct-2016	449.91	4875.69	4876		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SWTA3-MW3	5323.94	12-Oct-2016	447.28	4876.66	4877		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
SWTA3-MW4	5324.81	12-Oct-2016	447.99	4876.82	4877		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA1-W-01	5403.82	6-Oct-2016	535.85	4867.97	4868		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA1-W-02	5416.62	7-Oct-2016	521.11	4895.51	4896		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA1-W-03	5457.03	6-Oct-2016	354.93	5102.10	5102		SNL/NM	SNL/NM	PGWS - SFG sediments
TA1-W-04	5460.98	6-Oct-2016	567.50	4893.48	4893		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA1-W-05	5433.84	7-Oct-2016	561.98	4871.86	4872		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA1-W-06	5417.10	10-Oct-2016	308.44	5108.66	5109		SNL/NM	SNL/NM	PGWS - SFG sediments
TA1-W-07	5404.92	6-Oct-2016	286.27	5118.65	5119		SNL/NM	SNL/NM	PGWS - SFG sediments
TA1-W-08	5434.19	7-Oct-2016	311.54	5122.65	5123		SNL/NM	SNL/NM	PGWS - SFG sediments
TA2-NW1-325	5421.94	6-Oct-2016	319.12	5102.82	5103		SNL/NM	SNL/NM	PGWS - SFG sediments
TA2-NW1-595	5421.26	6-Oct-2016	520.79	4900.47	4900		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA2-W-01	5419.99	6-Oct-2016	329.35	5090.64	5091		SNL/NM	SNL/NM	PGWS - SFG sediments
TA2-W-19	5351.21	6-Oct-2016	272.76	5078.45	5078		SNL/NM	SNL/NM	PGWS - SFG sediments
TA2-W-24	5363.66	6-Oct-2016	441.51	4922.15	4922		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA2-W-25	5374.86	6-Oct-2016	467.39	4907.47	4907		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TA2-W-26	5375.77	6-Oct-2016	288.39	5087.38	5087		SNL/NM	SNL/NM	PGWS - SFG sediments
TA2-W-27	5362.85	6-Oct-2016	281.00	5081.85	5082		SNL/NM	SNL/NM	PGWS - SFG sediments
TA2-W-28	5412.41	6-Oct-2016	320.20	5092.21	5092		SNL/NM	SNL/NM	PGWS - SFG sediments
TAV-MW2	5427.33	14-Oct-2016	508.07	4919.26	4919		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW3	5464.26	14-Oct-2016	546.63	4917.63	4918		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW4	5427.89	11-Oct-2016	508.36	4919.53	4920		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW5	5408.71	14-Oct-2016	491.63	4917.08	4917		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW6	5431.17	11-Oct-2016	511.88	4919.29	4919		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW7	5430.40	11-Oct-2016	514.43	4915.97	4916		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW8	5417.00	11-Oct-2016	497.01	4919.99	4920		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW9	5416.27	11-Oct-2016	500.60	4915.67	4916		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW10	5437.03	11-Oct-2016	517.96	4919.07	4919		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW11	5440.12	11-Oct-2016	520.84	4919.28	4919		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW12	5435.72	11-Oct-2016	517.43	4918.29	4918		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW13	5409.02	14-Oct-2016	496.68	4912.34	4912		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TAV-MW14	5441.52	11-Oct-2016	524.51	4917.01	4917		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TJA-2	5353.20	6-Oct-2016	277.96	5075.24	5075		SNL/NM	SNL/NM	PGWS - SFG sediments
TJA-3	5390.56	6-Oct-2016	498.93	4891.63	4892		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TJA-4	5341.16	6-Oct-2016	300.37	5040.79	5041	NC - merging zone	SNL/NM	SNL/NM	merging zone – SFG sediments
TJA-5	5341.33	6-Oct-2016	270.17	5071.16	5071		SNL/NM	SNL/NM	PGWS - SFG sediments
TJA-6	5343.16	11-Oct-2016	451.23	4891.93	4892		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments

Table 2. Base-Wide Groundwater Elevations for Monitoring Wells Located at SNL/NM and the KAFB Vicinity for Calendar Year 2016 *(Continued)*

Well ID	Measuring Point [a, b] (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Groundwater Elevation (rounded, feet amsl)	Not Contoured on Plate 1 (if applicable for Regional Aquifer and Bedrock Wells)	Data Source	Well Owner	Screened Unit
TJA-7	5391.27	6-Oct-2016	303.92	5087.35	5087		SNL/NM	SNL/NM	PGWS - SFG sediments
TRE-1	5497.25	10-Oct-2016	177.54	5319.71	5320		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
TRN-1	5735.62	10-Oct-2016	92.31	5643.31	5643		SNL/NM	SNL/NM	Bedrock (sandstone)
TRS-1D	5779.80	10-Oct-2016	127.39	5652.41	5652		SNL/NM	SNL/NM	Bedrock (limestone)
TRS-1S	5780.07	10-Oct-2016	134.89	5645.18	5645		SNL/NM	SNL/NM	Bedrock (limestone)
TRS-2	5780.76	10-Oct-2016	135.45	5645.31	5645		SNL/NM	SNL/NM	Bedrock (limestone)
WYO-3	5392.09	6-Oct-2016	524.47	4867.62	4868		SNL/NM	SNL/NM	Regional Aquifer – SFG sediments
WYO-4	5392.57	6-Oct-2016	293.99	5098.58	5099		SNL/NM	SNL/NM	PGWS - SFG sediments
Non SNL/NM Wells									
EOD Well	5829.70	9-Dec-2016	144.91	5684.79	5685		KAFB	KAFB	Bedrock (granite)
Eubank-1	5460.02	6-Oct-2016	547.75	4912.27	4912		SNL/NM	COA EHD	Regional Aquifer – SFG sediments
Eubank-2	5474.39	18-Oct-2016	575.53	4898.86	4899		COA EHD	COA EHD	Regional Aquifer – SFG sediments
Eubank-3	5498.73	31-Oct-2016	603.55	4895.18	4895		COA EHD	COA EHD	Regional Aquifer – SFG sediments
Eubank-5	5507.40	27-Oct-2016	612.73	4894.67	4895		COA EHD	COA EHD	Regional Aquifer – SFG sediments
ITRI-MW-16	5644.91	1-Oct-2016	110.50	5534.41	5534		LRRI	LRRI	Regional Aquifer – SFG sediments
KAFB-0118	5320.75	28-Nov-2016	449.73	4871.02	4871		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0119	5315.82	28-Nov-2016	445.21	4870.61	4871		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0120	5292.29	28-Nov-2016	418.27	4874.02	4874		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0121	5307.60	28-Nov-2016	436.93	4870.67	4871		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0213	5281.50	29-Nov-2016	413.71	4867.79	4868		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0219	5263.69	29-Nov-2016	393.97	4869.72	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0220	5265.10	29-Nov-2016	395.42	4869.68	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0221	5274.36	29-Nov-2016	404.70	4869.66	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0307	5364.53	2-Dec-2016	422.35	4942.18	4942		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0308	5381.65	2-Dec-2016	445.32	4936.33	4936		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0309	5411.80	2-Dec-2016	480.43	4931.37	4931		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0310	5416.48	2-Dec-2016	353.45	5063.03	5063		KAFB	KAFB	PGWS - SFG sediments
KAFB-0311	5353.29	2-Dec-2016	418.86	4934.43	4934		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0312	5432.17	2-Dec-2016	416.95	5015.22	5015		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0313	5418.98	2-Dec-2016	350.29	5068.69	5069		KAFB	KAFB	PGWS - SFG sediments
KAFB-0314	5455.75	2-Dec-2016	416.41	5039.34	5039		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0315	5466.11	2-Dec-2016	437.90	5028.21	5028		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0417	5313.07	28-Nov-2016	447.60	4865.47	4865		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0504	5357.87	29-Nov-2016	487.96	4869.91	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0505	5362.81	29-Nov-2016	487.96	4874.85	4875		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0506	5363.47	29-Nov-2016	208.79	5154.68	5155		KAFB	KAFB	PGWS - SFG sediments
KAFB-0507R	5358.21	29-Nov-2016	489.15	4869.06	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0508	5351.88	28-Nov-2016	483.34	4868.54	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0510	5367.10	28-Nov-2016	499.53	4867.57	4868		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0512R	5302.73	29-Nov-2016	433.38	4869.35	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0514	5206.41	29-Nov-2016	338.26	4868.15	4868		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0516	5205.64	30-Nov-2016	337.51	4868.13	4868		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0517	5197.10	29-Nov-2016	326.79	4870.31	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0518	5177.76	28-Nov-2016	306.41	4871.35	4871		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0520	5247.90	29-Nov-2016	379.67	4868.23	4868		KAFB	KAFB	Regional Aquifer – SFG sediments

Table 2. Base-Wide Groundwater Elevations for Monitoring Wells Located at SNL/NM and the KAFB Vicinity for Calendar Year 2016 *(Continued)*

Well ID	Measuring Point [a, b] (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Groundwater Elevation (rounded, feet amsl)	Not Contoured on Plate 1 (if applicable for Regional Aquifer and Bedrock Wells)	Data Source	Well Owner	Screened Unit
Non SNL/NM Wells (Continued)									
KAFB-0522	5267.48	29-Nov-2016	400.25	4867.23	4867		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0523	5352.62	28-Nov-2016	479.67	4872.95	4873		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0524	5345.61	28-Nov-2016	475.42	4870.19	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0525	5229.75	29-Nov-2016	360.28	4869.47	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0608	5361.17	30-Nov-2016	294.27	5066.90	5067		KAFB	KAFB	PGWS - SFG sediments
KAFB-0611	5386.09	30-Nov-2016	462.65	4923.44	4923		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0612	5385.45	30-Nov-2016	291.29	5094.16	5094		KAFB	KAFB	PGWS - SFG sediments
KAFB-0613	5390.78	30-Nov-2016	353.19	5037.59	5038		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0614	5390.89	30-Nov-2016	331.62	5059.27	5059		KAFB	KAFB	PGWS - SFG sediments
KAFB-0615	5638.43	1-Dec-2016	205.55	5432.88	5433		KAFB	KAFB	Bedrock (granite)
KAFB-0616	5481.07	1-Dec-2016	442.92	5038.15	5038		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0617	5505.78	1-Dec-2016	557.23	4948.55	4949	NC - nearby fault	KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0618	5410.05	30-Nov-2016	483.85	4926.20	4926		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0619	5410.78	30-Nov-2016	384.96	5025.82	5026		KAFB	KAFB	PGWS - SFG sediments
KAFB-0620	5334.64	29-Nov-2016	442.37	4892.27	4892		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0621	5569.89	1-Dec-2016	625.04	4944.85	4945	NC - nearby fault	KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0622	5488.64	30-Nov-2016	551.57	4937.07	4937		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0623	5328.94	30-Nov-2016	258.90	5070.04	5070		KAFB	KAFB	PGWS - SFG sediments
KAFB-0624	5673.78	2-Dec-2016	769.71	4904.07	4904	NC - nearby fault	KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0625	5390.23	29-Nov-2016	471.90	4918.33	4921		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-6301	5459.64	30-Nov-2016	540.32	4919.32	4919		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0901	5390.07	2-Dec-2016	469.62	4920.45	4920		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-0903	5391.63	2-Dec-2016	237.09	5154.54	5155	NC - semiconfined?	KAFB	KAFB	merging zone – SFG sediments
KAFB-0904	5291.75	29-Nov-2016	351.59	4940.16	4940	NC - semiconfined?	KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-1006	5257.01	1-Dec-2016	380.28	4876.73	4877		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-1007R	5260.62	1-Dec-2016	383.65	4876.97	4877		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-1008	5260.77	1-Dec-2016	380.71	4880.06	4880		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-1009	5272.16	1-Dec-2016	392.89	4879.27	4879		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2005	5624.27	1-Dec-2016	115.57	5508.70	5509		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2006	5590.88	1-Dec-2016	286.53	5304.35	5304		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2007	5564.48	1-Dec-2016	261.22	5303.26	5303		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2008	5541.74	1-Dec-2016	597.51	4944.23	4944		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2009	5655.63	1-Dec-2016	73.12	5582.51	5583		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2622	5358.14	29-Nov-2016	202.31	5155.83	5156		KAFB	KAFB	PGWS - SFG sediments
KAFB-2624	5362.27	29-Nov-2016	217.57	5144.70	5145		KAFB	KAFB	PGWS - SFG sediments
KAFB-2625	5359.26	29-Nov-2016	196.98	5162.28	5162		KAFB	KAFB	PGWS - SFG sediments
KAFB-2626	5357.51	29-Nov-2016	207.05	5150.46	5150		KAFB	KAFB	PGWS - SFG sediments
KAFB-2628	5369.64	29-Nov-2016	500.53	4869.11	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2629	5361.53	29-Nov-2016	493.05	4868.48	4868		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2901	5839.08	22-Jun-2015	125.82	5713.26	5713		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2902	5832.10	22-Jun-2015	167.65	5664.45	5664		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-2903	5819.46	23-Jun-2015	140.31	5679.15	5679		KAFB	KAFB	Bedrock (Abo Formation)
KAFB-2904	5842.72	24-Jun-2015	46.46	5796.26	5796		KAFB	KAFB	Bedrock (Madera Formation)
KAFB-3392	5394.51	30-Nov-2016	528.28	4866.23	4866		KAFB	KAFB	Regional Aquifer – SFG sediments

Table 2. Base-Wide Groundwater Elevations for Monitoring Wells Located at SNL/NM and the KAFB Vicinity for Calendar Year 2016 *(Continued)*

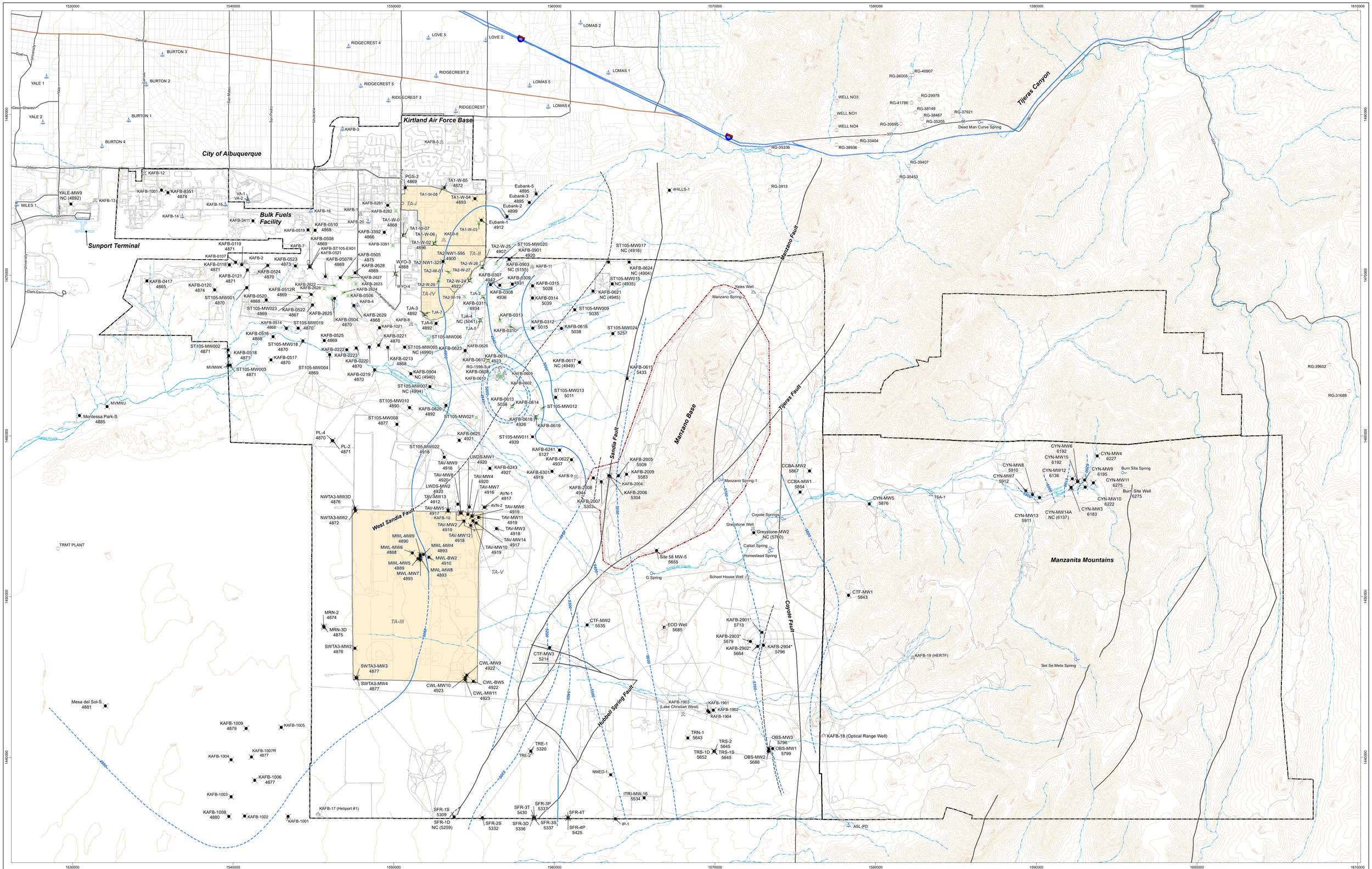
Well ID	Measuring Point [a, b] (feet amsl) NAVD 88	Date Measured	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)	Groundwater Elevation (rounded, feet amsl)	Not Contoured on Plate 1 (if applicable for Regional Aquifer and Bedrock Wells)	Data Source	Well Owner	Screened Unit
Non SNL/NM Wells (Continued)									
KAFB-6241	5466.50	30-Nov-2016	339.41	5127.09	5127		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-6243	5426.22	29-Nov-2016	499.35	4926.87	4927		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-6301	5459.64	30-Nov-2016	540.32	4919.32	4919		KAFB	KAFB	Regional Aquifer – SFG sediments
KAFB-8351	5325.51	28-Nov-2016	451.68	4873.83	4874		KAFB	KAFB	Regional Aquifer – SFG sediments
Mesa del Sol-S	5302.67	19-Oct-2016	421.68	4880.99	4881		USGS	NMOSE	Regional Aquifer – SFG sediments
Montessa Park-S	5102.67	19-Oct-2016	217.66	4885.01	4885		USGS	ABCUWA	Regional Aquifer – SFG sediments
YALE-MW9	5271.06	24-Oct-2016	378.81	4892.25	4892	NC - semiconfined?	ABCUWA	ABCUWA	Regional Aquifer – SFG sediments
ST105-MW001	5279.34	28-Nov-2016	408.97	4870.37	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW002	5180.32	28-Nov-2016	309.47	4870.85	4871		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW003	5174.61	28-Nov-2016	303.67	4870.94	4871		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW004	5234.61	29-Nov-2016	365.26	4869.35	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW005	5287.57	29-Nov-2016	297.61	4989.96	4990	NC - semiconfined?	KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW006	5313.26	29-Nov-2016	235.80	5077.46	5077		KAFB	KAFB	PGWS - SFG sediments
ST105-MW007	5311.18	29-Nov-2016	317.60	4993.58	4994	NC - semiconfined?	KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW008	5358.94	29-Nov-2016	482.04	4876.90	4877		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW009	5519.71	1-Dec-2016	484.70	5035.01	5035		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW010	5334.70	29-Nov-2016	444.51	4890.19	4890		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW011	5422.66	30-Nov-2016	483.81	4938.85	4939		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW012	5419.90	30-Nov-2016	383.89	5036.01	5036		KAFB	KAFB	PGWS - SFG sediments
ST105-MW013	5447.27	28-Nov-2016	436.62	5010.65	5011		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW015	5623.95	1-Dec-2016	688.84	4935.11	4935	NC - nearby fault	KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW017	5621.97	1-Dec-2016	706.42	4915.55	4916	NC - nearby fault	KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW018	5221.68	29-Nov-2016	351.88	4869.80	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW019	5217.94	29-Nov-2016	348.29	4869.65	4870		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW020	5383.72	2-Dec-2016	296.35	5087.37	5087		KAFB	KAFB	PGWS - SFG sediments
ST105-MW021	5390.90	29-Nov-2016	330.69	5060.21	5060		KAFB	KAFB	PGWS - SFG sediments
ST105-MW022	5386.66	29-Nov-2016	468.75	4917.91	4918		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW023	5275.86	29-Nov-2016	406.39	4869.47	4869		KAFB	KAFB	Regional Aquifer – SFG sediments
ST105-MW024	5595.67	1-Dec-2016	338.88	5256.79	5257		KAFB	KAFB	Regional Aquifer – SFG sediments
Site 58 MW-5	5716.83	31-Oct-2016	61.54	5655.29	5655		KAFB	KAFB	Bedrock (granite)

Table 2. Base-Wide Groundwater Elevations for Monitoring Wells Located at SNL/NM and the KAFB Vicinity for Calendar Year 2016 *(Concluded)*

Notes:

[a] Measuring point is the top of casing elevation used for measuring and calculating the groundwater elevations.
[b] Elevations are relative to the NAVD 88, New Mexico State Plane Coordinate System, Central Zone. Where necessary, elevation data from other government agencies were converted as necessary using a conversion (re-projection) of +2.671 feet.

ABCWUA = Albuquerque Bernalillo County Water Utility Authority.
amsl = Above mean sea level.
AVN = Area V (North).
btoc = Below top of casing (feet below the measuring point).
BW = Background well.
CCBA = Coyote Canyon Blast Area.
COA EHD = City of Albuquerque Environmental Health Department.
corr. = 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.
EOD = Explosive Ordnance Disposal.
ID = Identifier.
ITRI = Inhalation Toxicology Research Institute.
KAFB = Kirtland Air Force Base.
LRRI = Lovelace Respiratory Research Institute (formerly ITRI).
LWDS = Liquid Waste Disposal System.
MRN = Magazine Road North.
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 been 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 may be under semiconfined conditions.
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). The better-known Power Line Road is near the golf course.
R = Replacement well (term used by KAFB).
S = Shallow.
SFG = Santa Fe Group.
SFR = South Fence Road.
SNL/NM = Sandia National Laboratories, New Mexico.
ST105 = Series of KAFB wells.
SWTA3 = Southwest Technical Area III.
TA1-W = Technical Area I (Well).
TA2-NW = Technical Area II (Northwest).
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.
WYO = Wyoming.
YALE = Yale Boulevard area.



0 2,000 4,000 Feet

0 610 1,220 Meters

0 0.5 1 Miles

0 0.8 1.6 Kilometers

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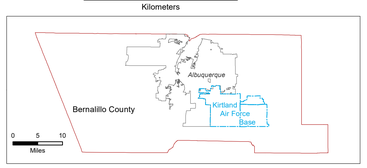

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Legend

- 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
- Injection Well
- Off-base Well, private use
- Spring, current or historical flow
- NC Not Contoured
- Potentiometric surface contour (ft amsl), dashed where uncertain
- Fault, exposed and concealed
- Fault, fully concealed
- Surface drainage, arroyo
- Ground surface contour (40 ft interval)
- Road, paved and unpaved
- Golf Course Main Pond
- SNL/NM Technical Area (TA) boundary
- Manzano Base boundary
- Kirtland Air Force Base (KAFB) boundary

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 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.
3. Groundwater elevations are rounded to the nearest foot. Water levels were measured between 30 September and 2 December 2016 except where noted by an asterisk. 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 map 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.
6. Numerous monitoring wells near the KAFB Bulk Fuels Facility and at KAFB Site 58 are not plotted.
7. Decommissioned (plugged and abandoned) monitoring wells are not shown.
8. 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, SFR-1D, and OBS-MW1 are inferred from groundwater elevations.
9. West of the Sandia Fault, the Regional Aquifer is present within the unconsolidated Santa Fe Group sediments. Groundwater within and east of theTijeras Fault Zone (bounded by the Sandia and Tijeras Faults) is primarily present in the Paleozoic and Precambrian bedrock.
10. The West Sandia Fault does not affect the alluvial-fan sediments at the water table.

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 2016

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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