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Sandia Field Office
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NMED
Hazardous Waste Bureau

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

Subject: Calendar Year 2014 Annual Groundwater Monitoring Report for Sandia National Laboratories/New Mexico

Dear Mr. Kieling:

The Department of Energy/National Nuclear Security Administration (DOE/NNSA) Sandia Field Office (SFO) is submitting the enclosed Calendar Year 2014 Annual Groundwater Monitoring Report for the DOE/NNSA SFO and the Sandia Corporation (Sandia). This report is submitted in compliance with periodic reporting requirements for groundwater monitoring discussed in Section X.D of the Compliance Order on Consent between the New Mexico Environment Department, the DOE/NNSA SFO, and Sandia. Specifically, the report meets the annual reporting requirement for the Tijeras Arroyo Groundwater, the Technical Area V Groundwater, the Burn Site Groundwater investigations, and groundwater investigations at several Solid Waste Management Units.

If you have questions, please contact Dave Rast of our staff at (505) 845-5349.

Sincerely,

Jeffery P. Harrell
Manager

Enclosure

cc: See Page 2

Calendar Year 2014 Annual Groundwater Monitoring Report

CERTIFICATION STATEMENT

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

Michael W. Hazen, Vice President
Sandia Corporation
Albuquerque, New Mexico
Operator

11 June 2015
Date signed

Jeffrey P. Harrell, Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office (SFO)
Owner

6/24/15
Date signed

SANDIA REPORT
Unlimited Release
SAND2015-4261 R
Printed June 2015

Calendar Year 2014

Annual Groundwater Monitoring Report

Prepared by
Sandia National Laboratories, Albuquerque, New Mexico

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

SANDIA REPORT
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Annual Groundwater Monitoring Report

Calendar Year 2014

Long-Term Stewardship Consolidated Groundwater Monitoring Program

Sandia National Laboratories, New Mexico

June 2015

Prepared by:
Long-Term Stewardship (4142) in coordination with
Environmental Restoration Operations (6234)

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Acknowledgments

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

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Abstract

Sandia National Laboratories, New Mexico (SNL/NM) is a government-owned/contractor-operated laboratory. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, 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. Sandia conducts two types of groundwater surveillance monitoring 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) as 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, 2014: Burn Site Groundwater Area of Concern (AOC); Chemical Waste Landfill; Mixed Waste Landfill; Solid Waste Management Units 8/58, 49, 68, 116, 149, and 154; 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*.

Chapter Tables

Chapter Tables (continued)

Chapter Tables (continued)

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Chapter Figures

Chapter Figures (continued)

Chapter Figures (concluded)

Table

Plate

Abbreviations and Acronyms

°C	degree(s) Celsius
ABCWUA	Albuquerque Bernalillo County Water Utility Authority
amsl	above mean sea level
AOC	Area of Concern
AOP	Administrative Operating Procedure
ARG	Ancestral Rio Grande
bgs	below ground surface
BSG	Burn Site Groundwater (AOC)
$CaCO_3$	calcium carbonate
CAC	Corrective Action Complete
CCBA	Coyote Canyon Blast Area
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
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
DCG	Derived Concentration Guide
DI	deionized
DO	dissolved oxygen
DOE	U.S. Department of Energy
DRO	diesel range organics
DSS	Drain and Septic System
dup	duplicate
EB	equipment blank
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
Final Closure Plan	*Chemical Waste Landfill Final Closure Plan and Postclosure Permit Application*
FIP	Field Implementation Plan
FOP	Field Operating Procedure
FY	Fiscal Year
GEL	GEL Laboratories LLC
GMP	Groundwater Monitoring Program
GRO	gasoline range organics
HASL	Health and Safety Laboratory
HE	high explosive

Abbreviations and Acronyms (continued)

HPT	High Performing Team
HSWA	Hazardous and Solid Waste Amendments
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
ID	identification
IMWP	Interim Measures Work Plan
IT	International Technology Corporation
JP-4	jet propellant, fuel grade 4
JP-8	jet propellant, fuel grade 8
KAFB	Kirtland Air Force Base
LCS	laboratory control sample
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
MW	monitoring well
MWL	Mixed Waste Landfill
N/A	not applicable
NE	not established
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
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/Notice of Deficiency
NPN	nitrate plus nitrite
OB	Oversight Bureau
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
Permit	Resource Conservation and Recovery Act Facility Operating Permit
PGWS	perched groundwater system
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI	RCRA Facility Investigation
RPD	relative percent difference
RSI	Request for Supplemental Information
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance

Abbreviations and Acronyms (concluded)

SFO	Sandia Field Office
SM	standard method
SMO	Sample Management Office
SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SW	southwest/solid waste
SWMU	Solid Waste Management Unit
TA	Technical Area
TAG	Tijeras Arroyo Groundwater (AOC)
TAL	Target Analyte List
TAV	Technical Area
TAVG	Technical Area-V Groundwater (AOC)
TB	trip blank
TCE	trichloroethene (equivalent to trichlorethylene)
tetryl	methyl 2,4,6-trinitrophenylnitramine
the Consent Order	the Compliance Order on Consent
TJA	Tijeras Arroyo
TOC	total organic carbon
TOX	total organic halogens
TPH	total petroleum hydrocarbons
UCS	Underground Conduit System
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USGS	U.S. Geological Survey
VA	Veterans Administration
VCM	voluntary corrective measure
VE	Vapor Extraction
VOC	volatile organic compound
WL	water level
WQ	water quality
WYO	Wyoming

Units

%	percent
µg/L	microgram(s) per liter
µmhos/cm	micromhos per centimeter(s)
ft	foot (feet)
ft/day	feet per day
ft/ft	feet per foot
ft/min	feet per minute
ft/yr	feet per year
gal.	gallon(s)
gpm	gallon(s) per minute
in/yr	inches per year
Ma	Mega Annum
mg/L	milligram(s) per liter
mrem/yr	millirem(s) per year
mV	millivolt(s)
NTU	nephelometric turbidity units
pCi/L	picocuries per liter
pH	potential of hydrogen
ppbv	part(s) per billion by volume
sq mi	square mile(s)
yr	year(s)

Monitoring Well Location Descriptions

AVN-#	Area V (North)
CCBA-#	Coyote Canyon Blast Area
CTF-#	Coyote Test Field
CWL-#	Chemical Waste Landfill
CYN-#	Lurance Canyon
HERTF	High Energy Research Test Facility
IP	Isleta Pueblo
ITRI	Inhalation Toxicology Research Institute
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
12AUP-#	ER Site 12A Underflow Piezometer

**** Meteorological Towers***

* SC1	School House
* A-21	TA-I
* A-36	TA-III and TA-V

Annual Groundwater Monitoring Report

Executive Summary

Sandia Corporation (Sandia) conducts groundwater surveillance monitoring for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) at Sandia National Laboratories, New Mexico (SNL/NM) 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 (formerly ER Project) 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 multi-program laboratory managed and operated by Sandia, a wholly owned subsidiary of Lockheed Martin Corporation, for the DOE/NNSA under Contract DE-AC04-94AL85000.

This Annual Groundwater Monitoring Report documents the results of the groundwater monitoring activities at SNL/NM for Calendar Year (CY) 2014. This report has been prepared to meet the environmental reporting requirements for the CY 2014 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. Separate 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); Burn Site Groundwater (BSG) AOC (Chapter 7.0); Solid Waste Management Units (SWMUs) 8/58 (Chapter 8.0); SWMU 49 (Chapter 9.0); SWMU 68 (Chapter 10.0); SWMU 116 (Chapter 11.0); SWMU 149 (Chapter 12.0); and SWMU 154 (Chapter 13.0).

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 Springs fault. The Tijeras fault, a strike-slip fault that trends northeast-southwest, intersects the Sandia and Hubbell Springs 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 LTS Program monitors the GMP network to provide site-wide characterization data. In addition, SNL/NM LTS and ER Operations maintain 11 site-specific groundwater monitoring networks at the following locations:

- CWL
- MWL

- TAVG AOC
- TAG AOC
- BSG AOC
- SWMUs 8/58
- SWMU 49
- SWMU 68
- SWMU 116
- SWMU 149
- SWMU 154

At SNL/NM, SWMUs are regulated under the Hazardous and Solid Waste Amendment (HSWA) module of the SNL/NM Resource Conservation and Recovery Permit. In the HSWA module, 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 (the Order) between the New Mexico Environment Department (NMED), the DOE, and Sandia governs corrective actions for these sites and, accordingly, monitoring performed at the MWL, TAVG AOC, TAG AOC, BSG AOC; and SWMUs 8/58, 49, 68, 116, 149, and 154. 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 2014, groundwater samples were collected from monitoring wells for the 12 investigations (GMP and 11 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 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 Sandia. 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 Order, as specified in Section III.A of the Order.

Groundwater Monitoring Program

Chapter 2.0 discusses the annual groundwater surveillance monitoring activities conducted during January, February, and April 2014 at wells that are part of the SNL/NM GMP. GMP well locations are scattered throughout and along the perimeter of the base in areas that are not specifically affiliated with SWMUs or AOCs. There is a site-wide Environmental Management System at SNL/NM. During CY 2014, groundwater elevations were measured in approximately 180 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 volatile organic compounds (VOCs), total organic halogens, total phenols, nitrate plus nitrite (NPN), general chemistry, Target Analyte List (TAL) metals plus 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) at four sampling locations (Coyote Springs and monitoring wells SFR-2S, SFR-4T, and TRE-1). The concentrations range from 1.66 to 2.69 mg/L, which are similar to historical concentrations. Beryllium was detected above the MCL of 0.004 mg/L in the surface water sample from Coyote Springs at a concentration of 0.00737 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 2014 at the CWL. The site is a 1.9-acre interim status landfill located in the southeastern corner of TA-III. The site was operational from 1962 until 1981, and was used for the disposal of chemical, radioactive, and solid waste generated by SNL/NM research activities. The site was remediated during two voluntary corrective measures (VCMs)--the Vapor Extraction VCM and Landfill Excavation VCM. The CWL is a remediated, closed, regulated unit undergoing post-closure care in accordance with the CWL Post-Closure Care Permit since June 2, 2011. During CY 2014, 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 any of the CWL groundwater samples. The analytical results are comparable to historical values. Other activities conducted at the CWL during CY 2014 include site inspections, cover maintenance, and soil-vapor sampling.

Mixed Waste Landfill

Chapter 4.0 discusses the semiannual groundwater monitoring activities conducted in April (associated resampling of one well in June), and October 2014 at the MWL (SWMU 76). The 2.6-acre site is located in the north-central portion of TA-III. The site was operational from March 1959 through December 1988 and consisted of classified and unclassified areas that received low-level radioactive and mixed waste. The NMED selected a final remedy, an evapotranspirative vegetative soil cover with a biointrusion barrier, which was installed in 2009. Activities at this site are regulated under the requirements of the MWL Long-Term Monitoring and Maintenance Plan (LTMMP) since January 8, 2014. During CY 2014, 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 uranium), radionuclides by gamma spectroscopy, gross alpha/beta activity, tritium, and radon-222. No analytes were detected at concentrations exceeding the associated MCLs, and the analytical results are comparable to historical values. Other activities conducted at the MWL during CY 2014 include pumping, sampling, and maintenance at well MWL-MW4; cover maintenance; installation of soil-vapor monitoring wells; soil-vapor sampling; inspections; and other monitoring required by the MWL LTMMP. A “Class 3 Permit modification request for a determination of corrective action complete with controls” was initiated on October 20, 2014. Activities associated with the Permit modification request are ongoing.

Technical Area-V Groundwater Area of Concern

Chapter 5.0 discusses the quarterly groundwater monitoring activities conducted during February-March, April-May, July-August-September, and October-November, 2014 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 Order. During CY 2014, 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 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 LWDS-MW1, TAV-MW10, and AVN-1 with a maximum concentration of 14.6 mg/L in the sample from monitoring well TAV-MW10 collected in August. 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 22.4 μg/L in the sample from monitoring well LWDS-MW1 collected in March. 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 2014 include preparation of documents related to the Corrective Measures Evaluation studies.

Tijeras Arroyo Groundwater Area of Concern

Chapter 6.0 discusses the quarterly groundwater monitoring activities conducted during March, May-June, August-September, and November-December 2014 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 Order. During CY 2014, groundwater elevations were measured in 31 wells and groundwater samples were collected from 22 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-SW1-320, 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, and WYO-4). Groundwater samples were analyzed for VOCs, NPN, general chemistry, TAL metals plus uranium, 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 TA2-SW1-320, TA2-W-28 (replacement well for TA2-SW1-320), TA2-W-19, TJA-2, TJA-4, and TJA-7, with a maximum concentration of 32.8 mg/L in the sample from monitoring well TJA-4 collected in September. Nitrate concentrations in monitoring wells TA2-SW1-320 (and replacement well 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. TCE concentrations exceeded the MCL of 5 μg/L in samples from monitoring well WYO-4 with a maximum concentration of 10.5 μg/L in the sample collected in November. The analytical results for the other 15 wells are consistent with historical concentrations. Other activities conducted at the TAG AOC during CY 2014 include the installation of a replacement monitoring well (TA2-W-28) and the decommissioning of well TA2-SW1-320.

Burn Site Groundwater Area of Concern

Chapter 7.0 discusses the semiannual groundwater monitoring activities conducted in June and December, 2014 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 Order. During CY 2014, groundwater elevations were measured in 13 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 uranium, perchlorate (at the two new wells 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 seven monitoring wells CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, and CYN-MW15 with a maximum concentration of 41.7 mg/L in the sample from monitoring well CYN-MW9 collected in June. The nitrate in these wells is from sources that have been tentatively identified, and concentration trends have increased slightly over the past year. Other activities conducted at the BSG AOC include the installation of two new groundwater monitoring wells CYN-MW14A and CYN-MW15, and the removal of the submersible pump from the Burn Site Well.

Solid Waste Management Units 8/58

Chapter 8.0 discusses the quarterly groundwater monitoring activities conducted during January, April, July, and October 2014 at SWMUs 8/58 (the Coyote Canyon Blast Area). This site is located in the Arroyo del Coyote watershed that captures runoff from the western flank of the Manzanita Mountains in the eastern portion of KAFB. The site was used in the 1950s and 1960s for ground level or aboveground explosive detonations and earth penetration tests. Activities at this site are regulated under the general requirements of the Order and the specific corrective action requirements stated in an April 2010 letter from the NMED. During CY 2014, groundwater elevations were measured and groundwater samples were collected from two wells (CCBA-MW1 and CCBA-MW2). Samples were analyzed for VOCs, SVOCs, HE compounds, NPN, general chemistry, TAL metals plus uranium, perchlorate, total cyanide, gross alpha/beta activity, and radionuclides by gamma spectroscopy. No analytes were detected at concentrations exceeding the associated MCLs, except for fluoride. Fluoride concentrations exceeded the MCL of 4.0 mg/L in samples from monitoring well CCBA-MW1 at concentrations ranging from 4.68 to 5.02 mg/L. The elevated fluoride concentration is due to naturally occurring fluorite deposits, not SNL/NM activities. No other activities were conducted at SWMUs 8/58 during CY 2014. The regulatory requirements at SWMUs 8/58 have been met; therefore, the SWMUs 8/58 monitoring wells will no longer be sampled.

Solid Waste Management Unit 49

Chapter 9.0 discusses the annual groundwater monitoring activities conducted during January 2014 at SWMU 49 (the Building 9820 Drains). The site is located in Lurance Canyon and consists of a surface discharge area associated with a former trailer and the area around a drainpipe outfall from Building 9820. The trailer was used as a darkroom in the late 1950s through late 1980s. Activities at this site are regulated under the general requirements of the Order and the specific corrective action requirements stated in an April 2010 letter from the NMED. During CY 2014, groundwater elevations were measured and groundwater samples were collected from one well (CYN-MW5). Samples were analyzed for VOCs, HE compounds, NPN, general chemistry, TAL metals plus uranium, perchlorate, total cyanide, gross alpha/beta activity, and radionuclides by gamma spectroscopy. No analytes were detected at concentrations exceeding the associated MCLs and the analytical results are comparable to historical concentrations. No other activities were conducted at SWMU 49 during CY 2014. The regulatory requirements at SWMU 49 have been met; therefore, the SWMU 49 monitoring well will no longer be sampled.

Solid Waste Management Unit 68

Chapter 10.0 discusses the quarterly groundwater monitoring activities conducted during January, April, July, and October 2014 at SWMU 68 (the Old Burn Site). The site is located in Coyote Test Field and was used from mid-1960s to the late-1970s for pool fire tests (using mostly jet fuel) to study the effects of fire on weapons components during transportation accidents. Activities at this site are regulated under the general requirements of the Order and the specific corrective action requirements stated in an April 2010 letter from the NMED. During CY 2014, groundwater elevations were measured and groundwater samples were collected from three wells (OBS-MW1, OBS-MW2, and OBS-MW3). Samples were analyzed for VOCs, SVOCs, HE compounds, NPN, general chemistry, TAL metals plus uranium, perchlorate, total cyanide, hexavalent chromium, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. No analytes were detected at concentrations exceeding the associated MCLs and the analytical results are comparable to historical concentrations. No other activities were conducted at SWMU 68 during CY 2014. The regulatory requirements at SWMU 68 have been met; therefore, the SWMU 68 monitoring wells will no longer be sampled.

Solid Waste Management Unit 116

Chapter 11.0 discusses the annual groundwater monitoring activities conducted during January 2014 at SWMU 116 (the Building 9990 Septic System). This site is located on the western margin of the Manzanita Mountain foothills and includes the immediate area surrounding the five seepage pits and a septic tank located south of Building 9990. Building 9990 is an electroexplosive research facility that was used as an explosive test facility from the late-1960s to the mid-1980s. Activities at this site are regulated under the general requirements of the Order and the specific corrective action requirements stated in an April 2010 letter from the NMED. During CY 2014, groundwater elevations were measured and groundwater samples were collected from one well (CTF-MW1). Samples were analyzed for VOCs, HE compounds, NPN, general chemistry, TAL metals plus uranium, perchlorate, and total cyanide. No analytes were detected at concentrations exceeding the associated MCLs and the analytical results are comparable to historical concentrations. No other activities were conducted at SWMU 116 during CY 2014. The regulatory requirements at SWMU 116 have been met; therefore, the SWMU 116 monitoring well will no longer be sampled.

Solid Waste Management Unit 149

Chapter 12.0 discusses the quarterly groundwater monitoring activities conducted during March, June, and September 2014 at SWMU 149 (the Building 9930 Septic System). The site is located in the Coyote Test Field and includes the area surrounding a septic system that serviced a darkroom, laboratory, shop, bathroom, and compressor room from the early-1960s to early-1990s. Activities at this site are regulated under the general requirements of the Order and the specific corrective action requirements stated in an April 2010 letter from the NMED. During CY 2014, groundwater elevations were measured and groundwater samples were collected from one well (CTF-MW3). Samples were analyzed for VOCs, NPN, general chemistry, TAL metals, and perchlorate. No analytes were detected at concentrations exceeding the associated MCLs and the analytical results are comparable to historical concentrations. No other activities were conducted at SWMU 149 during CY 2014. The regulatory requirements at SWMU 149 have been met; therefore, the SWMU 149 monitoring well will no longer be sampled.

Solid Waste Management Unit 154

Chapter 13.0 discusses the quarterly groundwater monitoring activities conducted during March, June, and September 2014 at SWMU 154 (the Building 9960 Septic Systems). The site is located in Coyote Test Field and includes the area surrounding an eastern septic system and a western system consisting of two HE seepage pits that both serviced Building 9960. Activities at this site are regulated under the general requirements of the Order and the specific corrective action requirements stated in an April 2010 letter from the NMED. During CY 2014, groundwater elevations were measured and groundwater samples were collected from one well (CTF-MW2). Samples were analyzed for VOCs, SVOCs, HE compounds, NPN, general chemistry, TAL total metals plus uranium, perchlorate, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. No analytes were detected at concentrations exceeding the associated MCLs except for arsenic. Arsenic was detected above the MCL of 0.010 mg/L at concentrations ranging from 0.0261 to 0.0458 mg/L, with a maximum concentration of 0.0458 mg/L in the sample collected in September. These slightly elevated arsenic concentrations are attributed to naturally occurring minerals in bedrock. No other analytes were detected at concentrations exceeding MCLs and the analytical results are comparable to historical concentrations. No other activities were conducted at SWMU 154 during CY 2014. The regulatory requirements at SWMU 154 have been met; therefore, the SWMU 154 monitoring well will no longer be sampled.

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 on a quarterly, semiannual, annual, and biennial basis during CY 2015, as specified by regulatory guidance. The results for these monitoring events will be presented in the Annual Groundwater Monitoring Report for CY 2015. The regulatory groundwater monitoring requirements for SWMUs 8/58, 49, 68, 116, 149, and 154 have been met and these sites no longer require active monitoring programs. The Annual Groundwater Monitoring Report for CY 2015 will not include specific discussions for SWMUs 8/58, 49, 68, 116, 149, and 154.

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1.0 Introduction

Sandia Corporation (Sandia) conducts general groundwater surveillance monitoring for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) at Sandia National Laboratories, New Mexico (SNL/NM) 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 (formerly ER Project) 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) 2014. Separate 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); Burn Site Groundwater (BSG) AOC (Chapter 7.0); Solid Waste Management Units (SWMUs) 8/58 (Chapter 8.0); SWMU 49 (Chapter 9.0); SWMU 68 (Chapter 10.0); SWMU 116 (Chapter 11.0); SWMU 149 (Chapter 12.0); and SWMU 154 (Chapter 13.0).

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 and a maximum elevation of 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, northeast, west, and southwest 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 is 9.45 inches (National Oceanic and Atmospheric Administration National Weather Service station). Half of this precipitation occurs from June through August in the form of brief, intense thunderstorms. The evaporation potential is high because of the 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 to 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 basin is more than 3 miles.

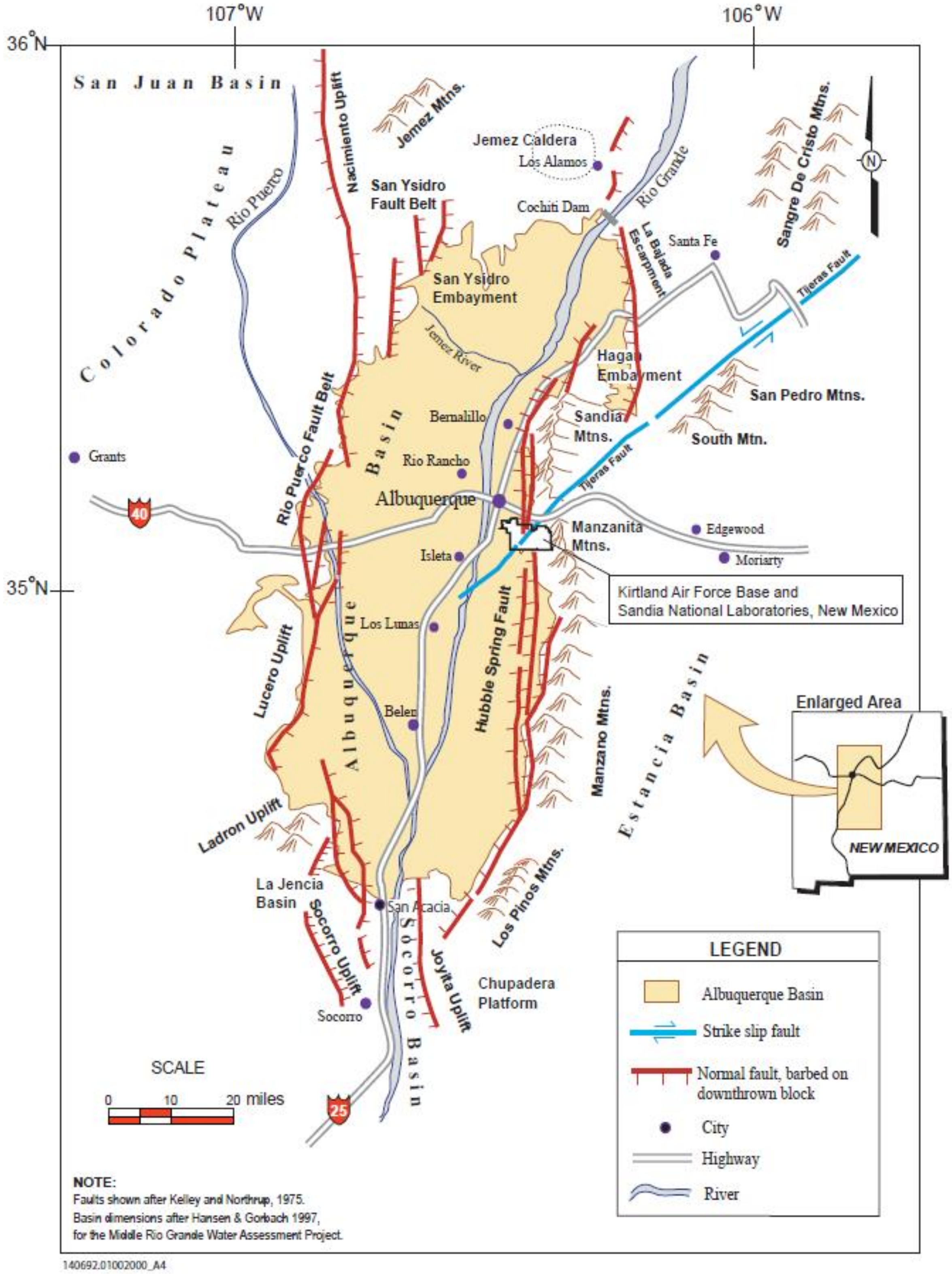

Figure 1-1. Albuquerque Basin, North-Central New Mexico

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 (Kelson et al. 1999, GRAM 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 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.

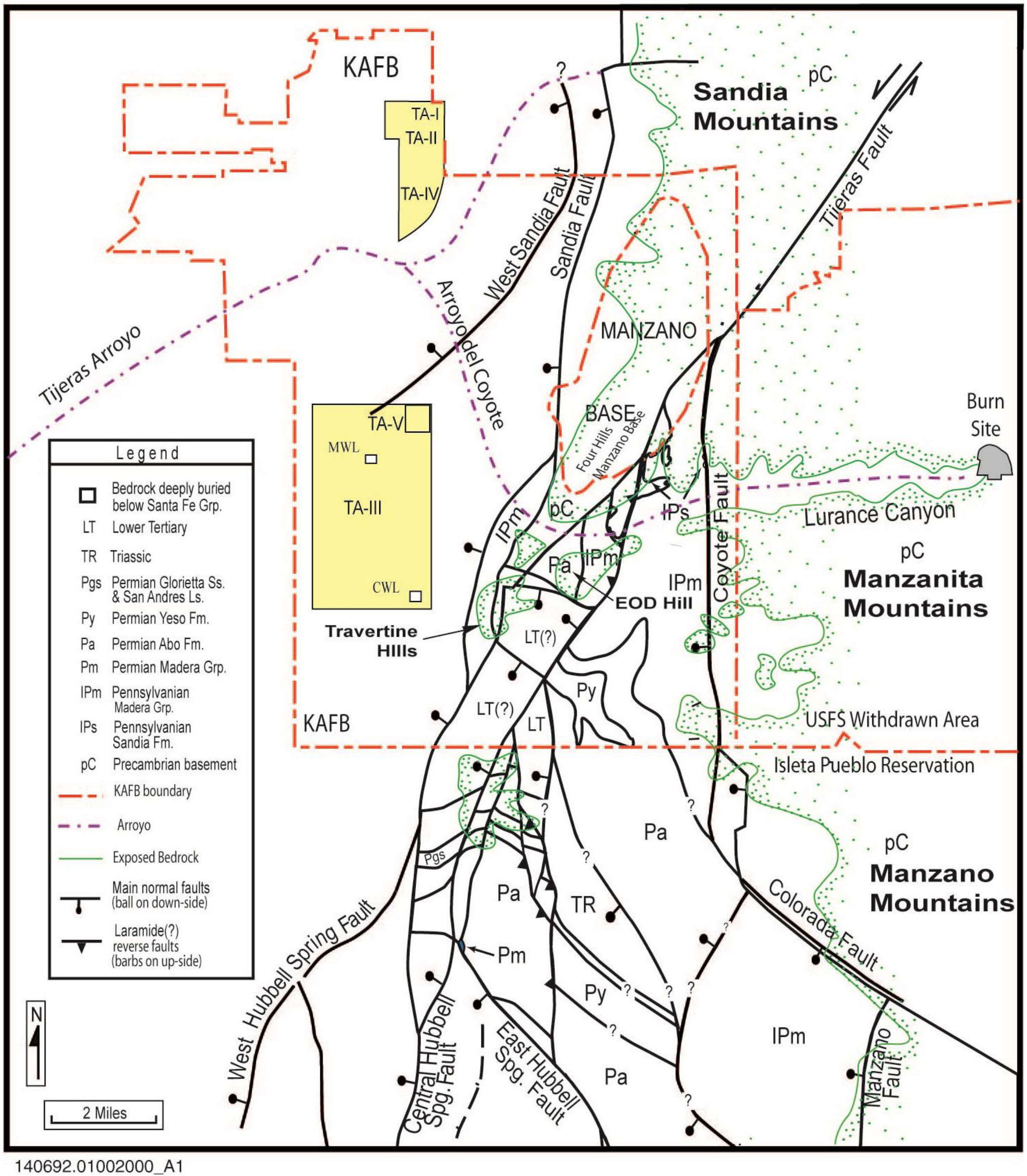

Figure 1-2. Generalized Geology in the Vicinity of SNL/NM and KAFB (Van Hart 2003)

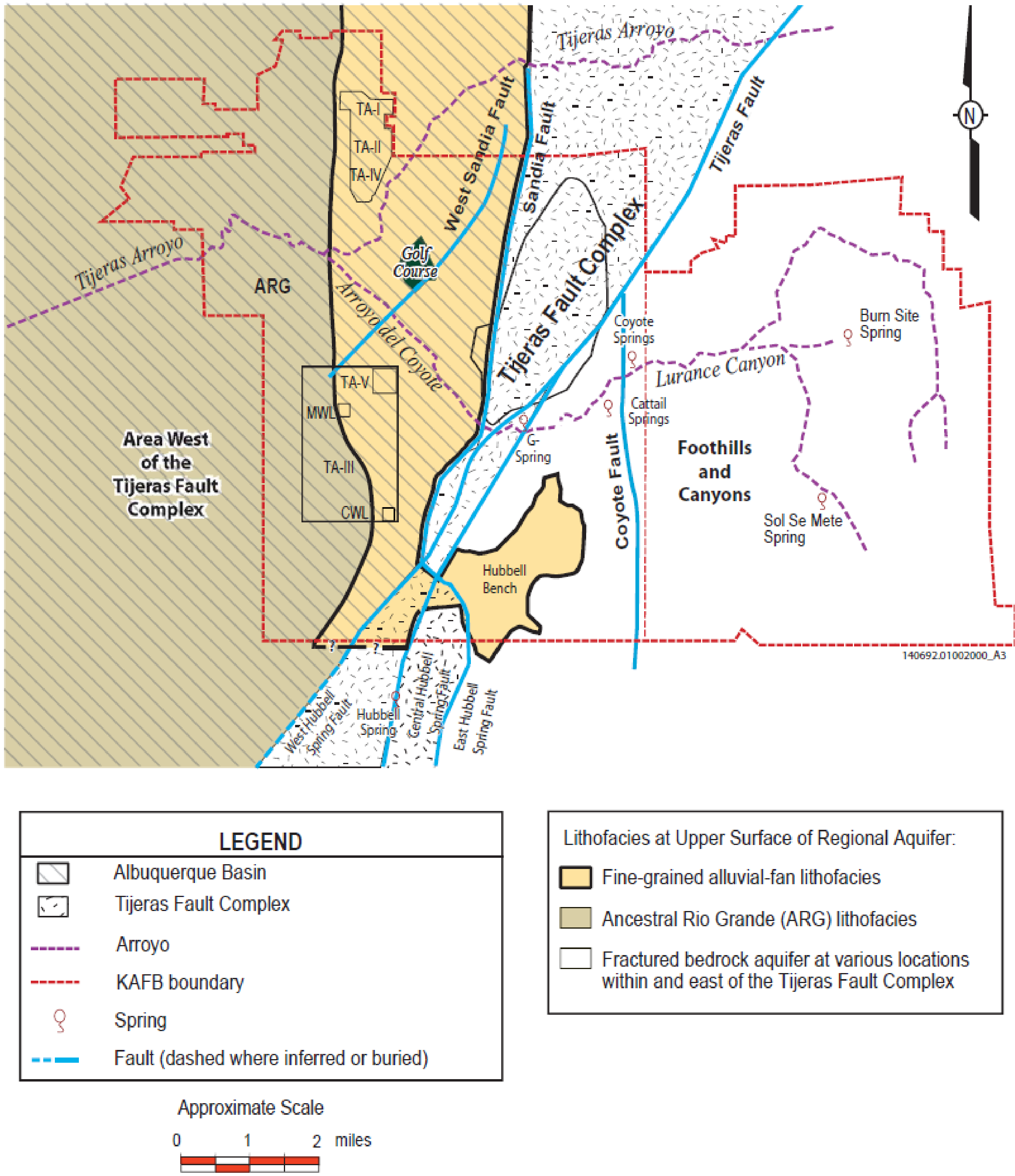

Figure 1-3. Hydrogeologically Distinct Areas Primarily Controlled by Faults (Modified from SNL 1995)

1.1.3 Hydrogeology

Figure 1-3 shows three distinct hydrogeologic regions 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 two regional aquifer systems. 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 (PGWS) lies above the regional aquifer in the vicinity of TA-I, TA-II, and TA-IV in the TAG AOC. The PGWS is not shown on Figure 1-3, but is discussed in detail in Chapter 6.0. The PGWS extends south to the KAFB Golf Course area, north to portions of TA-I, west of TA-II, and along the west side of the KAFB Landfill. Possible explanations for the existence of a PGWS are arroyo recharge, irrigation of the golf course and other vegetated areas, water leakage from utility distribution lines, 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 of the 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 bedrock aquifers on the east side 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. 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 created a broad trough 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 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 joins 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 floodplain of both Tijeras Arroyo and Arroyo del Coyote.

Several springs on KAFB are associated with the uplifts in the Tijeras Fault Complex and Foothills and Canyons hydrogeologic areas: (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 (50-acre feet per year [ft/yr]) (SNL February 1998). The best estimate for the groundwater recharge associated with Arroyo del Coyote is 0.4 million cubic feet per year (9.2-acre ft/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 at KAFB. The U.S. Air Force Installation Restoration Program has a large monitoring well network associated with several closed landfills and a closed sewage lagoon system. Additional KAFB wells are sited to monitor and characterize several nitrate plumes and an extensive KAFB jet fuel/aviation gasoline 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 at the end of this Annual Groundwater Monitoring Report along with Table 1, which provides construction details for the groundwater monitoring wells. Table 1-1 lists the CY 2014 sampling events conducted at the GMP and LTS/ER Operations monitoring networks maintained at SNL/NM.

Water quality and groundwater analytical results for the monitoring activities are summarized in Table 1-2. 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 groundwater monitoring activities in CY 2014 are listed in Table 1-3.

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 Sandia. 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 (the Consent Order) between the New Mexico Environment Department (NMED), Sandia, and the DOE, as specified in Section III.A of the Consent Order (NMED April 2004).

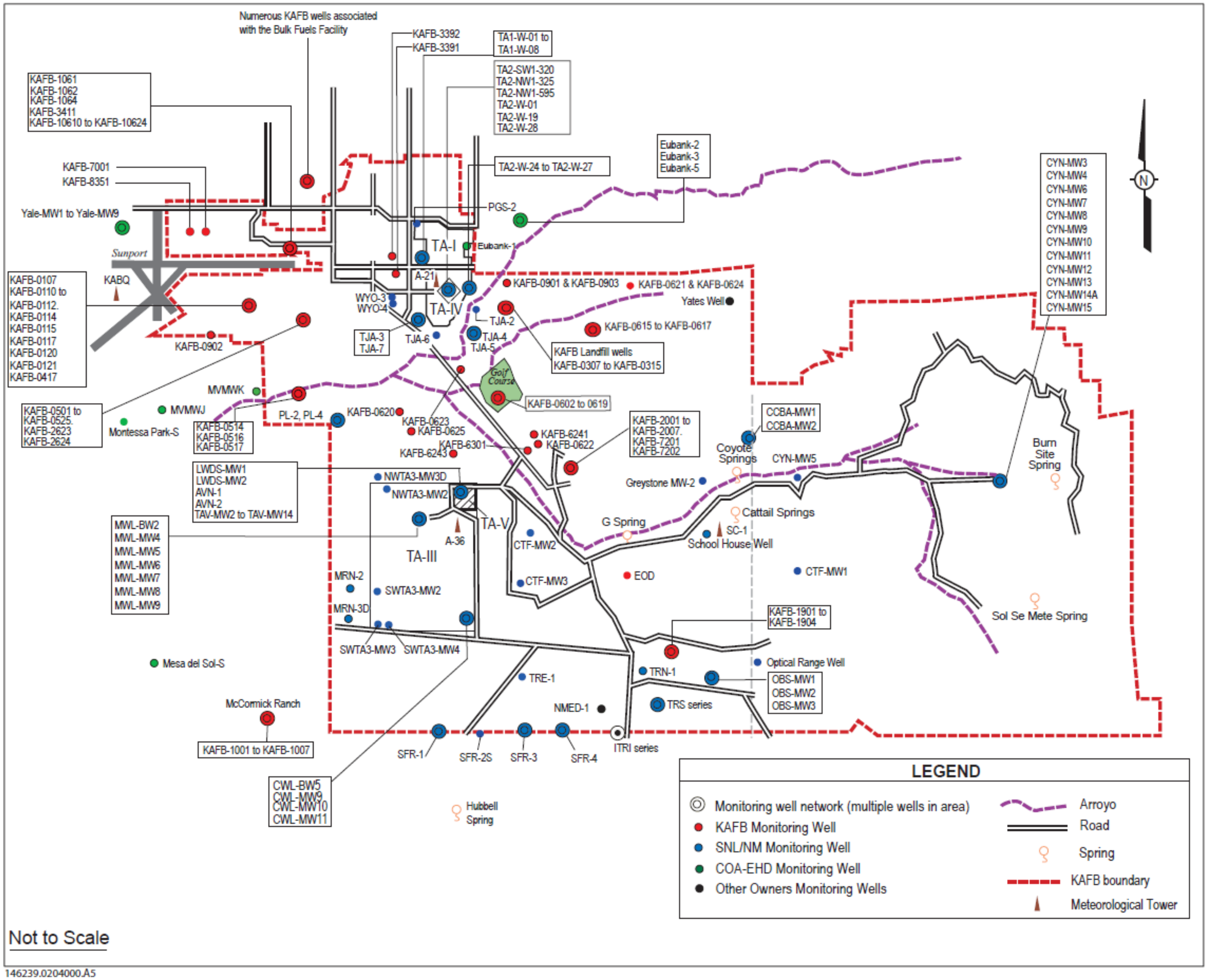

Figure 1-4. Wells and Springs within SNL/NM and KAFB

Table 1-1. Sample Collection Events for Groundwater Quality Monitoring at SNL/NM from January through December 2014

2014 Sampling Event	GMP	CWL	MWL	TAVG	TAG	BSG	SWMUs 8/58	SWMU 49	SWMU 68	SWMU 116	SWMU 149	SWMU 154
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.
SWMU = Solid Waste Management Unit.
TAG = Tijeras Area Groundwater (Area of Concern).
TAVG = Technical Area-V Groundwater (Area of Concern).

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2014

	SNL/NM Groundwater Monitoring
Number of Active Wells Monitored	78
Number of Analyses Performed	19,825
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	180	0	5.58	8.09	7.3973	0.3791	NE
Specific Conductivity in μmhos/cm	180	0	275.5	3316.1	694.1	481.9	NE
Temperature in °C	180	0	11.82	27.61	19.049	2.702	NE
Turbidity in NTU	180	0	0.11	12.3	1.19	1.826	NE
Detected Organic Compounds in μg/L							
Acetone	3	184	2.54	2.95	2.747	0.205	NE
Bromodichloromethane	5	198	0.400	0.590	0.490	0.0846	NE
Carbon Disulfide	1	186	1.74	1.74	1.74	N/A	NE
Chloroform	15	193	0.320	0.940	0.6707	0.1843	NE
Dibromochloromethane	3	200	0.320	0.490	0.430	0.0954	NE
Dichloroethane, 1,1-	14	189	0.380	1.18	0.6493	0.2813	NE
Dichloroethene, 1,1-	3	205	0.600	1.05	0.897	0.257	7.0
Dichloroethene, cis-1,2-	42	161	0.310	4.01	1.442	1.180	70
Diesel Range Organics	2	18	69.6	74.7	72.15	3.61	NE
RDX	3	46	0.208	0.340	0.2717	0.0661	NE
Tetrachloroethene	12	196	0.300	1.63	0.724	0.404	5.0
Toluene	2	201	0.820	1.41	1.115	0.417	1,000
Trichloro-1,2,2-trifluoroethane, 1,1,2-	2	178	13.6	13.9	13.75	0.212	NE
1,2,3-Trichlorobenzene	1	190	0.520	0.520	0.520	N/A	NE
1,2,4-Trichlorobenzene	1	190	0.360	0.360	0.360	N/A	70
Trichloroethene	76	137	0.310	22.4	5.643	5.571	5.0
m-,p-Xylene	1	190	0.330	0.330	0.330	N/A	10,000

Refer to footnotes on page 1-12.

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2014 *(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							
Aluminum	52	89	0.016	2.74	0.143	0.4153	NE
Arsenic	15	126	0.00179	0.0458	0.02066	0.01736	0.010
Barium	139	2	0.00193	0.206	0.05594	0.03436	2.0
Beryllium	16	125	0.000222	0.00737	0.001844	0.001775	0.004
Cadmium	8	143	0.000113	0.000328	0.000218	0.000069	0.005
Calcium	219	0	37.4	381	93.22	71.35	NE
Chromium	21	140	0.00203	0.0268	0.01029	0.01057	0.100
Cobalt	106	35	0.0001	0.0105	0.000989	0.002527	NE
Copper	87	54	0.000351	0.0551	0.001604	0.005909	NE
Iron	157	31	0.0477	2.71	0.3324	0.5556	NE
Lead	1	140	0.00209	0.00209	0.00209	N/A	NE
Magnesium	219	0	3.75	84.6	21.18	15.24	NE
Manganese	58	130	0.001	2.98	0.432	0.996	NE
Nickel	153	8	0.00057	0.0367	0.003513	0.006065	NE
Potassium	219	0	1.18	49.6	5.242	8.482	NE
Selenium	110	31	0.00153	0.0304	0.007477	0.009225	0.050
Silver	4	137	0.000367	0.00157	0.000879	0.000505	NE
Sodium	219	0	14.4	1170	73.87	115.94	NE
Thallium	8	133	0.00117	0.00154	0.001335	0.000109	0.002
Uranium	118	0	0.000248	0.0278	0.007058	0.006290	0.030
Vanadium	95	42	0.00105	0.0107	0.005188	0.002204	NE
Zinc	49	92	0.0037	0.832	0.0485	0.1294	NE

Refer to footnotes on page 1-12.

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2014 *(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 Inorganic Parameters in mg/L							
Nitrate plus nitrite	196	5	0.263	41.7	7.927	7.814	10
Bromide	102	6	0.138	3.04	0.6235	0.5958	NE
Chloride	156	0	9.46	481	61.3	85.01	NE
Fluoride	106	2	0.204	5.02	1.463	1.124	4.0
Sulfate	156	0	14.9	2010	105.3	187.3	NE
Acid Soluble Sulfides	3	63	1.13	1.40	1.2433	0.1401	NE
Total Organic Halogens	8	7	0.0041	0.0363	0.01775	0.01184	NE
Total Organic Carbon #1	42	24	0.366	2.62	0.6923	0.4614	NE
Total Organic Carbon #2	49	17	0.382	2.66	0.7323	0.4357	NE
Total Organic Carbon #3	49	17	0.338	2.78	0.6818	0.4487	NE
Total Organic Carbon #4	51	15	0.355	2.69	0.6678	0.4407	NE
Total Organic Carbon Average	49	17	0.352	2.69	0.6871	0.4405	NE
Total Phenols	1	14	0.0152	0.0152	0.0152	N/A	NE
Alkalinity as $CaCO_3$	156	0	64.6	1540	219.9	225.5	NE
Detected Radiochemistry Activities in pCi/L (unless noted otherwise)							
Alpha, gross (corrected) [a]	112	0	-21.05	13.74	2.132	4.331	15.0[b]
Beta, gross	96	16	1.52	65.2	7.37	11.47	4 mrem/yr[c]
Cobalt-60	1	111	-5.00	-5.00	-5.00	N/A	NE
Potassium-40	5	93	41.4	94.8	65.6	25.1	NE
Radium-226	7	8	0.559	1.50	0.749	0.335	5.0[d]
Radium-228	4	11	0.571	0.722	0.6367	0.0637	5.0[d]
Radon-222	12	0	110	427	245.0	125.7	NE
Uranium-233/234	35	0	0.49	62.1	22.04	15.11	NE
Uranium-235/236	33	2	0.114	0.761	0.3338	0.1805	NE
Uranium-238	35	0	0.096	8.86	3.904	2.060	NE

NOTES:

[a] Gross alpha results reported as corrected values (uranium activities subtracted out).

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

[c] Any combination of beta- and/or gamma-emitting radionuclides (as dose rate).

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

°C = Degree(s) Celsius.

µg/L = Microgram(s) per liter.

µmhos/cm = Micromhos per centimeter.

$CaCO_3$ = Calcium carbonate.

EPA = U.S. Environmental Protection Agency.

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

mg/L = Milligram(s) per liter.

mrem/yr = Millirem(s) per year.

N/A = Not applicable.

NE = Not established.

NTU = Nephelometric turbidity units.

pCi/L = Picocurie(s) per liter.

pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine

SNL/NM = Sandia National Laboratories, New Mexico.

SU = Standard Unit(s).

Table 1-3. Summary of Exceedances for SNL/NM Groundwater Monitoring Wells Sampled During Calendar Year 2014

Analyte	Well (Relevant Chapter)	Exceedance	Date
Arsenic MCL = 0.010 mg/L	CTF-MW2 (Ch. 13)	0.0365 mg/L	March 2014
		0.0365 mg/L[a]	
		0.0341 mg/L	June 2014
		0.0261 mg/L[a]	
		0.0458 mg/L	September 2014
		0.0398 mg/L[a]	
	CTF-MW2 (Duplicate) (Ch. 13)	0.0355 mg/L	March 2014
		0.0329 mg/L[a]	
Beryllium MCL = 0.004 mg/L	Coyote Springs (Ch. 2)	0.00737 mg/L	January 2014
Fluoride MCL = 4 mg/L	CCBA-MW1 (Ch. 8)	4.68 mg/L	January 2014
		4.97 mg/L	April 2014
		4.99 mg/L	July 2014
		4.81 mg/L	October 2014
	CCBA-MW1 (Duplicate) (Ch. 8)	4.74 mg/L	January 2014
		5.02 mg/L	July 2014
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	AVN-1 (Ch. 5)	10.6 mg/L	October 2014
	CYN-MW9 (Ch. 7)	41.7 mg/L	June 2014
		39.9 mg/L	December 2014
	CYN-MW9 (Duplicate) (Ch. 7)	40.6 mg/L	December 2014
	CYN-MW10 (Ch. 7)	14.0 mg/L	December 2014
	CYN-MW10 (Reanalysis) (Ch. 7)	13.6 mg/L	
	CYN-MW10 (Duplicate) (Ch. 7)	10.7 mg/L	
	CYN-MW10 (Duplicate Reanalysis) (Ch. 7)	13.6 mg/L	
	CYN-MW11 (Ch. 7)	17.8 mg/L	December 2014
	CYN-MW11 (Reanalysis) (Ch. 7)	17.9 mg/L	
	CYN-MW12 (Ch. 7)	16.5 mg/L	June 2014
		14.7 mg/L	December 2014
	CYN-MW12 (Duplicate) (Ch. 7)	15.2 mg/L	June 2014
	CYN-MW13 (Ch. 7)	39.5 mg/L	June 2014
	CYN-MW14A (Ch. 7)	14.8 mg/L	December 2014
	CYN-MW15 (Ch. 7)	18.7 mg/L	December 2014
	LWDS-MW1 (Ch. 5)	12.3 mg/L	March 2014
		11.9 mg/L	May 2014
		11.5 mg/L	August 2014
		12.7 mg/L	November 2014
	LWDS-MW1 (Duplicate) (Ch. 5)	12.3 mg/L	November 2014
	TA2-SW1-320 (Ch. 6)	21.7 mg/L	March 2014
		22.3 mg/L	June 2014
		19.6 mg/L	August 2014
	TA2-W-19 (Ch. 6)	10.8 mg/L	March 2014
		11.7 mg/L	August 2014
		10.9 mg/L	November 2014
	TA2-W-28 (Ch. 6)	21.8 mg/L	December 2014
	TJA-2 (Ch. 6)	10.9 mg/L	March 2014
		11.2 mg/L	June 2014
		10.9 mg/L	September 2014
		12.0 mg/L	November 2014

Refer to footnotes on page 1-14

Table 1-3. Summary of Exceedances for SNL/NM Groundwater Monitoring Wells Sampled During Calendar Year 2014 *(Concluded)*

Analyte	Well (Relevant Chapter)	Exceedance	Date
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	TJA-4 (Ch. 6)	28.4 mg/L	March 2014
		31.2 mg/L	June 2014
		32.8 mg/L	September 2014
		31.0 mg/L	November 2014
	TJA-7 (Ch. 6)	24.8 mg/L	March 2014
		22.9 mg/L	June 2014
		20.8 mg/L	September 2014
		22.4 mg/L	December 2014
	TJA-7 (Duplicate) (Ch. 6)	24.6 mg/L	December 2014
	TAV-MW10 (Ch. 5)	12.0 mg/L	March 2014
		12.0 mg/L	May 2014
		14.6 mg/L	August 2014
		13.1 mg/L	November 2014
	TAV-MW10 (Duplicate) (Ch. 5)	13.1 mg/L	March 2014
Trichloroethene MCL = 5.0 µg/L	LWDS-MW1 (Ch. 5)	22.4 µg/L	March 2014
		17.7 µg/L	May 2014
		16.0 µg/L	August 2014
		16.9 µg/L	November 2014
	LWDS-MW1 (Duplicate) (Ch. 5)	17.5 µg/L	November 2014
	TAV-MW6 (Ch. 5)	18.8 µg/L	March 2014
		14.3 µg/L	May 2014
		13.1 µg/L	August 2014
	TAV-MW10 (Ch. 5)	16.8 µg/L	March 2014
		14.1 µg/L	May 2014
		13.0 µg/L	August 2014
		12.9 µg/L	November 2014
	TAV-MW10 (Duplicate) (Ch. 5)	17.5 µg/L	March 2014
	TAV-MW12 (Ch. 5)	11.9 µg/L	March 2014
		9.40 µg/L	May 2014
		6.43 µg/L	August 2014
		9.05 µg/L	November 2014
	TAV-MW14 (Ch. 5)	8.43 µg/L	February 2014
		6.94 µg/L	May 2014
		6.43 µg/L	November 2014
	TAV-MW14 (Duplicate) (Ch. 5)	7.11 µg/L	May 2014
		6.53 µg/L	November 2014
	WYO-4 (Ch. 6)	9.85 µg/L	March 2014
		6.75 µg/L	June 2014
		10.5 µg/L	November 2014
	WYO-4 (Duplicate) (Ch. 6)	6.85 µg/L	June 2014

NOTES:

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

µg/L = Microgram(s) per liter.
AVN Area V (North).
CCBA = Coyote Canyon Blast Area.
Ch. = Chapter.
CTF = Coyote Test Field.
CYN = Canyons.
LWDS = Liquid Waste Disposal System.
MCL = Maximum contaminant level.
mg/L = Milligram(s) per liter.
MW = Monitoring well.
SNL/NM = Sandia National Laboratories, New Mexico.
SW = Southwest.
TA = Technical Area.
TAV = Technical Area-V (monitoring well designation only).
TJA = Tijeras Arroyo.
WYO = Wyoming.
W = Well.

1.2.1 Long-Term Stewardship and Environmental Restoration Operations Monitoring

SNL/NM LTS/ER Operations conducts groundwater monitoring where groundwater contamination is documented, or in areas where the potential exists for groundwater contamination from legacy surface or near-surface contamination. Currently, there are 11 LTS/ER Operations groundwater monitoring networks: CWL, MWL, TAVG AOC, TAG AOC, BSG AOC, SWMUs 8/58, SWMU 49, SWMU 68, SWMU 116, SWMU 149, and SWMU 154. The LTS/ER Operations groundwater monitoring wells are located upgradient and downgradient of known legacy surface contamination 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 of which 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 DOE Orders

Groundwater monitoring performed by SNL/NM LTS Program's GMP and LTS/ER Operations are directed based on three different sets of regulations and requirements. Groundwater surveillance conducted at the GMP network is directed by DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE 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 Directives, ER sites at SNL/NM are identified, characterized, and remediated (if required) under the Resource Conservation and Recovery Act (RCRA) regulations. In 1984, RCRA was supplemented by the Hazardous and Solid Waste Amendments (HSWA), which specifically addressed remediation of legacy contamination including groundwater at SWMUs.

At SNL/NM, SWMUs are regulated under the HSWA module of the SNL/NM RCRA Permit. In the HSWA module, 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 between the NMED, Sandia, and the DOE became effective in 2004 and specified that corrective actions for releases of hazardous waste or hazardous constituents were to be conducted under the Consent Order rather than under the RCRA Permit, with the exception of new releases from operating units; closure and post-closure at operating units; implementation of controls for any SWMU on the Permit's "Corrective Action Complete with Controls" list; and any releases of hazardous waste or hazardous constituents that occur after the Consent Order is no longer effective.

The MWL, TAVG AOC, TAG AOC, and BSG AOC are undergoing corrective action in accordance with the Consent Order (NMED April 2004). In addition to the Consent Order, groundwater monitoring requirements for the MWL are further defined in the MWL Long-Term Monitoring and Maintenance Plan (SNL March 2012) that was approved by NMED on January 8, 2014 (Blaine January 2014). Each of the TAVG, TAG, and BSG AOCs must comply with requirements set forth in the Consent Order for site characterization and the development of a Corrective Measures Evaluation for each AOC. The NMED is the regulatory agency responsible for enforcing the requirements identified in the Consent Order for each of the three Corrective Measures Evaluations (SNL 2004a, 2004b, and 2004c). The Consent Order also extends NMED regulatory jurisdiction to the placement and installation of new groundwater monitoring wells and decommissioning at SNL/NM.

In addition, SWMUs 8/58, 49, 68, 116, 149, and 154 are undergoing corrective action in accordance with the Consent Order and a letter received from the NMED by the DOE/NNSA and Sandia on April 14, 2010, entitled: *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001* (NMED April 2010). The NMED's letter lists these SWMUs under the heading of "SWMUs Requiring Additional Corrective Action" or "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls," and further states that these SWMUs require additional monitoring of groundwater on a quarterly or annual basis. As of CY 2014, all regulatory requirements of NMED's April 2010 letter have been met and sampling will be discontinued at these SWMUs.

CWL closure was approved by the NMED and the CWL Post-Closure Care Permit (PCCP) became effective on June 2, 2011 (Kieling June 2011), transitioning monitoring activities from ER Operations to LTS. The CWL PCCP supersedes the CWL Closure Plan (SNL December 1992) as the enforceable regulatory document. Therefore, all groundwater monitoring at the CWL after June 2011 are performed by the LTS Program in accordance with requirements specified in the PCCP (Kieling June 2011). Required monitoring (groundwater and soil-gas), inspections, and maintenance activities are documented annually in Post-Closure Care Reports submitted to NMED by March 31 of each year and document all PCCP-required activities for the previous calendar year. As required by the PCCP, the *CWL Annual Post-Closure Care Report for Calendar Year 2013* was submitted to the NMED in March 2014 (SNL March 2014). The CWL Annual Post-Closure Care Report for CY 2014 will be submitted to NMED in March 2015.

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 technical enforcement guidance document (EPA 1986a). This section discusses procedures that apply to all groundwater investigations. Any site-specific differences from the procedures discussed in Section 1.3 are presented in Chapters 2.0 through 13.0.

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

Throughout CY 2014, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table 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 2013). The water level information was used to create the potentiometric surface maps and hydrographs presented in Chapters 2.0 through 13.0.

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, except at wells with construction issues that require dedicated sampling system pumps. The minimum purge requirements for a portable piston pump is one saturated screen volume (including annulus) and two tubing volumes for a dedicated low-flow sampling system. Field water quality measurements for turbidity, potential of hydrogen (pH), temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) (Table 1-4) were recorded for the well prior to collecting groundwater samples, according to SNL/NM FOP 05-01 (SNL January 2012a). Groundwater temperature, SC, ORP, DO, and pH were measured using a YSI™ EXO1 water quality meter. Turbidity was measured with a HACH™ Model 2100P portable turbidity meter.

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

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

NOTES:

°C = Degree(s) Celsius.
µmhos/cm = Micromhos(s) per centimeter.
gpm = Gallon(s) per minute.
mg/L = Milligram(s) per liter.
mV = Millivolt(s).
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen.

The amount of water required to achieve stability of field parameters is fairly consistent for a particular monitoring well. However, the ability of the aquifer to produce water varies greatly from well to well. In accordance with the site-specific Mini-Sampling and Analysis Plans (SAPs) (as identified in Chapter 2.0 through 13.0), purging continued until four stable measurements for temperature, SC, pH, and turbidity were obtained. Groundwater stability is considered acceptable when measurements are less than 5 nephelometric turbidity units (NTU), or within 10 percent for turbidity values greater than 5 NTU, 0.1 pH units, 1.0 degree Celsius, and SC is within 5 percent. Associated Field Measurement Logs documenting details of well purging and water quality measurements for each sampling event have been 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 monitoring wells according to procedures described in SNL/NM FOP 05-03 (SNL January 2012b). An equipment blank (EB) is collected to verify the equipment decontamination process. For wells equipped with dedicated nitrogen gas-powered bladder pumps or piston pumps, pump decontamination is not required.

1.3.1.4 Sample Collection Sampling Procedures

Groundwater samples are collected using a nitrogen gas-powered portable piston pump (Bennett™) and/or a low-flow system in accordance with SNL/NM FOP 05-01 (SNL January 2012a). Sample bottles are filled directly from the pump discharge line and water sampling manifold, with the volatile organic compound (VOC) samples collected at the lowest achievable discharge rate.

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 13.0), obtains sampling kits, issues sample control and tracking numbers, tracks the chain-of-custody, and reviews analytical results to determine method, contract, and regulatory project-specific compliance (SNL November 2013). 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 05* (SNL November 2013) and Administrative Operating Procedure (AOP)

00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 3 and Revision 4* (SNL May 2011, 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 2012c). All wastewater was discharged to the sanitary sewer in accordance with ABCWUA requirements after waste characterization data were compared to discharge limits.

1.3.2 Analytical Methods

All 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
Anions	SW846-9056
Filtered Metals (including Cations)	SW846-6010/6020/7470
HE compounds	SW846-8321A
NPN	EPA 353.2
Hexavalent Chromium	SW846-7196A
Perchlorate	EPA 314.0
Sulfide	SW846-9034/9034B
SVOCs	SW846-8270C
Metals	SW846-6010/6020/7470
Total Cyanide	SW846-9012B
Total Organic Carbon	SW846-9060A
Total Organic Halogens	SW846-9020
TPH Diesel Range Organics	SW846-3535A/8015D
TPH Gasoline Range Organics	SW846-8015B
Total Phenol	SW846-9066
VOCs	SW846-8260B

NOTES:
[a]**Analytical Method**
Clesceri, L.S., A.E. Greenburg, and A.D. Eaton 1998 or EPA 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B.
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.
EPA 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.
EPA = U.S. Environmental Protection Agency.
HE = High explosive(s).
NPN = Nitrate plus nitrite (reported as nitrogen).
SM = Standard Method.
SVOC = Semivolatile organic compound.
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)	EPA 901.0
Gross Alpha/Beta Activity	EPA 900.0
Isotopic Uranium	HASL-300
Radium-226	EPA 903.1
Radium-228	EPA 904.0
Tritium	EPA 906.0

NOTES:
[a]**Analytical Method**
EPA 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
DOE 1990. *EML Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300, Environmental Measurements Laboratory.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
HASL = Health and Safety Laboratory.

1.3.3 Quality Control Samples

Field and laboratory QC samples were prepared and analyzed with the environmental samples to determine accuracy and precision of the 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. All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 3 and Revision 4* (SNL May 2011, SNL June 2014). Although some analytical results were qualified during the data validation process, no significant data quality issues were noted for most studies. Data validation qualifiers are provided with the analytical results in the data tables attached to Chapters 2.0 through 13.0. The data validation report associated with each sampling event is retained per the Sandia Records Retention and Disposition Schedule.

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

QC Sample Type	Description
Field QC	
Equipment blanks	Determine the effectiveness of the decontamination process of the portable sampling pump (Bennett™) to ensure that cross-contamination did not occur between wells.
Duplicate samples	Establish the precision of the sampling and analytical process.
Trip blanks	Determine whether contamination by VOCs occurred during sample handling, shipment, or storage by submitting deionized water samples with environmental samples for VOC analysis.
Field Blanks	Assess whether contamination of the VOC samples had resulted from ambient field conditions.
Laboratory QC	
Method blanks	Determine contaminants introduced during the sample preparation and handling process in the laboratory.
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.
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.)
Sample replicate	Used to determine precision in the laboratory for non-organic analyses.

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

1.3.4 Field Quality Control Samples

Field QC samples included duplicate environmental, EB, field blank, and trip blank (TB) samples. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in site-specific Mini-SAPs (Chapters 2.0 through 13.0).

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 (concentrations above detection limits only) are used to calculate relative percent difference values.

1.3.4.2 Equipment Blank Samples

The portable Bennett™ sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in SNL/NM FOP 05-03 (SNL January 2012b). 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 13.0.

1.3.4.3 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. They are prepared by the analytical laboratory and are included in the sampling kits. TB samples accompanied each sample shipment. The results for the TB analyses are discussed in Chapters 2.0 through 13.0.

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 and methodologies. 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 data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 3 and Revision 4* (SNL May 2011, SNL June 2014). Laboratory data qualifiers are provided with the analytical results in the tables attached to Chapters 2.0 through 13.0.

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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) 2014 groundwater surveillance monitoring activities conducted as part of the Sandia National Laboratories, New Mexico (SNL/NM) Long-Term Stewardship Consolidated Groundwater Monitoring Program (GMP) (formerly referred to as the Groundwater Protection Program). The surveillance activities include the annual collection and analysis of groundwater samples from 12 monitoring wells and one surface water sample from a perennial spring. As part of the activities, SNL/NM personnel used groundwater elevation data from 171 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 by identifying potential sources of contamination, working with other SNL/NM organizations to prevent groundwater contamination, implementing effective groundwater surveillance to detect contamination if it should occur, and initiating abatement or remedial action where necessary. To accomplish this mission, Sandia Corporation (Sandia) personnel perform the following tasks:

- Evaluates the potential effects of SNL/NM operations on groundwater through groundwater quality sampling and analysis and groundwater elevation measurements.

- Records and maintains groundwater information in a database.

- Maintains documents and records and ensures that all necessary reports are submitted to the appropriate agencies in a timely manner.

- Prepares and maintains administrative and field operating procedures for groundwater monitoring activities.

- Provides assistance to well owners in the areas of well installation, well inspection and maintenance, and well plugging and abandonment.

- Establishes requirements for well registration and well construction data tracking.

- Coordinates with the Surface Water Discharge Program to prevent groundwater contamination.

- Develops groundwater education and community outreach programs.

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

The groundwater surveillance monitoring involves completing the following objectives:

- Establishing baseline water quality and groundwater flow information for the regional aquifer and the perched groundwater system (PGWS) at SNL/NM.

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

- Demonstrating compliance with all federal, state, and local groundwater requirements.

The GMP is responsible for tracking information for all wells operated by SNL/NM personnel, including Long-Term Stewardship/Environmental Restoration (ER) Operations (formerly ER Project) monitoring wells and characterization boreholes. The GMP Well Registry and Oversight Task was established to ensure that all 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. Additional information for the GMP is provided in the *SNL/NM Long-Term Stewardship Consolidated Groundwater Monitoring Program Plan* (SNL May 2013).

2.2 Regulatory Criteria

Sandia has a site-wide Environmental Management System (EMS). The following actions ensure the implementation of a successful GMP that includes all relevant elements of an EMS at the facility:

- Possible sources of current and future groundwater contamination are identified and the potential for future contamination is evaluated.

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

- Appropriate groundwater protection goals are established for all affected or potentially affected groundwater consistent with water quality and current or likely future use.

- Strategies for predicting and preventing future contamination and for controlling existing contamination are developed.

- The history of GMP activities is documented for future site management.

- The quality of baseline groundwater and vadose zone conditions are documented.

- Environmental monitoring with surveillance program elements for the groundwater and the vadose zone, including baseline subsurface conditions, are described.

- A systematic approach is established 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 (the Consent Order) (New Mexico Environment Department [NMED] April 2004) became effective between the DOE, Sandia, and the NMED. 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 Sandia are required to assess the nature and extent of perchlorate contamination and incorporate the results of this assessment into a Corrective Measures Evaluation. 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 Corrective Measures Evaluation 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 Sandia on behalf of the DOE/NNSA Sandia Field Office (SFO). Additional requirements associated with groundwater quality regulations are presented in Table 2-1.

Table 2-1. Groundwater Quality Regulations

Regulation/Requirements	Standards and Guides	Regulating Agency
National Primary Drinking Water Regulations (40 CFR 141)	MCL	EPA (2001 and May 2009)
NMWQCC[a] Standards for Groundwater (20 6.2.3103A NMAC Human Health Standards) (NMED January 2001)	MAC	NMWQCC (NMED January 2001)
DOE Drinking Water Guidelines for Radioisotopes[b] (DOE Order 5400.5)	DCG	DOE (1993)

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.

[b]DOE drinking water guidelines set allowable radionuclide levels in drinking water (DOE 1993, *Drinking Water Guidelines for Radioisotopes*). The levels are calculated based on published DCGs and correspond to a 4 mrem/yr dose from chronic exposures. This is equivalent to 4 percent of the DCG for ingestion, which is based on an exposure of 100 mrem/yr. These may be different from EPA standards, where established.

CFR = Code of Federal Regulations.
DCG = Derived Concentration Guide.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
MAC = Maximum allowable concentration.
MCL = Maximum contaminant level.
mrem/yr = Millirem per year.
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 Sandia. 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 (NMED April 2004).

2.3 Scope of Activities

2.3.1 Groundwater Quality Surveillance Monitoring

Annual sampling of groundwater was conducted during the period from January 30 to April 18, 2014. Samples were collected from 12 wells and one 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 collected from Coyote Springs. Sampling locations are shown on Figure 2-1. The analytical results for the groundwater samples are presented in Tables 2A-1 through 2A-7 in Attachment 2A.

Samples collected from all 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)
- Gross alpha and beta activity
- Radium-226 and radium-228
- Isotopic uranium (uranium-233/234, uranium-235/236, and uranium-238), selected wells only

All 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, 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. Duplicate environmental samples from monitoring wells MRN-3D and NWTA3-MW3D were submitted for all analyses.

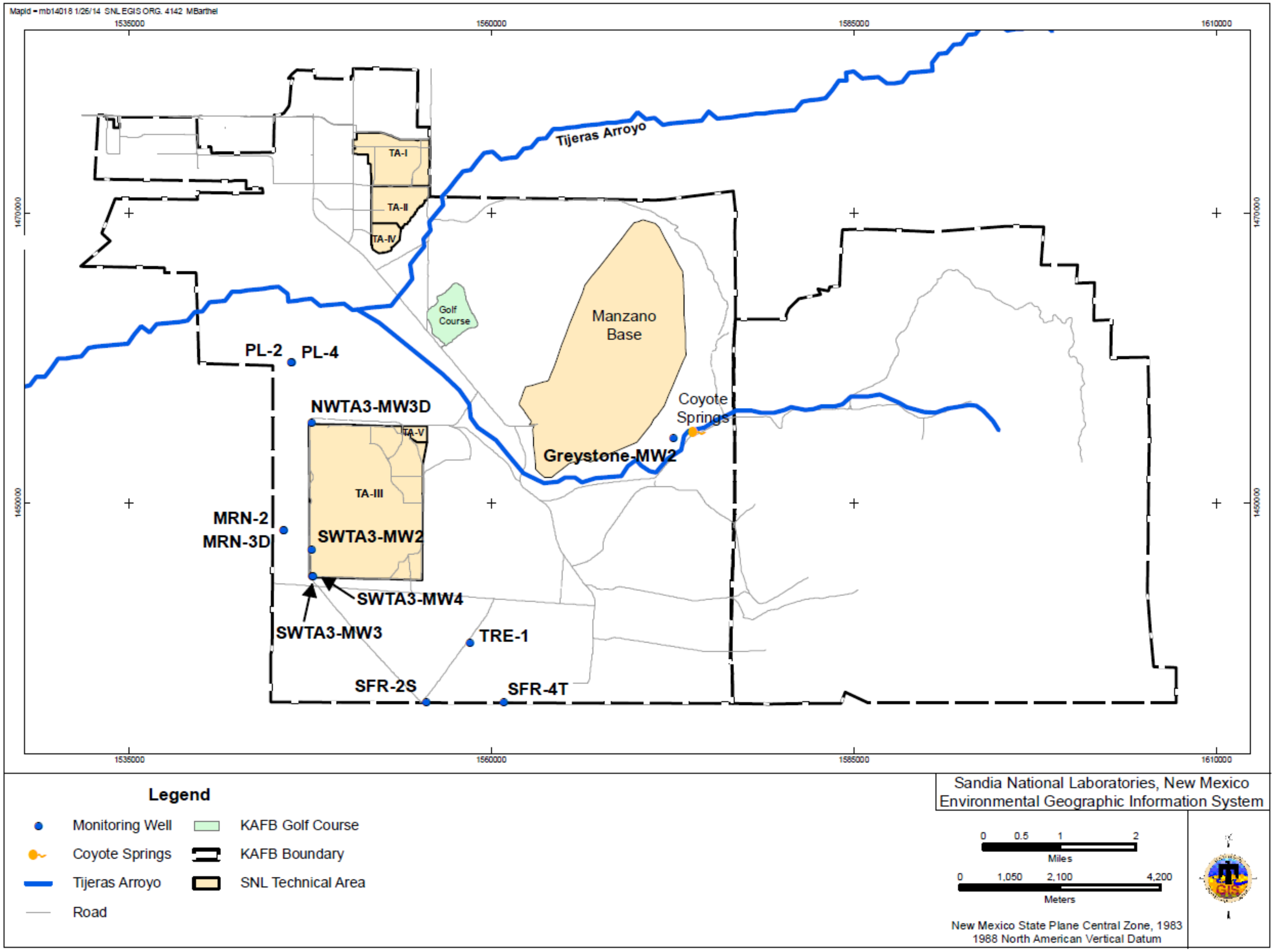

Figure 2-1. Groundwater Monitoring Program Water Quality Monitoring Network

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) ER Program, City of Albuquerque (COA) Environmental Health Department (EHD), and U.S. Geological Service (USGS) (Figure 1-4 and Plate 1). Groundwater elevations in wells were measured quarterly or annually during CY 2014, depending on the owner's requirements and the well characteristics. Groundwater elevations at the wells are depicted on Plate 1 and were used for preparing a base-wide potentiometric surface map of the regional aquifer (see discussion in Section 2.6.2.2).

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

2.3.2 Monitoring Well Installation

No new monitoring wells were installed by the GMP during CY 2014.

2.4 Field Methods and Measurements

The monitoring procedures conducted for GMP groundwater monitoring are described in detail in Section 1.3. The water level information obtained in 2014 was used to develop the potentiometric surface map presented in Plate 1 and the hydrographs presented on Figures 2B-1 through 2B-6 (Attachment 2B).

2.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using U.S. Environmental Protection Agency (EPA)-specified protocols as described in Section 1.3.2 (Tables 1-5 and 1-6).

2.6 Summary of Monitoring Results

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 2001 and 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) (NMED January 2001). 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 Records Center. Analytical results, laboratory QC qualifiers, and third-party validation qualifiers are archived in the Environmental Data Management System (EDMS) electronic database.

Table 2A-1 (Attachment 2A) summarizes detected VOC and HE compound results for groundwater samples collected in 2014. 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 m,p-xylenes and chloroform. The compound m,p-xylene was detected below the MAC of 620 micrograms per liter (μg/L) in SWTA3-MW2 at a concentration of 0.330 μg/L. Chloroform was detected below the MAC of 100 μg/L in TRE-1 at a concentration of 0.540 μg/L. Table 2A-2 (Attachment 2A) lists the laboratory MDLs for VOC and HE compounds.

Table 2A-3 (Attachment 2A) summarizes NPN results. NPN was detected in all well samples above associated MDLs, and ranged from 0.263 to 5.22 milligrams per liter (mg/L). All NPN results are below the MCL/MAC of 10 mg/L.

Table 2A-4 (Attachment 2A) summarizes alkalinity, major anions (as bromide, chloride, fluoride, and sulfate), TOX, total phenols, and total cyanide results. None of the analytes listed were detected above established MCLs or MACs, except for fluoride. Fluoride was detected above the MAC of 1.6 mg/L in samples from Coyote Springs and monitoring wells SFR-2S, SFR-4T, and TRE-1 at concentrations ranging from 1.66 to 2.69 mg/L. The elevated fluoride concentrations routinely observed in Coyote Springs is in an area of shallow groundwater and exposed bedrock containing fluoride-bearing minerals such as fluorite. Fluoride in groundwater is suspected to be naturally occurring (geogenic). The time trend plots for Coyote Springs and for wells in which fluoride concentrations exceed the MCL are presented on Figures 2C-1 through 2C-4 (Attachment 2C).

Detections of TOX were reported in samples from eight sampling locations. TOX was qualified as not detected during data validation at two locations of the samples because TOX was reported at concentrations less than the values reported in associated blank samples. The detected TOX were mostly "J" values (estimated values), at concentrations ranging from 0.0041 to 0.0363 mg/L.

Total phenol was not detected at 12 of the sample locations, but was detected at 0.0152 mg/L at SWTA3-MW3. SNL/NM personnel resampled Coyote Spring for total phenol because the original result was not comparable to historical values, and the associated reanalysis was performed outside analytical hold times. All total phenol results are reported in Table 2A-4.

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

Mercury was analyzed using unfiltered samples and is reported as total mercury. Mercury was not detected above associated laboratory MDLs in any groundwater sample. Total mercury results are summarized in Table 2A-5 (Attachment 2A).

Samples from GMP monitoring wells were analyzed for TAL metals plus uranium. Dissolved TAL metal results are summarized in Table 2A-6 (Attachment 2A). 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 0.00737 mg/L. The time trend plot for beryllium concentrations for Coyote Springs is shown on Figure 2C-5 (Attachment 2C). The beryllium result for Coyote Springs is consistent with prior years of monitoring data as is demonstrated in the trend plot (Figure 2C-5).

Results for radiological analyses are summarized in Table 2A-7 (Attachment 2A), and include 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). All reported activities are below established

MCLs or MACs. Potassium-40 results in Coyote Springs, MRN-2, MRN-3D, SFR-4T, and TRE-1 were qualified as unusable during data validation because the laboratory did not meet minimum peak identification criteria.

Isotopic uranium (uranium-233/234, uranium-235/236, and uranium-238) analyses were conducted on those samples from wells that previously had high gross alpha activity, or are located where groundwater is in contact with bedrock that contains minerals that are 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 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4, should not include uranium. 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. The corrected gross alpha activity results are all below the MCL of 15 picocuries per liter (pCi/L), with a maximum value of 5.12 pCi/L.

Table 2A-8 (Attachment 2A) summarizes field water quality measurements collected prior to sampling. Field water quality measurements are used to document water chemistry stability and include turbidity, potential of hydrogen, temperature, specific conductance, oxidation-reduction potential, and dissolved oxygen.

2.6.2 Groundwater Elevation Measurements

Construction details for monitoring wells located on or near KAFB are listed in Table 1. During CY 2014, SNL/NM GMP personnel measured groundwater elevations in 96 SNL/NM monitoring wells (Table 2). The groundwater elevations were measured with an electric well sounder (water level meter). Data were also available for 75 additional monitoring wells owned by KAFB, COA, and NMOSE. The groundwater elevation data are maintained in the Sandia EDMS. Groundwater elevation data for CY 2014 are provided in Table 2. The total number of wells listed by the respective organization is provided in Table 2-2.

2.6.2.1 Groundwater Recharge and Withdrawal

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

Annual Precipitation

The regional climate for the Albuquerque Basin area 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 June through August when monsoonal thunderstorm activity is greatest. For CY 2014, 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
96	SNL/NM GMP	DOE/NNSA	Site-wide surveillance network wells, CWL, MWL, TA-V, TAG, and Burn Site Groundwater
68	SNL/NM GMP	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

NOTES:
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.
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.
TA-V = Technical Area-V.
TAG = Tijeras Arroyo Groundwater.
USGS = U.S. Geological Survey.

Precipitation data relevant to KAFB hydrogeology 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) (the rain gauge at A36 had intermittent data capture problems; therefore, there is increased uncertainty of August through October data);
- SC1 tower located near 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.

Annual precipitation during CY 2014 at the four locations is shown in Table 2-3. Data for CY 2013 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 8.81 inches of precipitation measured at the Albuquerque International Sunport (KABQ) during CY 2014 is 0.51 inches less than the corresponding period for the previous year; and it is 0.64 inches below the 30-year (1981-2010) norm of 9.45 inches. Monthly distribution of precipitation during CY 2014 at the four locations is shown on Figure 2B-7 (Attachment 2B). Figure 2B-8 shows the annual distribution of precipitation at these four locations for the period from January 2004 to December 2014.

Table 2-3. Precipitation Data for Kirtland Air Force Base, Calendar Years 2013 and 2014

Year	Meteorological Station			
	A21	A36	SC1	KABQ
CY 2013	11.46	12.11	11.00	9.32
CY 2014	9.69	6.26	9.60	8.81

NOTES:
Data are in inches of rainfall.
A21 = SNL/NM meteorological station in TA-II.
A36 = SNL/NM meteorological station in TA-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 upper and middle unit of the Santa Fe Group. During CY 2014, KAFB pumped groundwater primarily from six water supply wells.

KAFB supplies all the water for SNL/NM and other DOE/NNSA facilities located on KAFB. Figure 2B-9 (Attachment 2B) shows the CY 2014 monthly production for KAFB water supply wells. The highest level of production was in July at 118,471,000 gallons (gal.); the lowest occurred in December at 38,998,000 gal. The variability in production in response to demand is reflected in the cyclic fluctuation of groundwater elevations in monitoring wells within the region of influence of these pumping wells and is evident when shown in hydrographs. Figure 2B-10 shows the CY 2014 monthly production for each KAFB water supply well. Figure 2B-11 shows the trend of total annual groundwater production at KAFB for all wells, beginning in 2004. Table 2-4 provides a comparison of water pumped during CY 2014 to the previous year.

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

Units	CY 2013	CY 2014
Million gallons	826	879
Acre feet	2,534	2,697

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

2.6.2.2 Groundwater Elevations

Groundwater elevations were interpreted using potentiometric surface maps and hydrographs.

Base-Wide Potentiometric Surface Map

Groundwater elevation data for monitoring wells installed by Sandia, USAF ER Program, COA EHD, USGS, and NMOSE were used to construct the base-wide CY 2014 potentiometric surface map of the regional aquifer as shown on Plate 1. Water level measurements for June/October/November/December 2014 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 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. As a result, water levels across much of KAFB are steadily declining. This trough extends as far south as the Isleta Pueblo Reservation. The KAFB production well fields and ABCWUA Ridgecrest production well fields are located near the northern boundary of KAFB. 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 PGWS defined the lateral extent of the system, which is approximately 3.5 square miles. The western edge of the PGWS trends along the eastern side of former KAFB sewage lagoons. The northern edge of the PGWS coincides with the northern boundary of TA-I. To the east, the PGWS is defined using USAF ER Program monitoring wells along the west side of the KAFB Landfill. The southern tip of the PGWS appears to be south of the Tijeras Arroyo Golf Course along the northeastern side of Pennsylvania Avenue. The area covered by the PGWS comprises much of the Tijeras Arroyo Groundwater study area, and the elevation data for wells completed in the PGWS were used to construct the potentiometric surface map that is presented and discussed in Chapter 6.0.

Monitoring Well Hydrographs

This section discusses historical and recent trends in groundwater elevations in the vicinity of SNL/NM, as demonstrated in the hydrographs for 12 GMP monitoring wells (Figures 2B-1 through 2B-6). The groundwater elevation data for these wells are considered to be representative of groundwater across KAFB. Historical data from quarterly and annual groundwater elevation measurements through CY 2014 were used for plotting the hydrographs.

Since their construction, the 12 monitoring wells have had mostly declining water levels due to limited recharge from precipitation and groundwater withdrawals in the regional aquifer. 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 are mostly due to monsoonal thunderstorms; 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 up until early 2011; since then groundwater elevations have stabilized.

- **NWTA3-MW3D, PL-2, and PL-4 (Figure 2B-3)**—Declining trend up until late 2010/early 2011; since then, groundwater elevations have stabilized and show a slight increasing trend in NWTA3-MW3D, and a slight to moderate increasing trend in monitoring wells PL-2 and PL-4.

- **SFR-2S and TRE-1 (Figure 2B-4)**—Slight to moderate 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 2014.

- **SWTA3-MW2, SWTA3-MW3, and SWTA3-MW4 (Figure 2B-6)**—Moderate declining trend up until late 2011; since then, groundwater elevations continue to decline but appear to be stabilizing.

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

Duplicate environmental samples were collected to estimate the overall reproducibility of the sampling and analytical process. Duplicates from monitoring wells MRN-3D and NWTA3-MW3D were analyzed for all parameters, and a duplicate from monitoring well SWTA3-MW4 was analyzed for VOCs only. Relative percent difference (RPD) calculations of environmental samples and duplicate environmental samples were performed for detected chemical analytes only. The duplicate sample results show good agreement (RPD values less than 35 for inorganic analyses) for all calculated parameters. No organic parameters were detected above laboratory MDLs.

EB samples were collected prior to well purging and sampling at monitoring wells MRN-3D, NWTA3-MW3D, and SWTA3-MW4 and submitted for all analyses.

Barium, bromodichloromethane, bromoform, chloride, chloroform, chromium, copper, dibromochloromethane, NPN, and TOX were detected in EB samples. No corrective action was required for barium, bromodichloromethane, bromoform, chloride, chloroform, chromium, dibromochloromethane, NPN, or TOX because these parameters were not detected in associated environmental samples, or were detected at concentrations greater than five times the blank result. Copper was detected in EB samples at concentrations greater than the associated environmental samples; therefore, copper was qualified as not detected in MRN-3D and NWTA3-MW3D samples during data validation. Total phenol was detected in the EB at a concentration less than five times the PL-4 environmental samples, and these environmental sample results were qualified as not detected during data validation.

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 trip blanks were submitted with the CY 2014 samples. No VOCs were detected above associated laboratory MDLs.

Four FB samples were collected for VOCs to assess whether contamination of the samples resulted from ambient conditions during sample collection. FB samples were prepared by pouring deionized water into sample containers at the monitoring wells PL-4, MRN-2, SFR-2S, and SWTA3-MW3 sampling points to simulate the transfer of environmental samples from the sampling system to the sample container. The VOC compounds bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above laboratory MDLs in every FB sample. No corrective action was necessary, because these compounds were not detected in the associated environmental samples.

QC samples are also 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 analytical results were qualified during the data validation process, and all data were determined as acceptable and reported QC measures to be adequate, except for the values listed below:

- Original total phenol analysis for Coyote Springs was qualified as unusable during data validation because the result could not be verified with reanalysis or resample results.

- The potassium-40 activities in samples from Coyote Springs, MRN-2, MRN-3D, SFR-4T, and TRE-1 were qualified as unusable during data validation because GEL was unable to meet minimum peak identification criteria.

2.8 Variances and Nonconformances

No variances or non-conformances of field activities from requirements in the GMP Mini-Sampling and Analysis Plan (SAP) (SNL January 2014) were identified during CY 2014 sampling activities.

2.9 Summary and Conclusions

The annual groundwater surveillance monitoring sampling event was conducted between January 30 and April 18, 2014. Groundwater samples were collected from 12 monitoring wells and one 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 all well samples above associated MDLs, and ranged from 0.263 to 5.22 mg/L. All NPN results are below the MCL/MAC of 10 mg/L.

Total phenol was not detected at 12 of the sample locations, but was detected at 0.0152 mg/L at SWTA3-MW3. SNL/NM personnel resampled Coyote Spring for total phenol because the original result was not comparable to historical values and the associated reanalysis was performed outside analytical hold times.

Fluoride was detected above the MAC of 1.6 mg/L (NMED January 2001) in samples from Coyote Springs and monitoring wells SFR-2S, SFR-4T, and TRE-1 at concentrations ranging from 1.66 to 2.69 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 0.00737 mg/L.

Groundwater elevations were obtained during CY 2014 at 96 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. 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 by ABCWUA production wells located north of the base.

2.10 References

40 CFR 141 Code of Federal Regulations, Title 40—Protection of the Environment, Part 141--National Primary Drinking Water Regulations.

DOE 1993 U.S. Department of Energy (DOE), 1993. *Drinking Water Guidelines for Radioisotopes,* DOE Order 5400.5, U.S. Department of Energy, Washington, D.C.

EPA May 2009 U.S. Environmental Protection Agency (EPA), 2009. *National Primary Drinking Water Regulations,* EPA 816-F 09-004, U.S. Environmental Protection Agency, Washington, D.C. May.

EPA 2001 U.S. Environmental Protection Agency (EPA), 2001. *National Primary Drinking Water Regulations,* Title 40, Code of Federal Regulations, Part 141, Subpart B, Office of Water, U.S. Environmental Protection Agency, Washington, D.C.

NMED April 2004 New Mexico Environment Department (NMED), 2004. *Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act 74-4-10: Sandia National Laboratories Consent Order*, New Mexico Environment Department, Santa Fe, New Mexico, April 29.

NMED January 2001 New Mexico Environment Department (NMED), 2001. *New Mexico Water Quality Control Commission Regulations,* Section 20.6.2 of the New Mexico Administrative Code, *Environmental Protection, Water Quality, Groundwater and Surface Water Protection*, New Mexico Environment Department, Santa Fe, New Mexico, January 15.

NMOSE August 2005 New Mexico Office of the State Engineer (NMOSE), 2005. *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells*, Office of the State Engineer, Santa Fe, New Mexico, August 31.

SNL January 2014 Sandia National Laboratories, New Mexico (SNL/NM), 2014. *LTS Consolidated Groundwater Monitoring Program Mini-SAP for FY14 Groundwater Surveillance Task*, Sandia National Laboratories, Albuquerque, New Mexico, January.

SNL May 2013 Sandia National Laboratories, New Mexico (SNL/NM), 2013. *SNL/NM Long-Term Stewardship Consolidated Groundwater Monitoring Program Plan*, Sandia National Laboratories, Albuquerque, New Mexico, May.

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

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Attachment 2A Tables

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

Calendar Year 2014

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]
SWTA3-MW2 07-Feb-14	m,p-Xylenes	0.330	0.300	2.00	10000	620	J		095276-001	SW846-8260
TRE-1 03-Feb-14	Chloroform	0.540	0.300	1.00	NE	100	J		095259-001	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 2014

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	3.00	SW846-8260
1,1-Dichloroethane	0.300	SW846-8260	Naphthalene	0.400	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	0.300	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	0.0829–0.0874	SW846-8321A
4-Isopropyltoluene	0.300	SW846-8260	1,3-Dinitrobenzene	0.0829–0.0874	SW846-8321A
Benzene	0.300	SW846-8260	2,4,6-Trinitrotoluene	0.0829–0.0874	SW846-8321A
Bromobenzene	0.300	SW846-8260	2,4-Dinitrotoluene	0.0829–0.0874	SW846-8321A
Bromochloromethane	0.300	SW846-8260	2,6-Dinitrotoluene	0.0829–0.0874	SW846-8321A
Bromodichloromethane	0.300	SW846-8260	2-Amino-4,6-dinitrotoluene	0.0829–0.0874	SW846-8321A
Bromoform	0.300	SW846-8260	2-Nitrotoluene	0.0850–0.0896	SW846-8321A
Carbon tetrachloride	0.300	SW846-8260	3-Nitrotoluene	0.0829–0.0874	SW846-8321A
Chlorobenzene	0.300	SW846-8260	4-Amino-2,6-dinitrotoluene	0.0829–0.0874	SW846-8321A
Chloroethane	0.300	SW846-8260	4-Nitrotoluene	0.155–0.164	SW846-8321A
Chloroform	0.300	SW846-8260	HMX	0.0829–0.0874	SW846-8321A
Chloromethane	0.300	SW846-8260	Nitro-benzene	0.0829–0.0874	SW846-8321A
Dibromochloromethane	0.300	SW846-8260	Pentaerythritol tetranitrate	0.104–0.109	SW846-8321A
Dibromomethane	0.300	SW846-8260	RDX	0.0829–0.0874	SW846-8321A
Dichlorodifluoromethane	0.300	SW846-8260	Tetryl	0.0829–0.0874	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 2014

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 31-Jan-14	Nitrate plus nitrite	0.485	0.017	0.050	10.0			095572-018	EPA 353.2
Greystone-MW2 30-Jan-14	Nitrate plus nitrite	4.74	0.170	0.500	10.0			095255-018	EPA 353.2
MRN-2 12-Feb-14	Nitrate plus nitrite	4.23	0.170	0.500	10.0			095288-018	EPA 353.2
MRN-3D 13-Feb-14	Nitrate plus nitrite	2.40	0.170	0.500	10.0			095292-018	EPA 353.2
MRN-3D (Duplicate) 13-Feb-14	Nitrate plus nitrite	2.47	0.170	0.500	10.0			095293-018	EPA 353.2
NWTA3-MW3D 06-Feb-14	Nitrate plus nitrite	1.00	0.017	0.050	10.0			095273-018	EPA 353.2
NWTA3-MW3D (Duplicate) 06-Feb-14	Nitrate plus nitrite	1.01	0.017	0.050	10.0			095274-018	EPA 353.2
PL-2 17-Feb-14	Nitrate plus nitrite	2.95	0.170	0.500	10.0			095266-018	EPA 353.2
PL-4 14-Feb-14	Nitrate plus nitrite	5.22	0.170	0.500	10.0			095269-018	EPA 353.2
SFR-2S 04-Feb-14	Nitrate plus nitrite	0.894	0.170	0.500	10.0			095262-018	EPA 353.2
SFR-4T 05-Feb-14	Nitrate plus nitrite	0.263	0.017	0.050	10.0			095264-018	EPA 353.2
SWTA3-MW2 07-Feb-14	Nitrate plus nitrite	0.830	0.085	0.250	10.0			095276-018	EPA 353.2
SWTA3-MW3 10-Feb-14	Nitrate plus nitrite	0.585	0.085	0.250	10.0			095279-018	EPA 353.2
SWTA3-MW4 11-Feb-14	Nitrate plus nitrite	1.06	0.085	0.250	10.0			095284-018	EPA 353.2
TRE-1 03-Feb-14	Nitrate plus nitrite	2.19	0.170	0.500	10.0			095259-018	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 2014

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 31-Jan-14	Total Organic Halogens	0.0237	0.00333	0.010	NE	NE		J	095257-003	SW846 9020
	Bromide	0.143	0.067	0.200	NE	NE	J		095257-016	SW846 9056
	Chloride	481	6.70	20.0	NE	NE			095257-016	SW846 9056
	Fluoride	**1.69**	0.033	0.100	4.0	1.60			095257-016	SW846 9056
	Sulfate	129	13.3	40.0	NE	NE			095257-016	SW846 9056
	Alkalinity as CaCO3	1120	0.725	1.00	NE	NE			095257-022	SM2320B
	Total Phenol	0.550	0.00834	0.025	NE	NE		R	095257-026	SW846 9066
	Total Phenol (reanalysis)	ND	0.00167	0.005	NE	NE	H, h, U	R	095257-R26	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095257-027	SW846 9012
Coyote Spring (resample) 18-Apr-14	Total Phenol	ND	0.00167	0.005	NE	NE	U		095835-026	SW846 9066
Greystone-MW2 30-Jan-14	Total Organic Halogens	0.0259	0.00333	0.010	NE	NE		J	095255-003	SW846 9020
	Bromide	0.637	0.067	0.200	NE	NE			095255-016	SW846 9056
	Chloride	113	1.68	5.00	NE	NE			095255-016	SW846 9056
	Fluoride	0.862	0.033	0.100	4.0	1.60			095255-016	SW846 9056
	Sulfate	52.1	3.33	10.0	NE	NE			095255-016	SW846 9056
	Alkalinity as CaCO3	461	0.725	1.00	NE	NE			095255-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095255-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095255-027	SW846 9012
MRN-2 12-Feb-14	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		095288-003	SW846 9020
	Bromide	0.153	0.067	0.200	NE	NE	J		095288-016	SW846 9056
	Chloride	13.4	0.335	1.00	NE	NE			095288-016	SW846 9056
	Fluoride	0.523	0.033	0.100	4.0	1.60			095288-016	SW846 9056
	Sulfate	51.7	0.665	2.00	NE	NE			095288-016	SW846 9056
	Alkalinity as CaCO3	146	0.725	1.00	NE	NE			095288-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095288-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095288-027	SW846 9012
MRN-3D 13-Feb-14	Total Organic Halogens	0.00466	0.00333	0.010	NE	NE	J	0.044U	095292-003	SW846 9020
	Bromide	0.148	0.067	0.200	NE	NE	J		095292-016	SW846 9056
	Chloride	14.3	0.335	1.00	NE	NE			095292-016	SW846 9056
	Fluoride	0.389	0.033	0.100	4.0	1.60			095292-016	SW846 9056
	Sulfate	76.1	0.665	2.00	NE	NE			095292-016	SW846 9056
	Alkalinity as CaCO3	155	0.725	1.00	NE	NE			095292-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095292-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095292-027	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 2014

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 (Duplicate) 13-Feb-14	Total Organic Halogens	0.00466	0.00333	0.010	NE	NE	J	0.044U	095293-003	SW846 9020
	Bromide	0.174	0.067	0.200	NE	NE	J		095293-016	SW846 9056
	Chloride	14.3	0.335	1.00	NE	NE			095293-016	SW846 9056
	Fluoride	0.395	0.033	0.100	4.0	1.60			095293-016	SW846 9056
	Sulfate	75.6	0.665	2.00	NE	NE			095293-016	SW846 9056
	Alkalinity as CaCO3	156	0.725	1.00	NE	NE			095293-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095293-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095293-027	SW846 9012
NWTA3-MW3D 06-Feb-14	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		095273-003	SW846 9020
	Bromide	0.140	0.067	0.200	NE	NE	J		095273-016	SW846 9056
	Chloride	10.8	0.335	1.00	NE	NE			095273-016	SW846 9056
	Fluoride	0.752	0.033	0.100	4.0	1.60			095273-016	SW846 9056
	Sulfate	52.5	0.665	2.00	NE	NE			095273-016	SW846 9056
	Alkalinity as CaCO3	140	0.725	1.00	NE	NE			095273-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095273-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095273-027	SW846 9012
NWTA3-MW3D (Duplicate) 06-Feb-14	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		095274-003	SW846 9020
	Bromide	0.149	0.067	0.200	NE	NE	J		095274-016	SW846 9056
	Chloride	10.7	0.335	1.00	NE	NE			095274-016	SW846 9056
	Fluoride	0.762	0.033	0.100	4.0	1.60			095274-016	SW846 9056
	Sulfate	51.3	0.665	2.00	NE	NE			095274-016	SW846 9056
	Alkalinity as CaCO3	144	0.725	1.00	NE	NE			095274-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095274-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095274-027	SW846 9012
PL-2 17-Feb-14	Total Organic Halogens	0.00442	0.00333	0.010	NE	NE	J		095266-003	SW846 9020
	Bromide	0.170	0.067	0.200	NE	NE	J		095266-016	SW846 9056
	Chloride	14.4	0.335	1.00	NE	NE			095266-016	SW846 9056
	Fluoride	0.424	0.033	0.100	4.0	1.60			095266-016	SW846 9056
	Sulfate	74.1	0.665	2.00	NE	NE			095266-016	SW846 9056
	Alkalinity as CaCO3	145	0.725	1.00	NE	NE			095266-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095266-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095266-027	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 2014

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		095269-003	SW846 9020
14-Feb-14	Bromide	0.215	0.067	0.200	NE	NE			095269-016	SW846 9056
	Chloride	15.7	0.335	1.00	NE	NE			095269-016	SW846 9056
	Fluoride	0.282	0.033	0.100	4.0	1.60			095269-016	SW846 9056
	Sulfate	69.7	0.665	2.00	NE	NE			095269-016	SW846 9056
	Alkalinity as CaCO3	164	0.725	1.00	NE	NE			095269-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095269-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095269-027	SW846 9012
SFR-2S	Total Organic Halogens	0.0208	0.00333	0.010	NE	NE		J	095262-003	SW846 9020
04-Feb-14	Bromide	0.658	0.067	0.200	NE	NE			095262-016	SW846 9056
	Chloride	127	1.68	5.00	NE	NE			095262-016	SW846 9056
	Fluoride	**1.68**	0.033	0.100	4.0	1.60			095262-016	SW846 9056
	Sulfate	72.7	3.33	10.0	NE	NE			095262-016	SW846 9056
	Alkalinity as CaCO3	382	0.725	1.00	NE	NE			095262-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095262-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095262-027	SW846 9012
SFR-4T	Total Organic Halogens	0.0363	0.00333	0.010	NE	NE		J	095264-003	SW846 9020
05-Feb-14	Bromide	1.57	0.067	0.200	NE	NE			095264-016	SW846 9056
	Chloride	201	13.4	40.0	NE	NE			095264-016	SW846 9056
	Fluoride	**2.69**	0.033	0.100	4.0	1.60			095264-016	SW846 9056
	Sulfate	2010	26.6	80.0	NE	NE			095264-016	SW846 9056
	Alkalinity as CaCO3	106	0.725	1.00	NE	NE			095264-022	SM2320B
	Total Phenol	0.00409	0.00167	0.005	NE	NE	B, J	0.0092UJ	095264-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095264-027	SW846 9012
SWTA3-MW2	Total Organic Halogens	0.0055	0.00333	0.010	NE	NE	J		095276-003	SW846 9020
07-Feb-14	Bromide	0.154	0.067	0.200	NE	NE	J		095276-016	SW846 9056
	Chloride	16.0	0.335	1.00	NE	NE			095276-016	SW846 9056
	Fluoride	1.03	0.033	0.100	4.0	1.60			095276-016	SW846 9056
	Sulfate	59.2	0.665	2.00	NE	NE			095276-016	SW846 9056
	Alkalinity as CaCO3	163	0.725	1.00	NE	NE			095276-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095276-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095276-027	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 2014

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	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		095279-003	SW846 9020
10-Feb-14	Bromide	0.144	0.067	0.200	NE	NE	J		095279-016	SW846 9056
	Chloride	13.6	0.335	1.00	NE	NE			095279-016	SW846 9056
	Fluoride	1.18	0.033	0.100	4.0	1.60			095279-016	SW846 9056
	Sulfate	65.0	0.665	2.00	NE	NE			095279-016	SW846 9056
	Alkalinity as CaCO3	156	0.725	1.00	NE	NE			095279-022	SM2320B
	Total Phenol	0.0152	0.00167	0.005	NE	NE			095279-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095279-027	SW846 9012
SWTA3-MW4	Total Organic Halogens	0.0041	0.00333	0.010	NE	NE	J		095284-003	SW846 9020
11-Feb-14	Bromide	0.210	0.067	0.200	NE	NE			095284-016	SW846 9056
	Chloride	17.7	0.335	1.00	NE	NE			095284-016	SW846 9056
	Fluoride	1.57	0.033	0.100	4.0	1.60			095284-016	SW846 9056
	Sulfate	52.6	0.665	2.00	NE	NE			095284-016	SW846 9056
	Alkalinity as CaCO3	169	0.725	1.00	NE	NE			095284-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095284-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095284-027	SW846 9012
TRE-1	Total Organic Halogens	0.0213	0.00333	0.010	NE	NE		J	095259-003	SW846 9020
03-Feb-14	Bromide	0.747	0.067	0.200	NE	NE			095259-016	SW846 9056
	Chloride	135	1.68	5.00	NE	NE			095259-016	SW846 9056
	Fluoride	**1.66**	0.033	0.100	4.0	1.60			095259-016	SW846 9056
	Sulfate	102	3.33	10.0	NE	NE			095259-016	SW846 9056
	Alkalinity as CaCO3	475	0.725	1.00	NE	NE			095259-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U	UJ	095259-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	095259-027	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 2014

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 31-Jan-14	ND	0.000067	0.0002	0.002	U		095257-010	SW846 7470A
Greystone-MW2 30-Jan-14	ND	0.000067	0.0002	0.002	U		095255-010	SW846 7470A
MRN-2 12-Feb-14	ND	0.000067	0.0002	0.002	U		095288-010	SW846 7470A
MRN-3D 13-Feb-14	ND	0.000067	0.0002	0.002	U		095292-010	SW846 7470A
MRN-3D (Duplicate) 13-Feb-14	ND	0.000067	0.0002	0.002	U		095293-010	SW846 7470A
NWTA3-MW3D 06-Feb-14	ND	0.000067	0.0002	0.002	U		095273-010	SW846 7470A
NWTA3-MW3D (Duplicate) 06-Feb-14	ND	0.000067	0.0002	0.002	U		095274-010	SW846 7470A
PL-2 17-Feb-14	ND	0.000067	0.0002	0.002	U		095266-010	SW846 7470A
PL-4 14-Feb-14	ND	0.000067	0.0002	0.002	U		095269-010	SW846 7470A
SFR-2S 04-Feb-14	ND	0.000067	0.0002	0.002	U		095262-010	SW846 7470A
SFR-4T 05-Feb-14	ND	0.000067	0.0002	0.002	U		095264-010	SW846 7470A
SWTA3-MW2 07-Feb-14	ND	0.000067	0.0002	0.002	U		095276-010	SW846 7470A
SWTA3-MW3 10-Feb-14	ND	0.000067	0.0002	0.002	U		095279-010	SW846 7470A
SWTA3-MW4 11-Feb-14	ND	0.000067	0.0002	0.002	U		095284-010	SW846 7470A
TRE-1 03-Feb-14	ND	0.000067	0.0002	0.002	U		095259-010	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 2014

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	0.227	0.015	0.050	NE	NE			095257-009	SW846 6020
31-Jan-14	Antimony	ND	0.001	0.003	0.006	NE	U		095257-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095257-009	SW846 6020
	Barium	0.0448	0.0006	0.002	2.00	1.00			095257-009	SW846 6020
	Beryllium	**0.00737**	0.0002	0.0005	0.004	NE			095257-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095257-009	SW846 6020
	Calcium	297	0.600	2.00	NE	NE			095257-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095257-009	SW846 6020
	Cobalt	0.0103	0.0001	0.001	NE	NE			095257-009	SW846 6020
	Copper	0.00211	0.00035	0.001	NE	NE		J-	095257-009	SW846 6020
	Iron	0.624	0.033	0.100	NE	NE			095257-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095257-009	SW846 6020
	Magnesium	61.0	0.050	0.150	NE	NE			095257-009	SW846 6020
	Manganese	1.48	0.005	0.025	NE	NE		J	095257-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095257-009	SW846 7470
	Nickel	0.0314	0.0005	0.002	NE	NE			095257-009	SW846 6020
	Potassium	27.9	0.080	0.300	NE	NE			095257-009	SW846 6020
	Selenium	0.00191	0.0015	0.005	0.050	0.050	J		095257-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095257-009	SW846 6020
	Sodium	390	0.800	2.50	NE	NE		J	095257-009	SW846 6020
	Thallium	0.00128	0.00045	0.002	0.002	NE	J		095257-009	SW846 6020
	Uranium	0.00759	0.000067	0.0002	0.03	0.03			095257-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	NE	U		095257-009	SW846 6010
	Zinc	0.0478	0.0035	0.010	NE	NE			095257-009	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 2014

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		095255-009	SW846 6020
30-Jan-14	Antimony	ND	0.001	0.003	0.006	NE	U		095255-009	SW846 6020
	Arsenic	0.00397	0.0017	0.005	0.010	0.100	J		095255-009	SW846 6020
	Barium	0.140	0.0006	0.002	2.00	1.00			095255-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095255-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095255-009	SW846 6020
	Calcium	155	0.600	2.00	NE	NE	B		095255-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095255-009	SW846 6020
	Cobalt	0.000453	0.0001	0.001	NE	NE	J		095255-009	SW846 6020
	Copper	0.000794	0.00035	0.001	NE	NE	J	J-	095255-009	SW846 6020
	Iron	0.393	0.033	0.100	NE	NE			095255-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095255-009	SW846 6020
	Magnesium	29.2	0.010	0.030	NE	NE			095255-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095255-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095255-009	SW846 7470
	Nickel	0.00247	0.0005	0.002	NE	NE		J-	095255-009	SW846 6020
	Potassium	5.56	0.080	0.300	NE	NE			095255-009	SW846 6020
	Selenium	0.0017	0.0015	0.005	0.050	0.050	J		095255-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095255-009	SW846 6020
	Sodium	96.1	0.800	2.50	NE	NE		J	095255-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095255-009	SW846 6020
	Uranium	0.00726	0.000067	0.0002	0.03	0.03			095255-009	SW846 6020
	Vanadium	0.00298	0.001	0.005	NE	NE	J		095255-009	SW846 6010
	Zinc	0.00511	0.0035	0.010	NE	NE	B, J	0.018U	095255-009	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 2014

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		095288-009	SW846 6020
12-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095288-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095288-009	SW846 6020
	Barium	0.0502	0.0006	0.002	2.00	1.00			095288-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095288-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095288-009	SW846 6020
	Calcium	49.1	0.060	0.200	NE	NE			095288-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095288-009	SW846 6020
	Cobalt	0.000101	0.0001	0.001	NE	NE	J		095288-009	SW846 6020
	Copper	0.00078	0.00035	0.001	NE	NE	J		095288-009	SW846 6020
	Iron	0.240	0.033	0.100	NE	NE	B	0.44U	095288-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095288-009	SW846 6020
	Magnesium	14.8	0.010	0.030	NE	NE			095288-009	SW846 6020
	Manganese	0.00251	0.001	0.005	NE	NE	B, J	0.0096U	095288-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095288-009	SW846 7470
	Nickel	0.0015	0.0005	0.002	NE	NE	J		095288-009	SW846 6020
	Potassium	3.18	0.080	0.300	NE	NE			095288-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095288-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095288-009	SW846 6020
	Sodium	22.5	0.080	0.250	NE	NE			095288-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095288-009	SW846 6020
	Uranium	0.00312	0.000067	0.0002	0.03	0.03			095288-009	SW846 6020
	Vanadium	0.00778	0.001	0.005	NE	NE			095288-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095288-009	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 2014

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		095292-009	SW846 6020
13-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095292-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095292-009	SW846 6020
	Barium	0.106	0.0006	0.002	2.00	1.00			095292-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095292-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095292-009	SW846 6020
	Calcium	59.7	0.600	2.00	NE	NE			095292-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095292-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095292-009	SW846 6020
	Copper	0.000707	0.00035	0.001	NE	NE	J	0.0052U	095292-009	SW846 6020
	Iron	0.119	0.033	0.100	NE	NE	B	0.44U	095292-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095292-009	SW846 6020
	Magnesium	14.0	0.010	0.030	NE	NE			095292-009	SW846 6020
	Manganese	0.00187	0.001	0.005	NE	NE	B, J	0.0096U	095292-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095292-009	SW846 7470
	Nickel	0.00155	0.0005	0.002	NE	NE	J		095292-009	SW846 6020
	Potassium	4.43	0.080	0.300	NE	NE			095292-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095292-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095292-009	SW846 6020
	Sodium	27.7	0.080	0.250	NE	NE			095292-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095292-009	SW846 6020
	Uranium	0.00403	0.000067	0.0002	0.03	0.03			095292-009	SW846 6020
	Vanadium	0.00558	0.001	0.005	NE	NE			095292-009	SW846 6010
	Zinc	0.0576	0.0035	0.010	NE	NE			095292-009	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 2014

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		095293-009	SW846 6020
(Duplicate)	Antimony	ND	0.001	0.003	0.006	NE	U		095293-009	SW846 6020
13-Feb-14	Arsenic	0.00196	0.0017	0.005	0.010	0.100	J		095293-009	SW846 6020
	Barium	0.106	0.0006	0.002	2.00	1.00			095293-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095293-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095293-009	SW846 6020
	Calcium	60.2	0.600	2.00	NE	NE			095293-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095293-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095293-009	SW846 6020
	Copper	0.000676	0.00035	0.001	NE	NE	J	0.0052U	095293-009	SW846 6020
	Iron	0.106	0.033	0.100	NE	NE	B	0.44U	095293-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095293-009	SW846 6020
	Magnesium	13.7	0.010	0.030	NE	NE			095293-009	SW846 6020
	Manganese	0.00149	0.001	0.005	NE	NE	B, J	0.0096U	095293-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095293-009	SW846 7470
	Nickel	0.00137	0.0005	0.002	NE	NE	J		095293-009	SW846 6020
	Potassium	4.22	0.080	0.300	NE	NE			095293-009	SW846 6020
	Selenium	0.00153	0.0015	0.005	0.050	0.050	J		095293-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095293-009	SW846 6020
	Sodium	26.6	0.080	0.250	NE	NE			095293-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095293-009	SW846 6020
	Uranium	0.00407	0.000067	0.0002	0.03	0.03			095293-009	SW846 6020
	Vanadium	0.00508	0.001	0.005	NE	NE			095293-009	SW846 6010
	Zinc	0.0613	0.0035	0.010	NE	NE			095293-009	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,
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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		095273-009	SW846 6020
06-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095273-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095273-009	SW846 6020
	Barium	0.0912	0.0006	0.002	2.00	1.00			095273-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095273-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095273-009	SW846 6020
	Calcium	38.8	0.060	0.200	NE	NE			095273-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095273-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095273-009	SW846 6020
	Copper	0.000658	0.00035	0.001	NE	NE	J	0.0063U	095273-009	SW846 6020
	Iron	0.0703	0.033	0.100	NE	NE	J		095273-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095273-009	SW846 6020
	Magnesium	8.80	0.010	0.030	NE	NE		J	095273-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095273-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095273-009	SW846 7470
	Nickel	0.00125	0.0005	0.002	NE	NE	J		095273-009	SW846 6020
	Potassium	3.26	0.080	0.300	NE	NE			095273-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095273-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095273-009	SW846 6020
	Sodium	40.1	0.080	0.250	NE	NE			095273-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095273-009	SW846 6020
	Uranium	0.00414	0.000067	0.0002	0.03	0.03			095273-009	SW846 6020
	Vanadium	0.00783	0.001	0.005	NE	NE			095273-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095273-009	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,
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Calendar Year 2014

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		095274-009	SW846 6020
(Duplicate)	Antimony	ND	0.001	0.003	0.006	NE	U		095274-009	SW846 6020
06-Feb-14	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095274-009	SW846 6020
	Barium	0.0888	0.0006	0.002	2.00	1.00			095274-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095274-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095274-009	SW846 6020
	Calcium	37.4	0.060	0.200	NE	NE			095274-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095274-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095274-009	SW846 6020
	Copper	0.00064	0.00035	0.001	NE	NE	J	0.0063U	095274-009	SW846 6020
	Iron	0.0625	0.033	0.100	NE	NE	J		095274-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095274-009	SW846 6020
	Magnesium	8.25	0.010	0.030	NE	NE		J	095274-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095274-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095274-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	NE	J		095274-009	SW846 6020
	Potassium	3.39	0.080	0.300	NE	NE			095274-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095274-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095274-009	SW846 6020
	Sodium	39.6	0.080	0.250	NE	NE			095274-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095274-009	SW846 6020
	Uranium	0.00404	0.000067	0.0002	0.03	0.03			095274-009	SW846 6020
	Vanadium	0.00822	0.001	0.005	NE	NE			095274-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095274-009	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 2014

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		095266-009	SW846 6020
17-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095266-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095266-009	SW846 6020
	Barium	0.081	0.0006	0.002	2.00	1.00			095266-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095266-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095266-009	SW846 6020
	Calcium	59.6	0.300	1.00	NE	NE			095266-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095266-009	SW846 6020
	Cobalt	0.000111	0.0001	0.001	NE	NE	J		095266-009	SW846 6020
	Copper	0.000844	0.00035	0.001	NE	NE	J		095266-009	SW846 6020
	Iron	0.159	0.033	0.100	NE	NE			095266-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095266-009	SW846 6020
	Magnesium	8.81	0.010	0.030	NE	NE		J	095266-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095266-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095266-009	SW846 7470
	Nickel	0.00393	0.0005	0.002	NE	NE			095266-009	SW846 6020
	Potassium	3.08	0.080	0.300	NE	NE			095266-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095266-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095266-009	SW846 6020
	Sodium	24.4	0.400	1.25	NE	NE			095266-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095266-009	SW846 6020
	Uranium	0.00391	0.000067	0.0002	0.03	0.03			095266-009	SW846 6020
	Vanadium	0.00675	0.001	0.005	NE	NE			095266-009	SW846 6010
	Zinc	0.0156	0.0035	0.010	NE	NE			095266-009	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 2014

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		095269-009	SW846 6020
14-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095269-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095269-009	SW846 6020
	Barium	0.0651	0.0006	0.002	2.00	1.00			095269-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095269-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095269-009	SW846 6020
	Calcium	72.2	0.300	1.00	NE	NE	B		095269-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095269-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095269-009	SW846 6020
	Copper	0.000485	0.00035	0.001	NE	NE	J		095269-009	SW846 6020
	Iron	0.118	0.033	0.100	NE	NE			095269-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095269-009	SW846 6020
	Magnesium	11.8	0.010	0.030	NE	NE			095269-009	SW846 6020
	Manganese	0.00292	0.001	0.005	NE	NE	J		095269-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095269-009	SW846 7470
	Nickel	0.000967	0.0005	0.002	NE	NE	J		095269-009	SW846 6020
	Potassium	4.50	0.080	0.300	NE	NE		J	095269-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095269-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095269-009	SW846 6020
	Sodium	21.1	0.080	0.250	NE	NE		J	095269-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095269-009	SW846 6020
	Uranium	0.00358	0.000067	0.0002	0.03	0.03			095269-009	SW846 6020
	Vanadium	0.00396	0.001	0.005	NE	NE	J		095269-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095269-009	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

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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		095262-009	SW846 6020
04-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095262-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095262-009	SW846 6020
	Barium	0.0609	0.0006	0.002	2.00	1.00			095262-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095262-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095262-009	SW846 6020
	Calcium	133	0.600	2.00	NE	NE			095262-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095262-009	SW846 6020
	Cobalt	0.000466	0.0001	0.001	NE	NE	J		095262-009	SW846 6020
	Copper	0.00165	0.00035	0.001	NE	NE			095262-009	SW846 6020
	Iron	0.229	0.033	0.100	NE	NE			095262-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095262-009	SW846 6020
	Magnesium	35.2	0.010	0.030	NE	NE		J	095262-009	SW846 6020
	Manganese	0.00174	0.001	0.005	NE	NE	J		095262-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095262-009	SW846 7470
	Nickel	0.0175	0.0005	0.002	NE	NE			095262-009	SW846 6020
	Potassium	7.06	0.080	0.300	NE	NE			095262-009	SW846 6020
	Selenium	0.00212	0.0015	0.005	0.050	0.050	J		095262-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095262-009	SW846 6020
	Sodium	86.2	0.800	2.50	NE	NE			095262-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095262-009	SW846 6020
	Uranium	0.019	0.000067	0.0002	0.03	0.03			095262-009	SW846 6020
	Vanadium	0.00335	0.001	0.005	NE	NE	J		095262-009	SW846 6010
	Zinc	0.0045	0.0035	0.010	NE	NE	J		095262-009	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

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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		095264-009	SW846 6020
05-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095264-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095264-009	SW846 6020
	Barium	0.0102	0.0006	0.002	2.00	1.00			095264-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095264-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095264-009	SW846 6020
	Calcium	61.6	0.600	2.00	NE	NE			095264-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095264-009	SW846 6020
	Cobalt	0.000107	0.0001	0.001	NE	NE	J		095264-009	SW846 6020
	Copper	0.00407	0.00035	0.001	NE	NE			095264-009	SW846 6020
	Iron	0.118	0.033	0.100	NE	NE			095264-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095264-009	SW846 6020
	Magnesium	3.75	0.010	0.030	NE	NE		J	095264-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095264-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095264-009	SW846 7470
	Nickel	0.00328	0.0005	0.002	NE	NE			095264-009	SW846 6020
	Potassium	2.50	0.080	0.300	NE	NE			095264-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095264-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095264-009	SW846 6020
	Sodium	1170	8.00	25.0	NE	NE			095264-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095264-009	SW846 6020
	Uranium	0.000248	0.000067	0.0002	0.03	0.03			095264-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	NE	U		095264-009	SW846 6010
	Zinc	0.0217	0.0035	0.010	NE	NE			095264-009	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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL/MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW2	Aluminum	ND	0.015	0.050	NE	NE	U		095276-009	SW846 6020
07-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095276-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095276-009	SW846 6020
	Barium	0.0682	0.0006	0.002	2.00	1.00			095276-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095276-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095276-009	SW846 6020
	Calcium	42.3	0.060	0.200	NE	NE			095276-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095276-009	SW846 6020
	Cobalt	0.000112	0.0001	0.001	NE	NE	J		095276-009	SW846 6020
	Copper	0.000784	0.00035	0.001	NE	NE	J		095276-009	SW846 6020
	Iron	0.0956	0.033	0.100	NE	NE	J		095276-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095276-009	SW846 6020
	Magnesium	12.3	0.010	0.030	NE	NE		J	095276-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095276-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095276-009	SW846 7470
	Nickel	0.00126	0.0005	0.002	NE	NE	J		095276-009	SW846 6020
	Potassium	3.75	0.080	0.300	NE	NE			095276-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095276-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095276-009	SW846 6020
	Sodium	32.9	0.080	0.250	NE	NE			095276-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095276-009	SW846 6020
	Uranium	0.00356	0.000067	0.0002	0.03	0.03			095276-009	SW846 6020
	Vanadium	0.00702	0.001	0.005	NE	NE			095276-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095276-009	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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL/MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW3	Aluminum	ND	0.015	0.050	NE	NE	U		095279-009	SW846 6020
10-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095279-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095279-009	SW846 6020
	Barium	0.0549	0.0006	0.002	2.00	1.00			095279-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095279-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095279-009	SW846 6020
	Calcium	39.3	0.060	0.200	NE	NE			095279-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095279-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095279-009	SW846 6020
	Copper	0.000851	0.00035	0.001	NE	NE	J		095279-009	SW846 6020
	Iron	0.0868	0.033	0.100	NE	NE	B, J	0.44U	095279-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095279-009	SW846 6020
	Magnesium	10.6	0.010	0.030	NE	NE			095279-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095279-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095279-009	SW846 7470
	Nickel	0.00113	0.0005	0.002	NE	NE	J		095279-009	SW846 6020
	Potassium	4.65	0.080	0.300	NE	NE			095279-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		095279-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095279-009	SW846 6020
	Sodium	47.8	0.080	0.250	NE	NE			095279-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095279-009	SW846 6020
	Uranium	0.00241	0.000067	0.0002	0.03	0.03			095279-009	SW846 6020
	Vanadium	0.00796	0.001	0.005	NE	NE			095279-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095279-009	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 2014

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		095284-009	SW846 6020
11-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095284-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095284-009	SW846 6020
	Barium	0.0476	0.0006	0.002	2.00	1.00			095284-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		095284-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095284-009	SW846 6020
	Calcium	37.5	0.060	0.200	NE	NE			095284-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095284-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		095284-009	SW846 6020
	Copper	0.000482	0.00035	0.001	NE	NE	J		095284-009	SW846 6020
	Iron	0.0704	0.033	0.100	NE	NE	B, J	0.44U	095284-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095284-009	SW846 6020
	Magnesium	10.3	0.010	0.030	NE	NE			095284-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095284-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095284-009	SW846 7470
	Nickel	0.000968	0.0005	0.002	NE	NE	J		095284-009	SW846 6020
	Potassium	4.32	0.080	0.300	NE	NE			095284-009	SW846 6020
	Selenium	0.00155	0.0015	0.005	0.050	0.050	J		095284-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095284-009	SW846 6020
	Sodium	56.9	0.800	2.50	NE	NE			095284-009	SW846 6020
	Thallium	0.000565	0.00045	0.002	0.002	NE	J	0.003U	095284-009	SW846 6020
	Uranium	0.00249	0.000067	0.0002	0.03	0.03			095284-009	SW846 6020
	Vanadium	0.00845	0.001	0.005	NE	NE			095284-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095284-009	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 2014

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		095259-009	SW846 6020
03-Feb-14	Antimony	ND	0.001	0.003	0.006	NE	U		095259-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		095259-009	SW846 6020
	Barium	0.0428	0.0006	0.002	2.00	1.00			095259-009	SW846 6020
	Beryllium	0.000222	0.0002	0.0005	0.004	NE	J		095259-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		095259-009	SW846 6020
	Calcium	171	0.600	2.00	NE	NE			095259-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		095259-009	SW846 6020
	Cobalt	0.000345	0.0001	0.001	NE	NE	J		095259-009	SW846 6020
	Copper	0.000889	0.00035	0.001	NE	NE	J		095259-009	SW846 6020
	Iron	0.265	0.033	0.100	NE	NE			095259-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		095259-009	SW846 6020
	Magnesium	36.0	0.010	0.030	NE	NE		J	095259-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		095259-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		095259-009	SW846 7470
	Nickel	0.00445	0.0005	0.002	NE	NE			095259-009	SW846 6020
	Potassium	6.40	0.080	0.300	NE	NE			095259-009	SW846 6020
	Selenium	0.00244	0.0015	0.005	0.050	0.050	J		095259-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		095259-009	SW846 6020
	Sodium	118	0.800	2.50	NE	NE			095259-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		095259-009	SW846 6020
	Uranium	0.021	0.000067	0.0002	0.03	0.03			095259-009	SW846 6020
	Vanadium	0.00274	0.001	0.005	NE	NE	J		095259-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		095259-009	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 2014

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	-1.77 ± 8.73	8.93	4.38	NE	NE	U	BD	095257-033	EPA 901.1
31-Jan-14	Cesium-137	-1.87 ± 2.97	3.04	1.47	NE	NE	U	BD	095257-033	EPA 901.1
	Cobalt-60	-5.0 ± 3.62	3.05	1.45	NE	NE	U	BD	095257-033	EPA 901.1
	Potassium-40	45.3 ± 41.9	28.1	13.2	NE	NE	X	R	095257-033	EPA 901.1
	Gross Alpha	-21.05	NA	NA	15 pCi/L	NE	NA	None	095257-034	EPA 900.0
	Gross Beta	29.3 ± 8.03	9.71	4.72	4mrem/yr	NE			095257-034	EPA 900.0
	Uranium-233/234	11.3 ± 1.48	0.0611	0.0259	NE	NE			095257-035	HASL-300
	Uranium-235/236	0.114 ± 0.0482	0.0321	0.0104	NE	NE			095257-035	HASL-300
	Uranium-238	2.20 ± 0.326	0.0428	0.0168	NE	NE			095257-035	HASL-300
	Radium-226	0.809 ± 0.592	0.826	0.332	5 pCi/L	30 pCi/L	U	BD	095257-038	EPA 903.1
	Radium-228	0.571 ± 0.363	0.496	0.219	5 pCi/L	30 pCi/L		J	095257-039	EPA 904.0
Greystone-MW2	Americium-241	16.8 ± 17.0	23.8	11.8	NE	NE	U	BD	095255-033	EPA 901.1
30-Jan-14	Cesium-137	3.10 ± 3.11	4.09	1.98	NE	NE	U	BD	095255-033	EPA 901.1
	Cobalt-60	-4.15 ± 4.36	4.20	2.01	NE	NE	U	BD	095255-033	EPA 901.1
	Potassium-40	5.12 ± 41.6	53.1	25.6	NE	NE	U	BD	095255-033	EPA 901.1
	Gross Alpha	-2.10	NA	NA	15 pCi/L	NE	NA	None	095255-034	EPA 900.0
	Gross Beta	9.88 ± 2.69	3.19	1.55	4mrem/yr	NE			095255-034	EPA 900.0
	Uranium-233/234	10.1 ± 1.31	0.0571	0.0242	NE	NE			095255-035	HASL-300
	Uranium-235/236	0.189 ± 0.0595	0.030	0.00968	NE	NE			095255-035	HASL-300
	Uranium-238	2.61 ± 0.372	0.040	0.0157	NE	NE			095255-035	HASL-300
	Radium-226	0.695 ± 0.355	0.387	0.158	5 pCi/L	30 pCi/L		J	095255-038	EPA 903.1
	Radium-228	0.209 ± 0.293	0.493	0.222	5 pCi/L	30 pCi/L	U	BD	095255-039	EPA 904.0
MRN-2	Americium-241	7.00 ± 12.7	19.3	9.44	NE	NE	U	BD	095288-033	EPA 901.1
12-Feb-14	Cesium-137	-0.546 ± 3.56	3.95	1.90	NE	NE	U	BD	095288-033	EPA 901.1
	Cobalt-60	0.928 ± 2.25	4.02	1.89	NE	NE	U	BD	095288-033	EPA 901.1
	Potassium-40	37.4 ± 46.6	36.6	17.1	NE	NE	X	R	095288-033	EPA 901.1
	Gross Alpha	2.70	NA	NA	15 pCi/L	NE	NA	None	095288-034	EPA 900.0
	Gross Beta	2.45 ± 0.716	0.643	0.303	4mrem/yr	NE		J	095288-034	EPA 900.0
	Radium-226	0.639 ± 0.406	0.544	0.221	5 pCi/L	30 pCi/L		J	095288-038	EPA 903.1
	Radium-228	0.261 ± 0.305	0.500	0.222	5 pCi/L	30 pCi/L	U	BD	095288-039	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 2014

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-3D 13-Feb-14	Americium-241	-5.21 ± 9.80	16.8	8.20	NE	NE	U	BD	095292-033	EPA 901.1
	Cesium-137	-0.752 ± 1.70	2.77	1.32	NE	NE	U	BD	095292-033	EPA 901.1
	Cobalt-60	0.072 ± 1.68	3.08	1.44	NE	NE	U	BD	095292-033	EPA 901.1
	Potassium-40	38.1 ± 38.5	28.1	13.1	NE	NE	X	R	095292-033	EPA 901.1
	Gross Alpha	1.97	NA	NA	15 pCi/L	NE	NA	None	095292-034	EPA 900.0
	Gross Beta	4.54 ± 1.24	1.47	0.718	4mrem/yr	NE		J	095292-034	EPA 900.0
	Radium-226	0.277 ± 0.308	0.497	0.203	5 pCi/L	30 pCi/L		BD	095292-038	EPA 903.1
	Radium-228	0.641 ± 0.372	0.501	0.227	5 pCi/L	30 pCi/L		J	095292-039	EPA 904.0
MRN-3D (Duplicate) 13-Feb-14	Americium-241	-1.86 ± 10.5	16.2	7.93	NE	NE	U	BD	095293-033	EPA 901.1
	Cesium-137	-2.58 ± 3.69	3.72	1.80	NE	NE	U	BD	095293-033	EPA 901.1
	Cobalt-60	-2.17 ± 3.01	3.65	1.73	NE	NE	U	BD	095293-033	EPA 901.1
	Potassium-40	0.660 ± 38.5	43.3	20.7	NE	NE	U	BD	095293-033	EPA 901.1
	Gross Alpha	5.12	NA	NA	15 pCi/L	NE	NA	None	095293-034	EPA 900.0
	Gross Beta	3.38 ± 0.909	0.991	0.477	4mrem/yr	NE		J	095293-034	EPA 900.0
	Radium-226	0.0994 ± 0.218	0.402	0.164	5 pCi/L	30 pCi/L	U	BD	095293-038	EPA 903.1
	Radium-228	0.105 ± 0.280	0.487	0.227	5 pCi/L	30 pCi/L	U	BD	095293-039	EPA 904.0
NWTA3-MW3D 06-Feb-14	Americium-241	-4.5 ± 13.9	23.7	11.6	NE	NE	U	BD	095273-033	EPA 901.1
	Cesium-137	-1.38 ± 1.99	3.07	1.47	NE	NE	U	BD	095273-033	EPA 901.1
	Cobalt-60	0.949 ± 1.76	3.17	1.48	NE	NE	U	BD	095273-033	EPA 901.1
	Potassium-40	-13 ± 43.8	47.5	22.6	NE	NE	U	BD	095273-033	EPA 901.1
	Gross Alpha	1.36	NA	NA	15 pCi/L	NE	NA	None	095273-034	EPA 900.0
	Gross Beta	2.66 ± 0.836	0.997	0.474	4mrem/yr	NE		J	095273-034	EPA 900.0
	Radium-226	0.0671 ± 0.263	0.513	0.206	5 pCi/L	30 pCi/L	U	BD	095273-038	EPA 903.1
	Radium-228	0.412 ± 0.323	0.495	0.231	5 pCi/L	30 pCi/L	U	BD	095273-039	EPA 904.0
NWTA3-MW3D (Duplicate) 06-Feb-14	Americium-241	-5.14 ± 10.9	16.3	7.98	NE	NE	U	BD	095274-033	EPA 901.1
	Cesium-137	2.29 ± 2.49	4.02	1.95	NE	NE	U	BD	095274-033	EPA 901.1
	Cobalt-60	0.729 ± 2.42	3.69	1.75	NE	NE	U	BD	095274-033	EPA 901.1
	Potassium-40	17.4 ± 49.6	32.9	15.5	NE	NE	U	BD	095274-033	EPA 901.1
	Gross Alpha	4.05	NA	NA	15 pCi/L	NE	NA	None	095274-034	EPA 900.0
	Gross Beta	3.85 ± 0.963	0.999	0.480	4mrem/yr	NE		J	095274-034	EPA 900.0
	Radium-226	0.320 ± 0.325	0.513	0.203	5 pCi/L	30 pCi/L	U	BD	095274-038	EPA 903.1
	Radium-228	-0.158 ± 0.260	0.497	0.230	5 pCi/L	30 pCi/L	U	BD	095274-039	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 2014

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	2.84 ± 12.7	19.6	9.60	NE	NE	U	BD	095266-033	EPA 901.1
17-Feb-14	Cesium-137	-0.265 ± 3.40	4.09	1.97	NE	NE	U	BD	095266-033	EPA 901.1
	Cobalt-60	-0.802 ± 2.24	3.81	1.79	NE	NE	U	BD	095266-033	EPA 901.1
	Potassium-40	-6.83 ± 39.9	48.1	22.8	NE	NE	U	BD	095266-033	EPA 901.1
	Gross Alpha	-0.27	NA	NA	15 pCi/L	NE	NA	None	095266-034	EPA 900.0
	Gross Beta	5.41 ± 1.64	2.09	1.02	4mrem/yr	NE		J	095266-034	EPA 900.0
	Radium-226	0.394 ± 0.398	0.637	0.260	5 pCi/L	30 pCi/L	U	BD	095266-038	EPA 903.1
	Radium-228	0.166 ± 0.287	0.489	0.227	5 pCi/L	30 pCi/L	U	BD	095266-039	EPA 904.0
PL-4	Americium-241	-6.6 ± 14.1	21.1	10.3	NE	NE	U	BD	095269-033	EPA 901.1
14-Feb-14	Cesium-137	-0.634 ± 2.90	3.24	1.55	NE	NE	U	BD	095269-033	EPA 901.1
	Cobalt-60	0.286 ± 1.92	3.54	1.65	NE	NE	U	BD	095269-033	EPA 901.1
	Potassium-40	-50.2 ± 45.9	45.9	21.8	NE	NE	U	BD	095269-033	EPA 901.1
	Gross Alpha	0.99	NA	NA	15 pCi/L	NE	NA	None	095269-034	EPA 900.0
	Gross Beta	3.82 ± 1.04	1.21	0.584	4mrem/yr	NE		J	095269-034	EPA 900.0
	Radium-226	0.597 ± 0.377	0.508	0.207	5 pCi/L	30 pCi/L		J	095269-038	EPA 903.1
	Radium-228	0.118 ± 0.275	0.486	0.218	5 pCi/L	30 pCi/L	U	BD	095269-039	EPA 904.0
SFR-2S	Americium-241	3.54 ± 12.1	18.8	9.20	NE	NE	U	BD	095262-033	EPA 901.1
04-Feb-14	Cesium-137	-1.67 ± 4.37	3.90	1.88	NE	NE	U	BD	095262-033	EPA 901.1
	Cobalt-60	0.746 ± 2.26	4.05	1.91	NE	NE	U	BD	095262-033	EPA 901.1
	Potassium-40	22.0 ± 51.9	37.1	17.4	NE	NE	U	BD	095262-033	EPA 901.1
	Gross Alpha	2.86	NA	NA	15 pCi/L	NE	NA	None	095262-034	EPA 900.0
	Gross Beta	8.54 ± 2.32	2.17	1.04	4mrem/yr	NE		J	095262-034	EPA 900.0
	Uranium-233/234	15.5 ± 2.00	0.0596	0.0253	NE	NE			095262-035	HASL-300
	Uranium-235/236	0.325 ± 0.0841	0.0314	0.0101	NE	NE			095262-035	HASL-300
	Uranium-238	4.22 ± 0.580	0.0418	0.0164	NE	NE			095262-035	HASL-300
	Radium-226	0.675 ± 0.410	0.546	0.222	5 pCi/L	30 pCi/L		J	095262-038	EPA 903.1
	Radium-228	0.0867 ± 0.288	0.497	0.237	5 pCi/L	30 pCi/L	U	BD	095262-039	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 2014

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-4T	Americium-241	3.50 ± 6.16	9.31	4.55	NE	NE	U	BD	095264-033	EPA 901.1
05-Feb-14	Cesium-137	3.05 ± 2.32	3.45	1.66	NE	NE	U	BD	095264-033	EPA 901.1
	Cobalt-60	1.22 ± 1.92	3.46	1.63	NE	NE	U	BD	095264-033	EPA 901.1
	Potassium-40	36.6 ± 46.8	32.1	15.1	NE	NE	X	R	095264-033	EPA 901.1
	Gross Alpha	-9.29	NA	NA	15 pCi/L	NE	NA	None	095264-034	EPA 900.0
	Gross Beta	-2.65 ± 4.76	8.49	4.07	4mrem/yr	NE	U	BD	095264-034	EPA 900.0
	Uranium-233/234	0.489 ± 0.102	0.0592	0.0251	NE	NE			095264-035	HASL-300
	Uranium-235/236	0.00817 ± 0.0196	0.0312	0.010	NE	NE	U	BD	095264-035	HASL-300
	Uranium-238	0.0959 ± 0.0402	0.0415	0.0163	NE	NE		J	095264-035	HASL-300
	Radium-226	0.580 ± 0.397	0.551	0.224	5 pCi/L	30 pCi/L		J	095264-038	EPA 903.1
	Radium-228	-0.0334 ± 0.284	0.497	0.239	5 pCi/L	30 pCi/L	U	BD	095264-039	EPA 904.0
SWTA3-MW2	Americium-241	-13.3 ± 8.61	9.50	4.65	NE	NE	U	BD	095276-033	EPA 901.1
07-Feb-14	Cesium-137	1.23 ± 1.75	2.80	1.35	NE	NE	U	BD	095276-033	EPA 901.1
	Cobalt-60	1.48 ± 1.62	2.85	1.34	NE	NE	U	BD	095276-033	EPA 901.1
	Potassium-40	9.10 ± 39.4	25.9	12.1	NE	NE	U	BD	095276-033	EPA 901.1
	Gross Alpha	0.63	NA	NA	15 pCi/L	NE	NA	None	095276-034	EPA 900.0
	Gross Beta	8.60 ± 1.86	1.71	0.838	4mrem/yr	NE		J	095276-034	EPA 900.0
	Radium-226	0.668 ± 0.555	0.830	0.338	5 pCi/L	30 pCi/L	U	BD	095276-038	EPA 903.1
	Radium-228	0.372 ± 0.317	0.496	0.232	5 pCi/L	30 pCi/L	U	BD	095276-039	EPA 904.0
SWTA3-MW3	Americium-241	-4.82 ± 15.3	23.1	11.3	NE	NE	U	BD	095279-033	EPA 901.1
10-Feb-14	Cesium-137	-0.616 ± 2.92	3.42	1.64	NE	NE	U	BD	095279-033	EPA 901.1
	Cobalt-60	-2.97 ± 4.29	3.31	1.55	NE	NE	U	BD	095279-033	EPA 901.1
	Potassium-40	2.17 ± 52.1	34.5	16.2	NE	NE	U	BD	095279-033	EPA 901.1
	Gross Alpha	0.81	NA	NA	15 pCi/L	NE	NA	None	095279-034	EPA 900.0
	Gross Beta	4.55 ± 1.35	1.73	0.845	4mrem/yr	NE		J	095279-034	EPA 900.0
	Radium-226	0.103 ± 0.124	0.196	0.0597	5 pCi/L	30 pCi/L	U	BD	095279-038	EPA 903.1
	Radium-228	0.124 ± 0.286	0.495	0.230	5 pCi/L	30 pCi/L	U	BD	095279-039	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 2014

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-MW4	Americium-241	10.3 ± 16.3	25.3	12.3	NE	NE	U	BD	095284-033	EPA 901.1
11-Feb-14	Cesium-137	2.39 ± 2.87	3.17	1.51	NE	NE	U	BD	095284-033	EPA 901.1
	Cobalt-60	0.792 ± 1.93	3.58	1.68	NE	NE	U	BD	095284-033	EPA 901.1
	Potassium-40	-14.2 ± 35.7	44.1	20.9	NE	NE	U	BD	095284-033	EPA 901.1
	Gross Alpha	0.71	NA	NA	15 pCi/L	NE	NA	None	095284-034	EPA 900.0
	Gross Beta	2.46 ± 0.779	0.964	0.463	4mrem/yr	NE		J	095284-034	EPA 900.0
	Radium-226	0.559 ± 0.339	0.451	0.184	5 pCi/L	30 pCi/L		J	095284-038	EPA 903.1
	Radium-228	0.722 ± 0.386	0.489	0.219	5 pCi/L	30 pCi/L		J	095284-039	EPA 904.0
TRE-1	Americium-241	9.85 ± 17.1	26.2	12.8	NE	NE	U	BD	095259-033	EPA 901.1
03-Feb-14	Cesium-137	-0.358 ± 1.92	3.40	1.63	NE	NE	U	BD	095259-033	EPA 901.1
	Cobalt-60	0.356 ± 2.02	3.71	1.74	NE	NE	U	BD	095259-033	EPA 901.1
	Potassium-40	43.2 ± 47.4	32.9	15.3	NE	NE	X	R	095259-033	EPA 901.1
	Gross Alpha	-5.16	NA	NA	15 pCi/L	NE	NA	None	095259-034	EPA 900.0
	Gross Beta	2.84 ± 2.06	3.18	1.54	4mrem/yr	NE	U	BD	095259-034	EPA 900.0
	Uranium-233/234	23.1 ± 2.95	0.0838	0.0355	NE	NE			095259-035	HASL-300
	Uranium-235/236	0.670 ± 0.150	0.0441	0.0142	NE	NE			095259-035	HASL-300
	Uranium-238	5.89 ± 0.803	0.0587	0.023	NE	NE			095259-035	HASL-300
	Radium-226	1.50 ± 0.561	0.551	0.224	5 pCi/L	30 pCi/L		J	095259-038	EPA 903.1
	Radium-228	0.613 ± 0.364	0.489	0.220	5 pCi/L	30 pCi/L		J	095259-039	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 2014

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	31-Jan-14	11.82	2225.2	237.8	6.10	1.01	15.6	1.67
Greystone-MW2	30-Jan-14	16.12	920.1	294.6	7.11	0.31	70.9	6.96
MRN-2	12-Feb-14	16.83	341.8	256.1	7.77	0.82	71.3	6.86
MRN-3D	13-Feb-14	20.06	405.2	133.5	7.66	1.22	50.3	4.57
NWTA3-MW3D	06-Feb-14	17.96	311.4	138.4	7.88	0.99	45.7	4.31
PL-2	17-Feb-14	19.20	386.2	90.4	7.82	0.70	69.0	6.35
PL-4	14-Feb-14	19.76	412.1	298.1	7.52	2.19	82.2	7.51
SFR-2S	04-Feb-14	15.04	860.9	167.7	6.96	5.32	77.0	7.73
SFR-4T	05-Feb-14	15.06	3301.8	30.1	8.09	0.56	7.8	0.77
SWTA3-MW2	07-Feb-14	17.27	358.4	276.4	7.77	0.84	50.1	4.83
SWTA3-MW3	10-Feb-14	20.08	385.2	137.5	7.84	1.19	52.5	4.74
SWTA3-MW4	11-Feb-14	17.81	374.8	247.8	7.89	0.72	55.2	5.11
TRE-1	03-Feb-14	15.88	1050.0	317.9	6.79	0.11	70.4	6.94

Refer to footnotes on page 2A-35.

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

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

[a]Result

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 Table 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 Table 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. MAC in groundwater is specified for the contaminants listed in 20.6.2.3103A New Mexico Administrative Code, New Mexico Water Quality Control Commission Regulations: Environmental Protection, Water Quality, Groundwater and Surface Water Protection, Human Health Standards, New Mexico Environment Department, January 2001.

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.
h	= Prep holding time exceeded.
H	= Analytical holding time 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.
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.
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

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Standard Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1990, *EML [Environmental Measurements Laboratory] Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300, Environmental Measurements Laboratory.

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

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

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.

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

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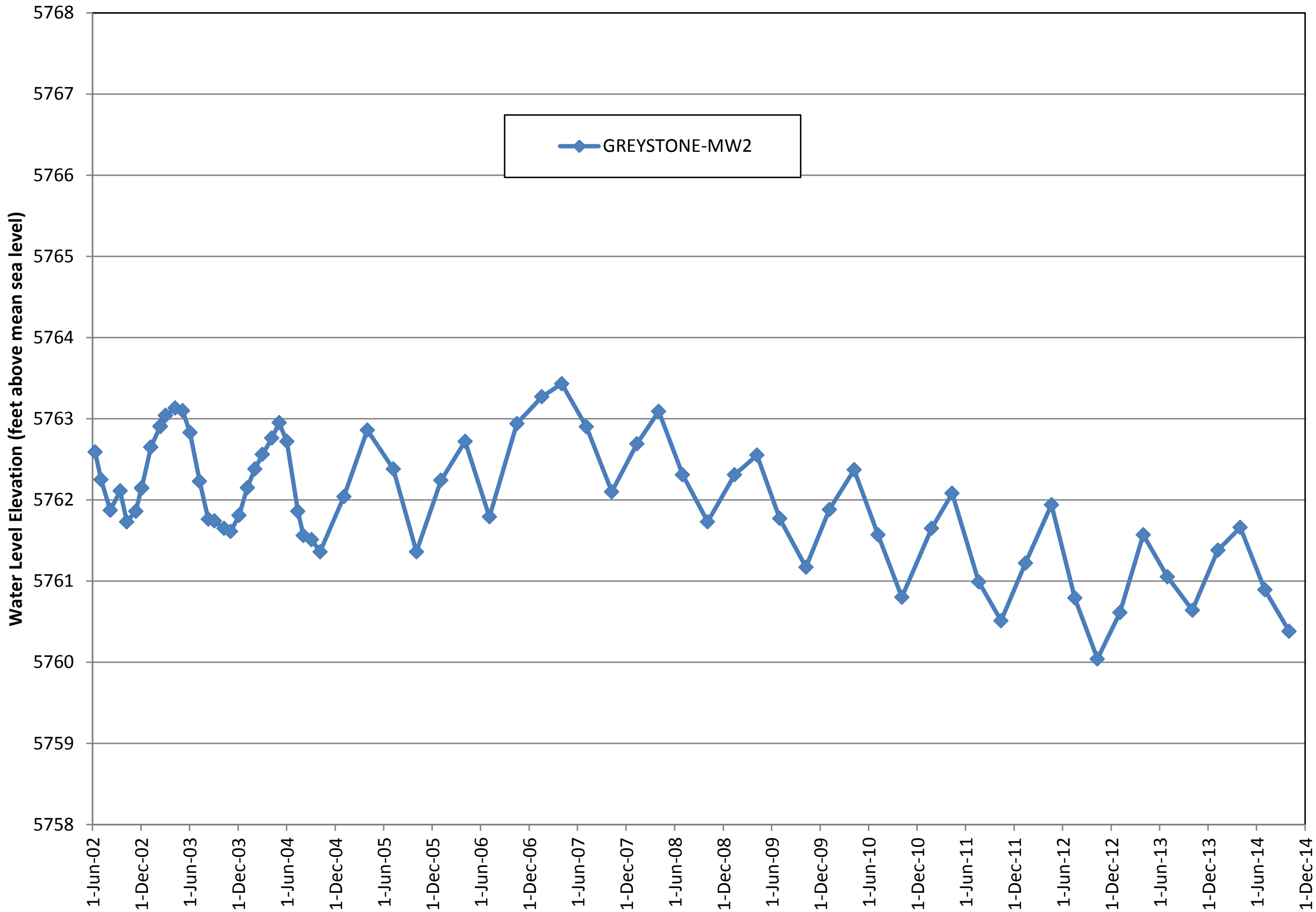

Figure 2B-1. GMP Study Wells (1 of 6)

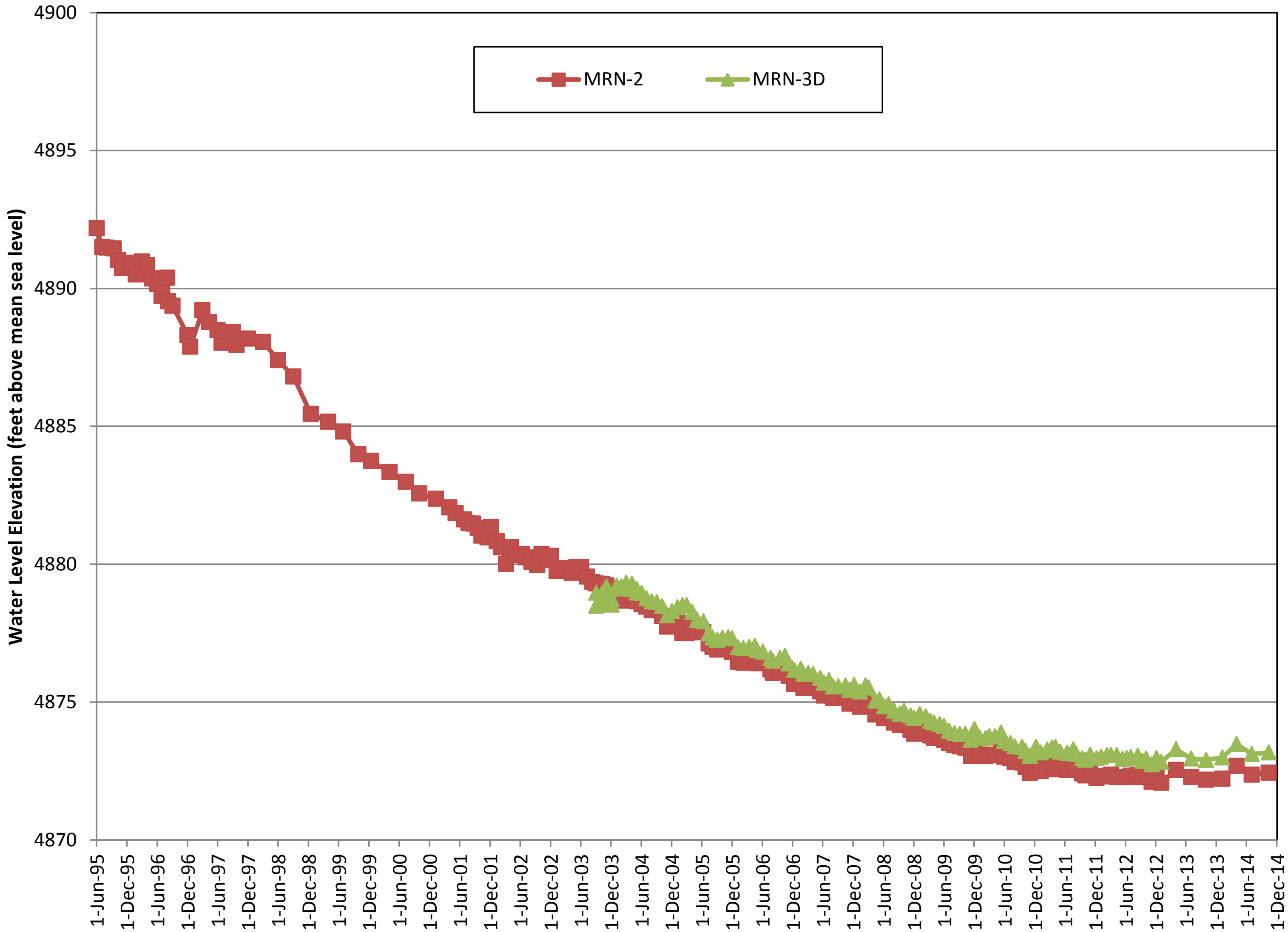

Figure 2B-2. GMP Study Wells (2 of 6)

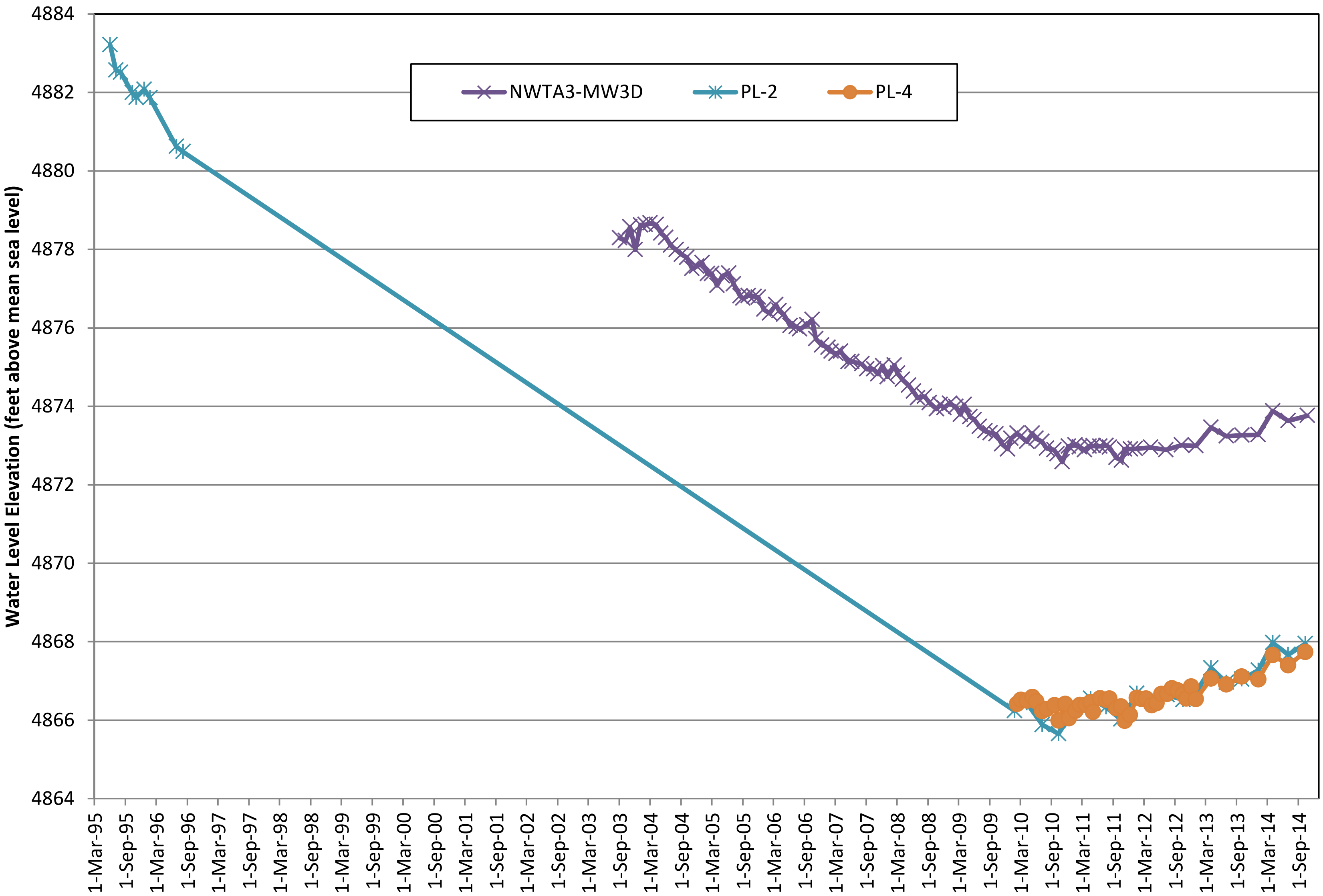

Figure 2B-3. GMP Study Wells (3 of 6)

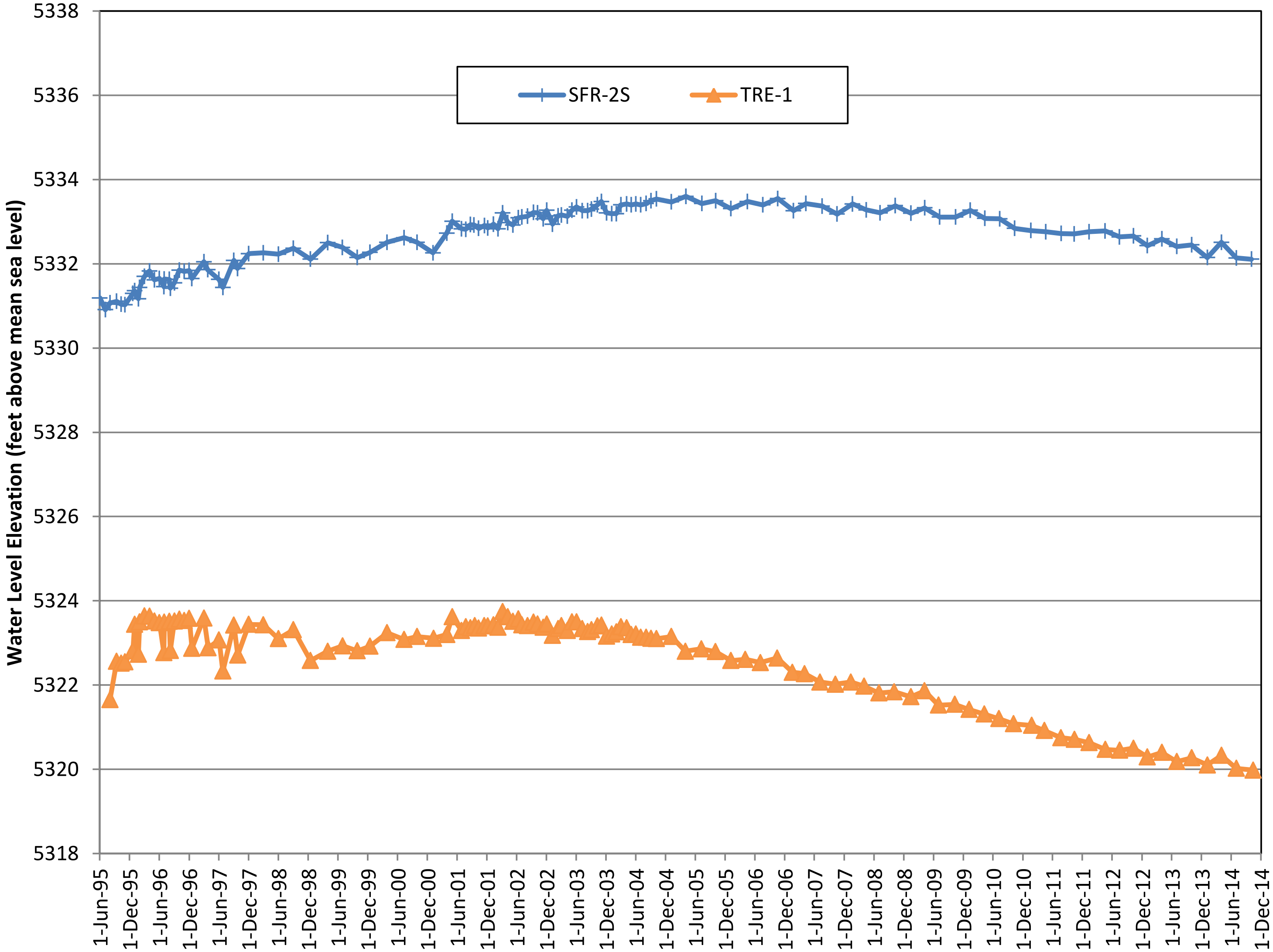

Figure 2B-4. GMP Study Wells (4 of 6)

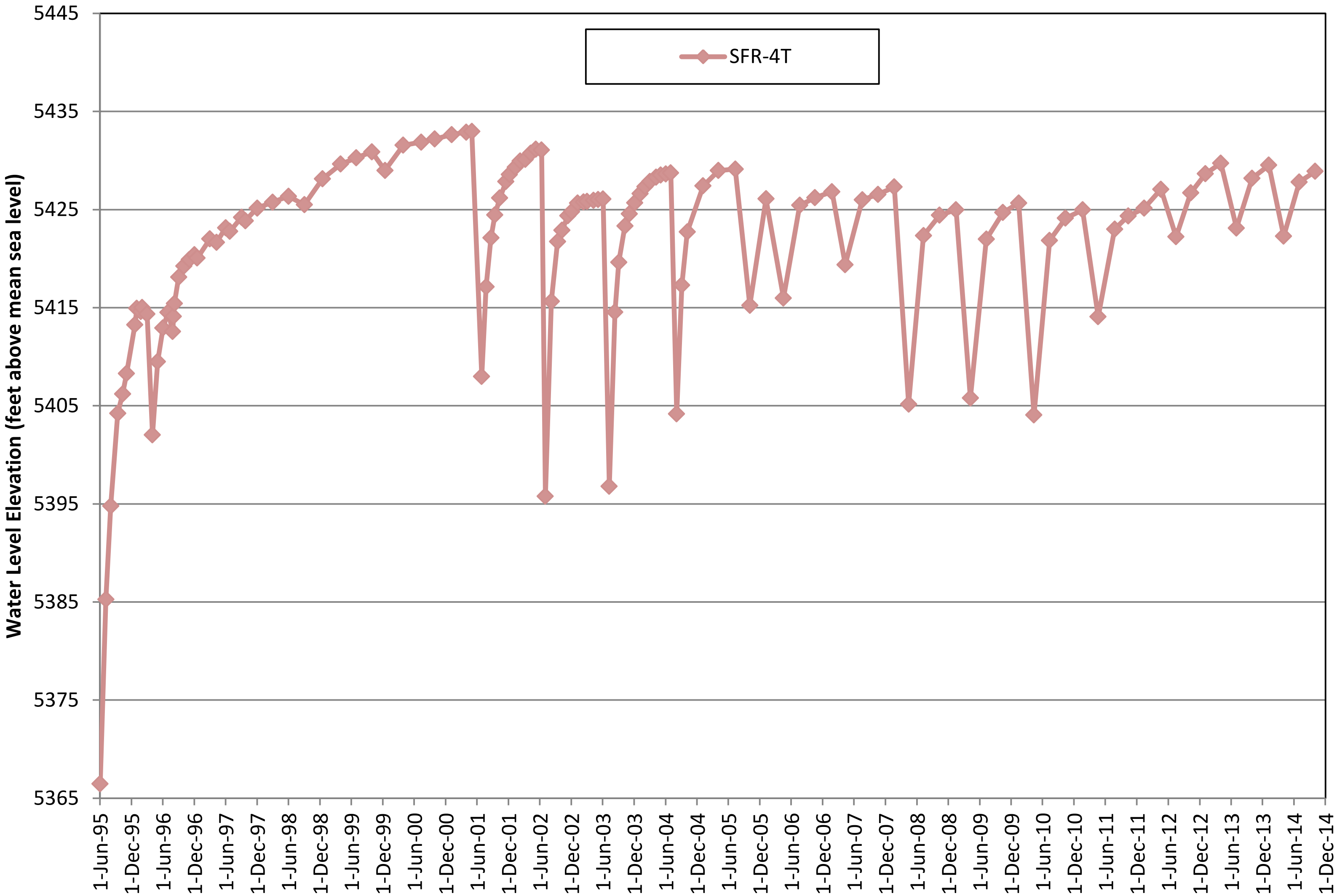

Figure 2B-5. GMP Study Wells (5 of 6)

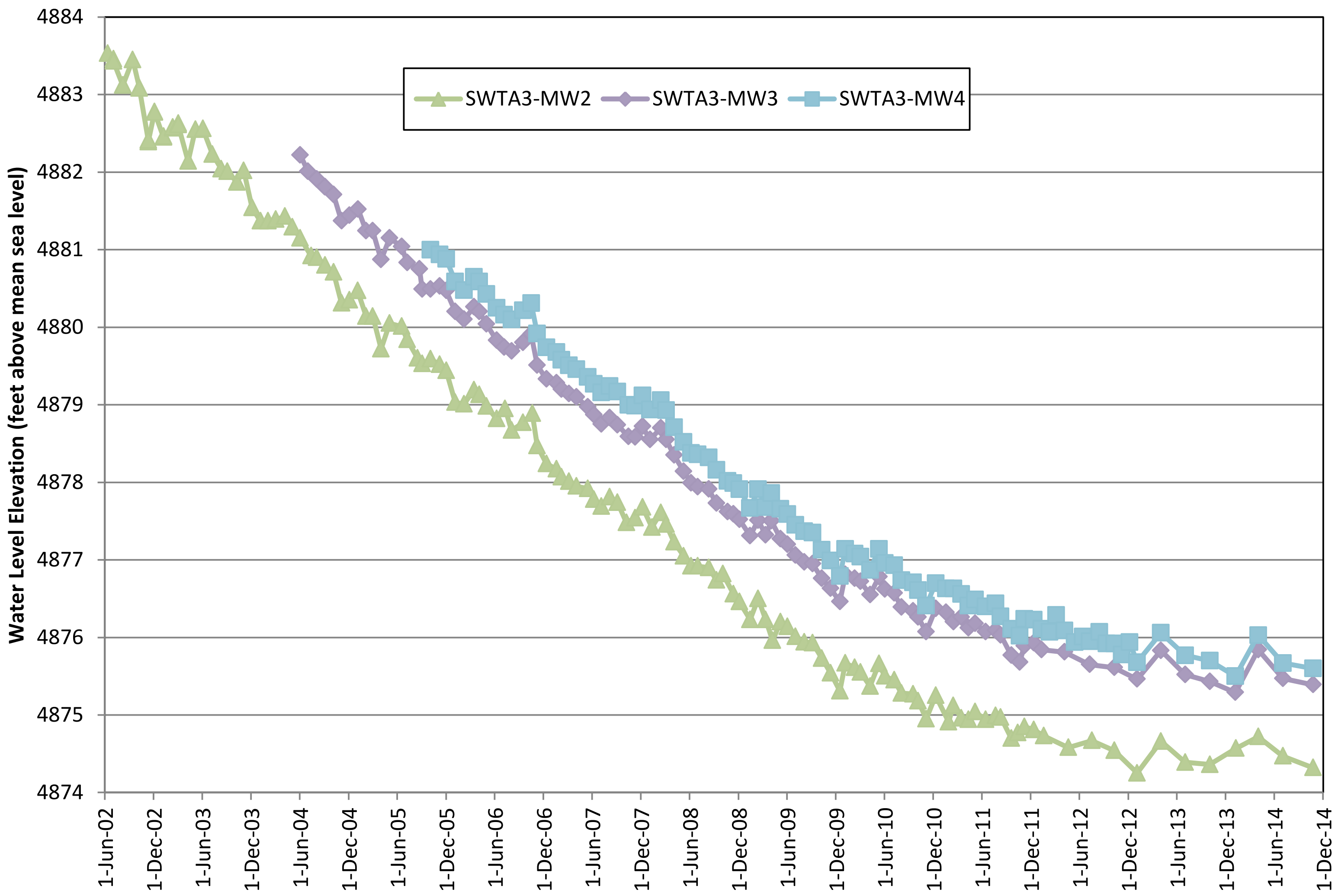

Figure 2B-6. GMP Study Wells (6 of 6)

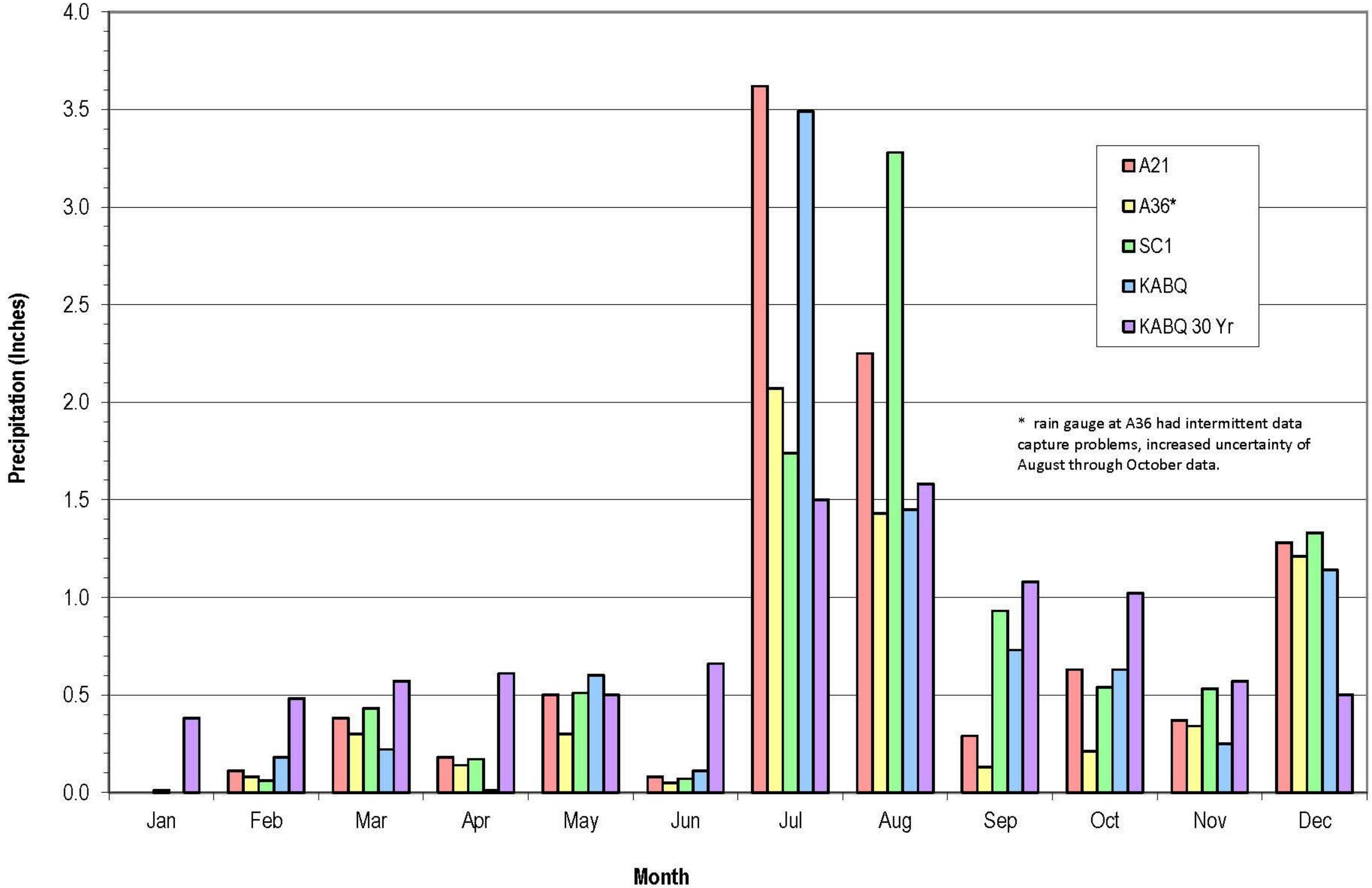

Figure 2B-7. Precipitation Data for SNL/NM, CY2014

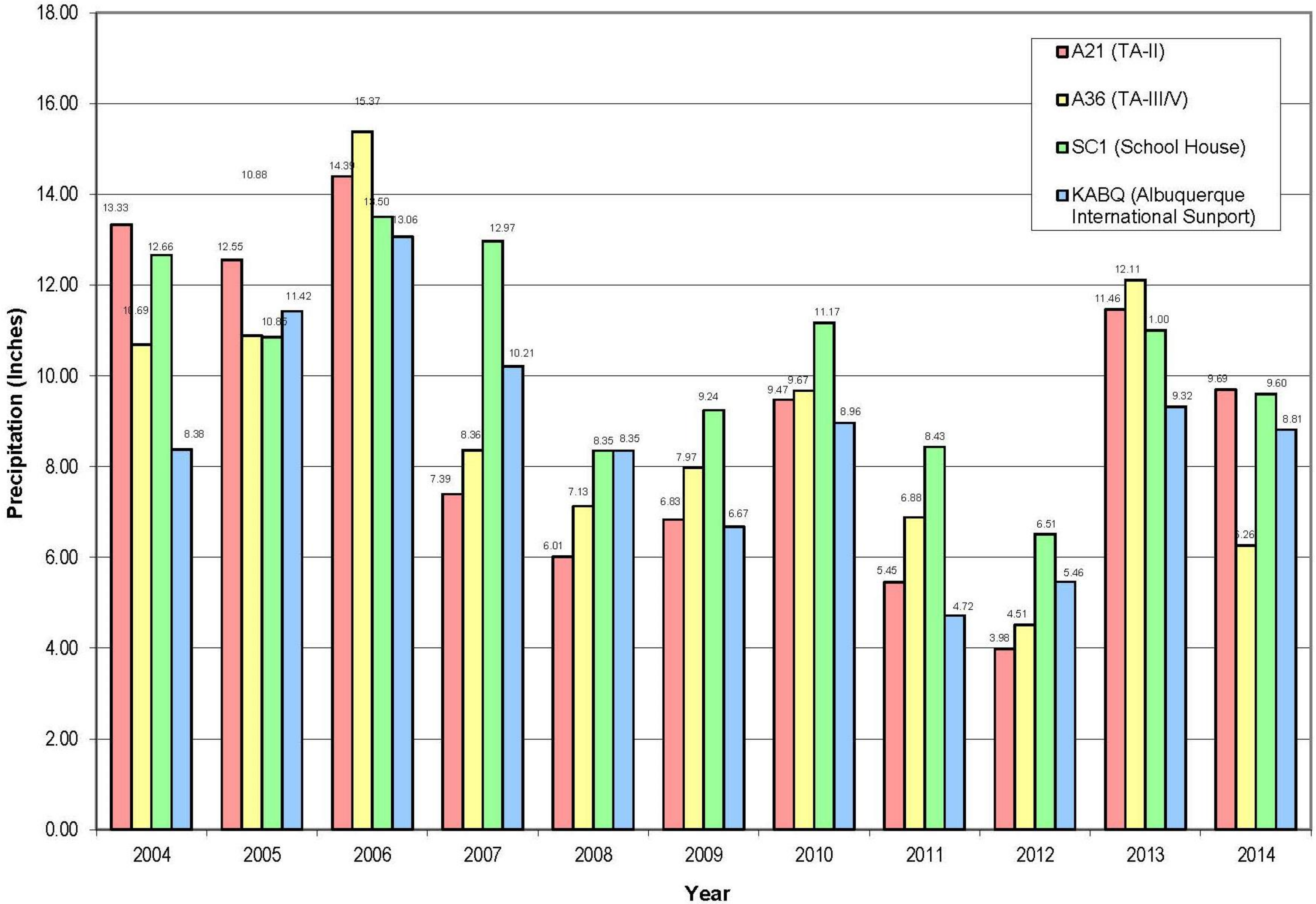

Figure 2B-8. Annual Precipitation Data for SNL/NM, January 2004 to December 2014

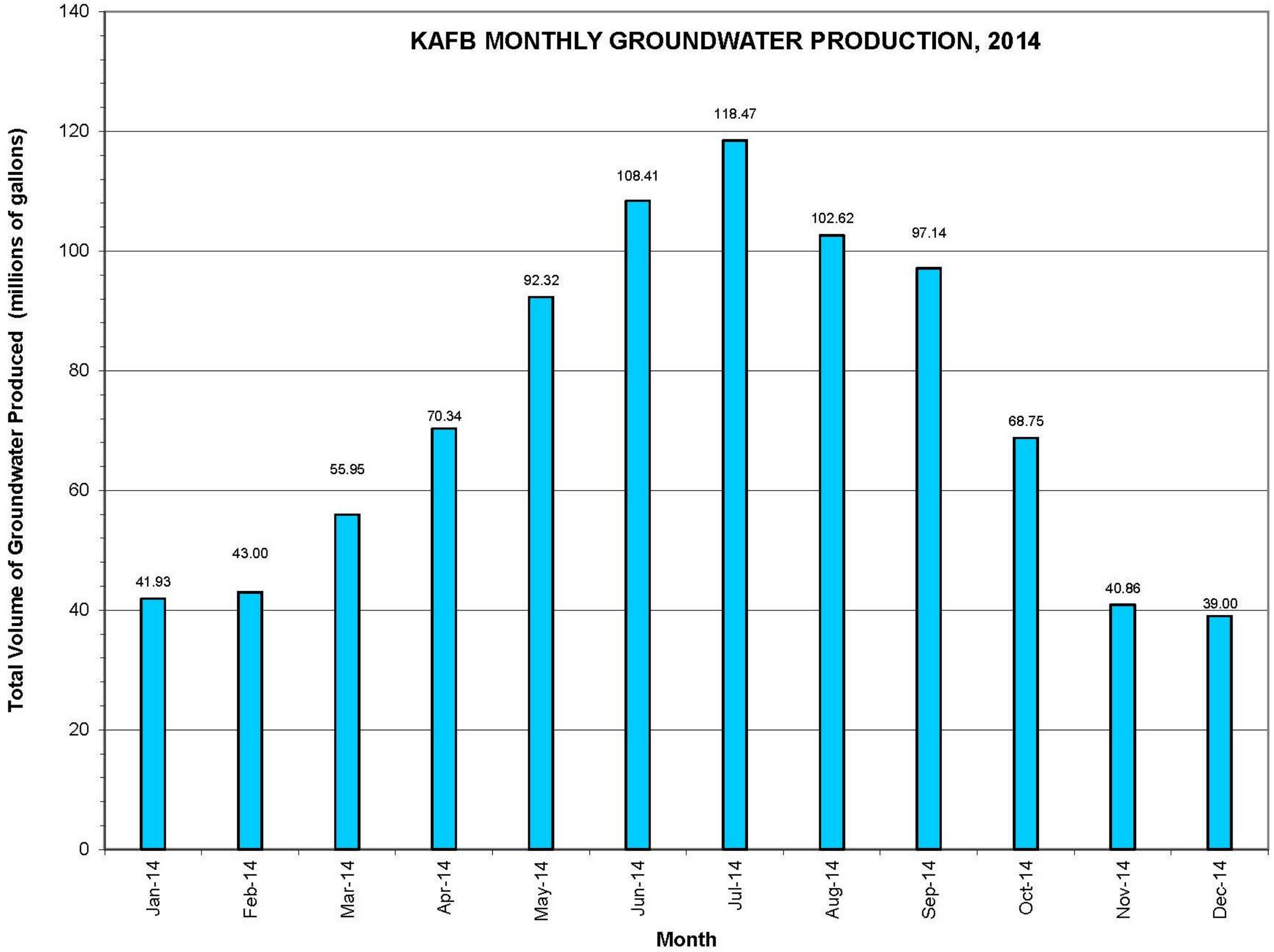

Figure 2B-9. Monthly Groundwater Pumped by KAFB Water Supply Wells, CY2014

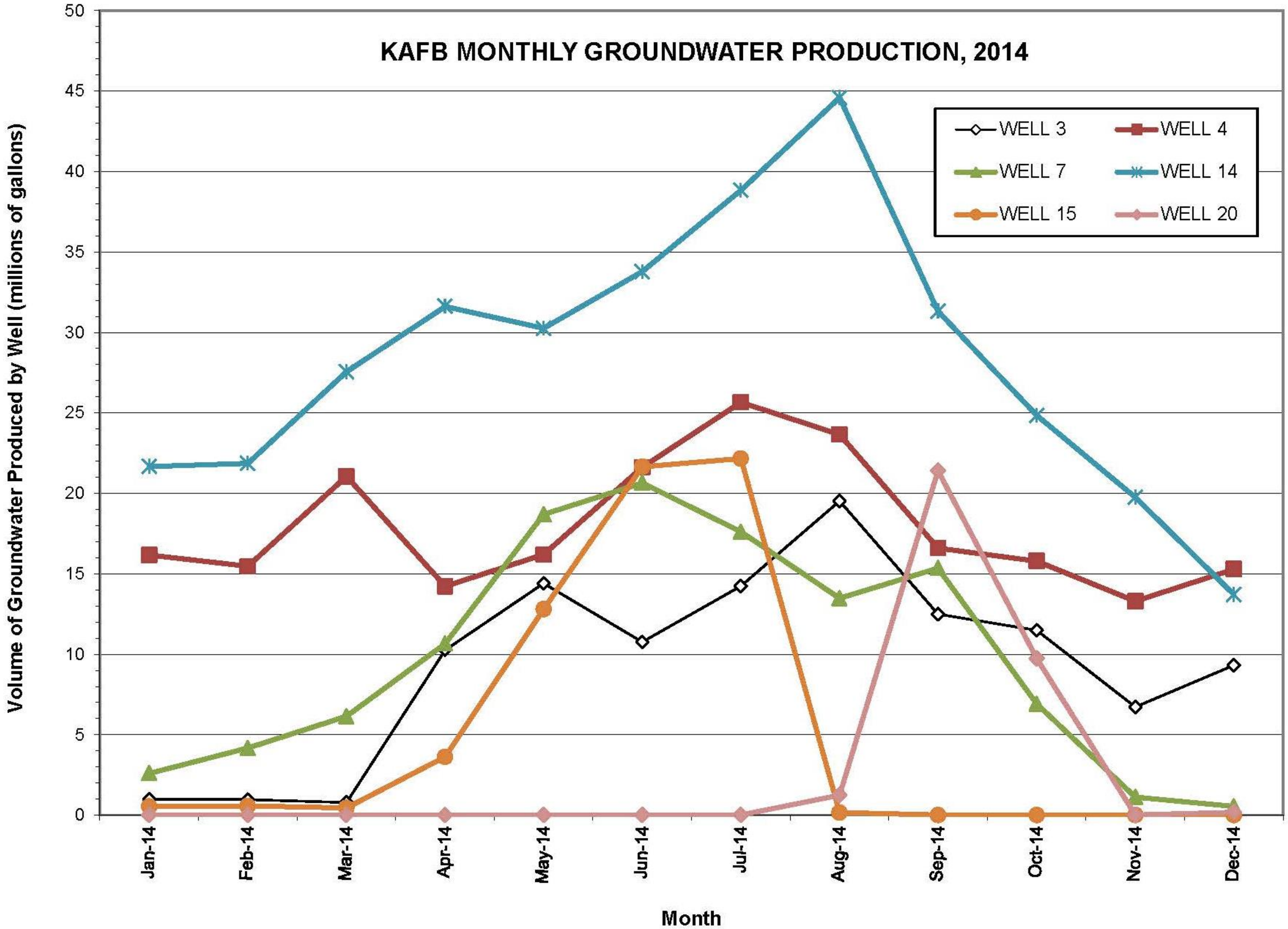

Figure 2B-10. Groundwater Pumped by KAFB Water Supply Wells, CY2014

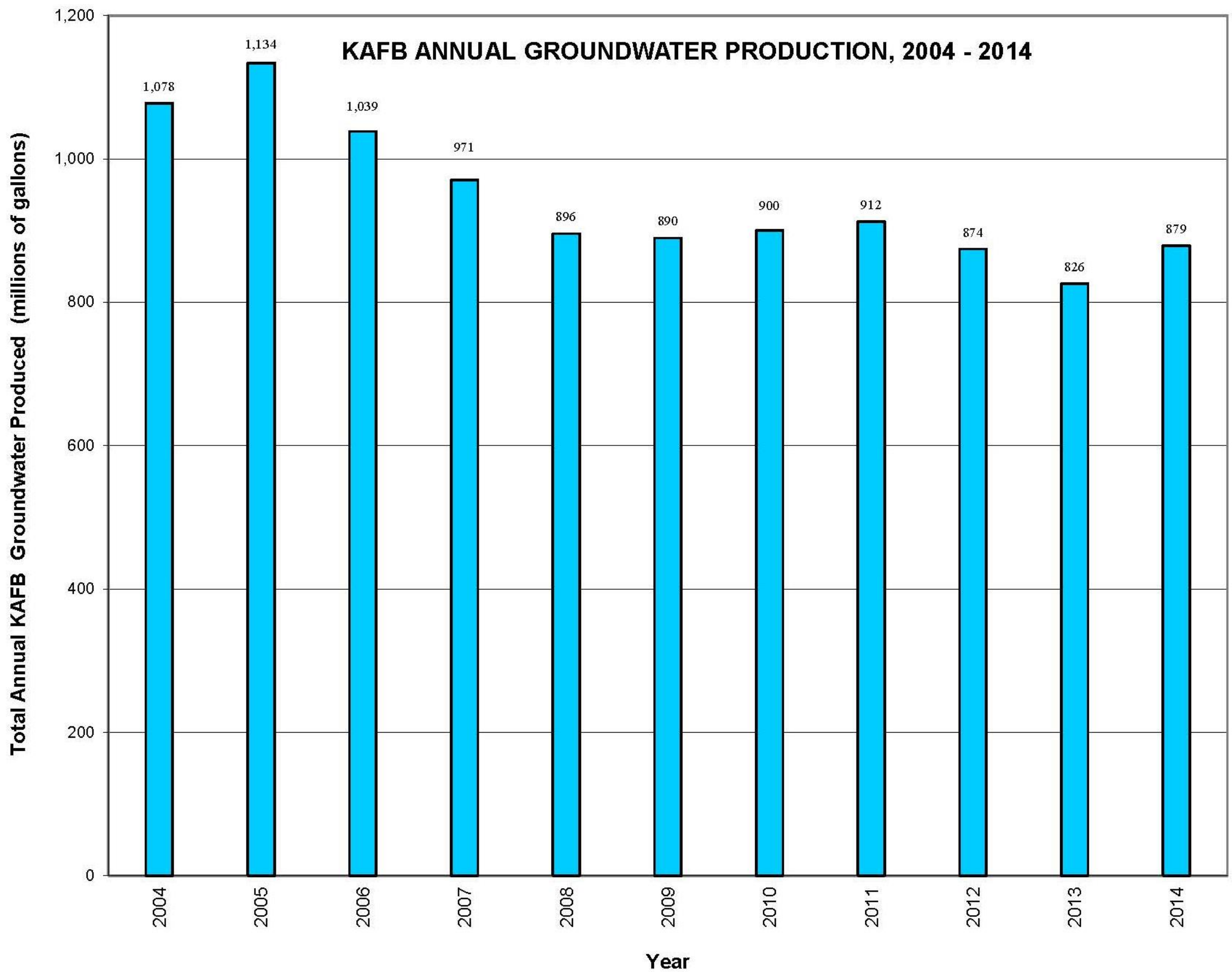

Figure 2B-11. Annual Groundwater Pumped by KAFB Water Supply Wells, 2004 to 2014

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

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Attachment 2C Plots

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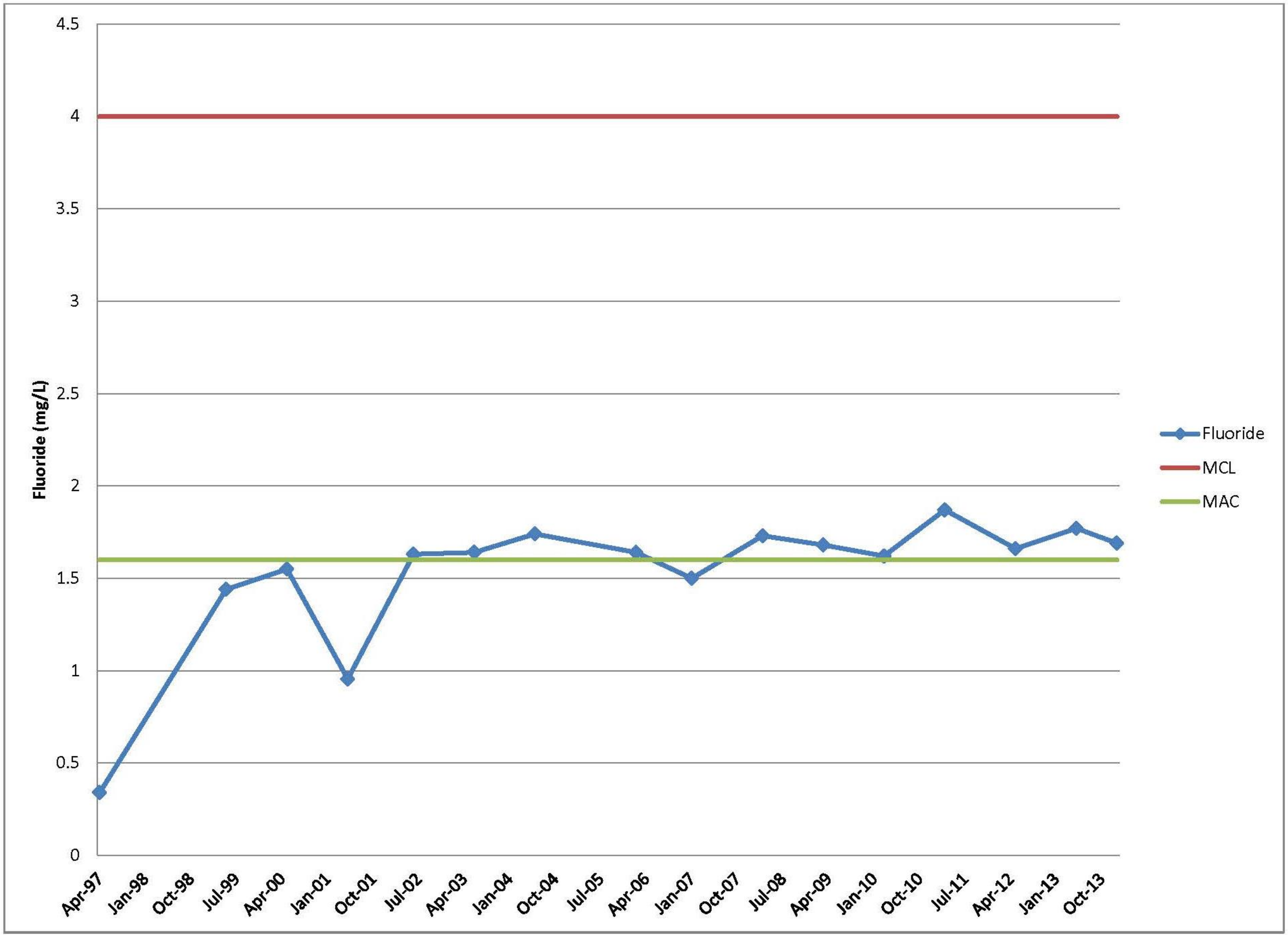

Figure 2C-1. Fluoride Concentrations, Coyote Springs

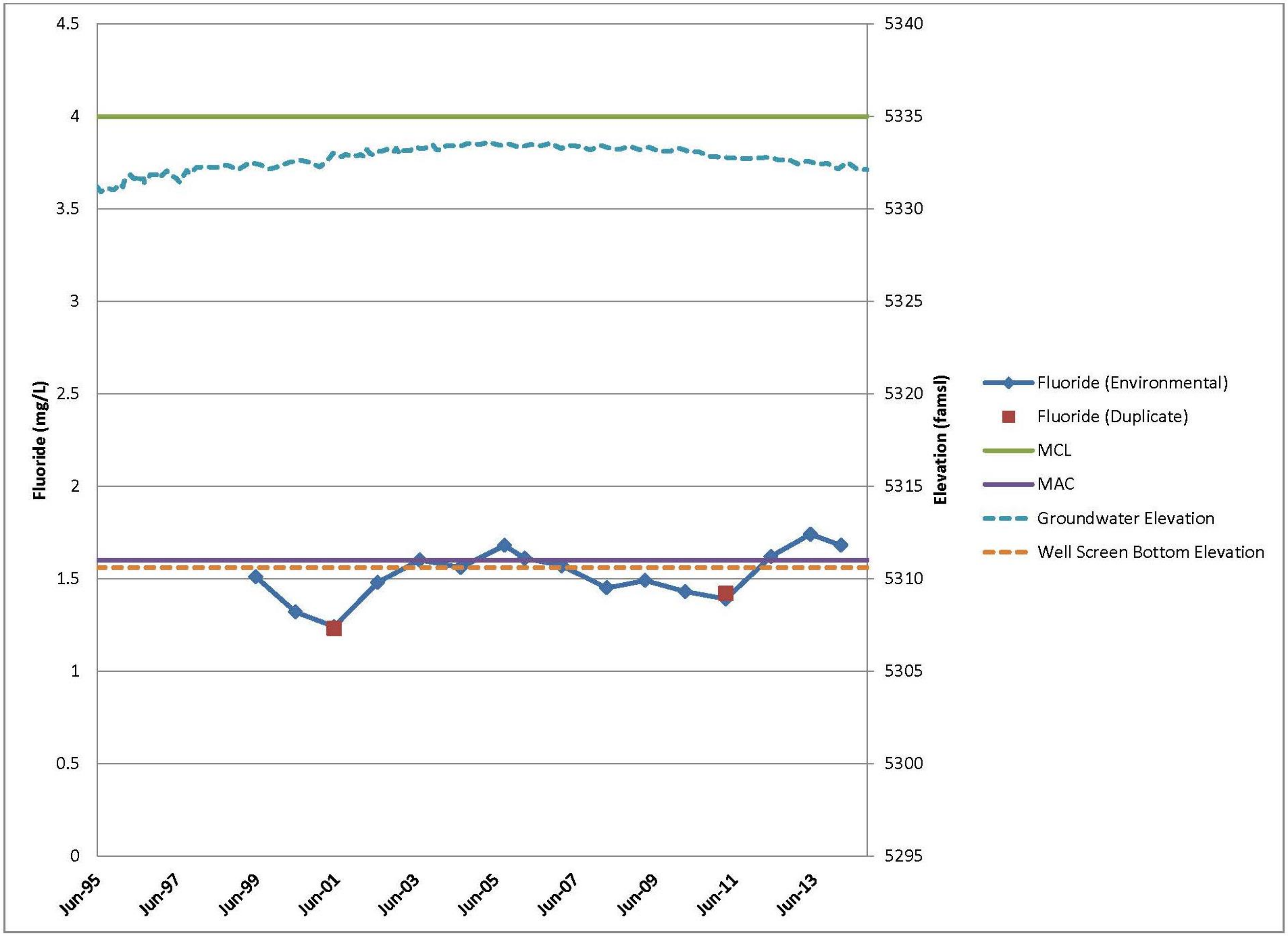

Figure 2C-2. Fluoride Concentrations, SFR-2S

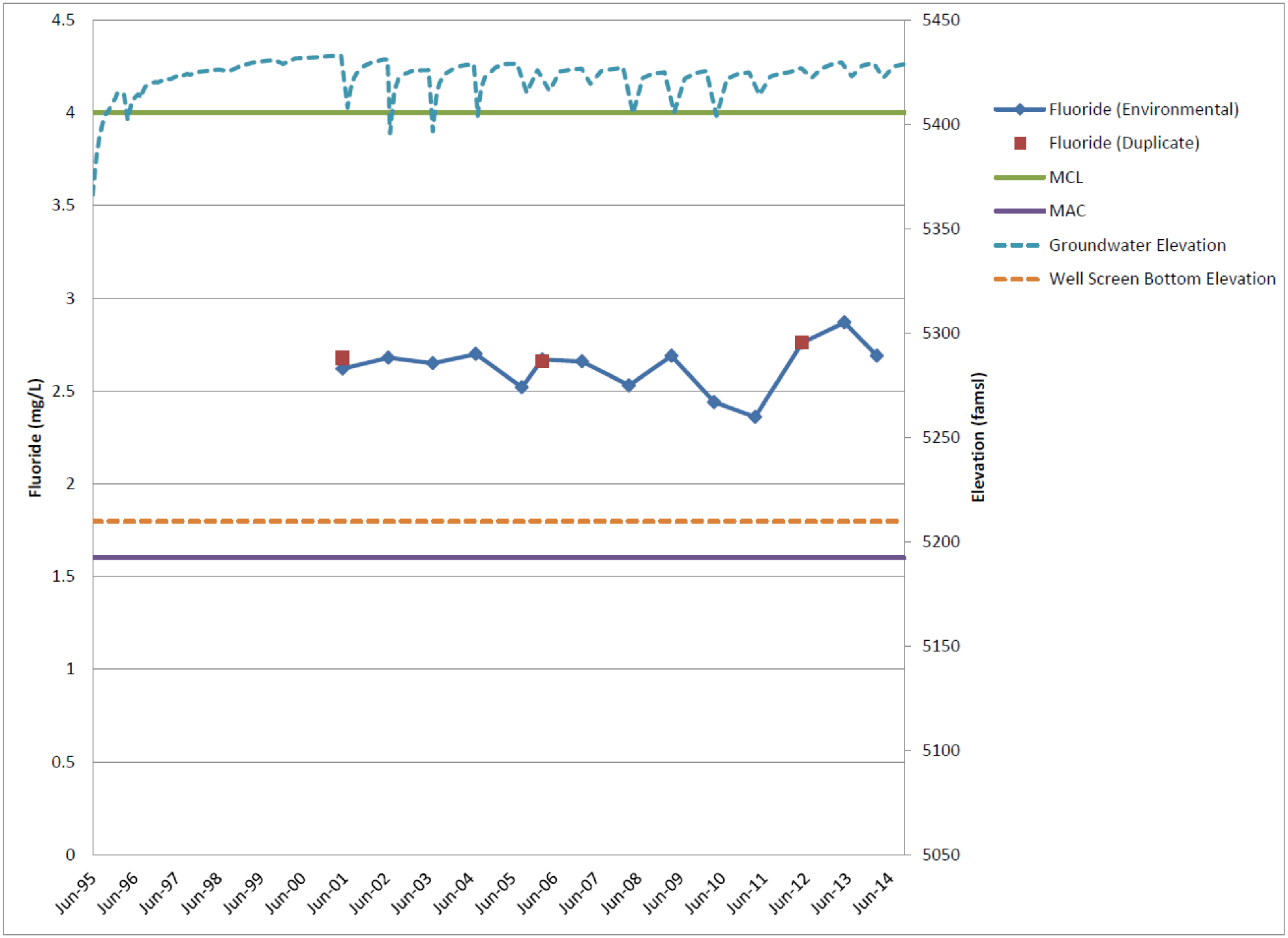

Figure 2C-3. Fluoride Concentrations, SFR-4T

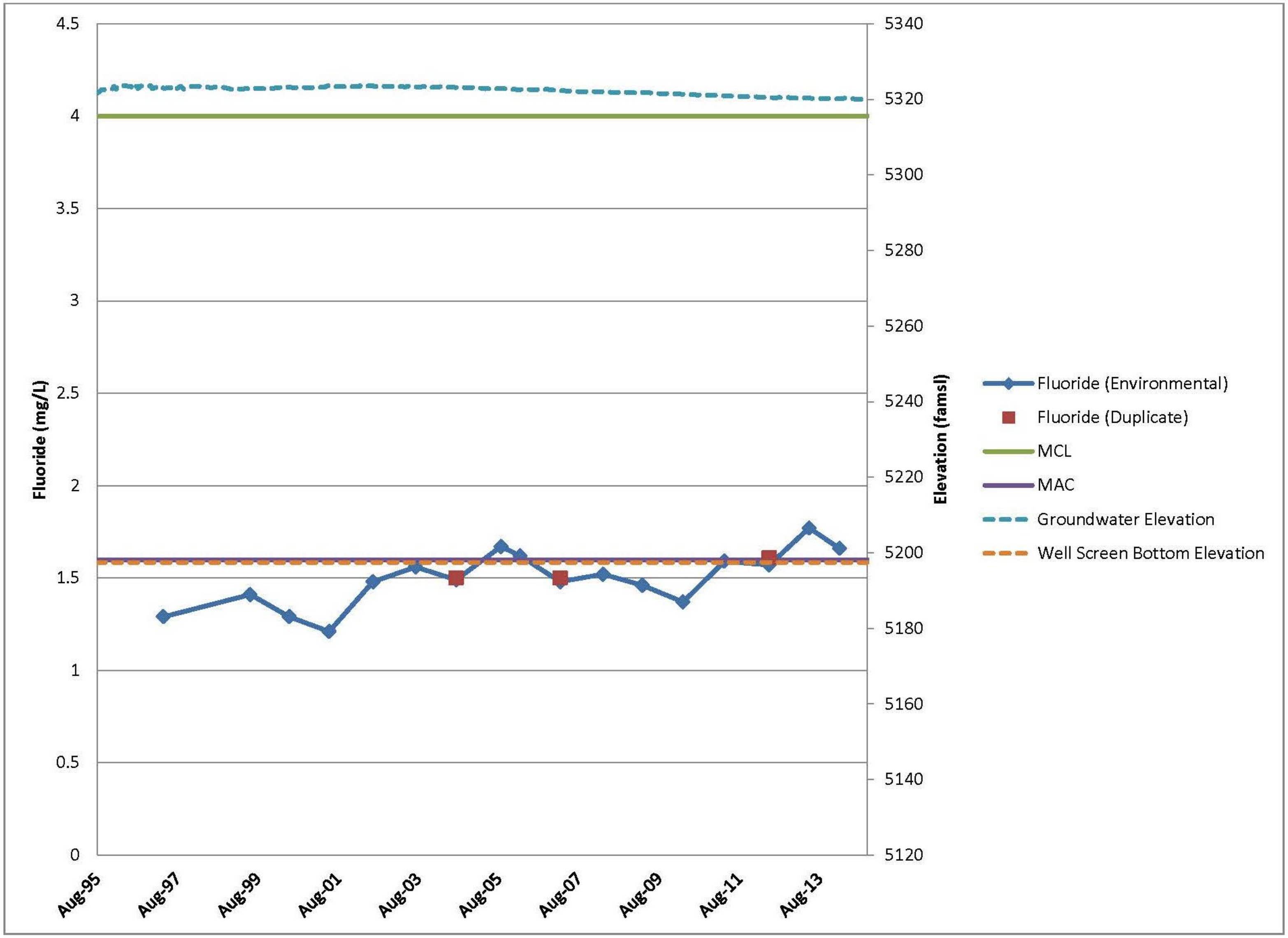

Figure 2C-4. Fluoride Concentrations, TRE-1

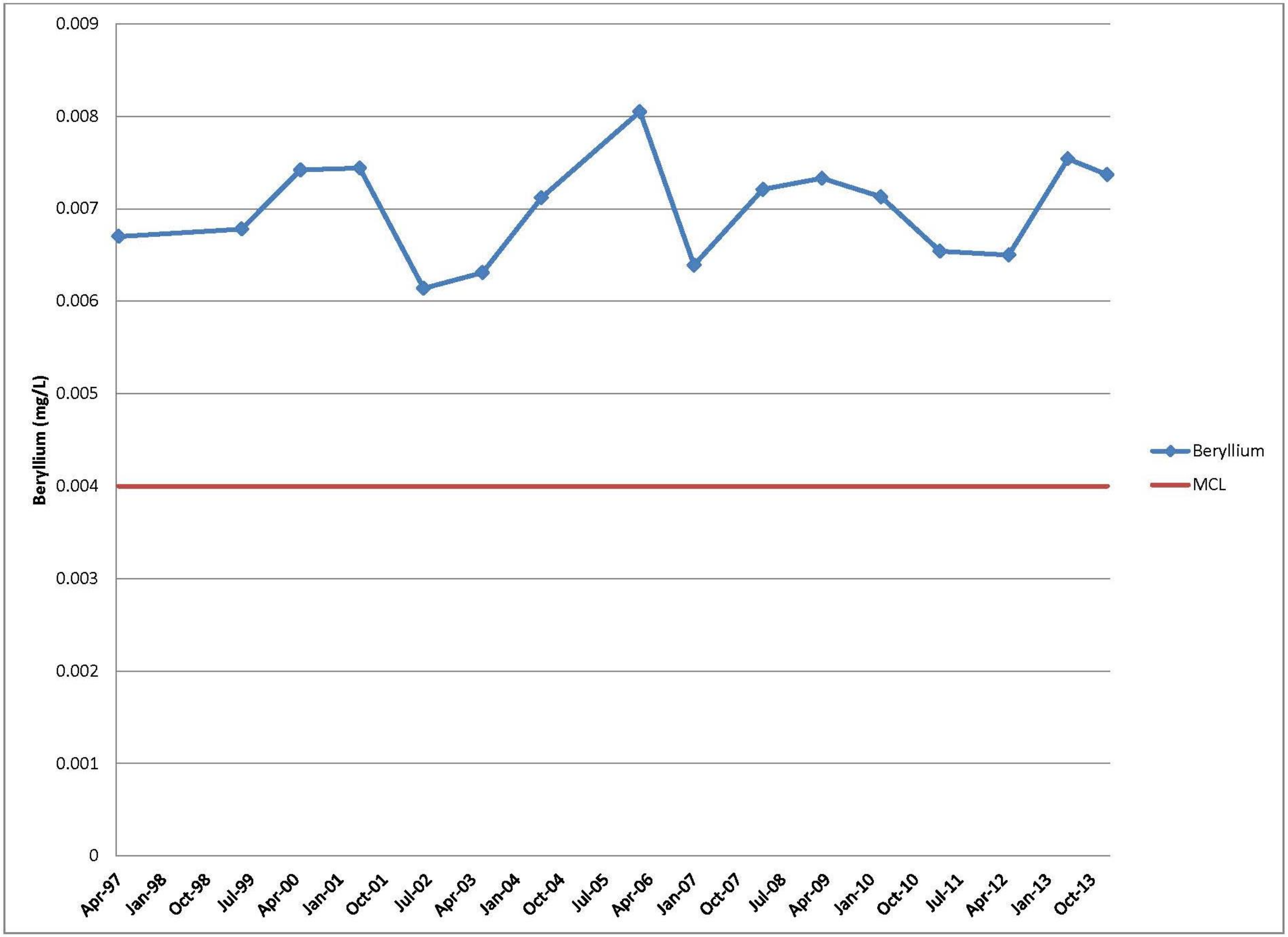

Figure 2C-5. Beryllium Concentrations, Coyote Springs

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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 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. In addition, the CWL was used as a hazardous waste drum storage facility from 1981 to 1989.

In 1990, trichloroethene (TCE) was identified in groundwater at a concentration exceeding the regulatory limit 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* (Final Closure Plan; SNL December 1992). The SNL/NM Environmental Restoration Project implemented two voluntary corrective measures (VCMs), the Vapor Extraction and Landfill Excavation VCMs. As part of the Vapor Extraction VCM that was 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 regulatory limit. 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 meet industrial risk-based standards (SNL September 2010) 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 to a depth of 4 feet (ft) below ground surface, the U.S. Department of Energy/National Nuclear Security Administration and Sandia Corporation requested approval to install an at-grade vegetative soil cover as an interim measure (Wagner April 2004) while NMED comments on the April 2003 CWL Corrective Measures Study (CMS) Report were being resolved. On September 22, 2004, the NMED approved this request with conditions (Kieling September 2004). The conditions of approval were addressed in the subsequent revised Remedial Action Proposal that was submitted as Annex I of the revised CWL CMS Report (SNL December 2004). Construction of the at-grade evapotranspirative cover began in March 2005 and was completed in September 2005.

On May 21, 2007, the NMED issued a Notice of Public Comment Period (Kieling May 2007) with regard to three documents: the CWL CMS Report (SNL December 2004), Draft Post-Closure Care Permit (PCCP) (NMED May 2007), and a Final Closure Plan Amendment (SNL February 2006). The 60-day public comment period began on May 21, 2007 and was completed on August 20, 2007. Informal negotiations were initiated by the NMED in August 2008 with all parties that requested a public hearing, and final changes to the Closure Plan Amendment and Draft PCCP were resolved without a public hearing. In October 2009, the NMED issued the final CWL PCCP, and approved the CWL CMS Report and Closure Plan Amendment as changed (NMED October 2009a and October 2009b).

From April through August 2010, monitoring wells CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, CWL-MW6U, and CWL-BW4A were decommissioned, and new monitoring wells CWL-MW9, CWL-MW10, CWL-MW11, and CWL-BW5 were installed. The new monitoring wells became the exclusive groundwater monitoring network for the CWL in accordance with the approved Closure Plan Amendment. The Final Resource Conservation and Recovery Act (RCRA) Closure Report documenting closure in accordance with all CWL Closure Plan requirements was submitted to the NMED on September 27, 2010 (SNL September 2010).

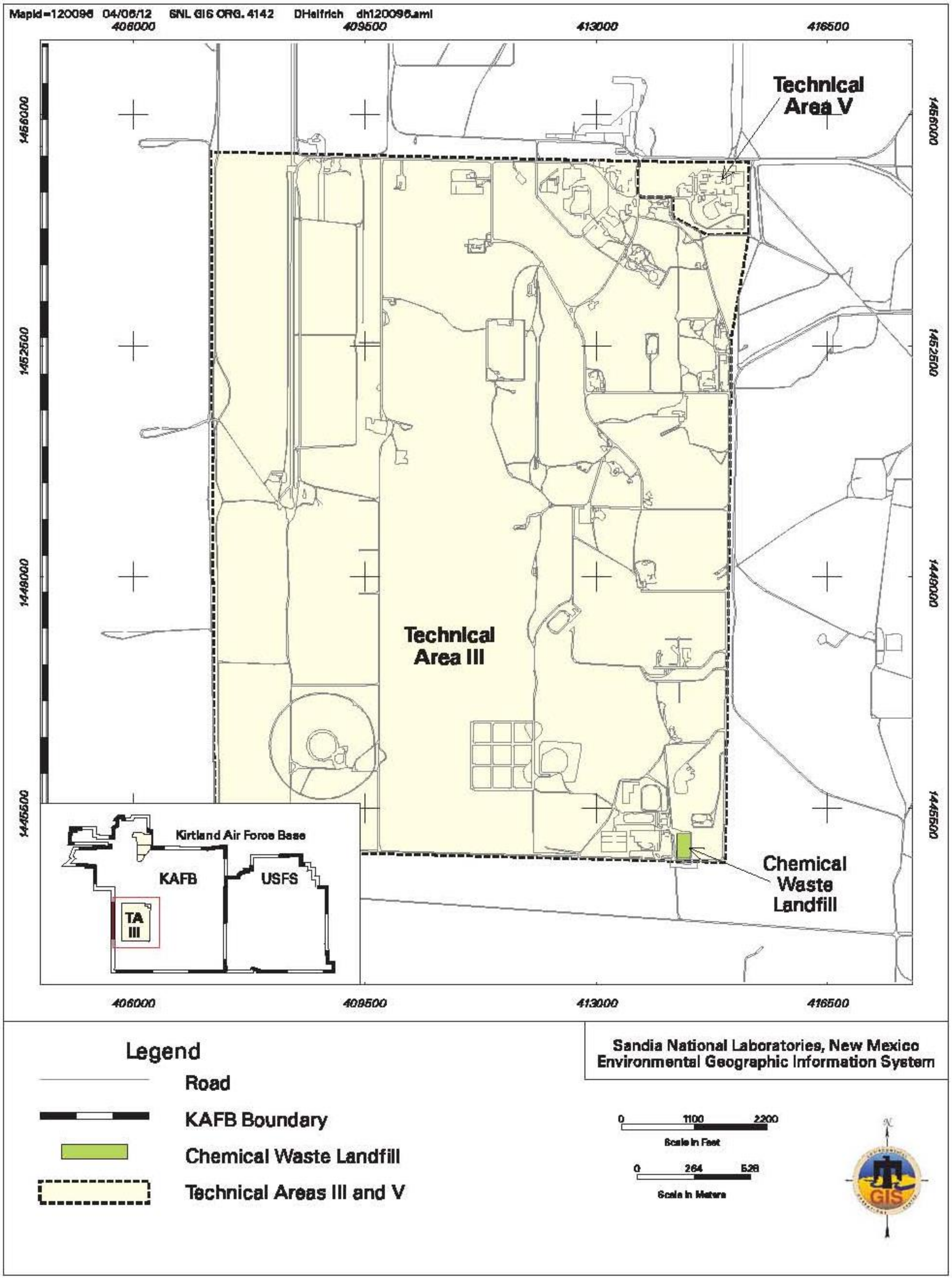

Figure 3-1. Location of the Chemical Waste Landfill within Technical Area III

The Well Installation and Decommissioning Report was included as an appendix to the CWL Final RCRA Closure Report.

CWL closure was approved by the NMED and the CWL PCCP (NMED October 2009a) became effective on June 2, 2011 (Kieling June 2011). The CWL PCCP supersedes the Final Closure Plan (SNL December 1992) as the enforceable regulatory document. Therefore, all groundwater monitoring activities at the CWL after June 2011 are performed by the Long-Term Stewardship Program in accordance with requirements specified in the CWL PCCP (NMED October 2009a). Required monitoring (groundwater and soil-gas), inspections, and maintenance activities are documented annually in Post-Closure Care Reports submitted to NMED by March 31 of each year and document all PCCP-required activities for the previous calendar year (CY). As required by the PCCP, the CWL Annual Post-Closure Care Report for CY 2013 (SNL March 2014) was submitted to the NMED in March 2014. As of December 31, 2014 the CY 2013 Annual Post-Closure Care Report had not been approved by NMED. The *Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2014* will be submitted to NMED in March 2015.

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 (SNL December 1992 and subsequent revisions) was conducted until June 2, 2011 when the CWL PCCP became effective. Since this time, groundwater monitoring has been performed at the CWL in accordance with the CWL PCCP (NMED October 2009a).

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 shown on Figure 3-2 and listed in Table 3-1.

3.1.3 Summary of Activities

The CY 2014 semiannual groundwater monitoring activities for the CWL were performed during January and July 2014 in accordance with Attachment 2 of the CWL PCCP, (NMED October 2009a). 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. Attachment 3A presents tables showing the analytical results for the CWL monitoring wells sampled during CY 2014.

A comprehensive presentation of all required monitoring, inspections, maintenance, and repair activities will be presented in the *Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2014* that will be submitted to the NMED in March 2015.

3.1.4 Summary of Future Activities

As defined in the CWL PCCP (NMED October 2009a), the post-closure care period for the CWL is 30 years and the compliance period for which the groundwater protection standard applies is 47 years; both periods began on June 2, 2011 when NMED approved closure (Kieling June 2011). The NMED may shorten or extend the post-closure care period under 20.4.1.500 NMAC, incorporating 40 CFR 264.117(a)(2).

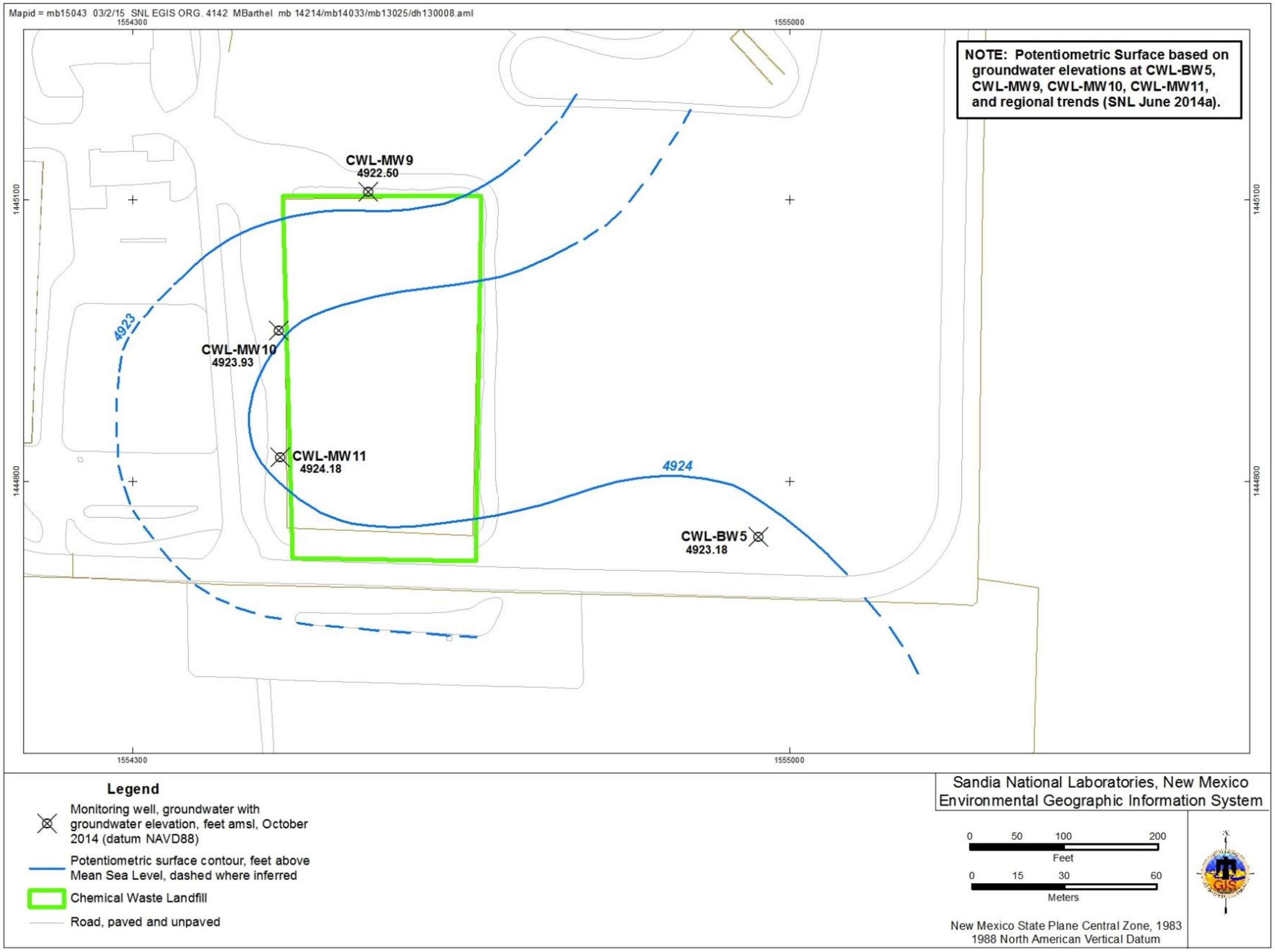

Figure 3-2. Chemical Waste Landfill Monitoring Well Locations and Potentiometric Surface Map, October 2014

Table 3-1. CWL Post-Closure Care Permit Monitoring Well Network and Calendar Year 2014 Compliance Activities

Well ID	WQ	WL	Comment
CWL-BW5	✓	✓	Upgradient well
CWL-MW9	✓	✓	Downgradient well
CWL-MW10	✓	✓	Downgradient well
CWL-MW11	✓	✓	Downgradient well

NOTES:
Check marks in the WQ and WL columns indicate WQ sampling and WL measurements were performed during January and July 2014 Sampling Events.
BW = Background Well.
CWL = Chemical Waste Landfill.
ID = Identification.
MW = Monitoring Well.
WL = Water level.
WQ = Water quality.

In accordance with the CWL PCCP (NMED October 2009a), groundwater monitoring is required on a semiannual basis. One of the two semiannual events must include analyses for the enhanced list of VOCs, chromium, and nickel. The other semiannual event must include only analyses for TCE, chromium, and nickel.

3.1.5 Conceptual Site Model

The constituents of concern in groundwater are TCE, chromium, and nickel (NMED October 2009a). A detailed conceptual site model is provided in Annex E of the CWL CMS Report (SNL December 2004). The model is summarized as follows.

Groundwater at the CWL is contained within the regional aquifer, which consists of unconsolidated Santa Fe Group deposits (i.e., fine-grained alluvial-fan deposits). The depth to water is approximately 500 ft 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.

Since monitoring began at the CWL in 1985, the average rate of 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 2013 and October 2014 at the CWL wells ranged from 0.38 (CWL-MW11) to 0.85 (CWL-BW5) feet (Figure 3B-1 in Attachment 3B). 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.

The CWL potentiometric surface map for October 2014 is presented on Figure 3-2. The map is consistent with the conceptual site model and the base-wide potentiometric surface map presented on Plate 1. As shown on Plate 1, the potentiometric surface contours beneath Technical Area 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 (i.e., 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, purge dry, low hydraulic conductivity).

Based on the potentiometric surface map, the horizontal gradient at the CWL was approximately 0.011 ft/ft in October 2014. 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 calculated velocities range from approximately 1.8×10^{-4} to 2.8×10^{-3} feet per day (equivalent to 6.3×10^{-8} to 1.0×10^{-6} centimeters per second). 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 (NMED October 2009a) 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 (NMED October 2009a).

3.3 Scope of Activities

The groundwater monitoring performed at the CWL during CY 2014 is summarized in Section 3.1.3. Table 3-2 lists the parameters and CWL monitoring wells sampled.

Groundwater samples collected for chemical analyses were submitted to GEL Laboratories LLC (GEL) in Charleston, South Carolina. All chemical analytical results are compared with EPA maximum contaminant levels (MCLs) for drinking water (EPA May 2009). The analytical results are summarized in Attachment 3A, Tables 3A-1 and 3A-2.

Table 3-2. Analytical Parameters for the CWL Monitoring Wells, Calendar Year 2014

Parameters	CY 2014 Semiannual Event	CWL Monitoring Wells
Volatile Organic Compounds: 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		
Volatile Organic Compounds: TCE	July	CWL-BW5, CWL-MW9, CWL-MW9 dup, CWL-MW10, and CWL-MW11
Metals: Chromium, and Nickel		

NOTES:

BW	= Background Well.	dup	= Duplicate.
CWL	= Chemical Waste Landfill.	MW	= Monitoring Well.
CY	= Calendar Year.	TCE	= Trichloroethene.

Field and laboratory quality control (QC) samples were used to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process as 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 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 procedures specified in the CWL PCCP (NMED October 2009a), which are consistent with the methods described in Section 1.3. 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 efforts include equipping the existing 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 as specified in CWL PCCP Attachment 2, Section 2.12.

Field water quality parameters were measured in the field for temperature, specific conductance, oxidation-reduction potential, pH, and dissolved oxygen using an YSI™ EXO1 Water Quality Meter during the purging process. Turbidity was measured with a Hach™ Model 2100Q turbidity meter. Field water quality parameters are presented in Table 3A-3 (Attachment 3A) and groundwater elevation measurements at the CWL monitoring wells from CY 2010 through CY 2014 are presented in Attachment 3B, Figure 3B-1.

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 16.5 gallons were purged from CWL-MW10 prior to the well going dry. The average flow rate for the entire purging event was 0.14 gallons per minute (gpm), and the estimated flow rate during the final four gallons was 0.12 gpm (equivalent to 0.53 and 0.45 liters per minute, respectively). During July, approximately 18 gallons were purged from CWL-MW10 prior to the well going dry. The average flow rate for the entire purging event was 0.078 gpm, and the estimated flow rate during the final four gallons was 0.065 gpm (equivalent to 0.30 and 0.25 liters per minute, respectively).

Groundwater samples were submitted to the off-site laboratory (GEL) following analysis request/chain-of-custody protocol.

3.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

3.6 Summary of Analytical Results

The analytical results and water quality parameters are presented in Attachment 3A, Tables 3A-1 through 3A-3. Analytical results that are above the analytical laboratory method detection limit (MDL), but below the practical quantitation limit are qualified as estimated values and designated with a "J" qualifier in Tables 3A-1 and 3A-2. Analytical laboratory reports, including certificates of analyses, analytical methods, MDLs, practical quantitation limits, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Customer Funded Record Center. Data qualifiers based on the data validation process are presented with the associated results in the tables in Attachment 3A. Data validation and QC sample results are discussed in Section 3.7.

For the purposes of this report, all CY 2014 analytical results were compared with established EPA MCLs where applicable. However, as stipulated in the CWL PCCP (NMED October 2009a), the only regulatory standards that apply to CWL groundwater monitoring results are 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 95^{th} percent lower confidence limit of the mean for a particular constituent); not to individual results. The full statistical evaluation of CWL CY 2014 groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2014 (to be submitted to NMED in March 2015). For both of the CY2014 sampling events, none of the detected constituents exceed the respective MCLs. The analytical results are discussed in greater detail in the following sections.

3.6.1 Volatile Organic Compounds

The analytical results for the enhanced list of VOCs (January) and TCE (July) are summarized in Attachment 3A, Table 3A1-1. TCE was the only VOC detected above the laboratory MDL; it was detected in both samples from monitoring well CWL-MW10. TCE was detected in the January and July environmental samples at concentrations of 2.75 and 1.12 µg/L, respectively. Both of these results are below the MCL of 5.0 µg/L.

3.6.2 Metals

The analytical results for nickel and chromium are summarized in Attachment 3A, Table 3A-2. Chromium was not detected above the laboratory MDL of 0.002 milligrams per liter (mg/L) in any of the CY 2014 environmental samples (all results also below the MCL of 0.10 mg/L in all samples). Nickel was detected in each sample at concentrations ranging from 0.00142 mg/L to 0.00311 mg/L. All nickel detections were low concentrations; no MCL has been established for nickel.

3.6.3 Water Quality Parameters

The water quality parameters measured immediately prior to sample collection are listed in Attachment 3A, Table 3A-3. These field parameters consist of temperature, specific conductance, oxidation-reduction potential, pH, turbidity, and dissolved oxygen.

3.7 Quality Control Results

Field and laboratory QC samples were prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. All data were reviewed in accordance with Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2014b). The results for each QC analysis and the impact on data quality are discussed in the following sections.

3.7.1 Field Quality Control Samples

Field QC samples included duplicate environmental samples, FBs, TBs, and EBs. The purpose of each field QC sample type is presented in Section 1.3.3. The following sections discuss the analytical results for each QC sample type.

3.7.1.1 Duplicate Environmental Samples

One duplicate sample was collected from monitoring well CWL-BW5 in January and one duplicate sample was collected from monitoring well CWL-MW9 in July, and the results were compared to the results for the corresponding environmental sample. Relative percent difference (RPD) values were calculated for the detected parameters. For the environmental duplicate sample pair collected at CWL-BW5 in January, nickel was the only detected parameter with an RPD of 1. The RPD value for the environmental duplicate sample pair collected at CWL-MW9 in July likewise shows good correlation with an RPD value of 8 for nickel. The agreement between duplicate environmental and environmental sample results are within the acceptable range for RPD values of less than 35 for metals (NMED October 2009a).

3.7.1.2 Field Blank Samples

Two FB samples were collected in January and analyzed for the enhanced list of VOCs. Two FB samples were collected in July and analyzed for TCE only. The only detections were for chloroform in the two January FB samples, and TCE in the field blank sample collected in July at the CWL-MW11 location. No corrective action was required because chloroform and TCE were not detected in any of the associated environmental samples.

3.7.1.3 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 laboratory MDLS in any of the trip blank samples.

3.7.1.4 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 in the January EB sample. No corrective action was necessary because chloroform was not detected in the environmental sample associated with the EB sample (i.e., CWL-BW5 sample). No constituents were detected in the July EB sample.

3.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks, duplicate laboratory control samples, batch matrix spike, matrix spike duplicate, and surrogate spike samples, were analyzed concurrently with the groundwater samples. All laboratory data were reviewed and qualified in accordance with AOP 00-03, Revision 3, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2014b). All data were in compliance with analytical methods and laboratory procedures (i.e., technically defensible). The data validation reports are filed in the SNL/NM Customer Funded Record Center. 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

No variances or nonconformances from specified sampling and analysis requirements, or project-specific issues were identified during the January and July 2014 sampling activities at the CWL.

3.9 Summary and Conclusions

During CY 2014, groundwater samples were collected from four CWL PCCP 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). No analytes were detected at concentrations exceeding the EPA MCLs.

Based on the field and laboratory QC sample and data validation results, the CY 2014 groundwater monitoring data meet data quality objectives and are in compliance with analytical methods and laboratory procedures (i.e., representative and technically defensible).

3.10 References

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Attachment 3A
Chemical Waste Landfill
Analytical Results Tables

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Attachment 3A Tables

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

Calendar Year 2014

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CWL-BW5	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		095107-001	SW846-8260B
09-Jan-14	Chloroform	ND	0.300	1.00	NE	U		095107-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		095107-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		095107-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		095107-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1.50	5.00	NE	U		095107-001	SW846-8260B
CWL-BW5 (Duplicate)	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		095108-001	SW846-8260B
09-Jan-14	Chloroform	ND	0.300	1.00	NE	U		095108-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		095108-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		095108-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		095108-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1.50	5.00	NE	U		095108-001	SW846-8260B
CWL-MW9	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		095112-001	SW846-8260B
10-Jan-14	Chloroform	ND	0.300	1.00	NE	U		095112-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		095112-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		095112-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		095112-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1.50	5.00	NE	U		095112-001	SW846-8260B
CWL-MW10	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		095121-001	SW846-8260B
15-Jan-14	Chloroform	ND	0.300	1.00	NE	U		095121-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		095121-001	SW846-8260B
	Trichloroethene	2.75	0.300	1.00	5.00			095121-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		095121-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1.50	5.00	NE	U		095121-001	SW846-8260B
CWL-MW11	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		095116-001	SW846-8260B
13-Jan-14	Chloroform	ND	0.300	1.00	NE	U		095116-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		095116-001	SW846-8260B
	Trichloroethene	ND	0.300	1.00	5.00	U		095116-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		095116-001	SW846-8260B
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	1.50	5.00	NE	U		095116-001	SW846-8260B

Refer to footnotes on page 3A-9.

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

Calendar Year 2014

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 07-Jul-14	Trichloroethene	ND	0.300	1.00	5.00	U		096179-001	SW846-8260B
CWL-MW9 08-Jul-14	Trichloroethene	ND	0.300	1.00	5.00	U		096184-001	SW846-8260B
CWL-MW9 (Duplicate) 08-Jul-14	Trichloroethene	ND	0.300	1.00	5.00	U		096185-001	SW846-8260B
CWL-MW10 11-Jul-14	Trichloroethene	1.12	0.300	1.00	5.00			096195-001	SW846-8260B
CWL-MW11 09-Jul-14	Trichloroethene	ND	0.300	1.00	5.00	U		096190-001	SW846-8260B

Refer to footnotes on page 3A-9.

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

Calendar Year 2014

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		095107-015	SW846-6020
09-Jan-14	Nickel	0.00267	0.0005	0.002	NE			095107-015	SW846-6020
CWL-BW5 (Duplicate)	Chromium	ND	0.002	0.010	0.100	U		095108-015	SW846-6020
09-Jan-14	Nickel	0.0027	0.0005	0.002	NE			095108-015	SW846-6020
CWL-MW9	Chromium	ND	0.002	0.010	0.100	U		095112-015	SW846-6020
10-Jan-14	Nickel	0.00187	0.0005	0.002	NE	J	J-	095112-015	SW846-6020
CWL-MW10	Chromium	ND	0.002	0.010	0.100	U		095121-015	SW846-6020
15-Jan-14	Nickel	0.00311	0.0005	0.002	NE			095121-015	SW846-6020
CWL-MW11	Chromium	ND	0.002	0.010	0.100	U		095116-015	SW846-6020
13-Jan-14	Nickel	0.00284	0.0005	0.002	NE			095116-015	SW846-6020
CWL-BW5	Chromium	ND	0.002	0.010	0.100	U		096179-015	SW846-6020
07-Jul-14	Nickel	0.00166	0.0005	0.002	NE	J	J-	096179-015	SW846-6020
CWL-MW9	Chromium	ND	0.002	0.010	0.100	U		096184-015	SW846-6020
08-Jul-14	Nickel	0.0015	0.0005	0.002	NE	J	J-	096184-015	SW846-6020
CWL-MW9 (Duplicate)	Chromium	ND	0.002	0.010	0.100	U		096185-015	SW846-6020
08-Jul-14	Nickel	0.00162	0.0005	0.002	NE	J	J-	096185-015	SW846-6020
CWL-MW10	Chromium	ND	0.002	0.010	0.100	U		096195-015	SW846-6020
11-Jul-14	Nickel	0.00239	0.0005	0.002	NE			096195-015	SW846-6020
CWL-MW11	Chromium	ND	0.002	0.010	0.100	U		096190-015	SW846-6020
09-Jul-14	Nickel	0.00142	0.0005	0.002	NE	J	J-	096190-015	SW846-6020

Refer to footnotes on page 3A-9.

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

Calendar Year 2014

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	09-Jan-14	19.20	935.0	263.1	6.99	0.94	76.9	7.07
CWL-MW9	10-Jan-14	19.16	829.0	103.7	7.07	0.29	25.5	2.36
CWL-MW10	15-Jan-14	17.13	742.5	64.4	7.17	1.90	21.1	2.03
CWL-MW11	13-Jan-14	18.04	844.9	240.9	7.07	0.87	51.9	4.95
CWL-BW5	07-Jul-14	25.66	1135.9	279.4	6.90	0.30	84.7	6.88
CWL-MW9	08-Jul-14	25.91	1029.6	183.1	6.95	0.21	38.8	3.14
CWL-MW10	11-Jul-14	25.05	964.9	-18.1	7.05	1.76	34.9	2.87
CWL-MW11	09-Jul-14	27.61	1105.8	300.2	6.94	0.36	65.9	5.18

Refer to footnotes on page 3A-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
Bold = Indicates the value exceeds the established MCL.
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 negative bias.

[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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Attachment 3B
Chemical Waste Landfill
Hydrographs

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Attachment 3B Hydrographs

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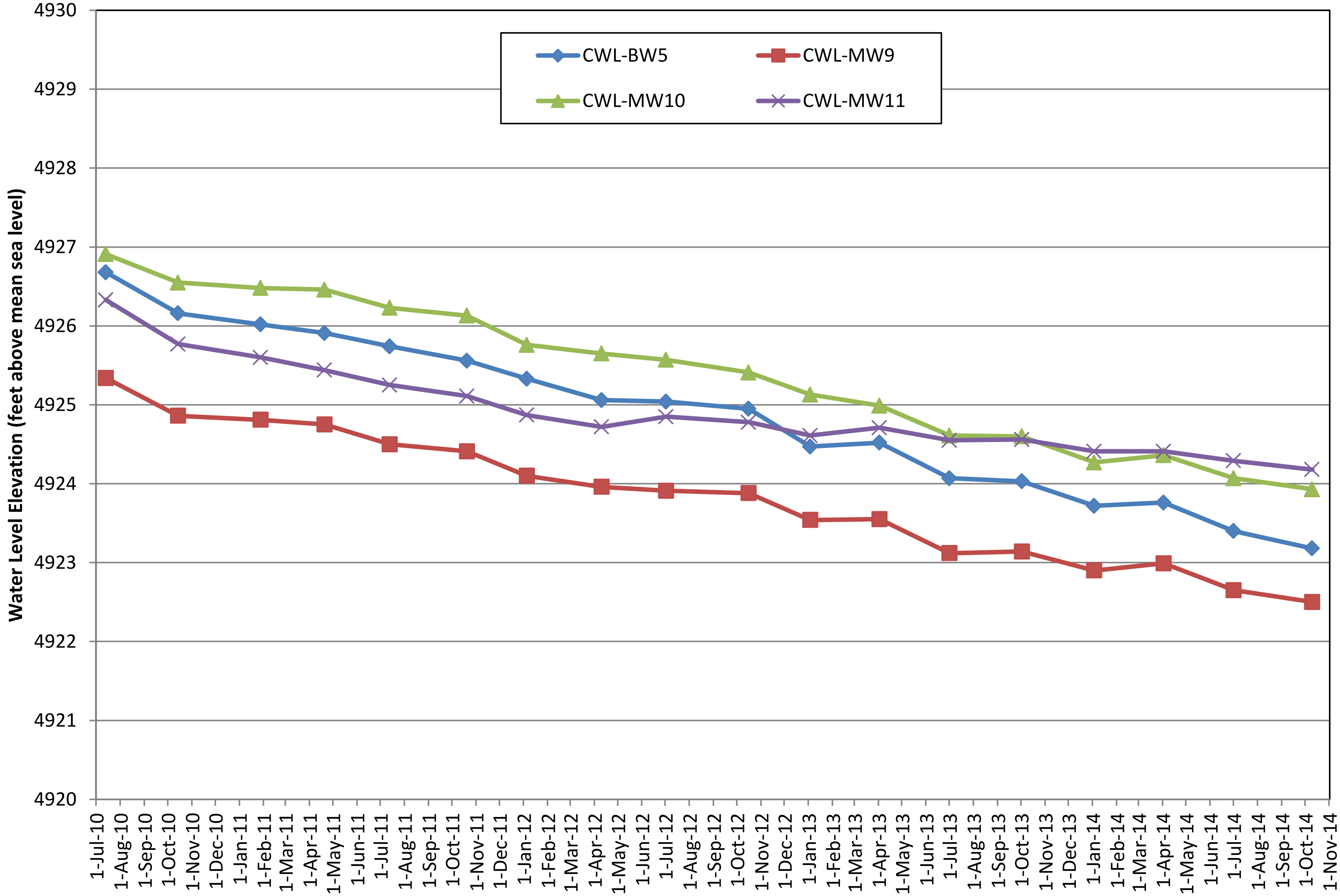

Figure 3B-1. CWL Study Area Wells

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4.0 Mixed Waste Landfill

4.1 Introduction

The Mixed Waste Landfill (MWL) is a 2.6-acre site in the north-central portion of Technical Area III at Sandia National Laboratories, New Mexico (SNL/NM) (Figure 4-1). The MWL consists of two distinct disposal areas: the classified area (occupying 0.6 acres) and the unclassified area (occupying 2.0 acres). Approximately 100,000 cubic feet of low-level radioactive and mixed waste containing approximately 6,300 curies of activity (at the time of disposal) were disposed of in the MWL from March 1959 through December 1988. Classified wastes were buried in cylindrical pits in the classified area and unclassified wastes were buried in shallow trenches in the unclassified area.

The Phase 1 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was conducted in 1989 and 1990 (SNL September 1990), and the Phase 2 RFI was conducted from 1992 to 1995. The Phase 2 RFI confirmed tritium as the constituent of concern in soil at the MWL (Peace et al. 2002). As directed by the New Mexico Environment Department (NMED), the MWL Corrective Measures Study (SNL May 2003) was submitted to the NMED in May 2003. The NMED held a public comment period on the MWL Corrective Measures Study from August 11 to December 9, 2004, and a public hearing was held from December 2 to December 3 and December 8 to December 9, 2004. On May 26, 2005, the Secretary of the NMED selected a vegetative cover with a biointrusion barrier (i.e., evapotranspirative [ET] cover) as the final remedy for the MWL and required a Corrective Measures Implementation (CMI) Plan within 180 days that included fate and transport modeling (NMED May 2005). The MWL CMI Plan (SNL November 2005) was submitted in November 2005 and conditionally approved by the NMED in December 2008 (Bearzi December 2008). The MWL ET cover construction was completed from May through September 2009. The MWL CMI Report documenting cover construction in accordance with the CMI Plan was submitted to NMED in January 2010 (SNL January 2010) and was approved by NMED on October 14, 2011 (Bearzi October 2011) after a 90-day NMED public comment period (November 29, 2010 through February 28, 2011) that included a public meeting on December 14, 2010.

The MWL Long-Term Monitoring and Maintenance Plan (LTMMP) previously submitted in September 2007 was revised (SNL March 2012) and submitted to the NMED in March 2012. NMED approved the revised LTMMP after conducting a 150-day public comment period (September 14, 2012 through February 11, 2013) that included a public meeting on October 16, 2012. NMED approved the revised MWL LTMMP on January 8, 2014 and directed U.S. Department of Energy (DOE) and Sandia Corporation (Sandia) to implement LTMMP monitoring, maintenance, and reporting requirements; including deployment of all LTMMP monitoring systems (Blaine January 2014). DOE and Sandia implemented the associated monitoring, inspection, maintenance/repair, and reporting requirements as requested and submitted the installation work plan for three multi-port soil-vapor monitoring wells (SNL January 2014) required to complete the LTMMP monitoring systems on January 15, 2014. The installation work plan was approved by NMED (Blaine February 2014) and the drilling and installation field work was completed in July 2014. DOE and Sandia submitted the Soil-Vapor Monitoring Well Installation Report (SNL September 2014a) that was approved by NMED on September 25, 2014 (Kieling September 2014). Subsequently, DOE and Sandia requested a Certification of Completion for the MWL (Beausoliel September 2014). On October 8, 2014, NMED determined that all LTMMP monitoring systems are deployed for long-term controls and provided a Certificate of Corrective Action Complete with Controls (Cobrain October 2014).

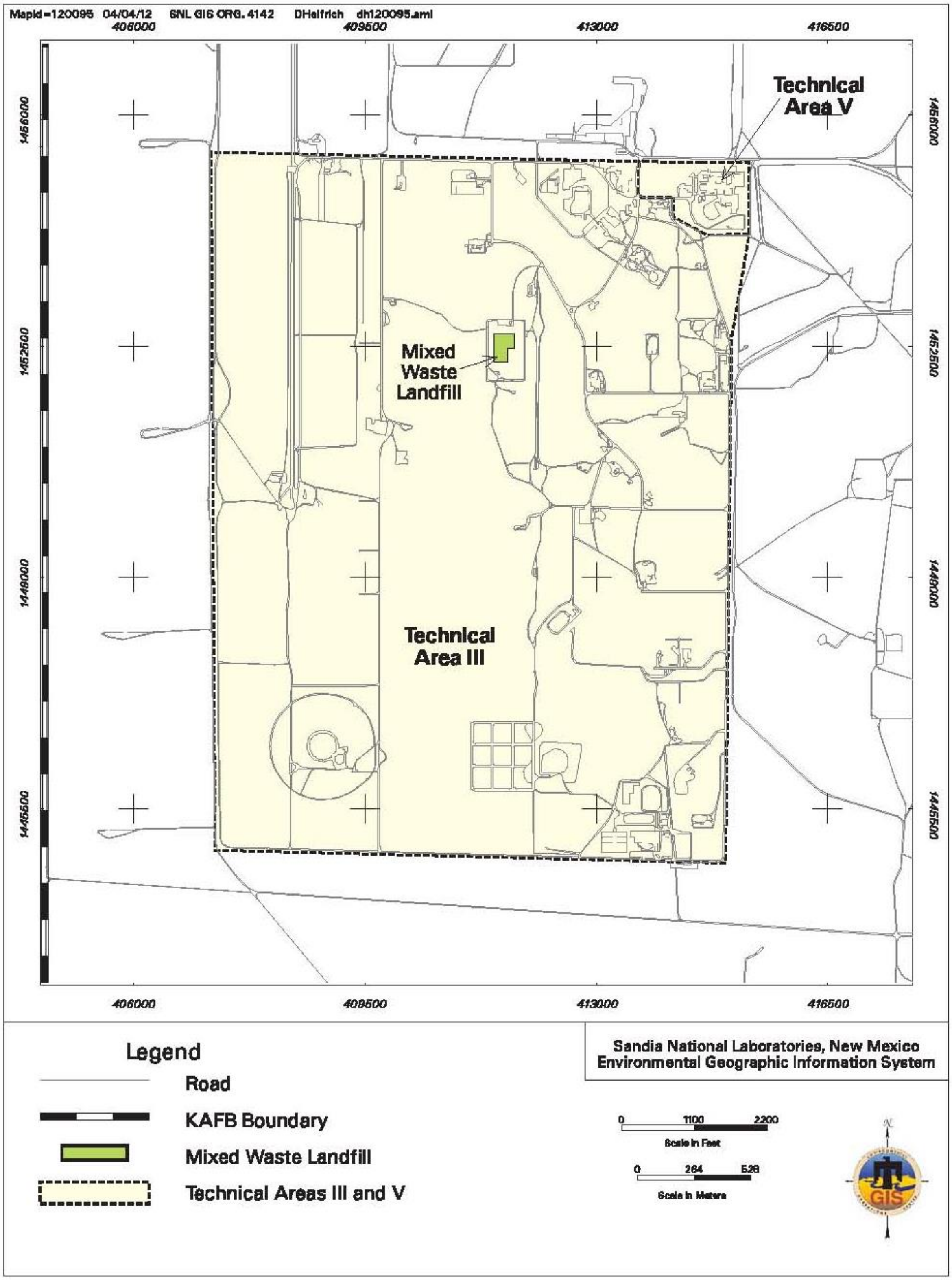

Figure 4-1. Location of the Mixed Waste Landfill within Technical Area III

On October 20, 2014, DOE and Sandia submitted a request to NMED for a Class 3 Permit Modification for Corrective Action Complete with Controls at the MWL (Beausoleil October 2014). The request and associated legal notice initiated the DOE and Sandia 60-day public comment period that will be completed on January 5, 2015, and included a public meeting held on November 18, 2014.

A separate, comprehensive MWL Annual Long-Term Monitoring and Maintenance Report must be submitted to NMED by June 30th of each year that documents all monitoring, inspection, and maintenance activities. The "reporting year" defined in the LTMMP is April 1st through March 31st. The first MWL Annual Long-Term Monitoring and Maintenance Report for the initial implementation reporting period of January 8 through March 31, 2014 was submitted to NMED on June 18, 2014 (SNL June 2014a) and was approved by NMED on August 6, 2014 (Kieling August 2014).

4.1.1 Monitoring History

Groundwater monitoring has been conducted at the MWL since 1990. The original groundwater monitoring well network at the MWL (monitoring wells MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3) was installed in 1988 and 1989. In 1993, monitoring well MWL-MW4 was completed at an angle of 6 degrees from vertical and was screened at two discrete intervals, 20 feet (ft) apart, to evaluate vertical potentiometric gradients and changes in aquifer parameters with depth. An inflatable packer separates the screened intervals, and nitrogen gas pressure is maintained in the packer to prevent commingling of water from the two screened sections of the aquifer. The upper screened interval of MWL-MW4 is within the interfingering, fine-grained, Santa Fe Group alluvial-fan deposits. The lower screen interval of MWL-MW4 is completed within the coarse-grained Ancestral Rio Grande (ARG) deposits. References to groundwater samples and water levels from monitoring well MWL-MW4 refer to groundwater withdrawn or measured from the upper screened interval, and references made to the bottom of this well refer to the depth to the top of the packer. Monitoring wells MWL-MW5 and MWL-MW6 were installed in 2000 at a distance of approximately 200 and 500 ft west of the MWL, respectively, with the screened intervals below the top of the regional water table in the coarse-grained ARG deposits.

The MWL groundwater monitoring network was modified in 2008 (SNL May 2009). Due to the declining water table and corrosion of stainless-steel well screens, four monitoring wells were plugged and abandoned (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3) and four new monitoring wells were installed (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) (SNL April 2008 and September 2008). The four wells installed in 2008 are completed within the interfingering, fine-grained, Santa Fe Group alluvial-fan deposits and comprise the MWL compliance groundwater monitoring network for the uppermost part of the regional aquifer (Bearzi October 2008 and January 2009; Blaine January 2014).

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 twenty years of data indicate that groundwater has not been contaminated by the MWL (Goering et al. 2002; SNL December 2001, January 2002, July 2002, October 2002, June 2003, September 2003, July 2004; Lyon and Goering 2006; SNL November 2006, January 2008, May 2009, June 2010, October 2010, September 2011, June 2012, June 2013, May 2014, and June 2014b).

4.1.2 Monitoring Network

The current groundwater monitoring network at the MWL consists of seven wells, as shown on Figure 4-2 and listed in Table 4-1.

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

Table 4-1. MWL Monitoring Well Network and Calendar Year 2014 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 in the WQ and WL columns indicate WQ sampling and WL measurements were completed.

[b]Requirements defined in the MWL Long-Term Monitoring and Maintenance Plan (SNL March 2012). Semiannual groundwater monitoring of compliance wells was conducted in April and October. Monitoring well MWL-MW8 resampled in June for VOCs only.

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

BW = Background Well.
ID = Identification.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
SNL = Sandia National Laboratories.
VOC = Volatile organic compound.
WL = Water level.
WQ = Water quality.

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 in accordance with the MWL LTMMP (SNL March 2012). The other three groundwater monitoring wells (MWL-MW4, MWL-MW5, and MWL-MW6) are retained for monitoring the groundwater elevation; sampling of these wells is not required under the MWL LTMMP.

4.1.3 Summary of Activities

Semiannual groundwater sampling was conducted in April (resampling of MWL-MW8 for VOCs only in June) and October 2014 at the MWL as summarized in Table 4-1. 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 uranium; specific radionuclides by gamma spectroscopy; gross alpha and beta; tritium; and radon-222. Duplicate environmental samples were collected at monitoring well MWL-BW2 (April), MWL-MW8 (June resampling), and MWL-MW7 (October). All calendar year (CY) 2014 sampling was conducted in accordance with MWL LTMMP requirements (SNL March 2012). Attachment 4A provides summary tables for the CY 2014 analytical results.

Additional sampling and maintenance outside the scope of the MWL LTMMP was performed during 2014 at monitoring well MWL-MW4 to address elevated unfiltered metals results reported in CY 2013 (SNL May 2014 and June 2014b). This non-routine monitoring and maintenance is detailed in a separate report that will be submitted to NMED in February 2015, and is summarized in Section 4.10.

4.1.4 Summary of Future Activities

All MWL LTMMP monitoring, inspection, and maintenance requirements were implemented as of January 8, 2014 after NMED approval (Blaine January 2014). Under the LTMMP, the groundwater monitoring frequency is semiannual for the four compliance wells only. A separate, comprehensive MWL Annual Long-Term Monitoring and Maintenance Report must be submitted to NMED by June 30th of each year that documents all monitoring, inspection, and maintenance activities. Groundwater monitoring activities and results will also continue to be provided in this Annual Groundwater Monitoring Report.

4.1.5 Conceptual Site Model

A detailed conceptual site model is provided in the MWL Phase 2 RFI Report (Peace et al. 2002) and the *Mixed Waste Landfill Groundwater Report, 1990 through 2001, Sandia National Laboratories, Albuquerque, New Mexico* (Goering et al. 2002). An update to the conceptual site model 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) and the *Annual Groundwater Monitoring Report, Calendar Year 2012* (SNL June 2013).

The upper surface of the regional aquifer at the MWL is contained within the interfingering, unconsolidated, fine-grained alluvial-fan deposits of the Santa Fe Group. The more transmissive, coarser-grained ARG sediments underlie the fine-grained alluvial deposits beneath the MWL. The depth to water is approximately 500 ft below ground surface and groundwater flows generally westward, away from the Manzanita Mountains and towards the Rio Grande. 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 continued to decline since monitoring began in 1990.

Figure 4-3 shows the October 2014 potentiometric surface of the regional aquifer beneath the MWL. Groundwater flows towards the west and northwest. Based on the contours, the horizontal gradient varies from approximately 0.02 to 0.08 ft per foot. The map is consistent with the conceptual site model and the base-wide potentiometric surface map presented on Plate 1. As shown on Plate 1, the potentiometric surface contours beneath Technical Area III generally trend north to south with the inferred groundwater flow direction being generally westward.

The rate of groundwater elevation decline at the existing MWL monitoring wells is shown in Attachment 4B, Figures 4B-1 and 4B-2. Since 2009, the rate of groundwater elevation decline in all wells except MWL-MW4 has been relatively slow and constant, and less than 2 ft overall (Figures 4B-1 and 4B-2 of Attachment 4B). The rate of groundwater elevation decline in the upper screen interval of MWL-MW4 has stabilized since April 2010. 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 Solid Waste Management Unit 76 under the Hazardous and Solid Waste Amendments module of the SNL/NM RCRA Permit. The NMED issued the *Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act §74-4-10: Sandia National Laboratories Consent Order* (the Consent Order) in April 2004, which transferred the regulatory authority for corrective action at the MWL to the Consent Order (NMED April 2004). Groundwater monitoring requirements for the MWL are defined in the MWL LTMMP (SNL March 2012) that was approved by NMED on January 8, 2014 (Blaine January 2014). This report has been formatted to address the content criteria set forth in the Consent Order (NMED April 2004) for Periodic Monitoring Reports.

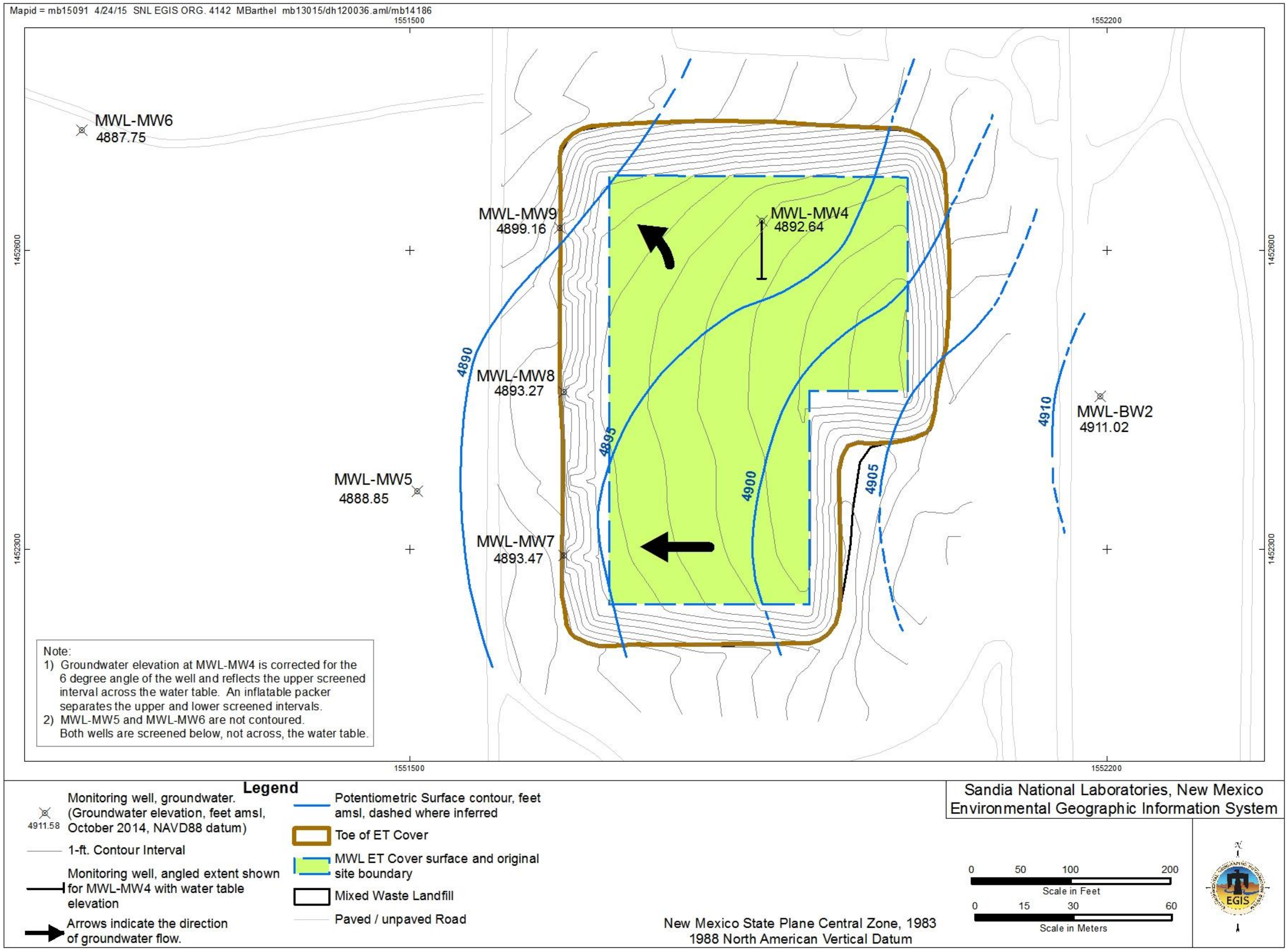

Figure 4-3. Localized Potentiometric Surface of the Basin Fill Aquifer at the Mixed Waste Landfill, October 2014

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 (NNSA) and Sandia. 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 (NMED April 2004).

4.3 Scope of Activities

The CY 2014 semiannual groundwater sampling is summarized in Section 4.1.3. Table 4-2 lists the analytical parameters and MWL wells sampled. SNL/NM field personnel conducted the sampling in April (with resampling of MWL-MW8 in June) and October. Groundwater sampling activities were conducted in conformance with the MWL LTMMP (SNL March 2012) and procedures outlined in the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2014, 3^{rd} Quarter Sampling* (SNL March 2014) and the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2015,1^{st} Quarter Sampling* (SNL September 2014b).

Table 4-2. Analytical Parameters for the MWL Monitoring Wells, Calendar Year 2014

Analytical Parameter	Calendar Year 2014[a]	
	April & June Resample	October
Volatile Organic Compounds	MWL-BW2 MWL-BW2 (dup in April) MWL-MW7 MWL-MW8 MWL-MW8 (dup in June) MWL-MW9	MWL-BW2 MWL-MW7 (dup in October) MWL-MW8 MWL-MW9
Metals (Cadmium, Chromium, Nickel, and Uranium)		
Radionuclides: Gamma-Emitting Radionuclides Gross Alpha Activity Gross Beta Activity Tritium Radon-222		

NOTES:
[a]Semiannual groundwater sampling was conducted in April (with resampling of MWL-MW8 for VOCs only in June) and October.
BW = Background well.
dup = Duplicate.
MW = Monitoring well.
MWL = Mixed Waste Landfill.
VOC = Volatile organic compound.

The MWL groundwater samples were submitted for analysis to GEL Laboratories LLC (GEL) 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 2001 and May 2009). The analytical results and laboratory detection limits are summarized in Attachment 4A, Tables 4A-1 through 4A-4.

Field and laboratory quality control (QC) samples were prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process as 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 performed included method blank, laboratory control sample, matrix spike, matrix spike duplicate, and surrogate spike analyses.

Water quality parameters were measured in the field for temperature, specific conductance, oxidation-reduction potential, pH, and dissolved oxygen using an YSI™ Model EXO1 Water Quality Meter during the purging process. Turbidity was measured with a Hach™ Model 2100P turbidity meter.

4.4 Field Methods and Measurements

Groundwater sampling and depth-to-groundwater measurements were conducted in conformance with procedures specified in the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plans* (SNL March 2014 and September 2014b), which are consistent with the methods described in Section 1.3 and the requirements of the MWL LTMMP (SNL March 2012). Field water quality parameters are presented in Table 4A-5 (Attachment 4A) and current CY 2014 and historical groundwater elevation measurements at the MWL monitoring wells are presented in Attachment 4B, Figures 4B-1 and 4B-2.

A portable Bennett™ groundwater sampling system was used to collect groundwater samples from all four monitoring wells. Minimum purge requirements were satisfied at monitoring wells. In accordance with the MWL LTMMP, a new portable Bennett™ sampling system was used that is equipped with a flow meter valve and small diameter tubing to decrease the purging flow rate to as low as reasonably achievable given the equipment. The purging volume requirement was achieved for all of the monitoring wells during CY 2014 sampling activities.

Groundwater samples were submitted to the off-site laboratory (GEL) following analysis request/chain-of-custody protocol.

4.5 Analytical Methods

All groundwater samples were analyzed by the off-site laboratory using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

4.6 Summary of Analytical Results

The analytical results for VOCs, metals, and radiological constituents are presented in Attachment 4A, Tables 4A-1, 4A-3, and 4A-4, respectively. Attachment 4A, Table 4A-2 presents the laboratory method detection limits (MDLs) for the VOCs. Field water quality measurements are presented in Attachment 4A, Table 4A-5. Analytical results that are above the analytical laboratory MDL, but below the practical quantitation limit (PQL) are qualified as estimated values and designated with a "J" qualifier in Tables 4A-1, 4A3, and 4A-4. Data qualifiers based on the data validation process are presented with the associated results in the Attachment 4A tables. Data validation and QC sample results associated with each sampling event are discussed in Section 4.7.

All CY 2014 analytical results were compared with established EPA MCLs where applicable. None of the detected constituents exceed the respective MCLs. The analytical results are discussed in greater detail in the following sections.

4.6.1 Volatile Organic Compounds

Of the four monitoring wells sampled, only well MWL-MW8 yielded groundwater samples that contained detectable VOCs at concentrations above the laboratory MDLs, but below the PQLs and respective MCLs for both the April and June MWL-MW8 samples. In the MWL-MW8 April sample, tetrachloroethene and tricholoroethene were detected at concentrations of 0.450 J and 0.380 J micrograms per liter (µg/L), respectively. The MCL for both of these VOCs is 5 µg/L. No VOCs were detected in any of the other April groundwater samples. Another groundwater sample and duplicate sample were collected from well MWL-MW8 in June as a best management practice to verify the April sample detections (i.e., resampling not required). In the June resamples, only tetrachloroethene was detected at a concentration of 0.370 J µg/L (environmental sample) and 0.390 J µg/L (duplicate sample). No VOCs were detected in the October samples from the four monitoring wells, including the sample from well MWL-MW8. VOC data are presented in Attachment 4A; Table 4A-1 contains analytical results and Table 4A-2 presents the laboratory MDLs for VOCs.

4.6.2 Metals

Unfiltered (or total metals) samples are collected without filtering. Table 4A-3 (Attachment 4A) summarizes the metal results for cadmium, chromium, nickel, and total uranium for the samples collected during the CY 2014 semiannual monitoring events at the MWL. Samples were analyzed for these specific metals according to EPA Methods 6020 (EPA 1986) in accordance with the MWL LTMMP (SNL March 2012).

No metal concentrations were reported above established MCLs in any groundwater samples and all results were consistent with historical ranges.

4.6.3 Radiological Parameters

Groundwater samples from the MWL monitoring wells were screened for gamma-emitting radionuclides, gross alpha/beta activity, radon-222, and tritium (Table 4A-4, Attachment 4A) and the analytical results are compared with the established EPA MCLs (MCL have only been established for gross alpha and gross beta).

Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4 should not include uranium. 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. Corrected gross alpha activity results are all below the MCL of 15 picocuries per liter (pCi/L) and range from -0.10 to 4.98 pCi/L. Gross beta results did not 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. Radon-222 results ranged from 110 to 427 pCi/L. All radiological parameter results are summarized in Table 4A-4 (Attachment 4A).

4.6.4 Water Quality Parameters

The field water quality parameters measured immediately before sampling are presented in Attachment 4A, Table 4A-5. These field parameters consist of temperature, specific conductance, oxidation-reduction potential, pH, turbidity, and dissolved oxygen.

4.7 Quality Control Results

Field and laboratory QC samples were used to determine the accuracy of the methods used and to monitor for inadvertent sample contamination that can occur during the sampling and analysis process. All data were reviewed in accordance with Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL June 2014c). The results for each QC analysis and the impact on data quality 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. The purpose of each field QC sample type is presented in Section 1.3.3. The following sections discuss the analytical results for each QC sample type.

4.7.1.1 Duplicate Environmental Samples

Duplicate environmental samples were collected from monitoring wells MWL-BW2 (April) and MWL-MW7 (October) and analyzed for all constituents. A duplicate sample was collected from well MWL-MW8 during the June resampling event; the June environmental and duplicate pair was analyzed for VOCs only. The results for the environmental sample were compared to the results for the corresponding environmental duplicate sample. The relative percent difference was calculated for constituents that were detected above the laboratory MDL in both samples.

CY 2014 duplicate environmental sample results show good correlation, with calculated RPD values ranging from less than 1 to 5. All calculated relative percent difference values are less than 20 for organic compounds and less than 35 for metals for all calculated parameters.

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 2014 sampling events and submitted for all analyses. One additional EB sample associated with resampling of monitoring well MWL-MW7, for radon-222 only, was also collected during the October sampling event.

Various constituents detected in EB samples at low concentrations included bromodichloromethane, chloroform, dibromochloromethane, nickel, and toluene. No corrective action was required for bromodichloromethane, chloroform, dibromochloromethane, and toluene because these analytes were not detected in associated environmental samples. Two nickel results associated with the April environmental samples from monitoring well MWL-BW2 (environmental and duplicate pair) were qualified during data validation as not detected (i.e., “U” qualified). These very low detections were above the laboratory MDL, but below the PQL, and were less than five times the reported concentration in the associated EB sample.

4.7.1.3 Field Blank Samples

A total of nine FB samples were collected during the CY 2014 sampling events and submitted for VOC analysis. Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected in the FB samples. No corrective action was required because these compounds were not detected in associated environmental samples.

4.7.1.4 Trip Blank Samples

A total of 13 TB samples were submitted with the CY 2014 samples for analysis of VOCs. No VOCs were detected in these 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. 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 2014c).

No significant data quality problems were noted for any CY 2014 MWL groundwater monitoring samples. Data validation reports are filed in the SNL/NM Customer Funded Record Center.

4.8 Variances and Nonconformances

All analytical and field methods were performed according to the requirements specified in the MWL LTMMP (SNL March 2012), the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2014, 3rd Quarter Sampling* (SNL March 2014), and the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2015,1st Quarter Sampling* (SNL September 2014b). There were no variances and/or nonconformances from requirements during CY 2014 sampling activities.

4.9 Summary and Conclusions

During CY 2014, groundwater samples were collected from the four MWL compliance groundwater monitoring wells (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9). Sample parameters included VOCs; metals including cadmium, chromium, nickel, and uranium; specific radionuclides by gamma spectroscopy; gross alpha and beta; tritium; and radon-222. Groundwater monitoring results were compared with established EPA MCLs for drinking water (EPA May 2009). No parameters were detected above established MCLs.

Based on the field and laboratory QC sample and data validation results, the CY 2014 groundwater monitoring data meet data quality objectives and are in compliance with analytical methods and laboratory procedures (i.e., representative and technically defensible).

4.10 Monitoring Well MWL-MW4 Metals Sampling and Maintenance Results

On May 20, 2014, the DOE and Sandia submitted a report titled *Mixed Waste Landfill Groundwater Monitoring Report, Monitoring Well MWL-MW4 Metals Data, Calendar Year 2013* to the NMED. The report presents filtered and unfiltered metals results for annual groundwater samples collected in January-February 2013 from monitoring well MWL-MW4, as well as historic filtered and unfiltered metals results for monitoring well MWL-MW4 samples (SNL May 2014). This information was also presented in the *CY 2013 Annual Groundwater Monitoring Report* (SNL June 2014b). The 2013 unfiltered groundwater sample results for chromium, cobalt, copper, iron, and nickel showed a significant increase in concentration relative to historic results. For these metal constituents, the 2013 unfiltered sample results were the highest concentrations historically reported for well MWL-MW4. Based on the evaluation presented in the May 2014 report (SNL May 2014), the most likely source of the significant increases in 2013 of unfiltered metals concentrations was corrosion of the dedicated stainless steel sampling pump in monitoring well MWL-MW4. Because this monitoring well was constructed at an incline and with two well screens, a dedicated pump had been installed. The well is constructed of polyvinyl chloride casing and screen.

From September 8 through September 29, 2014, pumping/purging and sampling of MWL-MW4 was conducted to remove sediment and corrosion particles from the well in accordance with recommendations provided by NMED (Kieling July 2014). Monitoring well MWL-MW4 was pumped/purged a total of 15 times over a 3-week period, a total of 7 environmental samples and 1 duplicate sample were collected, and a total of 233 gallons of groundwater were removed from the upper screen interval. Table 4A-6 presents a summary of the seven September 2014 groundwater sampling results for unfiltered metals. For comparison, the February 2013 unfiltered sample results are also included along with established MCLs.

All September 2014 unfiltered metals concentrations were significantly lower than the February 2013 results, including the initial sample results collected on September 9, 2014. The September 2014 unfiltered results show an overall decreasing trend, with all chromium, copper, cobalt, iron, and nickel results for the final two sampling events within or close to historic concentration ranges.

On December 16, 2014, SNL/NM staff and drilling subcontractor personnel removed the dedicated Bennett™ sampling pump, Baski™ packer, and associated tubing from MWL-MW4. The Bennett™ sampling pump was inspected and photographed to document the corrosion (Figure 4-4).

Figure 4-4. Photograph of the Stainless Steel Bennett™ Sampling Pump After Removal from MWL-MW4 on December 16, 2014 Showing Substantial Corrosion

The overall decreasing trend of field turbidity measurements, along with unfiltered metals analytical results, demonstrate that the September 2014 pumping/purging effort was effective at removing loose sediment and corrosion particles from the well casing and the dedicated sampling equipment. The subsequent removal and inspection of the stainless steel pump on December 16, 2014 provided conclusive evidence of substantial corrosion capable of causing elevated, anomalous metals results in groundwater samples (i.e., a source within the well).

Together these results confirm the February 2013 unfiltered metals results are anomalous and related to corrosion of the dedicated stainless steel pump. The video camera log, run while the dedicated equipment was out of the well, demonstrated MWL-MW4 is in reasonable condition and will continue to be used for groundwater elevation monitoring in accordance with the MWL LTMMP (SNL March 2012). Only the packer was reinstalled between the two well screens on December 16, 2014 after the video camera log was completed. A more detailed report, including trend plots and data tables, will be submitted to the NMED in February 2015.

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Attachment 4A
Mixed Waste Landfill
Analytical Results Tables

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Attachment 4A Tables

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

Calendar Year 2014

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	Tetrachloroethene	0.450	0.300	1.00	5.00	J		095821-001	SW846-8260B
28-Apr-14	Trichloroethene	0.380	0.300	1.00	5.00	J		095821-001	SW846-8260B
MWL-MW8 (Resample) 30-Jun-14	Tetrachloroethene	0.370	0.300	1.00	5.00	J		096150-001	SW846-8260B
MWL-MW8 (Resample Duplicate) 30-Jun-14	Tetrachloroethene	0.390	0.300	1.00	5.00	J		096151-001	SW846-8260B

Refer to footnotes on page 4A-15.

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

Calendar Year 2014

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	2.00
2-Hexanone	2.20
4-methyl-, 2-Pentanone	1.50
Acetone	2.50–3.00
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	1.70–3.00
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 4A-15.

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

Calendar Year 2014

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 21-Apr-14	Cadmium	ND	0.00011	0.001	0.005	U		095811-009	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		095811-009	SW846-6020
	Nickel	0.00092	0.0005	0.002	NE	J	0.0028U	095811-009	SW846-6020
	Uranium	0.00696	0.000067	0.0002	0.030			095811-009	SW846-6020
MWL-BW2 (Duplicate) 21-Apr-14	Cadmium	ND	0.00011	0.001	0.005	U		095812-009	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		095812-009	SW846-6020
	Nickel	0.000973	0.0005	0.002	NE	J	0.0028U	095812-009	SW846-6020
	Uranium	0.007	0.000067	0.0002	0.030			095812-009	SW846-6020
MWL-MW7 22-Apr-14	Cadmium	ND	0.00011	0.001	0.005	U		095815-009	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		095815-009	SW846-6020
	Nickel	0.000942	0.0005	0.002	NE	J		095815-009	SW846-6020
	Uranium	0.00741	0.000067	0.0002	0.030			095815-009	SW846-6020
MWL-MW8 28-Apr-14	Cadmium	ND	0.00011	0.001	0.005	U		095821-009	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		095821-009	SW846-6020
	Nickel	0.00173	0.0005	0.002	NE	J		095821-009	SW846-6020
	Uranium	0.00839	0.000067	0.0002	0.030			095821-009	SW846-6020
MWL-MW9 23-Apr-14	Cadmium	ND	0.00011	0.001	0.005	U		095818-009	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		095818-009	SW846-6020
	Nickel	0.000815	0.0005	0.002	NE	J		095818-009	SW846-6020
	Uranium	0.00922	0.000067	0.0002	0.030			095818-009	SW846-6020
MWL-BW2 16-Oct-14	Cadmium	ND	0.00011	0.001	0.005	U		096697-010	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		096697-010	SW846-6020
	Nickel	0.000914	0.0005	0.002	NE	J		096697-010	SW846-6020
	Uranium	0.00759	0.000067	0.0002	0.030			096697-010	SW846-6020
MWL-MW7 17-Oct-14	Cadmium	ND	0.00011	0.001	0.005	U		096703-010	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		096703-010	SW846-6020
	Nickel	0.000878	0.0005	0.002	NE	J		096703-010	SW846-6020
	Uranium	0.00864	0.000067	0.0002	0.030			096703-010	SW846-6020
MWL-MW7 (Duplicate) 17-Oct-14	Cadmium	ND	0.00011	0.001	0.005	U		096704-010	SW846-6020
	Chromium	ND	0.002	0.010	0.100	U		096704-010	SW846-6020
	Nickel	0.00084	0.0005	0.002	NE	J		096704-010	SW846-6020
	Uranium	0.00863	0.000067	0.0002	0.030			096704-010	SW846-6020

Refer to footnotes on page 4A-15.

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

Calendar Year 2014

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	0.00011	0.001	0.005	U		096710-010	SW846-6020
21-Oct-14	Chromium	ND	0.002	0.010	0.100	U		096710-010	SW846-6020
	Nickel	0.000827	0.0005	0.002	NE	J		096710-010	SW846-6020
	Uranium	0.00798	0.000067	0.0002	0.030			096710-010	SW846-6020
MWL-MW9	Cadmium	ND	0.00011	0.001	0.005	U		096707-010	SW846-6020
20-Oct-14	Chromium	ND	0.002	0.010	0.100	U		096707-010	SW846-6020
	Nickel	0.000777	0.0005	0.002	NE	J		096707-010	SW846-6020
	Uranium	0.00973	0.000067	0.0002	0.030			096707-010	SW846-6020

Refer to footnotes on page 4A-15.

Table 4A-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 2014

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	4.12 ± 12.0	18.5	9.05	NE	U	BD	095811-033	EPA 901.1
21-Apr-14	Cesium-137	0.835 ± 2.88	3.95	1.90	NE	U	BD	095811-033	EPA 901.1
	Cobalt-60	-0.22 ± 2.18	3.82	1.80	NE	U	BD	095811-033	EPA 901.1
	Gross Alpha	3.93	NA	NA	15 pCi/L	NA	None	095811-034	EPA 900.0
	Gross Beta	12.2 ± 2.50	1.96	0.955	4mrem/yr			095811-034	EPA 900.0
	Tritium	-11.4 ± 93.5	164	78.8	NE	U	BD	095811-036	EPA 906.0 M
	Radon-222	416 ± 98.6	42.4	20.3	NE			095811-040	SM7500 Rn B
MWL-BW2 (Duplicate)	Americium-241	-0.40 ± 17.8	30.6	15.0	NE	U	BD	095812-033	EPA 901.1
21-Apr-14	Cesium-137	-0.148 ± 1.88	3.34	1.60	NE	U	BD	095812-033	EPA 901.1
	Cobalt-60	0.445 ± 1.77	3.27	1.53	NE	U	BD	095812-033	EPA 901.1
	Gross Alpha	3.22	NA	NA	15 pCi/L	NA	None	095812-034	EPA 900.0
	Gross Beta	6.83 ± 1.62	1.54	0.741	4mrem/yr			095812-034	EPA 900.0
	Tritium	-36.9 ± 94.3	167	80.5	NE	U	BD	095812-036	EPA 906.0 M
	Radon-222	394 ± 94.1	42.5	20.4	NE			095812-040	SM7500 Rn B
MWL-MW7	Americium-241	2.30 ± 14.0	24.7	12.0	NE	U	BD	095815-033	EPA 901.1
22-Apr-14	Cesium-137	-0.186 ± 1.85	3.30	1.58	NE	U	BD	095815-033	EPA 901.1
	Cobalt-60	-1.37 ± 2.01	3.28	1.53	NE	U	BD	095815-033	EPA 901.1
	Gross Alpha	4.37	NA	NA	15 pCi/L	NA	None	095815-034	EPA 900.0
	Gross Beta	6.10 ± 1.49	1.53	0.740	4mrem/yr			095815-034	EPA 900.0
	Tritium	-57.2 ± 93.1	166	80.2	NE	U	BD	095815-036	EPA 906.0 M
	Radon-222	156 ± 50.2	53.6	25.8	NE		J	095815-040	SM7500 Rn B
MWL-MW8	Americium-241	2.56 ± 8.68	13.5	6.57	NE	U	BD	095821-033	EPA 901.1
28-Apr-14	Cesium-137	-0.465 ± 2.65	4.62	2.20	NE	U	BD	095821-033	EPA 901.1
	Cobalt-60	-1.68 ± 2.84	4.64	2.14	NE	U	BD	095821-033	EPA 901.1
	Gross Alpha	4.98	NA	NA	15 pCi/L	NA	None	095821-034	EPA 900.0
	Gross Beta	4.46 ± 1.25	1.38	0.664	4mrem/yr			095821-034	EPA 900.0
	Tritium	-13.5 ± 99.5	174	83.9	NE	U	BD	095821-036	EPA 906.0 M
	Radon-222	167 ± 55.6	61.3	29.4	NE		J	095821-040	SM7500 Rn B

Refer to footnotes on page 4A-15.

Table 4A-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 2014

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	1.53 ± 13.0	22.1	10.8	NE	U	BD	095818-033	EPA 901.1
23-Apr-14	Cesium-137	1.64 ± 1.95	3.66	1.76	NE	U	BD	095818-033	EPA 901.1
	Cobalt-60	-0.466 ± 2.15	3.69	1.73	NE	U	BD	095818-033	EPA 901.1
	Gross Alpha	2.99	NA	NA	15 pCi/L	NA	None	095818-034	EPA 900.0
	Gross Beta	8.01 ± 1.99	2.15	1.05	4mrem/yr			095818-034	EPA 900.0
	Tritium	64.1 ± 98.7	166	80.0	NE	U	BD	095818-036	EPA 906.0 M
	Radon-222	375 ± 90.6	44.9	21.3	NE			095818-040	SM7500 Rn B
MWL-BW2	Americium-241	6.07 ± 6.76	9.51	4.65	NE	U	BD	096697-033	EPA 901.1
16-Oct-14	Cesium-137	1.21 ± 1.63	2.81	1.35	NE	U	BD	096697-033	EPA 901.1
	Cobalt-60	0.499 ± 2.26	3.21	1.52	NE	U	BD	096697-033	EPA 901.1
	Gross Alpha	1.23	NA	NA	15 pCi/L	NA	None	096697-034	EPA 900.0
	Gross Beta	5.55 ± 1.32	1.23	0.593	4mrem/yr		J	096697-034	EPA 900.0
	Tritium	-21.6 ± 72.7	137	62.7	NE	U	BD	096697-036	EPA 906.0 M
	Radon-222	427 ± 119	94.2	44.8	NE			096697-037	SM7500 Rn B
MWL-MW7	Americium-241	4.45 ± 6.58	10.7	5.19	NE	U	BD	096703-033	EPA 901.1
17-Oct-14	Cesium-137	1.31 ± 1.87	3.28	1.57	NE	U	BD	096703-033	EPA 901.1
	Cobalt-60	-1.29 ± 2.50	3.48	1.62	NE	U	BD	096703-033	EPA 901.1
	Gross Alpha	0.85	NA	NA	15 pCi/L	NA	None	096703-034	EPA 900.0
	Gross Beta	5.30 ± 1.23	1.06	0.507	4mrem/yr		J	096703-034	EPA 900.0
	Tritium	-9.94 ± 73.9	137	62.8	NE	U	BD	096703-036	EPA 906.0 M
	Radon-222	156 ± 62.6	78.6	37.4	NE		J	096703-037	SM7500 Rn B
MWL-MW7 (Resample) 29-Oct-14	Radon-222	135 ± 56.4	72.5	34.4	NE		J	096857-037	SM7500 Rn B

Refer to footnotes on page 4A-15.

Table 4A-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 2014

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-MW7 (Duplicate) 17-Oct-14	Americium-241	2.40 ± 19.6	28.4	13.9	NE	U	BD	096704-033	EPA 901.1
	Cesium-137	1.13 ± 2.08	3.55	1.71	NE	U	BD	096704-033	EPA 901.1
	Cobalt-60	2.52 ± 2.62	3.37	1.59	NE	U	BD	096704-033	EPA 901.1
	Gross Alpha	-0.10	NA	NA	15 pCi/L	NA	None	096704-034	EPA 900.0
	Gross Beta	7.42 ± 1.56	1.15	0.551	4mrem/yr		J	096704-034	EPA 900.0
	Tritium	3.05 ± 75.8	138	63.4	NE	U	BD	096704-036	EPA 906.0 M
	Radon-222	110 ± 55.8	78.8	37.5	NE		J	096704-037	SM7500 Rn B
MWL-MW7 (Resample Duplicate) 29-Oct-14	Radon-222	192 ± 66.0	72.6	34.4	NE		J	096858-037	SM7500 Rn B
MWL-MW8 21-Oct-14	Americium-241	10.6 ± 7.92	10.7	4.82	NE	U	BD	096710-033	EPA 901.1
	Cesium-137	1.17 ± 1.82	2.79	1.34	NE	U	BD	096710-033	EPA 901.1
	Cobalt-60	-3.11 ± 2.63	2.70	1.26	NE	U	BD	096710-033	EPA 901.1
	Gross Alpha	2.97	NA	NA	15 pCi/L	NA	None	096710-034	EPA 900.0
	Gross Beta	6.15 ± 1.43	1.35	0.651	4mrem/yr		J	096710-034	EPA 900.0
	Tritium	-24.7 ± 71.3	134	61.8	NE	U	BD	096710-036	EPA 906.0 M
	Radon-222	122 ± 53.0	69.2	32.7	NE		J	096710-037	SM7500 Rn B
MWL-MW9 20-Oct-14	Americium-241	12.3 ± 13.6	17.4	8.54	NE	U	BD	096707-033	EPA 901.1
	Cesium-137	-3.01 ± 4.22	3.84	1.86	NE	U	BD	096707-033	EPA 901.1
	Cobalt-60	-0.908 ± 1.99	3.31	1.56	NE	U	BD	096707-033	EPA 901.1
	Gross Alpha	4.38	NA	NA	15 pCi/L	NA	None	096707-034	EPA 900.0
	Gross Beta	7.16 ± 1.55	1.27	0.611	4mrem/yr		J	096707-034	EPA 900.0
	Tritium	7.26 ± 76.3	138	63.4	NE	U	BD	096707-036	EPA 906.0 M
	Radon-222	290 ± 88.8	83.2	39.3	NE			096707-040	SM7500 Rn B

Refer to footnotes on page 4A-15.

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

Calendar Year 2014

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	21-Apr-14	22.44	695.7	110.0	7.41	0.20	11.0	0.95
MWL-MW7	22-Apr-14	23.88	594.4	246.0	7.66	0.26	74.6	6.24
MWL-MW8	28-Apr-14	18.35	528.1	202.7	7.66	0.23	40.0	3.70
	30-Jun-14	26.35	644.1	276.4	7.54	0.25	40.4	3.25
MWL-MW9	23-Apr-14	23.97	589.9	120.0	7.55	0.41	20.0	1.72
MWL-BW2	16-Oct-14	20.93	707.3	192.1	7.12	0.22	11.1	0.98
MWL-MW7	17-Oct-14	20.94	585.8	327.2	7.37	0.26	69.7	6.19
	29-Oct-14	19.17	571.4	37.2	7.58	0.32	73.5	6.65
MWL-MW8	21-Oct-14	21.42	604.4	275.0	7.43	0.37	35.6	3.14
MWL-MW9	20-Oct-14	20.97	584.4	171.3	7.35	0.44	23.0	2.01

Refer to footnotes on page 4A-15.

Table 4A-6
MWL-MW4 Unfiltered Metals Results Summary for September 2014,
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Metal	MCL[d] (mg/L)	February 2013 (mg/L)	September 9 (mg/L)	September 15 (mg/L)	September 16 (mg/L)	September 18 (mg/L)	September 22 (mg/L)	September 25 (mg/L)	September 29[i] (mg/L)
Chromium	0.100	0.112	0.0364	0.0101	0.0105	0.00969	0.0163	0.00621	0.00595 (0.00705)
Cobalt	NE	0.00229	0.00084	0.000243	0.000187	0.000275	0.000235	0.000179	0.000211 (0.000209)
Copper	NE	0.0335	< 0.0056	0.00149	0.00143	0.00141	0.00231	0.00134	< 0.0040 (< 0.0040)
Iron	NE	2.92	0.558	0.120	0.113	0.148	0.157	0.106	0.104 (0.0997)
Nickel	NE	0.417	0.215	0.0965	0.0553	0.0443	0.0701	0.0362	0.0574 (0.056)

Refer to footnotes on page 4A-15.

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Footnotes for Mixed Waste Landfill Groundwater Analytical Results Tables

%	= Percent.
BW	= Background well.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
GWM	= Groundwater Monitoring.
ID	= Identification.
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.
PQL	= practical quantitation limit.

[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 = Indicates the 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 4A- 1 through 4A-3. MDA applies to Table 4A- 4.

MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.

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

NA = Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level

The PQL applies to Tables 4A- 1 through 4A-3. Critical Level applies to Table 4A- 4.

Critical Level = The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

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

NA = Not applicable for gross alpha activities. The critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[d]MCL

MCL = Maximum contaminant level. Established by the EPA Office of Water, National Primary Drinking Water Standards, (EPA 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.

J = Estimated value, the analyte concentration is below the PQL.

NA = Not applicable.

U = Analyte is absent or below the method detection limit.

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.
None	=	No data validation for corrected gross alpha activity.
U	=	The analyte was analyzed for, but not detected. The associated numerical value is the sample quantitation limit.

[g]Analytical Method

1998, "Standard Methods for the Examination of Water and Wastewater," 7500-Rn B Method, 20th Edition, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

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

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

[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).

[i]September 29

Duplicate results are shown in parentheses.

Attachment 4B
Mixed Waste Landfill
Hydrographs

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Attachment 4B Hydrographs

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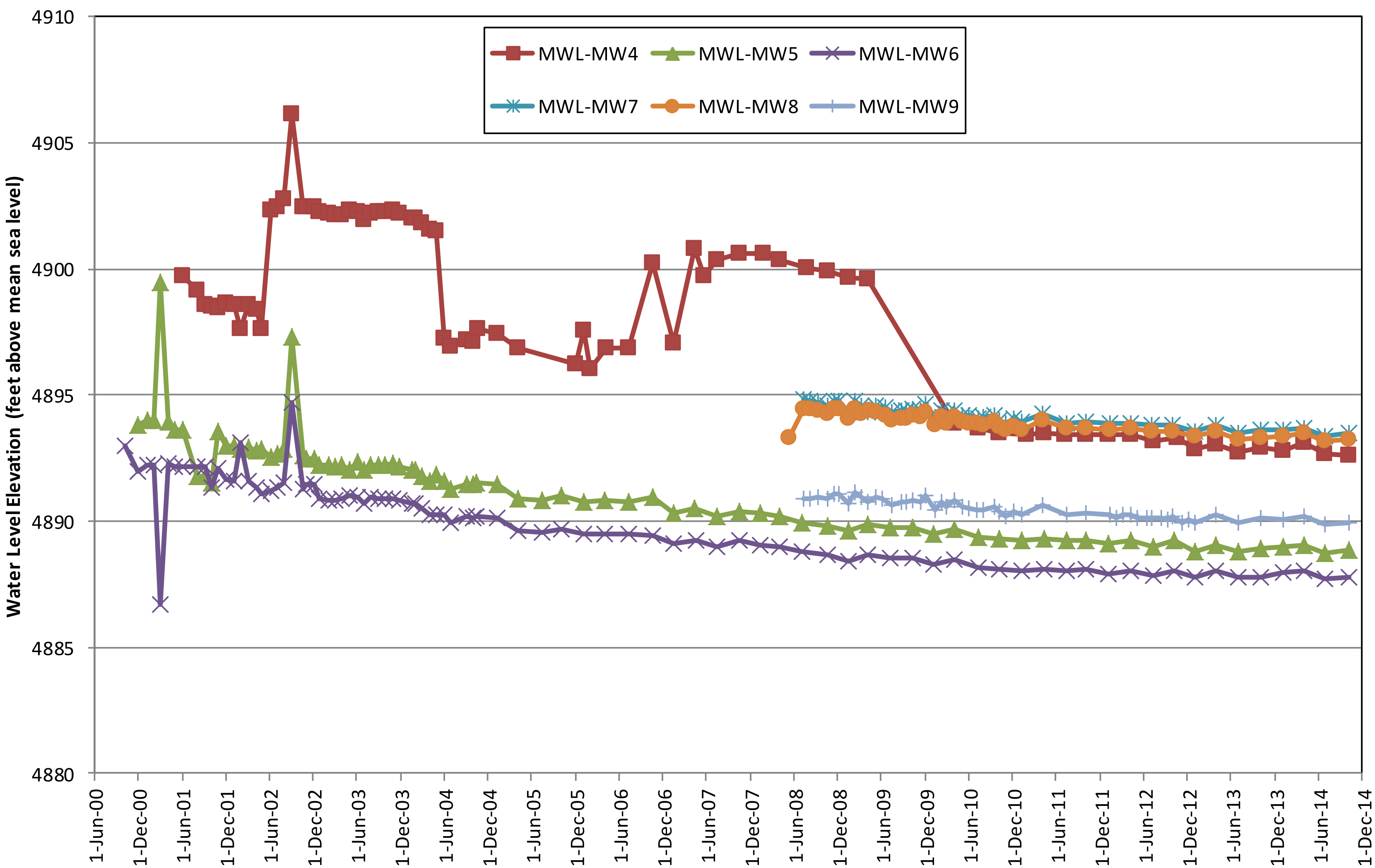

Figure 4B-1. MWL Study Area Wells (1 of 2)

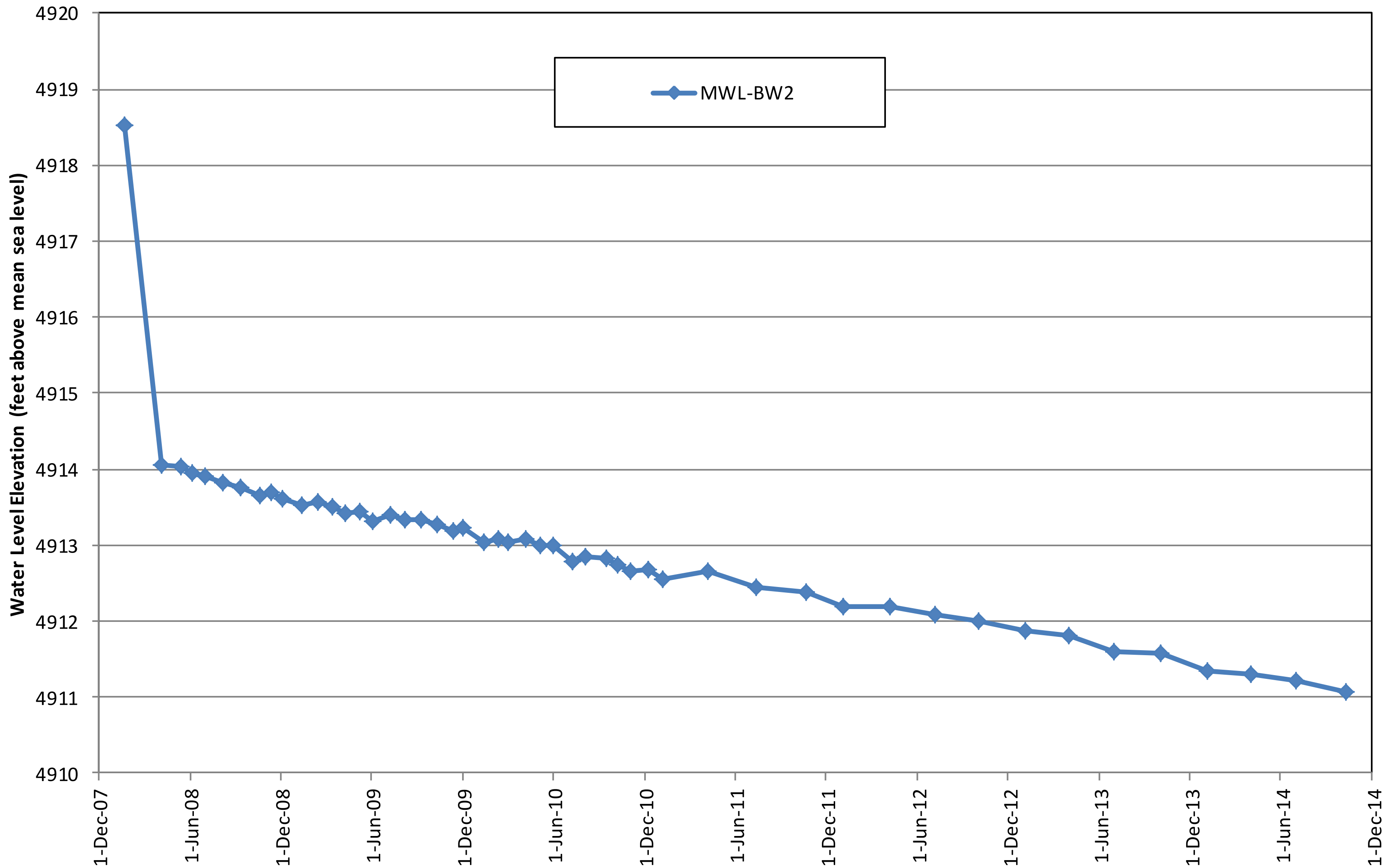

Figure 4B-2. MWL Study Area Wells (2 of 2)

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. Since 1993, the maximum concentrations detected in groundwater at the TAVG AOC have been 26 micrograms per liter (μg/L) of TCE and 19 milligrams per liter (mg/L) of nitrate (as nitrogen). The EPA MCLs and State of New Mexico drinking water standards for TCE and nitrate are 5 μg/L and 10 mg/L (as nitrogen), respectively. 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 occupies approximately 35 acres in the northeast corner of TA-III (Figure 5-1) at Sandia National Laboratories, New Mexico (SNL/NM). TA-V is located in the west-central portion of Kirtland Air Force Base (KAFB), south of the City of Albuquerque (Figure 5-1).

TA-V is situated within the Albuquerque Basin, and the 500 ft thick vadose zone at TA-V consists of heterogeneous, lenticular, coarse- to fine-grained deposits. The underlying aquifer at TA-V consists of unconsolidated fine-grained, clay-rich, alluvial-fan sediments. Groundwater in the vicinity of TA-V flows generally from east to west. To the west of TA-V, groundwater flow paths turn to the north in response to pumping from Albuquerque Bernalillo County Water Utility Authority (ABCWUA) supply wells located north of KAFB, and from KAFB water supply wells located in the northern portion of the base.

5.1.2 Site History

TA-V facilities are designed to test radiation effects on components and include two research reactors (the Annular Core Research Reactor and the Sandia Pulsed Reactor), as well as the Gamma Irradiation Facility and Hot Cell Facility. 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. SNL/NM Environmental Restoration (ER) Operations (formerly ER Project) personnel have conducted numerous groundwater investigations in the TAVG AOC since 1992 (Table 5-1). Many of these investigations were site-specific and conducted in support of 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 over the past 22 years (Table 5-1). 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).

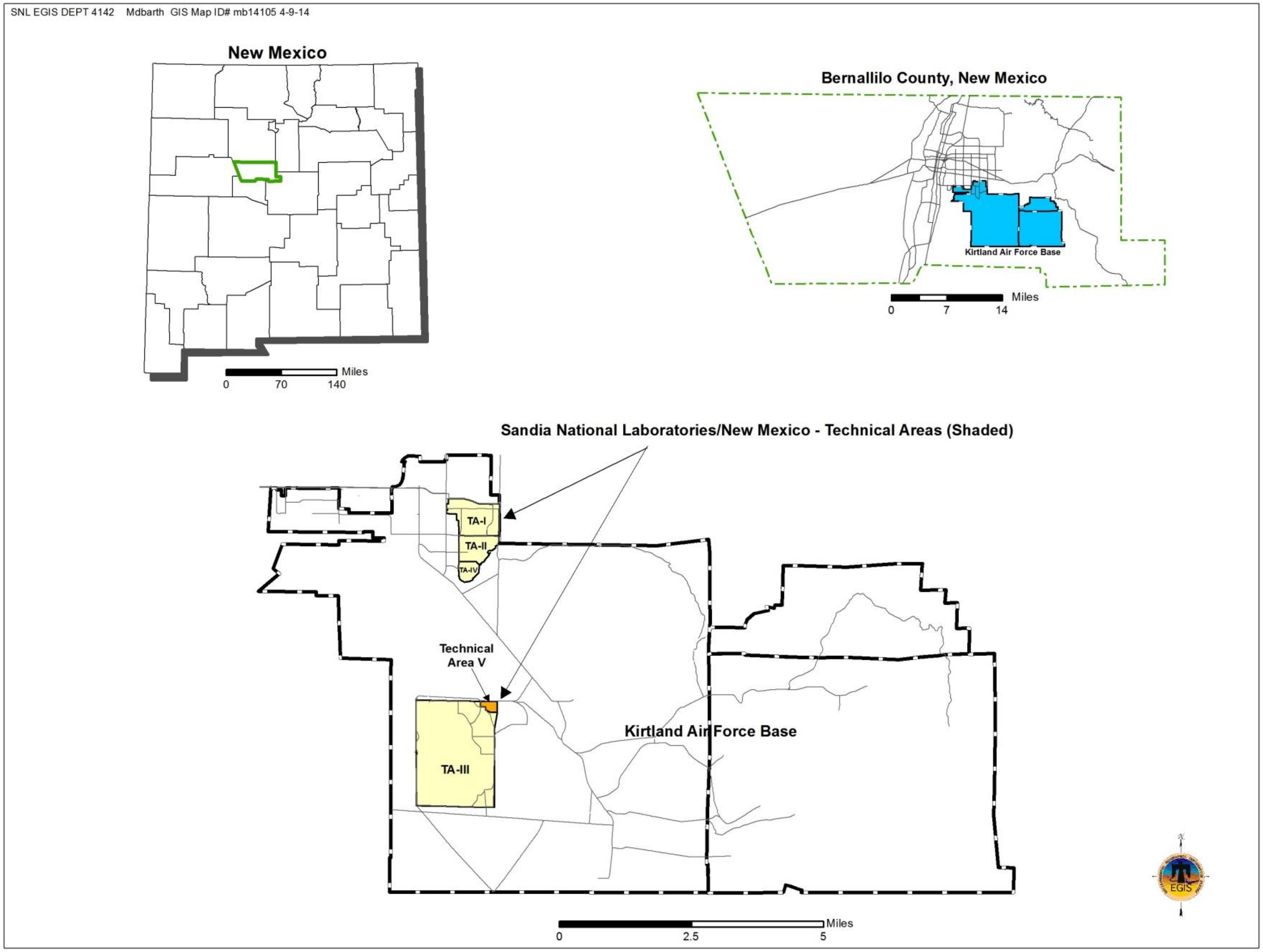

Figure 5-1. Location of SNL/NM and TA-V

Table 5-1. 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 TA-V 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 TA-V wells reported in the CY 1995 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1996
March	1996	Submit a 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 TA-V 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 TA-V wells reported in the CY 1997 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1998

Refer to footnotes on page 5-7.

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

Month	Year	Event	Reference
October	1998	Provide cross sections to NMED for the LWDS as required in the September 1997 RSI from NMED.	DOE October 1998
March	1999	Groundwater sampling analytical results for TA-V 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 TA-V wells reported in the FY 1999 SNL/NM Annual Groundwater Monitoring Report	SNL March 2000
April	2001	Groundwater sampling analytical results for TA-V 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 TA-V 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 TA-V wells reported in the FY 2001 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2002
March	2003	Groundwater sampling analytical results for TA-V wells reported in the FY 2002 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2003
June	2003	Subsurface geology at KAFB, including the TA-V area, is updated.	Van Hart June 2003
March	2004	Groundwater sampling analytical results for TA-V 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

Refer to footnotes on page 5-7.

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

Month	Year	Event	Reference
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
October	2005	Submit request to NMED for change in sampling frequency for TA-V wells.	DOE October 2005
October	2005	Groundwater sampling analytical results for TA-V 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 TA-V 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 TA-V wells reported in the FY 2005 SNL/NM Annual Groundwater Monitoring Report.	SNL November 2006
March	2007	Groundwater sampling analytical results for TA-V 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 TA-V 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 TA-V 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 TA-V 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

Refer to footnotes on page 5-7.

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

Month	Year	Event	Reference
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
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 TA-V 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 TA-V 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 TA-V wells reported in the CY 2010 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2011
September	2012	Groundwater sampling analytical results for TA-V wells reported in the CY 2011 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2012
June	2013	Groundwater sampling analytical results for TA-V 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 TA-V wells reported in the CY 2013 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2014

Refer to footnotes on page 5-7.

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

Month	Year	Event	Reference
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
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

NOTES:

AOC	= Area of Concern.
AVN	= Area V (North).
CCM	= Current Conceptual Model.
CME	= Corrective Measures Evaluation.
CY	= Calendar Year.
DOE	= U.S. Department of Energy.
EPA	= U.S. Environmental Protection Agency.
FY	= Fiscal Year.
IRR	= Internal Remedy Reviews.
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.
The Consent Order	= Compliance Order on Consent.

In April 2004, the Compliance Order on Consent (the Consent Order) became effective between the NMED, U.S. Department of Energy (DOE), and Sandia Corporation (Sandia). The Consent Order specifies TA-V as an area of groundwater contamination (NMED April 2004). Since the initial discoveries of TCE and nitrate at the TAVG AOC, numerous characterization activities have been conducted (Table 5-1), which are summarized in the *Current Conceptual Model of Groundwater Flow* *and Contaminant Transport at Sandia National Laboratories/New Mexico Technical Area-V* (SNL April 2004a). In response to the Consent Order, this document was submitted to the NMED along with the *Corrective Measures Evaluation Work Plan, Technical Area-V Groundwater* (SNL April 2004b) by DOE/National Nuclear Security Administration (NNSA) and Sandia in April 2004. After fulfilling the requirements of the Corrective Measures Evaluation (CME) Work Plan, DOE/NNSA and Sandia submitted the CME Report 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). DOE/NNSA and Sandia submitted responses to the three NODs in April 2009, November 2009, and February 2010, respectively (SNL April 2009, SNL November 2009, and SNL 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. In May 2010, NMED issued a notice of conditional approval for the TA-V Groundwater Investigation Work Plan (NMED May 2010). SNL/NM personnel installed four additional groundwater monitoring wells in November 2010 and three soil-vapor monitoring wells in March 2011.

The NMED-approved "Technical Area-V Groundwater Investigation Work Plan" specified that eight quarters of soil-vapor samples to be collected from the three soil-vapor monitoring wells and analyzed for volatile organic compounds (VOCs). Soil-vapor samples were collected for three quarters in 2011, four quarters in 2012, and one quarter in 2013; the monitoring activities and analytical results were presented in the Attachment 5D of Calendar Year (CY) 2011, CY 2012, and CY 2013 Annual Groundwater Monitoring Reports, respectively (SNL September 2012, June 2013, and June 2014). The soil-vapor sampling at TA-V was concluded in CY 2013 with the final quarterly sampling.

Groundwater monitoring results for TA-V wells have been summarized in the annual groundwater monitoring reports in accordance with requirements of the Consent Order.

5.1.4 Current Monitoring Network

In CY 2014, 16 wells in the TAVG AOC were being monitored for water quality and water levels (Figure 5-2; Table 5-2). Table XI-1 of the Consent Order (NMED April 2004) specifies that the sampling frequency for groundwater monitoring at TA-V is quarterly. The 16-well groundwater monitoring network has been in place since November 2010.

5.1.5 Summary of Calendar Year 2014 Activities

The following activities took place for the TAVG AOC during CY 2014:

- Obtained monthly or 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 5-2) in February/March, April/May, July/August/September, and October/November 2014 (SNL January 2014, April 2014, July 2014, and September 2014a).
- Prepared tables of analytical results (Attachment 5A), concentration versus time plots (Attachment 5B), and hydrographs (Attachment 5C) in support of this report.

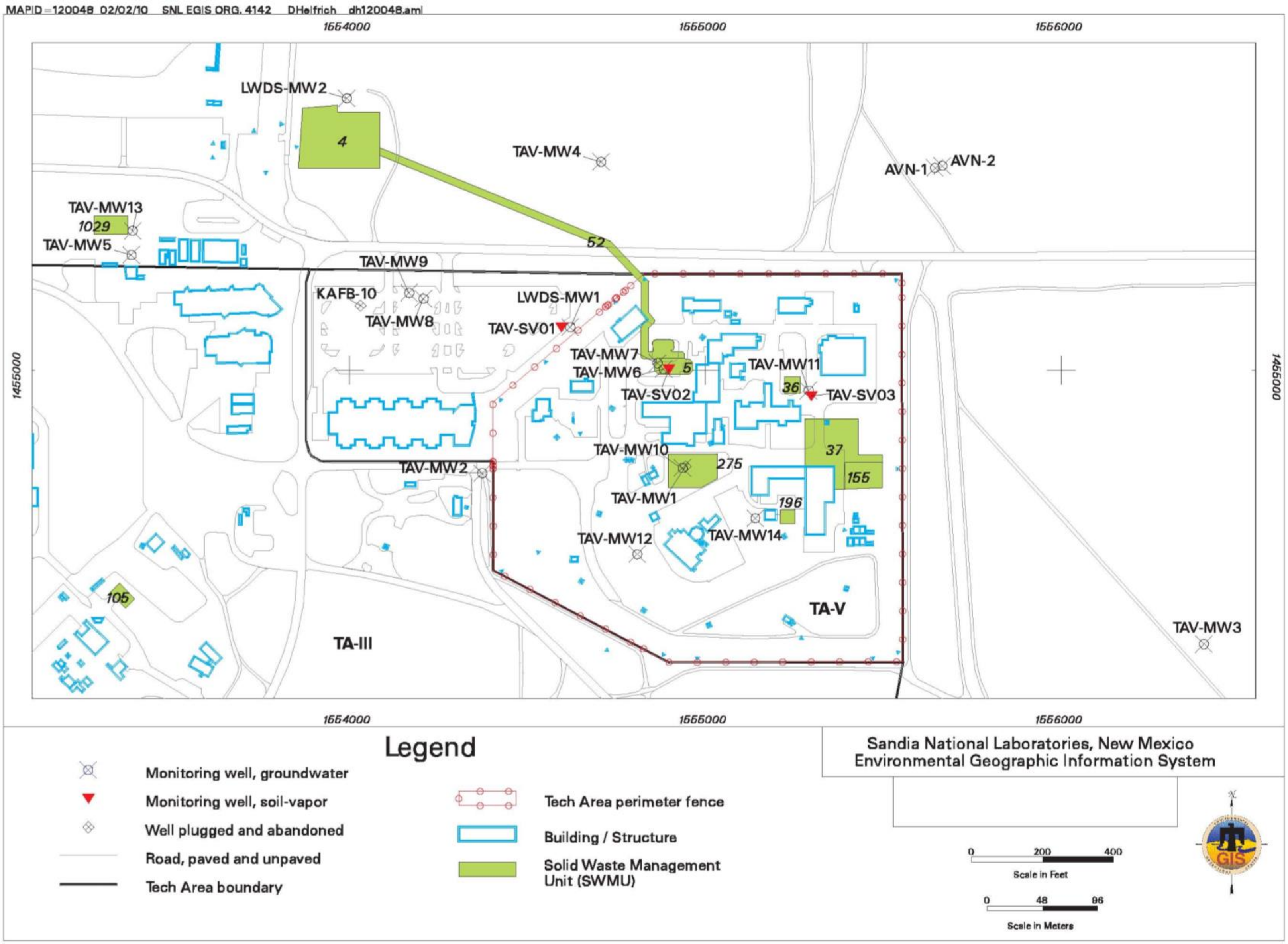

Figure 5-2. TAVG Monitoring Well Locations (16 Active Groundwater Monitoring Wells)

Table 5-2. 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

NOTES: Check marks in the WQ and WL columns 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 Summary of Future Activities

The following activities are anticipated for the TAVG AOC during CY 2015:

- Obtain periodic water level measurements for TAVG AOC wells.
- Conduct quarterly or semiannual (deep-completion wells only) groundwater sampling at 16 TAVG AOC wells.

5.1.7 Current Conceptual Model

This section presents an updated conceptual site model that characterizes contaminant source terms, the geological and hydrogeological framework, and the distribution and migration of contaminants in the subsurface at TA-V.

5.1.7.1 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 KAFB and TA-V.

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 feet 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 is 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 at TA-V 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.

The Ancestral Rio Grande (ARG) deposits interfinger with the alluvial-fan deposits at depth west of TA-V. The ARG deposits consist predominantly of well-sorted sands and gravels that were deposited during the integration of the Rio Grande drainage system. The ARG deposits have a predominantly north to south depositional fabric. The nearest known occurrence of the ARG facies is at monitoring well PL-4, located approximately 8,800 ft northwest of TA-V. The ARG facies were not encountered during drilling of any TA-V wells.

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.

5.1.7.2 Hydrologic Conditions at TA-V

Long-term average precipitation is 9.45 inches per year (30-year norm based on 1981-2010 data) at Albuquerque International Sunport (SNL September 2014b). Much of this precipitation is derived from summer thunderstorms that occur between July and October. Because the rate of evapotranspiration in the Albuquerque area greatly exceeds precipitation, this source of recharge is considered to be minimal as a mechanism for transporting contaminants through the 500-ft-thick vadose zone at TA-V. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

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 distances between these ephemeral channels and TA-V precludes a significant effect on local groundwater flow and potential contaminant transport.

The vadose zone at TA-V, 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. Upper sections of the alluvial-fan sediments are relatively coarse-grained, becoming fine-grained and clay-rich with depth. The hydraulic properties of the vadose zone at TA-V 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 occur along preferential pathways of saturated or nearly saturated flow through the thick vadose zone to the aquifer. Vertical flow through the discontinuous, layered, lenticular sediments in the vadose zone may be attenuated or diverted at horizons of contrasting hydraulic properties.

No evidence of groundwater perching has been observed at TA-V. Minimal moisture from wastewater discharge at TA-V remains in the vadose zone based on moisture content measurements in vadose-zone sediment samples.

Values of horizontal hydraulic conductivity for the alluvial-fan lithofacies were determined using aquifer pumping tests and slug tests. Aquifer pumping (and recovery) data were collected at two monitoring wells, TAV-MW2 and AVN-1, and the calculated hydraulic conductivities were 0.09 and 38.3 feet per day (ft/day), respectively. Slug tests were conducted at all 18 monitoring wells (Table 5-2). Estimates of horizontal hydraulic conductivity ranged from 0.04 to 30.82 ft/day. The wide range of hydraulic conductivity estimates derived from 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.

5.1.7.3 Local Direction of Flow

Water levels measured in the current 16 monitoring wells were used to construct a map of the local aquifer potentiometric surface at TA-V (Figure 5-3). The regional aquifer at TA-V is under unconfined conditions. The potentiometric surface indicates that the groundwater flow beneath TA-V is generally to the west, with localized flow paths to the south and southwest. The horizontal gradient ranges from approximately 0.002 to 0.008 feet per foot (ft/ft) based on the October 2014 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), the average horizontal hydraulic gradient of 0.005 ft/ft, and the effective porosity of 0.25. The estimates for linear groundwater flow velocity at TA-V 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 – 0.8 ft of additional head relative to nearby wells (SNL September 2012, June 2013, June 2014). The groundwater mound is most likely an artifact of laterally variable water level declines within a heterogeneous and anisotropic aquifer. In CY 2014, Figure 5-3 shows that a similar amount of additional hydraulic head still exists at wells TAV-MW8 and LWDS-MW1 relative to nearby wells, but a potentiometric mound cannot be confidently inferred using a 1-foot contour interval.

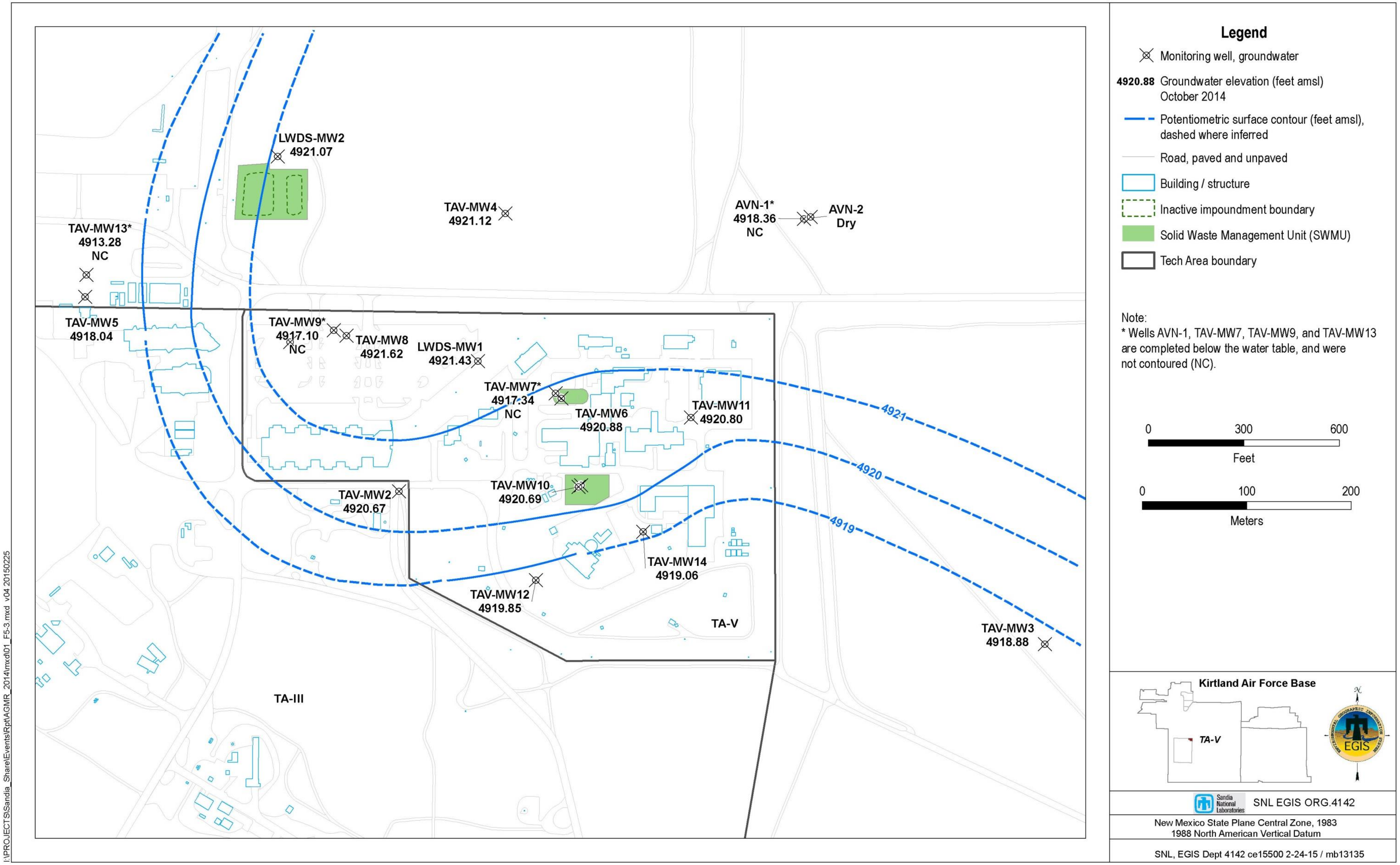

Figure 5-3. TAVG AOC Potentiometric Surface Map (October 2014)

Water level data indicate that groundwater flow to the west of TA-V turns sharply to the north, moving toward ABCWUA supply wells located north of KAFB and the KAFB water supply wells. The sharp change in flow direction coincides with the location of coarse, uniformly sorted ARG sediments. These sediments are much more permeable and transmissive than the fine-grained sediments of the alluvial-fan lithofacies at TA-V and allow for more rapid flow of groundwater.

Water level fluctuations are shown on the hydrographs present in Attachment 5C, Figures 5C-1 through 5C-3, for the current 16-well groundwater monitoring network at TA-V. Groundwater levels have steadily declined at all TA-V 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 0.55 to 0.88 ft/yr with an average decline rate of 0.77 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 differential dewatering of the aquifer is expected to continue as long as pumping of water supply wells in the region continues.

Since late 2008, groundwater levels 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 for potable water supplies and decreased dependence on water supply wells immediately north of KAFB (SNL June 2014). However, this effect has not been seen as far south as TA-V.

5.1.7.4 Contaminant Sources

Contaminant migration in the subsurface at TA-V 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 regional aquifer. Limited amounts of natural recharge are a minor factor. Possible sources of natural recharge include 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 estimated disposal volumes. TCE and other organic chemicals 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 seepage pits from the early 1980s until 1992, but it 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 organic chemicals moved through the alluvial-fan lithofacies into the aquifer. Low concentrations of TCE present in the aquifer today are a result of these initial releases. Upon cessation of disposal, vertical pathways to the aquifer were drained by gravity. Continued wastewater flushing of the vadose zone beneath the seepage pits until 1992 likely removed significant sources of secondary contaminants.

Sampling and analysis have been conducted in the vadose zone to characterize the presence of VOCs. Locations of investigations are based on possible release sites (Table 5-3). Investigation results indicate that the overall presence of VOCs in the vadose zone is minimal. 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 for soil-core and soil-vapor samples show no significant residual VOCs in the vadose zone. Also, no results have shown evidence of excessive moisture in the vadose zone sediments; therefore, no significant residual wastewater is 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 during 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.

Groundwater sample results from monitoring well LWDS-MW2, located to the immediate north of the LWDS surface impoundments (SWMU 4) (Figure 5-2), indicate 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 have facilitated sufficient VOC and wastewater evaporation that minimized the depth of VOC and wastewater percolation.

Other shallow contamination sites (SWMUs 36, 37, 52, 155, and 196 as shown in Figure 5-2) have also been investigated at TA-V. Site characterization and corrective action activities included excavation of oil spills and confirmatory sampling, near surface soil-vapor and soil sampling, and vadose zone vapor and soil sampling. Sampling results have shown that these other sites have not contributed to groundwater contamination.

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

Nitrate concentrations in groundwater have exceeded the MCL in the two AVN wells (AVN-1 and AVN-2 [shallower well, now dry]) upgradient of TA-V, which are presumably derived from upgradient sources. Concentrations have also exceeded the MCL in samples from monitoring wells located within TA-V (LWDS-MW1 and TAV-MW10), suggesting an additional local source of nitrate. Nitrate in groundwater at TA-V could also be attributed to leaching of naturally occurring nitrate in the vadose zone by the infiltration of the wastewater.

5.1.7.5 Contaminant Distribution and Transport in Groundwater

Distribution and transport of COCs are discussed in this section. Because TCE is a volatile compound, vapor transport of TCE in the vadose zone is a possible mechanism. 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 onto fine-grained materials, as well as dissolution into pore water.

VOC concentrations in soil vapor were measured at the 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 the 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 show that the vapor concentrations have stabilized in the vadose zone at TA-V. 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 present in low concentrations in the regional aquifer beneath TA-V. The highest TCE concentrations are located at 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 LWDS-MW1 is not located at a potential source, maximum concentrations of TCE have occurred in 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 conductivity values 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 value (0.04 ft/day) was measured in monitoring well LWDS-MW1, where some of the highest contaminant concentrations are present 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 average 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. From 2011 to 2014, 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 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 2014, except that the TCE concentration from the August sampling event is shown for TAV-MW6. The contours were relatively stable with the 15 μg/L concentration contour enclosing monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10 in CY 2011, 2012, and 2013 (SNL September 2012, June 2013, June 2014). In CY 2014, TCE concentrations in well LWDS-MW1 were consistently above 15 μg/L. TCE concentration in well TAV-MW6 was above 15 μg/L in the first quarter, below 15 μg/L in the second and third quarter, and was not detected in the fourth quarter. The fourth quarter result is considered an anomaly (see section 5.6). The TCE concentration in well TAV-MW10 was above 15 μg/L in the first quarter and below 15 μg/L for the remaining three quarters. TCE concentrations in wells TAV-MW12 and TAV-MW14 have been mostly between 5 and 10 μg/L.

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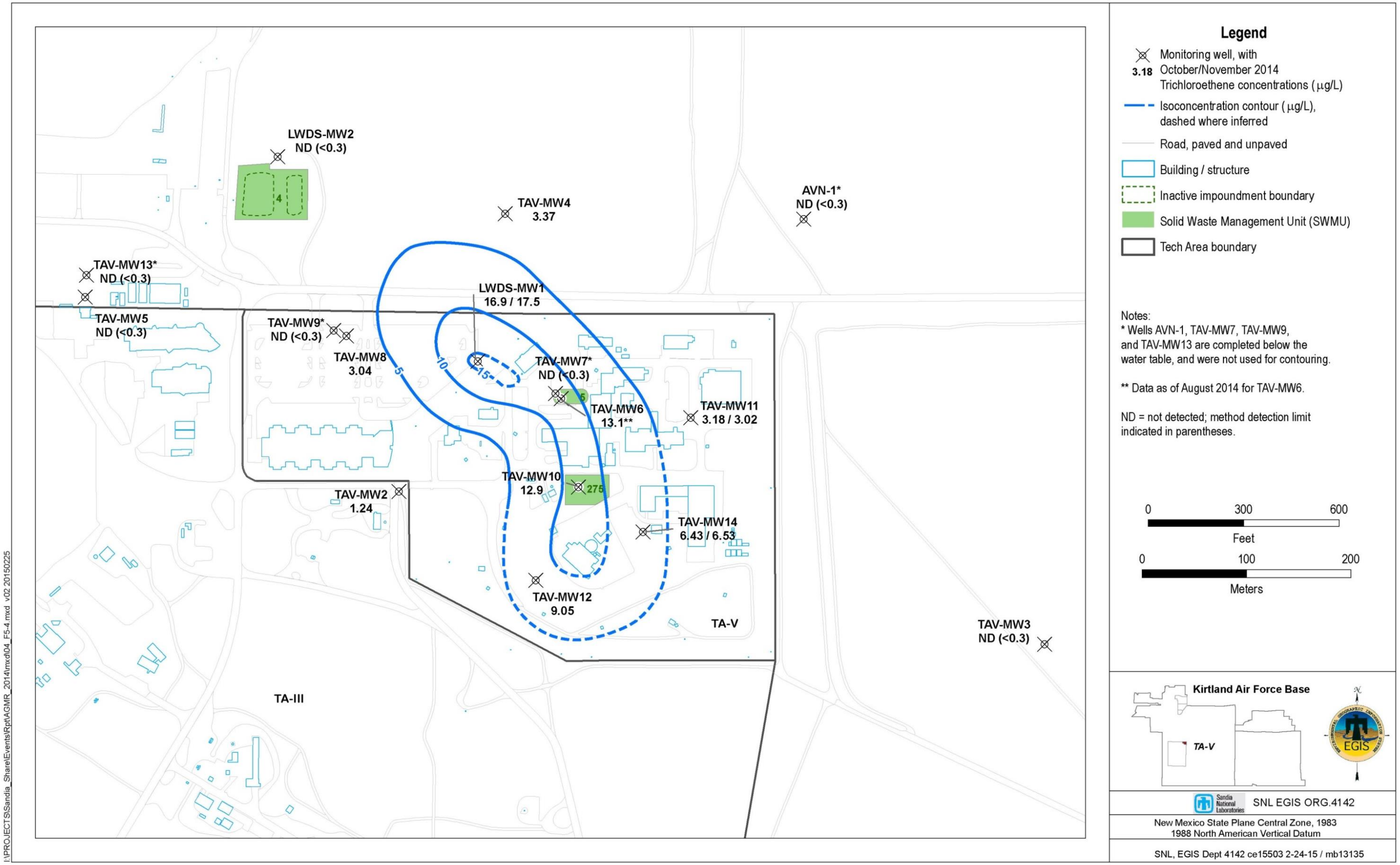

Figure 5-4. Distribution of TCE in Groundwater at TAVG AOC, October/November 2014

Figure 5-4 also shows that the concentrations of TCE decrease laterally from these wells. TCE has been detected only in the wells screened across the groundwater table and has not been detected in wells screened approximately 90 ft below the groundwater table, based on results of groundwater samples collected from deep monitoring 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 to more than 10 mg/L (Figure 5-5). Nitrate concentrations have exceeded the MCL in samples from monitoring wells AVN-1, AVN-2 (currently dry), LWDS-MW1, and TAV-MW10; 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 2014 with regards to the locations of the historical wastewater and sanitary discharges. 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 and encloses wells LWDS-MW1 and TAV-MW10, but not well TAV-MW6.

Nitrate has also been detected in groundwater monitoring wells outside the TA-V boundary. Concentrations of nitrate in upgradient monitoring well AVN-1 have occasionally exceeded the MCL of 10 mg/L. Concentrations of nitrate at LWDS-MW2 have been slightly below the MCL. In addition, upgradient wells AVN-1 and AVN-2 were completed at different depths, 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 at TA-V, most likely because of the low groundwater velocities. Dispersion and diffusion are important mechanisms at TA-V because of limited advection with low groundwater velocities at the site. While nitrate does not tend to sorb to sediment surfaces, TCE is a hydrophobic organic compound and sorbs to the organic matter in the aquifer matrix. Sorption is a reversible process for TCE. As the dissolved contaminant concentration in groundwater decreases due to advection, dilution, or biodegradation, the sorbed TCE portion will tend to desorb and reenter groundwater through equilibration process. 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 during preparation of the 2005 CME Report (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 at TA-V (Madrid et al. June 2013).

5.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM ER Operations, as well as implements and enforces regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER SWMUs and AOCs are listed in *Module IV: Hazardous and Solid Waste Amendment (HSWA) Portion for Solid Waste Management Units (Module IV to the RCRA Part B Permit, NM5890110518)* (NMED 1993).

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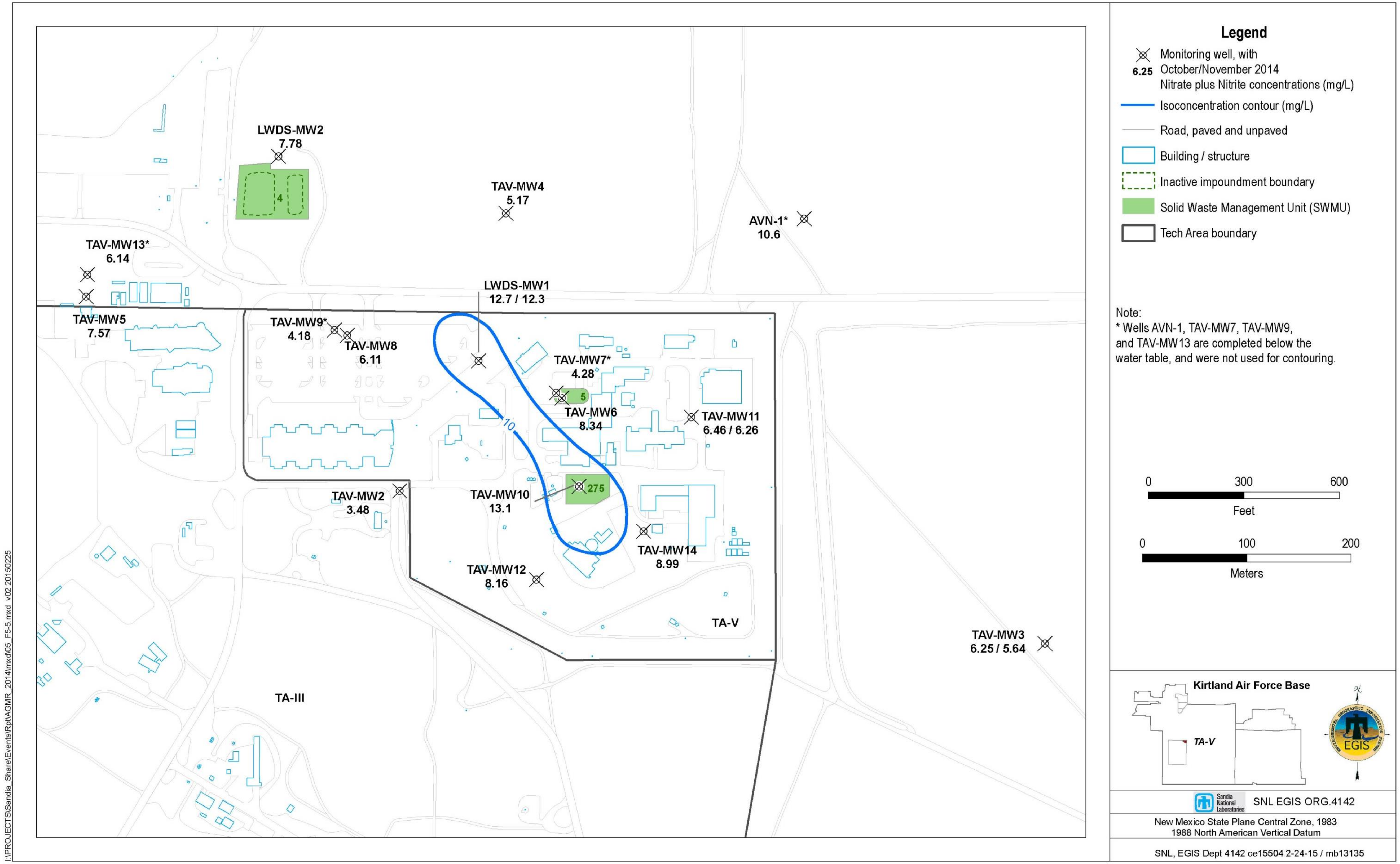

Figure 5-5. Distribution of Nitrate plus Nitrite in Groundwater at TAVG AOC, October/November 2014

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 (NMED 1993). The groundwater monitoring activities at TA-V are not associated with a single SWMU, but are more regional in nature and have historically been voluntarily conducted by SNL/NM ER Operations.

The Consent Order, which became effective in April 2004, transferred regulatory authority for corrective action requirements from the HSWA Module of the SNL/NM RCRA permit to the Consent Order. All corrective action requirements pertaining to the TAVG AOC are contained in the Consent Order (NMED April 2004). The TAVG AOC investigations must comply with requirements set forth in the Consent Order for site characterization and development of a CME (NMED April 2004).

DOE/NNSA and Sandia continue to present the TAVG monitoring data, along with the data from other groundwater sites, in this SNL/NM Annual Groundwater Monitoring Report. The outline of this report 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 Sandia. 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 (NMED April 2004).

5.3 Scope of Activities

The activities for the TAVG monitoring for CY 2014, including plans and reports, are listed in Section 5.1.5. The field activities included groundwater level measurements and groundwater sampling. The CY 2014 groundwater sampling events (four quarterly events) are summarized in Table 5-4, and the analytical parameters for each well for each sampling event are listed in Table 5-5.

Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples are used to monitor the sampling process and include duplicate environmental, equipment blank (EB), field blank (FB), and trip blank (TB). Duplicate environmental samples are used to measure the precision of the sampling process. EB samples are used to verify the effectiveness of sampling equipment decontamination procedures. Both duplicate environmental and EB samples are analyzed for the same parameters as environmental samples. FB samples are collected for VOCs to assess whether contamination of the samples had resulted from ambient field conditions. The FB sample was prepared by pouring deionized water into sample containers at the sample point to simulate the transfer of environmental samples from the sampling system to the sample container. TB samples are also collected for VOCs to determine whether contamination of the samples had resulted during preparation, transportation, or handling prior to receipt by the analytical laboratory.

Table 5-4. Groundwater Monitoring Well Network and Sampling Dates for the TAVG AOC, Calendar Year 2014

Date of Sampling Event	Wells Sampled	SAP
February/March 2014	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 2014* (SNL January 2014)
April/May 2014	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 2014* (SNL April 2014)
July/August/September 2014	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 2014* (SNL July 2014)
October/November 2014	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 2015* (SNL September 2014a)

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 2014

Parameter	February/March 2014	Parameter	April/May 2014
Alkalinity Calcium, total Chloride Iron, dissolved Magnesium, total Manganese, dissolved NPN Potassium, total Sodium, total Sulfate Sulfides Total Organic Carbon VOCs	AVN-1 LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW4 TAV-MW6 TAV-MW8 TAV-MW8 (dup) TAV-MW10 TAV-MW10 (dup) TAV-MW11 TAV-MW12 TAV-MW13 TAV-MW14	Alkalinity Anions (Bromide, Chloride, Fluoride, Sulfate) NPN Radionuclides (Gamma Spec*, Gross Alpha, Gross Beta, Tritium) Sulfides TAL Metals plus Total Uranium Total Organic Carbon VOCs	AVN-1 LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW4 TAV-MW4 (dup) TAV-MW5 TAV-MW5 (dup) TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10 TAV-MW11 TAV-MW12 TAV-MW13 TAV-MW14 TAV-MW14 (dup)

Parameter	July/August/September 2014	Parameter	October/November 2014
Alkalinity Calcium, total Chloride Iron, dissolved Magnesium, total Manganese, dissolved NPN Potassium, total Sodium, total Sulfate Sulfides Total Organic Carbon VOCs	AVN-1 AVN-1 (dup) LWDS-MW1 LWDS-MW2 LWDS-MW2 (dup) TAV-MW2 TAV-MW4 TAV-MW6 TAV-MW8 TAV-MW10 TAV-MW11 TAV-MW12 TAV-MW13 TAV-MW14	Alkalinity Calcium, total Chloride Iron, dissolved Magnesium, total Manganese, dissolved NPN Potassium, total Sodium, total Sulfate Sulfides Total Organic Carbon VOCs	AVN-1 LWDS-MW1 LWDS-MW1 (dup) LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW3 (dup) TAV-MW4 TAV-MW5 TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10 TAV-MW11 TAV-MW11 (dup) TAV-MW12 TAV-MW13 TAV-MW14 (dup for VOCs only)

NOTES:

AVN = Area V (North).
dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
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.

5.4 Field Methods and Measurements

The monitoring procedures conducted for TAVG monitoring are described in detail in Section 1.3. The water level information obtained in 2014 was used to develop the potentiometric surface map presented in Figure 5-3 and the hydrographs presented in Figures 5C-1 through 5C-3 (Attachment 5C).

5.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

5.6 Summary of Analytical Results

This section discusses monitoring results, exceedances of standards, and pertinent trends in concentrations for COCs in the TAVG AOC that exceed regulatory standards. The analytical results and field measurements for all TAVG sampling events are presented in Attachment 5A, Tables 5A-1 through 5A-9; concentration trend plots for COCs that exceed the MCLs are presented in Attachment 5B, Figures 5B-1 through 5B-8.

A summary of detected VOC results are presented in Table 5A-1. The method detection limits (MDLs) for all analyzed VOCs are listed in Table 5A-2. The VOCs detected at concentrations above the MDLs in groundwater samples from TA-V monitoring wells include the following:

- Acetone
- Chloroform
- Chloromethane
- cis-1,2-Dichloroethene
- 1,2,3-Trichlorobenzene
- 1,2,4-Trichlorobenzene
- TCE

Seven VOCs were detected during CY 2014. Three of these VOCs have promulgated MCLs. Only TCE exceeds its MCL of 5 μg/L (Table 5A-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 22.4 μg/L in the sample collected from monitoring well LWDS-MW1 in March 2014. Figures 5B-1 through 5B-5 (Attachment 5B) 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.

Two anomalies for TCE occurred in CY 2014. TCE was not detected above the MDL (0.300 μg/L) in the environmental sample collected from monitoring well TAV-MW14 in August, and it was not detected in the environmental sample collected from monitoring well TAV-MW6 in November; both wells have historically had TCE concentrations above the MCL. An environmental duplicate was collected from monitoring well TAV-MW14 in November and analyzed for VOCs; TCE was detected at concentrations comparable to historical values in the November environmental sample (6.43 μg/L) and duplicate sample (6.53 μg/L). The historical range of TCE concentrations for well TAV-MW6 is shown in Figure 5B-2; the well is continually sampled quarterly.

The analytical results for nitrate plus nitrite (NPN) (reported as nitrogen) are presented in Table 5A-3 (Attachment 5A). During this reporting period, NPN results exceed the MCL of 10 mg/L in samples from monitoring wells LWDS-MW1, TAV-MW10, and AVN-1. The maximum concentration of NPN detected during this reporting period is 14.6 mg/L in the sample collected from monitoring well TAV-MW10 in

August 2014. Figures 5B-6 through 5B-8 (Attachment 5B) present NPN concentrations over the lifetime of the three wells. The NPN concentrations in monitoring wells LWDS-MW1 and TAV-MW10 typically have exceeded the MCL, and those in monitoring well AVN-1 occasionally exceeded the MCL.

The analytical results for anions (bromide, chloride, fluoride, and sulfate), alkalinity, and sulfides are presented in Table 5A-4 (Attachment 5A). Only fluoride has a promulgated MCL, and none of the results exceed the MCL. SNL/NM personnel requested a reanalysis of alkalinity for the environmental sample from monitoring well TAV-MW8 collected in May 2014. Alkalinity was reported at 83.9 mg/L and significantly less than the historical average; the reanalysis reported alkalinity at 189 mg/L. The original result was qualified as unusable during data validation, and both original and reanalysis data are provided in Table 5A-4.

Total organic carbon (TOC) results are presented in Table 5A-5 (Attachment 5A); no MCL is established for TOC.

Unfiltered metal results are presented in Table 5A-6 and filtered metal results are presented in Table 5A-7; no metal results exceed established MCLs (Attachment 5A).

Gamma spectroscopy short-list, gross alpha, gross beta, and tritium results are presented in Table 5A-8; all radionuclide results are below established MCLs (Attachment 5A). Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4 should not include uranium. 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. SNL/NM personnel requested a reanalysis by gamma spectroscopy for the environmental sample from monitoring well TAV-MW11 collected in May 2014. The original activities were reported as negative values and greater than twice the associated minimum detectable activity. The gamma spectroscopy reanalysis results were reported within acceptable limits, and both original and reanalysis data are provided in Table 5A-8.

Field water quality parameters were measured during purging of each well prior to sampling and included temperature, specific conductivity, oxidation-reduction potential, potential of hydrogen, turbidity, and dissolved oxygen. The parameter measurements are presented in Table 5A-9 (Attachment 5A).

5.7 Quality Control Results

Field and laboratory QC samples were collected and prepared as described in Section 1.3. Data validation qualifiers are presented with the analytical results in Tables 5A-1 through 5A-8 (Attachment 5A). The results of QC samples and the impact on data quality for the TA-V quarterly sampling events are discussed in the following sections.

Duplicate environmental 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:

- Iron in the sample collected from monitoring well TAV-MW8 in February 2014 (Table 5A-7) had a calculated RPD of 87. However, the iron concentration is considered to be an estimated value due to poor replicate precision.

- Chromium in the sample collected from monitoring well TAV-MW5 in May 2014 (Table 5A-7) had a calculated RPD of 37. However, the chromium concentration is considered to be an estimated value because the reported values are less than the associated practical quantitation limit.

The results for the EB analyses are as follows:

- **February/March 2014 Sampling Event**—EB samples were collected prior to sampling monitoring wells TAV-MW8 and TAV-MW10 and submitted for all analyses. Bromodichloromethane, bromoform, chloride, chloroform, dibromochloromethane, magnesium, manganese, and TOC were detected in the EB samples. No corrective action was required for bromodichloromethane, bromoform, chloride, chloroform, dibromochloromethane, magnesium, or manganese, because these parameters were either not detected in environmental samples or the reported values in the environmental samples are greater than five times the EB concentration. TOC was detected in all EB samples at concentrations less than five times the associated environmental samples. TOC in TAV-MW8 and TAV-MW10 were qualified as not detected during data validation due to EB contamination.

- **April/May 2014 Sampling Event—**EB samples were collected prior to sampling monitoring wells TAV-MW4, TAV-MW5, and TAV-MW14 and submitted for all analyses. Bromodichloromethane, bromoform, cadmium, carbon disulfide, chloride, chloroform, copper, dibromochloromethane, 1,2-dichloroethene, manganese, sodium, TOC, and zinc were detected in EB samples. No corrective action was required because these parameters were either not detected in environmental samples or the reported values in environmental samples are greater than five times the EB concentration, except for copper, TOC, and manganese. Copper in all EB samples, TOC in the TAV-MW5 EB sample, and manganese in the TAV-MW14 EB sample were reported at concentrations within five times the associated environmental samples. As a result, these parameters were qualified as not detected during data validation in associated environmental samples for wells identified above.

- **July/August/September 2014 Sampling Event—**EB samples were collected prior to sampling monitoring wells AVN-1 and LWDS-MW2 and submitted for all analyses. Acetone, bromodichloromethane, calcium, chloroform, and TOC were detected in EB samples. No corrective action was required for acetone, bromodichloromethane, calcium, or chloroform, because these parameters were either not detected in environmental samples or the reported values in environmental samples are greater than five times the EB concentration. TOC was detected in the first analysis out of four analyses in both EB samples at concentrations less than five times the associated environmental samples. TOC in AVN-1 and LWDS-MW1 were qualified as not detected during data validation due to EB contamination.

- **October/November 2014 Sampling Event**—EB samples were collected prior to sampling monitoring wells LWDS-MW1, TAV-MW3, TAV-MW11, and TAV-MW14 and submitted for all analyses, except at TAV-MW14. Only VOCs were analyzed in the EB sample associated with TAV-MW14. Bromodichloromethane, chloroform, and dibromochloromethane were detected in TAV-MW3, TAV-MW11, and TAV-MW14 EB samples. Additional parameters detected in the LWDS-MW1 EB sample included acetone, bromoform, chloride, and sulfate. Sodium was also detected in the TAV-MW11 EB sample. No corrective action was required because all parameters were either not detected in associated environmental samples, or the reported values in environmental samples are greater than five times the EB concentration.

The results for the FB analyses are as follows:

- **February/March 2014 Sampling Event**—FB samples were collected at monitoring wells LWDS-MW2, TAV-MW11, and TAV-MW12. The compounds detected in FB samples included bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was required because these compounds were not detected in associated environmental samples.

- **April/May 2014 Sampling Event**—FB samples were collected at monitoring wells TAV-MW3, TAV-MW7, and TAV-MW9. The compounds detected in FB samples included acetone, bromodichloromethane, chloroform, dibromochloromethane, methyl acetate, and 1,2-dichloroethene. No corrective action was required because these compounds were not detected in associated environmental samples.

- **July/August/September 2014 Sampling Event**—FB samples were collected at monitoring wells AVN-1, TAV-MW4, and TAV-MW6. The compounds detected in FB samples included acetone, bromodichloromethane, chloroform, and dibromochloromethane. No corrective action was required because these compounds were not detected in associated environmental samples.

- **October/November 2014 Sampling Event—**FB samples were collected at TAV-MW6, TAV-MW10, and TAV-MW12. The compounds detected in FB samples included bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was required because these compounds were not detected in associated environmental samples.

The results for the TB analyses are as follows:

- **February/March 2014 Sampling Event**—A total of 14 VOC TB samples were submitted with the February/March 2014 samples. No VOCs were detected above associated laboratory MDLs.

- **April/May 2014 Sampling Event**—A total of 19 VOC TB samples were submitted with the April/May 2014 samples. No VOCs were detected above associated laboratory MDLs, except carbon disulfide. Carbon disulfide was detected in TAV-MW5 and TAV-MW13 TB samples. No corrective action was required, because this compound was not detected in associated environmental samples.

- **July/August/September 2014 Sampling Event**—A total of 14 VOC TB samples were submitted with the July/August/September 2014 samples. No VOCs were detected above associated laboratory MDLs.

- **October/November 2014 Sampling Event**—A total of 20 VOC TB samples were submitted with October/November 2014 samples. No VOCs were detected above associated laboratory MDLs, except acetone. Acetone was detected in the TB sample associated with well TAV-MW5. Acetone was detected at a concentration less than five times the environmental sample; therefore, the environmental sample was qualified as not detected during data validation.

5.8 Variances and Nonconformances

No variances or nonconformances from requirements specified in the TAVG monitoring mini-SAPs (SNL January 2014, SNL April 2014, SNL July 2014, and SNL September 2014a) were identified during CY 2014 sampling activities. However, the following project-specific issues 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 2014 Sampling Event**—Per compliance with the revised Work Planning and Control requirements, incorporating Engineered Safety principles at SNL/NM, authorization from TA-V Operations Management is required to perform work inside the technical area from this point on.

- **April/May 2014 Sampling Event—**The NMED DOE Oversight Bureau (OB) collected split samples at monitoring wells AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW6, TAV-MW8, TAV-MW9, TAV-MW13, and TAV-MW14. The NMED DOE OB analytical results are not reported in this document, but are available through DOE/NNSA Sandia Field Office. 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. At monitoring well AVN-1, rust particulates accumulated on the sample pump and tubing bundle during sampling. Several metal concentrations are increasing in AVN-1 groundwater samples. This increasing trend is probably associated with the degradation of the stainless steel screen at well AVN-1.

- **July/August/September 2014 Sampling Event**—A new tubing bundle and sample pump were used during this monitoring event. Monitoring well TAV-MW12 was purged an additional 9 gallons of groundwater prior to sampling due to unstable turbidity measurements. Sampling at monitoring well TAV-MW2 was delayed until September 9, 2014 due to road construction modifications near the monitoring well.

- **October/November 2014 Sampling Event**—Rust particulates accumulated on the sample pump and tubing bundle during sampling of monitoring wells AVN-1 and LWDS-MW2. Both monitoring wells have stainless steel screens.

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 chemicals 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 a secondary contaminant sources. Upon cessation of wastewater disposal, drainage diminished in vertical pathways through the vadose zone. Low concentrations of TCE present in the regional aquifer today represent the wastewater releases before 1992. The combined effect of low groundwater velocities, dispersion, diffusion, and sorption are responsible for the current distribution of TCE in the regional aquifer.

TCE results exceed the MCL of 5 μg/L in samples from monitoring wells LWDS-MW1, TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14. The maximum concentration of TCE detected during this reporting period is 22.4 μg/L in the sample collected from monitoring well LWDS-MW1 in March 2014.

During this reporting period, NPN results exceed the MCL of 10 mg/L in samples from monitoring wells LWDS-MW1, TAV-MW10, and AVN-1. The maximum concentration of NPN detected during this reporting period is 14.6 mg/L in the sample collected from monitoring well TAV-MW10 in August 2014.

The analytical results for this reporting period are consistent with historical values. The following conclusions are based on a comprehensive review of available information for current groundwater contamination conditions 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 the historical use and disposal of organic solvents at TA-V, the extent of TCE in groundwater is attributed to TA-V wastewater releases containing TCE and the subsequent transport of TCE through the vadose zone to the water table.
- The distribution of low concentrations of TCE in the regional aquifer at TA-V has remained relatively stable and is attributed to the combined effect of low groundwater velocities, dispersion, diffusion, and sorption.
- The distribution of nitrate concentrations above background level is laterally widespread in the area, both inside and outside the TA-V boundary. The extent of the 10 mg/L concentration contour in 2014, which accounts for the nitrate contamination within TA-V, has remained relatively stable. An unknown upgradient source probably contributes to the nitrate in the two AVN wells to the northeast of TA-V.

Ongoing environmental studies of the TAVG AOC include the following:

- Continue obtaining periodic measurements of groundwater elevations in all TAVG monitoring wells.
- Continue collecting groundwater samples at the 16 TAVG monitoring wells. At a minimum, the analytes for groundwater sampling will consist of VOCs and NPN.
- Continue reporting TAVG monitoring results in future SNL/NM Annual Groundwater Monitoring Reports.

5.10 References

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Attachment 5A
Technical Area-V
Analytical Results Tables

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Attachment 5A Tables

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

Calendar Year 2014

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	**22.4**	0.300	1.00	5.00			095341-001	SW846-8260B
03-Mar-14	cis-1,2-Dichloroethene	4.01	0.300	1.00	70.0			095341-001	SW846-8260B
TAV-MW2 21-Feb-14	Trichloroethene	0.890	0.300	1.00	5.00	J		095326-001	SW846-8260B
TAV-MW4	Chloroform	0.940	0.300	1.00	NE	J		095328-001	SW846-8260B
24-Feb-14	Trichloroethene	3.65	0.300	1.00	5.00			095328-001	SW846-8260B
TAV-MW6	Trichloroethene	**18.8**	0.300	1.00	5.00			095346-001	SW846-8260B
05-Mar-14	cis-1,2-Dichloroethene	2.98	0.300	1.00	70.0			095346-001	SW846-8260B
TAV-MW8 25-Feb-14	Trichloroethene	3.16	0.300	1.00	5.00			095333-001	SW846-8260B
TAV-MW8 (Duplicate) 25-Feb-14	Trichloroethene	3.10	0.300	1.00	5.00			095334-001	SW846-8260B
TAV-MW10	Trichloroethene	**16.8**	0.300	1.00	5.00			095351-001	SW846-8260B
06-Mar-14	cis-1,2-Dichloroethene	2.87	0.300	1.00	70.0			095351-001	SW846-8260B
TAV-MW10 (Duplicate)	Trichloroethene	**17.5**	0.300	1.00	5.00			095352-001	SW846-8260B
06-Mar-14	cis-1,2-Dichloroethene	2.89	0.300	1.00	70.0			095352-001	SW846-8260B
TAV-MW11	Trichloroethene	3.41	0.300	1.00	5.00			095337-001	SW846-8260B
26-Feb-14	cis-1,2-Dichloroethene	0.330	0.300	1.00	70.0	J		095337-001	SW846-8260B
TAV-MW12	Trichloroethene	**11.9**	0.300	1.00	5.00			095344-001	SW846-8260B
04-Mar-14	cis-1,2-Dichloroethene	0.620	0.300	1.00	70.0	J		095344-001	SW846-8260B
TAV-MW14	Trichloroethene	**8.43**	0.300	1.00	5.00			095339-001	SW846-8260B
27-Feb-14	cis-1,2-Dichloroethene	0.890	0.300	1.00	70.0	J		095339-001	SW846-8260B
AVN-1 07-May-14	Chloromethane	0.330	0.300	1.00	NE	B, J	1.0U	095854-001	SW846-8260B
LWDS-MW1	Trichloroethene	**17.7**	0.300	1.00	5.00			095869-001	SW846-8260B
19-May-14	cis-1,2-Dichloroethene	3.47	0.300	1.00	70.0			095869-001	SW846-8260B
LWDS-MW2 09-May-14	Chloromethane	0.310	0.300	1.00	NE	B, J	1.0U	095856-001	SW846-8260B
TAV-MW2 12-May-14	Trichloroethene	1.10	0.300	1.00	5.00			095858-001	SW846-8260B
TAV-MW3 02-May-14	Chloromethane	0.310	0.300	1.00	NE	B, J	1.0U	095846-001	SW846-8260B
TAV-MW4	Chloroform	0.810	0.300	1.00	NE	J	NJ	095864-001	SW846-8260B
14-May-14	Trichloroethene	3.16	0.300	1.00	5.00			095864-001	SW846-8260B
TAV-MW4 (Duplicate)	Chloroform	0.810	0.300	1.00	NE	J	NJ	095865-001	SW846-8260B
14-May-14	Trichloroethene	3.12	0.300	1.00	5.00			095865-001	SW846-8260B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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-MW6	Trichloroethene	**14.3**	0.300	1.00	5.00			095879-001	SW846-8260B
22-May-14	cis-1,2-Dichloroethene	2.44	0.300	1.00	70.0			095879-001	SW846-8260B
TAV-MW8 13-May-14	Trichloroethene	2.71	0.300	1.00	5.00			095860-001	SW846-8260B
TAV-MW9 05-May-14	Chloromethane	0.340	0.300	1.00	NE	B, J	1.0U	095849-001	SW846-8260B
TAV-MW10	Trichloroethene	**14.1**	0.300	1.00	5.00			095881-001	SW846-8260B
27-May-14	cis-1,2-Dichloroethene	2.21	0.300	1.00	70.0			095881-001	SW846-8260B
TAV-MW11	Trichloroethene	3.08	0.300	1.00	5.00			095867-001	SW846-8260B
15-May-14	cis-1,2-Dichloroethene	0.350	0.300	1.00	70.0	J		095867-001	SW846-8260B
TAV-MW12	Trichloroethene	**9.40**	0.300	1.00	5.00			095877-001	SW846-8260B
21-May-14	cis-1,2-Dichloroethene	0.560	0.300	1.00	70.0	J		095877-001	SW846-8260B
TAV-MW14	Trichloroethene	**6.94**	0.300	1.00	5.00			095874-001	SW846-8260B
20-May-14	cis-1,2-Dichloroethene	0.740	0.300	1.00	70.0	J		095874-001	SW846-8260B
TAV-MW14 (Duplicate)	Trichloroethene	**7.11**	0.300	1.00	5.00			095875-001	SW846-8260B
20-May-14	cis-1,2-Dichloroethene	0.830	0.300	1.00	70.0	J		095875-001	SW846-8260B
LWDS-MW1	Trichloroethene	**16.0**	0.300	1.00	5.00			096316-001	SW846-8260B
11-Aug-14	cis-1,2-Dichloroethene	3.36	0.300	1.00	70.0			096316-001	SW846-8260B
TAV-MW2 09-Sep-14	Trichloroethene	1.05	0.300	1.00	5.00			096632-001	SW846-8260B
TAV-MW4	Chloroform	0.840	0.300	1.00	NE	J		096303-001	SW846-8260B
30-Jul-14	Trichloroethene	3.26	0.300	1.00	5.00		NJ	096303-001	SW846-8260B
TAV-MW6	Trichloroethene	**13.1**	0.300	1.00	5.00		J	096312-001	SW846-8260B
06-Aug-14	cis-1,2-Dichloroethene	2.44	0.300	1.00	70.0		J	096312-001	SW846-8260B
TAV-MW8 28-Jul-14	Trichloroethene	2.75	0.300	1.00	5.00			096294-001	SW846-8260B
TAV-MW10	Trichloroethene	**13.0**	0.300	1.00	5.00		J	096314-001	SW846-8260B
07-Aug-14	cis-1,2-Dichloroethene	2.45	0.300	1.00	70.0		J	096314-001	SW846-8260B
TAV-MW11	Trichloroethene	3.39	0.300	1.00	5.00			096305-001	SW846-8260B
31-Jul-14	cis-1,2-Dichloroethene	0.370	0.300	1.00	70.0	J		096305-001	SW846-8260B
TAV-MW12	Trichloroethene	**6.43**	0.300	1.00	5.00		J	096309-001	SW846-8260B
05-Aug-14	cis-1,2-Dichloroethene	0.390	0.300	1.00	70.0	J	J	096309-001	SW846-8260B
LWDS-MW1	Trichloroethene	**16.9**	0.300	1.00	5.00			096853-001	SW846-8260B
17-Nov-14	cis-1,2-Dichloroethene	3.45	0.300	1.00	70.0	N	J-	096853-001	SW846-8260B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 (Duplicate) 17-Nov-14	Trichloroethene	**17.5**	0.300	1.00	5.00			096854-001	SW846-8260B
	cis-1,2-Dichloroethene	3.57	0.300	1.00	70.0	N	J-	096854-001	SW846-8260B
TAV-MW2 04-Nov-14	Trichloroethene	1.24	0.300	1.00	5.00			096827-001	SW846-8260B
TAV-MW3 (Duplicate) 28-Oct-14	Acetone	2.54	2.50	10.0	NE	J	J+	096817-001	SW846-8260B
TAV-MW4 05-Nov-14	Chloroform	0.830	0.300	1.00	NE	J		096829-001	SW846-8260B
	Trichloroethene	3.37	0.300	1.00	5.00			096829-001	SW846-8260B
TAV-MW5 24-Oct-14	Acetone	2.60	2.50	10.0	NE	J	10UJ	096809-001	SW846-8260B
TAV-MW6 12-Nov-14	1,2,3-Trichlorobenzene	0.520	0.300	1.00	NE	J		096845-001	SW846-8260B
	1,2,4-Trichlorobenzene	0.360	0.300	1.00	70.0	J		096845-001	SW846-8260B
TAV-MW8 31-Oct-14	Trichloroethene	3.04	0.300	1.00	5.00			096823-001	SW846-8260B
TAV-MW9 27-Oct-14	Acetone	2.95	2.50	10.0	NE	J	J+	096811-001	SW846-8260B
TAV-MW10 13-Nov-14	Trichloroethene	**12.9**	0.300	1.00	5.00			096848-001	SW846-8260B
	cis-1,2-Dichloroethene	2.58	0.300	1.00	70.0	N	J-	096848-001	SW846-8260B
TAV-MW11 06-Nov-14	Trichloroethene	3.18	0.300	1.00	5.00			096833-001	SW846-8260B
TAV-MW11 (Duplicate) 06-Nov-14	Trichloroethene	3.02	0.300	1.00	5.00			096834-001	SW846-8260B
TAV-MW12 11-Nov-14	Trichloroethene	**9.05**	0.300	1.00	5.00			096842-001	SW846-8260B
	cis-1,2-Dichloroethene	0.670	0.300	1.00	70.0	J, N	J-	096842-001	SW846-8260B
TAV-MW13 23-Oct-14	Acetone	2.75	2.50	10.0	NE	J	J+	096807-001	SW846-8260B
TAV-MW14 10-Nov-14	Trichloroethene	**6.43**	0.300	1.00	5.00			096838-001	SW846-8260B
	cis-1,2-Dichloroethene	0.870	0.300	1.00	70.0	J, N	J-	096838-001	SW846-8260B
TAV-MW14 (Duplicate) 10-Nov-14	Trichloroethene	**6.53**	0.300	1.00	5.00			096839-001	SW846-8260B
	cis-1,2-Dichloroethene	0.900	0.300	1.00	70.0	J, N	J-	096839-001	SW846-8260B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	1.70
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50	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 5A-89.

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

Calendar Year 2014

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 19-Feb-14	Nitrate plus nitrite	10.0	0.170	0.500	10.0			095321-018	EPA 353.2
LWDS-MW1 03-Mar-14	Nitrate plus nitrite	**12.3**	0.170	0.500	10.0			095341-018	EPA 353.2
LWDS-MW2 20-Feb-14	Nitrate plus nitrite	8.35	0.170	0.500	10.0			095324-018	EPA 353.2
TAV-MW2 21-Feb-14	Nitrate plus nitrite	3.73	0.170	0.500	10.0			095326-018	EPA 353.2
TAV-MW4 24-Feb-14	Nitrate plus nitrite	6.11	0.170	0.500	10.0			095328-018	EPA 353.2
TAV-MW6 05-Mar-14	Nitrate plus nitrite	8.29	0.170	0.500	10.0			095346-018	EPA 353.2
TAV-MW8 25-Feb-14	Nitrate plus nitrite	7.10	0.170	0.500	10.0			095333-018	EPA 353.2
TAV-MW8 (Duplicate) 25-Feb-14	Nitrate plus nitrite	6.55	0.170	0.500	10.0			095334-018	EPA 353.2
TAV-MW10 06-Mar-14	Nitrate plus nitrite	**12.0**	0.170	0.500	10.0			095351-018	EPA 353.2
TAV-MW10 (Duplicate) 06-Mar-14	Nitrate plus nitrite	**13.1**	0.170	0.500	10.0			095352-018	EPA 353.2
TAV-MW11 26-Feb-14	Nitrate plus nitrite	7.21	0.170	0.500	10.0			095337-018	EPA 353.2
TAV-MW12 04-Mar-14	Nitrate plus nitrite	7.04	0.170	0.500	10.0			095344-018	EPA 353.2
TAV-MW13 18-Feb-14	Nitrate plus nitrite	5.89	0.170	0.500	10.0			095319-018	EPA 353.2
TAV-MW14 27-Feb-14	Nitrate plus nitrite	9.50	0.170	0.500	10.0			095339-018	EPA 353.2
AVN-1 07-May-14	Nitrate plus nitrite	8.87	0.170	0.500	10.0			095854-018	EPA 353.2
LWDS-MW1 19-May-14	Nitrate plus nitrite	**11.9**	0.425	1.25	10.0			095869-018	EPA 353.2
LWDS-MW2 09-May-14	Nitrate plus nitrite	7.66	0.170	0.500	10.0			095856-018	EPA 353.2
TAV-MW2 12-May-14	Nitrate plus nitrite	3.38	0.170	0.500	10.0			095858-018	EPA 353.2

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 02-May-14	Nitrate plus nitrite	5.60	0.170	0.500	10.0			095846-018	EPA 353.2
TAV-MW4 14-May-14	Nitrate plus nitrite	5.30	0.170	0.500	10.0			095864-018	EPA 353.2
TAV-MW4 (Duplicate) 14-May-14	Nitrate plus nitrite	5.32	0.170	0.500	10.0			095865-018	EPA 353.2
TAV-MW5 01-May-14	Nitrate plus nitrite	7.35	0.425	1.25	10.0			095842-018	EPA 353.2
TAV-MW5 (Duplicate) 01-May-14	Nitrate plus nitrite	7.75	0.425	1.25	10.0			095843-018	EPA 353.2
TAV-MW6 22-May-14	Nitrate plus nitrite	7.80	0.425	1.25	10.0			095879-018	EPA 353.2
TAV-MW7 06-May-14	Nitrate plus nitrite	4.17	0.170	0.500	10.0			095852-018	EPA 353.2
TAV-MW8 13-May-14	Nitrate plus nitrite	6.31	0.170	0.500	10.0			095860-018	EPA 353.2
TAV-MW9 05-May-14	Nitrate plus nitrite	3.90	0.170	0.500	10.0			095849-018	EPA 353.2
TAV-MW10 27-May-14	Nitrate plus nitrite	**12.0**	0.170	0.500	10.0			095881-018	EPA 353.2
TAV-MW11 15-May-14	Nitrate plus nitrite	6.83	0.425	1.25	10.0			095867-018	EPA 353.2
TAV-MW12 21-May-14	Nitrate plus nitrite	7.18	0.425	1.25	10.0			095877-018	EPA 353.2
TAV-MW13 30-Apr-14	Nitrate plus nitrite	5.77	0.170	0.500	10.0			095838-018	EPA 353.2
TAV-MW14 20-May-14	Nitrate plus nitrite	9.60	0.425	1.25	10.0			095874-018	EPA 353.2
TAV-MW14 (Duplicate) 20-May-14	Nitrate plus nitrite	9.18	0.425	1.25	10.0			095875-018	EPA 353.2
AVN-1 24-Jul-14	Nitrate plus nitrite	9.51	0.170	0.500	10.0			096291-018	EPA 353.2
AVN-1 (Duplicate) 24-Jul-14	Nitrate plus nitrite	9.52	0.170	0.500	10.0			096292-018	EPA 353.2
LWDS-MW1 11-Aug-14	Nitrate plus nitrite	**11.5**	0.170	0.500	10.0			096316-018	EPA 353.2

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 29-Jul-14	Nitrate plus nitrite	7.61	0.170	0.500	10.0			096299-018	EPA 353.2
LWDS-MW2 (Duplicate) 29-Jul-14	Nitrate plus nitrite	8.18	0.170	0.500	10.0			096300-018	EPA 353.2
TAV-MW2 09-Sep-14	Nitrate plus nitrite	3.64	0.085	0.250	10.0			096632-018	EPA 353.2
TAV-MW4 30-Jul-14	Nitrate plus nitrite	5.34	0.170	0.500	10.0			096303-018	EPA 353.2
TAV-MW6 06-Aug-14	Nitrate plus nitrite	8.75	0.850	2.50	10.0			096312-018	EPA 353.2
TAV-MW8 28-Jul-14	Nitrate plus nitrite	5.84	0.170	0.500	10.0			096294-018	EPA 353.2
TAV-MW10 07-Aug-14	Nitrate plus nitrite	**14.6**	0.850	2.50	10.0			096314-018	EPA 353.2
TAV-MW11 31-Jul-14	Nitrate plus nitrite	6.49	0.170	0.500	10.0			096305-018	EPA 353.2
TAV-MW12 05-Aug-14	Nitrate plus nitrite	6.60	0.850	2.50	10.0			096309-018	EPA 353.2
TAV-MW13 23-Jul-14	Nitrate plus nitrite	5.67	0.170	0.500	10.0			096286-018	EPA 353.2
TAV-MW14 04-Aug-14	Nitrate plus nitrite	9.90	0.850	2.50	10.0			096307-018	EPA 353.2
AVN-1 30-Oct-14	Nitrate plus nitrite	**10.6**	0.425	1.25	10.0			096821-018	EPA 353.2
LWDS-MW1 17-Nov-14	Nitrate plus nitrite	**12.7**	0.170	0.500	10.0			096853-018	EPA 353.2
LWDS-MW1 (Duplicate) 17-Nov-14	Nitrate plus nitrite	**12.3**	0.170	0.500	10.0			096854-018	EPA 353.2
LWDS-MW2 03-Nov-14	Nitrate plus nitrite	7.78	0.170	0.500	10.0			096825-018	EPA 353.2
TAV-MW2 04-Nov-14	Nitrate plus nitrite	3.48	0.170	0.500	10.0			096827-018	EPA 353.2
TAV-MW3 28-Oct-14	Nitrate plus nitrite	6.25	0.085	0.250	10.0			096816-018	EPA 353.2
TAV-MW3 (Duplicate) 28-Oct-14	Nitrate plus nitrite	5.64	0.170	0.500	10.0			096817-018	EPA 353.2

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 05-Nov-14	Nitrate plus nitrite	5.17	0.170	0.500	10.0			096829-018	EPA 353.2
TAV-MW5 24-Oct-14	Nitrate plus nitrite	7.57	0.170	0.500	10.0			096809-018	EPA 353.2
TAV-MW6 12-Nov-14	Nitrate plus nitrite	8.34	0.170	0.500	10.0			096845-018	EPA 353.2
TAV-MW7 29-Oct-14	Nitrate plus nitrite	4.28	0.085	0.250	10.0			096819-018	EPA 353.2
TAV-MW8 31-Oct-14	Nitrate plus nitrite	6.11	0.170	0.500	10.0			096823-018	EPA 353.2
TAV-MW9 27-Oct-14	Nitrate plus nitrite	4.18	0.085	0.250	10.0			096811-018	EPA 353.2
TAV-MW10 13-Nov-14	Nitrate plus nitrite	**13.1**	0.170	0.500	10.0			096848-018	EPA 353.2
TAV-MW11 06-Nov-14	Nitrate plus nitrite	6.46	0.170	0.500	10.0			096833-018	EPA 353.2
TAV-MW11 (Duplicate) 06-Nov-14	Nitrate plus nitrite	6.26	0.170	0.500	10.0			096834-018	EPA 353.2
TAV-MW12 11-Nov-14	Nitrate plus nitrite	8.16	0.170	0.500	10.0			096842-018	EPA 353.2
TAV-MW13 23-Oct-14	Nitrate plus nitrite	6.14	0.170	0.500	10.0			096807-018	EPA 353.2
TAV-MW14 10-Nov-14	Nitrate plus nitrite	8.99	0.170	0.500	10.0			096838-018	EPA 353.2

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	9.54	0.134	0.400	NE			095321-016	SW846 9056
19-Feb-14	Sulfate	31.1	0.266	0.800	NE			095321-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095321-029	SW846 9034
	Bicarbonate Alkalinity	148	0.725	1.00	NE			095321-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095321-022	SM 2320B
LWDS-MW1	Chloride	76.5	1.34	4.00	NE			095341-016	SW846 9056
03-Mar-14	Sulfate	39.3	2.66	8.00	NE			095341-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095341-029	SW846 9034
	Bicarbonate Alkalinity	191	0.725	1.00	NE			095341-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095341-022	SM 2320B
LWDS-MW2	Chloride	12.4	0.335	1.00	NE			095324-016	SW846 9056
20-Feb-14	Sulfate	38.6	0.665	2.00	NE			095324-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095324-029	SW846 9034
	Bicarbonate Alkalinity	150	0.725	1.00	NE			095324-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095324-022	SM 2320B
TAV-MW2	Chloride	62.0	0.670	2.00	NE			095326-016	SW846 9056
21-Feb-14	Sulfate	56.7	1.33	4.00	NE			095326-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095326-029	SW846 9034
	Bicarbonate Alkalinity	237	0.725	1.00	NE			095326-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095326-022	SM 2320B
TAV-MW4	Chloride	37.5	0.670	2.00	NE			095328-016	SW846 9056
24-Feb-14	Sulfate	33.1	1.33	4.00	NE			095328-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095328-029	SW846 9034
	Bicarbonate Alkalinity	169	0.725	1.00	NE			095328-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095328-022	SM 2320B
TAV-MW6	Chloride	73.0	1.34	4.00	NE			095346-016	SW846 9056
05-Mar-14	Sulfate	44.0	2.66	8.00	NE			095346-016	SW846 9056
	Acid Soluble Sulfides	1.20	0.835	2.50	NE	J	J-	095346-029	SW846 9034
	Bicarbonate Alkalinity	192	0.725	1.00	NE			095346-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095346-022	SM 2320B
TAV-MW8	Chloride	40.8	0.670	2.00	NE			095333-016	SW846 9056
25-Feb-14	Sulfate	52.1	1.33	4.00	NE			095333-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095333-029	SW846 9034
	Bicarbonate Alkalinity	185	0.725	1.00	NE			095333-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095333-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8 (Duplicate)	Chloride	40.8	0.670	2.00	NE			095334-016	SW846 9056
25-Feb-14	Sulfate	52.5	1.33	4.00	NE			095334-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095334-029	SW846 9034
	Bicarbonate Alkalinity	191	0.725	1.00	NE			095334-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095334-022	SM 2320B
TAV-MW10	Chloride	47.7	0.670	2.00	NE			095351-016	SW846 9056
06-Mar-14	Sulfate	46.4	1.33	4.00	NE			095351-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U	UJ	095351-029	SW846 9034
	Bicarbonate Alkalinity	187	0.725	1.00	NE			095351-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095351-022	SM 2320B
TAV-MW10 (Duplicate)	Chloride	47.7	0.670	2.00	NE			095352-016	SW846 9056
06-Mar-14	Sulfate	46.0	1.33	4.00	NE			095352-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U	UJ	095352-029	SW846 9034
	Bicarbonate Alkalinity	188	0.725	1.00	NE			095352-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095352-022	SM 2320B
TAV-MW11	Chloride	44.2	0.670	2.00	NE			095337-016	SW846 9056
26-Feb-14	Sulfate	42.0	1.33	4.00	NE			095337-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095337-029	SW846 9034
	Bicarbonate Alkalinity	177	0.725	1.00	NE			095337-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095337-022	SM 2320B
TAV-**MW12**	Chloride	39.8	0.670	2.00	NE			095344-016	SW846 9056
04-Mar-14	Sulfate	46.6	1.33	4.00	NE			095344-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095344-029	SW846 9034
	Bicarbonate Alkalinity	215	0.725	1.00	NE			095344-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095344-022	SM 2320B
TAV-MW13	Chloride	19.1	0.335	1.00	NE			095319-016	SW846 9056
18-Feb-14	Sulfate	51.8	0.665	2.00	NE			095319-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095319-029	SW846 9034
	Bicarbonate Alkalinity	193	0.725	1.00	NE			095319-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095319-022	SM 2320B
TAV-MW14	Chloride	51.0	0.670	2.00	NE			095339-016	SW846 9056
27-Feb-14	Sulfate	51.6	1.33	4.00	NE			095339-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095339-029	SW846 9034
	Bicarbonate Alkalinity	197	0.725	1.00	NE			095339-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095339-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Bromide	0.138	0.067	0.200	NE	J		095854-016	SW846 9056
07-May-14	Chloride	9.54	0.134	0.400	NE			095854-016	SW846 9056
	Fluoride	1.28	0.033	0.100	4.0			095854-016	SW846 9056
	Sulfate	31.2	0.266	0.800	NE			095854-016	SW846 9056
	Bicarbonate Alkalinity	149	0.725	1.00	NE			095854-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095854-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095854-029	SW846 9034
LWDS-MW1	Bromide	0.815	0.067	0.200	NE			095869-016	SW846 9056
19-May-14	Chloride	76.7	1.34	4.00	NE			095869-016	SW846 9056
	Fluoride	0.544	0.033	0.100	4.0			095869-016	SW846 9056
	Sulfate	39.1	2.66	8.00	NE			095869-016	SW846 9056
	Bicarbonate Alkalinity	193	0.725	1.00	NE			095869-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095869-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095869-029	SW846 9034
LWDS-MW2	Bromide	0.152	0.067	0.200	NE	J		095856-016	SW846 9056
09-May-14	Chloride	12.6	0.335	1.00	NE			095856-016	SW846 9056
	Fluoride	1.41	0.033	0.100	4.0			095856-016	SW846 9056
	Sulfate	40.2	0.665	2.00	NE			095856-016	SW846 9056
	Bicarbonate Alkalinity	172	0.725	1.00	NE			095856-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095856-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095856-029	SW846 9034
TAV-MW2	Bromide	0.359	0.067	0.200	NE			095858-016	SW846 9056
12-May-14	Chloride	62.7	0.670	2.00	NE			095858-016	SW846 9056
	Fluoride	1.05	0.033	0.100	4.0			095858-016	SW846 9056
	Sulfate	57.9	1.33	4.00	NE			095858-016	SW846 9056
	Bicarbonate Alkalinity	243	0.725	1.00	NE			095858-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095858-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095858-029	SW846 9034
TAV-MW3	Bromide	0.211	0.067	0.200	NE			095846-016	SW846 9056
02-May-14	Chloride	21.6	0.335	1.00	NE			095846-016	SW846 9056
	Fluoride	1.68	0.033	0.100	4.0			095846-016	SW846 9056
	Sulfate	67.6	0.665	2.00	NE			095846-016	SW846 9056
	Bicarbonate Alkalinity	191	0.725	1.00	NE			095846-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095846-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095846-029	SW846 9034

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 14-May-14	Bromide	0.418	0.067	0.200	NE			095864-016	SW846 9056
	Chloride	40.0	0.670	2.00	NE			095864-016	SW846 9056
	Fluoride	1.23	0.033	0.100	4.0			095864-016	SW846 9056
	Sulfate	34.6	1.33	4.00	NE			095864-016	SW846 9056
	Bicarbonate Alkalinity	169	0.725	1.00	NE			095864-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095864-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095864-029	SW846 9034
TAV-MW4 (Duplicate) 14-May-14	Bromide	0.441	0.067	0.200	NE			095865-016	SW846 9056
	Chloride	39.9	0.670	2.00	NE			095865-016	SW846 9056
	Fluoride	1.25	0.033	0.100	4.0			095865-016	SW846 9056
	Sulfate	34.5	1.33	4.00	NE			095865-016	SW846 9056
	Bicarbonate Alkalinity	169	0.725	1.00	NE			095865-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095865-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095865-029	SW846 9034
TAV-MW5 01-May-14	Bromide	0.193	0.067	0.200	NE	J		095842-016	SW846 9056
	Chloride	18.1	0.335	1.00	NE			095842-016	SW846 9056
	Fluoride	1.35	0.033	0.100	4.0			095842-016	SW846 9056
	Sulfate	43.0	0.665	2.00	NE			095842-016	SW846 9056
	Bicarbonate Alkalinity	183	0.725	1.00	NE			095842-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095842-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095842-029	SW846 9034
TAV-MW5 (Duplicate) 01-May-14	Bromide	0.185	0.067	0.200	NE	J		095843-016	SW846 9056
	Chloride	18.3	0.335	1.00	NE			095843-016	SW846 9056
	Fluoride	1.33	0.033	0.100	4.0			095843-016	SW846 9056
	Sulfate	43.3	0.665	2.00	NE			095843-016	SW846 9056
	Bicarbonate Alkalinity	185	0.725	1.00	NE			095843-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095843-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095843-029	SW846 9034
TAV-MW6 22-May-14	Bromide	0.839	0.067	0.200	NE			095879-016	SW846 9056
	Chloride	73.9	1.34	4.00	NE			095879-016	SW846 9056
	Fluoride	1.07	0.033	0.100	4.0			095879-016	SW846 9056
	Sulfate	42.3	2.66	8.00	NE			095879-016	SW846 9056
	Bicarbonate Alkalinity	190	0.725	1.00	NE			095879-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095879-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095879-029	SW846 9034

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.248	0.067	0.200	NE			095852-016	SW846 9056
06-May-14	Chloride	27.8	0.335	1.00	NE			095852-016	SW846 9056
	Fluoride	1.21	0.033	0.100	4.0			095852-016	SW846 9056
	Sulfate	65.3	0.665	2.00	NE			095852-016	SW846 9056
	Bicarbonate Alkalinity	218	0.725	1.00	NE			095852-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095852-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095852-029	SW846 9034
TAV-MW8	Bromide	0.317	0.067	0.200	NE			095860-016	SW846 9056
13-May-14	Chloride	42.4	0.670	2.00	NE			095860-016	SW846 9056
	Fluoride	1.46	0.033	0.100	4.0			095860-016	SW846 9056
	Sulfate	54.0	1.33	4.00	NE			095860-016	SW846 9056
	Bicarbonate Alkalinity (reanalysis)	189	0.725	1.00	NE	H	J	095860-R22	SM 2320B
	Bicarbonate Alkalinity	83.9	0.725	1.00	NE		R	095860-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095860-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095860-029	SW846 9034
TAV-MW9	Bromide	0.268	0.067	0.200	NE			095849-016	SW846 9056
05-May-14	Chloride	34.2	0.670	2.00	NE			095849-016	SW846 9056
	Fluoride	1.03	0.033	0.100	4.0			095849-016	SW846 9056
	Sulfate	61.5	1.33	4.00	NE			095849-016	SW846 9056
	Bicarbonate Alkalinity	230	0.725	1.00	NE			095849-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095849-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095849-029	SW846 9034
TAV-MW10	Bromide	0.361	0.067	0.200	NE			095881-016	SW846 9056
27-May-14	Chloride	48.8	0.670	2.00	NE			095881-016	SW846 9056
	Fluoride	1.49	0.033	0.100	4.0			095881-016	SW846 9056
	Sulfate	44.5	1.33	4.00	NE			095881-016	SW846 9056
	Bicarbonate Alkalinity	183	0.725	1.00	NE			095881-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095881-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095881-029	SW846 9034
TAV-MW11	Bromide	0.460	0.067	0.200	NE			095867-016	SW846 9056
15-May-14	Chloride	45.8	0.670	2.00	NE			095867-016	SW846 9056
	Fluoride	1.32	0.033	0.100	4.0			095867-016	SW846 9056
	Sulfate	43.2	1.33	4.00	NE			095867-016	SW846 9056
	Bicarbonate Alkalinity	178	0.725	1.00	NE			095867-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095867-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095867-029	SW846 9034

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Bromide	0.255	0.067	0.200	NE			095877-016	SW846 9056
21-May-14	Chloride	40.2	0.670	2.00	NE			095877-016	SW846 9056
	Fluoride	1.19	0.033	0.100	4.0			095877-016	SW846 9056
	Sulfate	45.4	1.33	4.00	NE			095877-016	SW846 9056
	Bicarbonate Alkalinity	209	0.725	1.00	NE			095877-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095877-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U	UJ	095877-029	SW846 9034
TAV-MW13	Bromide	0.193	0.067	0.200	NE	J		095838-016	SW846 9056
30-Apr-14	Chloride	19.5	0.335	1.00	NE			095838-016	SW846 9056
	Fluoride	1.31	0.033	0.100	4.0			095838-016	SW846 9056
	Sulfate	52.8	0.665	2.00	NE			095838-016	SW846 9056
	Bicarbonate Alkalinity	193	0.725	1.00	NE			095838-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095838-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		095838-029	SW846 9034
TAV-MW14	Bromide	0.340	0.067	0.200	NE			095874-016	SW846 9056
20-May-14	Chloride	51.7	0.670	2.00	NE			095874-016	SW846 9056
	Fluoride	1.32	0.033	0.100	4.0			095874-016	SW846 9056
	Sulfate	52.8	1.33	4.00	NE			095874-016	SW846 9056
	Bicarbonate Alkalinity	198	0.725	1.00	NE			095874-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095874-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U	UJ	095874-029	SW846 9034
TAV-MW14 (Duplicate)	Bromide	0.328	0.067	0.200	NE			095875-016	SW846 9056
20-May-14	Chloride	51.7	0.670	2.00	NE			095875-016	SW846 9056
	Fluoride	1.30	0.033	0.100	4.0			095875-016	SW846 9056
	Sulfate	52.7	1.33	4.00	NE			095875-016	SW846 9056
	Bicarbonate Alkalinity	199	0.725	1.00	NE			095875-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095875-022	SM 2320B
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U	UJ	095875-029	SW846 9034

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	9.65	0.134	0.400	NE			096291-016	SW846 9056
24-Jul-14	Sulfate	32.2	0.266	0.800	NE			096291-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096291-029	SW846 9034
	Bicarbonate Alkalinity	138	0.725	1.00	NE			096291-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096291-022	SM 2320B
AVN-1 (Duplicate)	Chloride	9.70	0.134	0.400	NE			096292-016	SW846 9056
24-Jul-14	Sulfate	32.4	0.266	0.800	NE			096292-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096292-029	SW846 9034
	Bicarbonate Alkalinity	137	0.725	1.00	NE			096292-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096292-022	SM 2320B
LWDS-MW1	Chloride	81.6	1.34	4.00	NE			096316-016	SW846 9056
11-Aug-14	Sulfate	41.4	2.66	8.00	NE			096316-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096316-029	SW846 9034
	Bicarbonate Alkalinity	189	0.725	1.00	NE	H	J	096316-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096316-022	SM 2320B
LWDS-MW2	Chloride	12.5	0.335	1.00	NE			096299-016	SW846 9056
29-Jul-14	Sulfate	40.3	0.665	2.00	NE			096299-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096299-029	SW846 9034
	Bicarbonate Alkalinity	170	0.725	1.00	NE	H	J	096299-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096299-022	SM 2320B
LWDS-MW2 (Duplicate)	Chloride	12.5	0.335	1.00	NE			096300-016	SW846 9056
29-Jul-14	Sulfate	40.2	0.665	2.00	NE			096300-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096300-029	SW846 9034
	Bicarbonate Alkalinity	168	0.725	1.00	NE	H	J	096300-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096300-022	SM 2320B
TAV-MW2	Chloride	62.7	0.670	2.00	NE			096632-016	SW846 9056
09-Sep-14	Sulfate	57.8	1.33	4.00	NE			096632-016	SW846 9056
	Acid Soluble Sulfides	1.40	0.835	2.50	NE	J		096632-029	SW846 9034
	Bicarbonate Alkalinity	136	0.725	1.00	NE			096632-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096632-022	SM 2320B
TAV-MW4	Chloride	37.3	0.670	2.00	NE	H	J	096303-R16	SW846 9056
30-Jul-14	Sulfate	32.8	1.33	4.00	NE	H	J	096303-R16	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096303-029	SW846 9034
	Bicarbonate Alkalinity	170	0.725	1.00	NE	H	J	096303-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096303-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	80.5	1.34	4.00	NE			096312-016	SW846 9056
06-Aug-14	Sulfate	45.6	2.66	8.00	NE			096312-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096312-029	SW846 9034
	Bicarbonate Alkalinity	189	0.725	1.00	NE	H	J	096312-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096312-022	SM 2320B
TAV-MW8	Chloride	42.4	0.670	2.00	NE			096294-016	SW846 9056
28-Jul-14	Sulfate	54.1	1.33	4.00	NE			096294-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096294-029	SW846 9034
	Bicarbonate Alkalinity	184	0.725	1.00	NE	H	J	096294-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096294-R22	SM 2320B
TAV-MW10	Chloride	47.5	0.670	2.00	NE	H	J	096314-R16	SW846 9056
07-Aug-14	Sulfate	44.4	1.33	4.00	NE	H	J	096314-R16	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096314-029	SW846 9034
	Bicarbonate Alkalinity	179	0.725	1.00	NE	H	J	096314-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096314-022	SM 2320B
TAV-MW11	Chloride	45.7	0.670	2.00	NE	H	J	096305-R16	SW846 9056
31-Jul-14	Sulfate	41.9	1.33	4.00	NE	H	J	096305-R16	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096305-029	SW846 9034
	Bicarbonate Alkalinity	183	0.725	1.00	NE	H	J	096305-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096305-22	SM 2320B
TAV-MW12	Chloride	45.2	0.670	2.00	NE			096309-016	SW846 9056
05-Aug-14	Sulfate	51.3	1.33	4.00	NE			096309-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096309-029	SW846 9034
	Bicarbonate Alkalinity	214	0.725	1.00	NE	H	J	096309-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096309-022	SM 2320B
TAV-MW13	Chloride	20.3	0.335	1.00	NE			096286-016	SW846 9056
23-Jul-14	Sulfate	55.8	0.665	2.00	NE			096286-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096286-029	SW846 9034
	Bicarbonate Alkalinity	191	0.725	1.00	NE	H	J	096286-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096286-022	SM 2320B
TAV-MW14	Chloride	56.1	0.670	2.00	NE			096307-016	SW846 9056
04-Aug-14	Sulfate	57.3	1.33	4.00	NE			096307-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	H, U	UJ	096307-029	SW846 9034
	Bicarbonate Alkalinity	198	0.725	1.00	NE	H	J	096307-R22	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096307-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	9.46	0.134	0.400	NE			096821-016	SW846 9056
30-Oct-14	Sulfate	31.3	0.266	0.800	NE			096821-016	SW846 9056
	Acid Soluble Sulfides	1.13	0.835	2.50	NE	J	J-	096821-029	SW846 9034
	Bicarbonate Alkalinity	156	0.725	1.00	NE			096821-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096821-022	SM 2320B
LWDS-MW1	Chloride	82.0	1.34	4.00	NE			096853-016	SW846 9056
17-Nov-14	Sulfate	41.5	2.66	8.00	NE			096853-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096853-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE			096853-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096853-022	SM 2320B
LWDS-MW1 (Duplicate)	Chloride	81.6	1.34	4.00	NE			096854-016	SW846 9056
17-Nov-14	Sulfate	41.1	2.66	8.00	NE			096854-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096854-029	SW846 9034
	Bicarbonate Alkalinity	198	0.725	1.00	NE			096854-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096854-022	SM 2320B
LWDS-MW2	Chloride	12.0	0.335	1.00	NE			096825-016	SW846 9056
03-Nov-14	Sulfate	39.0	0.665	2.00	NE			096825-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096825-029	SW846 9034
	Bicarbonate Alkalinity	178	0.725	1.00	NE			096825-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096825-022	SM 2320B
TAV-MW2	Chloride	60.2	0.670	2.00	NE			096827-016	SW846 9056
04-Nov-14	Sulfate	56.5	1.33	4.00	NE			096827-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096827-029	SW846 9034
	Bicarbonate Alkalinity	248	0.725	1.00	NE			096827-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096827-022	SM 2320B
TAV-MW3	Chloride	21.1	0.335	1.00	NE			096816-016	SW846 9056
28-Oct-14	Sulfate	65.6	0.665	2.00	NE			096816-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096816-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE			096816-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096816-022	SM 2320B
TAV-MW3 (Duplicate)	Chloride	21.1	0.335	1.00	NE			096817-016	SW846 9056
28-Oct-14	Sulfate	65.8	0.665	2.00	NE			096817-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096817-029	SW846 9034
	Bicarbonate Alkalinity	197	0.725	1.00	NE			096817-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096817-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Chloride	37.8	0.670	2.00	NE			096829-016	SW846 9056
05-Nov-14	Sulfate	33.2	1.33	4.00	NE			096829-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096829-029	SW846 9034
	Bicarbonate Alkalinity	178	0.725	1.00	NE			096829-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096829-022	SM 2320B
TAV-MW5	Chloride	17.2	0.335	1.00	NE			096809-016	SW846 9056
24-Oct-14	Sulfate	41.1	0.665	2.00	NE			096809-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096809-029	SW846 9034
	Bicarbonate Alkalinity	183	0.725	1.00	NE			096809-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096809-022	SM 2320B
TAV-MW6	Chloride	79.2	1.34	4.00	NE			096845-016	SW846 9056
12-Nov-14	Sulfate	44.7	2.66	8.00	NE			096845-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096845-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE			096845-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096845-022	SM 2320B
TAV-MW7	Chloride	28.2	0.335	1.00	NE			096819-016	SW846 9056
29-Oct-14	Sulfate	65.5	0.665	2.00	NE			096819-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U	UJ	096819-029	SW846 9034
	Bicarbonate Alkalinity	231	0.725	1.00	NE			096819-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096819-022	SM 2320B
TAV-MW8	Chloride	40.7	0.670	2.00	NE			096823-016	SW846 9056
31-Oct-14	Sulfate	51.1	1.33	4.00	NE			096823-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096823-029	SW846 9034
	Bicarbonate Alkalinity	195	0.725	1.00	NE			096823-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096823-022	SM 2320B
TAV-MW9	Chloride	32.8	0.670	2.00	NE			096811-016	SW846 9056
27-Oct-14	Sulfate	58.9	1.33	4.00	NE			096811-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096811-029	SW846 9034
	Bicarbonate Alkalinity	238	0.725	1.00	NE			096811-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096811-022	SM 2320B
TAV-MW10	Chloride	53.4	1.34	4.00	NE			096848-016	SW846 9056
13-Nov-14	Sulfate	51.2	2.66	8.00	NE			096848-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096848-029	SW846 9034
	Bicarbonate Alkalinity	194	0.725	1.00	NE			096848-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096848-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	47.4	0.670	2.00	NE			096833-016	SW846 9056
06-Nov-14	Sulfate	42.0	1.33	4.00	NE			096833-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096833-029	SW846 9034
	Bicarbonate Alkalinity	186	0.725	1.00	NE			096833-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096833-022	SM 2320B
TAV-MW11 (Duplicate)	Chloride	47.2	0.670	2.00	NE			096834-016	SW846 9056
06-Nov-14	Sulfate	42.1	1.33	4.00	NE			096834-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096834-029	SW846 9034
	Bicarbonate Alkalinity	183	0.725	1.00	NE			096834-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096834-022	SM 2320B
TAV-MW12	Chloride	42.8	0.670	2.00	NE			096842-016	SW846 9056
11-Nov-14	Sulfate	47.6	1.33	4.00	NE			096842-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096842-029	SW846 9034
	Bicarbonate Alkalinity	224	0.725	1.00	NE			096842-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096842-022	SM 2320B
TAV-MW13	Chloride	19.2	0.335	1.00	NE			096807-016	SW846 9056
23-Oct-14	Sulfate	51.2	0.665	2.00	NE			096807-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096807-029	SW846 9034
	Bicarbonate Alkalinity	196	0.725	2.00	NE			096807-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096807-022	SM 2320B
TAV-MW14	Chloride	55.0	0.670	2.00	NE			096838-016	SW846 9056
10-Nov-14	Sulfate	55.4	1.33	4.00	NE			096838-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		096838-029	SW846 9034
	Bicarbonate Alkalinity	205	0.725	1.00	NE			096838-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096838-022	SM 2320B

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.585	0.330	1.00	NE	J		095321-004	SW846 9060
19-Feb-14	Total Organic Carbon #2	0.652	0.330	1.00	NE	J		095321-004	SW846 9060
	Total Organic Carbon #3	0.621	0.330	1.00	NE	J		095321-004	SW846 9060
	Total Organic Carbon #4	0.425	0.330	1.00	NE	J		095321-004	SW846 9060
	Total Organic Carbon Average	0.571	0.330	1.00	NE	J		095321-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.911	0.330	1.00	NE	J		095341-004	SW846 9060
03-Mar-14	Total Organic Carbon #2	1.03	0.330	1.00	NE			095341-004	SW846 9060
	Total Organic Carbon #3	0.938	0.330	1.00	NE	J		095341-004	SW846 9060
	Total Organic Carbon #4	1.09	0.330	1.00	NE			095341-004	SW846 9060
	Total Organic Carbon Average	0.993	0.330	1.00	NE	J		095341-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	0.597	0.330	1.00	NE	J		095324-004	SW846 9060
20-Feb-14	Total Organic Carbon #2	0.587	0.330	1.00	NE	J		095324-004	SW846 9060
	Total Organic Carbon #3	0.614	0.330	1.00	NE	J		095324-004	SW846 9060
	Total Organic Carbon #4	0.474	0.330	1.00	NE	J		095324-004	SW846 9060
	Total Organic Carbon Average	0.568	0.330	1.00	NE	J		095324-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.754	0.330	1.00	NE	J		095326-004	SW846 9060
21-Feb-14	Total Organic Carbon #2	0.847	0.330	1.00	NE	J		095326-004	SW846 9060
	Total Organic Carbon #3	0.771	0.330	1.00	NE	J		095326-004	SW846 9060
	Total Organic Carbon #4	0.681	0.330	1.00	NE	J		095326-004	SW846 9060
	Total Organic Carbon Average	0.763	0.330	1.00	NE	J		095326-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.793	0.330	1.00	NE	J		095328-004	SW846 9060
24-Feb-14	Total Organic Carbon #2	0.843	0.330	1.00	NE	J		095328-004	SW846 9060
	Total Organic Carbon #3	0.830	0.330	1.00	NE	J		095328-004	SW846 9060
	Total Organic Carbon #4	0.831	0.330	1.00	NE	J		095328-004	SW846 9060
	Total Organic Carbon Average	0.824	0.330	1.00	NE	J		095328-004	SW846 9060
TAV-MW6	Total Organic Carbon #1	0.970	0.330	1.00	NE	J		095346-004	SW846 9060
05-Mar-14	Total Organic Carbon #2	0.923	0.330	1.00	NE	J		095346-004	SW846 9060
	Total Organic Carbon #3	0.967	0.330	1.00	NE	J		095346-004	SW846 9060
	Total Organic Carbon #4	0.974	0.330	1.00	NE	J		095346-004	SW846 9060
	Total Organic Carbon Average	0.959	0.330	1.00	NE	J		095346-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Total Organic Carbon #1	0.935	0.330	1.00	NE	J	3.6U	095333-004	SW846 9060
25-Feb-14	Total Organic Carbon #2	1.02	0.330	1.00	NE		3.3U	095333-004	SW846 9060
	Total Organic Carbon #3	1.03	0.330	1.00	NE		3.4U	095333-004	SW846 9060
	Total Organic Carbon #4	0.941	0.330	1.00	NE	J	3.5U	095333-004	SW846 9060
	Total Organic Carbon Average	0.981	0.330	1.00	NE	J	3.5U	095333-004	SW846 9060
TAV-MW8 (Duplicate)	Total Organic Carbon #1	0.833	0.330	1.00	NE	J	3.6U	095334-004	SW846 9060
25-Feb-14	Total Organic Carbon #2	0.905	0.330	1.00	NE	J	3.3U	095334-004	SW846 9060
	Total Organic Carbon #3	0.821	0.330	1.00	NE	J	3.4U	095334-004	SW846 9060
	Total Organic Carbon #4	0.797	0.330	1.00	NE	J	3.5U	095334-004	SW846 9060
	Total Organic Carbon Average	0.839	0.330	1.00	NE	J	3.5U	095334-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	0.968	0.330	1.00	NE	J	3.9U	095351-004	SW846 9060
06-Mar-14	Total Organic Carbon #2	1.09	0.330	1.00	NE		3.8U	095351-004	SW846 9060
	Total Organic Carbon #3	0.997	0.330	1.00	NE	J	3.9U	095351-004	SW846 9060
	Total Organic Carbon #4	1.04	0.330	1.00	NE		4.1U	095351-004	SW846 9060
	Total Organic Carbon Average	1.02	0.330	1.00	NE		3.9U	095351-004	SW846 9060
TAV-MW10 (Duplicate)	Total Organic Carbon #1	0.920	0.330	1.00	NE	J	3.9U	095352-004	SW846 9060
06-Mar-14	Total Organic Carbon #2	1.00	0.330	1.00	NE		3.8U	095352-004	SW846 9060
	Total Organic Carbon #3	0.996	0.330	1.00	NE	J	3.9U	095352-004	SW846 9060
	Total Organic Carbon #4	0.902	0.330	1.00	NE	J	4.1U	095352-004	SW846 9060
	Total Organic Carbon Average	0.955	0.330	1.00	NE	J	3.9U	095352-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.956	0.330	1.00	NE	J		095337-004	SW846 9060
26-Feb-14	Total Organic Carbon #2	0.998	0.330	1.00	NE	J		095337-004	SW846 9060
	Total Organic Carbon #3	0.988	0.330	1.00	NE	J		095337-004	SW846 9060
	Total Organic Carbon #4	0.955	0.330	1.00	NE	J		095337-004	SW846 9060
	Total Organic Carbon Average	0.974	0.330	1.00	NE	J		095337-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.932	0.330	1.00	NE	J		095344-004	SW846 9060
04-Mar-14	Total Organic Carbon #2	0.993	0.330	1.00	NE	J		095344-004	SW846 9060
	Total Organic Carbon #3	0.892	0.330	1.00	NE	J		095344-004	SW846 9060
	Total Organic Carbon #4	0.958	0.330	1.00	NE	J		095344-004	SW846 9060
	Total Organic Carbon Average	0.944	0.330	1.00	NE	J		095344-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Total Organic Carbon #1	0.560	0.330	1.00	NE	J		095319-004	SW846 9060
18-Feb-14	Total Organic Carbon #2	0.675	0.330	1.00	NE	J		095319-004	SW846 9060
	Total Organic Carbon #3	0.595	0.330	1.00	NE	J		095319-004	SW846 9060
	Total Organic Carbon #4	0.509	0.330	1.00	NE	J		095319-004	SW846 9060
	Total Organic Carbon Average	0.585	0.330	1.00	NE	J		095319-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.876	0.330	1.00	NE	J		095339-004	SW846 9060
27-Feb-14	Total Organic Carbon #2	1.02	0.330	1.00	NE			095339-004	SW846 9060
	Total Organic Carbon #3	0.923	0.330	1.00	NE	J		095339-004	SW846 9060
	Total Organic Carbon #4	0.859	0.330	1.00	NE	J		095339-004	SW846 9060
	Total Organic Carbon Average	0.920	0.330	1.00	NE	J		095339-004	SW846 9060
AVN-1	Total Organic Carbon #1	0.543	0.330	1.00	NE	J	J-	095854-004	SW846 9060
07-May-14	Total Organic Carbon #2	0.601	0.330	1.00	NE	J	J-	095854-004	SW846 9060
	Total Organic Carbon #3	0.505	0.330	1.00	NE	J	J-	095854-004	SW846 9060
	Total Organic Carbon #4	0.470	0.330	1.00	NE	J	J-	095854-004	SW846 9060
	Total Organic Carbon Average	0.530	0.330	1.00	NE	J	J-	095854-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.724	0.330	1.00	NE	J		095869-004	SW846 9060
19-May-14	Total Organic Carbon #2	0.762	0.330	1.00	NE	J		095869-004	SW846 9060
	Total Organic Carbon #3	0.757	0.330	1.00	NE	J		095869-004	SW846 9060
	Total Organic Carbon #4	0.735	0.330	1.00	NE	J		095869-004	SW846 9060
	Total Organic Carbon Average	0.744	0.330	1.00	NE	J		095869-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	0.608	0.330	1.00	NE	J	J-	095856-004	SW846 9060
09-May-14	Total Organic Carbon #2	0.637	0.330	1.00	NE	J	J-	095856-004	SW846 9060
	Total Organic Carbon #3	0.589	0.330	1.00	NE	J	J-	095856-004	SW846 9060
	Total Organic Carbon #4	0.633	0.330	1.00	NE	J	J-	095856-004	SW846 9060
	Total Organic Carbon Average	0.617	0.330	1.00	NE	J	J-	095856-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.539	0.330	1.00	NE	J		095858-004	SW846 9060
12-May-14	Total Organic Carbon #2	0.797	0.330	1.00	NE	J		095858-004	SW846 9060
	Total Organic Carbon #3	0.551	0.330	1.00	NE	J		095858-004	SW846 9060
	Total Organic Carbon #4	0.545	0.330	1.00	NE	J		095858-004	SW846 9060
	Total Organic Carbon Average	0.608	0.330	1.00	NE	J		095858-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Total Organic Carbon #1	0.688	0.330	1.00	NE	J	J-	095846-004	SW846 9060
02-May-14	Total Organic Carbon #2	0.657	0.330	1.00	NE	J	J-	095846-004	SW846 9060
	Total Organic Carbon #3	0.580	0.330	1.00	NE	J	J-	095846-004	SW846 9060
	Total Organic Carbon #4	0.610	0.330	1.00	NE	J	J-	095846-004	SW846 9060
	Total Organic Carbon Average	0.634	0.330	1.00	NE	J	J-	095846-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.540	0.330	1.00	NE	J		095864-004	SW846 9060
14-May-14	Total Organic Carbon #2	0.509	0.330	1.00	NE	J		095864-004	SW846 9060
	Total Organic Carbon #3	0.463	0.330	1.00	NE	J		095864-004	SW846 9060
	Total Organic Carbon #4	0.466	0.330	1.00	NE	J		095864-004	SW846 9060
	Total Organic Carbon Average	0.494	0.330	1.00	NE	J		095864-004	SW846 9060
TAV-MW4 (Duplicate)	Total Organic Carbon #1	0.501	0.330	1.00	NE	J		095865-004	SW846 9060
14-May-14	Total Organic Carbon #2	0.565	0.330	1.00	NE	J		095865-004	SW846 9060
	Total Organic Carbon #3	0.481	0.330	1.00	NE	J		095865-004	SW846 9060
	Total Organic Carbon #4	0.484	0.330	1.00	NE	J		095865-004	SW846 9060
	Total Organic Carbon Average	0.508	0.330	1.00	NE	J		095865-004	SW846 9060
TAV-MW5	Total Organic Carbon #1	0.748	0.330	1.00	NE	J	2.4UJ	095842-004	SW846 9060
01-May-14	Total Organic Carbon #2	0.698	0.330	1.00	NE	J	2.1UJ	095842-004	SW846 9060
	Total Organic Carbon #3	0.669	0.330	1.00	NE	J	1.9UJ	095842-004	SW846 9060
	Total Organic Carbon #4	0.692	0.330	1.00	NE	J	J-	095842-004	SW846 9060
	Total Organic Carbon Average	0.702	0.330	1.00	NE	J	2.0UJ	095842-004	SW846 9060
TAV-MW5 (Duplicate)	Total Organic Carbon #1	0.632	0.330	1.00	NE	J	2.4UJ	095843-004	SW846 9060
01-May-14	Total Organic Carbon #2	0.782	0.330	1.00	NE	J	2.1UJ	095843-004	SW846 9060
	Total Organic Carbon #3	0.623	0.330	1.00	NE	J	1.9UJ	095843-004	SW846 9060
	Total Organic Carbon #4	0.600	0.330	1.00	NE	J	J-	095843-004	SW846 9060
	Total Organic Carbon Average	0.659	0.330	1.00	NE	J	2.0UJ	095843-004	SW846 9060
TAV-MW6	Total Organic Carbon #1	0.622	0.330	1.00	NE	J		095879-004	SW846 9060
22-May-14	Total Organic Carbon #2	0.793	0.330	1.00	NE	J		095879-004	SW846 9060
	Total Organic Carbon #3	0.680	0.330	1.00	NE	J		095879-004	SW846 9060
	Total Organic Carbon #4	0.646	0.330	1.00	NE	J		095879-004	SW846 9060
	Total Organic Carbon Average	0.685	0.330	1.00	NE	J		095879-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Total Organic Carbon #1	0.668	0.330	1.00	NE	J	J-	095852-004	SW846 9060
06-May-14	Total Organic Carbon #2	0.697	0.330	1.00	NE	J	J-	095852-004	SW846 9060
	Total Organic Carbon #3	0.628	0.330	1.00	NE	J	J-	095852-004	SW846 9060
	Total Organic Carbon #4	0.638	0.330	1.00	NE	J	J-	095852-004	SW846 9060
	Total Organic Carbon Average	0.658	0.330	1.00	NE	J	J-	095852-004	SW846 9060
TAV-MW8	Total Organic Carbon #1	0.521	0.330	1.00	NE	J		095860-004	SW846 9060
13-May-14	Total Organic Carbon #2	0.533	0.330	1.00	NE	J		095860-004	SW846 9060
	Total Organic Carbon #3	0.477	0.330	1.00	NE	J		095860-004	SW846 9060
	Total Organic Carbon #4	0.502	0.330	1.00	NE	J		095860-004	SW846 9060
	Total Organic Carbon Average	0.508	0.330	1.00	NE	J		095860-004	SW846 9060
TAV-MW9	Total Organic Carbon #1	2.54	0.330	1.00	NE			095849-004	SW846 9060
05-May-14	Total Organic Carbon #2	2.58	0.330	1.00	NE			095849-004	SW846 9060
	Total Organic Carbon #3	2.55	0.330	1.00	NE			095849-004	SW846 9060
	Total Organic Carbon #4	2.57	0.330	1.00	NE			095849-004	SW846 9060
	Total Organic Carbon Average	2.56	0.330	1.00	NE			095849-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	0.586	0.330	1.00	NE	J		095881-004	SW846 9060
27-May-14	Total Organic Carbon #2	0.604	0.330	1.00	NE	J		095881-004	SW846 9060
	Total Organic Carbon #3	0.586	0.330	1.00	NE	J		095881-004	SW846 9060
	Total Organic Carbon #4	0.577	0.330	1.00	NE	J		095881-004	SW846 9060
	Total Organic Carbon Average	0.588	0.330	1.00	NE	J		095881-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.458	0.330	1.00	NE	J		095867-004	SW846 9060
15-May-14	Total Organic Carbon #2	0.531	0.330	1.00	NE	J		095867-004	SW846 9060
	Total Organic Carbon #3	0.490	0.330	1.00	NE	J		095867-004	SW846 9060
	Total Organic Carbon #4	0.484	0.330	1.00	NE	J		095867-004	SW846 9060
	Total Organic Carbon Average	0.490	0.330	1.00	NE	J		095867-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.620	0.330	1.00	NE	J		095877-004	SW846 9060
21-May-14	Total Organic Carbon #2	0.765	0.330	1.00	NE	J		095877-004	SW846 9060
	Total Organic Carbon #3	0.642	0.330	1.00	NE	J		095877-004	SW846 9060
	Total Organic Carbon #4	0.688	0.330	1.00	NE	J		095877-004	SW846 9060
	Total Organic Carbon Average	0.679	0.330	1.00	NE	J		095877-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 30-Apr-14	Total Organic Carbon #1	0.701	0.330	1.00	NE	J	J-	095838-004	SW846 9060
	Total Organic Carbon #2	0.778	0.330	1.00	NE	J	J-	095838-004	SW846 9060
	Total Organic Carbon #3	0.735	0.330	1.00	NE	J	J-	095838-004	SW846 9060
	Total Organic Carbon #4	0.785	0.330	1.00	NE	J	J-	095838-004	SW846 9060
	Total Organic Carbon Average	0.750	0.330	1.00	NE	J	J-	095838-004	SW846 9060
TAV-MW14 20-May-14	Total Organic Carbon #1	0.636	0.330	1.00	NE	J	1.9U	095874-004	SW846 9060
	Total Organic Carbon #2	0.609	0.330	1.00	NE	J		095874-004	SW846 9060
	Total Organic Carbon #3	0.593	0.330	1.00	NE	J		095874-004	SW846 9060
	Total Organic Carbon #4	0.583	0.330	1.00	NE	J		095874-004	SW846 9060
	Total Organic Carbon Average	0.605	0.330	1.00	NE	J		095874-004	SW846 9060
TAV-MW14 (Duplicate) 20-May-14	Total Organic Carbon #1	0.612	0.330	1.00	NE	J	1.9U	095875-004	SW846 9060
	Total Organic Carbon #2	0.719	0.330	1.00	NE	J		095875-004	SW846 9060
	Total Organic Carbon #3	0.637	0.330	1.00	NE	J		095875-004	SW846 9060
	Total Organic Carbon #4	0.664	0.330	1.00	NE	J		095875-004	SW846 9060
	Total Organic Carbon Average	0.658	0.330	1.00	NE	J		095875-004	SW846 9060
AVN-1 24-Jul-14	Total Organic Carbon #1	0.480	0.330	1.00	NE	J	1.9U	096291-004	SW846 9060
	Total Organic Carbon #2	0.597	0.330	1.00	NE	J		096291-004	SW846 9060
	Total Organic Carbon #3	0.489	0.330	1.00	NE	J		096291-004	SW846 9060
	Total Organic Carbon #4	0.509	0.330	1.00	NE	J		096291-004	SW846 9060
	Total Organic Carbon Average	0.519	0.330	1.00	NE	J		096291-004	SW846 9060
AVN-1 (Duplicate) 24-Jul-14	Total Organic Carbon #1	0.502	0.330	1.00	NE	J	1.9U	096292-004	SW846 9060
	Total Organic Carbon #2	0.568	0.330	1.00	NE	J		096292-004	SW846 9060
	Total Organic Carbon #3	0.495	0.330	1.00	NE	J		096292-004	SW846 9060
	Total Organic Carbon #4	0.463	0.330	1.00	NE	J		096292-004	SW846 9060
	Total Organic Carbon Average	0.507	0.330	1.00	NE	J		096292-004	SW846 9060
LWDS-MW1 11-Aug-14	Total Organic Carbon #1	0.385	0.330	1.00	NE	J	2.73U	096316-004	SW846 9060
	Total Organic Carbon #2	0.403	0.330	1.00	NE	J	2.73U	096316-004	SW846 9060
	Total Organic Carbon #3	0.371	0.330	1.00	NE	J	2.73U	096316-004	SW846 9060
	Total Organic Carbon #4	0.351	0.330	1.00	NE	J	2.73U	096316-004	SW846 9060
	Total Organic Carbon Average	0.377	0.330	1.00	NE	B, J	2.73U	096316-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 29-Jul-14	Total Organic Carbon #1	0.474	0.330	1.00	NE	J	1.9U	096299-004	SW846 9060
	Total Organic Carbon #2	0.578	0.330	1.00	NE	J		096299-004	SW846 9060
	Total Organic Carbon #3	0.505	0.330	1.00	NE	J		096299-004	SW846 9060
	Total Organic Carbon #4	0.455	0.330	1.00	NE	J		096299-004	SW846 9060
	Total Organic Carbon Average	0.503	0.330	1.00	NE	J		096299-004	SW846 9060
LWDS-MW2 (Duplicate) 29-Jul-14	Total Organic Carbon #1	0.509	0.330	1.00	NE	J	1.9U	096300-004	SW846 9060
	Total Organic Carbon #2	0.505	0.330	1.00	NE	J		096300-004	SW846 9060
	Total Organic Carbon #3	0.463	0.330	1.00	NE	J		096300-004	SW846 9060
	Total Organic Carbon #4	0.486	0.330	1.00	NE	J		096300-004	SW846 9060
	Total Organic Carbon Average	0.491	0.330	1.00	NE	J		096300-004	SW846 9060
TAV-MW2 09-Sep-14	Total Organic Carbon #1	0.929	0.330	1.00	NE	J		096632-004	SW846 9060
	Total Organic Carbon #2	1.15	0.330	1.00	NE			096632-004	SW846 9060
	Total Organic Carbon #3	1.03	0.330	1.00	NE			096632-004	SW846 9060
	Total Organic Carbon #4	1.02	0.330	1.00	NE			096632-004	SW846 9060
	Total Organic Carbon Average	1.03	0.330	1.00	NE			096632-004	SW846 9060
TAV-MW4 30-Jul-14	Total Organic Carbon #1	0.671	0.330	1.00	NE	J		096303-004	SW846 9060
	Total Organic Carbon #2	0.753	0.330	1.00	NE	J		096303-004	SW846 9060
	Total Organic Carbon #3	0.661	0.330	1.00	NE	J		096303-004	SW846 9060
	Total Organic Carbon #4	0.671	0.330	1.00	NE	J		096303-004	SW846 9060
	Total Organic Carbon Average	0.689	0.330	1.00	NE	J		096303-004	SW846 9060
TAV-MW6 06-Aug-14	Total Organic Carbon #1	0.492	0.330	1.00	NE	J	2.3U	096312-004	SW846 9060
	Total Organic Carbon #2	0.491	0.330	1.00	NE	J	2.3U	096312-004	SW846 9060
	Total Organic Carbon #3	0.443	0.330	1.00	NE	J	2.3U	096312-004	SW846 9060
	Total Organic Carbon #4	0.440	0.330	1.00	NE	J	2.3U	096312-004	SW846 9060
	Total Organic Carbon Average	0.466	0.330	1.00	NE	B, J	2.3U	096312-004	SW846 9060
TAV-MW8 28-Jul-14	Total Organic Carbon #1	0.574	0.330	1.00	NE	J		096294-004	SW846 9060
	Total Organic Carbon #2	0.722	0.330	1.00	NE	J		096294-004	SW846 9060
	Total Organic Carbon #3	0.641	0.330	1.00	NE	J		096294-004	SW846 9060
	Total Organic Carbon #4	0.603	0.330	1.00	NE	J		096294-004	SW846 9060
	Total Organic Carbon Average	0.635	0.330	1.00	NE	J		096294-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.529	0.330	1.00	NE	J	2.3U	096314-004	SW846 9060
07-Aug-14	Total Organic Carbon #2	0.525	0.330	1.00	NE	J	2.3U	096314-004	SW846 9060
	Total Organic Carbon #3	0.518	0.330	1.00	NE	J	2.3U	096314-004	SW846 9060
	Total Organic Carbon #4	0.523	0.330	1.00	NE	J	2.3U	096314-004	SW846 9060
	Total Organic Carbon Average	0.524	0.330	1.00	NE	B, J	2.3U	096314-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.455	0.330	1.00	NE	J		096305-004	SW846 9060
31-Jul-14	Total Organic Carbon #2	0.540	0.330	1.00	NE	J		096305-004	SW846 9060
	Total Organic Carbon #3	0.448	0.330	1.00	NE	J		096305-004	SW846 9060
	Total Organic Carbon #4	0.502	0.330	1.00	NE	J		096305-004	SW846 9060
	Total Organic Carbon Average	0.486	0.330	1.00	NE	J		096305-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.579	0.330	1.00	NE	J	2.3U	096309-004	SW846 9060
05-Aug-14	Total Organic Carbon #2	0.624	0.330	1.00	NE	J	2.3U	096309-004	SW846 9060
	Total Organic Carbon #3	0.513	0.330	1.00	NE	J	2.3U	096309-004	SW846 9060
	Total Organic Carbon #4	0.601	0.330	1.00	NE	J	2.3U	096309-004	SW846 9060
	Total Organic Carbon Average	0.579	0.330	1.00	NE	B, J	2.3U	096309-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.392	0.330	1.00	NE	J		096286-004	SW846 9060
23-Jul-14	Total Organic Carbon #2	0.420	0.330	1.00	NE	J		096286-004	SW846 9060
	Total Organic Carbon #3	0.362	0.330	1.00	NE	J		096286-004	SW846 9060
	Total Organic Carbon #4	0.374	0.330	1.00	NE	J		096286-004	SW846 9060
	Total Organic Carbon Average	0.387	0.330	1.00	NE	J		096286-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.619	0.330	1.00	NE	J	2.3U	096307-004	SW846 9060
04-Aug-14	Total Organic Carbon #2	0.556	0.330	1.00	NE	J	2.3U	096307-004	SW846 9060
	Total Organic Carbon #3	0.548	0.330	1.00	NE	J	2.3U	096307-004	SW846 9060
	Total Organic Carbon #4	0.534	0.330	1.00	NE	J	2.3U	096307-004	SW846 9060
	Total Organic Carbon Average	0.564	0.330	1.00	NE	B, J	2.3U	096307-004	SW846 9060
AVN-1	Total Organic Carbon #1	ND	0.330	1.00	NE	U		096821-004	SW846 9060
30-Oct-14	Total Organic Carbon #2	ND	0.330	1.00	NE	U		096821-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		096821-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		096821-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		096821-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1 17-Nov-14	Total Organic Carbon #1	0.497	0.330	1.00	NE	J	2.41U	096853-004	SW846 9060
	Total Organic Carbon #2	0.553	0.330	1.00	NE	J	2.41U	096853-004	SW846 9060
	Total Organic Carbon #3	0.559	0.330	1.00	NE	J	2.41U	096853-004	SW846 9060
	Total Organic Carbon #4	0.485	0.330	1.00	NE	J	2.41U	096853-004	SW846 9060
	Total Organic Carbon Average	0.524	0.330	1.00	NE	J	2.41U	096853-004	SW846 9060
LWDS-MW1 (Duplicate) 17-Nov-14	Total Organic Carbon #1	0.536	0.330	1.00	NE	J	J-	096854-004	SW846 9060
	Total Organic Carbon #2	0.712	0.330	1.00	NE	J	J-	096854-004	SW846 9060
	Total Organic Carbon #3	0.610	0.330	1.00	NE	J	J-	096854-004	SW846 9060
	Total Organic Carbon #4	0.646	0.330	1.00	NE	J	J-	096854-004	SW846 9060
	Total Organic Carbon Average	0.626	0.330	1.00	NE	J	J-	096854-004	SW846 9060
LWDS-MW2 03-Nov-14	Total Organic Carbon #1	0.410	0.330	1.00	NE	J		096825-004	SW846 9060
	Total Organic Carbon #2	0.621	0.330	1.00	NE	J		096825-004	SW846 9060
	Total Organic Carbon #3	0.437	0.330	1.00	NE	J		096825-004	SW846 9060
	Total Organic Carbon #4	0.495	0.330	1.00	NE	J		096825-004	SW846 9060
	Total Organic Carbon Average	0.491	0.330	1.00	NE	J		096825-004	SW846 9060
TAV-MW2 04-Nov-14	Total Organic Carbon #1	0.443	0.330	1.00	NE	J		096827-004	SW846 9060
	Total Organic Carbon #2	0.487	0.330	1.00	NE	J		096827-004	SW846 9060
	Total Organic Carbon #3	0.547	0.330	1.00	NE	J		096827-004	SW846 9060
	Total Organic Carbon #4	0.479	0.330	1.00	NE	J		096827-004	SW846 9060
	Total Organic Carbon Average	0.489	0.330	1.00	NE	J		096827-004	SW846 9060
TAV-MW3 28-Oct-14	Total Organic Carbon #1	0.375	0.330	1.00	NE	J		096816-004	SW846 9060
	Total Organic Carbon #2	0.438	0.330	1.00	NE	J		096816-004	SW846 9060
	Total Organic Carbon #3	0.363	0.330	1.00	NE	J		096816-004	SW846 9060
	Total Organic Carbon #4	0.355	0.330	1.00	NE	J		096816-004	SW846 9060
	Total Organic Carbon Average	0.383	0.330	1.00	NE	J		096816-004	SW846 9060
TAV-MW3 (Duplicate) 28-Oct-14	Total Organic Carbon #1	0.399	0.330	1.00	NE	J		096817-004	SW846 9060
	Total Organic Carbon #2	0.489	0.330	1.00	NE	J		096817-004	SW846 9060
	Total Organic Carbon #3	0.404	0.330	1.00	NE	J		096817-004	SW846 9060
	Total Organic Carbon #4	0.389	0.330	1.00	NE	J		096817-004	SW846 9060
	Total Organic Carbon Average	0.420	0.330	1.00	NE	J		096817-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 05-Nov-14	Total Organic Carbon #1	0.389	0.330	1.00	NE	J		096829-004	SW846 9060
	Total Organic Carbon #2	0.400	0.330	1.00	NE	J		096829-004	SW846 9060
	Total Organic Carbon #3	0.507	0.330	1.00	NE	J		096829-004	SW846 9060
	Total Organic Carbon #4	0.371	0.330	1.00	NE	J		096829-004	SW846 9060
	Total Organic Carbon Average	0.417	0.330	1.00	NE	J		096829-004	SW846 9060
TAV-MW5 24-Oct-14	Total Organic Carbon #1	0.366	0.330	1.00	NE	J		096809-004	SW846 9060
	Total Organic Carbon #2	0.390	0.330	1.00	NE	J		096809-004	SW846 9060
	Total Organic Carbon #3	0.395	0.330	1.00	NE	J		096809-004	SW846 9060
	Total Organic Carbon #4	0.405	0.330	1.00	NE	J		096809-004	SW846 9060
	Total Organic Carbon Average	0.389	0.330	1.00	NE	J		096809-004	SW846 9060
TAV-MW6 12-Nov-14	Total Organic Carbon #1	0.588	0.330	1.00	NE	J	2.41U	096845-004	SW846 9060
	Total Organic Carbon #2	0.473	0.330	1.00	NE	J	2.41U	096845-004	SW846 9060
	Total Organic Carbon #3	0.478	0.330	1.00	NE	J	2.41U	096845-004	SW846 9060
	Total Organic Carbon #4	0.391	0.330	1.00	NE	J	2.41U	096845-004	SW846 9060
	Total Organic Carbon Average	0.482	0.330	1.00	NE	B, J	2.41U	096845-004	SW846 9060
TAV-MW7 29-Oct-14	Total Organic Carbon #1	ND	0.330	1.00	NE	U		096819-004	SW846 9060
	Total Organic Carbon #2	0.387	0.330	1.00	NE	J		096819-004	SW846 9060
	Total Organic Carbon #3	0.338	0.330	1.00	NE	J		096819-004	SW846 9060
	Total Organic Carbon #4	0.371	0.330	1.00	NE	J		096819-004	SW846 9060
	Total Organic Carbon Average	0.352	0.330	1.00	NE	J		096819-004	SW846 9060
TAV-MW8 31-Oct-14	Total Organic Carbon #1	0.445	0.330	1.00	NE	J		096823-004	SW846 9060
	Total Organic Carbon #2	0.428	0.330	1.00	NE	J		096823-004	SW846 9060
	Total Organic Carbon #3	0.489	0.330	1.00	NE	J		096823-004	SW846 9060
	Total Organic Carbon #4	0.370	0.330	1.00	NE	J		096823-004	SW846 9060
	Total Organic Carbon Average	0.433	0.330	1.00	NE	J		096823-004	SW846 9060
TAV-MW9 27-Oct-14	Total Organic Carbon #1	2.62	0.330	1.00	NE			096811-004	SW846 9060
	Total Organic Carbon #2	2.66	0.330	1.00	NE			096811-004	SW846 9060
	Total Organic Carbon #3	2.78	0.330	1.00	NE			096811-004	SW846 9060
	Total Organic Carbon #4	2.69	0.330	1.00	NE			096811-004	SW846 9060
	Total Organic Carbon Average	2.69	0.330	1.00	NE			096811-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.483	0.330	1.00	NE	J	2.41U	096848-004	SW846 9060
13-Nov-14	Total Organic Carbon #2	0.479	0.330	1.00	NE	J	2.41U	096848-004	SW846 9060
	Total Organic Carbon #3	0.387	0.330	1.00	NE	J	2.41U	096848-004	SW846 9060
	Total Organic Carbon #4	0.398	0.330	1.00	NE	J	2.41U	096848-004	SW846 9060
	Total Organic Carbon Average	0.437	0.330	1.00	NE	B, J	2.41U	096848-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.404	0.330	1.00	NE	J		096833-004	SW846 9060
06-Nov-14	Total Organic Carbon #2	0.382	0.330	1.00	NE	J		096833-004	SW846 9060
	Total Organic Carbon #3	0.467	0.330	1.00	NE	J		096833-004	SW846 9060
	Total Organic Carbon #4	0.378	0.330	1.00	NE	J		096833-004	SW846 9060
	Total Organic Carbon Average	0.408	0.330	1.00	NE	J		096833-004	SW846 9060
TAV-MW11 (Duplicate)	Total Organic Carbon #1	0.431	0.330	1.00	NE	J		096834-004	SW846 9060
06-Nov-14	Total Organic Carbon #2	0.498	0.330	1.00	NE	J		096834-004	SW846 9060
	Total Organic Carbon #3	0.441	0.330	1.00	NE	J		096834-004	SW846 9060
	Total Organic Carbon #4	0.490	0.330	1.00	NE	J		096834-004	SW846 9060
	Total Organic Carbon Average	0.465	0.330	1.00	NE	J		096834-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.512	0.330	1.00	NE	J	2.41U	096842-004	SW846 9060
11-Nov-14	Total Organic Carbon #2	0.443	0.330	1.00	NE	J	2.41U	096842-004	SW846 9060
	Total Organic Carbon #3	0.478	0.330	1.00	NE	J	2.41U	096842-004	SW846 9060
	Total Organic Carbon #4	0.460	0.330	1.00	NE	J	2.41U	096842-004	SW846 9060
	Total Organic Carbon Average	0.473	0.330	1.00	NE	B, J	2.41U	096842-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.455	0.330	1.00	NE	J		096807-004	SW846 9060
23-Oct-14	Total Organic Carbon #2	0.455	0.330	1.00	NE	J		096807-004	SW846 9060
	Total Organic Carbon #3	0.454	0.330	1.00	NE	J		096807-004	SW846 9060
	Total Organic Carbon #4	0.408	0.330	1.00	NE	J		096807-004	SW846 9060
	Total Organic Carbon Average	0.441	0.330	1.00	NE	J		096807-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.394	0.330	1.00	NE	J	2.41U	096838-004	SW846 9060
10-Nov-14	Total Organic Carbon #2	0.462	0.330	1.00	NE	J	2.41U	096838-004	SW846 9060
	Total Organic Carbon #3	0.483	0.330	1.00	NE	J	2.41U	096838-004	SW846 9060
	Total Organic Carbon #4	0.412	0.330	1.00	NE	J	2.41U	096838-004	SW846 9060
	Total Organic Carbon Average	0.438	0.330	1.00	NE	B, J	2.41U	096838-004	SW846 9060

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	42.6	0.600	2.00	NE			095321-017	SW846 6020
19-Feb-14	Magnesium	9.99	0.010	0.030	NE			095321-017	SW846 6020
	Potassium	3.46	0.080	0.300	NE			095321-017	SW846 6020
	Sodium	39.4	0.800	2.50	NE			095321-017	SW846 6020
LWDS-MW1	Calcium	65.9	0.300	1.00	NE			095341-017	SW846 6020
03-Mar-14	Magnesium	19.8	0.010	0.030	NE		J	095341-017	SW846 6020
	Potassium	3.13	0.080	0.300	NE			095341-017	SW846 6020
	Sodium	74.0	0.400	1.25	NE			095341-017	SW846 6020
LWDS-MW2	Calcium	44.1	0.600	2.00	NE			095324-017	SW846 6020
20-Feb-14	Magnesium	14.2	0.010	0.030	NE			095324-017	SW846 6020
	Potassium	2.94	0.080	0.300	NE			095324-017	SW846 6020
	Sodium	43.2	0.800	2.50	NE			095324-017	SW846 6020
TAV-MW2	Calcium	72.6	0.600	2.00	NE			095326-017	SW846 6020
21-Feb-14	Magnesium	23.8	0.010	0.030	NE			095326-017	SW846 6020
	Potassium	4.02	0.080	0.300	NE		J	095326-017	SW846 6020
	Sodium	67.5	0.800	2.50	NE			095326-017	SW846 6020
TAV-MW4	Calcium	48.7	0.600	2.00	NE			095328-017	SW846 6020
24-Feb-14	Magnesium	15.0	0.010	0.030	NE		J	095328-017	SW846 6020
	Potassium	3.32	0.080	0.300	NE			095328-017	SW846 6020
	Sodium	45.9	0.080	0.250	NE			095328-017	SW846 6020
TAV-MW6	Calcium	65.6	0.300	1.00	NE			095346-017	SW846 6020
05-Mar-14	Magnesium	21.4	0.010	0.030	NE		J	095346-017	SW846 6020
	Potassium	3.57	0.080	0.300	NE			095346-017	SW846 6020
	Sodium	67.9	0.400	1.25	NE			095346-017	SW846 6020
TAV-MW8	Calcium	55.0	0.600	2.00	NE			095333-017	SW846 6020
25-Feb-14	Magnesium	18.0	0.010	0.030	NE		J	095333-017	SW846 6020
	Potassium	4.06	0.080	0.300	NE			095333-017	SW846 6020
	Sodium	55.8	0.800	2.50	NE			095333-017	SW846 6020
TAV-MW8 (Duplicate)	Calcium	53.5	0.600	2.00	NE			095334-017	SW846 6020
25-Feb-14	Magnesium	17.7	0.010	0.030	NE		J	095334-017	SW846 6020
	Potassium	3.91	0.080	0.300	NE			095334-017	SW846 6020
	Sodium	55.6	0.800	2.50	NE			095334-017	SW846 6020
TAV-MW10	Calcium	58.7	0.300	1.00	NE			095351-017	SW846 6020
06-Mar-14	Magnesium	17.3	0.010	0.030	NE		J	095351-017	SW846 6020
	Potassium	4.43	0.080	0.300	NE			095351-017	SW846 6020
	Sodium	53.9	0.400	1.25	NE			095351-017	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 (Duplicate)	Calcium	62.6	0.300	1.00	NE			095352-017	SW846 6020
06-Mar-14	Magnesium	18.1	0.010	0.030	NE		J	095352-017	SW846 6020
	Potassium	4.29	0.080	0.300	NE			095352-017	SW846 6020
	Sodium	61.0	0.400	1.25	NE			095352-017	SW846 6020
TAV-MW11	Calcium	54.0	0.600	2.00	NE			095337-017	SW846 6020
26-Feb-14	Magnesium	17.6	0.010	0.030	NE		J	095337-017	SW846 6020
	Potassium	4.28	0.080	0.300	NE			095337-017	SW846 6020
	Sodium	55.1	0.800	2.50	NE			095337-017	SW846 6020
TAV-MW12	Calcium	59.3	0.300	1.00	NE			095344-017	SW846 6020
04-Mar-14	Magnesium	20.1	0.010	0.030	NE		J	095344-017	SW846 6020
	Potassium	3.85	0.080	0.300	NE			095344-017	SW846 6020
	Sodium	54.5	0.400	1.25	NE			095344-017	SW846 6020
TAV-MW13	Calcium	53.2	0.600	2.00	NE			095319-017	SW846 6020
18-Feb-14	Magnesium	16.0	0.010	0.030	NE			095319-017	SW846 6020
	Potassium	3.63	0.080	0.300	NE			095319-017	SW846 6020
	Sodium	53.4	0.800	2.50	NE			095319-017	SW846 6020
TAV-MW14	Calcium	59.9	0.600	2.00	NE			095339-017	SW846 6020
27-Feb-14	Magnesium	20.7	0.010	0.030	NE		J	095339-017	SW846 6020
	Potassium	4.61	0.080	0.300	NE			095339-017	SW846 6020
	Sodium	61.7	0.800	2.50	NE			095339-017	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0571	0.015	0.050	NE			095854-009	SW846 6020
07-May-14	Antimony	ND	0.001	0.003	0.006	U		095854-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095854-009	SW846 6020
	Barium	0.084	0.0006	0.002	2.00			095854-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095854-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095854-009	SW846 6020
	Calcium	44.9	0.060	0.200	NE	B		095854-009	SW846 6020
	Chromium	0.0172	0.002	0.010	0.100			095854-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095854-009	SW846 6020
	Copper	0.000873	0.00035	0.001	NE	J		095854-009	SW846 6020
	Iron	0.273	0.033	0.100	NE			095854-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095854-009	SW846 6020
	Magnesium	10.0	0.010	0.030	NE			095854-009	SW846 6020
	Manganese	0.00207	0.001	0.005	NE	J		095854-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095854-009	SW846 7470
	Nickel	0.0227	0.0005	0.002	NE			095854-009	SW846 6020
	Potassium	3.45	0.080	0.300	NE			095854-009	SW846 6020
	Selenium	0.00247	0.0015	0.005	0.050	J		095854-009	SW846 6020
	Silver	0.000858	0.0002	0.001	NE	J		095854-009	SW846 6020
	Sodium	38.7	0.080	0.250	NE			095854-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095854-009	SW846 6020
	Uranium	0.00225	0.000067	0.0002	0.030			095854-009	SW846 6020
	Vanadium	0.00694	0.001	0.005	NE			095854-009	SW846 6010
	Zinc	0.0116	0.0035	0.010	NE			095854-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Aluminum	ND	0.015	0.050	NE	U		095869-009	SW846 6020
19-May-14	Antimony	ND	0.001	0.003	0.006	U		095869-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095869-009	SW846 6020
	Barium	0.0806	0.0006	0.002	2.00			095869-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095869-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095869-009	SW846 6020
	Calcium	70.0	0.300	1.00	NE			095869-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095869-009	SW846 6020
	Cobalt	0.000122	0.0001	0.001	NE	J		095869-009	SW846 6020
	Copper	0.000649	0.00035	0.001	NE	J		095869-009	SW846 6020
	Iron	0.172	0.033	0.100	NE			095869-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095869-009	SW846 6020
	Magnesium	20.1	0.010	0.030	NE			095869-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095869-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095869-009	SW846 7470
	Nickel	0.00142	0.0005	0.002	NE	J		095869-009	SW846 6020
	Potassium	2.98	0.080	0.300	NE			095869-009	SW846 6020
	Selenium	0.00544	0.0015	0.005	0.050			095869-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095869-009	SW846 6020
	Sodium	69.6	0.400	1.25	NE			095869-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095869-009	SW846 6020
	Uranium	0.00334	0.000067	0.0002	0.030			095869-009	SW846 6020
	Vanadium	0.00454	0.001	0.005	NE	J		095869-009	SW846 6010
	Zinc	0.00456	0.0035	0.010	NE	J		095869-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095856-009	SW846 6020
09-May-14	Antimony	ND	0.001	0.003	0.006	U		095856-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095856-009	SW846 6020
	Barium	0.0725	0.0006	0.002	2.00			095856-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095856-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095856-009	SW846 6020
	Calcium	47.6	0.060	0.200	NE	B		095856-009	SW846 6020
	Chromium	0.00393	0.002	0.010	0.100	J		095856-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095856-009	SW846 6020
	Copper	0.000577	0.00035	0.001	NE	J		095856-009	SW846 6020
	Iron	0.0557	0.033	0.100	NE	J		095856-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095856-009	SW846 6020
	Magnesium	13.2	0.010	0.030	NE			095856-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095856-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095856-009	SW846 7470
	Nickel	0.000632	0.0005	0.002	NE	J		095856-009	SW846 6020
	Potassium	2.82	0.080	0.300	NE			095856-009	SW846 6020
	Selenium	0.00261	0.0015	0.005	0.050	J		095856-009	SW846 6020
	Silver	0.00157	0.0002	0.001	NE			095856-009	SW846 6020
	Sodium	42.6	0.080	0.250	NE			095856-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095856-009	SW846 6020
	Uranium	0.00313	0.000067	0.0002	0.030			095856-009	SW846 6020
	Vanadium	0.00673	0.001	0.005	NE			095856-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095856-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095858-009	SW846 6020
12-May-14	Antimony	ND	0.001	0.003	0.006	U		095858-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095858-009	SW846 6020
	Barium	0.0602	0.0006	0.002	2.00			095858-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095858-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095858-009	SW846 6020
	Calcium	74.0	0.300	1.00	NE			095858-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095858-009	SW846 6020
	Cobalt	0.000197	0.0001	0.001	NE	J		095858-009	SW846 6020
	Copper	0.000562	0.00035	0.001	NE	J		095858-009	SW846 6020
	Iron	0.180	0.033	0.100	NE			095858-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095858-009	SW846 6020
	Magnesium	21.7	0.010	0.030	NE			095858-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095858-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095858-009	SW846 7470
	Nickel	0.00149	0.0005	0.002	NE	J		095858-009	SW846 6020
	Potassium	3.56	0.080	0.300	NE			095858-009	SW846 6020
	Selenium	0.00271	0.0015	0.005	0.050	J		095858-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095858-009	SW846 6020
	Sodium	67.7	0.400	1.25	NE			095858-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095858-009	SW846 6020
	Uranium	0.0065	0.000067	0.0002	0.030			095858-009	SW846 6020
	Vanadium	0.00574	0.001	0.005	NE			095858-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095858-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0192	0.015	0.050	NE	J		095846-009	SW846 6020
02-May-14	Antimony	ND	0.001	0.003	0.006	U		095846-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095846-009	SW846 6020
	Barium	0.0474	0.0006	0.002	2.00			095846-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095846-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095846-009	SW846 6020
	Calcium	55.3	0.600	2.00	NE	B		095846-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095846-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095846-009	SW846 6020
	Copper	0.000391	0.00035	0.001	NE	J		095846-009	SW846 6020
	Iron	0.0763	0.033	0.100	NE	J		095846-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095846-009	SW846 6020
	Magnesium	14.3	0.010	0.030	NE			095846-009	SW846 6020
	Manganese	0.0013	0.001	0.005	NE	J		095846-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095846-009	SW846 7470
	Nickel	0.000639	0.0005	0.002	NE	J		095846-009	SW846 6020
	Potassium	4.45	0.080	0.300	NE			095846-009	SW846 6020
	Selenium	0.00284	0.0015	0.005	0.050	J		095846-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095846-009	SW846 6020
	Sodium	51.1	0.800	2.50	NE			095846-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095846-009	SW846 6020
	Uranium	0.00344	0.000067	0.0002	0.030			095846-009	SW846 6020
	Vanadium	0.0056	0.001	0.005	NE			095846-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095846-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0399	0.015	0.050	NE	J		095864-009	SW846 6020
14-May-14	Antimony	ND	0.001	0.003	0.006	U		095864-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095864-009	SW846 6020
	Barium	0.0816	0.0006	0.002	2.00			095864-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095864-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095864-009	SW846 6020
	Calcium	48.5	0.060	0.200	NE			095864-009	SW846 6020
	Chromium	0.0258	0.002	0.010	0.100			095864-009	SW846 6020
	Cobalt	0.000128	0.0001	0.001	NE	J		095864-009	SW846 6020
	Copper	0.000509	0.00035	0.001	NE	J	0.0044U	095864-009	SW846 6020
	Iron	0.177	0.033	0.100	NE			095864-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095864-009	SW846 6020
	Magnesium	14.0	0.010	0.030	NE			095864-009	SW846 6020
	Manganese	0.00162	0.001	0.005	NE	J		095864-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095864-009	SW846 7470
	Nickel	0.00128	0.0005	0.002	NE	J		095864-009	SW846 6020
	Potassium	3.07	0.080	0.300	NE			095864-009	SW846 6020
	Selenium	0.0035	0.0015	0.005	0.050	J		095864-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095864-009	SW846 6020
	Sodium	41.7	0.080	0.250	NE			095864-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095864-009	SW846 6020
	Uranium	0.00326	0.000067	0.0002	0.030			095864-009	SW846 6020
	Vanadium	0.00683	0.001	0.005	NE			095864-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095864-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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 (Duplicate) 14-May-14	Aluminum	0.0458	0.015	0.050	NE	J		095865-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		095865-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095865-009	SW846 6020
	Barium	0.0824	0.0006	0.002	2.00			095865-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095865-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095865-009	SW846 6020
	Calcium	52.9	0.300	1.00	NE			095865-009	SW846 6020
	Chromium	0.0268	0.002	0.010	0.100			095865-009	SW846 6020
	Cobalt	0.000136	0.0001	0.001	NE	J		095865-009	SW846 6020
	Copper	0.000541	0.00035	0.001	NE	J	0.0044U	095865-009	SW846 6020
	Iron	0.191	0.033	0.100	NE			095865-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095865-009	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			095865-009	SW846 6020
	Manganese	0.00184	0.001	0.005	NE	J		095865-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095865-009	SW846 7470
	Nickel	0.00126	0.0005	0.002	NE	J		095865-009	SW846 6020
	Potassium	3.08	0.080	0.300	NE			095865-009	SW846 6020
	Selenium	0.00367	0.0015	0.005	0.050	J		095865-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095865-009	SW846 6020
	Sodium	43.7	0.080	0.250	NE			095865-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095865-009	SW846 6020
	Uranium	0.00335	0.000067	0.0002	0.030			095865-009	SW846 6020
	Vanadium	0.00726	0.001	0.005	NE			095865-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095865-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0171	0.015	0.050	NE	J		095842-009	SW846 6020
01-May-14	Antimony	ND	0.001	0.003	0.006	U		095842-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095842-009	SW846 6020
	Barium	0.0608	0.0006	0.002	2.00		J	095842-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095842-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095842-009	SW846 6020
	Calcium	48.5	0.060	0.200	NE			095842-009	SW846 6020
	Chromium	0.00347	0.002	0.010	0.100	J		095842-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095842-009	SW846 6020
	Copper	0.000461	0.00035	0.001	NE	J	0.0035U	095842-009	SW846 6020
	Iron	0.141	0.033	0.100	NE			095842-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095842-009	SW846 6020
	Magnesium	16.5	0.050	0.150	NE			095842-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095842-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095842-009	SW846 7470
	Nickel	0.00104	0.0005	0.002	NE	J		095842-009	SW846 6020
	Potassium	2.89	0.080	0.300	NE			095842-009	SW846 6020
	Selenium	0.00252	0.0015	0.005	0.050	J		095842-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095842-009	SW846 6020
	Sodium	52.0	0.400	1.25	NE			095842-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095842-009	SW846 6020
	Uranium	0.00376	0.000067	0.0002	0.030			095842-009	SW846 6020
	Vanadium	0.00646	0.001	0.005	NE			095842-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095842-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5 (Duplicate)	Aluminum	0.016	0.015	0.050	NE	J		095843-009	SW846 6020
01-May-14	Antimony	ND	0.001	0.003	0.006	U		095843-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095843-009	SW846 6020
	Barium	0.0604	0.0006	0.002	2.00		J	095843-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095843-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095843-009	SW846 6020
	Calcium	47.7	0.060	0.200	NE			095843-009	SW846 6020
	Chromium	0.00364	0.002	0.010	0.100	J		095843-009	SW846 6020
	Cobalt	0.000101	0.0001	0.001	NE	J		095843-009	SW846 6020
	Copper	0.000487	0.00035	0.001	NE	J	0.0035U	095843-009	SW846 6020
	Iron	0.140	0.033	0.100	NE			095843-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095843-009	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			095843-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095843-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095843-009	SW846 7470
	Nickel	0.00106	0.0005	0.002	NE	J		095843-009	SW846 6020
	Potassium	2.89	0.080	0.300	NE			095843-009	SW846 6020
	Selenium	0.00221	0.0015	0.005	0.050	J		095843-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095843-009	SW846 6020
	Sodium	48.6	0.080	0.250	NE			095843-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095843-009	SW846 6020
	Uranium	0.00372	0.000067	0.0002	0.030			095843-009	SW846 6020
	Vanadium	0.00649	0.001	0.005	NE			095843-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095843-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.134	0.015	0.050	NE			095879-009	SW846 6020
22-May-14	Antimony	ND	0.001	0.003	0.006	U		095879-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095879-009	SW846 6020
	Barium	0.0651	0.0006	0.002	2.00			095879-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095879-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095879-009	SW846 6020
	Calcium	66.5	0.300	1.00	NE			095879-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095879-009	SW846 6020
	Cobalt	0.000153	0.0001	0.001	NE	J		095879-009	SW846 6020
	Copper	0.000492	0.00035	0.001	NE	J		095879-009	SW846 6020
	Iron	0.257	0.033	0.100	NE			095879-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095879-009	SW846 6020
	Magnesium	20.1	0.010	0.030	NE			095879-009	SW846 6020
	Manganese	0.00186	0.001	0.005	NE	J		095879-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095879-009	SW846 7470
	Nickel	0.00135	0.0005	0.002	NE	J		095879-009	SW846 6020
	Potassium	3.72	0.080	0.300	NE			095879-009	SW846 6020
	Selenium	0.00362	0.0015	0.005	0.050	J		095879-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095879-009	SW846 6020
	Sodium	65.8	0.400	1.25	NE			095879-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095879-009	SW846 6020
	Uranium	0.00392	0.000067	0.0002	0.030			095879-009	SW846 6020
	Vanadium	0.00593	0.001	0.005	NE			095879-009	SW846 6010
	Zinc	0.00635	0.0035	0.010	NE	J		095879-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW7	Aluminum	0.0586	0.015	0.050	NE			095852-009	SW846 6020
06-May-14	Antimony	ND	0.001	0.003	0.006	U		095852-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095852-009	SW846 6020
	Barium	0.0584	0.0006	0.002	2.00			095852-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095852-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095852-009	SW846 6020
	Calcium	59.2	0.600	2.00	NE	B		095852-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095852-009	SW846 6020
	Cobalt	0.000165	0.0001	0.001	NE	J		095852-009	SW846 6020
	Copper	0.000605	0.00035	0.001	NE	J		095852-009	SW846 6020
	Iron	0.149	0.033	0.100	NE			095852-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095852-009	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			095852-009	SW846 6020
	Manganese	0.00985	0.001	0.005	NE			095852-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095852-009	SW846 7470
	Nickel	0.000998	0.0005	0.002	NE	J		095852-009	SW846 6020
	Potassium	4.22	0.080	0.300	NE			095852-009	SW846 6020
	Selenium	0.00301	0.0015	0.005	0.050	J		095852-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095852-009	SW846 6020
	Sodium	56.2	0.800	2.50	NE			095852-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095852-009	SW846 6020
	Uranium	0.00486	0.000067	0.0002	0.030			095852-009	SW846 6020
	Vanadium	0.0067	0.001	0.005	NE			095852-009	SW846 6010
	Zinc	0.00566	0.0035	0.010	NE	J		095852-009	SW846 6020

Refer to footnotes on page 5A-89.

Table 5A-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	0.389	0.015	0.050	NE			095860-009	SW846 6020
13-May-14	Antimony	ND	0.001	0.003	0.006	U		095860-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095860-009	SW846 6020
	Barium	0.0514	0.0006	0.002	2.00			095860-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095860-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095860-009	SW846 6020
	Calcium	56.0	0.300	1.00	NE			095860-009	SW846 6020
	Chromium	0.00287	0.002	0.010	0.100	J		095860-009	SW846 6020
	Cobalt	0.000235	0.0001	0.001	NE	J		095860-009	SW846 6020
	Copper	0.000849	0.00035	0.001	NE	J		095860-009	SW846 6020
	Iron	0.403	0.033	0.100	NE			095860-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095860-009	SW846 6020
	Magnesium	16.5	0.010	0.030	NE			095860-009	SW846 6020
	Manganese	0.00541	0.001	0.005	NE			095860-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095860-009	SW846 7470
	Nickel	0.00148	0.0005	0.002	NE	J		095860-009	SW846 6020
	Potassium	3.56	0.080	0.300	NE			095860-009	SW846 6020
	Selenium	0.00273	0.0015	0.005	0.050	J		095860-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095860-009	SW846 6020
	Sodium	51.4	0.400	1.25	NE			095860-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095860-009	SW846 6020
	Uranium	0.00368	0.000067	0.0002	0.030			095860-009	SW846 6020
	Vanadium	0.00662	0.001	0.005	NE			095860-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095860-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.020	0.015	0.050	NE	J		095849-009	SW846 6020
05-May-14	Antimony	ND	0.001	0.003	0.006	U		095849-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095849-009	SW846 6020
	Barium	0.0656	0.0006	0.002	2.00			095849-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095849-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095849-009	SW846 6020
	Calcium	64.7	0.600	2.00	NE	B		095849-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095849-009	SW846 6020
	Cobalt	0.000105	0.0001	0.001	NE	J		095849-009	SW846 6020
	Copper	0.000709	0.00035	0.001	NE	J		095849-009	SW846 6020
	Iron	0.0961	0.033	0.100	NE	J		095849-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095849-009	SW846 6020
	Magnesium	19.2	0.010	0.030	NE			095849-009	SW846 6020
	Manganese	0.0058	0.001	0.005	NE			095849-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095849-009	SW846 7470
	Nickel	0.00118	0.0005	0.002	NE	J		095849-009	SW846 6020
	Potassium	4.10	0.080	0.300	NE			095849-009	SW846 6020
	Selenium	0.0028	0.0015	0.005	0.050	J		095849-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095849-009	SW846 6020
	Sodium	56.8	0.800	2.50	NE			095849-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095849-009	SW846 6020
	Uranium	0.00535	0.000067	0.0002	0.030			095849-009	SW846 6020
	Vanadium	0.00676	0.001	0.005	NE			095849-009	SW846 6010
	Zinc	0.00392	0.0035	0.010	NE	J		095849-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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		095881-009	SW846 6020
27-May-14	Antimony	ND	0.001	0.003	0.006	U		095881-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095881-009	SW846 6020
	Barium	0.0559	0.0006	0.002	2.00			095881-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095881-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095881-009	SW846 6020
	Calcium	61.8	0.300	1.00	NE			095881-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095881-009	SW846 6020
	Cobalt	0.000107	0.0001	0.001	NE	J		095881-009	SW846 6020
	Copper	0.000444	0.00035	0.001	NE	J		095881-009	SW846 6020
	Iron	0.144	0.033	0.100	NE			095881-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095881-009	SW846 6020
	Magnesium	15.6	0.010	0.030	NE			095881-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095881-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095881-009	SW846 7470
	Nickel	0.00121	0.0005	0.002	NE	J		095881-009	SW846 6020
	Potassium	4.13	0.080	0.300	NE			095881-009	SW846 6020
	Selenium	0.00245	0.0015	0.005	0.050	J		095881-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095881-009	SW846 6020
	Sodium	61.6	0.400	1.25	NE			095881-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095881-009	SW846 6020
	Uranium	0.00349	0.000067	0.0002	0.030			095881-009	SW846 6020
	Vanadium	0.00544	0.001	0.005	NE			095881-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095881-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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		095867-009	SW846 6020
15-May-14	Antimony	ND	0.001	0.003	0.006	U		095867-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095867-009	SW846 6020
	Barium	0.0623	0.0006	0.002	2.00			095867-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095867-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095867-009	SW846 6020
	Calcium	54.9	0.300	1.00	NE			095867-009	SW846 6020
	Chromium	0.00348	0.002	0.010	0.100	J		095867-009	SW846 6020
	Cobalt	0.000123	0.0001	0.001	NE	J		095867-009	SW846 6020
	Copper	0.000471	0.00035	0.001	NE	J		095867-009	SW846 6020
	Iron	0.143	0.033	0.100	NE			095867-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095867-009	SW846 6020
	Magnesium	14.9	0.010	0.030	NE			095867-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095867-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095867-009	SW846 7470
	Nickel	0.00117	0.0005	0.002	NE	J		095867-009	SW846 6020
	Potassium	3.59	0.080	0.300	NE			095867-009	SW846 6020
	Selenium	0.00381	0.0015	0.005	0.050	J		095867-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095867-009	SW846 6020
	Sodium	52.2	0.400	1.25	NE			095867-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095867-009	SW846 6020
	Uranium	0.00323	0.000067	0.0002	0.030			095867-009	SW846 6020
	Vanadium	0.00593	0.001	0.005	NE			095867-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095867-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.111	0.015	0.050	NE			095877-009	SW846 6020
21-May-14	Antimony	ND	0.001	0.003	0.006	U		095877-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095877-009	SW846 6020
	Barium	0.0693	0.0006	0.002	2.00			095877-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095877-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095877-009	SW846 6020
	Calcium	60.8	0.300	1.00	NE			095877-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095877-009	SW846 6020
	Cobalt	0.000156	0.0001	0.001	NE	J		095877-009	SW846 6020
	Copper	0.000536	0.00035	0.001	NE	J		095877-009	SW846 6020
	Iron	0.234	0.033	0.100	NE			095877-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095877-009	SW846 6020
	Magnesium	19.1	0.010	0.030	NE			095877-009	SW846 6020
	Manganese	0.00323	0.001	0.005	NE	J		095877-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095877-009	SW846 7470
	Nickel	0.00128	0.0005	0.002	NE	J		095877-009	SW846 6020
	Potassium	3.79	0.080	0.300	NE			095877-009	SW846 6020
	Selenium	0.00208	0.0015	0.005	0.050	J		095877-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095877-009	SW846 6020
	Sodium	60.1	0.400	1.25	NE			095877-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095877-009	SW846 6020
	Uranium	0.00477	0.000067	0.0002	0.030			095877-009	SW846 6020
	Vanadium	0.0043	0.001	0.005	NE	J		095877-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095877-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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		095838-009	SW846 6020
30-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095838-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095838-009	SW846 6020
	Barium	0.055	0.0006	0.002	2.00		J	095838-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095838-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095838-009	SW846 6020
	Calcium	57.4	0.300	1.00	NE			095838-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095838-009	SW846 6020
	Cobalt	0.000102	0.0001	0.001	NE	J		095838-009	SW846 6020
	Copper	0.000506	0.00035	0.001	NE	J		095838-009	SW846 6020
	Iron	0.139	0.033	0.100	NE			095838-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095838-009	SW846 6020
	Magnesium	17.3	0.050	0.150	NE			095838-009	SW846 6020
	Manganese	0.00254	0.001	0.005	NE	J		095838-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095838-009	SW846 7470
	Nickel	0.00114	0.0005	0.002	NE	J		095838-009	SW846 6020
	Potassium	3.45	0.080	0.300	NE			095838-009	SW846 6020
	Selenium	0.00215	0.0015	0.005	0.050	J		095838-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095838-009	SW846 6020
	Sodium	55.9	0.400	1.25	NE			095838-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095838-009	SW846 6020
	Uranium	0.00409	0.000067	0.0002	0.030			095838-009	SW846 6020
	Vanadium	0.00567	0.001	0.005	NE			095838-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095838-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0474	0.015	0.050	NE	J		095874-009	SW846 6020
20-May-14	Antimony	ND	0.001	0.003	0.006	U		095874-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095874-009	SW846 6020
	Barium	0.0544	0.0006	0.002	2.00			095874-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095874-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095874-009	SW846 6020
	Calcium	64.4	0.300	1.00	NE			095874-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095874-009	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		095874-009	SW846 6020
	Copper	0.000471	0.00035	0.001	NE	J	0.003U	095874-009	SW846 6020
	Iron	0.191	0.033	0.100	NE			095874-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095874-009	SW846 6020
	Magnesium	18.7	0.010	0.030	NE			095874-009	SW846 6020
	Manganese	0.00171	0.001	0.005	NE	J	0.015U	095874-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095874-009	SW846 7470
	Nickel	0.00125	0.0005	0.002	NE	J		095874-009	SW846 6020
	Potassium	4.21	0.080	0.300	NE			095874-009	SW846 6020
	Selenium	0.00265	0.0015	0.005	0.050	J		095874-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095874-009	SW846 6020
	Sodium	65.0	0.400	1.25	NE			095874-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095874-009	SW846 6020
	Uranium	0.00427	0.000067	0.0002	0.030			095874-009	SW846 6020
	Vanadium	0.00544	0.001	0.005	NE			095874-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095874-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0476	0.015	0.050	NE	J		095875-009	SW846 6020
20-May-14	Antimony	ND	0.001	0.003	0.006	U		095875-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095875-009	SW846 6020
	Barium	0.0544	0.0006	0.002	2.00			095875-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095875-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095875-009	SW846 6020
	Calcium	65.1	0.300	1.00	NE			095875-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095875-009	SW846 6020
	Cobalt	0.000134	0.0001	0.001	NE	J		095875-009	SW846 6020
	Copper	0.000509	0.00035	0.001	NE	J	0.003U	095875-009	SW846 6020
	Iron	0.195	0.033	0.100	NE			095875-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095875-009	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			095875-009	SW846 6020
	Manganese	0.00161	0.001	0.005	NE	J	0.015U	095875-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095875-009	SW846 7470
	Nickel	0.00125	0.0005	0.002	NE	J		095875-009	SW846 6020
	Potassium	4.13	0.080	0.300	NE			095875-009	SW846 6020
	Selenium	0.00252	0.0015	0.005	0.050	J		095875-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095875-009	SW846 6020
	Sodium	65.6	0.400	1.25	NE			095875-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095875-009	SW846 6020
	Uranium	0.00426	0.000067	0.0002	0.030			095875-009	SW846 6020
	Vanadium	0.00512	0.001	0.005	NE			095875-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095875-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	41.4	0.060	0.200	NE	B		096291-017	SW846 6020
24-Jul-14	Magnesium	9.14	0.010	0.030	NE			096291-017	SW846 6020
	Potassium	3.25	0.080	0.300	NE			096291-017	SW846 6020
	Sodium	36.3	0.080	0.250	NE			096291-017	SW846 6020
AVN-1 (Duplicate)	Calcium	42.1	0.060	0.200	NE	B		096292-017	SW846 6020
24-Jul-14	Magnesium	9.24	0.010	0.030	NE			096292-017	SW846 6020
	Potassium	3.26	0.080	0.300	NE			096292-017	SW846 6020
	Sodium	36.6	0.080	0.250	NE			096292-017	SW846 6020
LWDS-MW1	Calcium	69.0	0.600	2.00	NE			096316-017	SW846 6020
11-Aug-14	Magnesium	17.6	0.010	0.030	NE			096316-017	SW846 6020
	Potassium	2.93	0.080	0.300	NE			096316-017	SW846 6020
	Sodium	67.0	0.800	2.50	NE			096316-017	SW846 6020
LWDS-MW2	Calcium	41.5	0.060	0.200	NE			096299-017	SW846 6020
29-Jul-14	Magnesium	12.7	0.010	0.030	NE			096299-017	SW846 6020
	Potassium	2.72	0.080	0.300	NE			096299-017	SW846 6020
	Sodium	38.9	0.080	0.250	NE		J	096299-017	SW846 6020
LWDS-MW2 (Duplicate)	Calcium	44.0	0.060	0.200	NE			096300-017	SW846 6020
29-Jul-14	Magnesium	13.1	0.010	0.030	NE			096300-017	SW846 6020
	Potassium	2.80	0.080	0.300	NE			096300-017	SW846 6020
	Sodium	40.7	0.080	0.250	NE		J	096300-017	SW846 6020
TAV-MW2	Calcium	70.3	0.600	2.00	NE			096632-017	SW846 6020
09-Sep-14	Magnesium	22.7	0.100	0.300	NE			096632-017	SW846 6020
	Potassium	3.60	0.080	0.300	NE			096632-017	SW846 6020
	Sodium	66.5	0.800	2.50	NE			096632-017	SW846 6020
TAV-MW4	Calcium	48.3	0.060	0.200	NE			096303-017	SW846 6020
30-Jul-14	Magnesium	14.1	0.010	0.030	NE			096303-017	SW846 6020
	Potassium	3.23	0.080	0.300	NE			096303-017	SW846 6020
	Sodium	43.2	0.080	0.250	NE		J	096303-017	SW846 6020
TAV-MW6	Calcium	67.2	0.300	1.00	NE			096312-017	SW846 6020
06-Aug-14	Magnesium	18.6	0.010	0.030	NE			096312-017	SW846 6020
	Potassium	3.73	0.080	0.300	NE			096312-017	SW846 6020
	Sodium	65.9	0.400	1.25	NE			096312-017	SW846 6020
TAV-MW8	Calcium	55.2	0.300	1.00	NE			096294-017	SW846 6020
28-Jul-14	Magnesium	15.7	0.010	0.030	NE			096294-017	SW846 6020
	Potassium	3.81	0.080	0.300	NE			096294-017	SW846 6020
	Sodium	53.2	0.400	1.25	NE		J	096294-017	SW846 6020

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

Calendar Year 2014

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	Calcium	62.3	0.300	1.00	NE			096314-017	SW846 6020
07-Aug-14	Magnesium	16.9	0.010	0.030	NE			096314-017	SW846 6020
	Potassium	4.29	0.080	0.300	NE			096314-017	SW846 6020
	Sodium	59.0	0.400	1.25	NE			096314-017	SW846 6020
TAV-MW11	Calcium	54.2	0.300	1.00	NE			096305-017	SW846 6020
31-Jul-14	Magnesium	15.3	0.010	0.030	NE			096305-017	SW846 6020
	Potassium	3.74	0.080	0.300	NE			096305-017	SW846 6020
	Sodium	50.0	0.080	0.250	NE		J	096305-017	SW846 6020
TAV-MW12	Calcium	60.1	0.300	1.00	NE			096309-017	SW846 6020
05-Aug-14	Magnesium	19.6	0.010	0.030	NE			096309-017	SW846 6020
	Potassium	3.88	0.080	0.300	NE			096309-017	SW846 6020
	Sodium	55.9	0.400	1.25	NE			096309-017	SW846 6020
TAV-MW13	Calcium	48.4	0.060	0.200	NE	B		096286-017	SW846 6020
23-Jul-14	Magnesium	14.0	0.010	0.030	NE			096286-017	SW846 6020
	Potassium	3.31	0.080	0.300	NE			096286-017	SW846 6020
	Sodium	46.0	0.080	0.250	NE			096286-017	SW846 6020
TAV-MW14	Calcium	60.6	0.300	1.00	NE			096307-017	SW846 6020
04-Aug-14	Magnesium	20.3	0.010	0.030	NE			096307-017	SW846 6020
	Potassium	4.19	0.080	0.300	NE			096307-017	SW846 6020
	Sodium	58.2	0.400	1.25	NE			096307-017	SW846 6020
AVN-1	Calcium	43.4	0.060	0.200	NE			096821-010	SW846 6020
30-Oct-14	Magnesium	10.0	0.010	0.030	NE			096821-010	SW846 6020
	Potassium	3.41	0.080	0.300	NE			096821-010	SW846 6020
	Sodium	40.8	0.080	0.250	NE			096821-010	SW846 6020
LWDS-MW1	Calcium	66.4	0.300	1.00	NE			096853-010	SW846 6020
17-Nov-14	Magnesium	20.3	0.010	0.030	NE			096853-010	SW846 6020
	Potassium	3.04	0.080	0.300	NE			096853-010	SW846 6020
	Sodium	64.9	0.400	1.25	NE			096853-010	SW846 6020
LWDS-MW1 (Duplicate)	Calcium	65.2	0.300	1.00	NE			096854-010	SW846 6020
17-Nov-14	Magnesium	20.3	0.010	0.030	NE			096854-010	SW846 6020
	Potassium	3.01	0.080	0.300	NE			096854-010	SW846 6020
	Sodium	64.2	0.400	1.25	NE			096854-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Calcium	45.0	0.060	0.200	NE			096825-010	SW846 6020
03-Nov-14	Magnesium	13.0	0.010	0.030	NE			096825-010	SW846 6020
	Potassium	2.71	0.080	0.300	NE			096825-010	SW846 6020
	Sodium	42.5	0.080	0.250	NE			096825-010	SW846 6020
TAV-MW2	Calcium	70.9	0.300	1.00	NE			096827-010	SW846 6020
04-Nov-14	Magnesium	22.0	0.100	0.300	NE			096827-010	SW846 6020
	Potassium	3.71	0.080	0.300	NE			096827-010	SW846 6020
	Sodium	65.2	0.400	1.25	NE			096827-010	SW846 6020
TAV-MW3	Calcium	51.4	0.600	2.00	NE			096816-010	SW846 6020
28-Oct-14	Magnesium	14.6	0.010	0.030	NE			096816-010	SW846 6020
	Potassium	4.44	0.080	0.300	NE			096816-010	SW846 6020
	Sodium	48.7	0.800	2.50	NE			096816-010	SW846 6020
TAV-MW3 (Duplicate)	Calcium	52.2	0.600	2.00	NE			096817-010	SW846 6020
28-Oct-14	Magnesium	14.5	0.010	0.030	NE			096817-010	SW846 6020
	Potassium	4.46	0.080	0.300	NE			096817-010	SW846 6020
	Sodium	50.3	0.800	2.50	NE			096817-010	SW846 6020
TAV-MW4	Calcium	49.1	0.060	0.200	NE			096829-010	SW846 6020
05-Nov-14	Magnesium	14.2	0.010	0.030	NE			096829-010	SW846 6020
	Potassium	3.05	0.080	0.300	NE			096829-010	SW846 6020
	Sodium	43.2	0.080	0.250	NE			096829-010	SW846 6020
TAV-MW5	Calcium	48.3	0.060	0.200	NE			096809-010	SW846 6020
24-Oct-14	Magnesium	14.3	0.010	0.030	NE			096809-010	SW846 6020
	Potassium	2.94	0.080	0.300	NE			096809-010	SW846 6020
	Sodium	48.1	0.080	0.250	NE			096809-010	SW846 6020
TAV-MW6	Calcium	66.1	0.300	1.00	NE			096845-010	SW846 6020
12-Nov-14	Magnesium	19.4	0.010	0.030	NE			096845-010	SW846 6020
	Potassium	3.92	0.080	0.300	NE			096845-010	SW846 6020
	Sodium	63.6	0.400	1.25	NE			096845-010	SW846 6020
TAV-MW7	Calcium	55.9	0.600	2.00	NE			096819-010	SW846 6020
29-Oct-14	Magnesium	18.8	0.010	0.030	NE			096819-010	SW846 6020
	Potassium	4.06	0.080	0.300	NE			096819-010	SW846 6020
	Sodium	52.0	0.800	2.50	NE			096819-010	SW846 6020
TAV-MW8	Calcium	54.7	0.600	2.00	NE			096823-010	SW846 6020
31-Oct-14	Magnesium	16.6	0.010	0.030	NE			096823-010	SW846 6020
	Potassium	3.78	0.080	0.300	NE			096823-010	SW846 6020
	Sodium	53.6	0.800	2.50	NE			096823-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	Calcium	58.8	0.600	2.00	NE			096811-010	SW846 6020
27-Oct-14	Magnesium	19.8	0.010	0.030	NE			096811-010	SW846 6020
	Potassium	4.20	0.080	0.300	NE			096811-010	SW846 6020
	Sodium	53.9	0.800	2.50	NE			096811-010	SW846 6020
TAV-MW10	Calcium	60.2	0.300	1.00	NE			096848-010	SW846 6020
13-Nov-14	Magnesium	17.4	0.010	0.030	NE			096848-010	SW846 6020
	Potassium	4.43	0.080	0.300	NE			096848-010	SW846 6020
	Sodium	60.4	0.400	1.25	NE			096848-010	SW846 6020
TAV-MW11	Calcium	55.8	0.300	1.00	NE			096833-010	SW846 6020
06-Nov-14	Magnesium	15.5	0.010	0.030	NE			096833-010	SW846 6020
	Potassium	3.78	0.080	0.300	NE			096833-010	SW846 6020
	Sodium	54.2	0.400	1.25	NE			096833-010	SW846 6020
TAV-MW11 (Duplicate)	Calcium	56.8	0.300	1.00	NE			096834-010	SW846 6020
06-Nov-14	Magnesium	15.0	0.010	0.030	NE			096834-010	SW846 6020
	Potassium	3.69	0.080	0.300	NE			096834-010	SW846 6020
	Sodium	54.7	0.400	1.25	NE			096834-010	SW846 6020
TAV-MW12	Calcium	57.1	0.300	1.00	NE			096842-010	SW846 6020
11-Nov-14	Magnesium	19.2	0.010	0.030	NE			096842-010	SW846 6020
	Potassium	3.91	0.080	0.300	NE			096842-010	SW846 6020
	Sodium	60.4	0.400	1.25	NE			096842-010	SW846 6020
TAV-MW13	Calcium	55.4	0.300	1.00	NE	B		096807-010	SW846 6020
23-Oct-14	Magnesium	16.1	0.010	0.030	NE			096807-010	SW846 6020
	Potassium	3.51	0.080	0.300	NE			096807-010	SW846 6020
	Sodium	48.8	0.080	0.250	NE			096807-010	SW846 6020
TAV-MW14	Calcium	62.0	0.300	1.00	NE			096838-010	SW846 6020
10-Nov-14	Magnesium	19.1	0.010	0.030	NE			096838-010	SW846 6020
	Potassium	4.43	0.080	0.300	NE			096838-010	SW846 6020
	Sodium	60.7	0.400	1.25	NE			096838-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.226	0.033	0.100	NE	*	J	095321-009	SW846 6020
19-Feb-14	Manganese	0.00258	0.001	0.005	NE	B, J	0.0066U	095321-009	SW846 6020
LWDS-MW1	Iron	0.156	0.033	0.100	NE	B	0.17U	095341-009	SW846 6020
03-Mar-14	Manganese	ND	0.001	0.005	NE	U		095341-009	SW846 6020
LWDS-MW2	Iron	0.104	0.033	0.100	NE	*	J	095324-009	SW846 6020
20-Feb-14	Manganese	ND	0.001	0.005	NE	U		095324-009	SW846 6020
TAV-MW2	Iron	0.279	0.033	0.100	NE	B	0.29U	095326-009	SW846 6020
21-Feb-14	Manganese	0.00163	0.001	0.005	NE	J		095326-009	SW846 6020
TAV-MW4	Iron	0.0946	0.033	0.100	NE	*, J	J	095328-009	SW846 6020
24-Feb-14	Manganese	ND	0.001	0.005	NE	U		095328-009	SW846 6020
TAV-MW6	Iron	0.171	0.033	0.100	NE	B		095346-009	SW846 6020
05-Mar-14	Manganese	ND	0.001	0.005	NE	U		095346-009	SW846 6020
TAV-MW8	Iron	0.336	0.033	0.100	NE	*	J	095333-009	SW846 6020
25-Feb-14	Manganese	ND	0.001	0.005	NE	U		095333-009	SW846 6020
TAV-MW8 (Duplicate)	Iron	0.132	0.033	0.100	NE	*	J	095334-009	SW846 6020
25-Feb-14	Manganese	0.00141	0.001	0.005	NE	B, J	0.014U	095334-009	SW846 6020
TAV-MW10	Iron	0.181	0.033	0.100	NE	B		095351-009	SW846 6020
06-Mar-14	Manganese	ND	0.001	0.005	NE	U		095351-009	SW846 6020
TAV-MW10 (Duplicate)	Iron	0.181	0.033	0.100	NE	B		095352-009	SW846 6020
06-Mar-14	Manganese	ND	0.001	0.005	NE	U		095352-009	SW846 6020
TAV-MW11	Iron	0.128	0.033	0.100	NE	*	J	095337-009	SW846 6020
26-Feb-14	Manganese	ND	0.001	0.005	NE	U		095337-009	SW846 6020
TAV-MW12	Iron	0.129	0.033	0.100	NE	B	0.17U	095344-009	SW846 6020
04-Mar-14	Manganese	0.0223	0.001	0.005	NE			095344-009	SW846 6020
TAV-MW13	Iron	0.325	0.033	0.100	NE	*	J	095319-009	SW846 6020
18-Feb-14	Manganese	0.004	0.001	0.005	NE	B, J	0.0066U	095319-009	SW846 6020
TAV-MW14	Iron	0.199	0.033	0.100	NE	*	J	095339-009	SW846 6020
27-Feb-14	Manganese	ND	0.001	0.005	NE	U		095339-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Aluminum	ND	0.015	0.050	NE	U		095854-010	SW846 6020
07-May-14	Antimony	ND	0.001	0.003	0.006	U		095854-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095854-010	SW846 6020
	Barium	0.0795	0.0006	0.002	2.00			095854-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095854-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095854-010	SW846 6020
	Calcium	42.8	0.060	0.200	NE			095854-010	SW846 6020
	Chromium	0.00252	0.002	0.010	0.100	J		095854-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095854-010	SW846 6020
	Copper	0.000521	0.00035	0.001	NE	J		095854-010	SW846 6020
	Iron	0.0949	0.033	0.100	NE	J		095854-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095854-010	SW846 6020
	Magnesium	9.40	0.010	0.030	NE			095854-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095854-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095854-010	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	J		095854-010	SW846 6020
	Potassium	3.12	0.080	0.300	NE	N	J	095854-010	SW846 6020
	Selenium	0.00189	0.0015	0.005	0.050	J		095854-010	SW846 6020
	Silver	0.000367	0.0002	0.001	NE	J		095854-010	SW846 6020
	Sodium	36.3	0.080	0.250	NE			095854-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095854-010	SW846 6020
	Vanadium	0.00716	0.001	0.005	NE			095854-010	SW846 6010
	Zinc	0.00375	0.0035	0.010	NE	J		095854-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Aluminum	ND	0.015	0.050	NE	U		095869-010	SW846 6020
19-May-14	Antimony	ND	0.001	0.003	0.006	U		095869-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095869-010	SW846 6020
	Barium	0.0791	0.0006	0.002	2.00			095869-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095869-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095869-010	SW846 6020
	Calcium	67.9	0.300	1.00	NE			095869-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095869-010	SW846 6020
	Cobalt	0.000122	0.0001	0.001	NE	J		095869-010	SW846 6020
	Copper	0.000549	0.00035	0.001	NE	J		095869-010	SW846 6020
	Iron	0.165	0.033	0.100	NE			095869-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095869-010	SW846 6020
	Magnesium	20.4	0.010	0.030	NE			095869-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095869-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095869-010	SW846 7470
	Nickel	0.00135	0.0005	0.002	NE	J		095869-010	SW846 6020
	Potassium	2.86	0.080	0.300	NE			095869-010	SW846 6020
	Selenium	0.00518	0.0015	0.005	0.050			095869-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095869-010	SW846 6020
	Sodium	68.5	0.400	1.25	NE			095869-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095869-010	SW846 6020
	Vanadium	0.00485	0.001	0.005	NE	J		095869-010	SW846 6010
	Zinc	0.00425	0.0035	0.010	NE	J		095869-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095856-010	SW846 6020
09-May-14	Antimony	ND	0.001	0.003	0.006	U		095856-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095856-010	SW846 6020
	Barium	0.0695	0.0006	0.002	2.00			095856-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095856-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095856-010	SW846 6020
	Calcium	45.5	0.060	0.200	NE			095856-010	SW846 6020
	Chromium	0.00311	0.002	0.010	0.100	J		095856-010	SW846 6020
	Cobalt	0.000114	0.0001	0.001	NE	J		095856-010	SW846 6020
	Copper	0.000576	0.00035	0.001	NE	J		095856-010	SW846 6020
	Iron	0.0968	0.033	0.100	NE	J		095856-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095856-010	SW846 6020
	Magnesium	13.4	0.010	0.030	NE			095856-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095856-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095856-010	SW846 7470
	Nickel	0.00105	0.0005	0.002	NE	J		095856-010	SW846 6020
	Potassium	2.65	0.080	0.300	NE	N	J	095856-010	SW846 6020
	Selenium	0.00198	0.0015	0.005	0.050	J		095856-010	SW846 6020
	Silver	0.000722	0.0002	0.001	NE	J		095856-010	SW846 6020
	Sodium	42.7	0.080	0.250	NE			095856-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095856-010	SW846 6020
	Vanadium	0.00728	0.001	0.005	NE			095856-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095856-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095858-010	SW846 6020
12-May-14	Antimony	ND	0.001	0.003	0.006	U		095858-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095858-010	SW846 6020
	Barium	0.0574	0.0006	0.002	2.00			095858-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095858-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095858-010	SW846 6020
	Calcium	69.0	0.300	1.00	NE			095858-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095858-010	SW846 6020
	Cobalt	0.000155	0.0001	0.001	NE	J		095858-010	SW846 6020
	Copper	0.000558	0.00035	0.001	NE	J		095858-010	SW846 6020
	Iron	0.171	0.033	0.100	NE			095858-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095858-010	SW846 6020
	Magnesium	21.2	0.010	0.030	NE			095858-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095858-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095858-010	SW846 7470
	Nickel	0.00154	0.0005	0.002	NE	J		095858-010	SW846 6020
	Potassium	3.70	0.080	0.300	NE			095858-010	SW846 6020
	Selenium	0.00252	0.0015	0.005	0.050	J		095858-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095858-010	SW846 6020
	Sodium	62.1	0.400	1.25	NE			095858-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095858-010	SW846 6020
	Vanadium	0.00574	0.001	0.005	NE			095858-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095858-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095846-010	SW846 6020
02-May-14	Antimony	ND	0.001	0.003	0.006	U		095846-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095846-010	SW846 6020
	Barium	0.047	0.0006	0.002	2.00			095846-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095846-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095846-010	SW846 6020
	Calcium	56.4	0.600	2.00	NE	B		095846-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095846-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095846-010	SW846 6020
	Copper	0.000361	0.00035	0.001	NE	J		095846-010	SW846 6020
	Iron	0.066	0.033	0.100	NE	J		095846-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095846-010	SW846 6020
	Magnesium	14.0	0.010	0.030	NE			095846-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095846-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095846-010	SW846 7470
	Nickel	0.00057	0.0005	0.002	NE	J		095846-010	SW846 6020
	Potassium	4.35	0.080	0.300	NE			095846-010	SW846 6020
	Selenium	0.0027	0.0015	0.005	0.050	J		095846-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095846-010	SW846 6020
	Sodium	49.1	0.080	0.250	NE			095846-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095846-010	SW846 6020
	Vanadium	0.00655	0.001	0.005	NE			095846-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095846-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4	Aluminum	ND	0.015	0.050	NE	U		095864-010	SW846 6020
14-May-14	Antimony	ND	0.001	0.003	0.006	U		095864-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095864-010	SW846 6020
	Barium	0.082	0.0006	0.002	2.00			095864-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095864-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095864-010	SW846 6020
	Calcium	49.1	0.060	0.200	NE			095864-010	SW846 6020
	Chromium	0.026	0.002	0.010	0.100			095864-010	SW846 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		095864-010	SW846 6020
	Copper	0.000472	0.00035	0.001	NE	J		095864-010	SW846 6020
	Iron	0.130	0.033	0.100	NE			095864-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095864-010	SW846 6020
	Magnesium	13.7	0.010	0.030	NE			095864-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095864-010	SW846 6020
	Mercury	**0.00206**	0.000067	0.0002	0.002		R	095864-010	SW846 7470
	Nickel	0.00107	0.0005	0.002	NE	J		095864-010	SW846 6020
	Potassium	3.11	0.080	0.300	NE			095864-010	SW846 6020
	Selenium	0.00332	0.0015	0.005	0.050	J		095864-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095864-010	SW846 6020
	Sodium	43.9	0.080	0.250	NE			095864-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095864-010	SW846 6020
	Vanadium	0.00632	0.001	0.005	NE			095864-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095864-010	SW846 6020

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

Calendar Year 2014

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095865-010	SW846 6020
14-May-14	Antimony	ND	0.001	0.003	0.006	U		095865-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095865-010	SW846 6020
	Barium	0.0807	0.0006	0.002	2.00			095865-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095865-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095865-010	SW846 6020
	Calcium	47.8	0.060	0.200	NE			095865-010	SW846 6020
	Chromium	0.0255	0.002	0.010	0.100			095865-010	SW846 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		095865-010	SW846 6020
	Copper	0.000475	0.00035	0.001	NE	J		095865-010	SW846 6020
	Iron	0.157	0.033	0.100	NE			095865-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095865-010	SW846 6020
	Magnesium	14.0	0.010	0.030	NE			095865-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095865-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095865-010	SW846 7470
	Nickel	0.00103	0.0005	0.002	NE	J		095865-010	SW846 6020
	Potassium	3.00	0.080	0.300	NE			095865-010	SW846 6020
	Selenium	0.0034	0.0015	0.005	0.050	J		095865-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095865-010	SW846 6020
	Sodium	42.3	0.080	0.250	NE			095865-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095865-010	SW846 6020
	Vanadium	0.00681	0.001	0.005	NE			095865-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095865-010	SW846 6020

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095842-010	SW846 6020
1-May-14	Antimony	ND	0.001	0.003	0.006	U		095842-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095842-010	SW846 6020
	Barium	0.0655	0.0006	0.002	2.00		J	095842-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095842-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095842-010	SW846 6020
	Calcium	49.5	0.060	0.200	NE			095842-010	SW846 6020
	Chromium	0.0033	0.002	0.010	0.100	J		095842-010	SW846 6020
	Cobalt	0.0001	0.0001	0.001	NE	J		095842-010	SW846 6020
	Copper	0.000471	0.00035	0.001	NE	J	0.0027U	095842-010	SW846 6020
	Iron	0.127	0.033	0.100	NE			095842-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095842-010	SW846 6020
	Magnesium	15.3	0.010	0.030	NE			095842-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095842-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095842-010	SW846 7470
	Nickel	0.00101	0.0005	0.002	NE	J		095842-010	SW846 6020
	Potassium	2.84	0.080	0.300	NE			095842-010	SW846 6020
	Selenium	0.00232	0.0015	0.005	0.050	J		095842-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095842-010	SW846 6020
	Sodium	49.4	0.080	0.250	NE			095842-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095842-010	SW846 6020
	Vanadium	0.00609	0.001	0.005	NE			095842-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095842-010	SW846 6020

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

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095843-010	SW846 6020
1-May-14	Antimony	ND	0.001	0.003	0.006	U		095843-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095843-010	SW846 6020
	Barium	0.0636	0.0006	0.002	2.00		J	095843-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095843-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095843-010	SW846 6020
	Calcium	46.8	0.060	0.200	NE			095843-010	SW846 6020
	Chromium	0.00226	0.002	0.010	0.100	J		095843-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095843-010	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		095843-010	SW846 6020
	Iron	0.120	0.033	0.100	NE			095843-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095843-010	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			095843-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095843-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095843-010	SW846 7470
	Nickel	0.000733	0.0005	0.002	NE	J		095843-010	SW846 6020
	Potassium	2.90	0.080	0.300	NE			095843-010	SW846 6020
	Selenium	0.00244	0.0015	0.005	0.050	J		095843-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095843-010	SW846 6020
	Sodium	49.7	0.080	0.250	NE			095843-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095843-010	SW846 6020
	Vanadium	0.00555	0.001	0.005	NE			095843-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095843-010	SW846 6020

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095879-010	SW846 6020
22-May-14	Antimony	ND	0.001	0.003	0.006	U		095879-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095879-010	SW846 6020
	Barium	0.0645	0.0006	0.002	2.00			095879-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095879-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095879-010	SW846 6020
	Calcium	66.0	0.300	1.00	NE			095879-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095879-010	SW846 6020
	Cobalt	0.000146	0.0001	0.001	NE	J		095879-010	SW846 6020
	Copper	0.000529	0.00035	0.001	NE	J		095879-010	SW846 6020
	Iron	0.172	0.033	0.100	NE			095879-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095879-010	SW846 6020
	Magnesium	20.3	0.010	0.030	NE			095879-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095879-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095879-010	SW846 7470
	Nickel	0.00133	0.0005	0.002	NE	J		095879-010	SW846 6020
	Potassium	3.57	0.080	0.300	NE			095879-010	SW846 6020
	Selenium	0.0039	0.0015	0.005	0.050	J		095879-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095879-010	SW846 6020
	Sodium	66.7	0.400	1.25	NE			095879-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095879-010	SW846 6020
	Vanadium	0.00536	0.001	0.005	NE			095879-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095879-010	SW846 6020

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

Calendar Year 2014

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		095852-010	SW846 6020
06-May-14	Antimony	ND	0.001	0.003	0.006	U		095852-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095852-010	SW846 6020
	Barium	0.0541	0.0006	0.002	2.00			095852-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095852-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095852-010	SW846 6020
	Calcium	61.0	0.300	1.00	NE			095852-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095852-010	SW846 6020
	Cobalt	0.000134	0.0001	0.001	NE	J		095852-010	SW846 6020
	Copper	0.000464	0.00035	0.001	NE	J		095852-010	SW846 6020
	Iron	0.121	0.033	0.100	NE			095852-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095852-010	SW846 6020
	Magnesium	18.1	0.010	0.030	NE			095852-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095852-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095852-010	SW846 7470
	Nickel	0.00117	0.0005	0.002	NE	J		095852-010	SW846 6020
	Potassium	3.82	0.080	0.300	NE	N	J	095852-010	SW846 6020
	Selenium	0.00189	0.0015	0.005	0.050	J		095852-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095852-010	SW846 6020
	Sodium	57.2	0.400	1.25	NE			095852-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095852-010	SW846 6020
	Vanadium	0.00682	0.001	0.005	NE			095852-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095852-010	SW846 6020

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Table 5A-7 *(Continued)*
Summary of Filtered 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	ND	0.015	0.050	NE	U		095860-010	SW846 6020
13-May-14	Antimony	ND	0.001	0.003	0.006	U		095860-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095860-010	SW846 6020
	Barium	0.0507	0.0006	0.002	2.00			095860-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095860-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095860-010	SW846 6020
	Calcium	55.3	0.300	1.00	NE			095860-010	SW846 6020
	Chromium	0.00266	0.002	0.010	0.100	J		095860-010	SW846 6020
	Cobalt	0.000134	0.0001	0.001	NE	J		095860-010	SW846 6020
	Copper	0.000712	0.00035	0.001	NE	J		095860-010	SW846 6020
	Iron	0.155	0.033	0.100	NE			095860-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095860-010	SW846 6020
	Magnesium	15.7	0.010	0.030	NE			095860-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095860-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095860-010	SW846 7470
	Nickel	0.00121	0.0005	0.002	NE	J		095860-010	SW846 6020
	Potassium	3.61	0.080	0.300	NE			095860-010	SW846 6020
	Selenium	0.00262	0.0015	0.005	0.050	J		095860-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095860-010	SW846 6020
	Sodium	53.0	0.400	1.25	NE			095860-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095860-010	SW846 6020
	Vanadium	0.00605	0.001	0.005	NE			095860-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095860-010	SW846 6020

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Table 5A-7 *(Continued)*
Summary of Filtered 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	ND	0.015	0.050	NE	U		095849-010	SW846 6020
05-May-14	Antimony	ND	0.001	0.003	0.006	U		095849-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095849-010	SW846 6020
	Barium	0.0629	0.0006	0.002	2.00			095849-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095849-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095849-010	SW846 6020
	Calcium	64.0	0.300	1.00	NE			095849-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095849-010	SW846 6020
	Cobalt	0.000154	0.0001	0.001	NE	J		095849-010	SW846 6020
	Copper	0.000556	0.00035	0.001	NE	J		095849-010	SW846 6020
	Iron	0.131	0.033	0.100	NE			095849-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095849-010	SW846 6020
	Magnesium	18.8	0.010	0.030	NE			095849-010	SW846 6020
	Manganese	0.00397	0.001	0.005	NE	J		095849-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095849-010	SW846 7470
	Nickel	0.00156	0.0005	0.002	NE	J		095849-010	SW846 6020
	Potassium	4.23	0.080	0.300	NE	N	J	095849-010	SW846 6020
	Selenium	0.00182	0.0015	0.005	0.050	J		095849-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095849-010	SW846 6020
	Sodium	59.6	0.400	1.25	NE			095849-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095849-010	SW846 6020
	Vanadium	0.00658	0.001	0.005	NE			095849-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095849-010	SW846 6020

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Table 5A-7 *(Continued)*
Summary of Filtered 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		095881-010	SW846 6020
27-May-14	Antimony	ND	0.001	0.003	0.006	U		095881-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095881-010	SW846 6020
	Barium	0.0553	0.0006	0.002	2.00			095881-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095881-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095881-010	SW846 6020
	Calcium	60.3	0.300	1.00	NE			095881-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095881-010	SW846 6020
	Cobalt	0.000109	0.0001	0.001	NE	J		095881-010	SW846 6020
	Copper	0.000433	0.00035	0.001	NE	J		095881-010	SW846 6020
	Iron	0.146	0.033	0.100	NE			095881-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095881-010	SW846 6020
	Magnesium	15.7	0.010	0.030	NE			095881-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095881-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095881-010	SW846 7470
	Nickel	0.00119	0.0005	0.002	NE	J		095881-010	SW846 6020
	Potassium	4.09	0.080	0.300	NE			095881-010	SW846 6020
	Selenium	0.00266	0.0015	0.005	0.050	J		095881-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095881-010	SW846 6020
	Sodium	58.5	0.400	1.25	NE			095881-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095881-010	SW846 6020
	Vanadium	0.00543	0.001	0.005	NE			095881-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095881-010	SW846 6020

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Table 5A-7 *(Continued)*
Summary of Filtered 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		095867-010	SW846 6020
15-May-14	Antimony	ND	0.001	0.003	0.006	U		095867-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095867-010	SW846 6020
	Barium	0.0658	0.0006	0.002	2.00			095867-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095867-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095867-010	SW846 6020
	Calcium	54.4	0.300	1.00	NE			095867-010	SW846 6020
	Chromium	0.00376	0.002	0.010	0.100	J		095867-010	SW846 6020
	Cobalt	0.000149	0.0001	0.001	NE	J		095867-010	SW846 6020
	Copper	0.000588	0.00035	0.001	NE	J		095867-010	SW846 6020
	Iron	0.143	0.033	0.100	NE			095867-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095867-010	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			095867-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095867-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095867-010	SW846 7470
	Nickel	0.00118	0.0005	0.002	NE	J		095867-010	SW846 6020
	Potassium	3.53	0.080	0.300	NE			095867-010	SW846 6020
	Selenium	0.00367	0.0015	0.005	0.050	J		095867-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095867-010	SW846 6020
	Sodium	54.0	0.400	1.25	NE			095867-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095867-010	SW846 6020
	Vanadium	0.00601	0.001	0.005	NE			095867-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095867-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095877-010	SW846 6020
21-May-14	Antimony	ND	0.001	0.003	0.006	U		095877-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095877-010	SW846 6020
	Barium	0.069	0.0006	0.002	2.00			095877-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095877-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095877-010	SW846 6020
	Calcium	59.8	0.300	1.00	NE			095877-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095877-010	SW846 6020
	Cobalt	0.000152	0.0001	0.001	NE	J		095877-010	SW846 6020
	Copper	0.00047	0.00035	0.001	NE	J		095877-010	SW846 6020
	Iron	0.145	0.033	0.100	NE			095877-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095877-010	SW846 6020
	Magnesium	19.2	0.010	0.030	NE			095877-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095877-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095877-010	SW846 7470
	Nickel	0.00114	0.0005	0.002	NE	J		095877-010	SW846 6020
	Potassium	3.49	0.080	0.300	NE			095877-010	SW846 6020
	Selenium	0.00205	0.0015	0.005	0.050	J		095877-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095877-010	SW846 6020
	Sodium	62.1	0.400	1.25	NE			095877-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095877-010	SW846 6020
	Vanadium	0.00435	0.001	0.005	NE	J		095877-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095877-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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		095838-010	SW846 6020
30-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095838-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095838-010	SW846 6020
	Barium	0.0553	0.0006	0.002	2.00		J	095838-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095838-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095838-010	SW846 6020
	Calcium	49.7	0.060	0.200	NE			095838-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095838-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095838-010	SW846 6020
	Copper	0.000429	0.00035	0.001	NE	J		095838-010	SW846 6020
	Iron	0.124	0.033	0.100	NE			095838-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095838-010	SW846 6020
	Magnesium	16.1	0.050	0.150	NE			095838-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095838-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095838-010	SW846 7470
	Nickel	0.00111	0.0005	0.002	NE	J		095838-010	SW846 6020
	Potassium	3.25	0.080	0.300	NE			095838-010	SW846 6020
	Selenium	0.00202	0.0015	0.005	0.050	J		095838-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095838-010	SW846 6020
	Sodium	55.4	0.400	1.25	NE			095838-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095838-010	SW846 6020
	Vanadium	0.00584	0.001	0.005	NE			095838-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095838-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	ND	0.015	0.050	NE	U		095874-010	SW846 6020
20-May-14	Antimony	ND	0.001	0.003	0.006	U		095874-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095874-010	SW846 6020
	Barium	0.0551	0.0006	0.002	2.00			095874-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095874-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095874-010	SW846 6020
	Calcium	64.2	0.300	1.00	NE			095874-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095874-010	SW846 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		095874-010	SW846 6020
	Copper	0.000459	0.00035	0.001	NE	J	0.002U	095874-010	SW846 6020
	Iron	0.151	0.033	0.100	NE			095874-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095874-010	SW846 6020
	Magnesium	19.1	0.010	0.030	NE			095874-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095874-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095874-010	SW846 7470
	Nickel	0.00122	0.0005	0.002	NE	J		095874-010	SW846 6020
	Potassium	4.22	0.080	0.300	NE			095874-010	SW846 6020
	Selenium	0.0025	0.0015	0.005	0.050	J		095874-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095874-010	SW846 6020
	Sodium	63.7	0.400	1.25	NE			095874-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095874-010	SW846 6020
	Vanadium	0.00497	0.001	0.005	NE	J		095874-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095874-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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) 20-May-14	Aluminum	ND	0.015	0.050	NE	U		095875-010	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		095875-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095875-010	SW846 6020
	Barium	0.0543	0.0006	0.002	2.00			095875-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095875-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095875-010	SW846 6020
	Calcium	63.5	0.300	1.00	NE			095875-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095875-010	SW846 6020
	Cobalt	0.000107	0.0001	0.001	NE	J		095875-010	SW846 6020
	Copper	0.00044	0.00035	0.001	NE	J	0.002U	095875-010	SW846 6020
	Iron	0.155	0.033	0.100	NE			095875-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095875-010	SW846 6020
	Magnesium	19.4	0.010	0.030	NE			095875-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095875-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095875-010	SW846 7470
	Nickel	0.00116	0.0005	0.002	NE	J		095875-010	SW846 6020
	Potassium	4.10	0.080	0.300	NE			095875-010	SW846 6020
	Selenium	0.00268	0.0015	0.005	0.050	J		095875-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095875-010	SW846 6020
	Sodium	65.5	0.400	1.25	NE			095875-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095875-010	SW846 6020
	Vanadium	0.00495	0.001	0.005	NE	J		095875-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095875-010	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.0861	0.033	0.100	NE	J		096291-011	SW846 6020
24-Jul-14	Manganese	ND	0.001	0.005	NE	U		096291-011	SW846 6020
AVN-1 (Duplicate)	Iron	0.0857	0.033	0.100	NE	J		096292-011	SW846 6020
24-Jul-14	Manganese	ND	0.001	0.005	NE	U		096292-011	SW846 6020
LWDS-MW1	Iron	0.113	0.033	0.100	NE			096316-011	SW846 6020
11-Aug-14	Manganese	ND	0.001	0.005	NE	U		096316-011	SW846 6020
LWDS-MW2	Iron	0.0869	0.033	0.100	NE	J		096299-011	SW846 6020
29-Jul-14	Manganese	ND	0.001	0.005	NE	U		096299-011	SW846 6020
LWDS-MW2 (Duplicate)	Iron	0.0851	0.033	0.100	NE	J		096300-011	SW846 6020
29-Jul-14	Manganese	ND	0.001	0.005	NE	U		096300-011	SW846 6020
TAV-MW2	Iron	0.127	0.033	0.100	NE			096632-011	SW846 6020
09-Sep-14	Manganese	ND	0.001	0.005	NE	U		096632-011	SW846 6020
TAV-MW4	Iron	0.094	0.033	0.100	NE	J		096303-011	SW846 6020
30-Jul-14	Manganese	ND	0.001	0.005	NE	U		096303-011	SW846 6020
TAV-MW6	Iron	0.135	0.033	0.100	NE			096312-011	SW846 6020
06-Aug-14	Manganese	ND	0.001	0.005	NE	U		096312-011	SW846 6020
TAV-MW8	Iron	0.110	0.033	0.100	NE			096294-011	SW846 6020
28-Jul-14	Manganese	ND	0.001	0.005	NE	U		096294-011	SW846 6020
TAV-MW10	Iron	0.123	0.033	0.100	NE			096314-011	SW846 6020
07-Aug-14	Manganese	ND	0.001	0.005	NE	U		096314-011	SW846 6020
TAV-MW11	Iron	0.120	0.033	0.100	NE			096305-011	SW846 6020
31-Jul-14	Manganese	ND	0.001	0.005	NE	U		096305-011	SW846 6020
TAV-MW12	Iron	0.126	0.033	0.100	NE			096309-011	SW846 6020
05-Aug-14	Manganese	0.00548	0.001	0.005	NE			096309-011	SW846 6020
TAV-MW13	Iron	0.0893	0.033	0.100	NE	J		096286-011	SW846 6020
23-Jul-14	Manganese	ND	0.001	0.005	NE	U		096286-011	SW846 6020
TAV-MW14	Iron	0.122	0.033	0.100	NE			096307-011	SW846 6020
04-Aug-14	Manganese	ND	0.001	0.005	NE	U		096307-011	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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		096821-009	SW846 6020
30-Oct-14	Manganese	ND	0.001	0.005	NE	U		096821-009	SW846 6020
LWDS-MW1	Iron	ND	0.033	0.100	NE	U		096853-009	SW846 6020
17-Nov-14	Manganese	ND	0.001	0.005	NE	U		096853-009	SW846 6020
LWDS-MW1 (Duplicate)	Iron	ND	0.033	0.100	NE	U		096854-009	SW846 6020
17-Nov-14	Manganese	ND	0.001	0.005	NE	U		096854-009	SW846 6020
LWDS-MW2	Iron	ND	0.033	0.100	NE	U		096825-009	SW846 6020
03-Nov-14	Manganese	ND	0.001	0.005	NE	U		096825-009	SW846 6020
TAV-MW2	Iron	ND	0.033	0.100	NE	U		096827-009	SW846 6020
04-Nov-14	Manganese	ND	0.001	0.005	NE	U		096827-009	SW846 6020
TAV-MW3	Iron	ND	0.033	0.100	NE	U		096816-009	SW846 6020
28-Oct-14	Manganese	ND	0.001	0.005	NE	U		096816-009	SW846 6020
TAV-MW3 (Duplicate)	Iron	ND	0.033	0.100	NE	U		096817-009	SW846 6020
28-Oct-14	Manganese	ND	0.001	0.005	NE	U		096817-009	SW846 6020
TAV-MW4	Iron	ND	0.033	0.100	NE	U		096829-009	SW846 6020
05-Nov-14	Manganese	ND	0.001	0.005	NE	U		096829-009	SW846 6020
TAV-MW5	Iron	ND	0.033	0.100	NE	U		096809-009	SW846 6020
24-Oct-14	Manganese	ND	0.001	0.005	NE	U		096809-009	SW846 6020
TAV-MW6	Iron	ND	0.033	0.100	NE	U		096845-009	SW846 6020
12-Nov-14	Manganese	ND	0.001	0.005	NE	U		096845-009	SW846 6020
TAV-MW7	Iron	0.135	0.033	0.100	NE			096819-009	SW846 6020
29-Oct-14	Manganese	ND	0.001	0.005	NE	U		096819-009	SW846 6020
TAV-MW8	Iron	ND	0.033	0.100	NE	U		096823-009	SW846 6020
31-Oct-14	Manganese	ND	0.001	0.005	NE	U		096823-009	SW846 6020
TAV-MW9	Iron	ND	0.033	0.100	NE	U		096811-009	SW846 6020
27-Oct-14	Manganese	0.00444	0.001	0.005	NE	J		096811-009	SW846 6020
TAV-MW10	Iron	ND	0.033	0.100	NE	U		096848-009	SW846 6020
13-Nov-14	Manganese	ND	0.001	0.005	NE	U		096848-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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		096833-009	SW846 6020
06-Nov-14	Manganese	ND	0.001	0.005	NE	U		096833-009	SW846 6020
TAV-MW11 (Duplicate)	Iron	ND	0.033	0.100	NE	U		096834-009	SW846 6020
06-Nov-14	Manganese	ND	0.001	0.005	NE	U		096834-009	SW846 6020
TAV-MW12	Iron	ND	0.033	0.100	NE	U		096842-009	SW846 6020
11-Nov-14	Manganese	ND	0.001	0.005	NE	U		096842-009	SW846 6020
TAV-MW13	Iron	0.0477	0.033	0.100	NE	J		096807-009	SW846 6020
23-Oct-14	Manganese	ND	0.001	0.005	NE	U		096807-009	SW846 6020
TAV-MW14	Iron	ND	0.033	0.100	NE	U		096838-009	SW846 6020
10-Nov-14	Manganese	ND	0.001	0.005	NE	U		096838-009	SW846 6020

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	0.709 ± 5.87	10.2	4.96	NE	U	BD	095854-033	EPA 901.1
07-May-14	Cesium-137	-0.311 ± 1.92	3.35	1.60	NE	U	BD	095854-033	EPA 901.1
	Cobalt-60	-4.23 ± 3.63	3.81	1.80	NE	U	BD	095854-033	EPA 901.1
	Potassium-40	-18.4 ± 36.2	48.3	23.1	NE	U	BD	095854-033	EPA 901.1
	Gross Alpha	2.74	NA	NA	15 pCi/L	NA	None	095854-034	EPA 900.0
	Gross Beta	4.98 ± 1.30	1.47	0.709	4mrem/yr		J	095854-034	EPA 900.0
	Tritium	-65.5 ± 89.6	180	81.4	NE	U	BD	095854-036	EPA 906.0 M
LWDS-MW1	Americium-241	0.0043 ± 4.20	6.04	2.97	NE	U	BD	095869-033	EPA 901.1
19-May-14	Cesium-137	0.836 ± 2.55	4.42	2.13	NE	U	BD	095869-033	EPA 901.1
	Cobalt-60	-0.168 ± 2.71	4.05	1.90	NE	U	BD	095869-033	EPA 901.1
	Potassium-40	32.8 ± 53.9	39.7	18.5	NE	U	BD	095869-033	EPA 901.1
	Gross Alpha	4.37	NA	NA	15 pCi/L	NA	None	095869-034	EPA 900.0
	Gross Beta	3.64 ± 1.81	2.77	1.35	4mrem/yr		J	095869-034	EPA 900.0
	Tritium	-42.8 ± 91.3	179	80.8	NE	U	BD	095869-036	EPA 906.0 M
LWDS-MW2	Americium-241	-0.964 ± 12.0	18.6	9.10	NE	U	BD	095856-033	EPA 901.1
09-May-14	Cesium-137	-0.367 ± 2.45	4.18	2.00	NE	U	BD	095856-033	EPA 901.1
	Cobalt-60	-0.174 ± 2.28	4.02	1.88	NE	U	BD	095856-033	EPA 901.1
	Potassium-40	13.6 ± 50.2	37.9	17.6	NE	U	BD	095856-033	EPA 901.1
	Gross Alpha	3.25	NA	NA	15 pCi/L	NA	None	095856-034	EPA 900.0
	Gross Beta	4.02 ± 1.29	1.71	0.829	4mrem/yr		J	095856-034	EPA 900.0
	Tritium	-8.66 ± 96.4	181	81.8	NE	U	BD	095856-036	EPA 906.0 M
TAV-MW2	Americium-241	13.5 ± 13.9	20.1	9.82	NE	U	BD	095858-033	EPA 901.1
12-May-14	Cesium-137	0.583 ± 2.57	4.46	2.14	NE	U	BD	095858-033	EPA 901.1
	Cobalt-60	0.859 ± 2.51	4.48	2.11	NE	U	BD	095858-033	EPA 901.1
	Potassium-40	-8.63 ± 42.5	49.0	23.2	NE	U	BD	095858-033	EPA 901.1
	Gross Alpha	3.76	NA	NA	15 pCi/L	NA	None	095858-034	EPA 900.0
	Gross Beta	5.94 ± 1.47	1.58	0.769	4mrem/yr			095858-034	EPA 900.0
	Tritium	-66.3 ± 89.3	180	81.5	NE	U	BD	095858-036	EPA 906.0 M
TAV-MW3	Americium-241	-1.77 ± 5.89	10.1	4.94	NE	U	BD	095846-033	EPA 901.1
02-May-14	Cesium-137	-0.616 ± 1.98	3.42	1.64	NE	U	BD	095846-033	EPA 901.1
	Cobalt-60	2.62 ± 2.64	3.67	1.73	NE	U	BD	095846-033	EPA 901.1
	Potassium-40	-38.2 ± 44.9	44.6	21.2	NE	U	BD	095846-033	EPA 901.1
	Gross Alpha	2.69	NA	NA	15 pCi/L	NA	None	095846-034	EPA 900.0
	Gross Beta	3.40 ± 1.27	1.81	0.885	4mrem/yr		J	095846-034	EPA 900.0
	Tritium	11.5 ± 60.5	110	49.6	NE	U	BD	095846-036	EPA 906.0 M

Refer to footnotes on page 5A-89.

Table 5A-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 2014

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	-2.37 ± 6.16	10.4	5.06	NE	U	BD	095864-033	EPA 901.1
14-May-14	Cesium-137	0.446 ± 2.00	3.55	1.70	NE	U	BD	095864-033	EPA 901.1
	Cobalt-60	-1.28 ± 3.22	4.37	2.08	NE	U	BD	095864-033	EPA 901.1
	Potassium-40	2.58 ± 46.0	32.5	15.2	NE	U	BD	095864-033	EPA 901.1
	Gross Alpha	5.84	NA	NA	15 pCi/L	NA	None	095864-034	EPA 900.0
	Gross Beta	5.27 ± 1.37	1.55	0.754	4mrem/yr			095864-034	EPA 900.0
	Tritium	-56.4 ± 90.5	180	81.5	NE	U	BD	095864-036	EPA 906.0 M
TAV-MW4 (Duplicate)	Americium-241	8.40 ± 18.6	28.5	13.9	NE	U	BD	095865-033	EPA 901.1
14-May-14	Cesium-137	0.552 ± 1.98	3.60	1.71	NE	U	BD	095865-033	EPA 901.1
	Cobalt-60	-0.421 ± 1.99	3.44	1.59	NE	U	BD	095865-033	EPA 901.1
	Potassium-40	-15.3 ± 39.4	53.7	25.5	NE	U	BD	095865-033	EPA 901.1
	Gross Alpha	4.11	NA	NA	15 pCi/L	NA	None	095865-034	EPA 900.0
	Gross Beta	4.77 ± 1.27	1.46	0.709	4mrem/yr			095865-034	EPA 900.0
	Tritium	-52.6 ± 91.2	181	81.8	NE	U	BD	095865-036	EPA 906.0 M
TAV-MW5	Americium-241	-3.03 ± 9.72	16.2	7.98	NE	U	BD	095842-033	EPA 901.1
01-May-14	Cesium-137	-1.44 ± 2.22	2.99	1.45	NE	U	BD	095842-033	EPA 901.1
	Cobalt-60	-2.58 ± 3.05	3.24	1.54	NE	U	BD	095842-033	EPA 901.1
	Potassium-40	2.36 ± 37.3	29.9	14.2	NE	U	BD	095842-033	EPA 901.1
	Gross Alpha	1.87	NA	NA	15 pCi/L	NA	None	095842-034	EPA 900.0
	Gross Beta	3.43 ± 0.997	1.02	0.486	4mrem/yr		J	095842-034	EPA 900.0
	Tritium	7.23 ± 61.5	112	50.9	NE	U	BD	095842-036	EPA 906.0 M
TAV-MW5 (Duplicate)	Americium-241	5.34 ± 7.97	13.5	6.64	NE	U	BD	095843-033	EPA 901.1
01-May-14	Cesium-137	0.606 ± 3.42	2.94	1.41	NE	U	BD	095843-033	EPA 901.1
	Cobalt-60	2.09 ± 2.07	3.52	1.67	NE	U	BD	095843-033	EPA 901.1
	Potassium-40	1.40 ± 38.2	43.8	21.0	NE	U	BD	095843-033	EPA 901.1
	Gross Alpha	4.33	NA	NA	15 pCi/L	NA	None	095843-034	EPA 900.0
	Gross Beta	4.87 ± 1.52	2.01	0.983	4mrem/yr		J	095843-034	EPA 900.0
	Tritium	23.0 ± 63.2	112	50.8	NE	U	BD	095843-036	EPA 906.0 M
TAV-MW6	Americium-241	5.41 ± 7.95	12.3	6.00	NE	U	BD	095879-033	EPA 901.1
22-May-14	Cesium-137	-2.81 ± 4.00	3.68	1.78	NE	U	BD	095879-033	EPA 901.1
	Cobalt-60	-0.569 ± 1.77	3.07	1.44	NE	U	BD	095879-033	EPA 901.1
	Potassium-40	44.2 ± 28.7	44.3	19.3	NE	U	BD	095879-033	EPA 901.1
	Gross Alpha	5.27	NA	NA	15 pCi/L	NA	None	095879-034	EPA 900.0
	Gross Beta	4.65 ± 1.36	1.53	0.727	4mrem/yr			095879-034	EPA 900.0
	Tritium	6.85 ± 97.9	181	81.5	NE	U	BD	095879-036	EPA 906.0 M

Refer to footnotes on page 5A-89.

Table 5A-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 2014

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-MW7	Americium-241	13.7 ± 13.8	19.3	9.40	NE	U	BD	095852-033	EPA 901.1
06-May-14	Cesium-137	-0.436 ± 2.23	3.81	1.81	NE	U	BD	095852-033	EPA 901.1
	Cobalt-60	-2.64 ± 4.64	5.06	2.40	NE	U	BD	095852-033	EPA 901.1
	Potassium-40	-13.9 ± 38.0	52.9	25.1	NE	U	BD	095852-033	EPA 901.1
	Gross Alpha	3.94	NA	NA	15 pCi/L	NA	None	095852-034	EPA 900.0
	Gross Beta	7.06 ± 1.66	1.72	0.834	4mrem/yr		J	095852-034	EPA 900.0
	Tritium	-73.6 ± 88.6	180	81.5	NE	U	BD	095852-036	EPA 906.0 M
TAV-MW8	Americium-241	-6.42 ± 7.61	11.4	5.57	NE	U	BD	095860-033	EPA 901.1
13-May-14	Cesium-137	-1.5 ± 2.77	3.28	1.56	NE	U	BD	095860-033	EPA 901.1
	Cobalt-60	-1.42 ± 3.78	4.21	1.99	NE	U	BD	095860-033	EPA 901.1
	Potassium-40	9.39 ± 41.0	30.3	14.0	NE	U	BD	095860-033	EPA 901.1
	Gross Alpha	3.54	NA	NA	15 pCi/L	NA	None	095860-034	EPA 900.0
	Gross Beta	5.01 ± 1.39	1.69	0.820	4mrem/yr		J	095860-034	EPA 900.0
	Tritium	-0.232 ± 97.2	180	81.6	NE	U	BD	095860-036	EPA 906.0 M
TAV-MW9	Americium-241	-0.715 ± 18.1	27.8	13.5	NE	U	BD	095849-033	EPA 901.1
05-May-14	Cesium-137	0.443 ± 2.24	3.96	1.89	NE	U	BD	095849-033	EPA 901.1
	Cobalt-60	1.54 ± 2.41	4.39	2.06	NE	U	BD	095849-033	EPA 901.1
	Potassium-40	49.5 ± 46.7	37.3	17.3	NE	X	R	095849-033	EPA 901.1
	Gross Alpha	1.75	NA	NA	15 pCi/L	NA	None	095849-034	EPA 900.0
	Gross Beta	5.16 ± 1.76	1.84	0.822	4mrem/yr		J	095849-034	EPA 900.0
	Tritium	-82 ± 87.5	181	81.7	NE	U	BD	095849-036	EPA 906.0 M
TAV-MW10	Americium-241	12.0 ± 12.1	16.6	8.14	NE	U	BD	095881-033	EPA 901.1
27-May-14	Cesium-137	0.394 ± 1.98	3.43	1.65	NE	U	BD	095881-033	EPA 901.1
	Cobalt-60	0.286 ± 2.03	3.64	1.72	NE	U	BD	095881-033	EPA 901.1
	Potassium-40	-35.9 ± 46.9	43.8	20.9	NE	U	BD	095881-033	EPA 901.1
	Gross Alpha	3.87	NA	NA	15 pCi/L	NA	None	095881-034	EPA 900.0
	Gross Beta	3.18 ± 1.42	2.08	1.01	4mrem/yr		J	095881-034	EPA 900.0
	Tritium	34.7 ± 101	180	81.3	NE	U	BD	095881-036	EPA 906.0 M
TAV-MW11	Americium-241	-76.6 ± 36.2	7.36	3.61	NE	U	R	095867-033	EPA 901.1
15-May-14	Cesium-137	-1.91 ± 3.07	4.93	2.35	NE	U	R	095867-033	EPA 901.1
	Cobalt-60	-0.351 ± 2.92	5.15	2.39	NE	U	R	095867-033	EPA 901.1
	Potassium-40	25.5 ± 47.6	68.4	32.4	NE	U	R	095867-033	EPA 901.1
	Gross Alpha	2.72	NA	NA	15 pCi/L	NA	None	095867-034	EPA 900.0
	Gross Beta	4.30 ± 1.18	1.39	0.673	4mrem/yr			095867-034	EPA 900.0
	Tritium	-42.3 ± 92.4	181	81.7	NE	U	BD	095867-036	EPA 906.0 M

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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-MW11 (Reanalysis)	Americium-241	-1.62 ± 10.7	16.5	8.10	NE	U	BD	095867-R33	EPA 901.1
15-May-14	Cesium-137	2.44 ± 2.42	3.86	1.87	NE	U	BD	095867-R33	EPA 901.1
	Cobalt-60	2.29 ± 4.17	4.17	1.99	NE	U	BD	095867-R33	EPA 901.1
	Potassium-40	-15.1 ± 36.7	43.8	20.9	NE	U	BD	095867-R33	EPA 901.1
TAV-MW12	Americium-241	-9.17 ± 8.59	9.69	4.74	NE	U	BD	095877-033	EPA 901.1
21-May-14	Cesium-137	2.67 ± 2.65	3.34	1.61	NE	U	BD	095877-033	EPA 901.1
	Cobalt-60	1.02 ± 1.99	3.59	1.70	NE	U	BD	095877-033	EPA 901.1
	Potassium-40	94.8 ± 41.2	32.3	15.2	NE		J	095877-033	EPA 901.1
	Gross Alpha	3.53	NA	NA	15 pCi/L	NA	None	095877-034	EPA 900.0
	Gross Beta	4.59 ± 1.28	1.53	0.740	4mrem/yr			095877-034	EPA 900.0
	Tritium	-35.8 ± 92.7	181	81.5	NE	U	BD	095877-036	EPA 906.0 M
TAV-MW13	Americium-241	-0.0886 ± 6.71	10.4	5.11	NE	U	BD	095838-033	EPA 901.1
30-Apr-14	Cesium-137	-4.37 ± 3.47	2.87	1.38	NE	U	BD	095838-033	EPA 901.1
	Cobalt-60	0.881 ± 1.87	3.32	1.58	NE	U	BD	095838-033	EPA 901.1
	Potassium-40	37.8 ± 40.3	30.9	14.6	NE	X	R	095838-033	EPA 901.1
	Gross Alpha	4.14	NA	NA	15 pCi/L	NA	None	095838-034	EPA 900.0
	Gross Beta	3.64 ± 1.11	1.28	0.619	4mrem/yr		J	095838-034	EPA 900.0
	Tritium	12.8 ± 58.9	106	48.2	NE	U	BD	095838-036	EPA 906.0 M
TAV-MW14	Americium-241	-6.63 ± 14.6	24.7	12.0	NE	U	BD	095874-033	EPA 901.1
20-May-14	Cesium-137	-1.74 ± 1.92	2.97	1.41	NE	U	BD	095874-033	EPA 901.1
	Cobalt-60	-3.06 ± 3.46	3.19	1.48	NE	U	BD	095874-033	EPA 901.1
	Potassium-40	8.17 ± 38.0	47.6	22.6	NE	U	BD	095874-033	EPA 901.1
	Gross Alpha	4.79	NA	NA	15 pCi/L	NA	None	095874-034	EPA 900.0
	Gross Beta	5.11 ± 1.32	1.48	0.713	4mrem/yr			095874-034	EPA 900.0
	Tritium	-32.6 ± 93.4	182	81.8	NE	U	BD	095874-036	EPA 906.0 M
TAV-MW14 (Duplicate)	Americium-241	-2.09 ± 11.8	18.1	8.84	NE	U	BD	095875-033	EPA 901.1
20-May-14	Cesium-137	3.22 ± 3.38	3.52	1.68	NE	U	BD	095875-033	EPA 901.1
	Cobalt-60	-1.24 ± 2.29	3.75	1.76	NE	U	BD	095875-033	EPA 901.1
	Potassium-40	-2.43 ± 43.3	49.0	23.3	NE	U	BD	095875-033	EPA 901.1
	Gross Alpha	3.19	NA	NA	15 pCi/L	NA	None	095875-034	EPA 900.0
	Gross Beta	4.99 ± 1.32	1.49	0.718	4mrem/yr			095875-034	EPA 900.0
	Tritium	-43.1 ± 91.7	181	81.4	NE	U	BD	095875-036	EPA 906.0 M

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

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	19-Feb-14	20.01	358.1	260.6	7.78	1.58	45.1	4.10
LWDS-MW1	03-Mar-14	17.42	583.9	281.1	7.59	0.51	74.9	7.16
LWDS-MW2	20-Feb-14	18.46	385.9	292.8	7.69	0.33	47.1	4.45
TAV-MW2	21-Feb-14	18.75	600.8	284.9	7.40	9.07	52.8	4.90
TAV-MW4	24-Feb-14	19.67	441.6	278.6	7.69	0.98	72.6	6.62
TAV-MW6	05-Mar-14	19.61	590	310.7	7.57	3.90	75.9	6.93
TAV-MW8	25-Feb-14	20.26	513.1	298.6	7.61	11.4	70.0	6.29
TAV-MW10	06-Mar-14	19.56	543	305.3	7.60	0.18	77.0	7.05
TAV-MW11	26-Feb-14	19.42	488.5	286.5	7.64	0.29	74.7	6.87
TAV-MW12	04-Mar-14	18.97	519.3	298.4	7.58	9.01	56.9	5.26
TAV-MW13	18-Feb-14	20.71	464.1	244.6	7.59	0.37	31.7	2.84
TAV-MW14	27-Feb-14	18.68	551.6	289.1	7.56	2.60	75.0	6.98
AVN-1	07-May-14	20.39	395.8	241.8	7.65	0.75	43.9	3.96
LWDS-MW1	19-May-14	21.70	706.2	260.8	7.50	0.28	87.7	7.70
LWDS-MW2	09-May-14	19.74	436.6	236.7	7.54	0.28	50.1	4.56
TAV-MW2	12-May-14	19.68	672.9	239.7	7.36	0.50	55.2	5.03
TAV-MW3	02-May-14	20.66	524.0	243.6	7.66	0.74	68.8	6.16
TAV-MW4	14-May-14	20.06	488.9	294.5	7.65	1.56	76.6	6.94
TAV-MW5	01-May-14	20.83	477.0	232.9	7.69	0.51	54.6	4.88
TAV-MW6	22-May-14	20.86	661.5	313.2	7.46	3.04	80.3	7.16
TAV-MW7	06-May-14	20.76	580.0	128.8	7.52	3.85	3.2	0.28
TAV-MW8	13-May-14	15.34	500.3	252.5	7.58	6.80	67.8	6.69
TAV-MW9	05-May-14	20.79	574.9	62.6	7.40	1.08	13.9	1.24
TAV-MW10	27-May-14	21.89	621.8	300.6	7.54	0.17	83.7	7.32
TAV-MW11	15-May-14	20.34	547.1	295.7	7.59	0.17	80.0	7.20
TAV-MW12	21-May-14	21.91	602.4	299.9	7.44	3.51	70.4	6.15
TAV-MW13	30-Apr-14	19.81	496.4	173.6	7.64	0.44	25.7	2.33
TAV-MW14	20-May-14	20.73	628.4	282.1	7.45	1.52	79.7	7.12

Refer to footnotes on page 5A-89.

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

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
AVN-1	24-Jul-14	23.34	412.1	298.1	7.68	0.54	45.1	3.84
LWDS-MW1	11-Aug-14	22.64	702.5	283.4	7.46	0.35	87.8	7.56
LWDS-MW2	29-Jul-14	20.78	436.0	296.1	7.55	0.31	50.0	4.44
TAV-MW2	09-Sep-14	20.86	722.7	337.9	7.03	2.72	57.3	5.11
TAV-MW4	30-Jul-14	20.81	483.7	321.2	7.54	0.50	74.5	6.61
TAV-MW6	06-Aug-14	20.95	646.4	313.8	7.40	3.74	79.6	7.09
TAV-MW8	28-Jul-14	22.06	567.5	273.2	7.44	1.37	73.3	6.40
TAV-MW10	07-Aug-14	21.60	602.1	318.8	7.40	0.26	81.8	7.20
TAV-MW11	31-Jul-14	21.85	554.8	305.8	7.50	0.21	80.8	7.04
TAV-MW12	05-Aug-14	21.88	598.4	290.5	7.44	6.80	57.5	5.02
TAV-MW13	23-Jul-14	22.00	509.0	184.6	7.42	0.34	25.3	2.20
TAV-MW14	04-Aug-14	21.20	619.5	306.5	7.42	1.45	80.1	7.11
AVN-1	30-Oct-14	20.85	419.7	261.1	7.72	1.51	43.9	3.92
LWDS-MW1	17-Nov-14	16.30	651.3	284.6	7.77	0.48	76.8	7.43
LWDS-MW2	03-Nov-14	19.86	460.4	253.7	7.61	0.43	50.0	4.53
TAV-MW2	04-Nov-14	17.01	656.0	258.5	7.34	0.58	54.1	5.29
TAV-MW3	28-Oct-14	18.72	526.4	268.5	7.54	0.95	63.4	5.89
TAV-MW4	05-Nov-14	18.71	494.9	301.8	7.57	1.01	74.7	6.85
TAV-MW5	24-Oct-14	21.48	509.3	250.0	7.52	0.19	53.8	4.74
TAV-MW6	12-Nov-14	18.92	666.9	269.0	7.47	1.92	76.5	7.06
TAV-MW7	29-Oct-14	21.26	615.4	106.2	7.37	0.68	3.9	0.34
TAV-MW8	31-Oct-14	18.89	573.7	252.3	7.52	1.17	71.4	6.59
TAV-MW9	27-Oct-14	20.01	615.5	52.0	7.24	0.89	12.1	1.10
TAV-MW10	13-Nov-14	17.26	588.8	260.3	7.51	0.26	74.7	7.17
TAV-MW11	06-Nov-14	20.38	574.7	256.1	7.49	0.20	79.2	7.13
TAV-MW12	11-Nov-14	20.32	612.9	275.7	7.42	1.54	68.5	6.18
TAV-MW13	23-Oct-14	21.01	536.9	233.7	7.45	0.47	26.0	2.30
TAV-MW14	10-Nov-14	20.44	654.1	276.9	7.45	1.23	78.1	7.03

Refer to footnotes on page 5A-89.

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 = Identification.
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 Table 5A-1 through 5A-7. MDA applies to Table 5A-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 5A-1 through 5A-7. Critical Level applies to Table 5A-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 5A-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.

*	= Recovery or % relative percent difference (RPD) not within acceptance limits, and/or spike amount not compatible with the sample, or the duplicate RPD's are not applicable where the concentrations falls below the effective PQL.
B	= The analyte was found in the blank above the effective MDL.
H	= Analytical holding time was exceeded.
J	= Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N	= Results associated with a spike analysis that was outside control limits.
NA	= Not applicable.
U	= Analyte is absent or below the 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 numerical value is an estimated quantity with a suspected positive bias.
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.
NJ	= Presumptive evidence of the presence of the material at an estimated quantity.
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

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

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

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

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

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 5B
Technical Area-V
Plots

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Attachment 5B Plots

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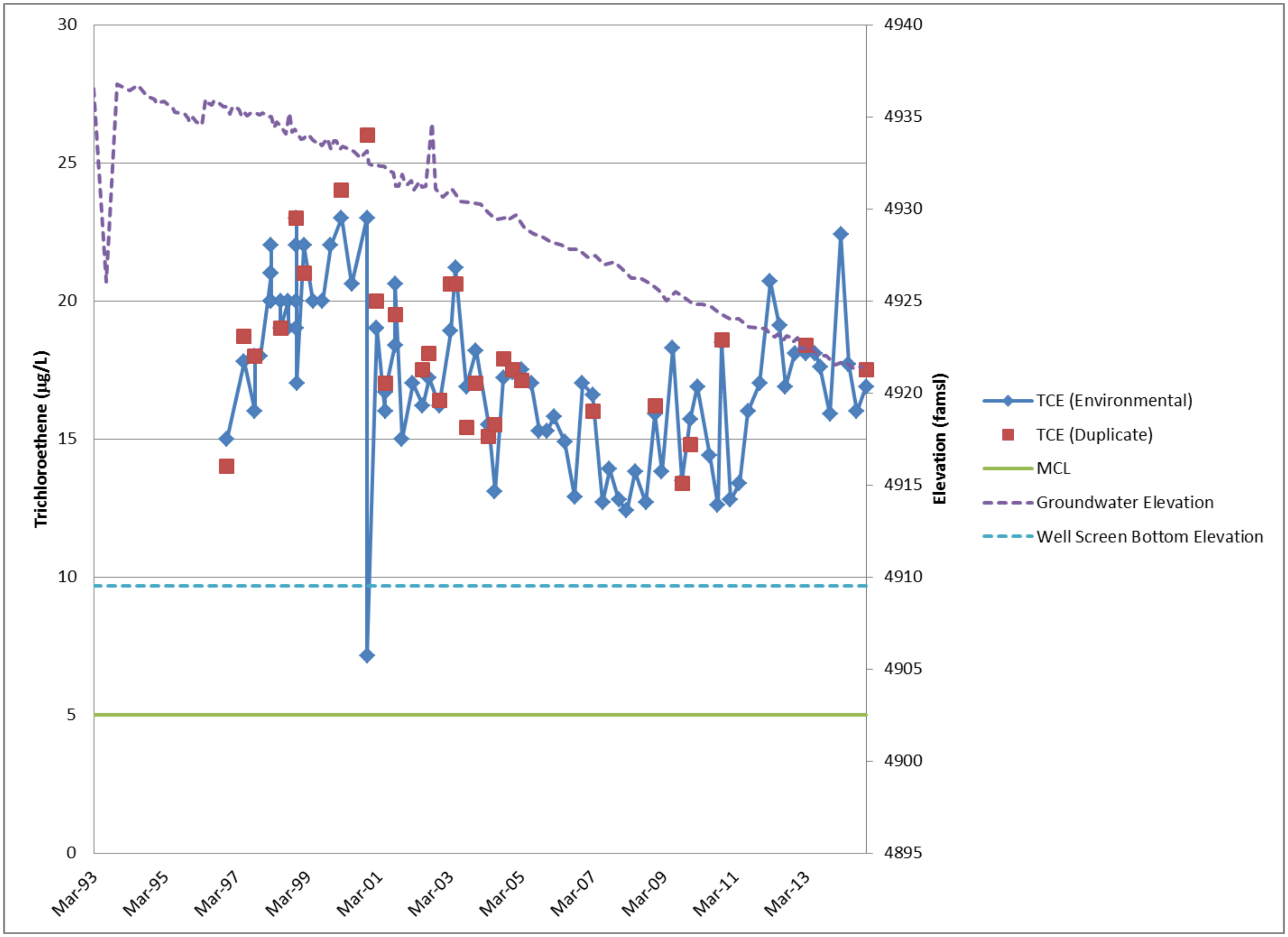
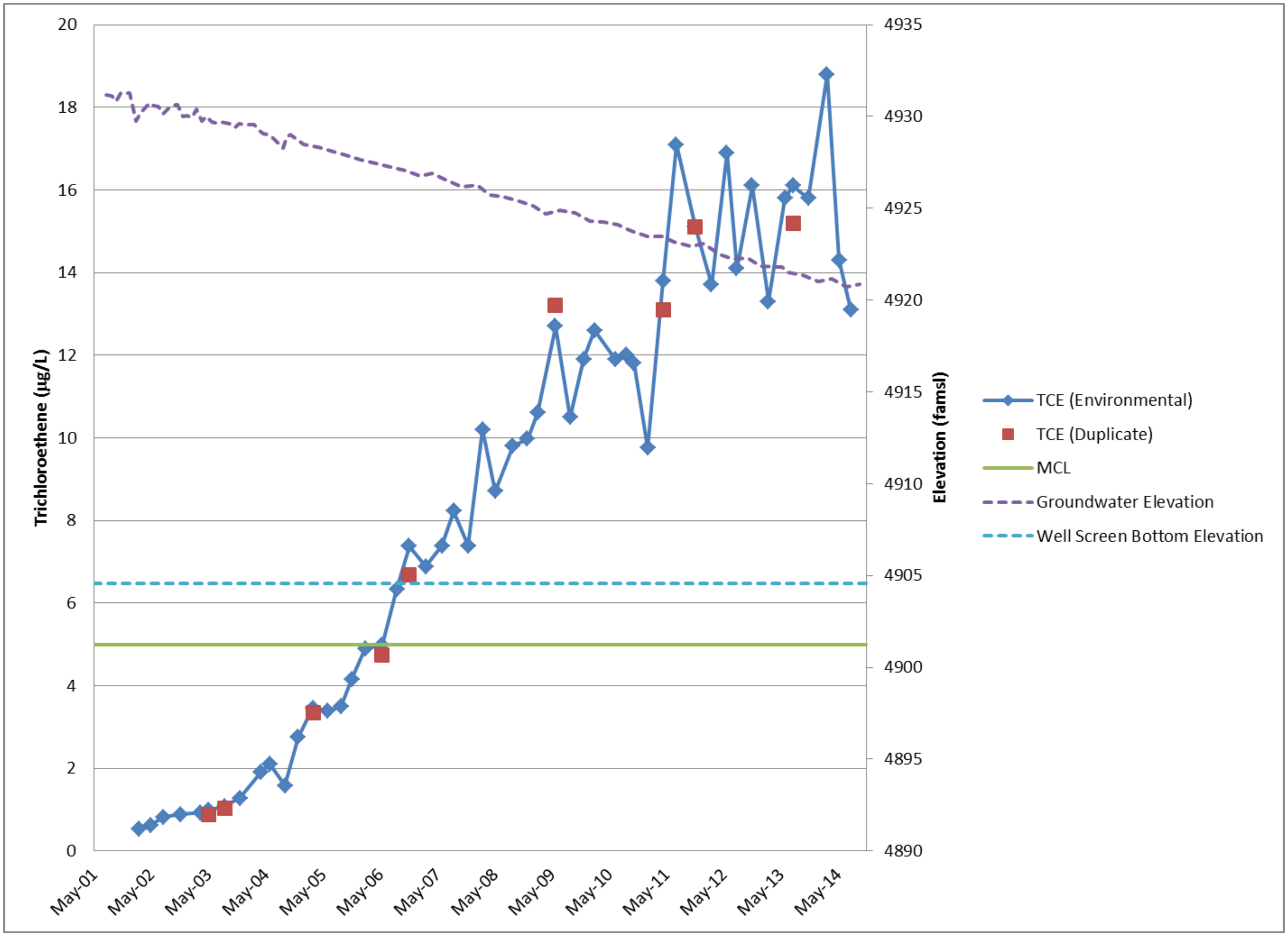


Figure 5B-1. Trichloroethene Concentrations, LWDS-MW1



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

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

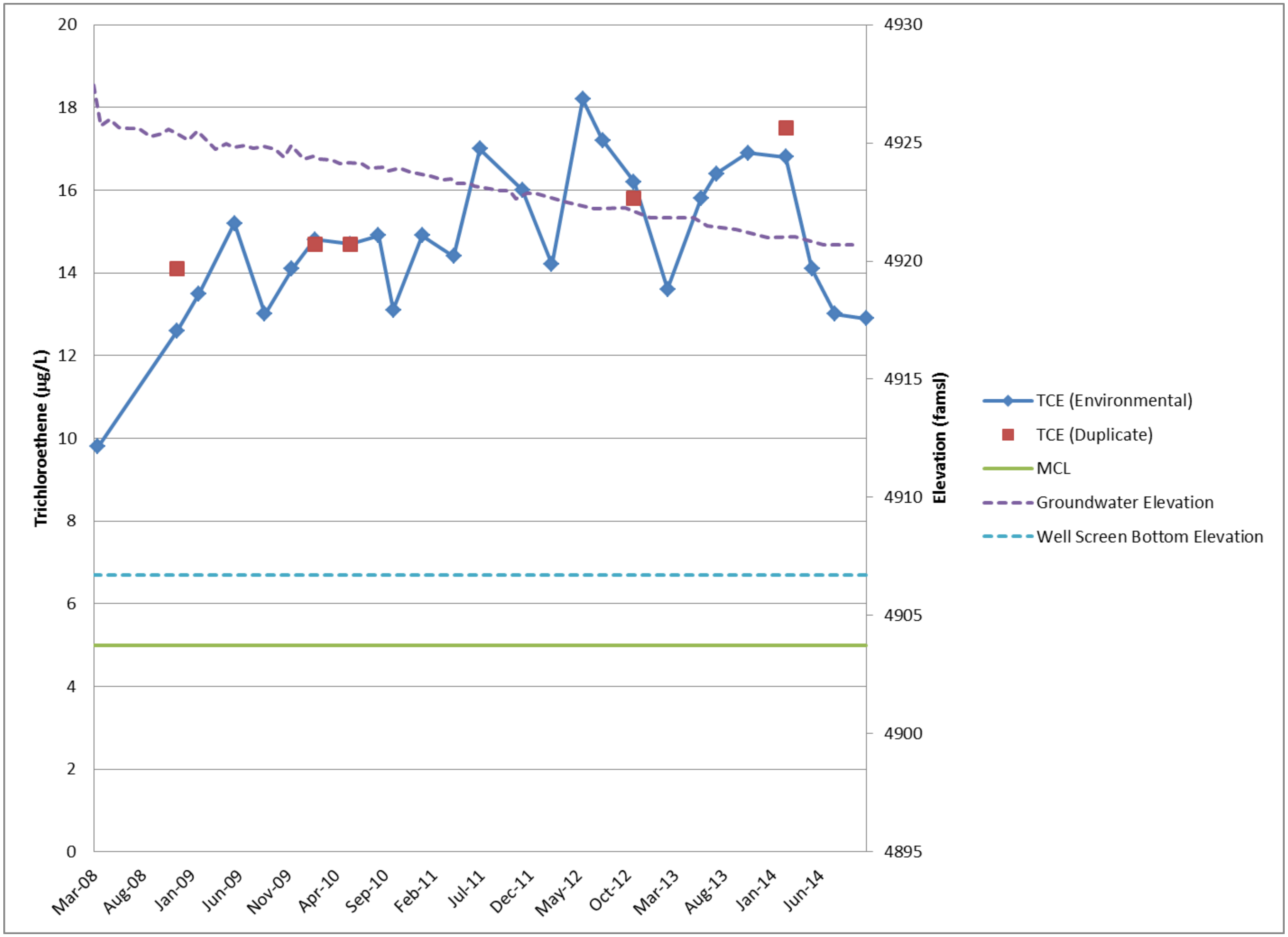


Figure 5B-3. Trichloroethene Concentrations, TAV-MW10

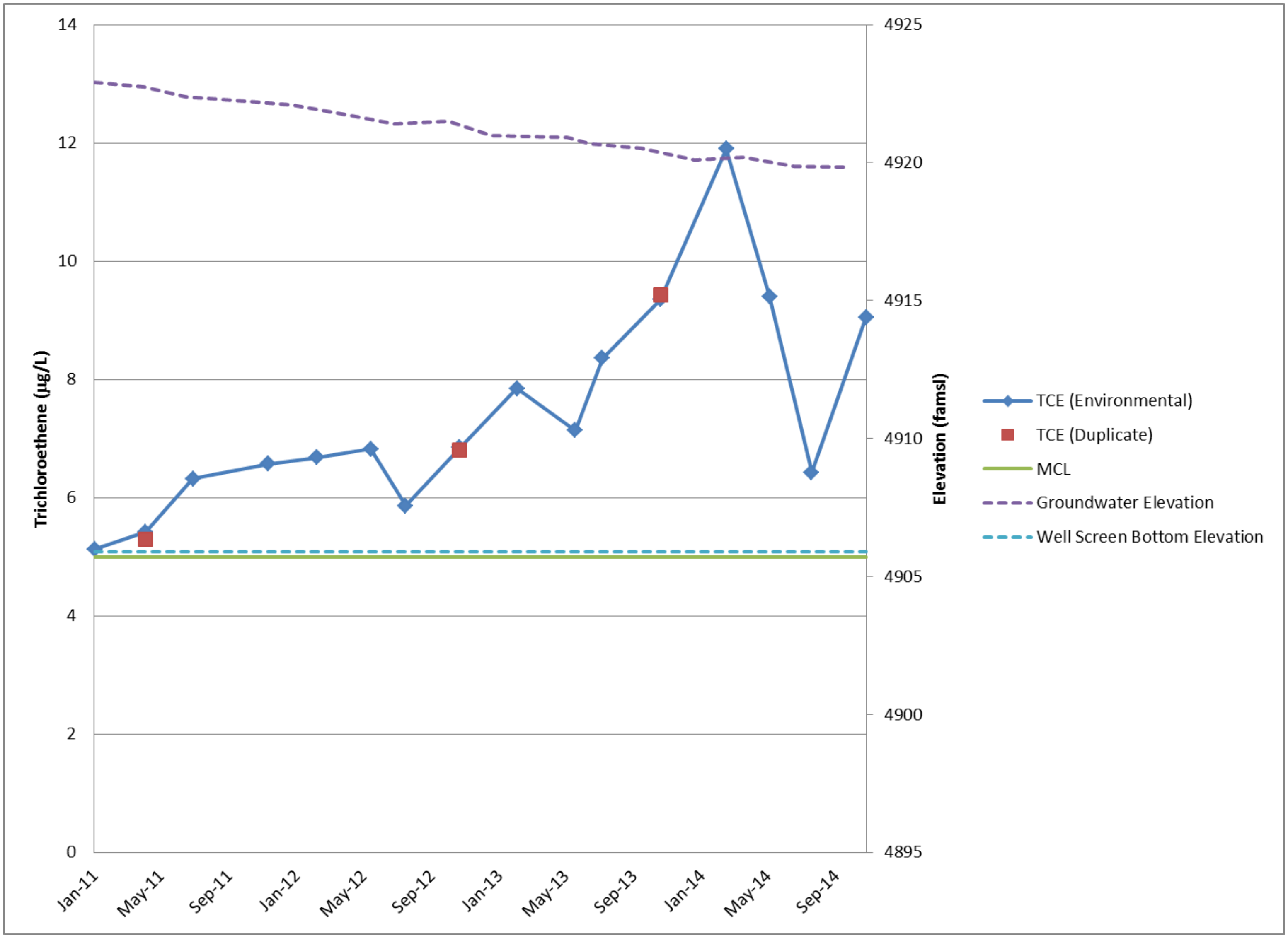
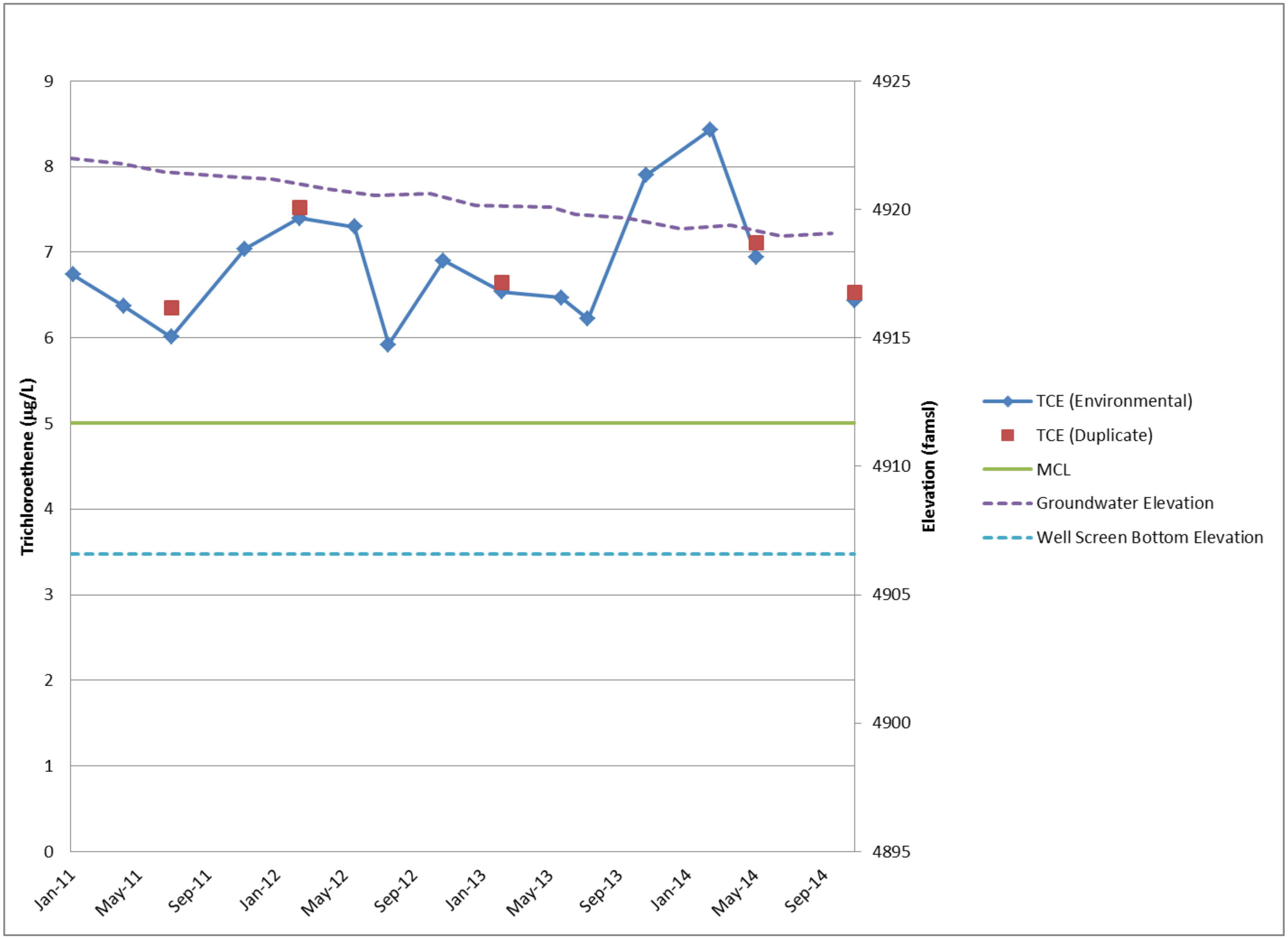


Figure 5B-4. Trichloroethene Concentrations, TAV-MW12



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

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

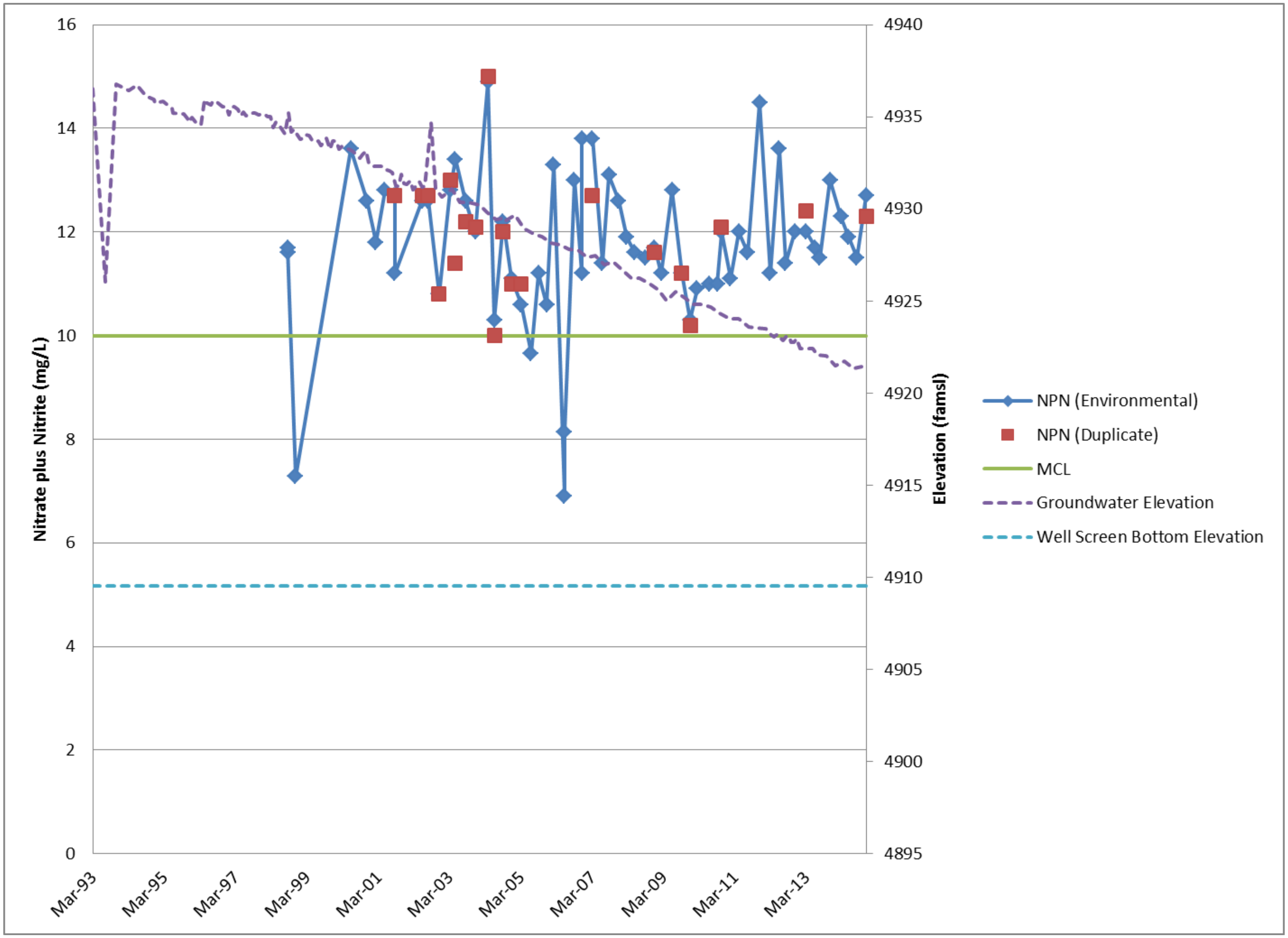


Figure 5B-6. Nitrate Plus Nitrite Concentrations, LWDS-MW1

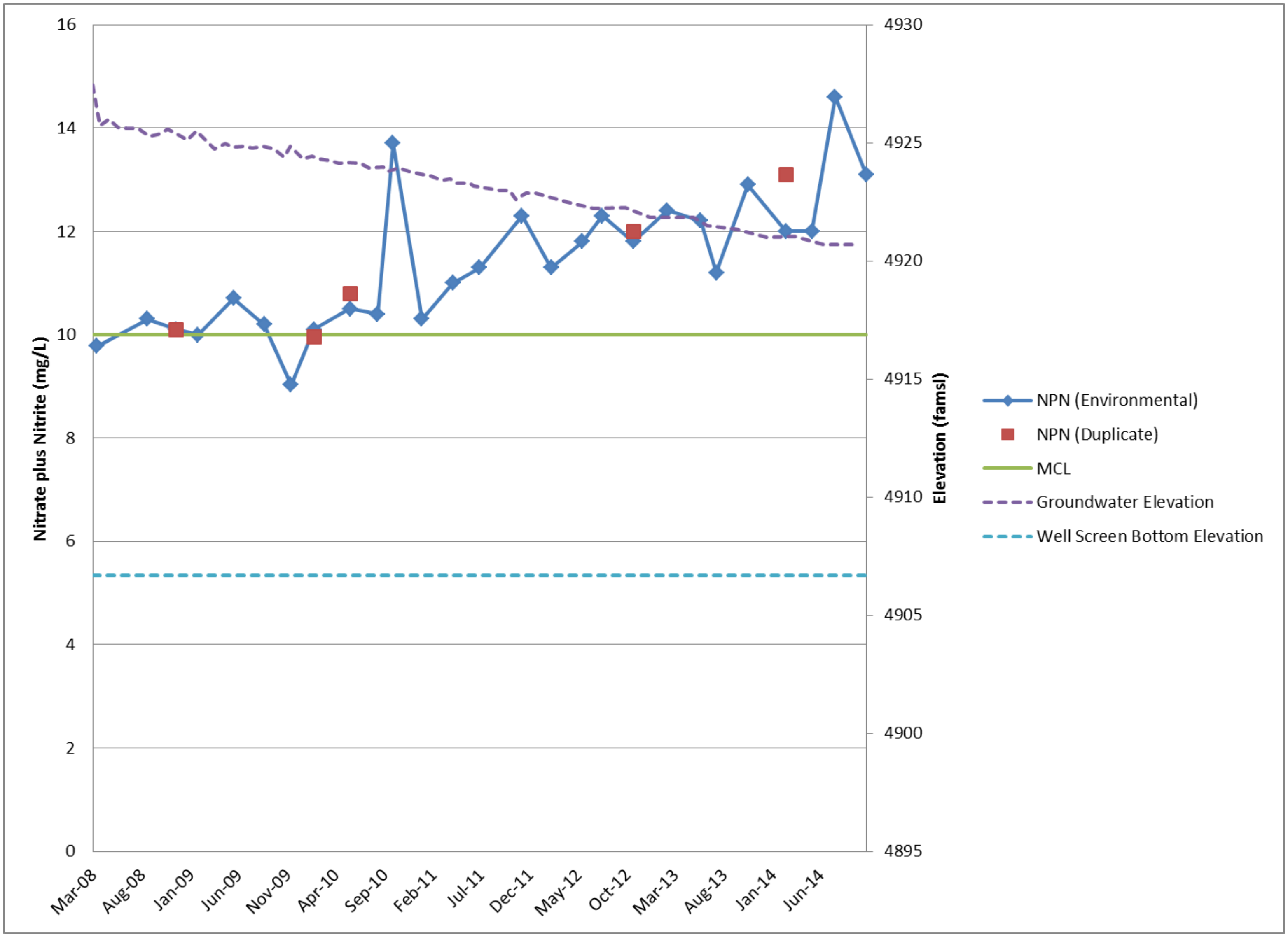


Figure 5B-7. Nitrate Plus Nitrite Concentrations, TAV-MW10

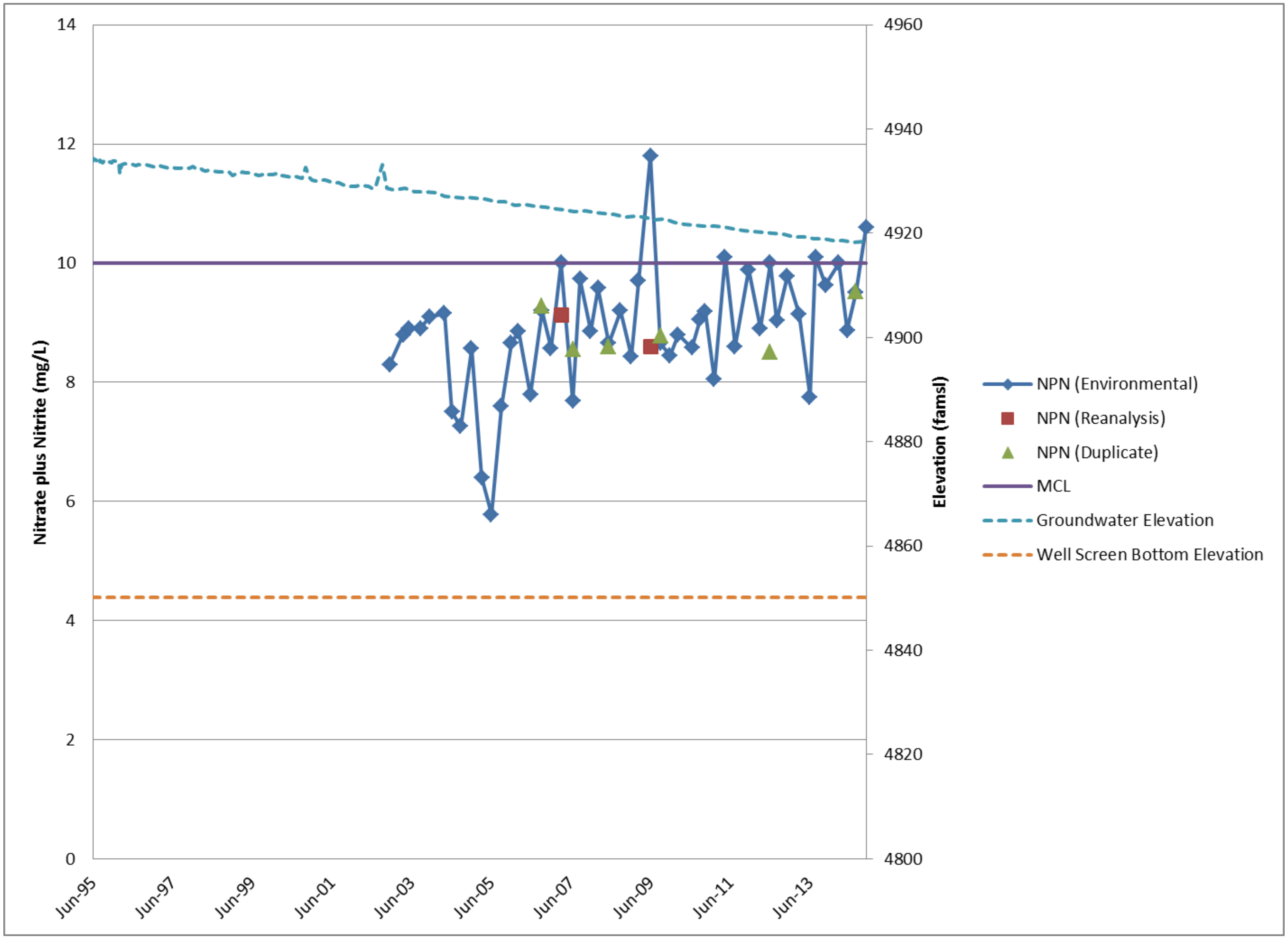


Figure 5B-8. Nitrate Plus Nitrite Concentrations, AVN-1

Attachment 5C
Technical Area-V
Hydrographs

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Attachment 5C Hydrographs

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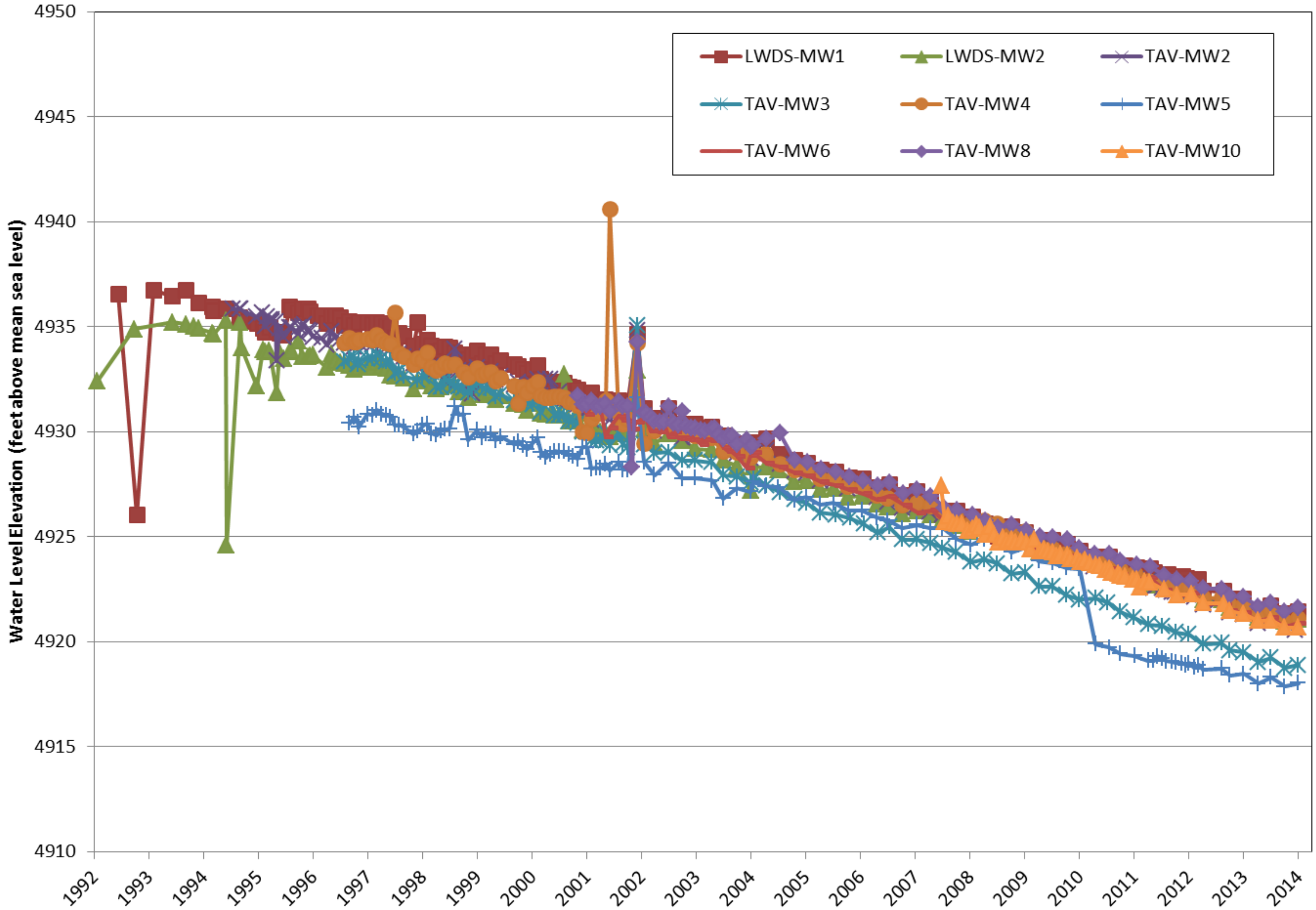

Figure 5C-1. TAVG AOC Wells (1 of 3)

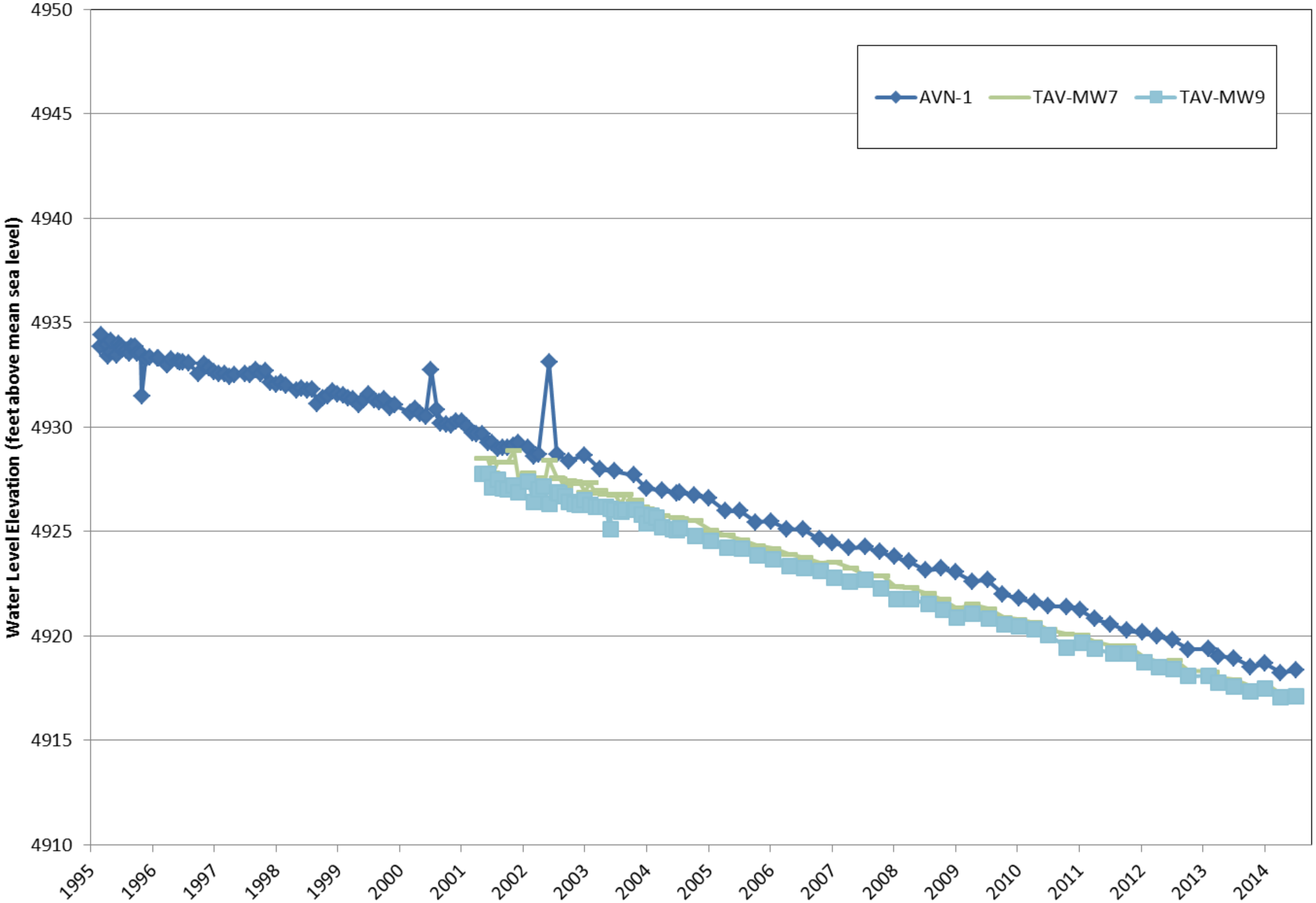

Figure 5C-2. TAVG AOC Wells (2 of 3)

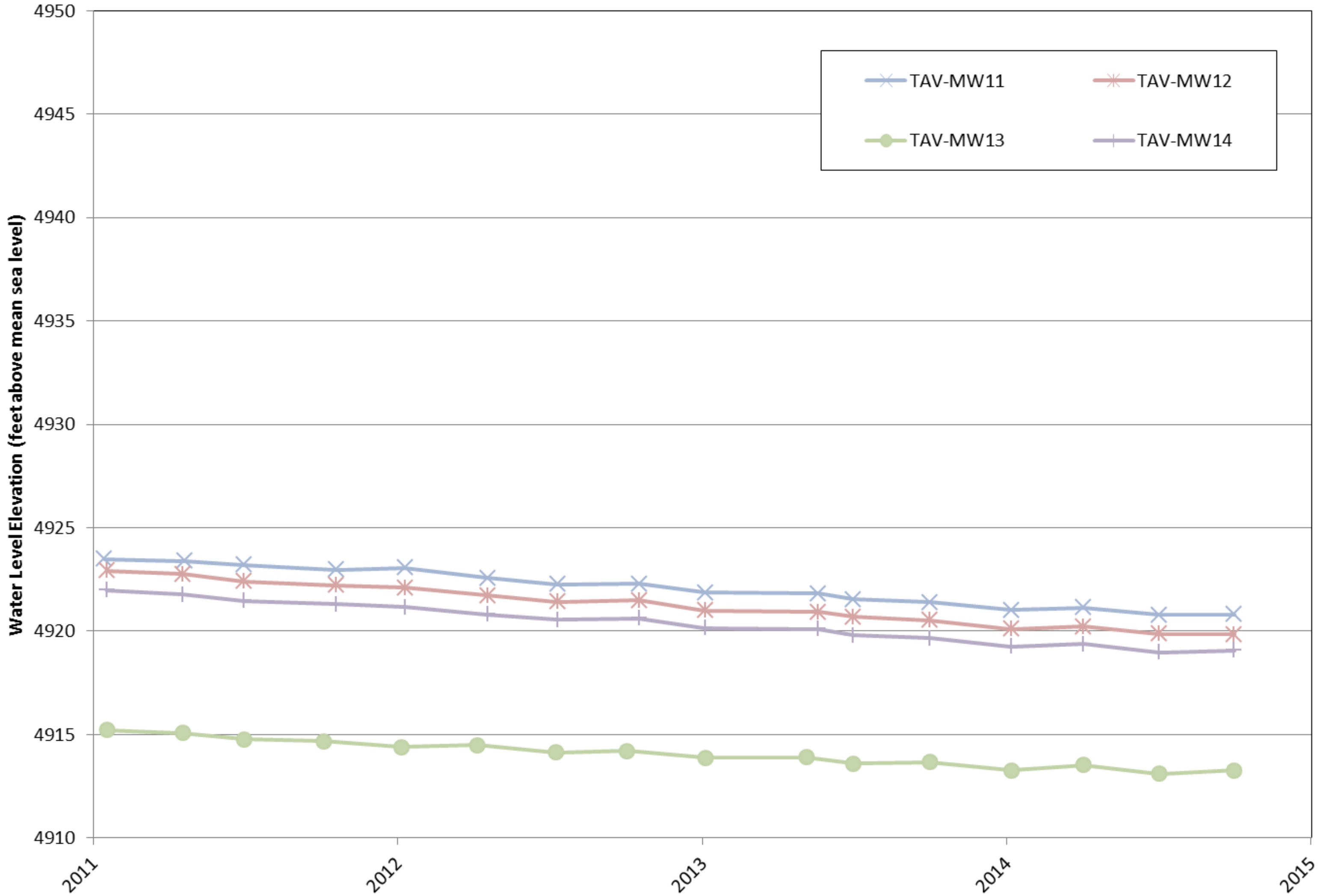

Figure 5C-3. TAVG AOC Wells (3 of 3)

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6.0 Tijeras Arroyo Groundwater Area of Concern

6.1 Introduction

Trichloroethene (TCE) and nitrate have been identified as constituents of concern (COCs) in groundwater at the Tijeras Arroyo Groundwater (TAG) Area of Concern (AOC) based on historical groundwater monitoring results. Detections of these two COCs exceed the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) in groundwater samples collected from the TAG AOC monitoring wells. Since August 1996, the historical maximum TCE concentration detected at the site has been 10.5 micrograms per liter (µg/L), and the maximum nitrate detection has been 49 milligrams per liter (mg/L). The EPA MCLs and State of New Mexico drinking water standards for TCE and nitrate are 5 µg/L and 10 mg/L (as nitrogen), respectively.

Characteristics of the TAG AOC include concentrations of TCE below to just above the MCL at scattered locations in the perched groundwater system (PGWS) and concentrations of nitrate above the MCL at scattered locations in both the PGWS and the regional aquifer.

6.1.1 Location

The TAG AOC encompasses approximately 40 square miles (sq mi) in the north-central portion of Kirtland Air Force Base (KAFB) and adjoining Albuquerque (Figure 6-1). Three of the five Technical Areas (TAs) at Sandia National Laboratories, New Mexico (SNL/NM) are within the TAG AOC. Together, the three TAs (TA-I, TA-II, and TA-IV) encompass approximately 641 acres.

The parties identified as potentially responsible for groundwater contamination within the TAG AOC include the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and its contractor Sandia Corporation (Sandia), KAFB, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), and the City of Albuquerque (COA). KAFB controls 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 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 undeveloped open spaces, active landfills, closed landfills, emergency response training areas, and the Tijeras Arroyo Golf Course. The COA residential areas are located along most of the northern boundary of KAFB, and a major sanitary-waste line operated by ABCWUA trends along Tijeras Arroyo.

6.1.2 Site History

In early 1928, the first airport in Albuquerque was constructed where TA-I and TA-II are currently located. In the spring of 1946, during a dismantling operation, 2,250 surplus military aircraft were dismantled adjacent to the taxiways. In July 1945, the “Z Division” of the Manhattan Engineers District, an extension of the original Los Alamos Laboratory, was established as the forerunner of SNL/NM. At that time, the primary mission of the Z Division was to provide engineering, production, stockpiling, and testing support for nuclear weapon components and systems. In the summer of 1949, the major weapons production was transferred to out-of-state manufacturing facilities and the early work at SNL/NM concentrated on prototype research and manufacturing of experimental devices.

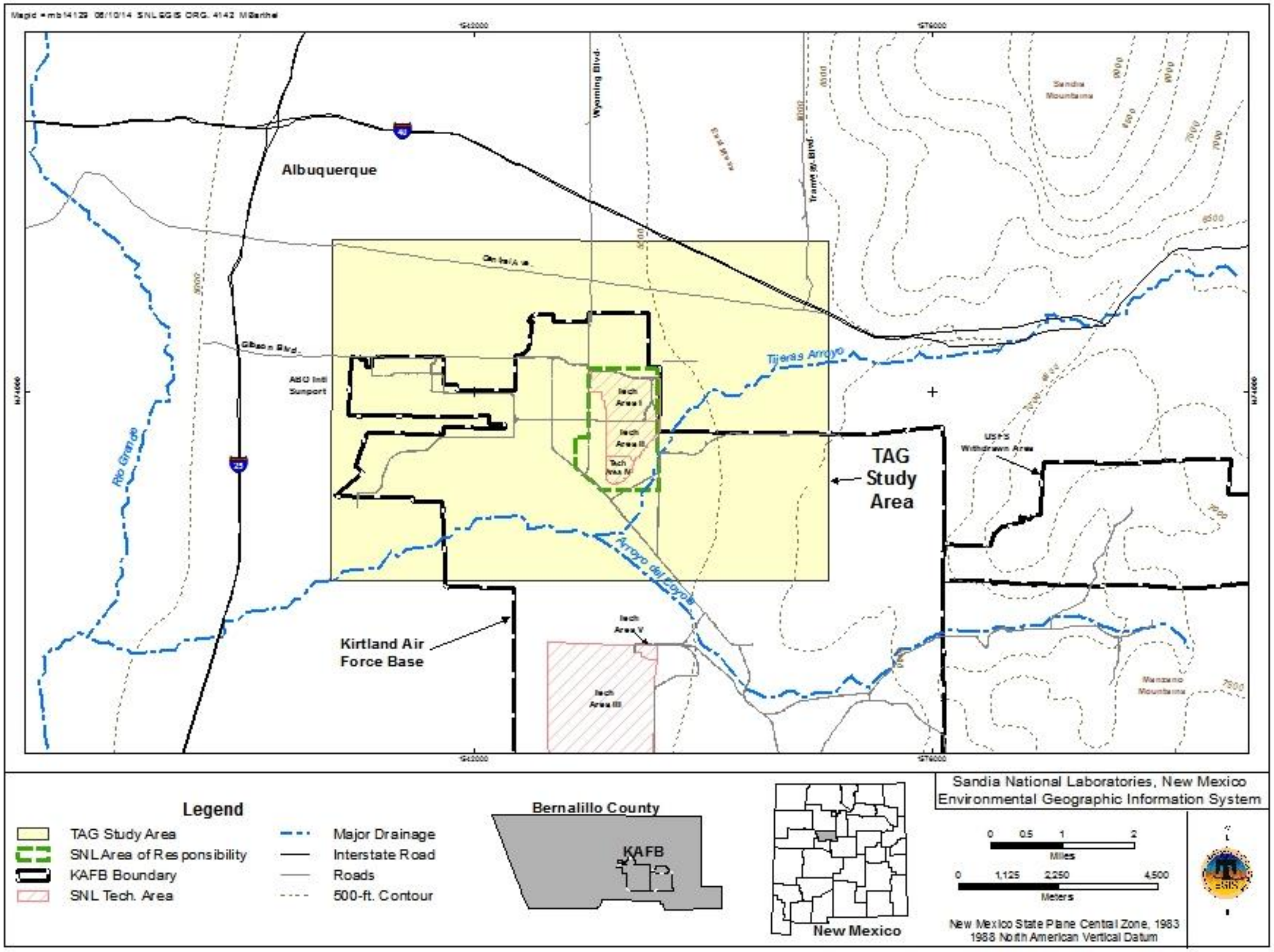

Figure 6-1. Location of the TAG AOC

Since 1949, SNL/NM has grown from a factory-style ordnance facility to a national laboratory dedicated to research, development, and testing of both defense and nondefense components. The current work performed in TA-I, TA-II, and TA-IV can be divided into four main types: nuclear weapon, nonnuclear weapon, technical support, and special research and development. Numerous SNL/NM facilities may have potentially released hazardous materials to the soil and groundwater; however, the current research-oriented mission for most SNL/NM operations involves a diverse inventory of chemicals, which are generally stored and used indoors in small quantities.

SNL/NM Environmental Restoration (ER) Operations (formerly the ER Project) has conducted numerous groundwater investigations in the TAG AOC since 1992 (SNL November 2005) (Table 6-1). Many of these investigations were site-specific and conducted in support of various Solid Waste Management Unit (SWMU) assessments. Other investigations in the TAG AOC were more regional studies conducted by the SNL/NM Site-Wide Hydrogeologic Characterization Project (SNL February 1998). Both KAFB and COA have also completed numerous groundwater investigations in the TAG AOC, the results of which are presented in the TAG Investigation Report (SNL November 2005).

6.1.3 Monitoring History

Investigations of groundwater quality in the TAG AOC have been conducted by SNL/NM personnel over the past 20 years (Table 6-1). In 1992, SNL/NM personnel began to investigate groundwater quality 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 PGWS was discovered at a depth of approximately 320 feet (ft) below ground surface (bgs). In October 1994, the analytical results for a groundwater sample from the PGWS showed TCE at a concentration of 1 µg/L, which prompted SNL/NM personnel to further investigate groundwater contamination in the study area. The regional aquifer is present at approximately 500 ft bgs beneath TA-II.

Beginning in October 2000, meetings of the TAG High Performing Team (HPT) served as a forum for discussing TAG issues. During these meetings, members of the HPT (staff from SNL/NM, KAFB, COA, the New Mexico Environment Department [NMED], and 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 Sandia 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 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. The NMED approved the TAG Investigation Work Plan in September 2003 (NMED September 2003).

Since initial discoveries of TCE and nitrate in groundwater at the TAG AOC, numerous characterization activities have been conducted (Table 6-1). Results of these characterization activities are summarized in the TAG Investigation Report (SNL November 2005). The November 2005 report presents a conceptual model that provides a comprehensive list of groundwater monitoring data sources used to support the investigations.

In April 2004, the Compliance Order on Consent (the Consent Order) became effective between the DOE, Sandia, and the NMED, and the Consent Order specifies TAG as an area of groundwater contamination (NMED April 2004). In response to the Consent Order, DOE/Sandia submitted the TAG Corrective Measures Evaluation (CME) Work Plan to the NMED in July 2004 (SNL July 2004). After fulfilling the requirements of the CME Work Plan, DOE/Sandia submitted the CME Report to the NMED (SNL August 2005).

Table 6-1. Historical Timeline of the TAG AOC

Month	Year	Event	Reference
November–July	1992–1993	SNL/NM personnel began investigation of TA-II groundwater. PGWS discovered as first wells were installed (TA2-SW1-320, TA2-NW1-325, and TA2-NW1-595).	SNL March 1995a
March	1994	Groundwater sampling analytical results for TA-II wells reported in the CY 1993 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1994
March–July	1994	Installed monitoring wells TA2-W-01 and TJA-2.	SNL March 1995a
October	1994	Analytical results for groundwater sampling first detected TCE.	SNL March 1996a
March	1995	Groundwater sampling analytical results for TA-II wells reported in the CY 1994 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1995b
August–September	1995	Installed monitoring wells WYO-1, WYO-2, and PGS-2.	SNL March 1996b
November	1995	Analytical results for groundwater sampling first detected TCE above the EPA MCL of 5 µg/L.	SNL March 1996b
November	1995	Installed monitoring well TA2-W-19.	SNL March 1996b
March	1996	Groundwater sampling analytical results for TA-II wells reported in the CY 1995 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1996a
March	1996	Sandia North Groundwater Investigation Plan submitted to the NMED.	SNL March 1996b
September	1996	Shallow Water-Bearing Zone Hydrologic Evaluation prepared.	Wolford September 1996
November	1996	Pressure transducer program initiated for select monitoring wells.	SNL March 1998a
November–December	1996	Installed TA-II soil-vapor monitoring wells TA2-VW-20 and TA2-VW-21.	IT January 1997
March	1997	Groundwater sampling analytical results for Sandia North wells in TA-I and TA-II reported in the CY 1996 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1997
March	1997	Sandia North Geological Investigation Project Report prepared.	Fritts and Van Hart March 1997
March–April	1997	Installed monitoring wells TAI-W-01 and TA2-W-25.	SNL March 1998a
August	1997	Borehole geophysical investigation (electromagnetic induction, neutron, and natural gamma) completed on 21 SNL/NM and KAFB monitoring wells.	SNL March 1998a
January–February	1998	Installed monitoring wells TAI-W-02, TAI-W-03, TAI-W-06, TA2-W-24, TA2-W-26, and TA2-W-27.	SNL June 2000
March	1998	Groundwater sampling analytical results for Sandia North wells in TA-I and TA-II reported in the CY 1997 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1998b
March	1998	FY 1997 Sandia North Groundwater Investigation Annual Report submitted to the NMED.	SNL March 1998a
August–December	1998	Installed monitoring wells TAI-W-04, TAI-W-05, TAI-W-07, TJA-3, TJA-4, and TJA-5.	SNL June 2000
March	1999	Groundwater sampling analytical results for Sandia North wells in TA-I and TA-II reported in the FY 1998 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1999
May–June	1999	Colloidal borescope investigation performed on 18 SNL/NM and KAFB monitoring wells.	AquaVISION July 1999
October	1999	Analysis of the USGS aeromagnetic survey performed to revise the interpretation of the SNL/NM and KAFB area geologic structure.	Van Hart et al. October 1999
March	2000	Groundwater sampling analytical results for Sandia North wells in TA-I and TA-II reported in the FY 1999 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2000
June	2000	FY 1998 Sandia North Groundwater Investigation Annual Report submitted to the NMED.	SNL June 2000

Refer to footnotes on page 6-6.

Table 6-1. Historical Timeline of the TAG AOC *(Continued)*

Month	Year	Event	Reference
October	2000	TAG High Performing Team convened for the first time.	SNL June 2003
December	2000	Project name changed from the Sandia North to the Tijeras Arroyo Groundwater Investigation.	Collins December 2000
January–March	2001	Installed groundwater monitoring wells TJA-6 and TJA-7, and soil-vapor monitoring wells 46-VW-01, 46-VW-02, and 227-VW-01.	SNL November 2002
February	2001	Preliminary model of the PGWS updated.	BGW February 2001
April	2001	Groundwater sampling analytical results for TAG wells reported in the FY 2000 SNL/NM Annual Groundwater Monitoring Report.	SNL April 2001
June	2001	Geologic model of the PGWS updated.	Van Hart June 2001
July	2001	Monitoring wells WYO-1 and WYO-2 plugged and abandoned, replaced by WYO-3 and WYO-4.	SNL June 2003
October	2001	Monitoring well TA1-W-08 installed.	SNL November 2002
March	2002	Groundwater sampling analytical results for TAG wells reported in the FY 2001 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2002
November	2002	TAG Continuing Investigation Report submitted to the NMED.	SNL November 2002
March	2003	Groundwater sampling analytical results for TAG wells reported in the FY 2002 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2003
June	2003	Subsurface geology at KAFB, including the TAG area, updated.	Van Hart June 2003
June	2003	TAG Investigation Work Plan submitted to the NMED.	SNL June 2003
September	2003	TAG Investigation Work Plan approved by the NMED.	NMED September 2003
December–January	2003–2004	Slug (hydraulic conductivity) tests at groundwater monitoring wells were performed.	Collins May 2004
March	2004	Groundwater sampling analytical results for TAG wells reported in the FY 2003 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2004
April	2004	The Compliance Order on Consent (the Consent Order) identified TAG as an area with groundwater contamination requiring a CME.	NMED April 2004
July	2004	TAG CME Work Plan submitted to the NMED.	SNL July 2004
July-August	2004	Soil-vapor monitoring wells TAG-SV-01 through TAG-SV-05 installed.	SNL November 2005
October	2004	TAG CME Work Plan for the SNL/NM Area of Responsibility approved by the NMED.	NMED October 2004
September	2005	CME Report for TAG submitted to NMED.	SNL August 2005
October	2005	Groundwater sampling analytical results for TAG wells reported in the FY 2004 SNL/NM Annual Groundwater Monitoring Report.	SNL October 2005
November	2005	TAG Investigation Report submitted to the NMED.	SNL November 2005
November	2006	Groundwater sampling analytical results for TAG wells reported in the FY 2005 SNL/NM Annual Groundwater Monitoring Report.	SNL November 2006
March	2007	Groundwater sampling analytical results for TAG wells reported in the FY 2006 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2007
March	2008	Groundwater sampling analytical results for TAG wells reported in the FY 2007 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2008
August	2008	NMED issues Notice of Disapproval on November 2005 TAG Investigation Report.	NMED August 2008
February	2009	DOE/NNSA and Sandia submit Response to NMED's August 2008 Notice of Disapproval on November 2005 TAG Investigation Report.	SNL February 2009

Refer to footnotes on page 6-6.

Table 6-1. Historical Timeline of the TAG AOC *(Concluded)*

Month	Year	Event	Reference
June	2009	Groundwater sampling analytical results for TAG wells reported in the CY 2008 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2009
April	2009	NMED requires characterization of perchlorate in groundwater in five wells in the TAG AOC.	NMED April 2009
August	2009	NMED issues Second Notice of Disapproval on November 2005 TAG Investigation Report.	NMED August 2009
January	2010	DOE/NNSA and Sandia submit Response to NMED's August 2009 Second Notice of Disapproval on November 2005 TAG Investigation Report	SNL January 2010
February	2010	NMED issues Notice of Approval for the November 2005 TAG Investigation Report.	NMED February 2010
October	2010	Groundwater sampling analytical results for TAG wells reported in the CY 2009 SNL/NM Annual Groundwater Monitoring Report.	SNL October 2010
September	2011	Groundwater sampling analytical results for TAG wells reported in the CY 2010 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2011
September	2012	Groundwater sampling analytical results for TAG wells reported in the CY 2011 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2012
September	2013	Groundwater sampling analytical results for TAG wells reported in the CY 2012 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2013
September	2014	Groundwater sampling analytical results for TAG wells reported in the CY 2013 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2014
December	2014	Installed monitoring well TA2-W-28, Plugged and abandoned nearby monitoring well TA2-SW1-320.	Pending

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.
FY	= Fiscal Year.
IT	= IT Corporation.
KAFB	= Kirtland Air Force Base.
MCL	= Maximum Contaminant Level.
NMED	= New Mexico Environment Department.
NNSA	= National Nuclear Security Administration.
PGWS	= Perched Groundwater System.
Sandia	= Sandia Corporation.
SNL	= Sandia National Laboratories.
SNL/NM	= Sandia National Laboratories, New Mexico.
TA	= Technical Area.
TAG	= Tijeras Arroyo Groundwater.
TCE	= Trichloroethene.
The Consent Order	= the Compliance Order on Consent.
USGS	= U.S. Geological Survey.

Table XI-1 of the Consent Order (NMED April 2004) 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 Sandia 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 (SNL June 2003).

6.1.4 Current Monitoring Network

Currently, 22 wells in the TAG AOC are monitored for water quality, and 31 wells are monitored for water levels (Figure 6-2; Table 6-2). Two groundwater systems are present in the TAG AOC: the PGWS at approximately 269 to 340 ft bgs, and the regional aquifer at approximately 440 to 570 ft bgs. Groundwater monitoring wells are completed in either the PGWS or the regional aquifer (Table 6-2).

6.1.5 Summary of Calendar Year 2014 Activities

The following activities took place for the TAG investigation during Calendar Year (CY) 2014:

- Quarterly or annual water level measurements were obtained from TAG wells.
- Quarterly groundwater sampling events were conducted at eight locations (TA2-SW1-320 [and replacement well TA2-W-28], TA2-W-19, TA2-W-26, TJA-2, TJA-3, TJA-4, TJA-7, and WYO-4) in March, May/June, August/September, and November/December 2014 (SNL February 2014, May 2014, July 2014, and October 2014). The monitoring well TA2-SW1-320 was replaced with well TA2-W-28 in December 2014.
- Semiannual groundwater sampling was conducted at four wells (TA1-W-06, TA2-W-01, TA2-W-27, and TJA-6) in March 2014 and August/September 2014 (SNL February 2014 and July 2014).
- Annual groundwater sampling was conducted 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 2014 (SNL July 2014).
- Tables of analytical results (Attachment 6A), concentration versus time graphs (Attachment 6B), and hydrographs (Attachment 6C) were prepared in support of this report.

6.1.6 Summary of Future Activities

The following activities are anticipated for the TAG investigation during the next reporting period (CY 2015):

- Quarterly or annual water level measurements for TAG wells.
- Quarterly groundwater sampling at eight wells: TA2-W-19, TA2-W-26, TA2-W-28, TJA-2, TJA-4, TJA-3, TJA-7, and WYO-4.
- 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.

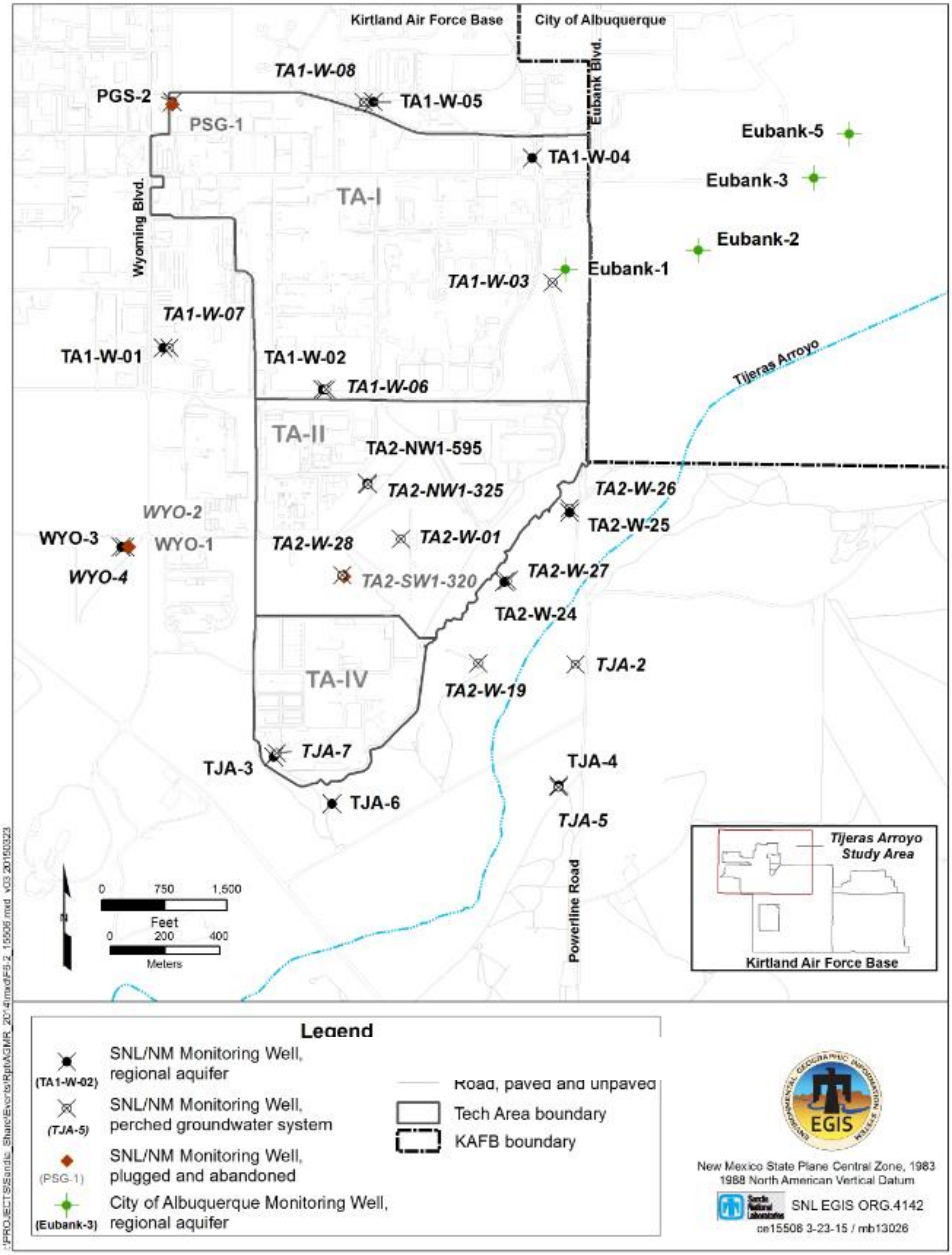

Figure 6-2. TAG Investigation Monitoring Well Locations

Table 6-2. Groundwater Monitoring Wells in the TAG AOC

Well ID	Installation Year	WQ	WL	Comments
Eubank-1	1988		✓	Regional aquifer (COA well)[a]
Eubank-2	1997		✓	Regional aquifer (COA well)[a]
Eubank-3	1997		✓	Regional aquifer (COA well)[a]
Eubank-5	1997		✓	Regional aquifer (COA well)[a]
PGS-2	1995	✓	✓	Regional aquifer
TA1-W-01	1997	✓	✓	Regional aquifer
TA1-W-02	1998	✓	✓	Regional aquifer
TA1-W-03	1998	✓	✓	PGWS
TA1-W-04	1998	✓	✓	Regional aquifer
TA1-W-05	1998	✓	✓	Regional aquifer
TA1-W-06	1998	✓	✓	PGWS
TA1-W-07	1998		✓	PGWS
TA1-W-08	2001	✓	✓	PGWS
TA2-NW1-595	1993	✓	✓	Regional aquifer
TA2-NW1-325	1993		✓	PGWS
TA2-SW1-320	1992	✓	✓	PGWS
TA2-W-01	1994	✓	✓	PGWS
TA2-W-19	1995	✓	✓	PGWS
TA2-W-24	1998		✓	Regional aquifer
TA2-W-25	1997		✓	Regional aquifer
TA2-W-26	1998	✓	✓	PGWS
TA2-W-27	1998	✓	✓	PGWS
TA2-W-28	2014	✓	✓	PGWS
TJA-2	1994	✓	✓	PGWS
TJA-3	1998	✓	✓	Regional aquifer
TJA-4	1998	✓	✓	Regional aquifer
TJA-5	1998		✓	PGWS
TJA-6	2001	✓	✓	Regional aquifer
TJA-7	2001	✓	✓	PGWS
WYO-3	2001	✓	✓	Regional aquifer
WYO-4	2001	✓	✓	PGWS

NOTES: Check marks in the WQ and WL columns indicate WQ sampling and WL measurements were obtained during this reporting period.

[a]WL data for Eubank-2, Eubank-3, and Eubank- 5 provided by Environmental Service Division of the City of Albuquerque Environmental Health Department.

AOC = Area of Concern.
COA = City of Albuquerque.
ID = Identification.
PGWS = Perched Groundwater System.
TAG = Tijeras Arroyo Groundwater.
WL = Water level.
WQ = Water quality.

6.1.7 Conceptual Model

Two groundwater systems are present in the TAG AOC: the PGWS at approximately 269 to 340 ft bgs, and the regional aquifer at approximately 440 to 570 ft bgs. Both systems occur in the alluvial-fan lithofacies of the Santa Fe Group. The uppermost saturated interval of the PGWS is between 10 and 30 ft in thickness.

Groundwater in the PGWS moves toward the southeast and is assumed to merge with the underlying regional aquifer southeast of Tijeras Arroyo. Figure 6-3 presents a diagram of the TAG conceptual model. Data pertaining to the hydrogeologic setting have been synthesized into the TAG conceptual model. The hydrogeologic setting for the TAG AOC is well understood and based on a significant number of monitoring wells. Groundwater occurs in both the PGWS and the regional aquifer. However, the PGWS has a limited lateral extent that encompasses approximately 3.8 sq mi of north-central KAFB. The PGWS may extend northward across the KAFB boundary. In the TAG AOC, the depth to groundwater for the PGWS ranges from 269 to 340 ft bgs. The uppermost saturated zone in the PGWS varies from approximately 10 to 30 ft in thickness, depending on the well location. Borehole geophysical surveys indicate that a few relatively damp intervals are present below the uppermost saturated zone, but borehole-yield testing has revealed that most of these deeper intervals are either too thin or too impermeable to yield sufficient volumes of water for the construction of monitoring wells. The PGWS is not used as a potable water supply source.

The direction of groundwater flow in the PGWS is to the southeast. Groundwater flows through low-yield, alluvial-fan sediments with an average hydraulic gradient of approximately 0.007 feet per foot (ft/ft). Groundwater elevations in the PGWS are decreasing in the northwestern portion of the study area, but are increasing in the southeastern area. The PGWS is recharged by both artificial (leaking water supply/sewer lines and previously by the former KAFB sewage lagoons) and natural sources (Tijeras Arroyo and possibly ancestral Tijeras Creek). Principal hydrogeologic controls on the PGWS include eastward bedding-plane dip attributed to the western limb of an inferred syncline; stratigraphic variations (i.e., braided paleochannels); and multiple recharge locations in the northwestern portion of the TAG AOC.

Multiple overlapping lenses and layers of low conductivity, mostly unsaturated sediments, serve as a perching horizon beneath the PGWS. Beneath the central TAG AOC, a layer of approximately 180 to 280 ft of these unsaturated sediments separates the PGWS from the regional aquifer. Groundwater in the PGWS merges with the regional aquifer southeast of Tijeras Arroyo where the alluvial-fan sediments are slightly more permeable.

The regional aquifer is more laterally extensive than the PGWS, underlying the entire TAG AOC as well as the Albuquerque Basin. Across the TAG AOC, the depth to the regional aquifer ranges from approximately 440 to 570 ft bgs. The regional aquifer is composed of both the Ancestral Rio Grande (ARG) fluvial lithofacies and the alluvial-fan lithofacies. Locally, groundwater in the regional aquifer flows to the northwest, in a nearly opposite direction to that of the PGWS. The gradient in the regional aquifer averages approximately 0.018 ft/ft across the TAG AOC, but is steeper near water supply 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 PGWS. Deflection of the contours shown on the base-wide potentiometric surface map (Plate 1), approximately 1 mile east of TA-II, indicates that underflow along Tijeras Arroyo is most likely recharging the regional aquifer to some degree. Groundwater elevations in the regional aquifer are

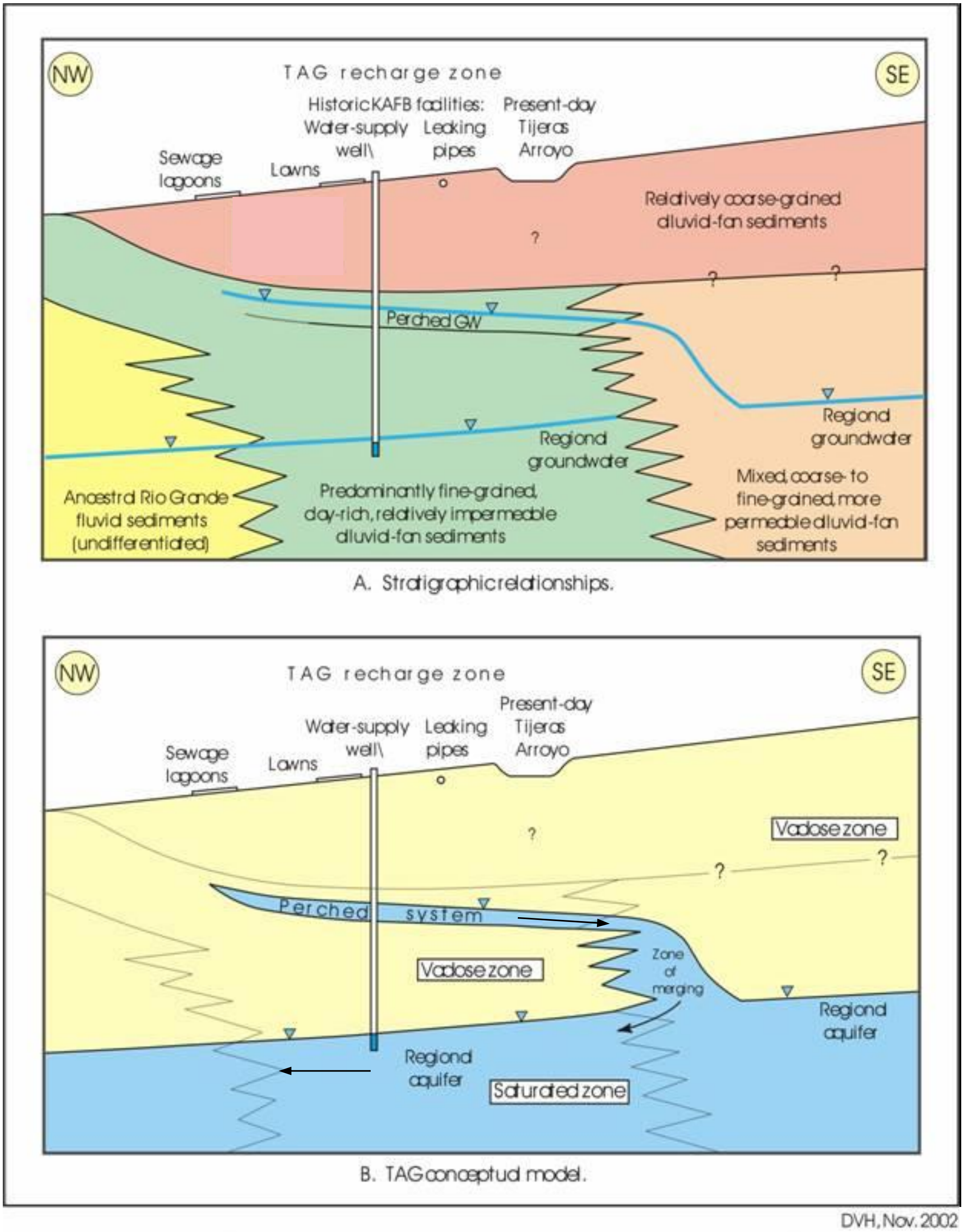

Figure 6-3. TAG Conceptual Model Illustration (Van Hart June 2003)

influenced by water supply pumping. Seasonal pumping variations cause sporadic water-level fluctuations in some monitoring wells near the water supply wells. The principal hydrogeologic control upon groundwater flow direction in the regional aquifer is the combined drawdown effect of the KAFB, ABCWUA, and VA water supply wells.

The aqueous geochemical signatures of the PGWS and the regional aquifer are distinctive. The geochemical signature of the PGWS varies slightly between well locations, but tends to exhibit higher concentrations of calcium, sulfate, and chloride than those for the regional aquifer. Groundwater in the regional aquifer exhibits higher bicarbonate/alkalinity concentrations.

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 3 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 8.2 inches (SNL February 2001). 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: an alluvial-fan lithofacies and the ARG fluvial lithofacies. Both lithofacies are less than 5 Mega Annum 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 is derived from northern sources and is typically composed of well sorted, medium- to coarse-grained sands with higher hydraulic conductivities.

6.1.7.2 Hydrologic Conditions at the TAG AOC

The thickness of the vadose zone is reduced in the central portion of the TAG AOC where the PGWS is present. Discontinuous, yet overlapping multiple lenses of unsaturated alluvial-fan sediments serve as a perching horizon beneath the PGWS in that area. The PGWS is present at approximately 269 to 340 ft bgs, and the regional aquifer system is present at approximately 440 to 570 ft bgs. Groundwater in the PGWS most likely merges with the regional aquifer southeast of Tijeras Arroyo where the alluvial-fan sediments are slightly more permeable.

A comparison of aquifer characteristics for the PGWS and the regional aquifer in the TAG AOC is provided in Table 6-3. The PGWS covers approximately 3.8 sq mi. Monitoring wells bound the PGWS on the western and southern margins. The northern margin of the PGWS has not been fully defined and may extend across the northern KAFB boundary (Figure 6-1). A southeastern margin is not discernible because the PGWS merges with the regional aquifer. The direction of groundwater flow in the PGWS is inferred to be principally to the southeast, with an average horizontal gradient of approximately 0.007 ft/ft. The horizontal gradient of the PGWS is variable across the TAG AOC (Figure 6-4). Beneath TA-I, TA-II, and TA-IV, the horizontal gradient varies from 0.005 to 0.017 ft/ft. The horizontal gradient is steeper east of TA-II at 0.04 ft/ft. The vertical gradient is approximately 0.95 ft/ft over most of the PGWS, and continuous vertical flow is suggested by the merging of the two groundwater systems to the southeast.

Table 6-3. Comparison of the Perched Groundwater System and the Regional Aquifer in the Tijeras Arroyo Groundwater Area of Concern (SNL November 2005)

Characteristic	PGWS	Regional Aquifer
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 southeast.	Primarily to the northwest.
Horizontal Gradient	Approximate average of 0.007 ft/ft.	Approximate average of 0.018 ft/ft, but steeper near water supply wells.
Flow velocities	4 to 10 ft/yr, laterally.	4 to 10 ft/yr, laterally.
Usage	Not used for water supply purposes.	Utilized for water supply by KAFB, ABCWUA, and VA.
Lateral extent	Limited lateral extent across north-central KAFB.	Laterally extensive across the Albuquerque Basin.
Saturated Thickness	Uppermost saturated interval only about 10 to 30 ft in thickness.	In excess of 1,000 ft in thickness across much of the study area.
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 water levels in the northwest, but increasing in the southeast part of the TAG AOC.	Increasing water levels in the north, declining water levels in the center, and increasing in the southeastern part of the TAG AOC.
Recharge	Recharged by both anthropogenic (leaking water supply/sewer lines, irrigated lawns, Tijeras Arroyo Golf Course), and natural sources, such as Tijeras Arroyo.	Recharged by natural sources including mountain front flow, the PGWS, and Tijeras Arroyo.
Principal Hydrologic Controls	Stratigraphic variations such as multiple overlapping lenses; several recharge locations; stratigraphic dip of the alluvial-fan sediments.	Combined drawdown of KAFB, ABCWUA, and VA water supply wells.

NOTES:

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.
PGWS = Perched Groundwater System.
SNL = Sandia National Laboratories.
TAG = Tijeras Arroyo Groundwater.
VA = Veterans Administration.

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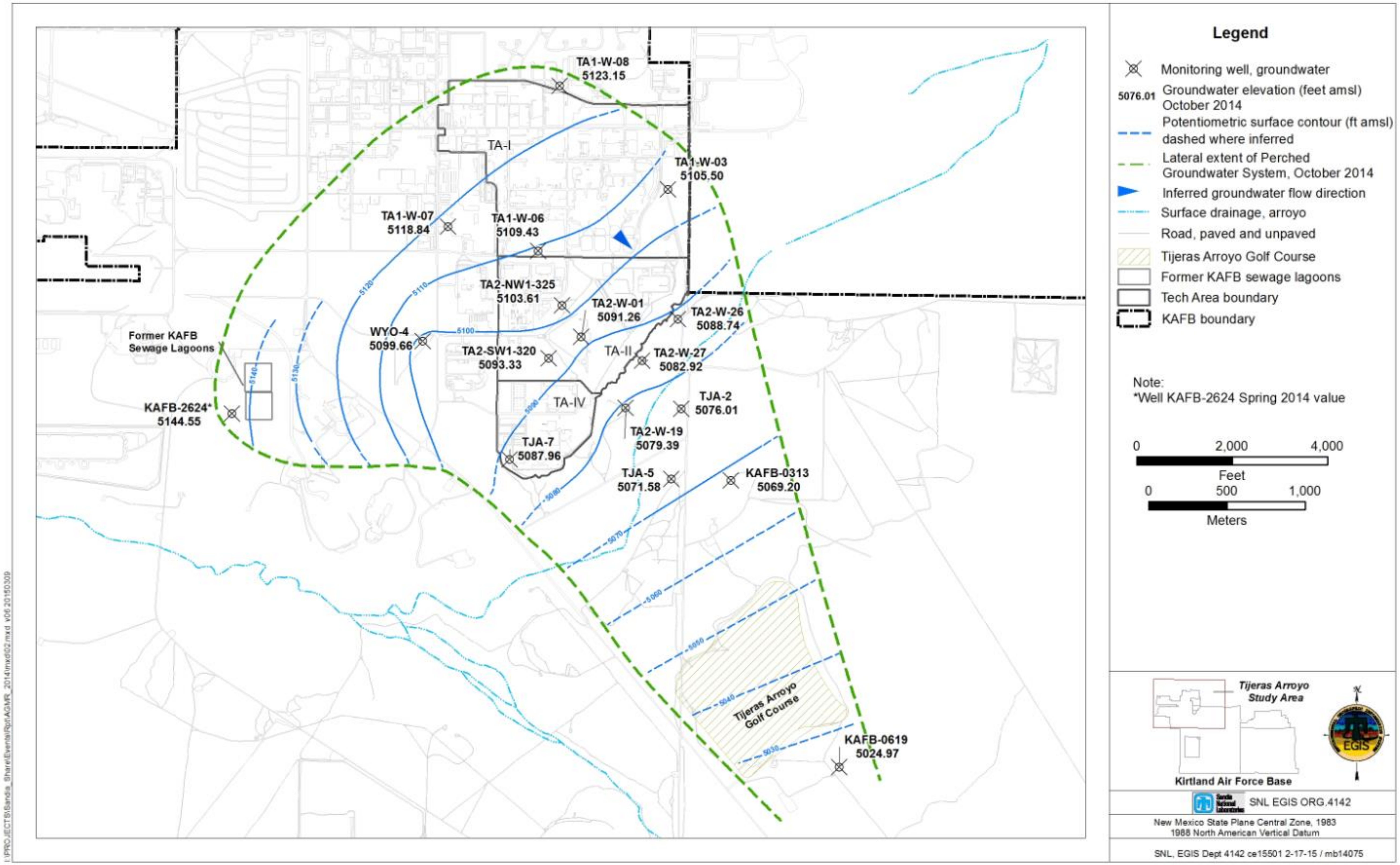

Figure 6-4. Tijeras Arroyo Groundwater Investigation Potentiometric Surface Map for the Perched Groundwater System (October 2014)

6.1.7.3 Local Direction of Flow

Figure 6-4 presents the October 2014 potentiometric surface for the PGWS. The direction of groundwater flow in the PGWS is generally toward the southeast. The horizontal gradient of the PGWS varies from approximately 0.004 to 0.012 ft/ft. Historically, water levels in the PGWS have fluctuated across the AOC (SNL November 2005). In the vicinity of the former sewage lagoons, water levels have been declining since 1987, apparently in response to the lagoons being removed from service. Conversely, water levels have increased southeast of Tijeras Arroyo in some regional aquifer monitoring wells in response to ongoing water operations (BGW February 2001) (Attachment 6C, Figures 6C-1 through 6C-7).

Figure 6-5 presents the October 2014 potentiometric surface for the regional aquifer. The direction of groundwater flow in the regional aquifer is to the northwest toward the KAFB, ABCWUA, and VA water supply wells. The horizontal gradient of the regional aquifer across the study area varies from approximately 0.005 to 0.05 ft/ft. Vertical flow gradients within the TAG AOC have not been measured, but are inferred to be downward, consistent with other SNL/NM groundwater study areas.

Historically, water levels in the regional aquifer have fluctuated across the AOC (SNL November 2005) (Attachment 6C, Figures 6C-1 through 6C-7). A line of demarcation between increasing and declining water levels is evident along the eastern extent of the ARG-fluvial lithofacies. Increases in groundwater elevations of up to 1.8 feet per year (ft/yr) in the southeast portion of the study area reflect recharge of the regional aquifer from the PGWS, Tijeras Arroyo, the golf course, and the mountain front. Until recently, declining water levels approaching 1.5 ft/yr were associated with long-term pumping of KAFB, ABCWUA, and VA water supply wells. However, since late 2008, hydrographs for regional aquifer wells in the northern part of the TAG AOC show an increasing trend in groundwater elevations. For example, hydrographs for monitoring wells TA1-W-01, TA1-W-02, TA1-W-04, and WYO-3 show recent increases in groundwater elevations (Attachment 6C, Figures 6C-1 and 6C-2). Presumably, this is in response to the ABCWUA transitioning to surface water withdrawals for potable water supplies and decreasing dependence on water supply wells immediately north of KAFB.

6.1.7.4 Contaminant Sources

Personnel from the DOE/NNSA and Sandia, the KAFB Environmental Compliance Program, and the COA have evaluated a variety of potentially contaminated sites. The TAG Investigation Report (SNL November 2005) presents a comprehensive summary of the environmental investigations that have been conducted by these three parties. As described in the TAG Investigation Report, two potential TCE and three potential nitrate sources are believed to be the responsibility of DOE/NNSA and Sandia. A brief description of each SNL/NM potential release site is provided as follows.

SWMU 46 (Old Acid Waste Line Outfall)—TCE and Nitrate: An estimated 1.3 billion gallons of wastewater from six TA-I research/office buildings (839, 840, 841, 860, 863, and 892) discharged into the three outfall ditches at the south end of SWMU 226 where SWMU 46 is located. TCE and nitrate were possibly present in the wastewater. Septic water from possible cross connects between the SWMU 226 wastewater line and sanitary sewer lines may have discharged at SWMU 46. In 2000, two soil-vapor monitoring wells were installed at SWMU 46, and soil-vapor sampling was conducted quarterly. Monitoring well 46-VW-01 is located near the waste-line outfall, and soil-vapor sampling ports are set at 50-ft intervals from 15 to 265 ft bgs. The maximum TCE concentration to date is 46,000 parts per billion by volume (ppbv) from the port set at 115 ft bgs. Monitoring well 46-VW-02, located 900 ft farther southeast, has soil-vapor sampling ports set at 50-ft intervals from 46 to 296 ft bgs. The maximum TCE concentration to date at this well is 650 ppbv from the port set at 96 ft bgs.

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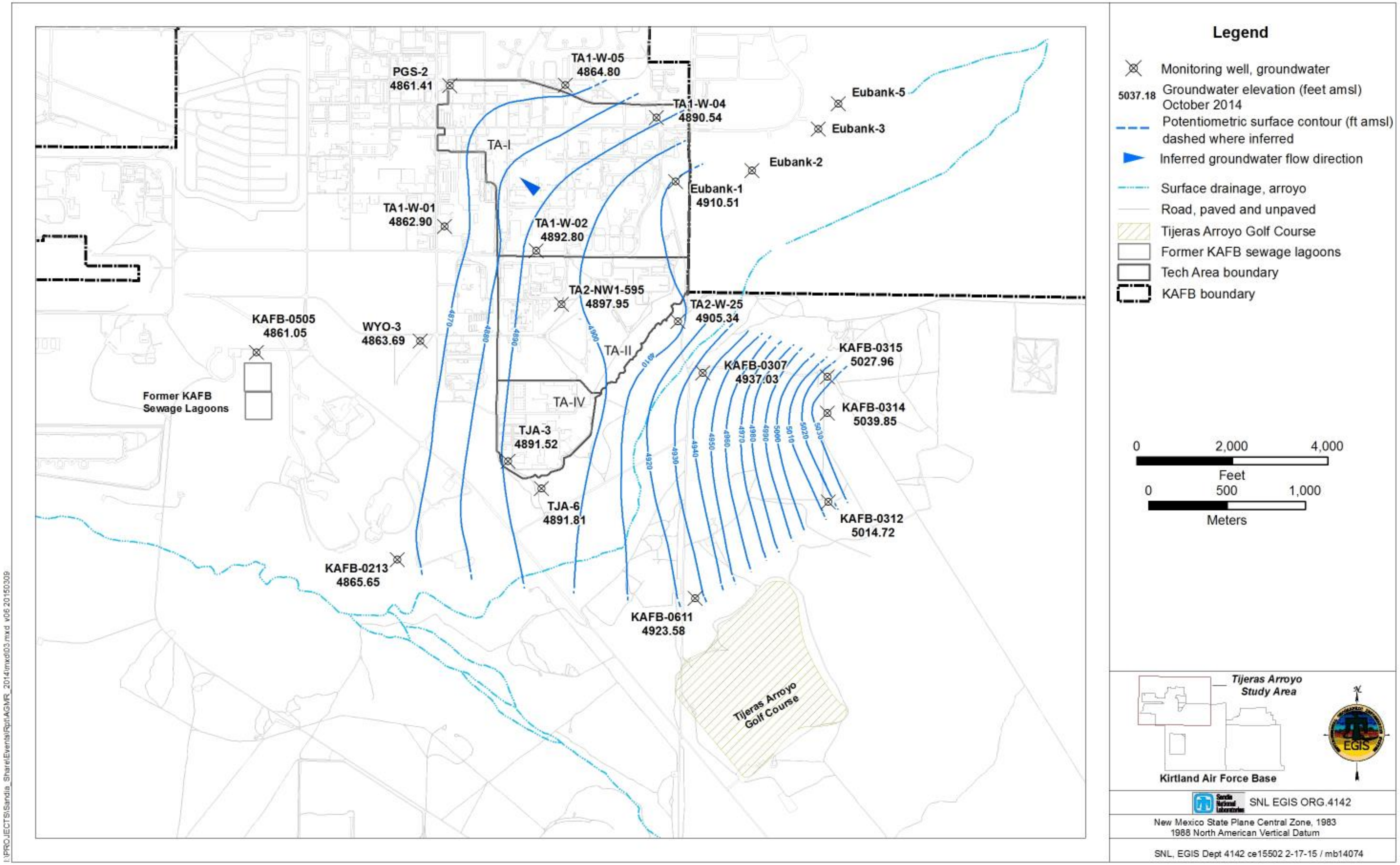

Figure 6-5. Tijeras Arroyo Groundwater Investigation Potentiometric Surface Map for the Regional Aquifer (October 2014)

SWMU 165 (Building 901 Septic System)—TCE and Nitrate: The TA-II septic system leach field was connected to a personnel shower/laundry facility (Building 901) and small research/machine shop (Building 902). Nitrate was most likely present in the septic water. Possible TCE and high explosive compounds were present in the wastewater. No significant contamination has been detected in soil samples. Groundwater samples from PGWS monitoring well TA2-SW1-320 have contained a maximum nitrate concentration of 44 mg/L.

SWMU 187 (TA-I Sanitary Sewer System)—Nitrate: The sanitary sewer system has sewer lines that possibly leaked in the past and possibly had several cross connects with wastewater lines. The system is connected to numerous research/office buildings in TA-I. No significant contamination has been detected in soil samples.

Soil-vapor and soil samples collected from the vadose zone (land surface to the water table) during drilling operations and from the soil-vapor monitoring network have indicated evidence of vapor-phase volatile organic compounds (VOCs). However, no free phase TCE and no water-saturated core samples have been encountered in any of the soil samples collected from the boreholes. The original source of the TCE was the aqueous phase (i.e., wastewater), and the current vapor phase contaminants have partitioned from the aqueous phase. All anthropogenic sources of recharge (i.e., wastewater) have been removed from service and no longer contribute water to the vadose zone at TA-I.

Based on soil-vapor data (SNL November 2005), the mass of TCE that the vapor phase is contributing to the regional aquifer is minimal. In addition, the consistency of soil-vapor concentrations over time indicates that this TCE soil-vapor plume is immobile. Therefore, the only potential mechanism for transporting these contaminants to the aquifer would be through partitioning back into the aqueous phase and additional recharge that might move through the system. Given that both current anthropogenic and natural recharge to the PGWS is minimal, it is extremely unlikely that significant transport of the vadose zone TCE into the aquifer will occur. Therefore, the vapor phase TCE in the vadose zone is not considered to be a continuing source of contamination to the groundwater that needs to be addressed under the source control criteria defined in the *RCRA Corrective Action Plan (Final)* (EPA May 1994).

Nitrate was present in sewage wastewater discharged to SNL/NM, KAFB, and ABCWUA septic systems and sanitary sewer lines in the area. The nitrate was transported to the PGWS water table by high volumes of wastewater disposed of at various locations. Because nitrate is extremely soluble and cannot exist as a separate phase (i.e., as vapor or as nonaqueous phase liquid), and because no water-saturated core samples have been encountered in any of the soil samples collected from boreholes, a secondary source of anthropogenic nitrate contamination in the vadose zone does not exist.

6.1.7.5 Contaminant Distribution and Transport in Groundwater

Perched Groundwater System

The distribution of TCE in groundwater is discontinuous across the PGWS and does not indicate a single contaminant release site. Based on the historic use of chlorinated solvents across SNL/NM and KAFB, the known extent of TCE in the PGWS is associated with multiple releases of aqueous-phase solvents and subsequent transport through the vadose zone.

The maximum historical concentration of TCE in the PGWS is 10.5 µg/L, which was collected from monitoring well WYO-4 in November 2014. The results for groundwater samples from only three TAG AOC monitoring wells (TA2-W-19, TA2-W-26, and WYO-4) have exceeded the MCL for TCE (5 µg/L).

The maximum historical concentration of nitrate in the PGWS within the TAG AOC is 44 mg/L for monitoring well TA2-SW1-320. Concentrations of nitrate in the PGWS exceeding the MCL for nitrate (10 mg/L) are scattered across the TAG AOC. For purposes of discussion, KAFB has defined four plumes of elevated nitrate concentrations in groundwater. Historically, two plumes have been identified in the

PGWS, consisting of Plume 3 beneath SNL/NM TA-II and Plume 4 beneath the Tijeras Arroyo Golf Course (MWH Americas, Inc. July 2003). However, the subsequent installation and sampling of several monitoring wells failed to identify a boundary between Plumes 3 and 4. Therefore, the PGWS nitrate plume is now shown as one contiguous plume and is referred to as Plume 4 (CH2M HILL, Inc. June 2009).

Plume 4, which originates near monitoring well TA2-SW1-320, is located beneath the southwest portion of TA-II and extends southward to the Tijeras Arroyo Golf Course. The plume is 2 miles long and 0.8 miles wide (CH2M HILL, Inc. June 2009), and the upgradient portion is considered to emanate from SWMU 165, the Building 901 Septic System.

Regional Aquifer

The regional aquifer monitoring wells have generally yielded no groundwater samples with detectable TCE concentrations except for low-level detections in samples from monitoring well TJA-3. No sample results for the SNL/NM TAG AOC regional aquifer monitoring wells exceed the MCL of 5 µg/L for TCE.

For the regional aquifer, groundwater samples from nine SNL/NM TAG AOC monitoring wells have exceeded the MCL for nitrate during at least one sampling event. The maximum historical concentration of nitrate for monitoring wells completed in the regional aquifer is 49 mg/L for monitoring well TJA-4. The nitrate contamination in the regional aquifer southeast of TA-II forms what is referred to as Plume 2 (CH2M HILL, Inc. June 2009). Plume 2 is most likely responsible for the nitrate concentrations in samples from monitoring well TJA-4, a well near where the PGWS and regional aquifer merge. Plume 2 is 3 miles long and 1.5 miles wide and the potential sources of nitrate contamination are not completely defined.

Potential downgradient receptors for the TAG nitrate and TCE plumes are the ABCWUA, KAFB, and VA production wells located to the north and northwest of TA-I. Numerical simulations suggest that nitrate and TCE in the PGWS would migrate to the southeast, merge with the regional aquifer, and then travel back to the north and northwest. Additionally, downgradient concentrations of nitrate and TCE are decreasing in groundwater to below levels of concern through dispersion and dilution as the plume moves into the more hydraulically conductive deposits near the production wells.

6.2 Regulatory Criteria

The NMED Hazardous Waste Bureau 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 Areas of Concern are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (NMED 1993).

All corrective action requirements pertaining to the TAG AOC are contained in the Consent Order (NMED April 2004). The groundwater monitoring activities for the TAG investigation 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). Recently, TAG activities have been conducted as required by the NMED-approved TAG Investigation Work Plan (SNL June 2003).

The Consent Order, effective in April 2004, transferred regulatory authority for corrective action requirements from the Hazardous and Solid Waste Amendments module of the SNL/NM RCRA Permit to the Consent Order (NMED April 2004). The TAG investigation must comply with requirements set forth in the Consent Order for site characterization and the development of a CME for the SNL Area of

Responsibility (Figure 6-1). The Consent Order also contains schedules that define dates for the delivery of plans and reports related to TAG. The NMED is the regulatory agency responsible for enforcing the CME requirements identified in the Consent Order.

Although the Consent Order requires that DOE/NNSA and Sandia evaluate the nature and extent of contamination in the TAG AOC, no specific reporting requirements are prescribed in the Consent Order (NMED April 2004). However, the TAG Investigation Report (SNL November 2005) 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 (NMED April 2004).

In this Annual Groundwater Monitoring Report, TAG 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 Sandia. 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 (NMED April 2004). 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

The CY 2014 activities for the TAG investigation, including plans and reports, are listed in Section 6.1.5. However, the recent field activities completed in the study area include groundwater monitoring, monitoring well decommissioning, and replacement well installation. The four groundwater sampling events are summarized in Table 6-4, and the analytical parameters for each well and each sampling event are listed in Table 6-5.

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. Field QC samples are used to monitor the sampling process. Duplicate environmental samples are used to measure the precision of the sampling process. EB samples are used to verify the effectiveness of sampling equipment decontamination procedures. TB samples are used to determine whether VOCs contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory.

6.4 Field Methods and Measurements

The monitoring procedures conducted for TAG groundwater monitoring are described in detail in Section 1.3. The water level information was used to create the potentiometric surface maps presented in Figures 6-4 and 6-5 and the hydrographs presented in Attachment 6C.

6.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

6.6 Summary of Analytical Results

This section discusses monitoring results, exceedances of standards, and pertinent trends in concentrations for COCs in the TAG AOC that exceeded standards. The analytical results and field measurements for all TAG sampling events are presented in Attachment 6A, Tables 6A-1 through 6A-7; concentration trend plots for COCs that exceed the MCLs are presented in Attachment 6B, Figures 6B-1 through 6B-6. A summary of detected VOC results is presented in Table 6A-1. The method detection limits (MDLs) for all analyzed VOCs are listed in Table 6A-2.

Table 6-4. Groundwater Monitoring Well Network and Sampling Dates for the TAG AOC, Calendar Year 2014

Date of Sampling Event	Wells Sampled		SAP
March 2014	TA1-W-06 TA2-SW1-320 TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27	TJA-2 TJA-3 TJA-4 TJA-6 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY14, 2nd Quarter Sampling* (SNL February 2014)
May/June 2014	TA2-SW1-320 TA2-W-19 TA2-W-26 TJA-2	TJA-3 TJA-4 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY14, 3rd Quarter Sampling* (SNL May 2014)
August/September 2014	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-SW1-320 TA2-W-01	TA2-W-19 TA2-W-26 TA2-W-27 TJA-2 TJA-3 TJA-4 TJA-6 TJA-7 WYO-3 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY14, 4th Quarter Sampling* (SNL July 2014)
November/December 2014	TA2-W-19 TA2-W-26 TA2-W-28 TJA-2	TJA-3 TJA-4 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY15, 1st Quarter Sampling* (SNL October 2014)

NOTES:

AOC = Area of Concern.
FY = Fiscal Year.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
TAG = Tijeras Arroyo Groundwater.

Table 6-5. Parameters Sampled at TAG AOC Wells for Each Sampling Event, Calendar Year 2014

Parameter	March 2014		
NPN	TA1-W-06	TA2-W-26	TJA-6
VOCs	TA1-W-06 (dup)	TA2-W-27	TJA-6 (dup)
	TA2-SW1-320 (low-flow)	TJA-2	TJA-7
	TA2-W-01	TJA-3	WYO-4
	TA2-W-19	TJA-4	
Parameter	**May/June 2014**		
NPN	TA2-SW1-320 (low-flow)	TJA-3	
VOCs	TA2-W-19	TJA-4	
	TA2-W-19 (dup)	TJA-7	
	TA2-W-26	WYO-4	
	TJA-2	WYO-4 (dup)	
Parameter	**August/September 2014**		
Alkalinity	PGS-2 (low-flow)	TA1-W-06	TJA-2 TJA-3
Anions	PGS-2 (low-flow dup)	TA1-W-08	TJA-4
Gamma Spec*	TA1-W-01	TA2-NW1-595	TJA-6
Gross alpha/beta activity	TA1-W-02	TA2-NW1-595 (dup)	TJA-7
NPN	TA1-W-03	TA2-SW1-320 (low-flow)	WYO-3
TAL Metals, plus Total	TA1-W-03 (dup)	TA2-W-01	
Uranium	TA1-W-04	TA2-W-19	WYO-4
Tritium	TA1-W-05	TA2-W-26	
VOCs	TA1-W-05 (dup)	TA2-W-27	
Parameter	**November/December 2014**		
NPN	TA2-W-19	TJA-4	
VOCs	TA2-W-26	TJA-7	
	TA2-W-28	TJA-7 (dup)	
	TJA-2	WYO-4	
	TJA-3		

NOTES:

AOC = Area of Concern.
dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).
NPN = Nitrate plus nitrite (reported as nitrogen).
Low-flow = QED™ Environmental Systems or Geotech Environmental Equipment, Inc. (low-flow sampling system).
TAG = Tijeras Arroyo Groundwater.
TAL = Target Analyte List.
VOC = Volatile organic compound.

The VOCs detected at low concentrations in groundwater samples from TAG AOC monitoring wells include the following:

- 1,1-Dichloroethane
- 1,1-Dichloroethene
- Chloroform
- cis-1,2-Dichloroethene
- Tetrachloroethene
- TCE
- Toluene

Seven VOCs were detected during CY 2014. Five of these VOCs have promulgated MCLs. Only TCE exceeds its MCL of 5 µg/L (Table 6A-1). TCE was detected above the MCL in the sample from one PGWS monitoring well, WYO-4. The maximum concentration of TCE reported for monitoring well WYO-4 during this reporting period is 10.5 µg/L in the sample collected during the November 2014 sampling event; this is also the all-time maximum concentration of TCE in this well. Figure 6B-1 (Attachment 6B) shows that the TCE concentrations in samples from monitoring well WYO-4 have exceeded the MCL, and the trend ranges from stable to increasing over time.

The analytical results for nitrate plus nitrite (NPN) (reported as nitrogen) are presented in Table 6A-3 (Attachment 6A). The NPN results exceed the MCL of 10 mg/L in samples from monitoring wells TA2-SW1-320, TA2-W-28, TA2-W-19, TJA-2, TJA-4, and TJA-7. The maximum concentration of NPN detected during this reporting period is 32.8 mg/L in the environmental sample from monitoring well TJA-4 collected during the September 2014 sampling event. Figures 6B-2 through 6B-6 (Attachment 6B) show that the NPN concentrations in monitoring wells TA2-SW1-320, TA2-W-28, TJA-4, and TJA-7 have generally exceeded the MCL for the duration of the wells, and NPN concentrations in monitoring wells TA2-W-19 and TJA-2 have regularly exceeded the MCL since May 2009.

Analytical results for anions and alkalinity are presented in Table 6A-4; no anion concentrations exceed established MCLs. Total metal analytical results are presented in Table 6A-5; no metal results exceed established MCLs.

Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4 should not include uranium. Naturally occurring uranium is measured independently (i.e., the 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. Groundwater samples were analyzed for tritium, gross alpha/beta activity, and gamma-emitting radionuclides. The results are presented in Table 6A-6. All radionuclide activities are below MCLs, where established.

Field water quality parameters are measured during purging of each well prior to sampling and include temperature, specific conductance, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. The parameter measurements obtained immediately before collecting the samples are presented in Table 6A-7.

6.7 Quality Control Results

Field and laboratory QC samples were collected and prepared as described in Section 1.3. Data validation qualifiers are provided with the analytical results in Tables 6A-1 through 6A-6 (Attachment 6A). The results of QC samples and the impact on data quality for the TAG quarterly sampling events are discussed in the following paragraphs.

Duplicate sample results for all wells and all sampling periods show good correlation for all calculated parameters (relative percent difference [RPD] values less than 20 for organic compounds and less than 35 for inorganic analyses), except for 1,1-dichloroethane. The RPD for 1,1-dichloroethane was calculated at 21 from the May/June 2014 samples collected at well TA2-W-19, and is an estimated value because reported concentrations are below the PQL.

The results for the EB analyses are as follows:

- **March 2014 Sampling Event**—The EB samples were collected prior to sampling monitoring wells TA1-W-06 and TJA-6 and submitted for analysis of VOCs and NPN. The organic compounds bromodichloromethane and chloroform were detected in the EB samples. No corrective action was required for bromodichloromethane because this compound was not detected in associated environmental samples. Chloroform was detected in the EB at a concentration greater than the associated TA1-W-06 environmental and environmental duplicate sample results, and chloroform was qualified as not detected during data validation in these groundwater samples.

- **May/June 2014 Sampling Event**—The EB samples were collected prior to sampling monitoring wells TA2-W-19 and WYO-4 and submitted for analysis of VOCs and NPN. Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was required because these compounds were not detected in associated environmental samples.

- **August/September 2014 Sampling Event**—EB samples were collected prior to sampling monitoring wells PGS-2, TA1-W-03, TA1-W-05, and TA2-NW1-595 and submitted for VOC, NPN, anions, alkalinity, metals, gamma spectroscopy, gross alpha, gross beta, and tritium analyses. Bromide, bromodichloromethane, calcium, chloroform, chloride, copper, and NPN were detected above laboratory MDLs. No corrective action was necessary for bromodichloromethane, calcium, chloroform, chloride, or NPN because these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result. Bromide was qualified as not detected during validation in TA1-W-05 environmental samples because bromide was reported at concentrations less than five times the EB result. Copper was detected in all associated environmental samples at concentrations less the associated EB result, and qualified as not detected during data validation.

- **November/December 2014 Sampling Event**—An EB sample was collected prior to sampling monitoring well TJA-7 and submitted for analysis of VOCs and NPN. Bromodichloromethane, chloroform, and dibromochloromethane were detected in the EB sample. No corrective action was required because these compounds were not detected in the associated environmental sample.

The results for the TB analyses are as follows:

- **March 2014 Sampling Event**—No VOCs were detected above laboratory MDLs in any TB sample.

- **May/June 2014 Sampling Event**—No VOCs were detected above laboratory MDLs in any TB sample except chloromethane and methylene chloride. No corrective action was required because these compounds were not detected in associated environmental samples.

- **August/September 2014 Sampling Event**—No VOCs were detected above laboratory MDLs in any TB sample.

- **November/December 2014 Sampling Event**—No VOCs were detected above laboratory MDLs in any TB sample.

The results for the FB analyses are as follows:

- **March 2014 Sampling Event**—FB samples were collected at monitoring wells TA2-W-26 and TJA-4. The compounds detected included bromodichloromethane, chloroform, and dibromochloromethane. No corrective action was required, because these compounds were not detected in the associated environmental samples.

- **May/June 2014 Sampling Event**—A FB sample was collected at monitoring well TJA-2. The compounds detected included bromodichloromethane, chloroform, and dibromochloromethane. No corrective action was required, because these compounds were not detected in the associated environmental sample.

- **August/September 2014 Sampling Event**—FB samples were collected at monitoring wells TA2-NW1-595, TA2-W-27, and TJA-2. The compounds detected in FB samples included bromodichloromethane chloroform, and dibromochloromethane. No corrective action was required, because these compounds were not detected in the associated environmental samples.

- **November/December 2014 Sampling Event**—A FB sample was collected at monitoring well TJA-3. The compounds detected included bromodichloromethane, chloroform, dibromochloromethane, and TCE. No corrective action was required for bromodichloromethane, chloroform, or dibromochloromethane, because these compounds were not detected in the TJA-3 environmental sample. TCE was reported in the FB sample at a concentration of 1.60 μg/L. Based upon historical results and the review in data validation indicate evidence of TCE in TJA-3; therefore, the environmental sample was qualified as an estimated value.

Laboratory data qualifiers are provided with the analytical results in Tables 6A-1 through 6A-6 (Attachment 6A).

6.8 Variances and Nonconformances

No variances or nonconformances from field or sampling requirements specified in the TAG Investigation Mini-Sampling and Analysis Plans (SAPs) (SNL February 2014, May 2014, July 2014, and October 2014) were noted during sampling activities. However, project-specific issues associated with these sampling events are noted as follows:

- **All Sampling Events**—(1) Monitoring well WYO-4 was purged dry prior to sampling. This well was allowed to recover to 80 percent of the original water level, or upon sufficient volume to fill containers, and then samples were collected. (2) A QED Environmental Systems, Inc. (MicroPurge® low-flow sampling method) sampling system was used to collect a groundwater sample from monitoring well PGS-2. (3) A Geotech Environmental Equipment, Inc. bladder pump sampling system was used to collect a groundwater sample from monitoring well TA2-SW1-320. Conventional sampling equipment cannot be lowered to the proper sampling depth in either PGS-2 or TA2-SW1-320 due to well construction issues.

- **March 2014 Sampling Event**—The field team encountered difficulties operating the dedicated sampling system in monitoring well TA2-SW1-320. The sampling system initially did not produce purge water. The sampling system began operating properly after the field team made several adjustments to regulate pressure and cycle times to the microprocessor controller unit.

- **May/June 2014 Sampling Event**—The bladder pump controller for the dedicated sampling system failed to operate and pressurize the sampling system. A new controller was purchased and monitoring well TA2-SW1-320 was successfully sampled on June 20, 2014.

- **August/September 2014 Sampling Event**—Monitoring well WYO-3 did not purge dry prior to meeting groundwater stability criteria. Two groundwater sampling crews and trucks were used during August and September 2014 sampling activities.

- **November/December 2014 Sampling Event**—Monitoring well TA2-W-28 was recently installed as a replacement to monitoring well TA2-SW1-320. This is the initial monitoring event for well TA2-W-28.

6.9 Summary and Conclusions

This section provides a brief summary of activities, discussion of COCs that exceed standards, trends of concentrations versus time, the conceptual model, and plans for studies to be completed during CY 2015 at the TAG AOC.

The TAG AOC encompasses an area of approximately 40 sq mi in the north-central portion of KAFB and adjoining Albuquerque. Groundwater investigations were initiated in 1992, and the current monitoring network consists of 21 monitoring wells for water quality analysis and 30 wells for water level measurements. For this reporting period, monitoring wells were sampled in March, May/June, August/September, and November/December 2014. The groundwater samples were analyzed for VOCs, NPN, anions, alkalinity, Target Analyte List metals (plus uranium), gross alpha/beta activity, tritium, and radionuclides by gamma spectroscopy. Analytical results were compared with EPA MCL guidelines for drinking water (EPA May 2009). Depending on their locations and historical concentrations of COCs, the monitoring wells were sampled quarterly, semiannually, or annually during this reporting period.

Only NPN and TCE were detected above MCLs in groundwater samples from TAG AOC wells. NPN concentrations exceed the MCL of 10 mg/L in samples from monitoring wells TA2-SW1-320, TA2-W-28, TA2-W-19, TJA-2, TJA-4, and TJA-7, with a maximum concentration of 32.8 mg/L in the environmental sample from monitoring well TJA-4 collected during the September 2014 sampling event.

TCE concentrations exceed the MCL of 5 µg/L in samples from monitoring well WYO-4, which is screened in the PGWS. The maximum concentration of TCE detected for monitoring well WYO-4 during this reporting period is 10.5 µg/L in the sample collected during the November/December 2014 sampling event. This value establishes a new maximum concentration of TCE in the PGWS and monitoring well WYO-4. TCE concentrations in monitoring well WYO-4 have exceeded the MCL for the duration of the well, and the trend ranges from stable to increasing over time. A historical maximum concentration for TCE of 4.44 µg/L is reported at monitoring well TJA-2 during the November/December 2014 sampling event.

The following conclusions are based on a comprehensive review of available information for current groundwater contamination conditions in the TAG AOC:

- The distribution of TCE in the PGWS is sporadic across the study area and reflects multiple release sites and the effect of stratigraphic heterogeneity.

- Based on the historical use and disposal of chlorinated solvents, the extent of TCE in groundwater is most likely associated with multiple aqueous releases of solvents and subsequent vapor-phase transport through the vadose zone.

- The distribution of nitrate above the background level is laterally widespread in the PGWS.

- In the regional aquifer, concentrations of nitrate above the MCL occur in the western and southeastern portions of the TAG AOC.

- The potential sources of TCE and/or nitrate in the TAG AOC include the former sewage lagoons, wastewater outfalls, septic systems, landfills, sewer lines, and the golf course.

- The conceptual model described in Section 6.1.7 does not require modification based on the water level and analytical data for this reporting period.

Ongoing environmental studies of the TAG AOC include the following:

- Continue collection of groundwater samples at the 21 TAG groundwater monitoring wells on a quarterly, semiannual, or annual basis. At a minimum, the analytes for groundwater sampling will consist of VOCs and nitrate.

- Continue periodic measurements of groundwater elevations in all TAG monitoring wells.

- Maintain contact with the KAFB Environmental Compliance Program personnel with respect to the results of TCE and nitrate abatement studies.

- As available, obtain groundwater results from KAFB, U.S. Geological Survey, and the COA.

- Continue to integrate SNL/NM, KAFB, and COA data into the CME process currently underway for the SNL/NM area of responsibility.

- Continue to report future TAG investigation results in the 2015 SNL/NM Annual Groundwater Monitoring Report.

- Upon NMED approval of the TAG CME Report (SNL August 2005), prepare a Corrective Measures Implementation Plan.

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Attachment 6A
Tijeras Arroyo Groundwater
Analytical Results Tables

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Attachment 6A Tables

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

Calendar Year 2014

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06	1,1-Dichloroethene	1.04	0.300	1.00	7.00	*, N	J	095526-001	SW846-8260B
11-Mar-14	Chloroform	0.330	0.300	1.00	NE	*, J, N	1.0U	095526-001	SW846-8260B
	Trichloroethene	0.400	0.300	1.00	5.00	*, J, N	J	095526-001	SW846-8260B
TA1-W-06 (Duplicate)	1,1-Dichloroethene	1.05	0.300	1.00	7.00	*, N	J	095527-001	SW846-8260B
11-Mar-14	Chloroform	0.310	0.300	1.00	NE	*, J, N	1.0U	095527-001	SW846-8260B
	Trichloroethene	0.410	0.300	1.00	5.00	*, J, N	J	095527-001	SW846-8260B
TA2-W-01	Tetrachloroethene	0.580	0.300	1.00	5.00	*, J, N	J	095521-001	SW846-8260B
10-Mar-14	Trichloroethene	1.71	0.300	1.00	5.00	*, N	J	095521-001	SW846-8260B
TA2-W-19	1,1-Dichloroethane	0.480	0.300	1.00	NE	J		095542-001	SW846-8260B
19-Mar-14	Trichloroethene	3.27	0.300	1.00	5.00			095542-001	SW846-8260B
	cis-1,2-Dichloroethene	0.440	0.300	1.00	70.0	J		095542-001	SW846-8260B
TA2-W-26	Tetrachloroethene	0.920	0.300	1.00	5.00	J		095540-001	SW846-8260B
18-Mar-14	Trichloroethene	0.970	0.300	1.00	5.00	J		095540-001	SW846-8260B
	cis-1,2-Dichloroethene	0.310	0.300	1.00	70.0	J		095540-001	SW846-8260B
TA2-W-27	Tetrachloroethene	1.63	0.300	1.00	5.00	*, N	J	095529-001	SW846-8260B
12-Mar-14	Trichloroethene	1.39	0.300	1.00	5.00	*, N	J	095529-001	SW846-8260B
TJA-2	1,1-Dichloroethane	0.380	0.300	1.00	NE	J		095544-001	SW846-8260B
20-Mar-14	Trichloroethene	3.64	0.300	1.00	5.00			095544-001	SW846-8260B
	cis-1,2-Dichloroethene	0.490	0.300	1.00	70.0	J		095544-001	SW846-8260B
TJA-7 26-Mar-14	Trichloroethene	1.06	0.300	1.00	5.00			095551-001	SW846-8260B
WYO-4	1,1-Dichloroethane	0.940	0.300	1.00	NE	J		095546-001	SW846-8260B
24-Mar-14	Tetrachloroethene	0.300	0.300	1.00	5.00	J		095546-001	SW846-8260B
	Trichloroethene	**9.85**	0.300	1.00	5.00			095546-001	SW846-8260B
	cis-1,2-Dichloroethene	1.86	0.300	1.00	70.0			095546-001	SW846-8260B
TA2-W-19	1,1-Dichloroethane	0.470	0.300	1.00	NE	J		096007-001	SW846-8260B
30-May-14	Trichloroethene	3.12	0.300	1.00	5.00			096007-001	SW846-8260B
	cis-1,2-Dichloroethene	0.340	0.300	1.00	70.0	J		096007-001	SW846-8260B
TA2-W-19 (Duplicate)	1,1-Dichloroethane	0.380	0.300	1.00	NE	J		096008-001	SW846-8260B
30-May-14	Trichloroethene	3.13	0.300	1.00	5.00			096008-001	SW846-8260B
	cis-1,2-Dichloroethene	0.330	0.300	1.00	70.0	J		096008-001	SW846-8260B

Refer to footnotes on page 6A-51.

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

Calendar Year 2014

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 26-May-14	Chloroform	0.320	0.300	1.00	NE	J		096000-001	SW846-8260B
	Tetrachloroethene	0.960	0.300	1.00	5.00	J		096000-001	SW846-8260B
	Trichloroethene	1.34	0.300	1.00	5.00			096000-001	SW846-8260B
	cis-1,2-Dichloroethene	0.320	0.300	1.00	70.0	J		096000-001	SW846-8260B
TJA-2 02-Jun-14	1,1-Dichloroethane	0.470	0.300	1.00	NE	J		096011-001	SW846-8260B
	Trichloroethene	4.04	0.300	1.00	5.00			096011-001	SW846-8260B
	cis-1,2-Dichloroethene	0.430	0.300	1.00	70.0	J		096011-001	SW846-8260B
TJA-3 29-May-14	Trichloroethene	2.49	0.300	1.00	5.00			096002-001	SW846-8260B
TJA-7 04-Jun-14	Trichloroethene	1.22	0.300	1.00	5.00			096015-001	SW846-8260B
WYO-4 10-Jun-14	1,1-Dichloroethane	0.960	0.300	1.00	NE	J		096021-001	SW846-8260B
	Trichloroethene	**6.75**	0.300	1.00	5.00			096021-001	SW846-8260B
	cis-1,2-Dichloroethene	2.02	0.300	1.00	70.0			096021-001	SW846-8260B
WYO-4 (Duplicate) 10-Jun-14	1,1-Dichloroethane	0.940	0.300	1.00	NE	J		096022-001	SW846-8260B
	Trichloroethene	**6.85**	0.300	1.00	5.00			096022-001	SW846-8260B
	cis-1,2-Dichloroethene	1.95	0.300	1.00	70.0			096022-001	SW846-8260B
TA1-W-03 14-Aug-14	Chloroform	0.410	0.300	1.00	NE	J	NJ	096360-001	SW846-8260B
TA1-W-03 (Duplicate) 14-Aug-14	Chloroform	0.390	0.300	1.00	NE	J	NJ	096361-001	SW846-8260B
TA1-W-06 13-Aug-14	1,1-Dichloroethene	0.600	0.300	1.00	7.00	J		096388-001	SW846-8260B
TA2-W-01 14-Aug-14	Tetrachloroethene	0.350	0.300	1.00	5.00	J, N		096390-001	SW846-8260B
	Trichloroethene	1.10	0.300	1.00	5.00			096390-001	SW846-8260B
TA2-W-19 28-Aug-14	1,1-Dichloroethane	0.420	0.300	1.00	NE	J		096403-001	SW846-8260B
	Trichloroethene	2.59	0.300	1.00	5.00			096403-001	SW846-8260B
	cis-1,2-Dichloroethene	0.400	0.300	1.00	70.0	J		096403-001	SW846-8260B
TA2-W-26 20-Aug-14	Tetrachloroethene	0.690	0.300	1.00	5.00	J		096401-001	SW846-8260B
	Trichloroethene	0.970	0.300	1.00	5.00	J		096401-001	SW846-8260B
TA2-W-27 15-Aug-14	Tetrachloroethene	1.17	0.300	1.00	5.00			096393-001	SW846-8260B
	Trichloroethene	1.08	0.300	1.00	5.00			096393-001	SW846-8260B
TJA-2 03-Sep-14	1,1-Dichloroethane	0.510	0.300	1.00	NE	J		096406-001	SW846-8260B
	Trichloroethene	4.08	0.300	1.00	5.00			096406-001	SW846-8260B
	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		096406-001	SW846-8260B

Refer to footnotes on page 6A-51.

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

Calendar Year 2014

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-3 21-Aug-14	Trichloroethene	0.430	0.300	1.00	5.00	J		096397-001	SW846-8260B
TJA-7 05-Sep-14	Trichloroethene	1.01	0.300	1.00	5.00			096412-001	SW846-8260B
WYO-4 25-Aug-14	1,1-Dichloroethane	0.990	0.300	1.00	NE	J		096410-001	SW846-8260B
	Chloroform	0.590	0.300	1.00	NE	J		096410-001	SW846-8260B
	Toluene	1.41	0.300	1.00	1000			096410-001	SW846-8260B
	Trichloroethene	4.19	0.300	1.00	5.00			096410-001	SW846-8260B
	cis-1,2-Dichloroethene	1.56	0.300	1.00	70.0			096410-001	SW846-8260B
TA2-W-19 19-Nov-14	1,1-Dichloroethane	0.510	0.300	1.00	NE	J		096900-001	SW846-8260B
	Trichloroethene	4.03	0.300	1.00	5.00			096900-001	SW846-8260B
	cis-1,2-Dichloroethene	0.480	0.300	1.00	70.0	J		096900-001	SW846-8260B
TA2-W-26 01-Dec-14	Tetrachloroethene	0.880	0.300	1.00	5.00	J		096908-001	SW846-8260B
	Trichloroethene	1.01	0.300	1.00	5.00			096908-001	SW846-8260B
	cis-1,2-Dichloroethene	0.340	0.300	1.00	70.0	J		096908-001	SW846-8260B
TA2-W-28 18-Dec-14	Toluene	0.820	0.300	1.00	1000	J		096981-001	SW846-8260B
TJA-2 20-Nov-14	1,1-Dichloroethane	0.460	0.300	1.00	NE	J		096902-001	SW846-8260B
	Trichloroethene	4.44	0.300	1.00	5.00			096902-001	SW846-8260B
	cis-1,2-Dichloroethene	0.510	0.300	1.00	70.0	J		096902-001	SW846-8260B
TJA-3 02-Dec-14	Trichloroethene	0.310	0.300	1.00	5.00	J	NJ	096911-001	SW846-8260B
TJA-7 03-Dec-14	Trichloroethene	1.15	0.300	1.00	5.00			096916-001	SW846-8260B
TJA-7 (Duplicate) 03-Dec-14	Trichloroethene	1.15	0.300	1.00	5.00			096917-001	SW846-8260B
WYO-4 24-Nov-14	1,1-Dichloroethane	1.18	0.300	1.00	NE			096904-001	SW846-8260B
	Trichloroethene	**10.5**	0.300	1.00	5.00			096904-001	SW846-8260B
	cis-1,2-Dichloroethene	2.11	0.300	1.00	70.0			096904-001	SW846-8260B

Refer to footnotes on page 6A-51.

Table 6A-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846 8260B), Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300–0.500	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	0.300–3.00
1,2-Dichloropropane	0.300	Methylene chloride	1.70–3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50–3.00	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 6A-51.

Table 6A-3
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 11-Mar-14	Nitrate plus nitrite	3.28	0.170	0.500	10.0			095526-018	EPA 353.2
TA1-W-06 (Duplicate) 11-Mar-14	Nitrate plus nitrite	3.28	0.085	0.250	10.0			095527-018	EPA 353.2
TA2-SW1-320 27-Mar-14	Nitrate plus nitrite	**21.7**	0.850	2.50	10.0			095553-018	EPA 353.2
TA2-W-01 10-Mar-14	Nitrate plus nitrite	4.60	0.170	0.500	10.0			095521-018	EPA 353.2
TA2-W-19 19-Mar-14	Nitrate plus nitrite	**10.8**	0.170	0.500	10.0			095542-018	EPA 353.2
TA2-W-26 18-Mar-14	Nitrate plus nitrite	6.18	0.170	0.500	10.0			095540-018	EPA 353.2
TA2-W-27 12-Mar-14	Nitrate plus nitrite	4.33	0.170	0.500	10.0			095529-018	EPA 353.2
TJA-2 20-Mar-14	Nitrate plus nitrite	**10.9**	0.170	0.500	10.0			095544-018	EPA 353.2
TJA-3 17-Mar-14	Nitrate plus nitrite	2.83	0.170	0.500	10.0			095537-018	EPA 353.2
TJA-4 25-Mar-14	Nitrate plus nitrite	**28.4**	0.850	2.50	10.0			095549-018	EPA 353.2
TJA-6 13-Mar-14	Nitrate plus nitrite	2.46	0.085	0.250	10.0			095534-018	EPA 353.2
TJA-6 (Duplicate) 13-Mar-14	Nitrate plus nitrite	2.48	0.085	0.250	10.0			095535-018	EPA 353.2
TJA-7 26-Mar-14	Nitrate plus nitrite	**24.8**	0.850	2.50	10.0			095551-018	EPA 353.2
WYO-4 24-Mar-14	Nitrate plus nitrite	2.98	0.170	0.500	10.0			095546-018	EPA 353.2
TA2-SW1-320 20-Jun-14	Nitrate plus nitrite	**22.3**	1.70	5.00	10.0	B		096017-018	EPA 353.2
TA2-W-19 30-May-14	Nitrate plus nitrite	10.0	0.425	1.25	10.0			096007-018	EPA 353.2
TA2-W-19 (Duplicate) 30-May-14	Nitrate plus nitrite	10.0	0.425	1.25	10.0			096008-018	EPA 353.2
TA2-W-26 28-May-14	Nitrate plus nitrite	5.41	0.170	0.500	10.0			096000-018	EPA 353.2

Refer to footnotes on page 6A-51.

Table 6A-3 *(Continued)*
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 02-Jun-14	Nitrate plus nitrite	**11.2**	0.425	1.25	10.0			096011-018	EPA 353.2
TJA-3 29-May-14	Nitrate plus nitrite	2.50	0.085	0.250	10.0			096002-018	EPA 353.2
TJA-4 03-Jun-14	Nitrate plus nitrite	**31.2**	0.850	2.50	10.0			096013-018	EPA 353.2
TJA-7 04-Jun-14	Nitrate plus nitrite	**22.9**	0.850	2.50	10.0			096015-018	EPA 353.2
WYO-4 10-Jun-14	Nitrate plus nitrite	3.44	0.170	0.500	10.0			096021-018	EPA 353.2
WYO-4 (Duplicate) 10-Jun-14	Nitrate plus nitrite	3.29	0.170	0.500	10.0			096022-018	EPA 353.2
PGS-2 15-Aug-14	Nitrate plus nitrite	1.56	0.085	0.250	10.0			096368-018	EPA 353.2
PGS-2 (Duplicate) 15-Aug-14	Nitrate plus nitrite	1.53	0.085	0.250	10.0			096369-018	EPA 353.2
TA1-W-01 13-Aug-14	Nitrate plus nitrite	2.74	0.170	0.500	10.0			096356-018	EPA 353.2
TA1-W-02 18-Aug-14	Nitrate plus nitrite	1.11	0.085	0.250	10.0			096363-018	EPA 353.2
TA1-W-03 14-Aug-14	Nitrate plus nitrite	6.48	0.170	0.500	10.0			096360-018	EPA 353.2
TA1-W-03 (Duplicate) 14-Aug-14	Nitrate plus nitrite	6.84	0.170	0.500	10.0			096361-018	EPA 353.2
TA1-W-04 21-Aug-14	Nitrate plus nitrite	1.69	0.170	0.500	10.0			096378-018	EPA 353.2
TA1-W-05 20-Aug-14	Nitrate plus nitrite	1.35	0.085	0.250	10.0			096375-018	EPA 353.2
TA1-W-05 (Duplicate) 20-Aug-14	Nitrate plus nitrite	1.39	0.085	0.250	10.0			096376-018	EPA 353.2
TA1-W-06 13-Aug-14	Nitrate plus nitrite	3.23	0.170	0.500	10.0			096388-018	EPA 353.2
TA1-W-08 19-Aug-14	Nitrate plus nitrite	7.55	0.170	0.500	10.0			096371-018	EPA 353.2

Refer to footnotes on page 6A-51.

Table 6A-3 *(Continued)*
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 26-Aug-14	Nitrate plus nitrite	3.87	0.170	0.500	10.0			096383-018	EPA 353.2
TA2-NW1-595 (Duplicate) 26-Aug-14	Nitrate plus nitrite	4.20	0.085	0.250	10.0			096384-018	EPA 353.2
TA2-SW1-320 27-Aug-14	Nitrate plus nitrite	**19.6**	0.340	1.00	10.0			096399-018	EPA 353.2
TA2-W-01 14-Aug-14	Nitrate plus nitrite	4.14	0.170	0.500	10.0			096390-018	EPA 353.2
TA2-W-19 28-Aug-14	Nitrate plus nitrite	**11.7**	0.170	0.500	10.0			096403-018	EPA 353.2
TA2-W-26 20-Aug-14	Nitrate plus nitrite	5.56	0.170	0.500	10.0			096401-018	EPA 353.2
TA2-W-27 15-Aug-14	Nitrate plus nitrite	3.98	0.170	0.500	10.0			096393-018	EPA 353.2
TJA-2 03-Sep-14	Nitrate plus nitrite	**10.9**	0.170	0.500	10.0			096406-018	EPA 353.2
TJA-3 21-Aug-14	Nitrate plus nitrite	2.50	0.170	0.500	10.0			096397-018	EPA 353.2
TJA-4 04-Sep-14	Nitrate plus nitrite	**32.8**	0.425	1.25	10.0			096408-018	EPA 353.2
TJA-6 19-Aug-14	Nitrate plus nitrite	2.45	0.170	0.500	10.0			096395-018	EPA 353.2
TJA-7 05-Sep-14	Nitrate plus nitrite	**20.8**	0.340	1.00	10.0			096412-018	EPA 353.2
WYO-3 22-Aug-14	Nitrate plus nitrite	1.97	0.170	0.500	10.0			096386-018	EPA 353.2
WYO-4 25-Aug-14	Nitrate plus nitrite	3.10	0.085	0.250	10.0			096410-018	EPA 353.2
TA2-W-19 19-Nov-14	Nitrate plus nitrite	**10.9**	0.850	2.50	10.0			096900-018	EPA 353.2
TA2-W-26 01-Dec-14	Nitrate plus nitrite	6.04	0.170	0.500	10.0			096908-018	EPA 353.2
TA2-W-28 18-Dec-14	Nitrate plus nitrite	**21.8**	0.425	1.25	10.0			096981-018	EPA 353.2

Refer to footnotes on page 6A-51.

Table 6A-3 *(Concluded)*
Summary of Nitrate plus Nitrite Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 20-Nov-14	Nitrate plus nitrite	**12.0**	0.850	2.50	10.0			096902-018	EPA 353.2
TJA-3 02-Dec-14	Nitrate plus nitrite	2.72	0.170	0.500	10.0			096911-018	EPA 353.2
TJA-4 25-Nov-14	Nitrate plus nitrite	**31.0**	0.425	1.25	10.0			096906-018	EPA 353.2
TJA-7 03-Dec-14	Nitrate plus nitrite	**22.4**	0.850	2.50	10.0			096916-018	EPA 353.2
TJA-7 (Duplicate) 03-Dec-14	Nitrate plus nitrite	**24.6**	0.850	2.50	10.0			096917-018	EPA 353.2
WYO-4 24-Nov-14	Nitrate plus nitrite	3.02	0.085	0.250	10.0			096904-018	EPA 353.2

Refer to footnotes on page 6A-51.

Table 6A-4
Summary of Anions and Alkalinity Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.235	0.067	0.200	NE			096368-016	SW846 9056
15-Aug-14	Chloride	14.9	0.670	2.00	NE			096368-016	SW846 9056
	Fluoride	ND	0.033	0.100	4.0	U		096368-016	SW846 9056
	Sulfate	67.5	1.33	4.00	NE			096368-016	SW846 9056
	Bicarbonate Alkalinity	199	0.725	1.00	NE			096368-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096368-022	SM 2320B
PGS-2 (Duplicate)	Bromide	0.220	0.067	0.200	NE			096369-016	SW846 9056
15-Aug-14	Chloride	14.6	0.670	2.00	NE			096369-016	SW846 9056
	Fluoride	ND	0.033	0.100	4.0	U		096369-016	SW846 9056
	Sulfate	66.4	1.33	4.00	NE			096369-016	SW846 9056
	Bicarbonate Alkalinity	200	0.725	1.00	NE			096369-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096369-022	SM 2320B
TA1-W-01	Bromide	0.188	0.067	0.200	NE	J		096356-016	SW846 9056
13-Aug-14	Chloride	13.8	0.670	2.00	NE			096356-016	SW846 9056
	Fluoride	0.420	0.033	0.100	4.0			096356-016	SW846 9056
	Sulfate	73.4	1.33	4.00	NE			096356-016	SW846 9056
	Bicarbonate Alkalinity	152	0.725	1.00	NE			096356-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096356-022	SM 2320B
TA1-W-02	Bromide	0.156	0.067	0.200	NE	J		096363-016	SW846 9056
18-Aug-14	Chloride	15.5	0.670	2.00	NE			096363-016	SW846 9056
	Fluoride	0.422	0.033	0.100	4.0			096363-016	SW846 9056
	Sulfate	83.6	1.33	4.00	NE			096363-016	SW846 9056
	Bicarbonate Alkalinity	152	0.725	1.00	NE			096363-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096363-022	SM 2320B
TA1-W-03	Bromide	3.04	0.134	0.400	NE			096360-016	SW846 9056
14-Aug-14	Chloride	232	3.35	10.0	NE			096360-016	SW846 9056
	Fluoride	0.204	0.033	0.100	4.0			096360-016	SW846 9056
	Sulfate	468	6.65	20.0	NE			096360-016	SW846 9056
	Bicarbonate Alkalinity	64.6	0.725	1.00	NE			096360-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096360-022	SM 2320B
TA1-W-03 (Duplicate)	Bromide	3.02	0.134	0.400	NE			096361-016	SW846 9056
14-Aug-14	Chloride	231	3.35	10.0	NE			096361-016	SW846 9056
	Fluoride	0.209	0.033	0.100	4.0			096361-016	SW846 9056
	Sulfate	462	6.65	20.0	NE			096361-016	SW846 9056
	Bicarbonate Alkalinity	65.1	0.725	1.00	NE			096361-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096361-022	SM 2320B

Refer to footnotes on page 6A-51.

Table 6A-4 *(Continued)*
Summary of Anions and Alkalinity Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.171	0.067	0.200	NE	J		096378-016	SW846 9056
21-Aug-14	Chloride	15.7	0.670	2.00	NE			096378-016	SW846 9056
	Fluoride	0.412	0.033	0.100	4.0			096378-016	SW846 9056
	Sulfate	65.0	1.33	4.00	NE			096378-016	SW846 9056
	Bicarbonate Alkalinity	156	0.725	1.00	NE			096378-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096378-022	SM 2320B
TA1-W-05	Bromide	0.109	0.067	0.200	NE	J	0.467U	096375-016	SW846 9056
20-Aug-14	Chloride	11.2	0.670	2.00	NE			096375-016	SW846 9056
	Fluoride	0.242	0.033	0.100	4.0			096375-016	SW846 9056
	Sulfate	105	1.33	4.00	NE			096375-016	SW846 9056
	Bicarbonate Alkalinity	188	0.725	1.00	NE			096375-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096375-022	SM 2320B
TA1-W-05 (Duplicate)	Bromide	0.191	0.067	0.200	NE	J	0.467U	096376-016	SW846 9056
20-Aug-14	Chloride	12.2	0.670	2.00	NE			096376-016	SW846 9056
	Fluoride	0.292	0.033	0.100	4.0			096376-016	SW846 9056
	Sulfate	106	1.33	4.00	NE			096376-016	SW846 9056
	Bicarbonate Alkalinity	187	0.725	1.00	NE			096376-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096376-022	SM 2320B
TA1-W-06	Bromide	1.21	0.067	0.200	NE			096388-016	SW846 9056
13-Aug-14	Chloride	96.3	1.34	4.00	NE			096388-016	SW846 9056
	Fluoride	0.307	0.033	0.100	4.0			096388-016	SW846 9056
	Sulfate	195	2.66	8.00	NE			096388-016	SW846 9056
	Bicarbonate Alkalinity	79.2	0.725	1.00	NE			096388-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096388-022	SM 2320B
TA1-W-08	Bromide	2.66	0.067	0.200	NE			096371-016	SW846 9056
19-Aug-14	Chloride	234	6.70	20.0	NE			096371-016	SW846 9056
	Fluoride	0.241	0.033	0.100	4.0			096371-016	SW846 9056
	Sulfate	782	13.3	40.0	NE			096371-016	SW846 9056
	Bicarbonate Alkalinity	73.0	0.725	1.00	NE			096371-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096371-022	SM 2320B
TA2-NW1-595	Bromide	1.34	0.067	0.200	NE			096383-016	SW846 9056
26-Aug-14	Chloride	102	1.34	4.00	NE			096383-016	SW846 9056
	Fluoride	0.237	0.033	0.100	4.0			096383-016	SW846 9056
	Sulfate	107	2.66	8.00	NE			096383-016	SW846 9056
	Bicarbonate Alkalinity	118	0.725	1.00	NE			096383-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096383-022	SM 2320B

Refer to footnotes on page 6A-51.

Table 6A-4 *(Continued)*
Summary of Anions and Alkalinity Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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)	Bromide	1.36	0.067	0.200	NE			096384-016	SW846 9056
26-Aug-14	Chloride	102	1.34	4.00	NE			096384-016	SW846 9056
	Fluoride	0.233	0.033	0.100	4.0			096384-016	SW846 9056
	Sulfate	107	2.66	8.00	NE			096384-016	SW846 9056
	Bicarbonate Alkalinity	118	0.725	1.00	NE			096384-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096384-022	SM 2320B
TA2-SW1-320	Bromide	0.604	0.067	0.200	NE			096399-016	SW846 9056
27-Aug-14	Chloride	34.4	0.670	2.00	NE			096399-016	SW846 9056
	Fluoride	0.358	0.033	0.100	4.0			096399-016	SW846 9056
	Sulfate	14.9	0.133	0.400	NE			096399-016	SW846 9056
	Bicarbonate Alkalinity	99.6	0.725	1.00	NE			096399-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096399-022	SM 2320B
TA2-W-01	Bromide	1.35	0.067	0.200	NE			096390-016	SW846 9056
14-Aug-14	Chloride	93.4	1.34	4.00	NE			096390-016	SW846 9056
	Fluoride	0.323	0.033	0.100	4.0			096390-016	SW846 9056
	Sulfate	53.3	2.66	8.00	NE			096390-016	SW846 9056
	Bicarbonate Alkalinity	87.8	0.725	1.00	NE			096390-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096390-022	SM 2320B
TA2-W-19	Bromide	0.822	0.067	0.200	NE			096403-016	SW846 9056
28-Aug-14	Chloride	62.8	0.670	2.00	NE			096403-016	SW846 9056
	Fluoride	0.298	0.033	0.100	4.0			096403-016	SW846 9056
	Sulfate	55.8	1.33	4.00	NE			096403-016	SW846 9056
	Bicarbonate Alkalinity	98.3	0.725	1.00	NE			096403-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096403-022	SM 2320B
TA2-W-26	Bromide	2.65	0.067	0.200	NE			096401-016	SW846 9056
20-Aug-14	Chloride	208	6.70	20.0	NE			096401-016	SW846 9056
	Fluoride	0.241	0.033	0.100	4.0			096401-016	SW846 9056
	Sulfate	397	13.3	40.0	NE			096401-016	SW846 9056
	Bicarbonate Alkalinity	75.1	0.725	1.00	NE			096401-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096401-022	SM 2320B
TA2-W-27	Bromide	1.44	0.067	0.200	NE			096393-016	SW846 9056
15-Aug-14	Chloride	100	1.34	4.00	NE			096393-016	SW846 9056
	Fluoride	0.297	0.033	0.100	4.0			096393-016	SW846 9056
	Sulfate	131	2.66	8.00	NE			096393-016	SW846 9056
	Bicarbonate Alkalinity	87.4	0.725	1.00	NE			096393-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096393-022	SM 2320B

Refer to footnotes on page 6A-51.

Table 6A-4 *(Continued)*
Summary of Anions and Alkalinity Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	Bromide	0.923	0.067	0.200	NE			096406-016	SW846 9056
03-Sep-14	Chloride	66.7	0.670	2.00	NE			096406-016	SW846 9056
	Fluoride	0.273	0.033	0.100	4.0			096406-016	SW846 9056
	Sulfate	53.8	1.33	4.00	NE			096406-016	SW846 9056
	Bicarbonate Alkalinity	106	0.725	1.00	NE			096406-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096406-022	SM 2320B
TJA-3	Bromide	ND	0.067	0.200	NE	U		096397-016	SW846 9056
21-Aug-14	Chloride	14.5	0.670	2.00	NE			096397-016	SW846 9056
	Fluoride	0.320	0.033	0.100	4.0			096397-016	SW846 9056
	Sulfate	82.2	1.33	4.00	NE			096397-016	SW846 9056
	Bicarbonate Alkalinity	151	0.725	1.00	NE			096397-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096397-022	SM 2320B
TJA-4	Bromide	0.363	0.067	0.200	NE			096408-016	SW846 9056
04-Sep-14	Chloride	20.4	0.335	1.00	NE			096408-016	SW846 9056
	Fluoride	0.326	0.033	0.100	4.0			096408-016	SW846 9056
	Sulfate	18.0	0.133	0.400	NE			096408-016	SW846 9056
	Bicarbonate Alkalinity	131	0.725	1.00	NE			096408-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096408-022	SM 2320B
TJA-6	Bromide	0.207	0.067	0.200	NE			096395-016	SW846 9056
19-Aug-14	Chloride	15.2	0.670	2.00	NE			096395-016	SW846 9056
	Fluoride	0.425	0.033	0.100	4.0			096395-016	SW846 9056
	Sulfate	66.7	1.33	4.00	NE			096395-016	SW846 9056
	Bicarbonate Alkalinity	144	0.725	1.00	NE			096395-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096395-022	SM 2320B
TJA-7	Bromide	0.463	0.067	0.200	NE			096412-016	SW846 9056
05-Sep-14	Chloride	24.3	0.335	1.00	NE			096412-016	SW846 9056
	Fluoride	0.315	0.033	0.100	4.0			096412-016	SW846 9056
	Sulfate	21.5	0.665	2.00	NE			096412-016	SW846 9056
	Bicarbonate Alkalinity	124	0.725	1.00	NE			096412-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096412-022	SM 2320B

Refer to footnotes on page 6A-51.

Table 6A-4 *(Concluded)*
Summary of Anions and Alkalinity Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	Bromide	ND	0.067	0.200	NE	U		096386-016	SW846 9056
22-Aug-14	Chloride	15.4	0.670	2.00	NE			096386-016	SW846 9056
	Fluoride	0.463	0.330	0.100	4.0			096386-016	SW846 9056
	Sulfate	91.0	1.33	4.00	NE			096386-016	SW846 9056
	Bicarbonate Alkalinity	140	0.725	1.00	NE			096386-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096386-022	SM 2320B
WYO-4	Bromide	1.25	0.067	0.200	NE			096410-016	SW846 9056
25-Aug-14	Chloride	105	1.34	4.00	NE			096410-016	SW846 9056
	Fluoride	0.289	0.033	0.100	4.0			096410-016	SW846 9056
	Sulfate	50.5	2.66	8.00	NE			096410-016	SW846 9056
	Bicarbonate Alkalinity	90.1	0.725	1.00	NE			096410-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096410-022	SM 2320B

Refer to footnotes on page 6A-51.

Table 6A-5
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	ND	0.015	0.050	NE	U		096368-009	SW846 6020
15-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096368-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096368-009	SW846 6020
	Barium	0.0685	0.0006	0.002	2.00			096368-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096368-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096368-009	SW846 6020
	Calcium	70.5	0.600	2.00	NE			096368-009	SW846 6020
	Chromium	0.0255	0.002	0.010	0.100			096368-009	SW846 6020
	Cobalt	0.000134	0.0001	0.001	NE	J		096368-009	SW846 6020
	Copper	0.00127	0.00035	0.001	NE		0.010U	096368-009	SW846 6020
	Iron	0.378	0.033	0.100	NE			096368-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096368-009	SW846 6020
	Magnesium	12.7	0.010	0.030	NE			096368-009	SW846 6020
	Manganese	0.00208	0.001	0.005	NE	J		096368-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096368-009	SW846 7470
	Nickel	0.0367	0.0005	0.002	NE			096368-009	SW846 6020
	Potassium	2.96	0.080	0.300	NE			096368-009	SW846 6020
	Selenium	0.00154	0.0015	0.005	0.050	J		096368-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096368-009	SW846 6020
	Sodium	41.3	0.080	0.250	NE			096368-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096368-009	SW846 6020
	Uranium	0.000515	0.000067	0.0002	0.030			096368-009	SW846 6020
	Vanadium	0.005	0.001	0.005	NE	J		096368-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096368-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	ND	0.015	0.050	NE	U		096369-009	SW846 6020
15-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096369-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096369-009	SW846 6020
	Barium	0.0697	0.0006	0.002	2.00			096369-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096369-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096369-009	SW846 6020
	Calcium	68.6	0.600	2.00	NE			096369-009	SW846 6020
	Chromium	0.0257	0.002	0.010	0.100			096369-009	SW846 6020
	Cobalt	0.000142	0.0001	0.001	NE	J		096369-009	SW846 6020
	Copper	0.00121	0.00035	0.001	NE		0.010U	096369-009	SW846 6020
	Iron	0.385	0.033	0.100	NE			096369-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096369-009	SW846 6020
	Magnesium	12.1	0.010	0.030	NE			096369-009	SW846 6020
	Manganese	0.00233	0.001	0.005	NE	J		096369-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096369-009	SW846 7470
	Nickel	0.0362	0.0005	0.002	NE			096369-009	SW846 6020
	Potassium	2.93	0.080	0.300	NE			096369-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096369-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096369-009	SW846 6020
	Sodium	41.0	0.080	0.250	NE			096369-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096369-009	SW846 6020
	Uranium	0.000513	0.000067	0.0002	0.030			096369-009	SW846 6020
	Vanadium	0.00501	0.001	0.005	NE			096369-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096369-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0198	0.015	0.050	NE	J		096356-009	SW846 6020
13-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096356-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096356-009	SW846 6020
	Barium	0.0447	0.0006	0.002	2.00			096356-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096356-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096356-009	SW846 6020
	Calcium	69.0	0.600	2.00	NE			096356-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096356-009	SW846 6020
	Cobalt	0.000175	0.0001	0.001	NE	J		096356-009	SW846 6020
	Copper	0.000558	0.00035	0.001	NE	J		096356-009	SW846 6020
	Iron	0.142	0.033	0.100	NE			096356-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096356-009	SW846 6020
	Magnesium	12.3	0.010	0.030	NE			096356-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096356-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096356-009	SW846 7470
	Nickel	0.00192	0.0005	0.002	NE	J		096356-009	SW846 6020
	Potassium	2.37	0.080	0.300	NE	N		096356-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096356-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096356-009	SW846 6020
	Sodium	25.4	0.080	0.250	NE			096356-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096356-009	SW846 6020
	Uranium	0.0035	0.000067	0.0002	0.030			096356-009	SW846 6020
	Vanadium	0.00447	0.001	0.005	NE	J		096356-009	SW846 6010
	Zinc	0.00533	0.0035	0.010	NE	J		096356-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.124	0.015	0.050	NE			096363-009	SW846 6020
18-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096363-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096363-009	SW846 6020
	Barium	0.0462	0.0006	0.002	2.00			096363-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096363-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096363-009	SW846 6020
	Calcium	67.7	0.600	2.00	NE			096363-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096363-009	SW846 6020
	Cobalt	0.000157	0.0001	0.001	NE	J		096363-009	SW846 6020
	Copper	0.000814	0.00035	0.001	NE	J		096363-009	SW846 6020
	Iron	0.270	0.033	0.100	NE			096363-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096363-009	SW846 6020
	Magnesium	13.0	0.010	0.030	NE			096363-009	SW846 6020
	Manganese	0.00542	0.001	0.005	NE			096363-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096363-009	SW846 7470
	Nickel	0.00217	0.0005	0.002	NE			096363-009	SW846 6020
	Potassium	2.22	0.080	0.300	NE			096363-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096363-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096363-009	SW846 6020
	Sodium	22.0	0.080	0.250	NE			096363-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096363-009	SW846 6020
	Uranium	0.00375	0.000067	0.0002	0.030			096363-009	SW846 6020
	Vanadium	0.00446	0.001	0.005	NE	J		096363-009	SW846 6010
	Zinc	0.00597	0.0035	0.010	NE	J		096363-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0427	0.015	0.050	NE	J		096360-009	SW846 6020
14-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096360-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096360-009	SW846 6020
	Barium	0.0282	0.0006	0.002	2.00			096360-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096360-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096360-009	SW846 6020
	Calcium	284	0.600	2.00	NE			096360-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096360-009	SW846 6020
	Cobalt	0.000514	0.0001	0.001	NE	J		096360-009	SW846 6020
	Copper	0.0018	0.00035	0.001	NE		0.0066UJ	096360-009	SW846 6020
	Iron	0.598	0.033	0.100	NE			096360-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096360-009	SW846 6020
	Magnesium	31.5	0.010	0.030	NE			096360-009	SW846 6020
	Manganese	0.00119	0.001	0.005	NE	J		096360-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096360-009	SW846 7470
	Nickel	0.0042	0.0005	0.002	NE		J-	096360-009	SW846 6020
	Potassium	2.92	0.080	0.300	NE	N		096360-009	SW846 6020
	Selenium	0.0298	0.0015	0.005	0.050			096360-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096360-009	SW846 6020
	Sodium	49.9	0.080	0.250	NE			096360-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096360-009	SW846 6020
	Uranium	0.00121	0.000067	0.0002	0.030			096360-009	SW846 6020
	Vanadium	0.00274	0.001	0.005	NE	J		096360-009	SW846 6010
	Zinc	0.00374	0.0035	0.010	NE	J		096360-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0437	0.015	0.050	NE	J		096361-009	SW846 6020
14-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096361-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096361-009	SW846 6020
	Barium	0.0293	0.0006	0.002	2.00			096361-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096361-009	SW846 6020
	Cadmium	0.000113	0.00011	0.001	0.005	J		096361-009	SW846 6020
	Calcium	281	0.600	2.00	NE			096361-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096361-009	SW846 6020
	Cobalt	0.000514	0.0001	0.001	NE	J		096361-009	SW846 6020
	Copper	0.00174	0.00035	0.001	NE		0.0066UJ	096361-009	SW846 6020
	Iron	0.604	0.033	0.100	NE			096361-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096361-009	SW846 6020
	Magnesium	31.6	0.010	0.030	NE			096361-009	SW846 6020
	Manganese	0.00124	0.001	0.005	NE	J		096361-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096361-009	SW846 7470
	Nickel	0.00433	0.0005	0.002	NE		J-	096361-009	SW846 6020
	Potassium	2.71	0.080	0.300	NE	N		096361-009	SW846 6020
	Selenium	0.0301	0.0015	0.005	0.050			096361-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096361-009	SW846 6020
	Sodium	54.4	0.800	2.50	NE			096361-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096361-009	SW846 6020
	Uranium	0.00119	0.000067	0.0002	0.030			096361-009	SW846 6020
	Vanadium	0.00267	0.001	0.005	NE	J		096361-009	SW846 6010
	Zinc	0.00394	0.0035	0.010	NE	J		096361-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096378-009	SW846 6020
21-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096378-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096378-009	SW846 6020
	Barium	0.0513	0.0006	0.002	2.00			096378-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096378-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096378-009	SW846 6020
	Calcium	66.7	0.600	2.00	NE			096378-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096378-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096378-009	SW846 6020
	Copper	0.000483	0.00035	0.001	NE	J		096378-009	SW846 6020
	Iron	0.148	0.033	0.100	NE			096378-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096378-009	SW846 6020
	Magnesium	11.0	0.010	0.030	NE			096378-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096378-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096378-009	SW846 7470
	Nickel	0.00119	0.0005	0.002	NE	J		096378-009	SW846 6020
	Potassium	2.03	0.080	0.300	NE			096378-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096378-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096378-009	SW846 6020
	Sodium	22.4	0.080	0.250	NE			096378-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096378-009	SW846 6020
	Uranium	0.00325	0.000067	0.0002	0.030			096378-009	SW846 6020
	Vanadium	0.00428	0.001	0.005	NE	J		096378-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096378-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096375-009	SW846 6020
20-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096375-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096375-009	SW846 6020
	Barium	0.0333	0.0006	0.002	2.00			096375-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096375-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096375-009	SW846 6020
	Calcium	86.0	0.600	2.00	NE			096375-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096375-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		096375-009	SW846 6020
	Copper	0.000616	0.00035	0.001	NE	J	0.0041U	096375-009	SW846 6020
	Iron	0.181	0.033	0.100	NE			096375-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096375-009	SW846 6020
	Magnesium	12.1	0.010	0.030	NE			096375-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096375-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096375-009	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	J		096375-009	SW846 6020
	Potassium	2.05	0.080	0.300	NE			096375-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096375-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096375-009	SW846 6020
	Sodium	29.6	0.080	0.250	NE			096375-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096375-009	SW846 6020
	Uranium	0.00376	0.000067	0.0002	0.030			096375-009	SW846 6020
	Vanadium	0.0031	0.001	0.005	NE	J		096375-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096375-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096376-009	SW846 6020
20-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096376-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096376-009	SW846 6020
	Barium	0.0337	0.0006	0.002	2.00			096376-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096376-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096376-009	SW846 6020
	Calcium	88.9	0.600	2.00	NE			096376-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096376-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096376-009	SW846 6020
	Copper	0.000586	0.00035	0.001	NE	J	0.0041U	096376-009	SW846 6020
	Iron	0.167	0.033	0.100	NE			096376-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096376-009	SW846 6020
	Magnesium	11.9	0.010	0.030	NE			096376-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096376-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096376-009	SW846 7470
	Nickel	0.00143	0.0005	0.002	NE	J		096376-009	SW846 6020
	Potassium	2.17	0.080	0.300	NE			096376-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096376-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096376-009	SW846 6020
	Sodium	29.5	0.080	0.250	NE			096376-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096376-009	SW846 6020
	Uranium	0.00382	0.000067	0.0002	0.030			096376-009	SW846 6020
	Vanadium	0.0031	0.001	0.005	NE	J		096376-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096376-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0212	0.015	0.050	NE	J		096388-009	SW846 6020
13-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096388-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096388-009	SW846 6020
	Barium	0.0226	0.0006	0.002	2.00			096388-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096388-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096388-009	SW846 6020
	Calcium	131	0.600	2.00	NE			096388-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096388-009	SW846 6020
	Cobalt	0.000234	0.0001	0.001	NE	J		096388-009	SW846 6020
	Copper	0.000862	0.00035	0.001	NE	J	J-	096388-009	SW846 6020
	Iron	0.252	0.033	0.100	NE			096388-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096388-009	SW846 6020
	Magnesium	15.9	0.010	0.030	NE			096388-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096388-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096388-009	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	J	J-	096388-009	SW846 6020
	Potassium	2.21	0.080	0.300	NE	N		096388-009	SW846 6020
	Selenium	0.00805	0.0015	0.005	0.050			096388-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096388-009	SW846 6020
	Sodium	31.0	0.080	0.250	NE			096388-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096388-009	SW846 6020
	Uranium	0.00116	0.000067	0.0002	0.030			096388-009	SW846 6020
	Vanadium	0.00393	0.001	0.005	NE	J		096388-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096388-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096371-009	SW846 6020
19-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096371-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096371-009	SW846 6020
	Barium	0.0186	0.0006	0.002	2.00			096371-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096371-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096371-009	SW846 6020
	Calcium	339	0.600	2.00	NE			096371-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096371-009	SW846 6020
	Cobalt	0.000431	0.0001	0.001	NE	J		096371-009	SW846 6020
	Copper	0.0022	0.00035	0.001	NE		J-	096371-009	SW846 6020
	Iron	0.705	0.033	0.100	NE			096371-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096371-009	SW846 6020
	Magnesium	40.7	0.010	0.030	NE			096371-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096371-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096371-009	SW846 7470
	Nickel	0.00563	0.0005	0.002	NE		J-	096371-009	SW846 6020
	Potassium	2.86	0.080	0.300	NE			096371-009	SW846 6020
	Selenium	0.0304	0.0015	0.005	0.050			096371-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096371-009	SW846 6020
	Sodium	90.8	0.800	2.50	NE			096371-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096371-009	SW846 6020
	Uranium	0.00187	0.000067	0.0002	0.030			096371-009	SW846 6020
	Vanadium	0.00237	0.001	0.005	NE	J		096371-009	SW846 6010
	Zinc	0.00381	0.0035	0.010	NE	J		096371-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096383-009	SW846 6020
26-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096383-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096383-009	SW846 6020
	Barium	0.0444	0.0006	0.002	2.00			096383-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096383-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096383-009	SW846 6020
	Calcium	106	0.300	1.00	NE			096383-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096383-009	SW846 6020
	Cobalt	0.000143	0.0001	0.001	NE	J		096383-009	SW846 6020
	Copper	0.000579	0.00035	0.001	NE	J	0.0044UJ	096383-009	SW846 6020
	Iron	0.221	0.033	0.100	NE			096383-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096383-009	SW846 6020
	Magnesium	16.3	0.010	0.030	NE			096383-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096383-009	SW846 6020
	Mercury	ND	0.00067	0.0002	0.002	U		096383-009	SW846 7470
	Nickel	0.00182	0.0005	0.002	NE	J	J-	096383-009	SW846 6020
	Potassium	2.26	0.080	0.300	NE			096383-009	SW846 6020
	Selenium	0.00819	0.0015	0.005	0.050			096383-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096383-009	SW846 6020
	Sodium	28.8	0.080	0.250	NE			096383-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096383-009	SW846 6020
	Uranium	0.00221	0.000067	0.0002	0.030			096383-009	SW846 6020
	Vanadium	0.00374	0.001	0.005	NE	J		096383-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096383-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, 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		096384-009	SW846 6020
26-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096384-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096384-009	SW846 6020
	Barium	0.0432	0.0006	0.002	2.00			096384-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096384-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096384-009	SW846 6020
	Calcium	105	0.300	1.00	NE			096384-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096384-009	SW846 6020
	Cobalt	0.000129	0.0001	0.001	NE	J		096384-009	SW846 6020
	Copper	0.00056	0.00035	0.001	NE	J	0.0044UJ	096384-009	SW846 6020
	Iron	0.203	0.033	0.100	NE			096384-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096384-009	SW846 6020
	Magnesium	15.1	0.010	0.030	NE			096384-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096384-009	SW846 6020
	Mercury	ND	0.00067	0.0002	0.002	U		096384-009	SW846 7470
	Nickel	0.00173	0.0005	0.002	NE	J	J-	096384-009	SW846 6020
	Potassium	2.32	0.080	0.300	NE			096384-009	SW846 6020
	Selenium	0.00797	0.0015	0.005	0.050			096384-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096384-009	SW846 6020
	Sodium	27.5	0.080	0.250	NE			096384-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096384-009	SW846 6020
	Uranium	0.00218	0.000067	0.0002	0.030			096384-009	SW846 6020
	Vanadium	0.00351	0.001	0.005	NE	J		096384-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096384-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-SW1-320	Aluminum	0.105	0.015	0.050	NE			096399-009	SW846 6020
27-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096399-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096399-009	SW846 6020
	Barium	0.206	0.0006	0.002	2.00			096399-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096399-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096399-009	SW846 6020
	Calcium	64.8	0.300	1.00	NE			096399-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096399-009	SW846 6020
	Cobalt	0.000126	0.0001	0.001	NE	J		096399-009	SW846 6020
	Copper	0.000446	0.00035	0.001	NE	J		096399-009	SW846 6020
	Iron	0.205	0.033	0.100	NE			096399-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096399-009	SW846 6020
	Magnesium	10.5	0.010	0.030	NE			096399-009	SW846 6020
	Manganese	0.00297	0.001	0.005	NE	J		096399-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096399-009	SW846 7470
	Nickel	0.00131	0.0005	0.002	NE	J		096399-009	SW846 6020
	Potassium	1.81	0.080	0.300	NE			096399-009	SW846 6020
	Selenium	0.00337	0.0015	0.005	0.050	J		096399-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096399-009	SW846 6020
	Sodium	17.5	0.080	0.250	NE			096399-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096399-009	SW846 6020
	Uranium	0.00139	0.000067	0.0002	0.030			096399-009	SW846 6020
	Vanadium	0.00559	0.001	0.005	NE			096399-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096399-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01	Aluminum	ND	0.015	0.050	NE	U		096390-009	SW846 6020
14-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096390-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096390-009	SW846 6020
	Barium	0.0784	0.0006	0.002	2.00			096390-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096390-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096390-009	SW846 6020
	Calcium	86.2	0.600	2.00	NE			096390-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096390-009	SW846 6020
	Cobalt	0.000153	0.0001	0.001	NE	J		096390-009	SW846 6020
	Copper	0.00062	0.00035	0.001	NE	J		096390-009	SW846 6020
	Iron	0.177	0.033	0.100	NE			096390-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096390-009	SW846 6020
	Magnesium	12.8	0.010	0.030	NE			096390-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096390-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096390-009	SW846 7470
	Nickel	0.00125	0.0005	0.002	NE	J		096390-009	SW846 6020
	Potassium	2.00	0.080	0.300	NE	N		096390-009	SW846 6020
	Selenium	0.0067	0.0015	0.005	0.050			096390-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096390-009	SW846 6020
	Sodium	22.5	0.080	0.250	NE			096390-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096390-009	SW846 6020
	Uranium	0.000989	0.000067	0.0002	0.030			096390-009	SW846 6020
	Vanadium	0.00403	0.001	0.005	NE	J		096390-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096390-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, 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		096403-009	SW846 6020
28-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096403-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096403-009	SW846 6020
	Barium	0.0467	0.0006	0.002	2.00			096403-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096403-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096403-009	SW846 6020
	Calcium	74.5	0.300	1.00	NE			096403-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096403-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		096403-009	SW846 6020
	Copper	0.000429	0.00035	0.001	NE	J		096403-009	SW846 6020
	Iron	0.155	0.033	0.100	NE			096403-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096403-009	SW846 6020
	Magnesium	10.7	0.010	0.030	NE			096403-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096403-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096403-009	SW846 7470
	Nickel	0.00138	0.0005	0.002	NE	J		096403-009	SW846 6020
	Potassium	1.68	0.080	0.300	NE			096403-009	SW846 6020
	Selenium	0.00399	0.0015	0.005	0.050	J		096403-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096403-009	SW846 6020
	Sodium	19.6	0.080	0.250	NE			096403-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096403-009	SW846 6020
	Uranium	0.00124	0.000067	0.0002	0.030			096403-009	SW846 6020
	Vanadium	0.00519	0.001	0.005	NE			096403-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096403-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, 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	0.025	0.015	0.050	NE	J		096401-009	SW846 6020
20-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096401-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096401-009	SW846 6020
	Barium	0.0601	0.0006	0.002	2.00			096401-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096401-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096401-009	SW846 6020
	Calcium	232	0.600	2.00	NE			096401-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096401-009	SW846 6020
	Cobalt	0.0003	0.0001	0.001	NE	J		096401-009	SW846 6020
	Copper	0.00144	0.00035	0.001	NE		J-	096401-009	SW846 6020
	Iron	0.496	0.033	0.100	NE			096401-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096401-009	SW846 6020
	Magnesium	26.6	0.010	0.030	NE			096401-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096401-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096401-009	SW846 7470
	Nickel	0.0038	0.0005	0.002	NE		J-	096401-009	SW846 6020
	Potassium	2.50	0.080	0.300	NE			096401-009	SW846 6020
	Selenium	0.0206	0.0015	0.005	0.050			096401-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096401-009	SW846 6020
	Sodium	38.5	0.080	0.250	NE			096401-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096401-009	SW846 6020
	Uranium	0.00148	0.000067	0.0002	0.030			096401-009	SW846 6020
	Vanadium	0.00262	0.001	0.005	NE	J		096401-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096401-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater Investigation, 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	0.0175	0.015	0.050	NE	J		096393-009	SW846 6020
15-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096393-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096393-009	SW846 6020
	Barium	0.0599	0.0006	0.002	2.00			096393-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096393-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096393-009	SW846 6020
	Calcium	123	0.600	2.00	NE			096393-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096393-009	SW846 6020
	Cobalt	0.000127	0.0001	0.001	NE	J		096393-009	SW846 6020
	Copper	0.000661	0.00035	0.001	NE	J	J-	096393-009	SW846 6020
	Iron	0.236	0.033	0.100	NE			096393-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096393-009	SW846 6020
	Magnesium	14.2	0.010	0.030	NE			096393-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096393-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096393-009	SW846 7470
	Nickel	0.00165	0.0005	0.002	NE	J	J-	096393-009	SW846 6020
	Potassium	2.03	0.080	0.300	NE			096393-009	SW846 6020
	Selenium	0.00863	0.0015	0.005	0.050			096393-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096393-009	SW846 6020
	Sodium	24.0	0.080	0.250	NE			096393-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096393-009	SW846 6020
	Uranium	0.00129	0.000067	0.0002	0.030			096393-009	SW846 6020
	Vanadium	0.00378	0.001	0.005	NE	J		096393-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096393-009	SW846 6020

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Table 6A-5 *(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]
TJA-2	Aluminum	ND	0.015	0.050	NE	U		096406-009	SW846 6020
03-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096406-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096406-009	SW846 6020
	Barium	0.0439	0.0006	0.002	2.00			096406-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	N, U		096406-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096406-009	SW846 6020
	Calcium	83.7	0.300	1.00	NE			096406-009	SW846 6020
	Chromium	0.00203	0.002	0.010	0.100	J		096406-009	SW846 6020
	Cobalt	0.000113	0.0001	0.001	NE	J		096406-009	SW846 6020
	Copper	0.000399	0.00035	0.001	NE	J		096406-009	SW846 6020
	Iron	0.108	0.033	0.100	NE			096406-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096406-009	SW846 6020
	Magnesium	12.4	0.010	0.030	NE			096406-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096406-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096406-009	SW846 7470
	Nickel	0.000876	0.0005	0.002	NE	J		096406-009	SW846 6020
	Potassium	1.88	0.080	0.300	NE			096406-009	SW846 6020
	Selenium	0.00475	0.0015	0.005	0.050	J		096406-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096406-009	SW846 6020
	Sodium	23.6	0.080	0.250	NE			096406-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096406-009	SW846 6020
	Uranium	0.00132	0.000067	0.0002	0.030			096406-009	SW846 6020
	Vanadium	0.00413	0.001	0.005	NE	J		096406-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096406-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, 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]
TJA-3	Aluminum	ND	0.015	0.050	NE	U		096397-009	SW846 6020
21-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096397-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096397-009	SW846 6020
	Barium	0.0404	0.0006	0.002	2.00			096397-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096397-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096397-009	SW846 6020
	Calcium	72.5	0.600	2.00	NE			096397-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096397-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096397-009	SW846 6020
	Copper	0.000581	0.00035	0.001	NE	J		096397-009	SW846 6020
	Iron	0.159	0.033	0.100	NE			096397-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096397-009	SW846 6020
	Magnesium	11.0	0.010	0.030	NE			096397-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096397-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096397-009	SW846 7470
	Nickel	0.00142	0.0005	0.002	NE	J		096397-009	SW846 6020
	Potassium	1.92	0.080	0.300	NE			096397-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096397-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096397-009	SW846 6020
	Sodium	24.9	0.080	0.250	NE			096397-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096397-009	SW846 6020
	Uranium	0.00282	0.000067	0.0002	0.030			096397-009	SW846 6020
	Vanadium	0.00362	0.001	0.005	NE	J		096397-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096397-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, 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]
TJA-4	Aluminum	ND	0.015	0.050	NE	U		096408-009	SW846 6020
04-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096408-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096408-009	SW846 6020
	Barium	0.178	0.0006	0.002	2.00			096408-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	N, U		096408-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096408-009	SW846 6020
	Calcium	77.7	0.300	1.00	NE			096408-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096408-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096408-009	SW846 6020
	Copper	0.000398	0.00035	0.001	NE	J		096408-009	SW846 6020
	Iron	0.0906	0.033	0.100	NE	J		096408-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096408-009	SW846 6020
	Magnesium	14.3	0.010	0.030	NE			096408-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096408-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096408-009	SW846 7470
	Nickel	0.000692	0.0005	0.002	NE	J		096408-009	SW846 6020
	Potassium	3.23	0.080	0.300	NE			096408-009	SW846 6020
	Selenium	0.00263	0.0015	0.005	0.050	J		096408-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096408-009	SW846 6020
	Sodium	26.3	0.080	0.250	NE			096408-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096408-009	SW846 6020
	Uranium	0.00295	0.000067	0.0002	0.030			096408-009	SW846 6020
	Vanadium	0.00489	0.001	0.005	NE	J		096408-009	SW846 6010
	Zinc	0.00373	0.0035	0.010	NE	J		096408-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.145	0.015	0.050	NE			096395-009	SW846 6020
19-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096395-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096395-009	SW846 6020
	Barium	0.0616	0.0006	0.002	2.00			096395-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096395-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096395-009	SW846 6020
	Calcium	64.8	0.600	2.00	NE			096395-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096395-009	SW846 6020
	Cobalt	0.000124	0.0001	0.001	NE	J		096395-009	SW846 6020
	Copper	0.00076	0.00035	0.001	NE	J		096395-009	SW846 6020
	Iron	0.241	0.033	0.100	NE			096395-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096395-009	SW846 6020
	Magnesium	11.7	0.010	0.030	NE			096395-009	SW846 6020
	Manganese	0.00457	0.001	0.005	NE	J		096395-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096395-009	SW846 7470
	Nickel	0.00128	0.0005	0.002	NE	J		096395-009	SW846 6020
	Potassium	2.09	0.080	0.300	NE			096395-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096395-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096395-009	SW846 6020
	Sodium	21.9	0.080	0.250	NE			096395-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096395-009	SW846 6020
	Uranium	0.00355	0.000067	0.0002	0.030			096395-009	SW846 6020
	Vanadium	0.00494	0.001	0.005	NE	J		096395-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096395-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0309	0.015	0.050	NE	J	0.14U	096412-009	SW846 6020
05-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096412-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096412-009	SW846 6020
	Barium	0.196	0.0006	0.002	2.00			096412-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096412-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096412-009	SW846 6020
	Calcium	71.3	0.300	1.00	NE			096412-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096412-009	SW846 6020
	Cobalt	0.000873	0.0001	0.001	NE	J		096412-009	SW846 6020
	Copper	0.000357	0.00035	0.001	NE	J		096412-009	SW846 6020
	Iron	0.0511	0.033	0.100	NE	J		096412-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096412-009	SW846 6020
	Magnesium	13.2	0.010	0.030	NE		J	096412-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096412-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096412-009	SW846 7470
	Nickel	0.000592	0.0005	0.002	NE	J		096412-009	SW846 6020
	Potassium	2.04	0.080	0.300	NE			096412-009	SW846 6020
	Selenium	0.005	0.0015	0.005	0.050	J		096412-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096412-009	SW846 6020
	Sodium	20.6	0.080	0.250	NE			096412-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096412-009	SW846 6020
	Uranium	0.00182	0.000067	0.0002	0.030			096412-009	SW846 6020
	Vanadium	0.00493	0.001	0.005	NE	J		096412-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096412-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096386-009	SW846 6020
22-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096386-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096386-009	SW846 6020
	Barium	0.042	0.0006	0.002	2.00			096386-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096386-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096386-009	SW846 6020
	Calcium	70.0	0.600	2.00	NE			096386-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096386-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096386-009	SW846 6020
	Copper	0.000632	0.00035	0.001	NE	J		096386-009	SW846 6020
	Iron	0.158	0.033	0.100	NE			096386-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096386-009	SW846 6020
	Magnesium	13.3	0.010	0.030	NE			096386-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096386-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096386-009	SW846 7470
	Nickel	0.00129	0.0005	0.002	NE	J		096386-009	SW846 6020
	Potassium	2.28	0.080	0.300	NE			096386-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096386-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096386-009	SW846 6020
	Sodium	26.2	0.080	0.250	NE			096386-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096386-009	SW846 6020
	Uranium	0.00366	0.000067	0.0002	0.030			096386-009	SW846 6020
	Vanadium	0.00528	0.001	0.005	NE			096386-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096386-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-5 *(Concluded)*
Summary of Target Analyte List Metals plus Uranium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-4	Aluminum	ND	0.015	0.050	NE	U		096410-009	SW846 6020
25-Aug-14	Antimony	ND	0.001	0.003	0.006	U		096410-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096410-009	SW846 6020
	Barium	0.160	0.0006	0.002	2.00			096410-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096410-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096410-009	SW846 6020
	Calcium	84.6	0.300	1.00	NE			096410-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096410-009	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		096410-009	SW846 6020
	Copper	0.000718	0.00035	0.001	NE	J		096410-009	SW846 6020
	Iron	0.171	0.033	0.100	NE			096410-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096410-009	SW846 6020
	Magnesium	13.3	0.010	0.030	NE			096410-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096410-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096410-009	SW846 7470
	Nickel	0.00171	0.0005	0.002	NE	J		096410-009	SW846 6020
	Potassium	1.89	0.080	0.300	NE			096410-009	SW846 6020
	Selenium	0.00527	0.0015	0.005	0.050			096410-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096410-009	SW846 6020
	Sodium	19.2	0.080	0.250	NE			096410-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096410-009	SW846 6020
	Uranium	0.00132	0.000067	0.0002	0.030			096410-009	SW846 6020
	Vanadium	0.00445	0.001	0.005	NE	J		096410-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096410-009	SW846 6020

Refer to footnotes on page 6A-51.

Table 6A-6
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
PGS-2	Americium-241	8.29 ± 6.65	8.88	4.36	NE	U	BD	096368-033	EPA 901.1
15-Aug-14	Cesium-137	1.48 ± 1.80	3.01	1.45	NE	U	BD	096368-033	EPA 901.1
	Cobalt-60	-0.656 ± 1.69	2.88	1.36	NE	U	BD	096368-033	EPA 901.1
	Potassium-40	-15.2 ± 30.2	38.4	18.4	NE	U	BD	096368-033	EPA 901.1
	Gross Alpha	1.71	NA	NA	15 pCi/L	NA	None	096368-034	EPA 900.0
	Gross Beta	4.68 ± 1.34	1.65	0.802	4mrem/yr		J	096368-034	EPA 900.0
	Tritium	11.9 ± 86.1	160	70.9	NE	U	BD	096368-036	EPA 906.0 M
PGS-2 (Duplicate)	Americium-241	0.0846 ± 2.75	4.25	2.08	NE	U	BD	096369-033	EPA 901.1
15-Aug-14	Cesium-137	-1.97 ± 2.42	3.11	1.49	NE	U	BD	096369-033	EPA 901.1
	Cobalt-60	-1.64 ± 2.11	3.34	1.57	NE	U	BD	096369-033	EPA 901.1
	Potassium-40	11.4 ± 38.1	33.3	15.6	NE	U	BD	096369-033	EPA 901.1
	Gross Alpha	-0.17	NA	NA	15 pCi/L	NA	None	096369-034	EPA 900.0
	Gross Beta	3.91 ± 1.29	1.76	0.856	4mrem/yr		J	096369-034	EPA 900.0
	Tritium	125 ± 102	159	70.6	NE	U	BD	096369-036	EPA 906.0 M
TA1-W-01	Americium-241	1.89 ± 10.6	18.9	9.24	NE	U	BD	096356-033	EPA 901.1
13-Aug-14	Cesium-137	0.00121 ± 3.47	3.75	1.81	NE	U	BD	096356-033	EPA 901.1
	Cobalt-60	-3.04 ± 3.97	3.76	1.78	NE	U	BD	096356-033	EPA 901.1
	Potassium-40	25.3 ± 60.9	37.5	17.7	NE	U	BD	096356-033	EPA 901.1
	Gross Alpha	1.39	NA	NA	15 pCi/L	NA	None	096356-034	EPA 900.0
	Gross Beta	4.84 ± 1.34	1.62	0.784	4mrem/yr		J	096356-034	EPA 900.0
	Tritium	-5.2 ± 84.4	161	71.4	NE	U	BD	096356-036	EPA 906.0 M
TA1-W-02	Americium-241	-2.16 ± 14.9	25.6	12.4	NE	U	BD	096363-033	EPA 901.1
18-Aug-14	Cesium-137	0.636 ± 1.95	3.52	1.68	NE	U	BD	096363-033	EPA 901.1
	Cobalt-60	1.07 ± 2.14	3.97	1.85	NE	U	BD	096363-033	EPA 901.1
	Potassium-40	28.9 ± 60.5	33.6	15.4	NE	U	BD	096363-033	EPA 901.1
	Gross Alpha	0.22	NA	NA	15 pCi/L	NA	None	096363-034	EPA 900.0
	Gross Beta	2.66 ± 0.831	1.00	0.479	4mrem/yr		J	096363-034	EPA 900.0
	Tritium	31.2 ± 80.4	141	64.9	NE	U	BD	096363-036	EPA 906.0 M
TA1-W-03	Americium-241	-9.37 ± 8.33	12.2	5.94	NE	U	BD	096360-033	EPA 901.1
14-Aug-14	Cesium-137	1.23 ± 4.29	2.93	1.40	NE	U	BD	096360-033	EPA 901.1
	Cobalt-60	1.12 ± 1.97	3.53	1.67	NE	U	BD	096360-033	EPA 901.1
	Potassium-40	24.9 ± 37.1	31.4	14.8	NE	U	BD	096360-033	EPA 901.1
	Gross Alpha	-2.40	NA	NA	15 pCi/L	NA	None	096360-034	EPA 900.0
	Gross Beta	2.41 ± 2.49	4.11	1.98	4mrem/yr	U	BD	096360-034	EPA 900.0
	Tritium	5.90 ± 85.3	159	70.9	NE	U	BD	096360-036	EPA 906.0 M

Refer to footnotes on page 6A-51.

Table 6A-6 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-03 (Duplicate)	Americium-241	-6.93 ± 14.6	18.7	9.18	NE	U	BD	096361-033	EPA 901.1
14-Aug-14	Cesium-137	-1.47 ± 2.28	3.43	1.65	NE	U	BD	096361-033	EPA 901.1
	Cobalt-60	0.456 ± 2.22	3.88	1.85	NE	U	BD	096361-033	EPA 901.1
	Potassium-40	60.9 ± 37.6	60.9	21.7	NE	U	BD	096361-033	EPA 901.1
	Gross Alpha	-5.75	NA	NA	15 pCi/L	NA	None	096361-034	EPA 900.0
	Gross Beta	5.89 ± 2.86	4.30	2.08	4mrem/yr		J	096361-034	EPA 900.0
	Tritium	98.4 ± 96.8	156	69.5	NE	U	BD	096361-036	EPA 906.0 M
TA1-W-04	Americium-241	9.74 ± 12.5	18.0	8.82	NE	U	BD	096378-033	EPA 901.1
21-Aug-14	Cesium-137	-0.398 ± 2.00	3.40	1.63	NE	U	BD	096378-033	EPA 901.1
	Cobalt-60	2.04 ± 2.29	4.01	1.89	NE	U	BD	096378-033	EPA 901.1
	Potassium-40	71.0 ± 78.8	36.6	17.1	NE	X	R	096378-033	EPA 901.1
	Gross Alpha	2.98	NA	NA	15 pCi/L	NA	None	096378-034	EPA 900.0
	Gross Beta	2.44 ± 0.751	0.911	0.436	4mrem/yr		J	096378-034	EPA 900.0
	Tritium	34.0 ± 81.0	142	65.2	NE	U	BD	096378-036	EPA 906.0 M
TA1-W-05	Americium-241	0.432 ± 6.62	10.2	4.98	NE	U	BD	096375-033	EPA 901.1
20-Aug-14	Cesium-137	0.666 ± 2.50	3.75	1.80	NE	U	BD	096375-033	EPA 901.1
	Cobalt-60	1.54 ± 2.22	3.99	1.88	NE	U	BD	096375-033	EPA 901.1
	Potassium-40	1.25 ± 44.2	36.6	17.2	NE	U	BD	096375-033	EPA 901.1
	Gross Alpha	0.15	NA	NA	15 pCi/L	NA	None	096375-R34	EPA 900.0
	Gross Beta	2.02 ± 0.756	0.992	0.472	4mrem/yr		J	096375-034	EPA 900.0
	Tritium	6.99 ± 80.1	145	66.6	NE	U	BD	096375-036	EPA 906.0 M
TA1-W-05 (Duplicate)	Americium-241	-28.9 ± 20.2	24.0	11.7	NE	U	BD	096376-033	EPA 901.1
20-Aug-14	Cesium-137	1.16 ± 2.60	3.95	1.89	NE	U	BD	096376-033	EPA 901.1
	Cobalt-60	-0.67 ± 2.49	4.25	1.99	NE	U	BD	096376-033	EPA 901.1
	Potassium-40	48.4 ± 33.7	51.3	24.3	NE	U	BD	096376-R33	EPA 901.1
	Gross Alpha	1.61	NA	NA	15 pCi/L	NA	None	096376-034	EPA 900.0
	Gross Beta	1.73 ± 0.937	1.43	0.692	4mrem/yr		J	096376-034	EPA 900.0
	Tritium	-2.91 ± 78.0	143	65.7	NE	U	BD	096376-036	EPA 906.0 M
TA1-W-06	Americium-241	-9.02 ± 18.0	25.5	12.5	NE	U	BD	096388-033	EPA 901.1
13-Aug-14	Cesium-137	2.98 ± 1.71	3.25	1.56	NE	U	BD	096388-033	EPA 901.1
	Cobalt-60	0.346 ± 1.89	3.44	1.62	NE	U	BD	096388-033	EPA 901.1
	Potassium-40	-28.4 ± 50.7	44.2	21.0	NE	U	BD	096388-033	EPA 901.1
	Gross Alpha	0.07	NA	NA	15 pCi/L	NA	None	096388-034	EPA 900.0
	Gross Beta	1.85 ± 1.38	2.23	1.08	4mrem/yr	U	BD	096388-034	EPA 900.0
	Tritium	18.3 ± 87.5	160	71.3	NE	U	BD	096388-036	EPA 906.0 M

Refer to footnotes on page 6A-51.

Table 6A-6 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-08	Americium-241	5.35 ± 5.49	6.84	3.36	NE	U	BD	096371-033	EPA 901.1
19-Aug-14	Cesium-137	0.110 ± 2.86	4.95	2.38	NE	U	BD	096371-033	EPA 901.1
	Cobalt-60	1.97 ± 2.74	4.89	2.29	NE	U	BD	096371-033	EPA 901.1
	Potassium-40	29.7 ± 61.8	46.2	21.5	NE	U	BD	096371-033	EPA 901.1
	Gross Alpha	-0.56	NA	NA	15 pCi/L	NA	None	096371-R34	EPA 900.0
	Gross Beta	0.895 ± 2.17	3.72	1.77	4mrem/yr	U	BD	096371-034	EPA 900.0
	Tritium	-31.4 ± 75.0	142	65.4	NE	U	BD	096371-036	EPA 906.0 M
TA2-NW1-595	Americium-241	-7.9 ± 11.1	18.0	8.76	NE	U	BD	096383-033	EPA 901.1
26-Aug-14	Cesium-137	0.0692 ± 1.64	2.95	1.41	NE	U	BD	096383-033	EPA 901.1
	Cobalt-60	-1.17 ± 1.82	3.02	1.41	NE	U	BD	096383-033	EPA 901.1
	Potassium-40	-5.87 ± 31.3	42.4	20.2	NE	U	BD	096383-033	EPA 901.1
	Gross Alpha	-0.52	NA	NA	15 pCi/L	NA	None	096383-034	EPA 900.0
	Gross Beta	0.522 ± 2.06	3.48	1.70	4mrem/yr	U	BD	096383-034	EPA 900.0
	Tritium	3.85 ± 85.8	159	71.7	NE	U	BD	096383-036	EPA 906.0 M
TA2-NW1-595 (Duplicate)	Americium-241	16.7 ± 16.5	23.8	11.6	NE	U	BD	096384-033	EPA 901.1
26-Aug-14	Cesium-137	0.592 ± 1.93	3.19	1.52	NE	U	BD	096384-033	EPA 901.1
	Cobalt-60	-0.951 ± 2.00	3.42	1.59	NE	U	BD	096384-033	EPA 901.1
	Potassium-40	-29.1 ± 36.4	42.9	20.3	NE	U	BD	096384-033	EPA 901.1
	Gross Alpha	1.19	NA	NA	15 pCi/L	NA	None	096384-034	EPA 900.0
	Gross Beta	2.41 ± 1.47	2.29	1.10	4mrem/yr		J	096384-034	EPA 900.0
	Tritium	54.4 ± 89.6	154	69.6	NE	U	BD	096384-036	EPA 906.0 M
TA2-SW1-320	Americium-241	-1.55 ± 4.03	5.98	2.94	NE	U	BD	096399-033	EPA 901.1
27-Aug-14	Cesium-137	0.611 ± 2.65	4.59	2.21	NE	U	BD	096399-033	EPA 901.1
	Cobalt-60	2.85 ± 2.79	4.73	2.23	NE	U	BD	096399-033	EPA 901.1
	Potassium-40	-41.8 ± 55.0	47.5	22.4	NE	U	BD	096399-033	EPA 901.1
	Gross Alpha	0.48	NA	NA	15 pCi/L	NA	None	096399-034	EPA 900.0
	Gross Beta	2.08 ± 1.14	1.76	0.849	4mrem/yr		J	096399-034	EPA 900.0
	Tritium	7.95 ± 82.1	151	68.1	NE	U	BD	096399-036	EPA 906.0 M
TA2-W-01	Americium-241	4.64 ± 6.85	9.94	4.87	NE	U	BD	096390-033	EPA 901.1
14-Aug-14	Cesium-137	5.38 ± 3.41	2.50	1.20	NE	X	R	096390-033	EPA 901.1
	Cobalt-60	0.433 ± 1.71	3.10	1.46	NE	U	BD	096390-033	EPA 901.1
	Potassium-40	-34.7 ± 38.6	35.7	17.0	NE	U	BD	096390-033	EPA 901.1
	Gross Alpha	-1.21	NA	NA	15 pCi/L	NA	None	096390-034	EPA 900.0
	Gross Beta	2.10 ± 1.08	1.64	0.799	4mrem/yr		J	096390-034	EPA 900.0
	Tritium	-35.2 ± 79.7	159	70.9	NE	U	BD	096390-036	EPA 906.0 M

Refer to footnotes on page 6A-51.

Table 6A-6 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-19	Americium-241	13.4 ± 16.4	25.3	12.3	NE	U	BD	096403-033	EPA 901.1
28-Aug-14	Cesium-137	0.241 ± 1.97	3.49	1.67	NE	U	BD	096403-033	EPA 901.1
	Cobalt-60	-0.824 ± 2.19	3.71	1.73	NE	U	BD	096403-033	EPA 901.1
	Potassium-40	-3.12 ± 42.4	55.1	26.3	NE	U	BD	096403-033	EPA 901.1
	Gross Alpha	0.35	NA	NA	15 pCi/L	NA	None	096403-034	EPA 900.0
	Gross Beta	1.80 ± 1.07	1.68	0.817	4mrem/yr		J	096403-034	EPA 900.0
	Tritium	7.46 ± 84.1	155	69.9	NE	U	BD	096403-036	EPA 906.0 M
TA2-W-26	Americium-241	4.72 ± 8.15	12.8	6.23	NE	U	BD	096401-033	EPA 901.1
20-Aug-14	Cesium-137	-3.12 ± 3.82	4.10	1.98	NE	U	BD	096401-033	EPA 901.1
	Cobalt-60	1.39 ± 1.82	3.31	1.55	NE	U	BD	096401-033	EPA 901.1
	Potassium-40	-25.1 ± 33.2	43.7	20.8	NE	U	BD	096401-033	EPA 901.1
	Gross Alpha	-1.13	NA	NA	15 pCi/L	NA	None	096401-034	EPA 900.0
	Gross Beta	1.48 ± 2.58	4.33	2.11	4mrem/yr	U	BD	096401-034	EPA 900.0
	Tritium	-11.6 ± 78.5	145	66.8	NE	U	BD	096401-036	EPA 906.0 M
TA2-W-27	Americium-241	4.46 ± 5.59	9.12	4.48	NE	U	BD	096393-033	EPA 901.1
15-Aug-14	Cesium-137	-0.738 ± 1.70	2.87	1.38	NE	U	BD	096393-033	EPA 901.1
	Cobalt-60	0.780 ± 1.70	3.03	1.44	NE	U	BD	096393-033	EPA 901.1
	Potassium-40	3.24 ± 43.0	28.0	13.2	NE	U	BD	096393-033	EPA 901.1
	Gross Alpha	-2.82	NA	NA	15 pCi/L	NA	None	096393-034	EPA 900.0
	Gross Beta	2.78 ± 1.31	1.97	0.951	4mrem/yr		J	096393-034	EPA 900.0
	Tritium	54.3 ± 92.8	161	71.5	NE	U	BD	096393-036	EPA 906.0 M
TJA-2	Americium-241	-10.4 ± 14.7	23.8	11.5	NE	U	BD	096406-033	EPA 901.1
03-Sep-14	Cesium-137	0.972 ± 1.78	3.20	1.53	NE	U	BD	096406-033	EPA 901.1
	Cobalt-60	-2.5 ± 2.19	3.03	1.40	NE	U	BD	096406-033	EPA 901.1
	Potassium-40	3.11 ± 38.6	34.4	16.0	NE	U	BD	096406-033	EPA 901.1
	Gross Alpha	-0.80	NA	NA	15 pCi/L	NA	None	096406-034	EPA 900.0
	Gross Beta	-0.115 ± 1.16	2.01	0.972	4mrem/yr	U	BD	096406-034	EPA 900.0
	Tritium	8.66 ± 82.7	152	68.6	NE	U	BD	096406-036	EPA 906.0 M
TJA-3	Americium-241	-1.63 ± 6.86	10.1	4.92	NE	U	BD	096397-033	EPA 901.1
21-Aug-14	Cesium-137	-0.0884 ± 1.95	2.99	1.43	NE	U	BD	096397-033	EPA 901.1
	Cobalt-60	0.529 ± 1.70	3.13	1.46	NE	U	BD	096397-033	EPA 901.1
	Potassium-40	-19.6 ± 30.2	39.2	18.6	NE	U	BD	096397-033	EPA 901.1
	Gross Alpha	1.57	NA	NA	15 pCi/L	NA	None	096397-034	EPA 900.0
	Gross Beta	3.17 ± 1.25	1.80	0.875	4mrem/yr		J	096397-034	EPA 900.0
	Tritium	31.6 ± 82.1	144	66.3	NE	U	BD	096397-036	EPA 906.0 M

Refer to footnotes on page 6A-51.

Table 6A-6 *(Concluded)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-4	Americium-241	18.7 ± 18.7	26.2	12.8	NE	U	BD	096408-033	EPA 901.1
04-Sep-14	Cesium-137	0.315 ± 1.96	3.41	1.64	NE	U	BD	096408-033	EPA 901.1
	Cobalt-60	2.29 ± 2.21	3.07	1.44	NE	U	BD	096408-033	EPA 901.1
	Potassium-40	-19.7 ± 39.1	43.1	20.5	NE	U	BD	096408-033	EPA 901.1
	Gross Alpha	-2.20	NA	NA	15 pCi/L	NA	None	096408-034	EPA 900.0
	Gross Beta	2.59 ± 1.95	3.16	1.55	4mrem/yr	U	BD	096408-034	EPA 900.0
	Tritium	-25.2 ± 80.1	154	69.7	NE	U	BD	096408-036	EPA 906.0 M
TJA-6	Americium-241	-4.78 ± 13.0	19.5	9.50	NE	U	BD	096395-033	EPA 901.1
19-Aug-14	Cesium-137	0.0596 ± 2.38	4.17	2.00	NE	U	BD	096395-033	EPA 901.1
	Cobalt-60	-1.33 ± 2.31	3.76	1.74	NE	U	BD	096395-033	EPA 901.1
	Potassium-40	4.83 ± 50.4	41.2	19.2	NE	U	BD	096395-033	EPA 901.1
	Gross Alpha	0.76	NA	NA	15 pCi/L	NA	None	096395-034	EPA 900.0
	Gross Beta	2.84 ± 1.41	2.12	1.03	4mrem/yr		J	096395-034	EPA 900.0
	Tritium	-2.38 ± 76.7	140	64.5	NE	U	BD	096395-036	EPA 906.0 M
TJA-7	Americium-241	-6.2 ± 15.2	19.6	9.60	NE	U	BD	096412-033	EPA 901.1
05-Sep-14	Cesium-137	2.39 ± 2.49	4.07	1.96	NE	U	BD	096412-033	EPA 901.1
	Cobalt-60	-0.639 ± 2.24	3.81	1.79	NE	U	BD	096412-033	EPA 901.1
	Potassium-40	23.8 ± 52.8	37.7	17.8	NE	U	BD	096412-033	EPA 901.1
	Gross Alpha	0.22	NA	NA	15 pCi/L	NA	None	096412-034	EPA 900.0
	Gross Beta	0.916 ± 1.10	1.83	0.884	4mrem/yr	U	BD	096412-034	EPA 900.0
	Tritium	-40.3 ± 77.6	153	69.1	NE	U	BD	096412-036	EPA 906.0 M
WYO-3	Americium-241	9.13 ± 12.4	19.1	9.37	NE	U	BD	096386-033	EPA 901.1
22-Aug-14	Cesium-137	2.46 ± 2.76	3.72	1.79	NE	U	BD	096386-033	EPA 901.1
	Cobalt-60	-0.474 ± 2.18	3.73	1.77	NE	U	BD	096386-033	EPA 901.1
	Potassium-40	-35.9 ± 50.0	55.7	26.9	NE	U	BD	096386-033	EPA 901.1
	Gross Alpha	3.10	NA	NA	15 pCi/L	NA	None	096386-034	EPA 900.0
	Gross Beta	2.60 ± 0.862	1.10	0.526	4mrem/yr		J	096386-034	EPA 900.0
	Tritium	-58.7 ± 71.8	141	64.9	NE	U	BD	096386-036	EPA 906.0 M
WYO-4	Americium-241	5.67 ± 6.83	9.78	4.77	NE	U	BD	096410-033	EPA 901.1
25-Aug-14	Cesium-137	1.41 ± 1.84	3.17	1.52	NE	U	BD	096410-033	EPA 901.1
	Cobalt-60	1.07 ± 1.79	3.27	1.53	NE	U	BD	096410-033	EPA 901.1
	Potassium-40	-43.8 ± 45.7	38.2	18.1	NE	U	BD	096410-033	EPA 901.1
	Gross Alpha	-0.71	NA	NA	15 pCi/L	NA	None	096410-034	EPA 900.0
	Gross Beta	2.26 ± 1.27	1.95	0.949	4mrem/yr		J	096410-034	EPA 900.0
	Tritium	1.93 ± 83.9	155	70.2	NE	U	BD	096410-036	EPA 906.0 M

Refer to footnotes on page 6A-51.

Table 6A-7
Summary of Field Water Quality Measurements[h], Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	11-Mar-14	17.48	674	154.9	7.79	3.81	45.6	4.36
TA2-SW1-320	27-Mar-14	15.04	367.7	254.7	7.96	4.92	75.4	7.51
TA2-W-01	10-Mar-14	18.05	502	98.4	7.87	0.29	62.9	5.94
TA2-W-19	19-Mar-14	16.42	448.1	211.7	7.80	1.19	74.2	7.20
TA2-W-26	18-Mar-14	16.02	999.0	204.1	7.63	3.98	66.8	6.56
TA2-W-27	12-Mar-14	14.98	595	143.7	7.76	0.41	50.1	4.96
TJA-2	20-Mar-14	16.47	445.8	195.9	7.78	0.89	72.1	7.00
TJA-3	17-Mar-14	19.21	407.9	184.7	7.65	1.25	66.8	6.12
TJA-4	25-Mar-14	17.81	443.5	191.6	7.73	0.28	59.4	5.62
TJA-6	13-Mar-14	18.08	370	177.6	7.69	2.27	55.1	5.17
TJA-7	26-Mar-14	16.72	395.5	241.7	7.76	2.08	81.5	7.89
WYO-4	24-Mar-14	15.21	470.1	215.5	7.88	1.13	76.7	7.91
TA2-SW1-320	20-Jun-14	12.67	503.7	293.3	7.92	12.3	89.4	7.42
TA2-W-19	30-May-14	18.74	516.8	295.3	7.65	0.78	94.0	8.75
TA2-W-26	28-May-14	20.22	1249.4	282.3	7.49	0.68	87.5	7.88
TJA-2	02-Jun-14	18.73	513.4	288.4	7.64	0.46	91.3	8.49
TJA-3	29-May-14	21.09	464.9	293.0	7.48	0.28	80.3	7.12
TJA-4	03-Jun-14	19.96	508.2	300.8	7.56	0.84	62.5	5.62
TJA-7	04-Jun-14	23.15	501.5	269.7	7.68	1.21	89.3	7.62
WYO-4	10-Jun-14	20.90	592.5	256.5	7.51	1.46	90.4	8.06
PGS-2	15-Aug-14	21.90	572.4	218.3	7.54	2.70	12.1	1.06
TA1-W-01	13-Aug-14	21.29	501.7	210.6	7.29	0.49	68.3	6.05
TA1-W-02	18-Aug-14	21.44	488.2	271.5	7.19	3.63	63.1	5.62
TA1-W-03	14-Aug-14	18.76	1551.8	228.9	7.06	1.28	82.7	7.67
TA1-W-04	21-Aug-14	19.59	447.0	290.4	7.18	0.25	63.7	5.83
TA1-W-05	20-Aug-14	20.59	561.8	298.1	7.01	0.51	82.2	7.39
TA1-W-06	13-Aug-14	20.27	810.9	80.6	7.47	0.68	74.9	6.76
TA1-W-08	19-Aug-14	22.35	1968.5	253.4	7.12	0.48	86.4	7.46
TA2-NW1-595	26-Aug-14	20.23	740.0	303.1	7.12	0.21	85.2	7.69
TA2-SW1-320	27-Aug-14	20.46	481.0	282.2	7.56	2.03	83.6	7.52
TA2-W-01	14-Aug-14	20.15	609.4	83.8	7.51	0.16	73.6	6.67
TA2-W-19	28-Aug-14	20.40	560.0	280.0	7.39	0.34	98.6	8.82

Refer to footnotes on page 6A-51.

Table 6A-7 *(Concluded)*
Summary of Field Water Quality Measurements[h], Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-26	20-Aug-14	20.81	1256.3	61.2	7.41	0.84	73.8	6.57
TA2-W-27	15-Aug-14	19.99	730.8	71.3	7.47	0.38	79.5	7.20
TJA-2	03-Sep-14	18.69	537.3	276.8	7.30	0.20	89.7	8.35
TJA-3	21-Aug-14	21.57	509.7	61.8	7.36	0.29	62.1	5.47
TJA-4	04-Sep-14	21.04	546.2	288.9	7.27	0.42	62.0	5.51
TJA-6	19-Aug-14	21.65	427.7	60.7	7.42	1.52	61.6	5.43
TJA-7	05-Sep-14	21.38	506.6	275.4	7.36	1.42	89.9	7.95
WYO-3	22-Aug-14	19.10	470.0	296.6	7.36	0.47	78.1	7.21
WYO-4	25-Aug-14	21.3	676.0	31.2	7.58	0.27	88.6	7.91
TA2-W-19	19-Nov-14	17.50	523.7	309.3	7.70	0.52	89.0	8.48
TA2-W-26	01-Dec-14	18.24	1266.1	247.9	7.39	1.09	82.0	7.69
TA2-W-28	18-Dec-14	17.36	453.9	242.8	7.68	1.64	52.1	4.99
TJA-2	20-Nov-14	15.27	496.8	302.3	7.66	0.29	84.1	8.40
TJA-3	02-Dec-14	18.82	461.4	261.9	7.46	0.31	74.6	6.94
TJA-4	25-Nov-14	17.45	501.5	349.8	7.60	0.31	59.4	5.70
TJA-7	03-Dec-14	18.42	471.5	266.5	7.54	1.18	84.7	7.91
WYO-4	24-Nov-14	12.43	506.9	274.6	7.88	0.44	76.7	8.16

Refer to footnotes on page 6A-51.

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Footnotes for Tijeras Arroyo Groundwater Analytical Results Tables

%	= Percent.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
ID	= Identification.
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 exceed the established MCL.

ND = Not detected (at method detection limit). Activities of zero or less are considered to be not detected.

[b]MDL or MDA

The MDL applies to Table 6A-1 through 6A-5. MDA applies to Table 6A-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 Table 6A-1 through 6A-5. MDA applies to Table 6A-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

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.

*	= Recovery or % relative percent difference (RPD) not within acceptance limits and/or spike amount not compatible with the sample, or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.
B	= Analyte is detected in associated laboratory method blank.
J	= Amount detected is below the practical quantitation limit (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.

Footnotes for Tijeras Arroyo 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.
J-	= The associated numerical value is an estimated quantity with a suspected negative bias.
None	= No data validation for corrected gross alpha activity.
NJ	= Presumptive evidence of the presence of the material at an estimated quantity.
NJ-	= Presumptive evidence of the presence of the material at an estimated quantity with a suspected negative bias.
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

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1990, “EML [Environmental Measurements Laboratory] Procedures Manual,” 27th ed., Vol. 1, Rev. 1992, HASL-300.

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

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.

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 6B
Tijeras Arroyo Groundwater
Plots

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Attachment 6B Plots

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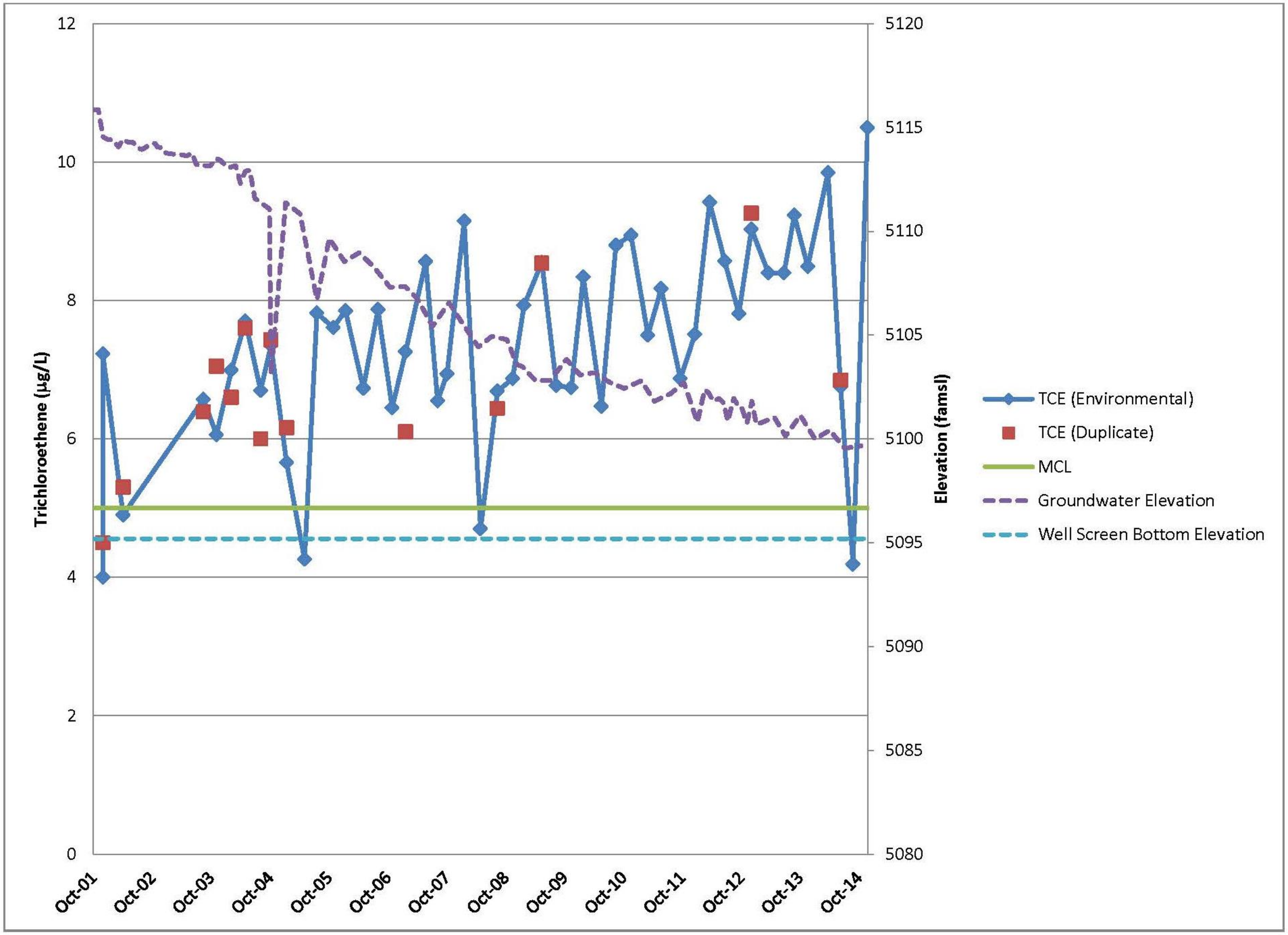

Figure 6B-1. Trichloroethene Concentrations, WYO-4

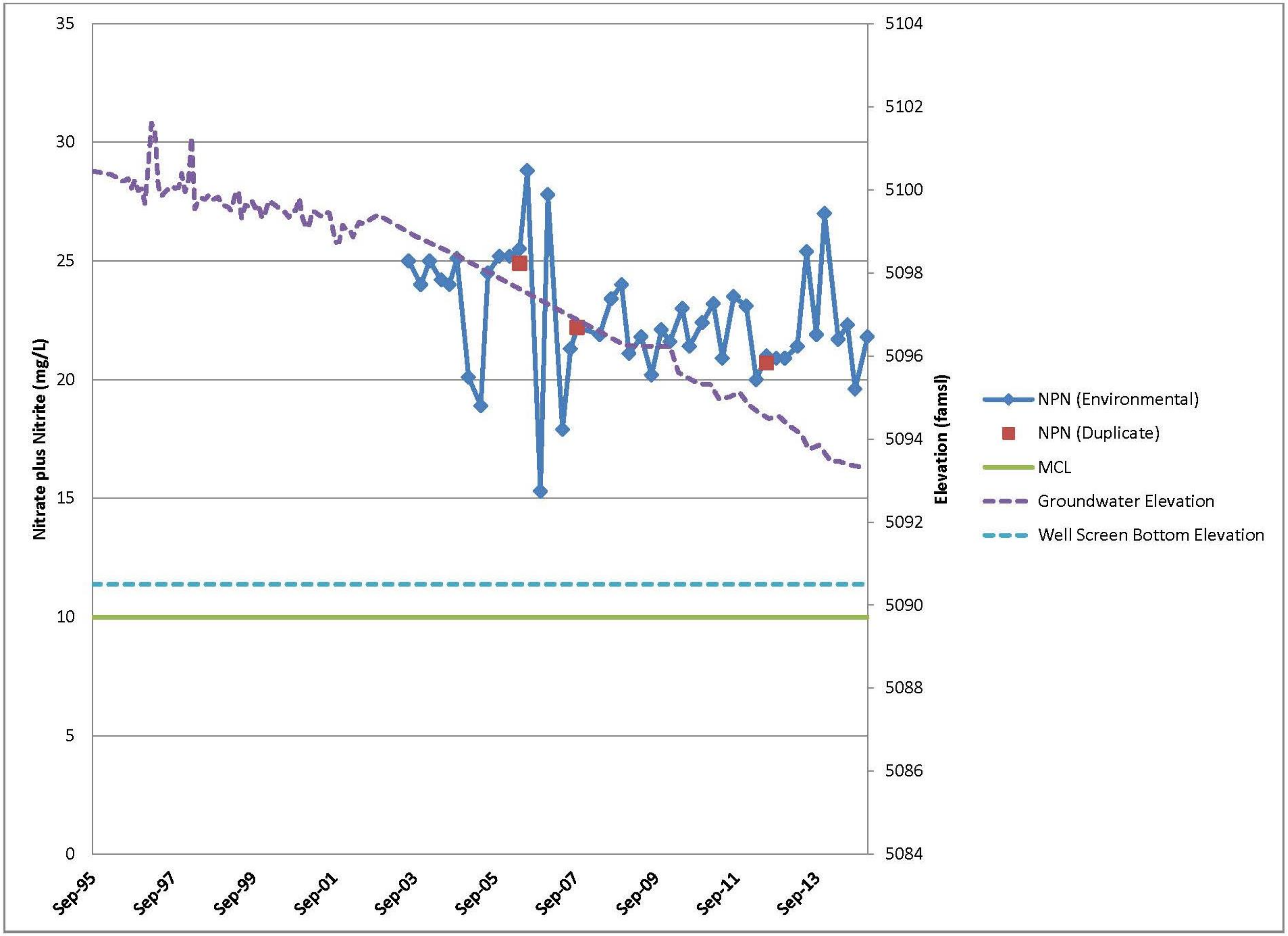

Figure 6B-2. Nitrate plus Nitrite Concentrations, TA2-SW1-320 and TA2-W-28

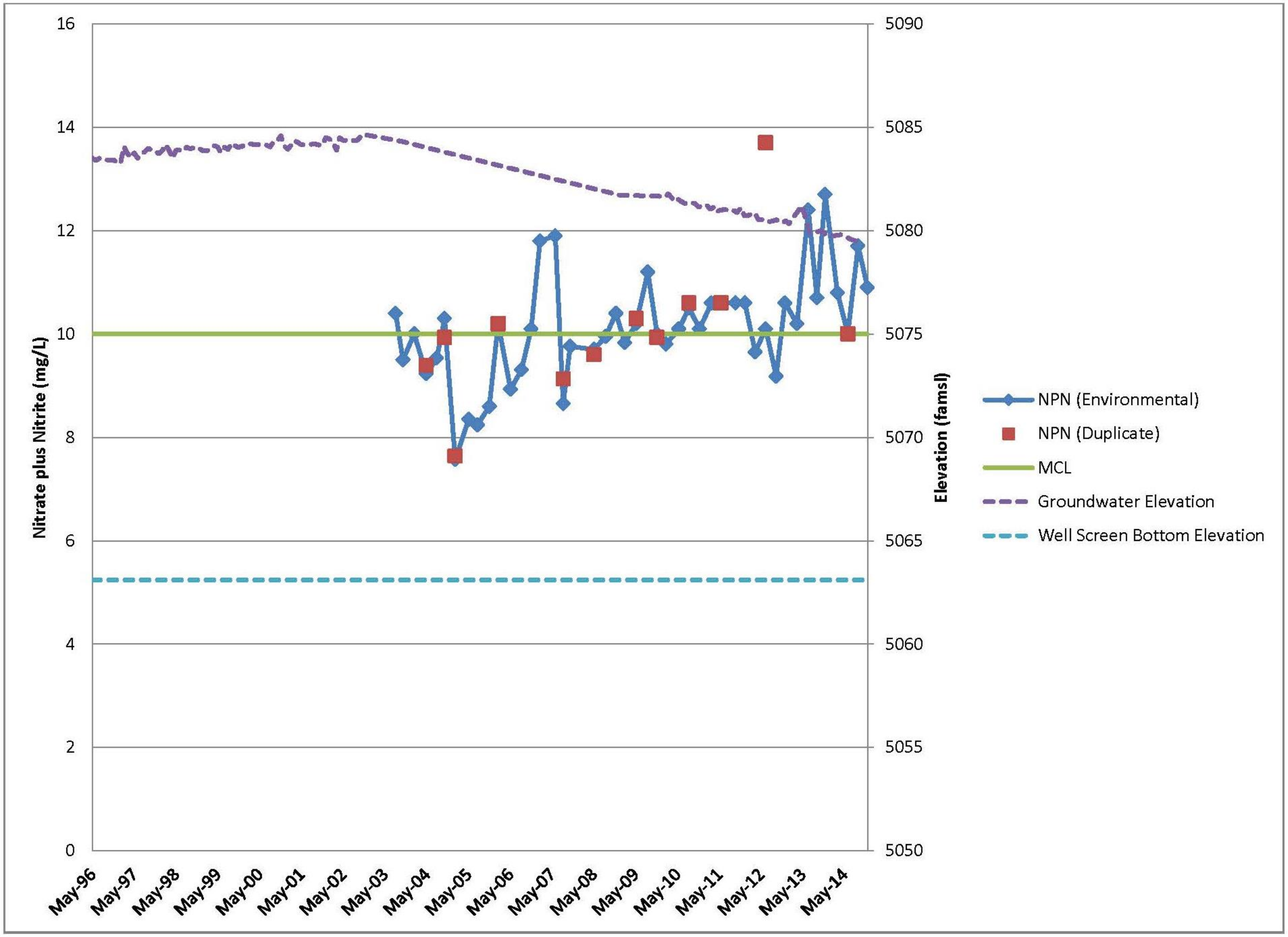

Figure 6B-3. Nitrate plus Nitrite Concentrations, TA2-W-19

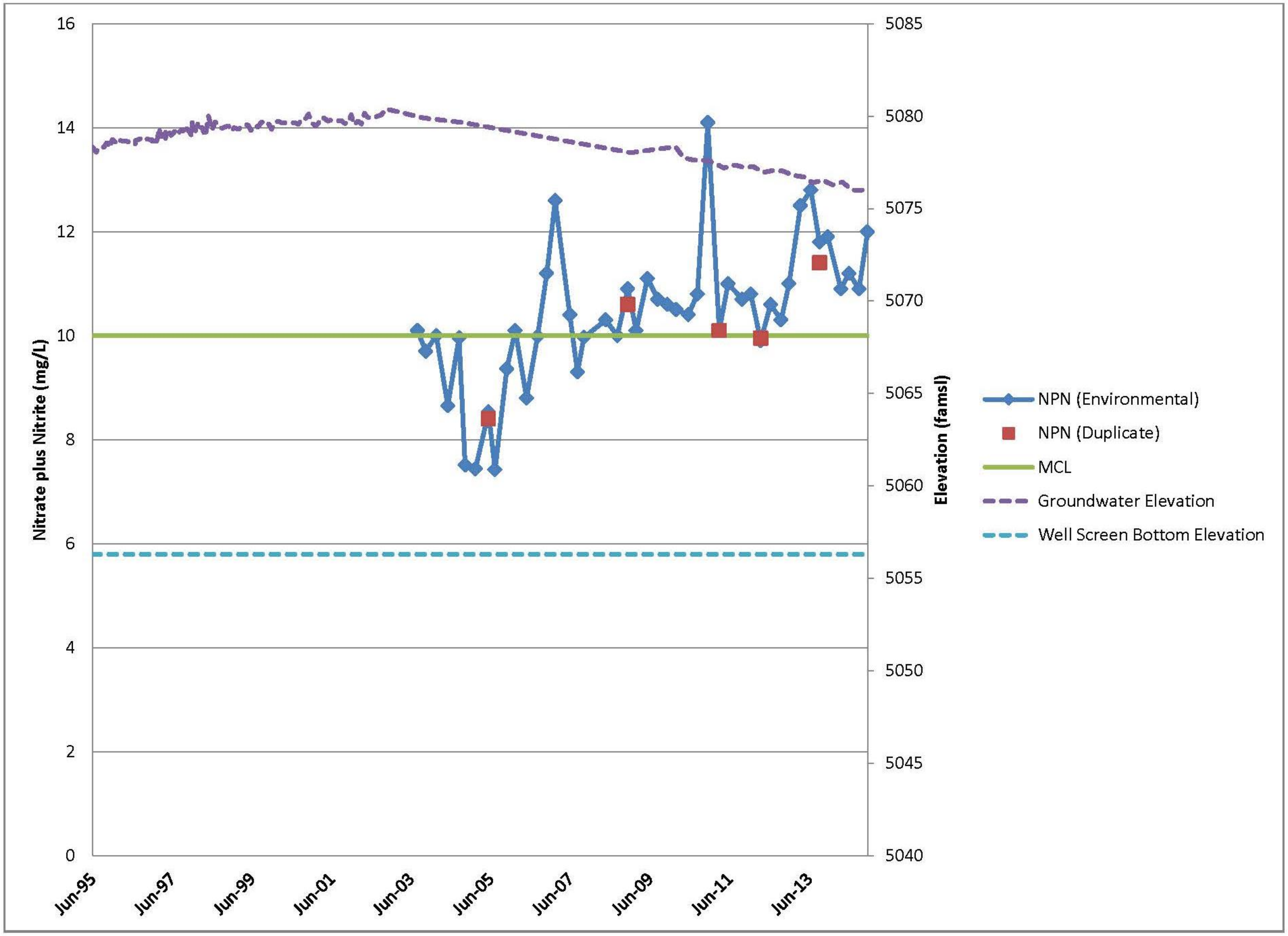

Figure 6B-4. Nitrate plus Nitrite Concentrations, TJA-2

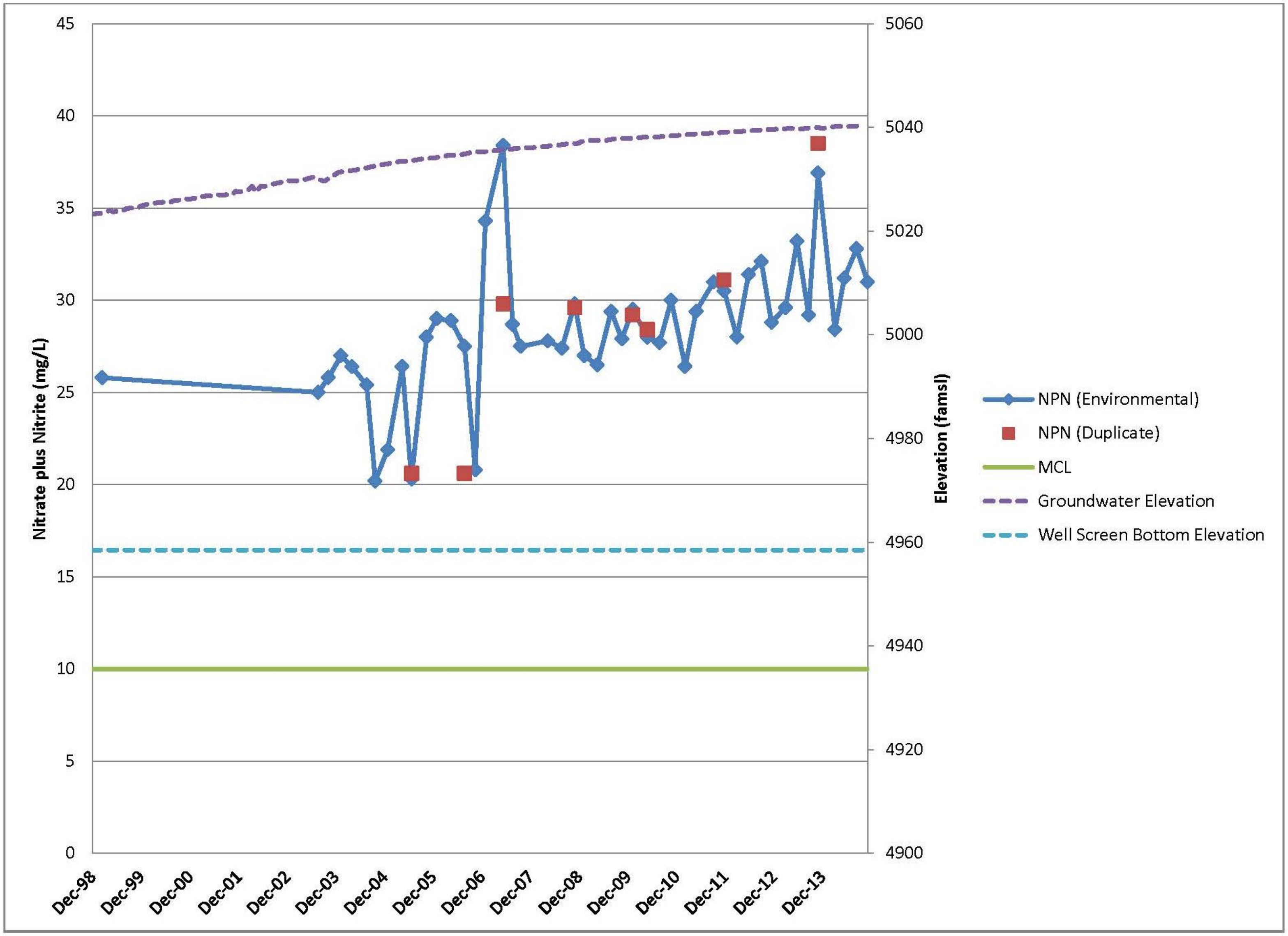

Figure 6B-5. Nitrate plus Nitrite Concentrations, TJA-4

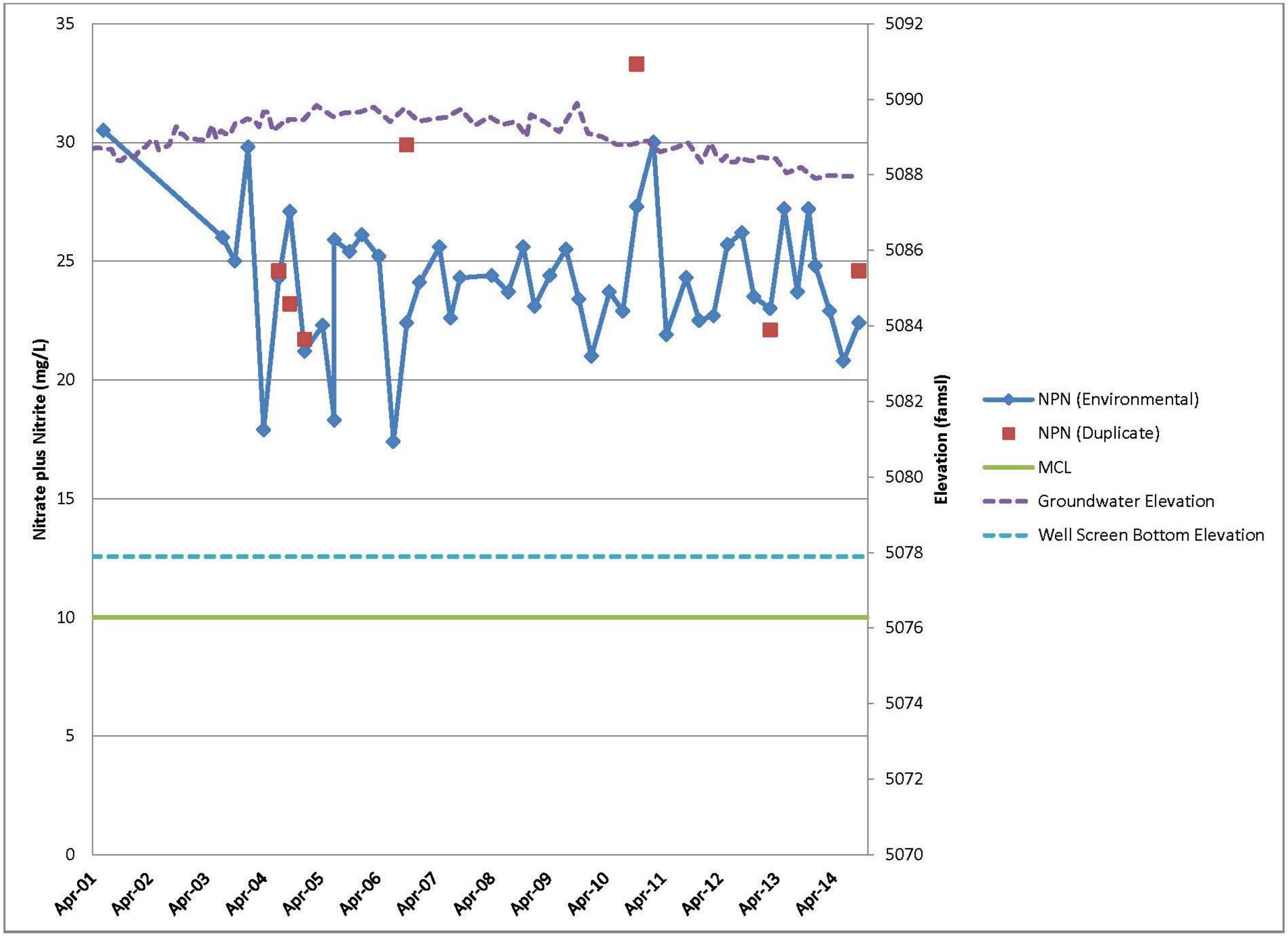

Figure 6B-6. Nitrate plus Nitrite Concentrations, TJA-7

Attachment 6C
Tijeras Arroyo Groundwater
Hydrographs

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Attachment 6C Hydrographs

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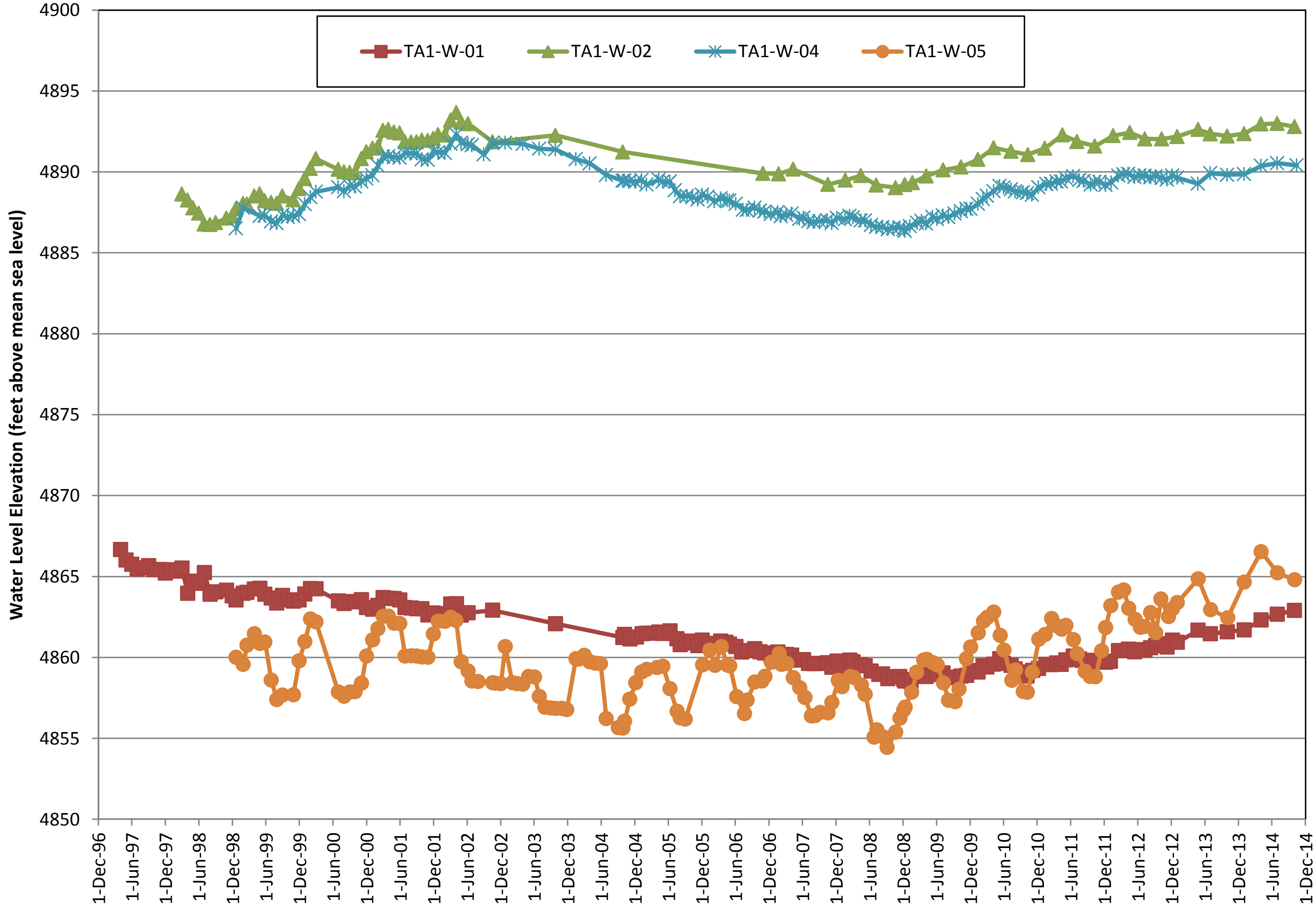

Figure 6C-1. TAG Area of Concern Wells (1 of 7)

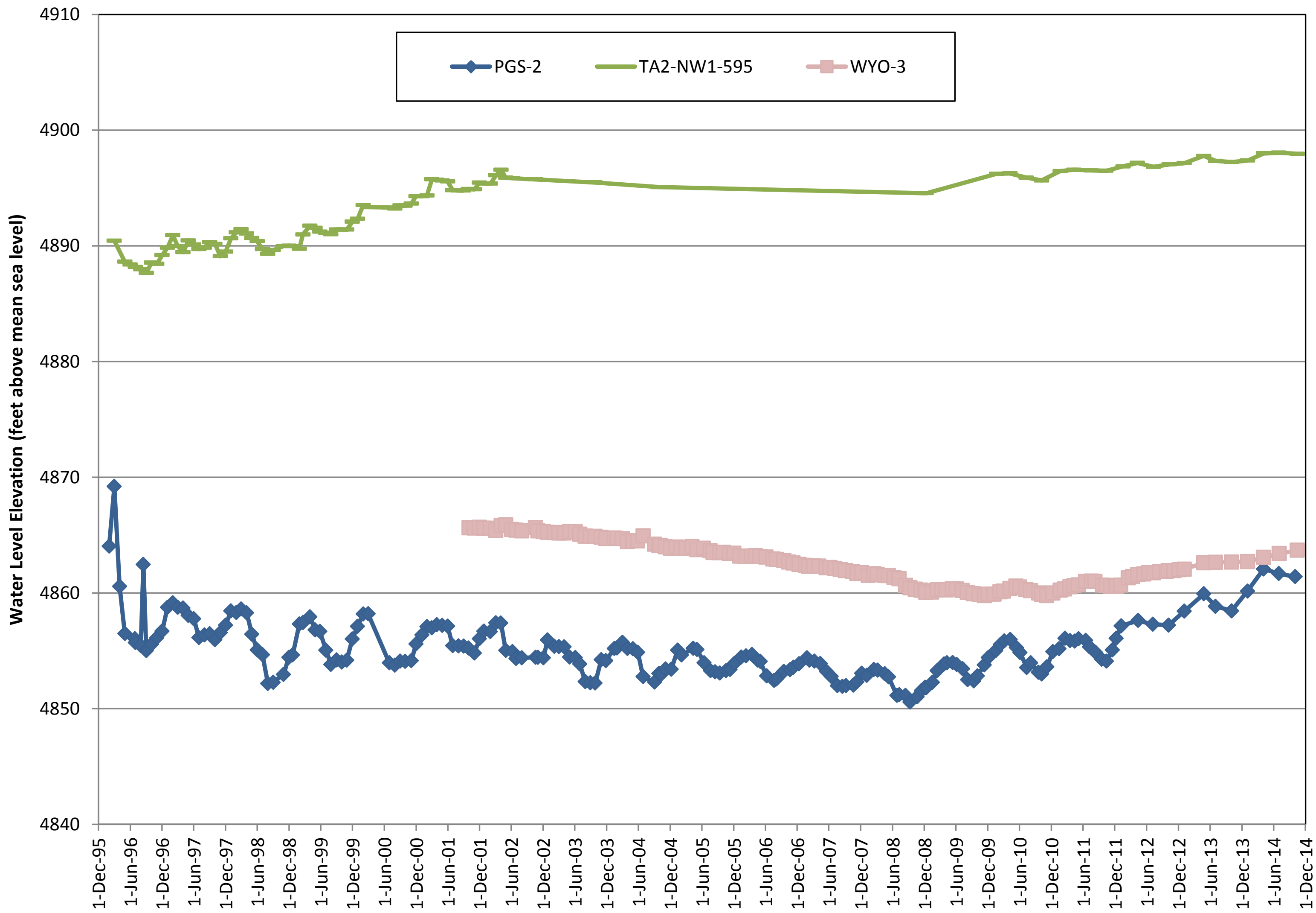

Figure 6C-2. TAG Area of Concern Wells (2 of 7)

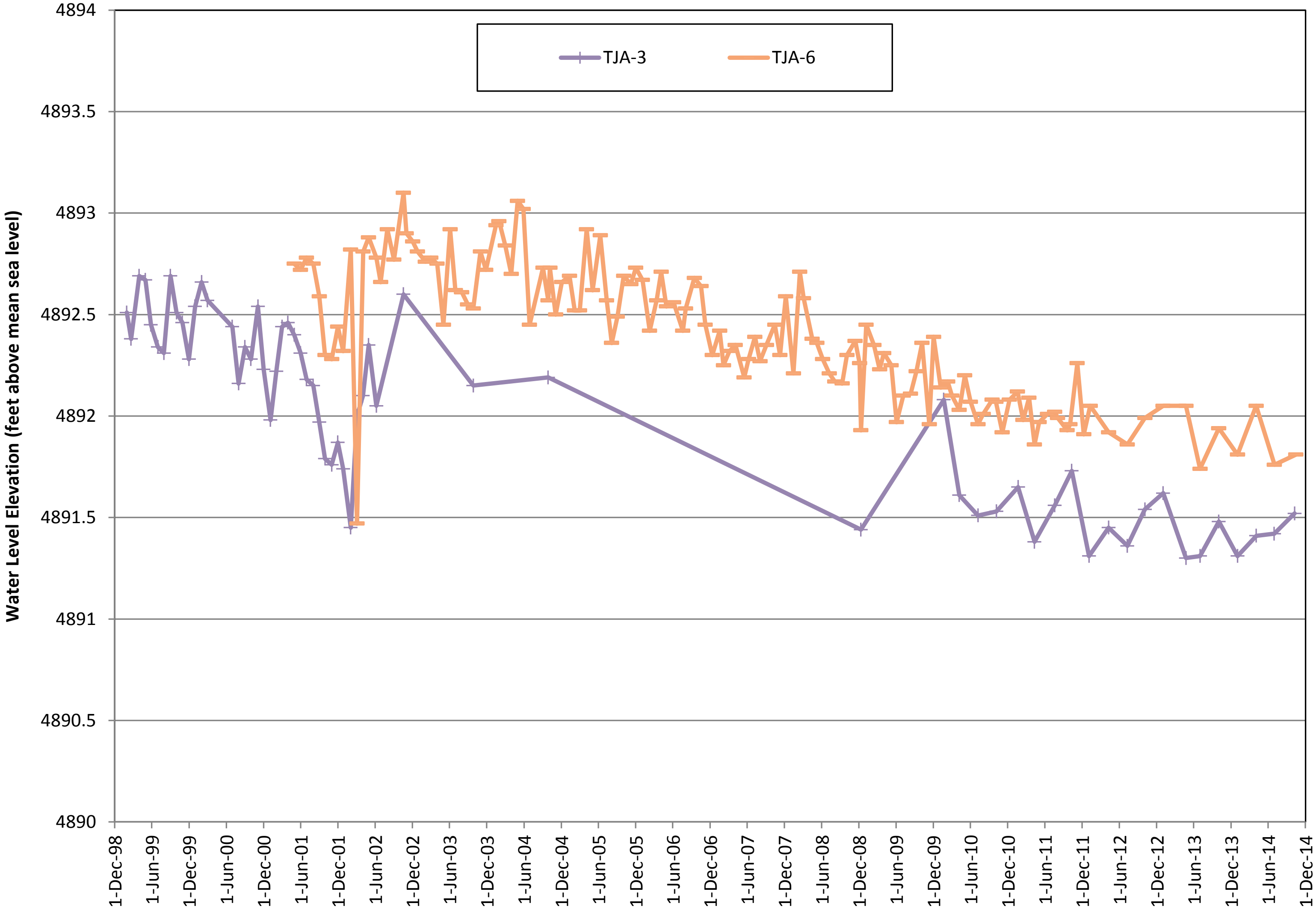

Figure 6C-3. TAG Area of Concern Wells (3 of 7)

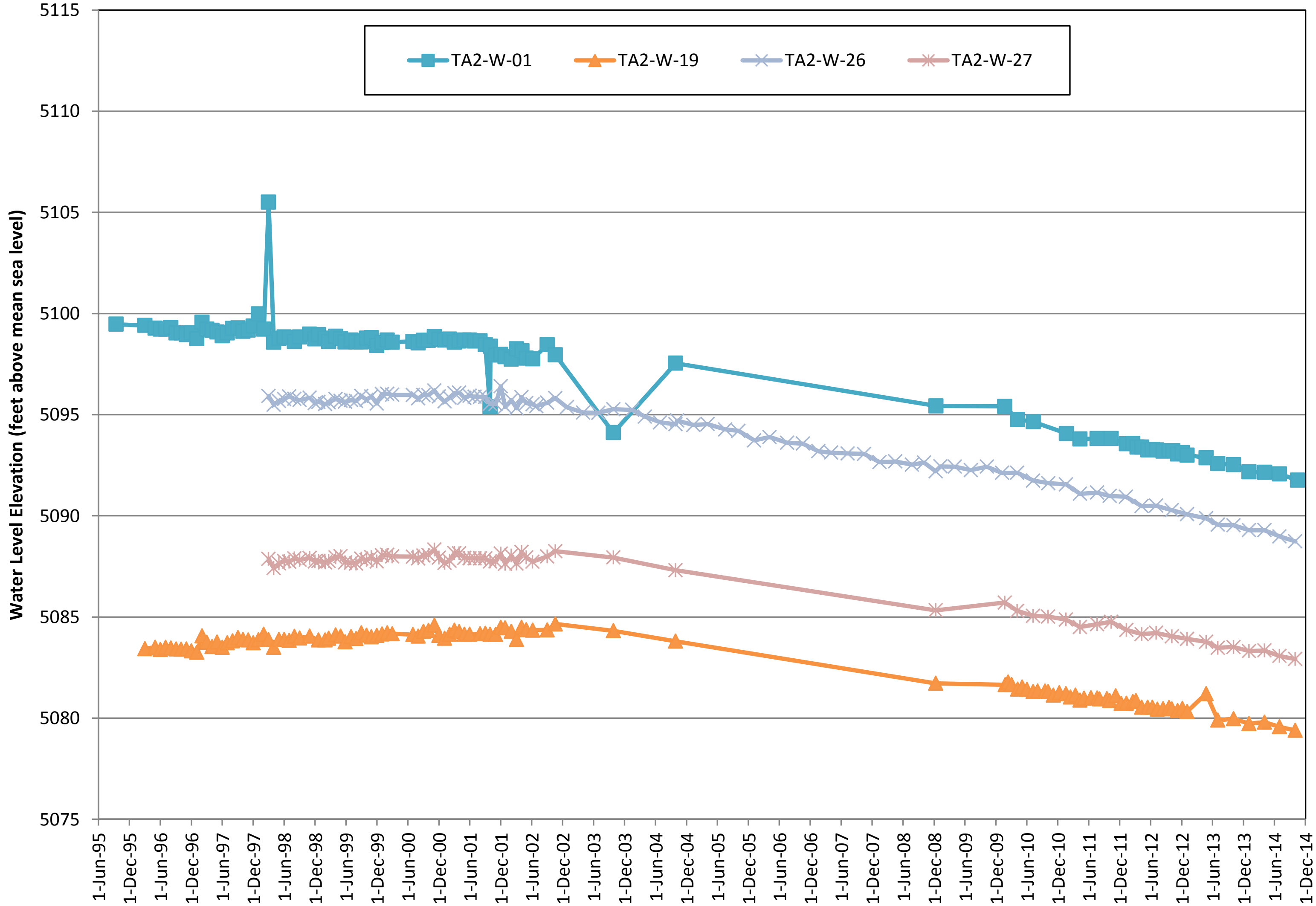

Figure 6C-4. TAG Area of Concern Wells (4 of 7)

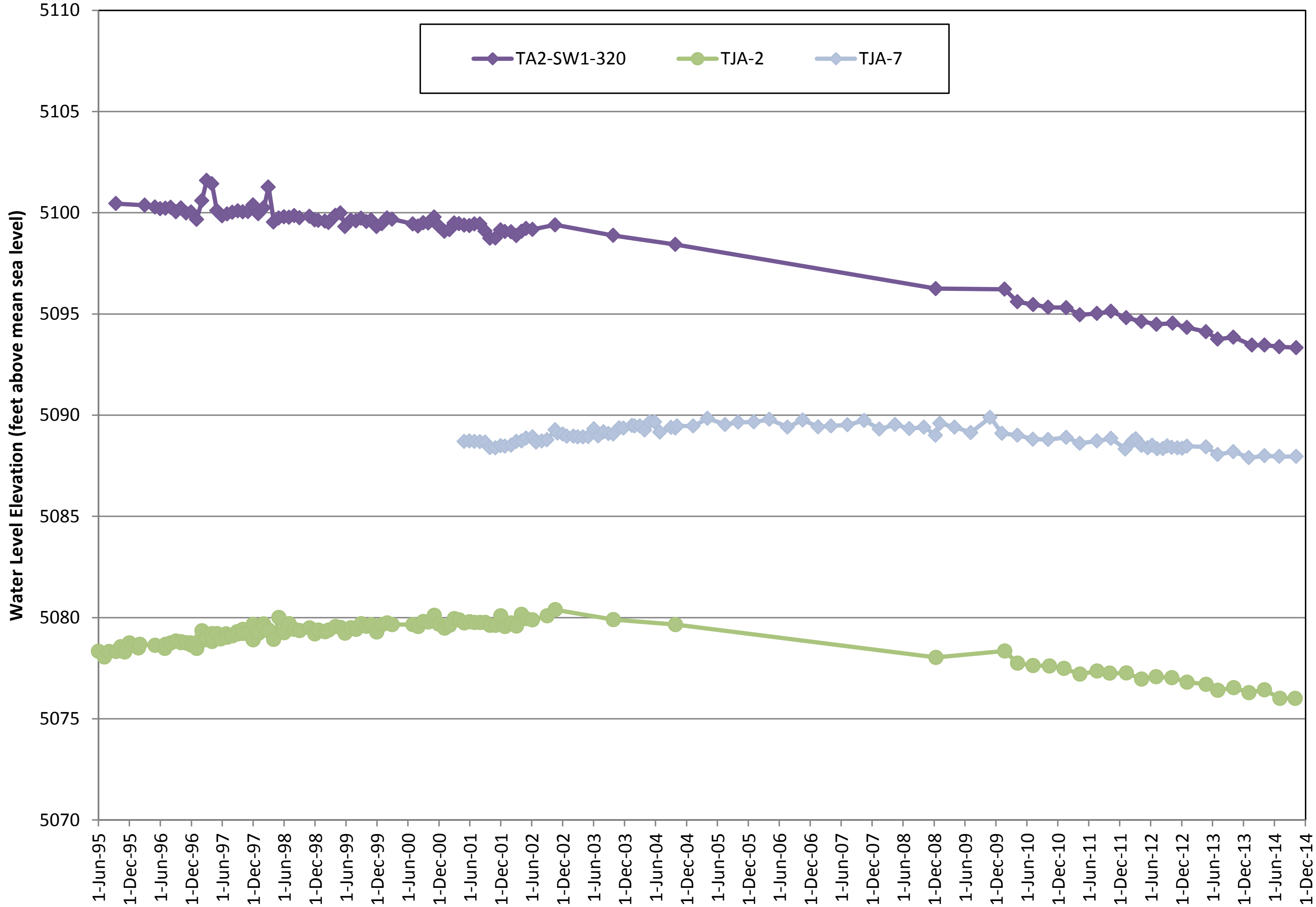

Figure 6C-5. TAG Area of Concern Wells (5 of 7)

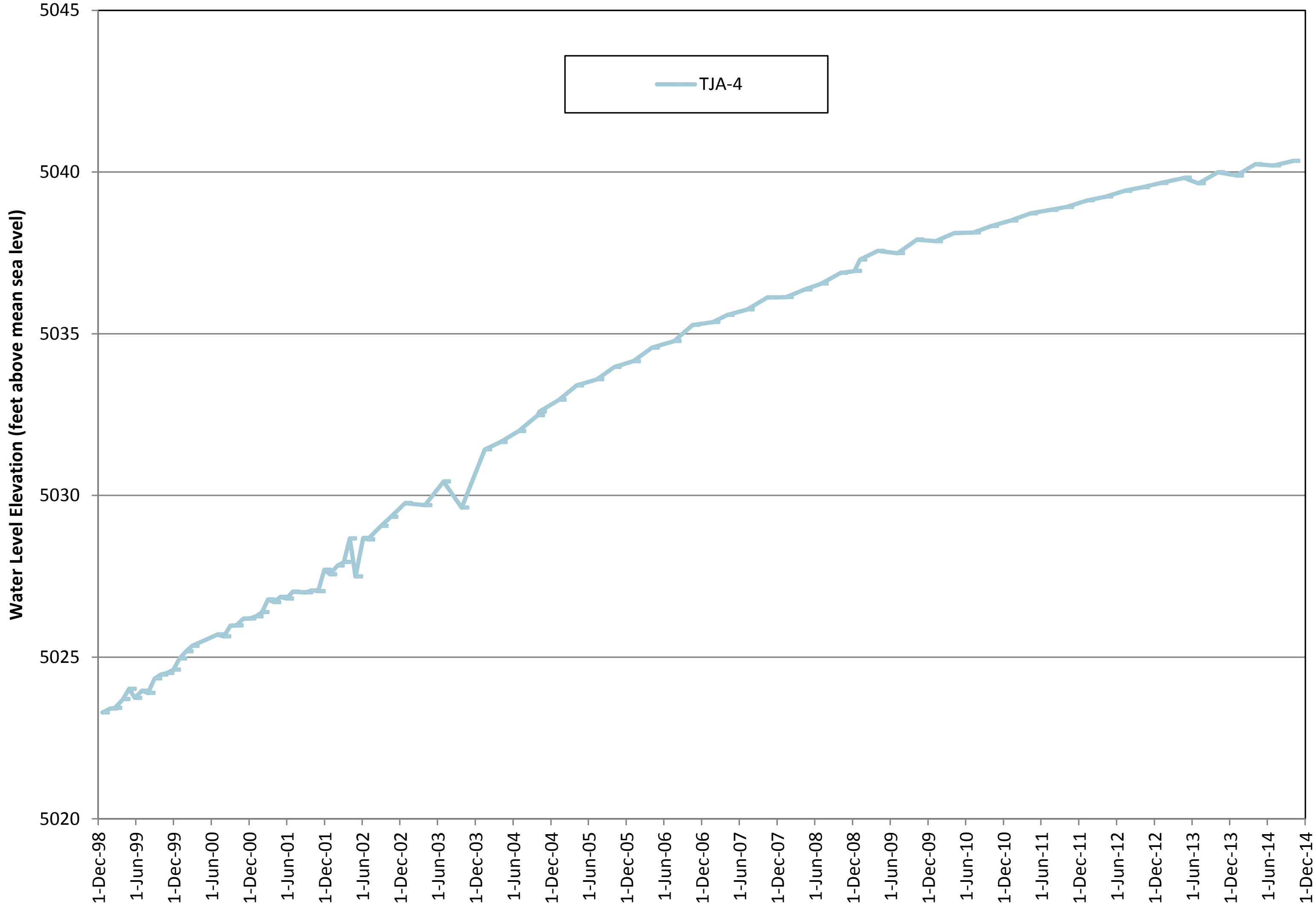

Figure 6C-6. TAG Area of Concern Wells (6 of 7)

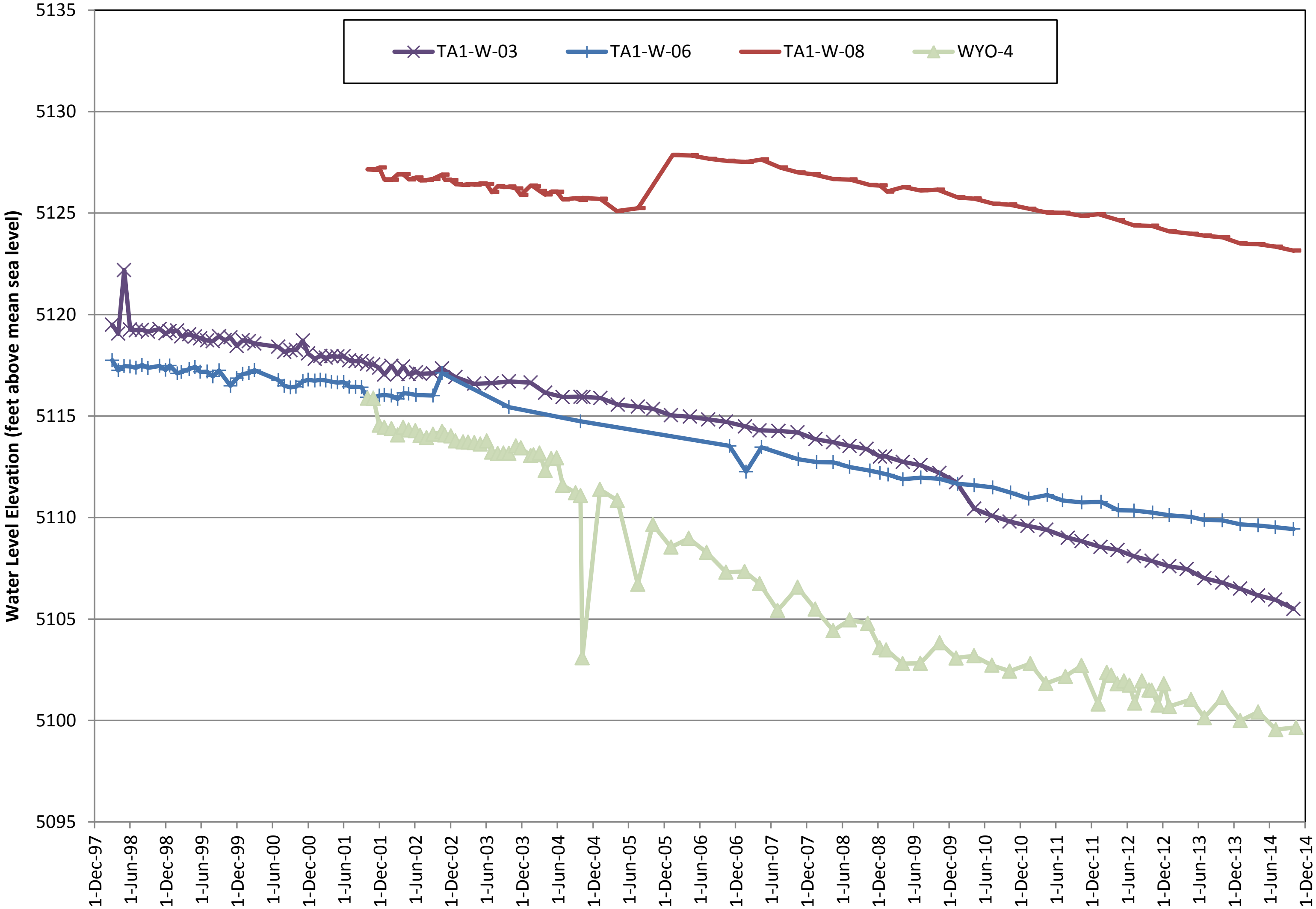

Figure 6C-7. TAG Area of Concern Wells (7 of 7)

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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) (previously Burn Site Groundwater Study Area), 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 at the study area based on detections above the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) in samples collected from monitoring wells. Since August 1998, the maximum concentration of nitrate detected in the study area 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 only one groundwater monitoring 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 (the Consent Order), between the New Mexico Environment Department (NMED), the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia) 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) (NMED April 2004). Furthermore, the Consent Order requires that for detections equal to or greater than 4 μg/L, the DOE, National Nuclear Security Administration (NNSA) and Sandia will evaluate the nature and extent of perchlorate contamination in groundwater. Since 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 at Sandia National Laboratories, New Mexico (SNL/NM) 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. 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

The Lurance Canyon Burn Site (Solid Waste Management Unit [SWMU] 94) and the nearby Lurance Canyon Explosive Test Site (SWMU 65) have been used since 1967. Most research has involved testing the fire survivability of transportation containers, weapon components, simulated weapons, and satellite components. Historical operations (Table 7-1) also include open detonation of high explosive (HE) compounds and 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.

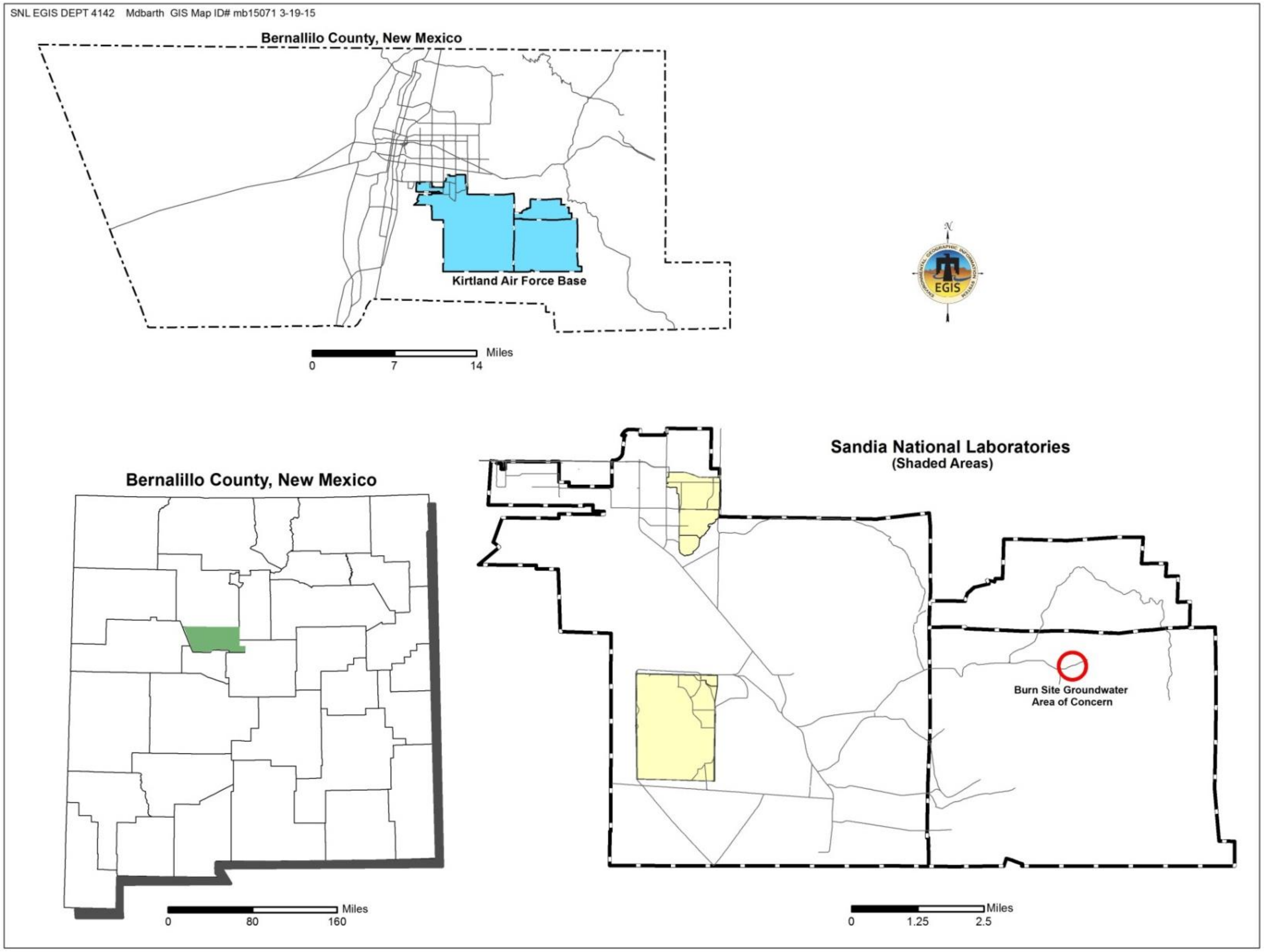

Figure 7-1. Location of the Burn Site Groundwater Area of Concern

Table 7-1. 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 7-5.

Table 7-1. 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
September	2010	Initial sampling at groundwater monitoring wells CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12.	SNL August 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 Corrective Measures Evaluation 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 7-5.

Table 7-1. 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 2013a
August	2013	DOE/NNSA submitted an Extension Request to the NMED for the Burn Site Groundwater Corrective Measures Evaluation 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
June	2014	Approval for installation of groundwater monitoring wells CYN-MW14A and CYN-MW15.	NMED June 2014
December	2014	Installed groundwater monitoring wells CYN-MW14A and CYN-MW15.	In progress

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.

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. By 1975, portable steel burn pans were used for open burning, mostly using jet propellant, fuel grade 4 (JP-4). Several engineered structures, such as the Light Air Transport Accident Resistant Container Unit, were used at the Burn Site. The structures mostly used JP-4 and occasionally used diesel fuel and gasoline to create the high temperatures associated with transportation accidents. In the mid-1990s, jet propellant, fuel grade 8 (JP-8) replaced JP-4 as the petroleum fuel used for burn tests. Most test structures have been dismantled. The only remaining structure is the Smoke Emissions Reduction Facility. Portable burn pans 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 (24.3 mg/L in November 1996). In 1997, the NMED, DOE, and Sandia 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 7-2). 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 (discussed further in Section 7.2), monitoring wells CYN-MW6, CYN-MW7, and CYN-MW8 were installed in 2006.

Table 7-2. 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
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.

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. Most recently, sampling at monitoring well CYN-MW5 has been incorporated into the SNL/NM Long-Term Stewardship groundwater sampling program in response to NMED requirements (NMED April 2010). Results for recent sampling of monitoring well CYN-MW5 are presented in Chapter 9.0 of this Annual Groundwater Monitoring Report.

Since the initial discovery of nitrate at the BSG AOC, numerous characterization activities have been conducted (Table 7-1). 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 (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 between the DOE, Sandia, and the NMED, and the Consent Order specifies the Burn Site as an area of groundwater contamination (NMED April 2004). In response to the Consent Order, DOE/NNSA and Sandia submitted the Corrective Measures Evaluation (CME) Work Plan for the BSG AOC to the NMED in June 2004 (SNL June 2004b). Based on requirements stipulated by the NMED (discussed in Section 7.2), DOE/NNSA and Sandia submitted the BSG Interim Measures Work Plan (IMWP) (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 at locations shown on Figure 7-2. 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) downgradient of CYN-MW1D were analyzed for nitrate.

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 (SNL May 2005).

Based on a letter received from the NMED (April 2009), DOE/NNSA and Sandia are required to further characterize the nature and extent of the perchlorate contamination at the BSG AOC. DOE/NNSA and Sandia prepared the BSG Characterization Work Plan (SNL November 2009) that was approved by the NMED (NMED February 2010). In July 2010, DOE/NNSA and Sandia implemented the requirements of the work plan and installed four new groundwater monitoring wells (CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) to determine the extent of groundwater contamination. These four new wells were sampled for the first time in September 2010.

In February 2012, DOE/NNSA and Sandia submitted a work plan to decommission three 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 the 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 (SNL February 2012). 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 Corrective Measures Evaluation Report to March 31, 2013 (DOE August 2013).

In October 2013, DOE Office of Environmental Management submitted an Internal Remedy Review of the Burn Site Groundwater AOC to the DOE/NNSA Sandia Field Office (DOE October 2013). This review stated that more characterization activities were required at the BSG AOC before a Corrective Measures Evaluation could be implemented.

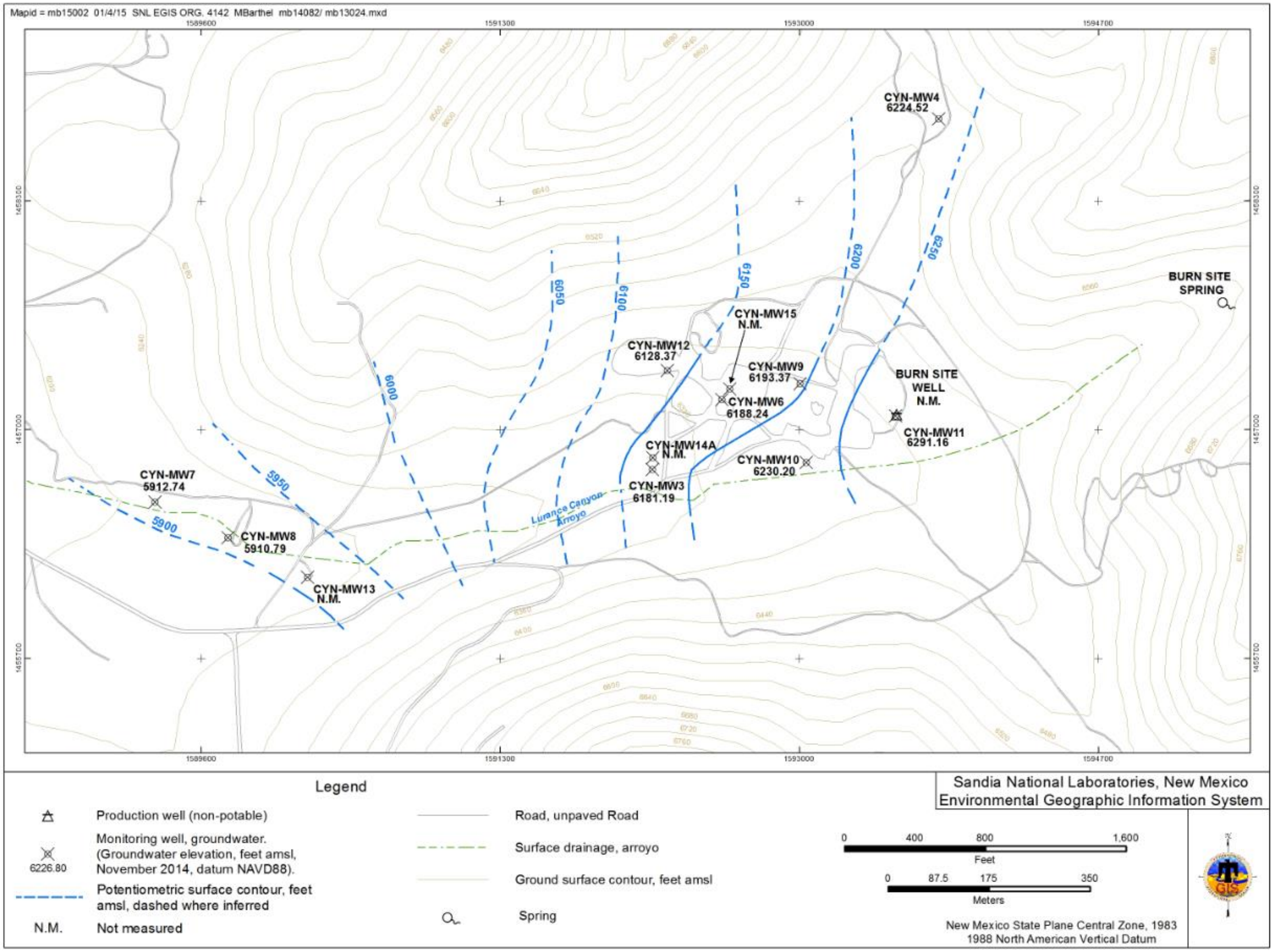

Figure 7-2. Burn Site Groundwater Area of Concern Potentiometric Surface Map (November 2014)

In September 2013, DOE/NNSA and Sandia submitted a work plan for the installation of two groundwater monitoring wells (SNL September 2013b) and in June 2014, the work plan was approved by NMED (NMED June 2014). 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. 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. Details for the two well installations are being prepared and will be submitted to the NMED under separate cover.

7.1.4 Current Monitoring Network

Currently 12 monitoring wells in the BSG AOC are in place to monitor for 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). Monitoring well CYN-MW3 was dry and CYN-MW6 did not produce adequate water volume during both CY 2014 sampling events. The two-track access roads near wells at CYN-MW4 and CYN-MW13 were damaged during summer thunderstorms and could not be accessed during the December 2014 sampling event.

7.1.5 Summary of Calendar Year 2014 Activities

The following activities were performed for the BSG AOC during CY 2014:

- Semiannual groundwater sampling was conducted at monitoring wells CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, and CYN-MW13 in June, and at monitoring wells CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW14A, and CYN-MW15 in December 2014. Monitoring wells CYN-MW3 and CYN-MW6 did not have adequate water volumes to sample in June or December. Monitoring wells CYN-MW4 and CYN-MW13 were not sampled in December due to site access issues.

- Initial groundwater monitoring activities were performed at monitoring wells CYN-MW14A and CYN-MW15 during CY 2014. Monitoring well CYN-MW14A was installed near CYN-MW3. Monitoring well CYN-MW15 was installed to replace CYN-MW6.

- Tables of analytical results (Attachment 7A), concentration versus time graphs (Attachment 7B), and hydrographs (Attachment 7C) were prepared in support of this report.

- The Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL September 2013b) for installation of groundwater monitoring wells CYN-MW14A and CYN-MW15 was approved by the NMED (NMED June 2014).

- Groundwater monitoring wells CYN-MW14A and CYN-MW15 were installed in December and a report describing well installation field activities is being prepared for submittal to the NMED.

7.1.6 Summary of Future Activities

The following activities are anticipated for the BSG AOC investigation during CY 2015:

- Semiannual groundwater sampling is planned at the following monitoring wells: CYN-MW3 (if water level recovers), CYN-MW4 (if accessible), CYN-MW6 (if water level recovers), CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13 (if accessible), CYN-MW14A, and CYN-MW15 during the second and fourth quarters of CY 2015.

- Semiannual sampling for perchlorate analyses will be performed at monitoring wells CYN-MW6 (if the groundwater level recovers) and at CYN-MW15. Quarterly sampling for perchlorate analysis will be performed at monitoring well CYN-MW14A during CY 2015.

7.1.7 Conceptual Site Model

Groundwater flow in the BSG AOC is controlled by the local geologic framework and structural features described in the following sections.

7.1.7.1 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* (SNL June 2004a and April 2008a).

Groundwater in the Manzanita Mountains predominantly occurs in fractured metamorphic and intrusive units that consist of metavolcanics, quartzite, metasediments (schists and phyllites), and the Manzanita Granite. Groundwater migrates through bedrock fractures in a generally westward direction. The only perennial spring in the area, the Burn Site Spring, is located upgradient and upslope of the testing facilities at a limestone outcrop. The matrix permeability of the fractured bedrock units is low. Meager amounts of groundwater are 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. 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, 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 (SNL June 2004a). Nearby outcrops indicate that the fault displacement is approximately 160 ft.

The canyon floor at the BSG AOC 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.

7.1.7.2 Hydrogeologic Conditions at the BSG AOC

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 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 (SNL November 2001). 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 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 is in the form of rainfall and minor snowfall. July and August are typically the wettest months; 45 to 62 percent of annual precipitation falls during summer thunderstorms from July to October (National Weather Service 2002). The average annual precipitation in this drainage basin is estimated to range between 12 and 16 inches (SNL April 2008a). Annual potential evapotranspiration in the Albuquerque area greatly exceeds annual 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 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 has been measured in monitoring well 12AUP01 since 2005. No groundwater has been measured in monitoring well CYN-MW2S since installation. 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 uncemented fractures in the underlying bedrock.

7.1.7.3 Local Direction of Flow

Figure 7-2 presents the November 2014 potentiometric surface for the BSG monitoring well network. 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 nonpotable 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 regional water supply well pumping from the basin fill deposits of the Albuquerque Basin, which are located to the west of the Tijeras Fault Zone.

The apparent horizontal groundwater gradient based on BSG monitoring wells and springs varies from approximately 0.08 to 0.18 feet per foot (ft/ft) The potentiometric surface shown on Figure 7-2 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 Study Area flattens substantially (Plate 1).

The range 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 is estimated to be approximately 160 feet per year (SNL April 2008a). 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.

Water levels have been routinely monitored in BSG monitoring wells since 1999. Figures 7C-1 through 7C-5 (Attachment 7C) 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 low-permeability fractured groundwater system at the BSG AOC 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 year, apparently in response to a pair of intense thunderstorms in the 2014 monsoon season. Water levels in these three wells rebounded by 10.85 to 25.82 ft between July and November 2014.

7.1.7.4 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 sampling events in the BSG AOC to identify the source of nitrate; however, no conclusive source has been identified. Additional studies are being conducted.

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, 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 products in groundwater was evaluated.

7.1.7.5 Contaminant Distribution and Transport in Groundwater

Nitrate was first detected above the MCL of 10 mg/L in groundwater samples from the Burn Site Well. Since the completion of monitoring wells CYN-MW1D (December 1997), CYN-MW3 (June 1999), CYN-MW6 (February 2006), CYN-MW9 (July 2010), CYN-MW12 (July 2010), and CYN-MW13 (December 2012), nitrate concentrations that exceed the MCL have been consistently detected in samples from these wells. In 2014, there were new maximum values of nitrate in monitoring wells CYN-MW10, CYN-MW11, CYN-MW12, and CYN-MW13 (Table 7-3). The first sampling event for monitoring wells CYN-MW14A and CYN-MW15 also revealed nitrate concentrations above the MCL. Nitrate concentrations in groundwater samples from monitoring wells CYN-MW4, CYN-MW7, and CYN-MW8 have not exceeded the MCL.

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	24.3	0
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	13.6[b]	600 ft west-southwest
CYN-MW11	17.9[b]	10 ft south
CYN-MW12	16.5[b]	1,300 ft west-northwest
CYN-MW13	39.5[b]	3,400 ft south-southwest
CYN-MW14A	14.8[c]	1,400 ft west
CYN-MW15	18.7[c]	1,000 ft west

NOTES:
[a] MCL for NPN is 10 mg/L.
[b] New maximum in 2014.
[c] Initial sampling in December 2014 exceeded MCL.
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 study area, 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 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 Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (NMED 1993).

All corrective action requirements pertaining to the BSG AOC are contained in the Consent Order (NMED April 2004). The groundwater monitoring activities for BSG are not associated with a single SWMU, but are more regional in nature. Before the Consent Order became effective in April 2004, groundwater investigations at the BSG AOC had been conducted voluntarily by SNL/NM ER Operations.

Initially, groundwater monitoring for the BSG was initiated to satisfy the requirements of the SNL/NM Hazardous Solid Waste Amendments (HSWA) permit for characterization of SWMUs. The Consent Order transferred regulatory authority for corrective action requirements from the HSWA module to the Consent Order (NMED April 2004). 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, DOE/NNSA and Sandia submitted two documents to the NMED: *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site* (SNL June 2004a), and *Corrective Measures Evaluation Work Plan for Sandia National Laboratories/New Mexico Burn Site* (SNL June 2004b). The current conceptual site model provides site-specific characteristics by which remedial alternatives were evaluated. The CME Work Plan (SNL June 2004b) 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 (NMED April 2004) and with the guidance of the RCRA Corrective Action Plan (EPA 1994).

On March 1, 2005, DOE/NNSA and Sandia received a letter from the NMED that rejected the CME Work Plan and stipulated the following requirements (NMED February 2005):

- DOE/NNSA and Sandia 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* (SNL June 2004b) 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, DOE/NNSA and Sandia submitted an IMWP to the NMED that proposed the installation of additional groundwater monitoring wells to characterize the extent of nitrate contamination in the bedrock aquifer 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 system to trigger an action if a danger 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 (SNL May 2005) 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 remedial alternatives with the purpose of identifying data gaps (SNL May 2005). One of the data gaps identified included determining background nitrate concentrations 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 simplified 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 (SNL May 2005) were incorporated into an updated version of the conceptual site model (SNL April 2008a). The updated conceptual site model 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 (SNL April 2008b) was developed to address the concerns outlined in the letter from the NMED (February 2005) and to comply with requirements of the Consent Order (NMED April 2004). The CME Work Plan (SNL April 2008b) provides information and data gathered during interim measures, and performance and compliance goals and objectives for the remediation of the BSG.

On April 30, 2009, DOE/NNSA and Sandia received a letter was 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 Sandia 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 Sandia 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 (SNL November 2009), which included such items as number and locations of wells and boreholes.

In February 2010, DOE/NNSA and Sandia received notice of conditional approval for the November 2009 BSG Characterization Work Plan (NMED February 2010). In July 2010, DOE/NNSA and Sandia implemented the requirements of the work plan and completed subsurface soil sampling at 10 deep soil boring locations to determine contaminant sources, and installed four groundwater monitoring wells to determine the extent of groundwater contamination. Based on an outstanding schedule commitment, DOE/NNSA and Sandia submitted an extension request for the BSG CME Report in September 2010 (SNL September 2010), which was approved by the NMED (October 2010) with a revised CME Report submittal date of March 31, 2014.

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 Sandia. 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 (NMED April 2004). 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

The activities for the BSG investigation conducted during this reporting period, including plans and reports, are listed in Section 7.1.5. The field activities completed in the study area during 2014 include groundwater monitoring (Table 7-4) and monitoring well installation. The analytical parameters for each well and each sampling event are listed in Table 7-5.

Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples include duplicate environmental samples, split samples, equipment blank (EB), field blank (FB), and trip blank (TB) samples. Duplicate environmental samples are used to measure the precision of the sampling process. Split samples are used to verify the performance of the analytical laboratory. EB samples are used to verify the effectiveness of sampling equipment decontamination procedures. FB samples provide a check for potential ambient sources of sample contamination during the sampling process and/or sampling error. TB samples are used to determine whether volatile organic compounds (VOCs) contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory.

7.4 Field Methods and Measurements

The monitoring procedures conducted for the BSG groundwater monitoring are described in detail in Section 1.3. The water level information was used to create the potentiometric surface map presented on Figure 7-2 and the hydrographs presented in Figures 7C-1 through 7C-5 (Attachment 7C).

7.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

7.6 Summary of Analytical Results

This section discusses analytical results, exceedances of regulatory standards, and pertinent trends in COC concentrations. The analytical results and field measurements for the CY 2014 BSG sampling events are presented in Tables 7A-1 through 7A-10 (Attachment 7A). Data qualifiers are explained in the footnotes following Table 7A-10.

No VOCs or HE compounds were detected, except for carbon disulfide (Table 7A-1). The VOC carbon disulfide was detected in monitoring well CYN-MW7 at a concentration of 1.74 µg/L. There is not an established MCL for this compound. This is the initial detection of a VOC in CYN-MW7; no other VOCs were detected. The MDLs for all analyzed VOCs are listed in Table 7A-2, and the MDLs for all analyzed HE compounds are listed in Table 7A-3.

Table 7-4. Groundwater Monitoring Well Network and Sampling Dates for the Burn Site Groundwater Area of Concern, Calendar Year 2014

Date of Sampling Event	Wells Sampled		SAP
June 2014	CYN-MW4 CYN-MW7 CYN-MW8 CYN-MW9	CYN-MW10 CYN-MW11 CYN-MW12 CYN-MW13	*Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter Fiscal Year 20143* (SNL May 2014)
December 2014	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 2015* (SNL November 2014)

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 2014

Parameter	June 2014	
Anions Gamma Spectroscopy[a] Gross Alpha Gross Beta Isotopic Uranium NPN TAL Metals, plus Total Uranium DRO GRO Tritium VOCs HE compounds	CYN-MW4 CYN-MW7 CYN-MW8 CYN-MW8 (dup) CYN-MW9 CYN-MW10	CYN-MW11 CYN-MW-12 CYN-MW12 (dup) CYN-MW13
Parameter	**December 2014**	
NPN DRO GRO Perchlorate[b]	CYN-MW7 CYN-MW8 CYN-MW9 CYN-MW9 (dup)	CYN-MW10 CYN-MW10 (dup) CYN-MW11 CYN-MW12 CYN-MW14A CYN-MW-15

NOTES:
[a] Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
[b] Perchlorate analysis performed on samples from monitoring wells CYN-MW14A and CYN-MW15 only.
CYN = Canyons.
DRO = Diesel range organics.
Dup = Duplicate sample.
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.

The analytical results for nitrate plus nitrite (NPN) (reported as nitrogen) are presented in Table 7A-4, and Figure 7-3 presents NPN concentration contours for the BSG AOC. NPN results exceed the MCL of 10 mg/L in samples from monitoring wells CYN-MW9, CYN-MW9 duplicate, CYN-MW10, CYN-MW10 duplicate, CYN-MW11, CYN-MW12, CYN-MW12 duplicate, CYN-MW13, CYN-MW14A, and CYN-MW15. NPN concentrations in samples from the other BSG wells are less than the MCL (Table 7A-4). For CY 2014, the NPN concentrations for wells exceeding the MCL are summarized as follows:

- Monitoring well CYN-MW6 has been replaced by CYN-MW15 (installed in December 2014). CYN-MW15 had a reported concentration of 18.7 mg/L for the initial sampling in December 2014. All NPN concentrations for monitoring well CYN-MW6 and the replacement monitoring well CYN-MW15 are displayed in Figure 7B-1.

- Monitoring well CYN-MW9 had reported concentrations of 41.7 mg/L (June 2014) and 39.9 mg/L (December 2014), and 40.6 mg/L (December 2014, duplicate). The historical range of NPN concentrations for monitoring well CYN-MW9 is approximately 29 to 42 mg/L with an upward trend in the past few years (Figure 7B-2).

- Monitoring well CYN-MW10 had reported concentrations of 14.0 mg/L (December 2014), 10.7 mg/L (December 2014, duplicate), and 13.6 mg/L (December 2014, reanalysis). The historical range of NPN concentrations for monitoring well CYN-MW10 is approximately 4 to 11 mg/L with a slightly decreasing trend, with the exception of the December 2014 results (Figure 7B-3).

- Monitoring well CYN-MW11 had reported concentrations 17.8 mg/L (December 2014), and 17.9 mg/L (December 2014, reanalysis). The historical range of NPN concentrations for monitoring well CYN-MW11 is approximately 9 to 12 mg/L with a consistent trend, with the exception of the December 2014 result (Figure 7B-4).

- Monitoring well CYN-MW12 had reported concentrations of 16.5 mg/L (June 2014), 15.2 mg/L (June 2014, duplicate) and 14.7 mg/L (December 2014). All NPN concentrations for monitoring well CYN-MW12 are displayed in Figure 7B-5.

- Monitoring well CYN-MW13 had a reported concentration of 39.5 mg/L (June 2014), and was not sampled in December 2014. All NPN concentrations for monitoring well CYN-MW13 are displayed in Figure 7B-6.

- Monitoring well CYN-MW14A (installed in December 2014) had a reported concentration of 14.8 mg/L for the initial sampling.

The results for DRO and GRO are listed in Table 7A-5. No MCLs have been established for DRO or GRO. No detections of GRO were reported for any of the samples collected during the CY 2014 sampling events. Several detections of DRO were reported in samples collected in December 2014 from monitoring wells CYN-MW7, CYN-MW9, and CYN-MW9 duplicate at concentrations ranging from 81.5 to 101 µg/L. However, these DRO results were qualified with “UJ” in the data validation process (Table 7A-5). DRO was detected in samples collected in December 2014 from monitoring wells CYN-MW14A at 69.6 µg/L and in CYN-MW15 at 74.7 µg/L.

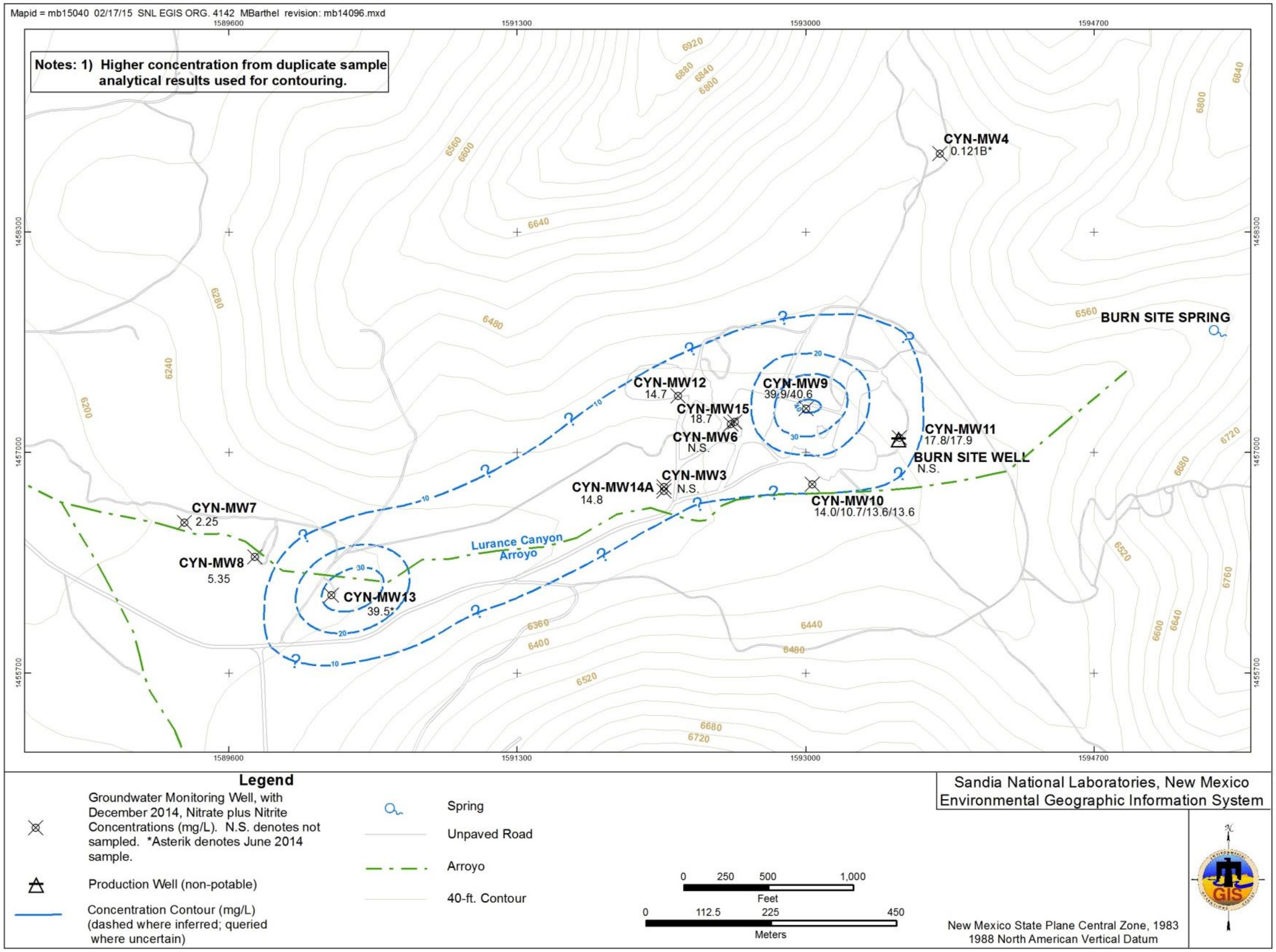

Figure 7-3. Nitrate plus Nitrite Concentration Contour Map for the Burn Site Groundwater Area of Concern

The results for perchlorate are listed in Table 7A-6. No detections of perchlorate were reported for samples collected in December 2014 from CYN-MW14A and CYN-MW15. No MCL has been established for perchlorate.

The analytical results for anions are presented in Table 7A-7. None of the analytes exceed MCLs, where established.

Total metal results are presented in Table 7A-8. No metals exceed established MCLs.

Groundwater samples were analyzed for tritium, gross alpha/beta activity, isotopic uranium, and radionuclides by gamma spectroscopy. The results are presented in Table 7A-9. 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; Parts 9, 141, and 142; and Table I-4 should not include uranium. 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. Americium-241 in CYN-MW11 was qualified as unusable during data validation because the result was negative with an absolute value greater than twice the associated MDA. Radiological results are further reviewed by an SNL/NM Health Physicist to assure that the samples are nonradioactive. Corrected gross alpha activity results are below the MCL of 15 picocuries per liter.

Field water quality parameters are measured during purging of each monitoring well prior to sampling and include temperature, specific conductance, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. The parameter measurements obtained immediately prior to sample collection are presented in Table 7A-10.

7.7 Quality Control Results

Field and laboratory QC samples were collected and prepared as described in Section 1.3. Data validation qualifiers are provided with the analytical results in Attachment 7A. The results of QC samples and the impact on data quality for the BSG quarterly sampling events are discussed in the following sections.

Duplicate environmental sample results from both 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:

- **June 2014 Sampling Events at Monitoring Wells CYN-MW8 and CYN-MW12**—The EB samples were collected prior to sampling these wells and analyzed for all parameters. Arsenic, bromodichloromethane, bromoform, chloroform, chloride, copper, dibromochloromethane, nickel, and NPN were detected above the laboratory MDLs. No corrective action was necessary for bromodichloromethane, bromoform, chloroform, chloride, dibromochloromethane, or NPN, because these analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Both arsenic and nickel reported in CYN-MW8 environmental samples were qualified as not detected during data validation because these metals were reported in the EB sample at concentrations less than five times the concentrations reported in the environmental samples. Copper in both CYN-MW8 and CYN-MW12 samples were qualified as not detected during data validation because copper was reported in the EB samples at concentrations greater than reported environmental samples.

- **December 2014 Sampling Events at Monitoring Wells CYN-MW9 and CYN-MW10**—The EB samples were collected prior to sampling these wells and analyzed for all parameters. No GRO or NPN was detected in EB samples. DRO was qualified as not detected during data validation in both EB samples because DRO was reported in the laboratory method blank sample at a concentration less than five times the associated EB result.

The results of the TB samples are as follows:

- **June 2014 Sampling Event**—A total of 10 VOC and 10 GRO TB samples were submitted during this sampling event. No VOCs or GRO were detected above laboratory MDLs in any TB sample.

- **December 2014 Sampling Event**—A total of 10 GRO TB samples were submitted during this sampling event. No GRO was detected above laboratory MDLs in any TB sample.

The results of the FB samples are as follows:

- **June 2014 Sampling Event at Monitoring Wells CYN-MW10 and CYN-MW13**—The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above associated laboratory MDLs in both VOC FB samples. No corrective action was required, because these compounds were not detected in associated environmental samples. GRO was not detected in any FB sample.

- **December 2014 Sampling Event at Monitoring Wells CYN-MW7 and CYN-MW11**—GRO was not detected in any FB sample.

7.8 Variances and Nonconformances

There was one variance from field or sampling requirements specified in the BSG Monitoring Mini-Sampling and Analysis Plans (SNL May 2014 and November 2014) that occurred during sampling activities. The following project-specific issues associated with the CY 2014 sampling events for BSG occurred:

- **June 2014 Sampling Event** (1) Monitoring well CYN-MW6 was not sampled due to insufficient groundwater volume. The water level declined below the well screen.

- **December 2014 Sampling Event** (1) No groundwater samples were collected from monitoring wells CYN-MW3 and CYN-MW6 due to a similar lack of water. (2) Monitoring wells CYN-MW4 and CYN-MW13 were not sampled due to site access issues. (3) Sandia requested NPN reanalysis from CYN-MW10 and CYN-MW11 samples because results are higher than historical values.

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 2015 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 June and December

2014. The samples were analyzed for VOCs, HE compounds, DRO, GRO, NPN, Target Analyte List metals (plus uranium), anions, 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 is 41.7 mg/L in the sample collected from monitoring well CYN-MW9 during the December 2014 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-MW9, CYN-MW10, CYN-MW11, CYN-MW12, and CYN-MW13. The newly installed monitoring wells CYN-MW14A and CYN-MW15 had initial nitrate concentrations that exceeded the MCL.

During CY 2015, semiannual groundwater sampling will continue at the BSG AOC wells during the second and fourth quarters. Water levels will be measured monthly.

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Attachment 7A
Burn Site Groundwater
Analytical Results Tables

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Attachment 7A Tables

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Table 7A-1
Summary of Detected Volatile Organic and High Explosive Compounds (EPA Method[g] SW846-8260B), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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.
CYN-MW7 17-Jun-14	Carbon Disulfide	1.74	1.50	5.00	NE	J		096099-001

Refer to footnotes on page 7A-31.

Table 7A-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300	Ethyl benzene	0.300
1,2-Dibromoethane	0.500	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	1.70
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50	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 7A-31.

Table 7A-3
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0825–0.0889
1,3-Dinitrobenzene	0.0825–0.0889
2,4,6-Trinitrotoluene	0.0825–0.0889
2,4-Dinitrotoluene	0.0825–0.0889
2,6-Dinitrotoluene	0.0825–0.0889
2-Amino-4,6-dinitrotoluene	0.0825–0.0889
2-Nitrotoluene	0.0845–0.0911
3-Nitrotoluene	0.0825–0.0889
4-Amino-2,6-dinitrotoluene	0.0825–0.0889
4-Nitrotoluene	0.155–0.167
HMX	0.0825–0.0889
Nitro-benzene	0.0825–0.0889
Pentaerythritol tetranitrate	0.103–0.111
RDX	0.0825–0.0889
Tetryl	0.0825–0.0889

Refer to footnotes on page 7A-31.

Table 7A-4
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 16-Jun-14	Nitrate plus nitrite	0.121	0.017	0.050	10.0	B	0.14U	096097-018	EPA 353.2
CYN-MW7 17-Jun-14	Nitrate plus nitrite	1.83	0.170	0.500	10.0	B		096099-018	EPA 353.2
CYN-MW8 18-Jun-14	Nitrate plus nitrite	4.21	0.170	0.500	10.0	B		096103-018	EPA 353.2
CYN-MW8 (Duplicate) 18-Jun-14	Nitrate plus nitrite	4.20	0.170	0.500	10.0	B		096104-018	EPA 353.2
CYN-MW9 26-Jun-14	Nitrate plus nitrite	**41.7**	0.850	2.50	10.0			096120-018	EPA 353.2
CYN-MW10 20-Jun-14	Nitrate plus nitrite	4.19	0.170	0.500	10.0	B		096106-018	EPA 353.2
CYN-MW11 23-Jun-14	Nitrate plus nitrite	9.05	0.170	0.500	10.0	B		096109-018	EPA 353.2
CYN-MW12 24-Jun-14	Nitrate plus nitrite	**16.5**	0.425	1.25	10.0			096114-018	EPA 353.2
CYN-MW12 (Duplicate) 24-Jun-14	Nitrate plus nitrite	**15.2**	0.425	1.25	10.0			096115-018	EPA 353.2
CYN-MW13 25-Jun-14	Nitrate plus nitrite	**39.5**	0.850	2.50	10.0			096117-018	EPA 353.2
CYN-MW7 04-Dec-14	Nitrate plus nitrite	2.25	0.085	0.250	10.0			096958-018	EPA 353.2
CYN-MW8 15-Dec-14	Nitrate plus nitrite	5.35	0.425	1.25	10.0			096965-018	EPA 353.2
CYN-MW9 05-Dec-14	Nitrate plus nitrite	**39.9**	0.850	2.50	10.0			096962-018	EPA 353.2
CYN-MW9 (Duplicate) 05-Dec-14	Nitrate plus nitrite	**40.6**	0.850	2.50	10.0			096963-018	EPA 353.2
CYN-MW10 05-Dec-14	Nitrate plus nitrite	**14.0**	0.170	0.500	10.0			096970-018	EPA 353.2
CYN-MW10 (Duplicate) 05-Dec-14	Nitrate plus nitrite	**10.7**	0.850	2.50	10.0			096971-018	EPA 353.2
CYN-MW10 (Reanalysis) 05-Dec-14	Nitrate plus nitrite	**13.6**	0.170	0.500	10.0	H	J	096970-R18	EPA 353.2
CYN-MW10 (Reanalysis Duplicate) 05-Dec-14	Nitrate plus nitrite	**13.6**	0.170	0.500	10.0	H	J	096971-R18	EPA 353.2

Refer to footnotes on page 7A-31.

Table 7A-4 *(Concluded)*
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 04-Dec-14	Nitrate plus nitrite	**17.8**	0.850	2.50	10.0			096955-018	EPA 353.2
CYN-MW11 (Reanalysis) 04-Dec-14	Nitrate plus nitrite	**17.9**	0.850	2.50	10.0	H	J	096955-R18	EPA 353.2
CYN-MW12 15-Dec-14	Nitrate plus nitrite	**14.7**	0.850	2.50	10.0			096973-018	EPA 353.2
CYN-MW14A 17-Dec-14	Nitrate plus nitrite	**14.8**	0.850	2.50	10.0			096977-018	EPA 353.2
CYN-MW15 17-Dec-14	Nitrate plus nitrite	**18.7**	0.850	2.50	10.0			096979-018	EPA 353.2

Refer to footnotes on page 7A-31.

Table 7A-5
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096097-005	SW846 8015D
16-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096097-006	SW846 8015A/B
CYN-MW7	Diesel Range Organics	ND	51.5	206	NE	U		096099-005	SW846 8015D
17-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096099-006	SW846 8015A/B
CYN-MW8	Diesel Range Organics	ND	52.1	208	NE	U		096103-005	SW846 8015D
18-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096103-006	SW846 8015A/B
CYN-MW8 (Duplicate)	Diesel Range Organics	ND	52.1	208	NE	U		096104-005	SW846 8015D
18-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096104-006	SW846 8015A/B
CYN-MW9	Diesel Range Organics	ND	52.6	211	NE	U		096120-005	SW846 8015D
26-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096120-006	SW846 8015A/B
CYN-MW10	Diesel Range Organics	ND	56.2	225	NE	U		096106-005	SW846 8015D
20-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096106-006	SW846 8015A/B
CYN-MW11	Diesel Range Organics	ND	55.6	222	NE	U		096109-005	SW846 8015D
23-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096109-006	SW846 8015A/B
CYN-MW12	Diesel Range Organics	ND	52.6	211	NE	U		096114-005	SW846 8015D
24-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096114-006	SW846 8015A/B
CYN-MW12 (Duplicate)	Diesel Range Organics	ND	52.6	211	NE	U		096115-005	SW846 8015D
24-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096115-006	SW846 8015A/B
CYN-MW13	Diesel Range Organics	ND	52.6	211	NE	U		096117-005	SW846 8015D
25-Jun-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096117-006	SW846 8015A/B
CYN-MW7	Diesel Range Organics	81.5	52.6	211	NE	B, J	211UJ	096958-005	SW846 8015D
04-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096958-006	SW846 8015A/B
CYN-MW8	Diesel Range Organics	ND	50.5	202	NE	U		096965-005	SW846 8015D
15-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096965-006	SW846 8015A/B
CYN-MW9	Diesel Range Organics	87.2	53.2	213	NE	B, J	213UJ	096962-005	SW846 8015D
05-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096962-006	SW846 8015A/B
CYN-MW9 (Duplicate)	Diesel Range Organics	101	52.1	208	NE	B, J	208UJ	096963-005	SW846 8015D
05-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096963-006	SW846 8015A/B
CYN-MW10	Diesel Range Organics	ND	49.5	198	NE	U		096970-005	SW846 8015D
05-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096970-006	SW846 8015A/B
CYN-MW10 (Duplicate)	Diesel Range Organics	ND	50.0	200	NE	U		096971-005	SW846 8015D
05-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096971-006	SW846 8015A/B

Refer to footnotes on page 7A-31.

Table 7A-5 *(Concluded)*
Summary of Diesel Range Organics and Gasoline Range Organics Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW11	Diesel Range Organics	ND	50.0	200	NE	U		096955-005	SW846 8015D
04-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096955-006	SW846 8015A/B
CYN-MW12	Diesel Range Organics	ND	50.5	202	NE	U		096973-005	SW846 8015D
15-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096973-006	SW846 8015A/B
CYN-MW14A	Diesel Range Organics	69.6	50.0	200	NE	J		096977-005	SW846 8015D
17-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096977-006	SW846 8015A/B
CYN-MW15	Diesel Range Organics	74.7	51.0	204	NE	J		096979-005	SW846 8015D
17-Dec-14	Gasoline Range Organics	ND	16.7	50.0	NE	U		096979-006	SW846 8015A/B

Refer to footnotes on page 7A-31.

Table 7A-6
Summary of Perchlorate Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW14A 17-Dec-14	ND	0.004	0.012	NE	U		096977-020	EPA 314.0
CYN-MW15 17-Dec-14	ND	0.004	0.012	NE	U		096979-020	EPA 314.0

Refer to footnotes on page 7A-31.

Table 7A-7
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.381	0.067	0.200	NE			096097-016	SW846 9056
16-Jun-14	Chloride	25.1	0.670	2.00	NE			096097-016	SW846 9056
	Fluoride	0.828	0.033	0.100	4.0			096097-016	SW846 9056
	Sulfate	142	1.33	4.00	NE			096097-016	SW846 9056
CYN-MW7	Bromide	0.591	0.067	0.200	NE			096099-016	SW846 9056
17-Jun-14	Chloride	44.5	0.670	2.00	NE			096099-016	SW846 9056
	Fluoride	1.42	0.033	0.100	4.0			096099-016	SW846 9056
	Sulfate	89.4	1.33	4.00	NE			096099-016	SW846 9056
CYN-MW8	Bromide	0.801	0.067	0.200	NE			096103-016	SW846 9056
18-Jun-14	Chloride	63.1	0.670	2.00	NE			096103-016	SW846 9056
	Fluoride	1.50	0.033	0.100	4.0			096103-016	SW846 9056
	Sulfate	130	1.33	4.00	NE			096103-016	SW846 9056
CYN-MW8 (Duplicate)	Bromide	0.793	0.067	0.200	NE			096104-016	SW846 9056
18-Jun-14	Chloride	67.0	0.670	2.00	NE			096104-016	SW846 9056
	Fluoride	1.51	0.033	0.100	4.0			096104-016	SW846 9056
	Sulfate	139	1.33	4.00	NE			096104-016	SW846 9056
CYN-MW9	Bromide	0.749	0.067	0.200	NE			096120-016	SW846 9056
26-Jun-14	Chloride	53.2	1.34	4.00	NE			096120-016	SW846 9056
	Fluoride	0.646	0.033	0.100	4.0			096120-016	SW846 9056
	Sulfate	145	2.66	8.00	NE			096120-016	SW846 9056
CYN-MW10	Bromide	0.680	0.067	0.200	NE			096106-016	SW846 9056
20-Jun-14	Chloride	45.9	1.34	4.00	NE			096106-016	SW846 9056
	Fluoride	0.645	0.033	0.100	4.0			096106-016	SW846 9056
	Sulfate	168	2.66	8.00	NE			096106-016	SW846 9056
CYN-MW11	Bromide	1.18	0.067	0.200	NE			096109-016	SW846 9056
23-Jun-14	Chloride	81.6	1.34	4.00	NE			096109-016	SW846 9056
	Fluoride	0.742	0.033	0.100	4.0			096109-016	SW846 9056
	Sulfate	180	2.66	8.00	NE			096109-016	SW846 9056
CYN-MW12	Bromide	0.967	0.067	0.200	NE			096114-016	SW846 9056
24-Jun-14	Chloride	86.4	1.34	4.00	NE			096114-016	SW846 9056
	Fluoride	1.14	0.033	0.100	4.0			096114-016	SW846 9056
	Sulfate	217	2.66	8.00	NE			096114-016	SW846 9056

Refer to footnotes on page 7A-31.

Table 7A-7 *(Concluded)*
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 (Duplicate) 24-Jun-14	Bromide	0.916	0.067	0.200	NE			096115-016	SW846 9056
	Chloride	85.8	1.34	4.00	NE			096115-016	SW846 9056
	Fluoride	1.13	0.033	0.100	4.0			096115-016	SW846 9056
	Sulfate	217	2.66	8.00	NE			096115-016	SW846 9056
CYN-MW13 25-Jun-14	Bromide	0.415	0.067	0.200	NE			096117-016	SW846 9056
	Chloride	18.7	0.670	2.00	NE			096117-016	SW846 9056
	Fluoride	1.75	0.033	0.100	4.0			096117-016	SW846 9056
	Sulfate	76.5	1.33	4.00	NE			096117-016	SW846 9056

Refer to footnotes on page 7A-31.

Table 7A-8
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096097-009	SW846 6020
16-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096097-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096097-009	SW846 6020
	Barium	0.0397	0.0006	0.002	2.00			096097-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096097-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096097-009	SW846 6020
	Calcium	65.0	1.20	4.00	NE			096097-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096097-009	SW846 6020
	Cobalt	0.000145	0.0001	0.001	NE	J		096097-009	SW846 6020
	Copper	0.000847	0.00035	0.001	NE	J		096097-009	SW846 6020
	Iron	0.0997	0.033	0.100	NE	J		096097-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096097-009	SW846 6020
	Magnesium	31.1	0.010	0.030	NE			096097-009	SW846 6020
	Manganese	0.00115	0.001	0.005	NE	J		096097-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096097-009	SW846 7470
	Nickel	0.000962	0.0005	0.002	NE	J		096097-009	SW846 6020
	Potassium	6.46	0.080	0.300	NE			096097-009	SW846 6020
	Selenium	0.0136	0.0015	0.005	0.050			096097-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096097-009	SW846 6020
	Sodium	40.2	0.080	0.250	NE			096097-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096097-009	SW846 6020
	Uranium	0.0131	0.000067	0.0002	0.030			096097-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096097-009	SW846 6010
	Zinc	0.00548	0.0035	0.010	NE	J		096097-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0199	0.015	0.050	NE	J		096099-009	SW846 6020
17-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096099-009	SW846 6020
	Arsenic	0.00523	0.0017	0.005	0.010			096099-009	SW846 6020
	Barium	0.101	0.0006	0.002	2.00			096099-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096099-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096099-009	SW846 6020
	Calcium	97.8	1.20	4.00	NE			096099-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096099-009	SW846 6020
	Cobalt	0.000159	0.0001	0.001	NE	J		096099-009	SW846 6020
	Copper	0.00102	0.00035	0.001	NE			096099-009	SW846 6020
	Iron	0.158	0.033	0.100	NE			096099-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096099-009	SW846 6020
	Magnesium	19.8	0.010	0.030	NE			096099-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096099-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096099-009	SW846 7470
	Nickel	0.00159	0.0005	0.002	NE	J		096099-009	SW846 6020
	Potassium	2.44	0.080	0.300	NE			096099-009	SW846 6020
	Selenium	0.0041	0.0015	0.005	0.050	J		096099-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096099-009	SW846 6020
	Sodium	38.8	0.080	0.250	NE			096099-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096099-009	SW846 6020
	Uranium	0.00693	0.000067	0.0002	0.030			096099-009	SW846 6020
	Vanadium	0.00297	0.001	0.005	NE	J		096099-009	SW846 6010
	Zinc	0.0123	0.0035	0.010	NE			096099-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096103-009	SW846 6020
18-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096103-009	SW846 6020
	Arsenic	0.00413	0.0017	0.005	0.010	J	0.012U	096103-009	SW846 6020
	Barium	0.0541	0.0006	0.002	2.00			096103-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096103-009	SW846 6020
	Cadmium	0.000273	0.00011	0.001	0.005	J		096103-009	SW846 6020
	Calcium	111	1.20	4.00	NE			096103-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096103-009	SW846 6020
	Cobalt	0.000465	0.0001	0.001	NE	J		096103-009	SW846 6020
	Copper	0.001	0.00035	0.001	NE		0.028UJ	096103-009	SW846 6020
	Iron	0.155	0.033	0.100	NE			096103-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096103-009	SW846 6020
	Magnesium	22.9	0.010	0.030	NE			096103-009	SW846 6020
	Manganese	0.00336	0.001	0.005	NE	J	J+	096103-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096103-009	SW846 7470
	Nickel	0.0017	0.0005	0.002	NE	J	0.016UJ	096103-009	SW846 6020
	Potassium	2.31	0.080	0.300	NE			096103-009	SW846 6020
	Selenium	0.0066	0.0015	0.005	0.050			096103-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096103-009	SW846 6020
	Sodium	41.7	0.080	0.250	NE			096103-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096103-009	SW846 6020
	Uranium	0.0082	0.000067	0.0002	0.030			096103-009	SW846 6020
	Vanadium	0.00318	0.001	0.005	NE	J		096103-009	SW846 6010
	Zinc	0.00635	0.0035	0.010	NE	J		096103-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096104-009	SW846 6020
18-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096104-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096104-009	SW846 6020
	Barium	0.0544	0.0006	0.002	2.00			096104-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096104-009	SW846 6020
	Cadmium	0.000328	0.00011	0.001	0.005	J		096104-009	SW846 6020
	Calcium	106	1.20	4.00	NE			096104-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096104-009	SW846 6020
	Cobalt	0.000469	0.0001	0.001	NE	J		096104-009	SW846 6020
	Copper	0.00107	0.00035	0.001	NE		0.028UJ	096104-009	SW846 6020
	Iron	0.160	0.033	0.100	NE			096104-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096104-009	SW846 6020
	Magnesium	23.0	0.010	0.030	NE			096104-009	SW846 6020
	Manganese	0.00331	0.001	0.005	NE	J	J+	096104-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096104-009	SW846 7470
	Nickel	0.00184	0.0005	0.002	NE	J	0.016UJ	096104-009	SW846 6020
	Potassium	2.26	0.080	0.300	NE			096104-009	SW846 6020
	Selenium	0.00624	0.0015	0.005	0.050			096104-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096104-009	SW846 6020
	Sodium	42.1	0.080	0.250	NE			096104-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096104-009	SW846 6020
	Uranium	0.008	0.000067	0.0002	0.030			096104-009	SW846 6020
	Vanadium	0.00358	0.001	0.005	NE	J		096104-009	SW846 6010
	Zinc	0.00636	0.0035	0.010	NE	J		096104-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.018	0.015	0.050	NE	J		096120-009	SW846 6020
26-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096120-009	SW846 6020
	Arsenic	0.00304	0.0017	0.005	0.010	B, J	0.015U	096120-009	SW846 6020
	Barium	0.0607	0.0006	0.002	2.00			096120-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096120-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096120-009	SW846 6020
	Calcium	148	1.20	4.00	NE	B		096120-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096120-009	SW846 6020
	Cobalt	0.000327	0.0001	0.001	NE	J		096120-009	SW846 6020
	Copper	0.00141	0.00035	0.001	NE		J-	096120-009	SW846 6020
	Iron	0.215	0.033	0.100	NE			096120-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096120-009	SW846 6020
	Magnesium	40.1	0.010	0.030	NE			096120-009	SW846 6020
	Manganese	0.00118	0.001	0.005	NE	J	J+	096120-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096120-009	SW846 7470
	Nickel	0.00223	0.0005	0.002	NE		J-	096120-009	SW846 6020
	Potassium	2.52	0.080	0.300	NE			096120-009	SW846 6020
	Selenium	0.00747	0.0015	0.005	0.050	B	0.009U	096120-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096120-009	SW846 6020
	Sodium	41.9	1.60	5.00	NE			096120-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096120-009	SW846 6020
	Uranium	0.00648	0.000067	0.0002	0.030			096120-009	SW846 6020
	Vanadium	0.00189	0.001	0.005	NE	J		096120-009	SW846 6010
	Zinc	0.00565	0.0035	0.010	NE	J		096120-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096106-009	SW846 6020
20-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096106-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096106-009	SW846 6020
	Barium	0.0484	0.0006	0.002	2.00			096106-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096106-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096106-009	SW846 6020
	Calcium	113	1.20	4.00	NE			096106-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096106-009	SW846 6020
	Cobalt	0.000253	0.0001	0.001	NE	J	J+	096106-009	SW846 6020
	Copper	0.00104	0.00035	0.001	NE		J-	096106-009	SW846 6020
	Iron	0.322	0.033	0.100	NE			096106-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096106-009	SW846 6020
	Magnesium	30.0	0.010	0.030	NE			096106-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096106-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096106-009	SW846 7470
	Nickel	0.00244	0.0005	0.002	NE			096106-009	SW846 6020
	Potassium	1.55	0.080	0.300	NE			096106-009	SW846 6020
	Selenium	0.00676	0.0015	0.005	0.050			096106-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096106-009	SW846 6020
	Sodium	35.8	0.080	0.250	NE			096106-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096106-009	SW846 6020
	Uranium	0.00561	0.000067	0.0002	0.030			096106-009	SW846 6020
	Vanadium	0.0029	0.001	0.005	NE	J		096106-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096106-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096109-009	SW846 6020
23-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096109-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096109-009	SW846 6020
	Barium	0.0652	0.0006	0.002	2.00			096109-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096109-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096109-009	SW846 6020
	Calcium	129	0.600	2.00	NE			096109-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096109-009	SW846 6020
	Cobalt	0.000432	0.0001	0.001	NE	J		096109-009	SW846 6020
	Copper	0.00112	0.00035	0.001	NE		J-	096109-009	SW846 6020
	Iron	0.387	0.033	0.100	NE			096109-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096109-009	SW846 6020
	Magnesium	35.7	0.010	0.030	NE			096109-009	SW846 6020
	Manganese	0.221	0.001	0.005	NE			096109-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096109-009	SW846 7470
	Nickel	0.00379	0.0005	0.002	NE			096109-009	SW846 6020
	Potassium	3.00	0.080	0.300	NE			096109-009	SW846 6020
	Selenium	0.00514	0.0015	0.005	0.050			096109-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096109-009	SW846 6020
	Sodium	35.6	0.080	0.250	NE			096109-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096109-009	SW846 6020
	Uranium	0.00512	0.000067	0.0002	0.030			096109-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096109-009	SW846 6010
	Zinc	0.0239	0.0035	0.010	NE			096109-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.0178	0.015	0.050	NE	J		096114-009	SW846 6020
24-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096114-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096114-009	SW846 6020
	Barium	0.0346	0.0006	0.002	2.00			096114-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096114-009	SW846 6020
	Cadmium	0.000244	0.00011	0.001	0.005	J		096114-009	SW846 6020
	Calcium	156	1.20	4.00	NE	B		096114-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096114-009	SW846 6020
	Cobalt	0.000478	0.0001	0.001	NE	J		096114-009	SW846 6020
	Copper	0.00146	0.00035	0.001	NE		0.013UJ	096114-009	SW846 6020
	Iron	0.174	0.033	0.100	NE			096114-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096114-009	SW846 6020
	Magnesium	38.7	0.010	0.030	NE			096114-009	SW846 6020
	Manganese	0.0359	0.001	0.005	NE		J+	096114-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096114-009	SW846 7470
	Nickel	0.00216	0.0005	0.002	NE		J-	096114-009	SW846 6020
	Potassium	2.85	0.080	0.300	NE			096114-009	SW846 6020
	Selenium	0.00819	0.0015	0.005	0.050	B	0.009U	096114-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096114-009	SW846 6020
	Sodium	40.1	1.60	5.00	NE			096114-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096114-009	SW846 6020
	Uranium	0.00814	0.000067	0.0002	0.030			096114-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096114-009	SW846 6010
	Zinc	0.0146	0.0035	0.010	NE			096114-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Continued)*
Summary of Total Metal Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096115-009	SW846 6020
24-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096115-009	SW846 6020
	Arsenic	0.00375	0.0017	0.005	0.010	B, J	0.015U	096115-009	SW846 6020
	Barium	0.0353	0.0006	0.002	2.00			096115-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096115-009	SW846 6020
	Cadmium	0.000236	0.00011	0.001	0.005	J		096115-009	SW846 6020
	Calcium	156	1.20	4.00	NE	B		096115-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096115-009	SW846 6020
	Cobalt	0.000538	0.0001	0.001	NE	J		096115-009	SW846 6020
	Copper	0.00151	0.00035	0.001	NE		0.013UJ	096115-009	SW846 6020
	Iron	0.220	0.033	0.100	NE			096115-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096115-009	SW846 6020
	Magnesium	39.7	0.010	0.030	NE			096115-009	SW846 6020
	Manganese	0.0399	0.001	0.005	NE		J+	096115-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096115-009	SW846 7470
	Nickel	0.00243	0.0005	0.002	NE		J-	096115-009	SW846 6020
	Potassium	2.98	0.080	0.300	NE			096115-009	SW846 6020
	Selenium	0.00807	0.0015	0.005	0.050	B	0.009U	096115-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096115-009	SW846 6020
	Sodium	40.6	1.60	5.00	NE			096115-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096115-009	SW846 6020
	Uranium	0.00843	0.000067	0.0002	0.030			096115-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096115-009	SW846 6010
	Zinc	0.0156	0.0035	0.010	NE			096115-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-8 *(Concluded)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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		096117-009	SW846 6020
25-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096117-009	SW846 6020
	Arsenic	0.00173	0.0017	0.005	0.010	B, J	0.015U	096117-009	SW846 6020
	Barium	0.107	0.0006	0.002	2.00			096117-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096117-009	SW846 6020
	Cadmium	0.000193	0.00011	0.001	0.005	J		096117-009	SW846 6020
	Calcium	116	1.20	4.00	NE	B		096117-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096117-009	SW846 6020
	Cobalt	0.000245	0.0001	0.001	NE	J		096117-009	SW846 6020
	Copper	0.000951	0.00035	0.001	NE	J	J-	096117-009	SW846 6020
	Iron	0.170	0.033	0.100	NE			096117-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096117-009	SW846 6020
	Magnesium	21.0	0.010	0.030	NE			096117-009	SW846 6020
	Manganese	0.0256	0.001	0.005	NE		J+	096117-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096117-009	SW846 7470
	Nickel	0.00179	0.0005	0.002	NE	J	J-	096117-009	SW846 6020
	Potassium	2.38	0.080	0.300	NE			096117-009	SW846 6020
	Selenium	0.0034	0.0015	0.005	0.050	B, J	0.009U	096117-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096117-009	SW846 6020
	Sodium	24.4	1.60	5.00	NE			096117-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096117-009	SW846 6020
	Uranium	0.00576	0.000067	0.0002	0.030			096117-009	SW846 6020
	Vanadium	0.00223	0.001	0.005	NE	J		096117-009	SW846 6010
	Zinc	0.0198	0.0035	0.010	NE			096117-009	SW846 6020

Refer to footnotes on page 7A-31.

Table 7A-9
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	1.86 ± 2.92	4.41	2.15	NE	U	BD	096097-033	EPA 901.1
16-Jun-14	Cesium-137	-1.32 ± 2.12	3.38	1.62	NE	U	BD	096097-033	EPA 901.1
	Cobalt-60	-1.95 ± 2.80	3.61	1.70	NE	U	BD	096097-033	EPA 901.1
	Potassium-40	1.33 ± 34.9	48.4	23.1	NE	U	BD	096097-033	EPA 901.1
	Gross Alpha	8.25	NA	NA	15 pCi/L	NA	None	096097-R34	EPA 900.0
	Gross Beta	10.2 ± 2.86	2.12	1.02	4mrem/yr			096097-R34	EPA 900.0
	Uranium-233/234	34.1 ± 4.20	0.0941	0.0421	NE			096097-035	HASL-300
	Uranium-235/236	0.450 ± 0.105	0.0788	0.0333	NE			096097-035	HASL-300
	Uranium-238	4.30 ± 0.577	0.0528	0.0215	NE			096097-035	HASL-300
	Tritium	77.4 ± 74.4	120	53.5	NE	U	BD	096097-036	EPA 906.0 M
CYN-MW7	Americium-241	6.17 ± 11.3	16.6	8.16	NE	U	BD	096099-033	EPA 901.1
17-Jun-14	Cesium-137	-0.326 ± 1.98	3.37	1.62	NE	U	BD	096099-033	EPA 901.1
	Cobalt-60	0.513 ± 1.99	3.57	1.69	NE	U	BD	096099-033	EPA 901.1
	Potassium-40	48.6 ± 45.1	35.2	16.6	NE		J	096099-033	EPA 901.1
	Gross Alpha	3.89	NA	NA	15 pCi/L	NA	None	096099-034	EPA 900.0
	Gross Beta	11.4 ± 2.81	3.18	1.56	4mrem/yr			096099-034	EPA 900.0
	Uranium-233/234	17.0 ± 2.14	0.0722	0.0323	NE			096099-035	HASL-300
	Uranium-235/236	0.293 ± 0.0739	0.0605	0.0256	NE			096099-035	HASL-300
	Uranium-238	2.42 ± 0.339	0.0405	0.0165	NE			096099-035	HASL-300
	Tritium	4.15 ± 66.0	123	55.0	NE	U	BD	096099-036	EPA 906.0 M
CYN-MW8	Americium-241	26.7 ± 24.2	32.9	16.2	NE	U	BD	096103-033	EPA 901.1
18-Jun-14	Cesium-137	0.0932 ± 2.32	3.60	1.74	NE	U	BD	096103-033	EPA 901.1
	Cobalt-60	-2.2 ± 2.92	3.77	1.79	NE	U	BD	096103-033	EPA 901.1
	Potassium-40	1.21 ± 36.1	49.2	23.6	NE	U	BD	096103-033	EPA 901.1
	Gross Alpha	11.69	NA	NA	15 pCi/L	NA	None	096103-R34	EPA 900.0
	Gross Beta	5.68 ± 1.92	2.22	1.07	4mrem/yr		J	096103-R34	EPA 900.0
	Uranium-233/234	23.7 ± 2.94	0.0672	0.0301	NE			096103-035	HASL-300
	Uranium-235/236	0.408 ± 0.0876	0.0563	0.0238	NE			096103-035	HASL-300
	Uranium-238	2.70 ± 0.369	0.0377	0.0153	NE			096103-035	HASL-300
	Tritium	4.33 ± 65.8	122	54.7	NE	U	BD	096103-036	EPA 906.0 M

Refer to footnotes on page 7A-31.

Table 7A-9 *(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 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW8 (Duplicate)	Americium-241	8.72 ± 15.5	24.1	11.8	NE	U	BD	096104-033	EPA 901.1
18-Jun-14	Cesium-137	2.29 ± 3.24	3.54	1.71	NE	U	BD	096104-033	EPA 901.1
	Cobalt-60	-0.109 ± 2.07	3.72	1.77	NE	U	BD	096104-033	EPA 901.1
	Potassium-40	-17.6 ± 41.1	50.0	24.0	NE	U	BD	096104-033	EPA 901.1
	Gross Alpha	9.65	NA	NA	15 pCi/L	NA	None	096104-034	EPA 900.0
	Gross Beta	7.70 ± 2.33	2.96	1.44	4mrem/yr		J	096104-034	EPA 900.0
	Uranium-233/234	24.5 ± 3.06	0.0722	0.0323	NE			096104-035	HASL-300
	Uranium-235/236	0.273 ± 0.0695	0.0606	0.0256	NE			096104-035	HASL-300
	Uranium-238	2.78 ± 0.383	0.0406	0.0165	NE			096104-035	HASL-300
	Tritium	60.7 ± 71.6	119	53.2	NE	U	BD	096104-036	EPA 906.0 M
CYN-MW9	Americium-241	-5.17 ± 8.08	12.0	5.83	NE	U	BD	096120-R33	EPA 901.1
26-Jun-14	Cesium-137	-0.134 ± 4.03	3.86	1.87	NE	U	BD	096120-R33	EPA 901.1
	Cobalt-60	-0.465 ± 1.72	3.01	1.41	NE	U	BD	096120-R33	EPA 901.1
	Potassium-40	-11.4 ± 33.9	40.3	19.2	NE	U	BD	096120-R33	EPA 901.1
	Gross Alpha	0.72	NA	NA	15 pCi/L	NA	None	096120-R34	EPA 900.0
	Gross Beta	6.03 ± 3.27	4.95	2.36	4mrem/yr		J	096120-R34	EPA 900.0
	Uranium-233/234	7.03 ± 0.946	0.0788	0.0344	NE			096120-035	HASL-300
	Uranium-235/236	0.131 ± 0.0521	0.0512	0.0195	NE		J	096120-035	HASL-300
	Uranium-238	1.87 ± 0.287	0.0781	0.0341	NE			096120-035	HASL-300
	Tritium	-3.8 ± 64.2	121	54.3	NE	U	BD	096120-036	EPA 906.0 M
CYN-MW10	Americium-241	3.79 ± 15.3	24.0	11.7	NE	U	BD	096106-033	EPA 901.1
20-Jun-14	Cesium-137	0.484 ± 1.90	3.26	1.56	NE	U	BD	096106-033	EPA 901.1
	Cobalt-60	1.32 ± 2.03	3.58	1.68	NE	U	BD	096106-033	EPA 901.1
	Potassium-40	-30 ± 44.9	44.3	21.0	NE	U	BD	096106-033	EPA 901.1
	Gross Alpha	3.35	NA	NA	15 pCi/L	NA	None	096106-034	EPA 900.0
	Gross Beta	1.64 ± 1.87	3.10	1.51	4mrem/yr	U	BD	096106-034	EPA 900.0
	Uranium-233/234	5.06 ± 0.669	0.075	0.0336	NE			096106-035	HASL-300
	Uranium-235/236	0.136 ± 0.0475	0.0629	0.0266	NE		J	096106-035	HASL-300
	Uranium-238	1.85 ± 0.270	0.0422	0.0171	NE			096106-035	HASL-300
	Tritium	-80.3 ± 101	179	87.0	NE	U	BD	096106-036	EPA 906.0 M

Refer to footnotes on page 7A-31.

Table 7A-9 *(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 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW11	Americium-241	-56 ± 26.4	6.08	2.99	NE	U	R	096109-R33	EPA 901.1
23-Jun-14	Cesium-137	1.31 ± 2.57	4.42	2.13	NE	U	BD	096109-R33	EPA 901.1
	Cobalt-60	0.825 ± 2.66	4.73	2.23	NE	U	BD	096109-R33	EPA 901.1
	Potassium-40	5.60 ± 43.8	38.4	17.9	NE	U	BD	096109-R33	EPA 901.1
	Gross Alpha	1.55	NA	NA	15 pCi/L	NA	None	096109-034	EPA 900.0
	Gross Beta	6.12 ± 2.34	3.33	1.62	4mrem/yr		J	096109-034	EPA 900.0
	Uranium-233/234	5.32 ± 0.697	0.0712	0.0319	NE			096109-035	HASL-300
	Uranium-235/236	0.129 ± 0.0451	0.0597	0.0252	NE		J	096109-035	HASL-300
	Uranium-238	1.73 ± 0.252	0.040	0.0163	NE			096109-035	HASL-300
	Tritium	16.5 ± 66.8	121	54.3	NE	U	BD	096109-036	EPA 906.0 M
CYN-MW12	Americium-241	5.41 ± 15.6	23.5	11.5	NE	U	BD	096114-033	EPA 901.1
24-Jun-14	Cesium-137	-0.249 ± 2.21	3.70	1.78	NE	U	BD	096114-033	EPA 901.1
	Cobalt-60	0.623 ± 2.40	4.23	2.00	NE	U	BD	096114-033	EPA 901.1
	Potassium-40	-19.2 ± 42.7	49.3	23.5	NE	U	BD	096114-033	EPA 901.1
	Gross Alpha	5.90	NA	NA	15 pCi/L	NA	None	096114-034	EPA 900.0
	Gross Beta	-0.695 ± 3.37	5.81	2.84	4mrem/yr	U	BD	096114-034	EPA 900.0
	Uranium-233/234	12.2 ± 1.61	0.108	0.0473	NE			096114-035	HASL-300
	Uranium-235/236	0.124 ± 0.0591	0.0703	0.0267	NE		J	096114-035	HASL-300
	Uranium-238	2.88 ± 0.432	0.107	0.0468	NE			096114-035	HASL-300
	Tritium	-8.26 ± 63.0	120	53.7	NE	U	BD	096114-036	EPA 906.0 M
CYN-MW12 (Duplicate)	Americium-241	3.14 ± 7.62	13.3	6.51	NE	U	BD	096115-033	EPA 901.1
24-Jun-14	Cesium-137	-2.3 ± 3.35	3.90	1.89	NE	U	BD	096115-033	EPA 901.1
	Cobalt-60	-1.45 ± 1.92	3.06	1.44	NE	U	BD	096115-033	EPA 901.1
	Potassium-40	-0.191 ± 34.8	41.7	19.9	NE	U	BD	096115-033	EPA 901.1
	Gross Alpha	0.39	NA	NA	15 pCi/L	NA	None	096115-034	EPA 900.0
	Gross Beta	3.31 ± 2.58	4.16	2.03	4mrem/yr	U	BD	096115-034	EPA 900.0
	Uranium-233/234	12.2 ± 1.63	0.0861	0.0377	NE			096115-035	HASL-300
	Uranium-235/236	0.163 ± 0.061	0.056	0.0213	NE		J	096115-035	HASL-300
	Uranium-238	2.55 ± 0.383	0.0854	0.0373	NE			096115-035	HASL-300
	Tritium	38.9 ± 68.7	119	53.4	NE	U	BD	096115-036	EPA 906.0 M

Refer to footnotes on page 7A-31.

Table 7A-9 *(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 2014

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-MW13	Americium-241	14.6 ± 13.3	17.7	8.70	NE	U	BD	096117-033	EPA 901.1
25-Jun-14	Cesium-137	0.183 ± 2.00	3.45	1.66	NE	U	BD	096117-033	EPA 901.1
	Cobalt-60	2.70 ± 2.61	3.66	1.73	NE	U	BD	096117-033	EPA 901.1
	Potassium-40	-28.3 ± 37.6	48.4	23.2	NE	U	BD	096117-033	EPA 901.1
	Gross Alpha	2.17	NA	NA	15 pCi/L	NA	None	096117-034	EPA 900.0
	Gross Beta	2.06 ± 1.15	1.71	0.819	4mrem/yr		J	096117-034	EPA 900.0
	Uranium-233/234	8.72 ± 1.15	0.0708	0.0309	NE			096117-035	HASL-300
	Uranium-235/236	0.0366 ± 0.0559	0.046	0.0175	NE	U	BD	096117-035	HASL-300
	Uranium-238	1.71 ± 0.268	0.0702	0.0306	NE			096117-035	HASL-300
	Tritium	35.1 ± 69.2	121	54.2	NE	U	BD	096117-036	EPA 906.0 M

Refer to footnotes on page 7A-31.

Table 7A-10
Summary of Field Water Quality Measurements[h],
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CYN-MW4	16-Jun-14	20.08	658.2	295.3	7.43	0.29	46.0	4.16
CYN-MW7	17-Jun-14	20.68	706.1	290.5	7.22	0.71	46.1	4.11
CYN-MW8	18-Jun-14	20.70	803.8	294.5	7.28	0.33	53.7	4.77
CYN-MW9	26-Jun-14	19.68	991.2	193.2	7.13	0.49	51.5	4.79
CYN-MW10	20-Jun-14	17.63	741.2	298.8	7.49	0.22	75.1	7.13
CYN-MW11	23-Jun-14	18.90	907.9	82.5	7.34	0.34	6.8	0.62
CYN-MW12	24-Jun-14	19.63	1001.0	247.4	7.10	0.42	12.8	1.17
CYN-MW13	25-Jun-14	19.01	680.4	270.2	7.29	0.48	27.3	2.51
CYN-MW7	04-Dec-14	17.46	682.7	245.8	7.09	1.56	46.0	4.39
CYN-MW8	15-Dec-14	15.19	743.7	13.9	7.44	0.39	55.1	5.52
CYN-MW9	05-Dec-14	16.01	936.9	254.1	7.03	0.28	62.5	6.14
CYN-MW10	05-Dec-14	14.66	809.3	8.1	7.51	0.22	73.5	7.43
CYN-MW11	04-Dec-14	15.64	961.2	-51.2	7.33	0.41	8.5	0.84
CYN-MW12	15-Dec-14	15.41	940.4	226.8	7.03	0.34	13.1	1.31
CYN-MW14A	17-Dec-14	14.59	904.2	-49.6	7.39	3.95	12.4	1.26
CYN-MW15	17-Dec-14	15.22	1036.5	190.6	7.01	2.86	10.9	1.09

Refer to footnotes on page 7A-31.

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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	= Identification.
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

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 Table 7A-1 through 8. MDA applies to Table 7A-9.

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

[c]PQL or Critical Level

The PQL applies to Table 7A-1 through 8. Critical Level applies to Table 7A-9.

Critical Level = The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.
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 7A-1-4).

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

NE = Not established.

[e]Lab Qualifier

B = The analyte was detected in the blank above the effective method detection limit (MDL).
H = Analytical holding time was exceeded.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
NA = Not applicable.
U = Analyte is absent or below the method detection limit.

Footnotes for Burn Site 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.
J+	=	The associated numerical value is an estimated quantity with a suspected positive bias.
J-	=	The associated numerical value is an estimated quantity with a suspected negative bias.
None	=	No data validation for corrected gross alpha activity.
U	=	The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable, and resampling and reanalysis are necessary for verification.

[g]Analytical Method

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, Environmental Measurements Laboratory, 1990, "EML Procedures Manual," 27th ed., Vol. 1, Rev. 1992, HASL-300.

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

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.

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 7B
Burn Site Groundwater
Plots

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Attachment 7B Plots

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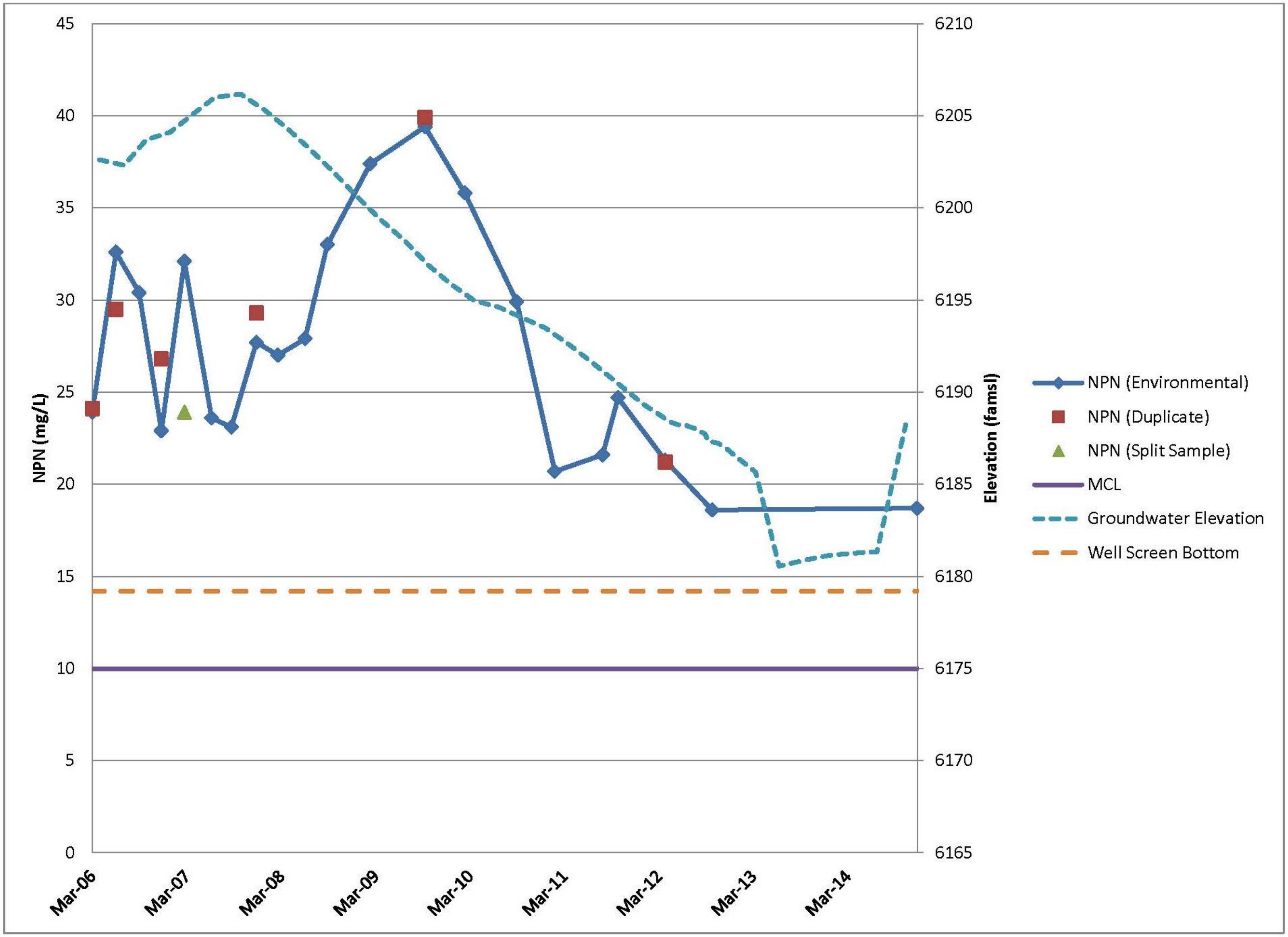

Figure 7B-1. Nitrate plus Nitrite Concentrations, CYN-MW6 and CYN-MW15

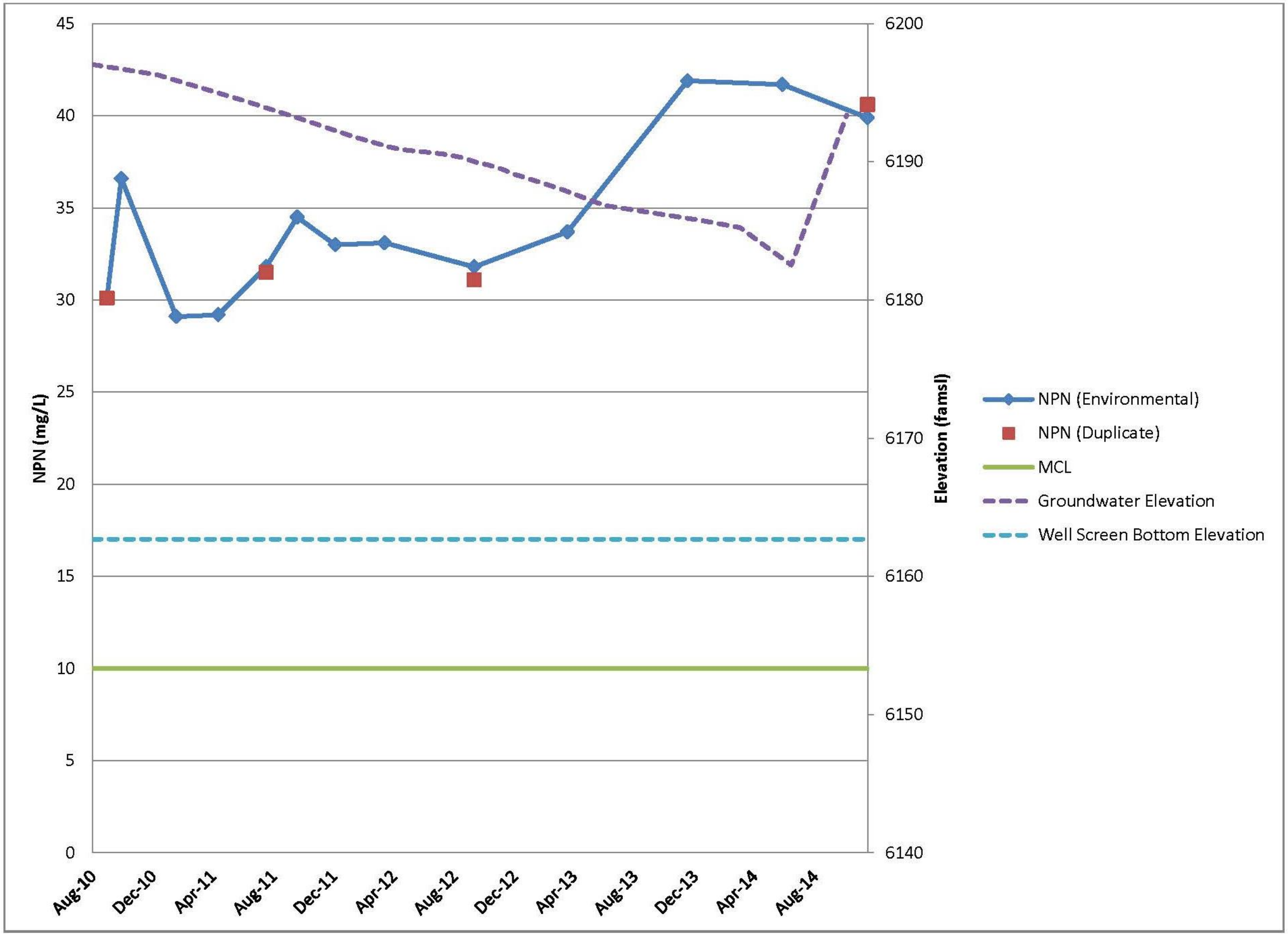

Figure 7B-2. Nitrate plus Nitrite Concentrations, CYN-MW9

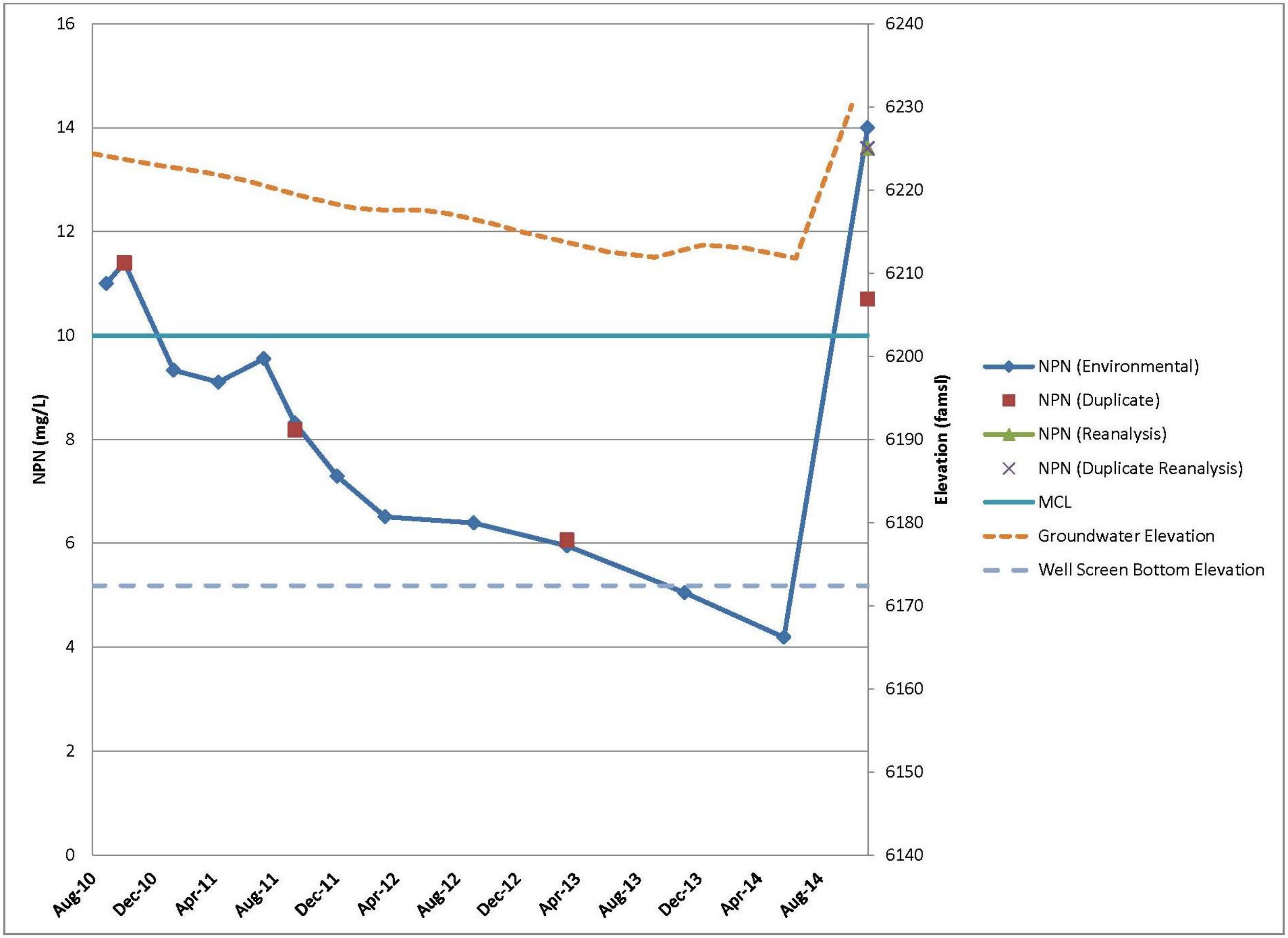

Figure 7B-3. Nitrate plus Nitrite Concentrations, CYN-MW10

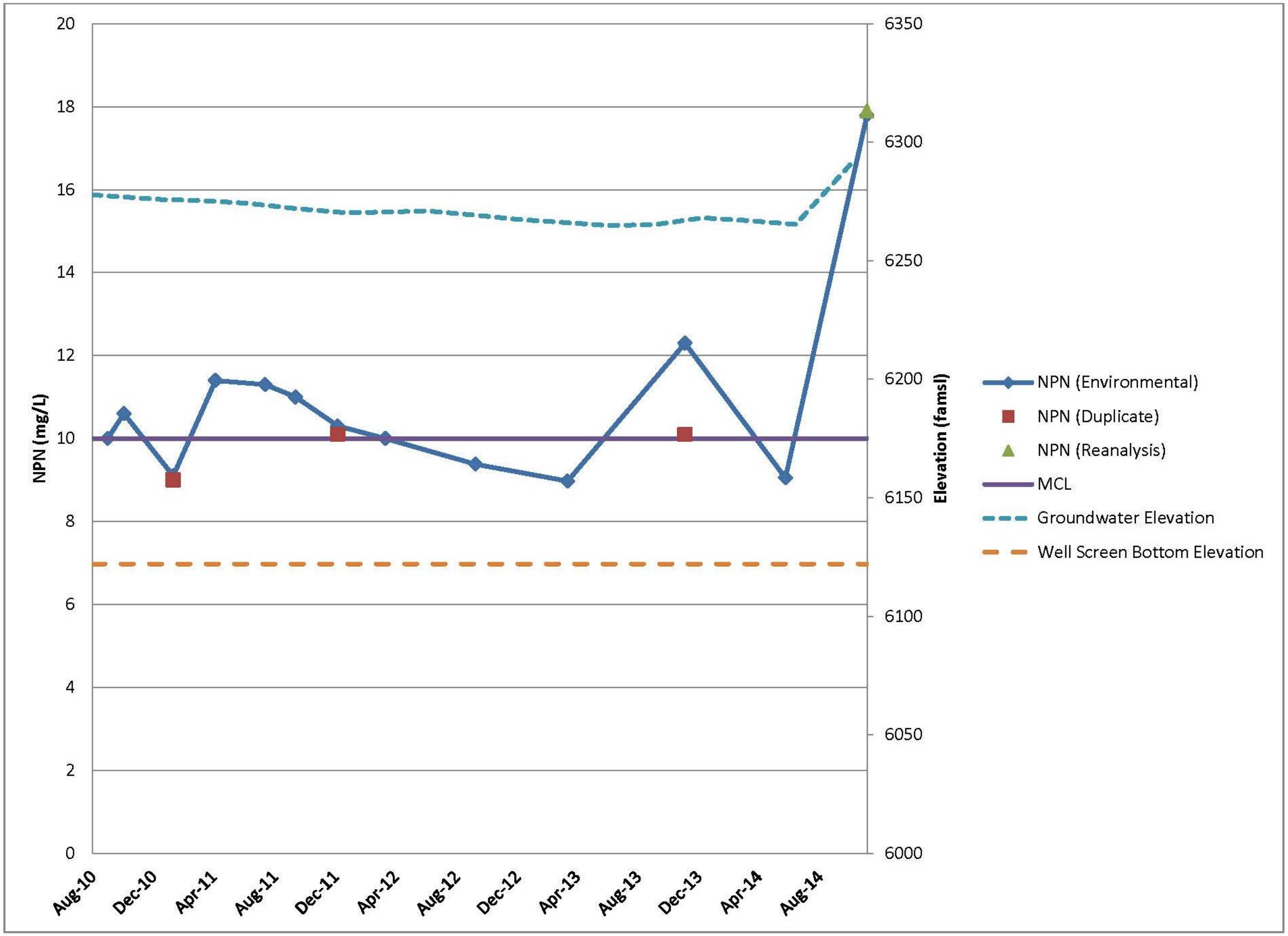

Figure 7B-4. Nitrate plus Nitrite Concentrations, CYN-MW11

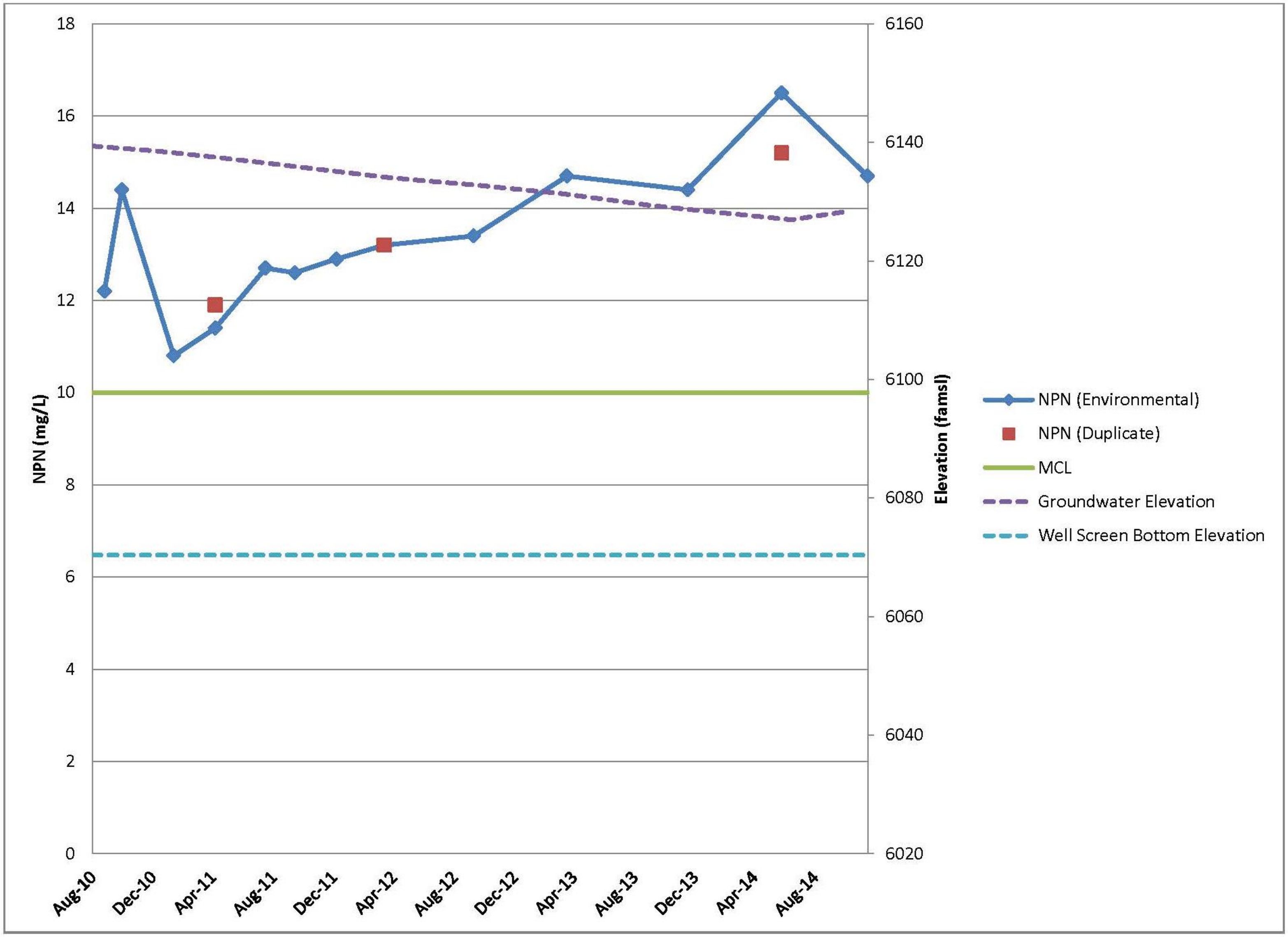

Figure 7B-5. Nitrate plus Nitrite Concentrations, CYN-MW12

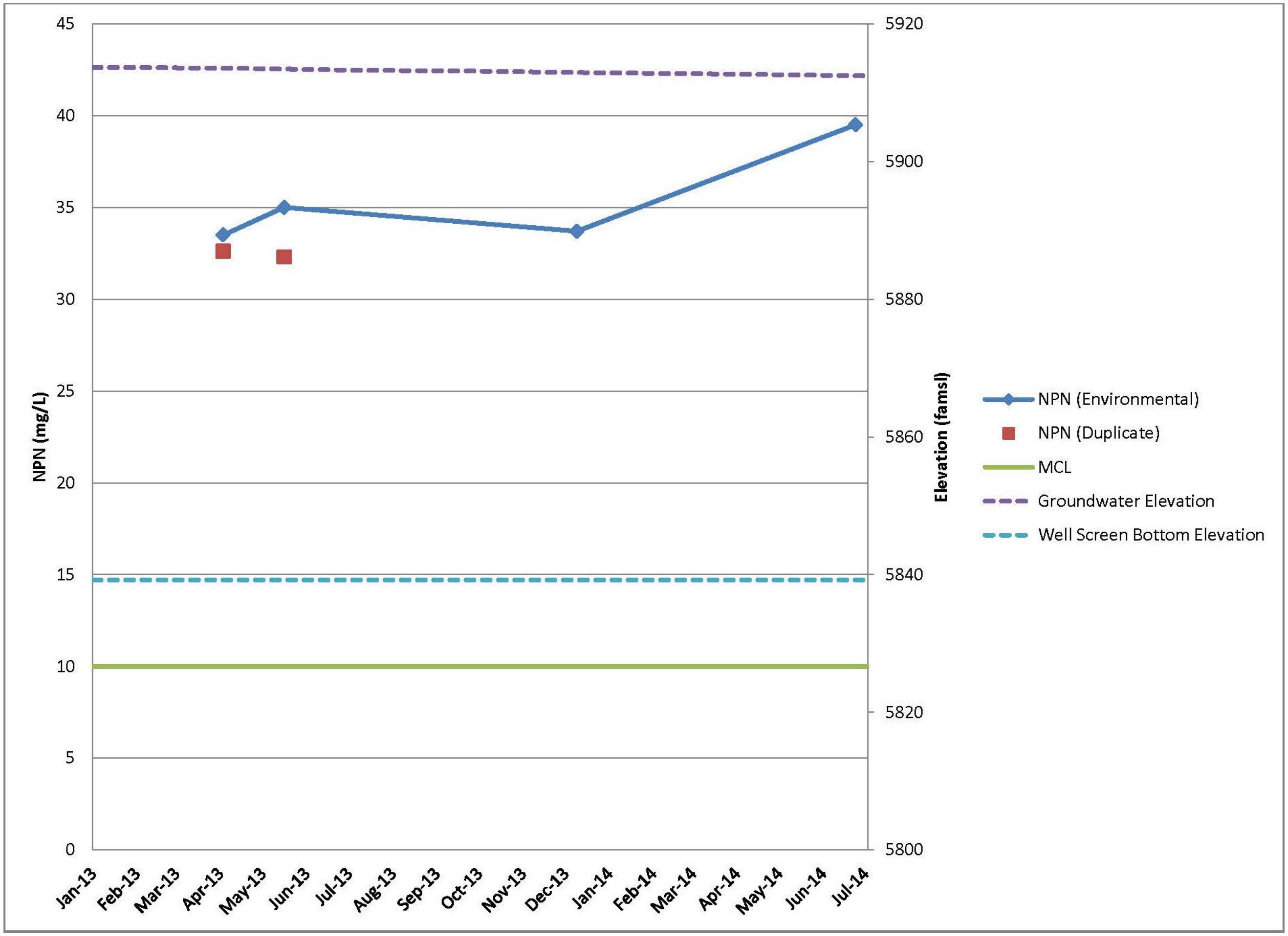

Figure 7B-6. Nitrate plus Nitrite Concentrations, CYN-MW13

Attachment 7C
Burn Site Groundwater
Hydrographs

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Attachment 7C Hydrographs

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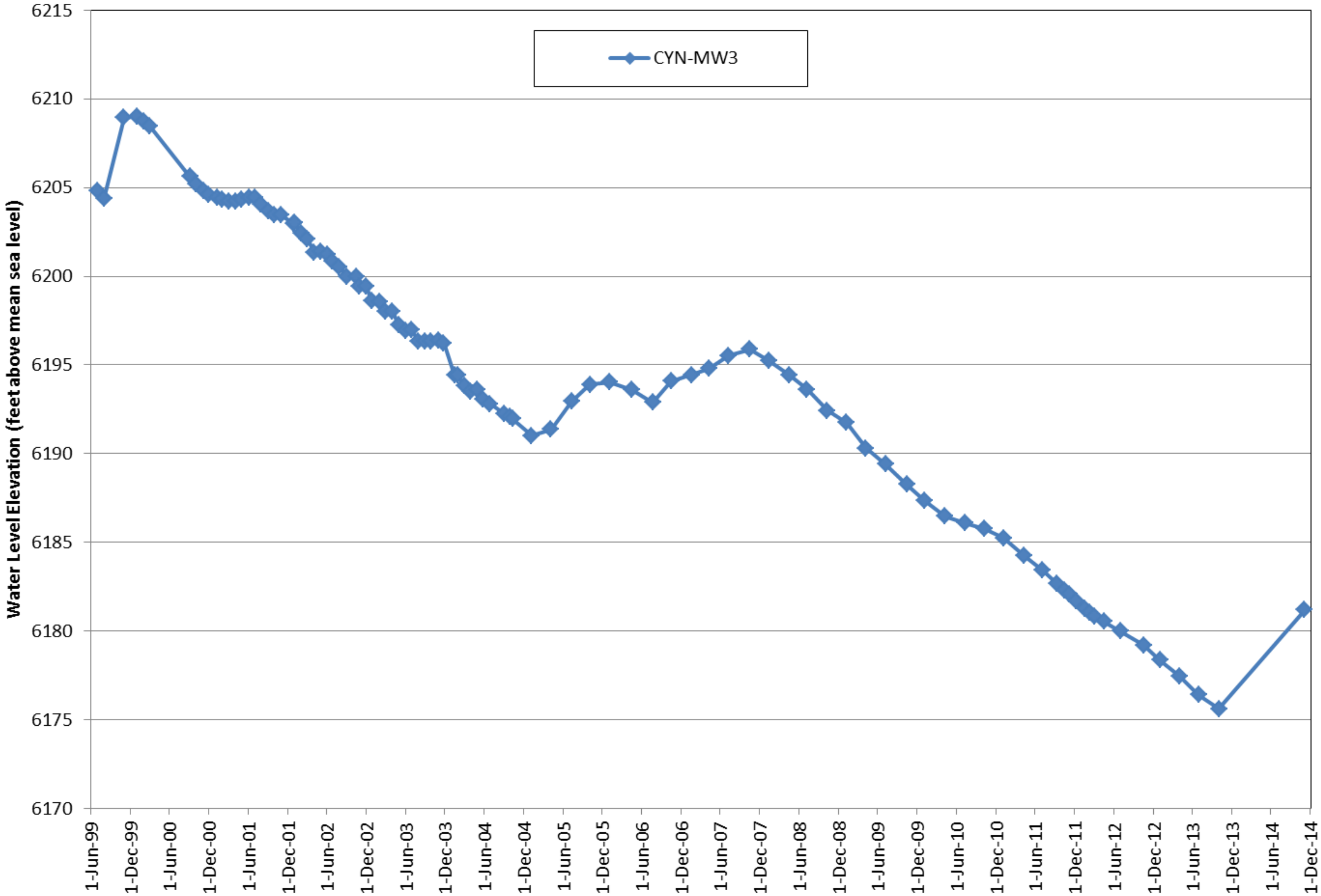

Figure 7C-1. BSG Area of Concern Wells (1 of 5)

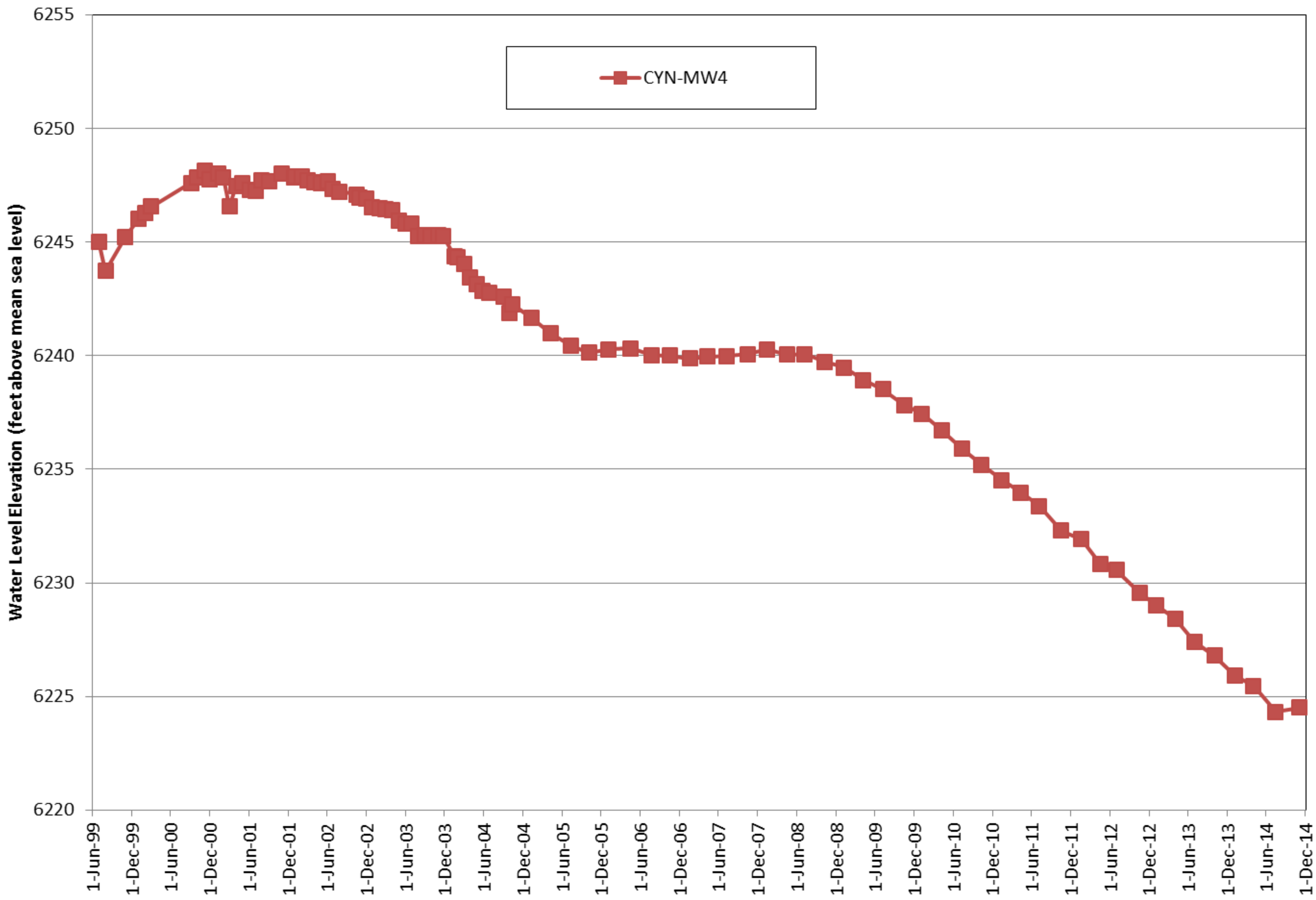

Figure 7C-2. BSG Area of Concern Wells (2 of 5)

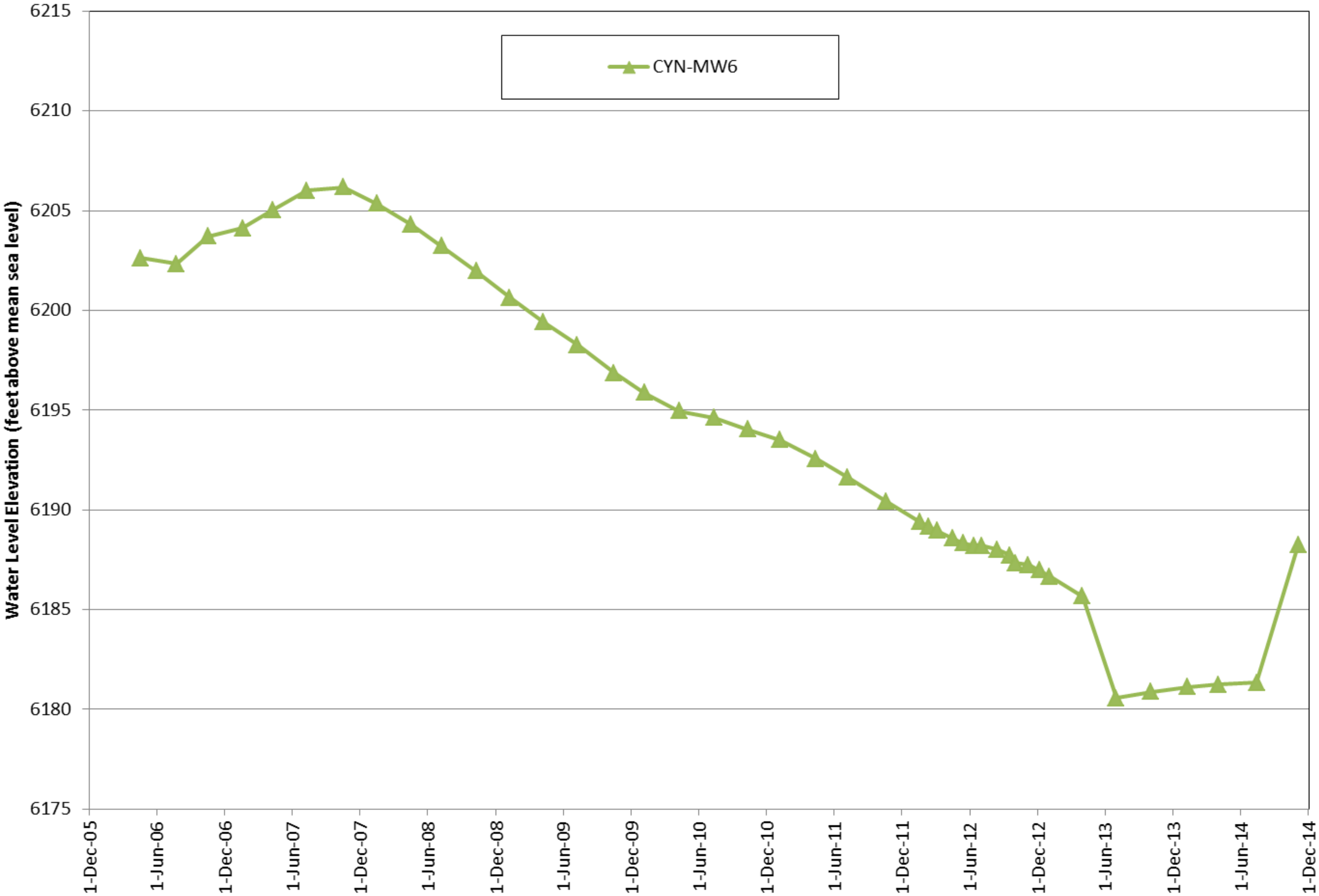

Figure 7C-3. BSG Area of Concern Wells (3 of 5)

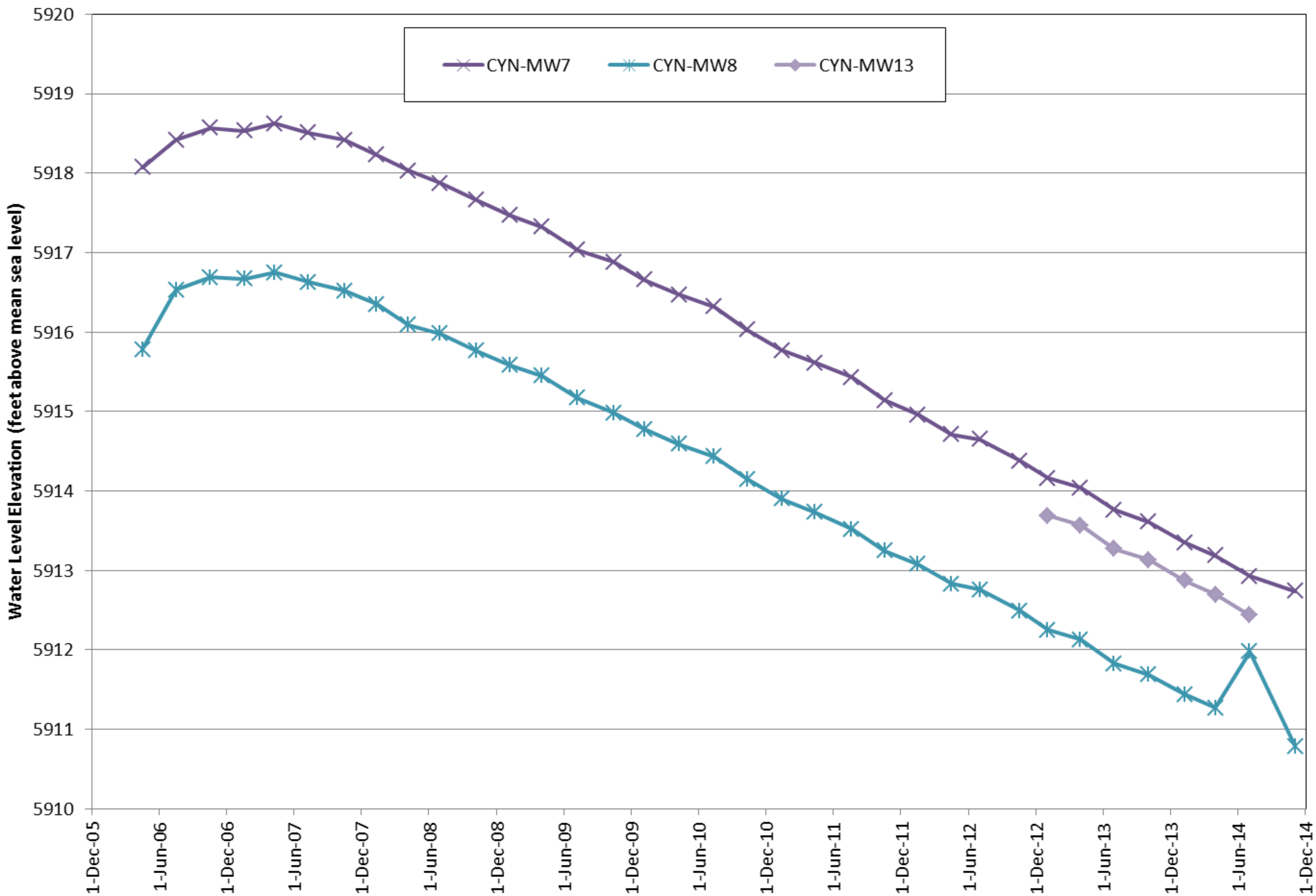

Figure 7C-4. BSG Area of Concern Wells (4 of 5)

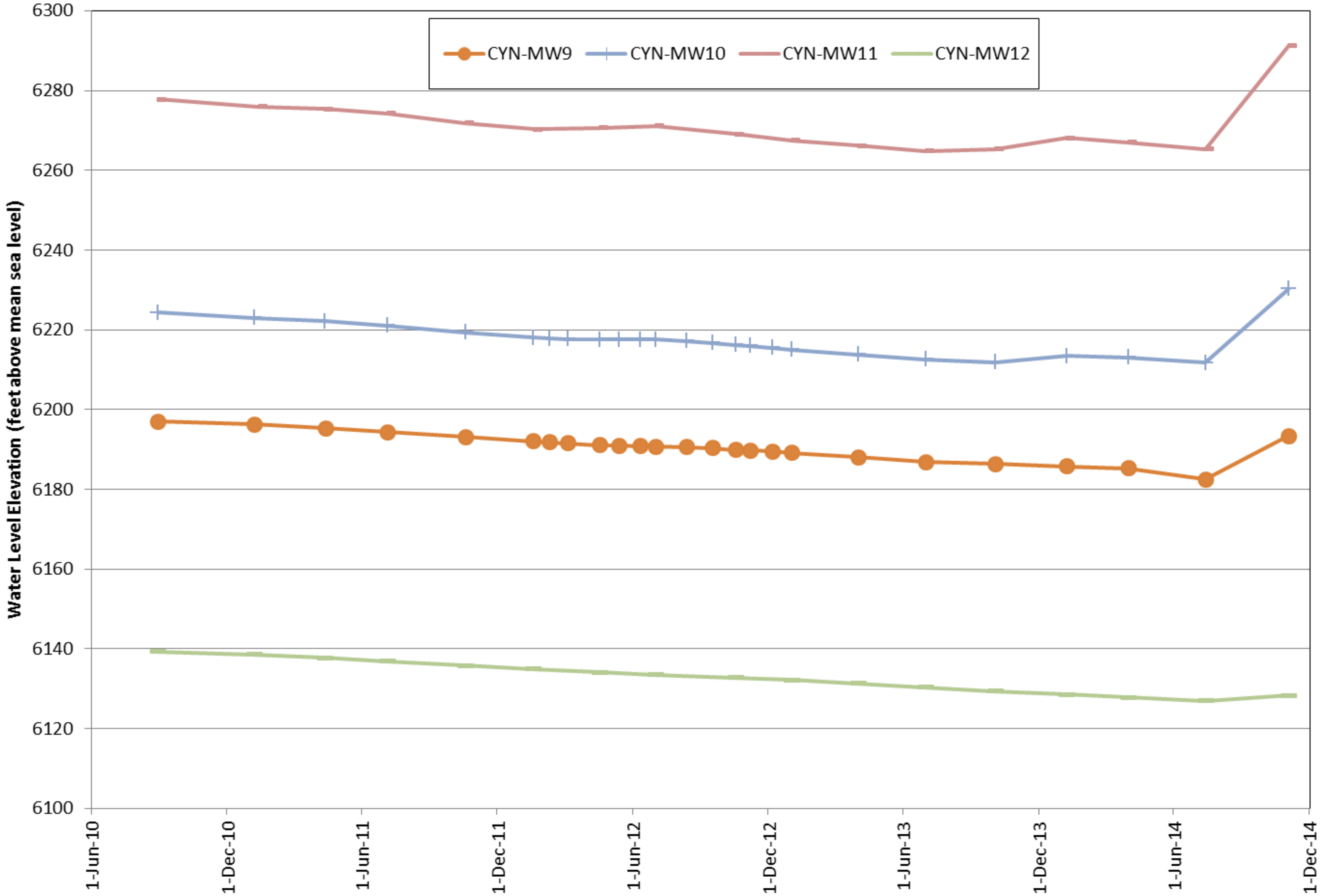

Figure 7C-5. BSG Area of Concern Wells (5 of 5)

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8.0 Solid Waste Management Units 8/58

8.1 Introduction

This chapter summarizes the Calendar Year (CY) 2014 quarterly groundwater sampling events for Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2, located within Solid Waste Management Units (SWMUs) 8/58 at Sandia National Laboratories, New Mexico (SNL/NM).

Monitoring wells CCBA-MW1 and CCBA-MW2 were installed at SWMUs 8/58 in August 2011. In April 2012, New Mexico Environment Department (NMED) approved the SWMUs 8/58 Well Installation Report (NMED April 2012). The installation and monitoring of these wells are designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) between the NMED, U.S. Department of Energy (DOE), and Sandia Corporation (Sandia) (NMED April 2004) and the NMED letter dated April 8, 2010, from the NMED Hazardous Waste Bureau requiring additional corrective action, and specifically included additional groundwater monitoring at SWMUs 8/58 (NMED April 2010). In October 2014, DOE and Sandia notified NMED that groundwater monitoring at SWMUs 8/58 had been completed and would be discontinued (SNL October 2014).

Monitoring well CCBA-MW1 was sampled on January 27, 2014, April 7, 2014, July 22, 2014, and October 13, 2014. Monitoring well CCBA-MW2 was sampled on January 23, 2014, April 8, 2014, July 21, 2014, and October 14, 2014. The groundwater samples were collected in accordance with the NMED-approved Groundwater Characterization Work Plan (SNL September 2010) and Mini-Sampling and Analysis Plans (SAPs) (SNL December 2013, March 2014, July 2014, and September 2014a). The groundwater samples from each well were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, gross alpha/beta activity, and radionuclides by gamma spectroscopy.

Analytical results for the CY 2014 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA May 2009). No constituents were detected above established MCLs, except for fluoride. Fluoride results from monitoring well CCBA-MW1 exceeded the established MCL of 4.0 milligrams per liter (mg/L) for all four quarters as shown in Table 8A-5 (Attachment 8A). Fluoride concentrations in samples from monitoring well CCBA-MW1 ranged from 4.68 to 5.02 mg/L.

The eighth quarter of the required groundwater sampling (NMED April 2010) was conducted in July 2013 (SNL September 2014b). The thirteenth and final quarterly groundwater sampling event at SWMUs 8/58 was conducted in October 2014.

8.1.1 Location

SWMUs 8/58 are located on Kirtland Air Force Base (KAFB) near the eastern boundary between U.S. Air Force land and the Withdrawn Area, a 22,500-acre area of the Cibola National Forest that has been withdrawn from the public domain for the exclusive use of KAFB and the DOE/National Nuclear Security Administration (NNSA) (Figure 8-1). The sites are located north of Coyote Springs Road, approximately 2.7 miles east of the intersection of Coyote Springs and Lovelace Roads.

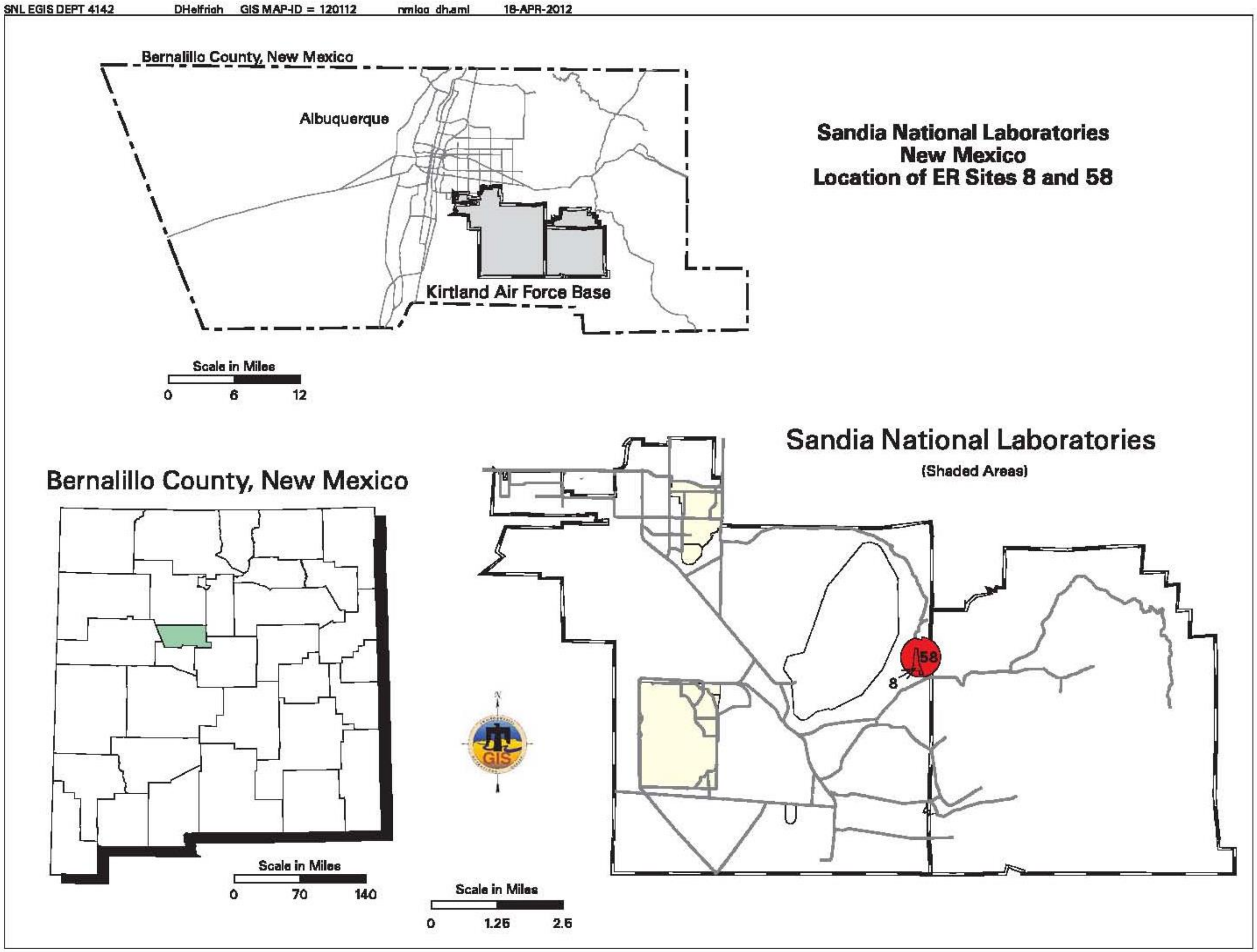

Figure 8-1. Location of SWMUs 8/58

SWMUs 8/58 are located in the Arroyo del Coyote watershed, which captures runoff from the western flank of the Manzanita Mountains. No surface water bodies are located at the site. The nearest surface water is Coyote Springs, a perennial spring located approximately 1,400 feet (ft) southwest of SWMU 58 in Arroyo del Coyote. Arroyo del Coyote intersects Tijeras Arroyo approximately 7 miles west of the two sites. Tijeras Arroyo eventually drains into the Rio Grande, approximately 16 miles west of the two sites (SNL September 2003).

SWMU 58 encompasses approximately 258 acres and is the site of the former CCBA where extensive explosive testing was conducted (Figure 8-2). A blast radius of 2,000 ft defines the boundary of SWMU 58. This boundary was based on the visual distribution of fragments (shrapnel) and the surrounding topography.

SWMU 8 is fully contained within the blast radius of SWMU 58 and consists of approximately 30 acres (Figure 8-2). A north-south road that bisects SWMU 58 provides access to the site. The boundaries of SWMU 8 are defined by this road to the east, by the end of debris and test fixtures to the north (approximately 3,200 ft north of Coyote Springs Road), by the base of the steep ridge to the west, and by the end of debris and test fixtures to the south. The majority of debris and test fixtures have been removed.

8.1.2 Site History

SWMUs 8/58 are interrelated by the types of tests conducted and their geographic locations. More than a hundred tests have occurred at SWMUs 8/58, and test debris and fixtures remain at numerous locations. Neither site is currently being used for test activities. From 1950 to the late 1960s, at various locations within SWMU 58, numerous SNL/NM research groups conducted tests involving at ground or above ground explosive detonations (SNL June 1995). Earth penetration tests commenced after this time, but did not involve any hazardous materials. Other unknown tests were conducted at SWMU 58, which may have dispersed other materials onto the site.

Prior to the penetration tests, the primary materials dispersed were HE compound combustion by-products and associated testing materials (such as metals and radionuclides). Primary emissions from the combustion of explosives would have been gaseous and would have dissipated. However, chunks of partially combusted HE compounds were found on site. Solid residues may have been produced by explosives containing metals, such as barium from Baratol. Carbon tetrachloride was alleged to have been poured into the Underground Conduit System (UCS) to displace water before the tests were performed. Jet propellant fuel grade 4 was released to the ground during burn tests. Metals were dispersed during some tests. Asbestos-containing material was found at various locations scattered throughout SWMUs 8/58. Gaseous argon was released during some experiments and readily dispersed into the atmosphere during the testing.

Debris from the SWMU 58 tests, and possibly other off-site sources, was disposed of at SWMU 8. Documented tests at SWMU 58 involved large quantities of bulk explosives, which were typically shipped in wooden crates. These wooden crates, along with scrap metals from the tests, comprised most of the solid waste found at SWMU 8.

SWMU 8 and portions of SWMU 58 are located within the Manzano Combat Range, an area where KAFB military training is periodically conducted. Most of the unexploded ordnance (e.g., spent ammunition and smoke cartridges) occasionally found on site results from this ongoing activity rather than past SNL/NM research activities.

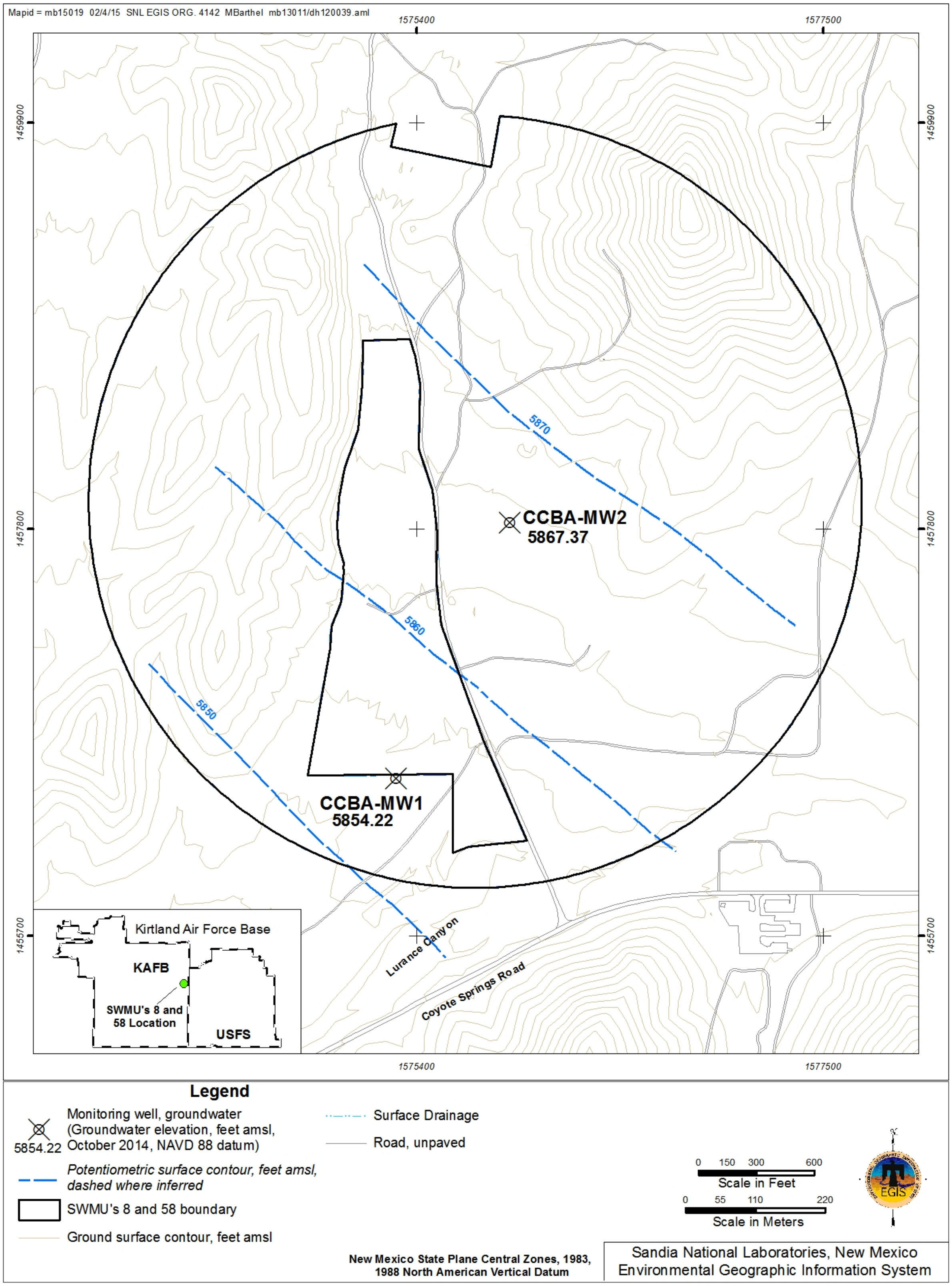

Figure 8-2. Groundwater Monitoring Wells CCBA-MW1 and CCBA-MW2 Installed at SWMUs 8/58 and Potentiometric Surface Map (October 2014)

SWMU 58 originally contained two control bunkers, an instrument shelter, a three-sided earthen bunker with concrete inner walls clad with metal armor plate, numerous concrete pads and rubble, a UCS for running test wires, and numerous other test structures. Many of these features have been removed (SNL April 2005).

SWMU 8 primarily contained general refuse (e.g., cardboard, paper, wood) and demolition debris. All SWMU 8 debris was removed during a series of investigations and remedial activities conducted from 1996 to 2004, listed in Table 8-1 (SNL April 2005).

SWMUs 8/58 contain similar constituents of concern (COCs) consisting of HE compounds, metals (i.e., arsenic, barium, beryllium, lead, mercury, and nickel), VOCs, SVOCs, asbestos, petroleum fuels, and radionuclides (DOE September 1987).

8.1.3 Monitoring History

In 2011, SNL/NM personnel installed two groundwater monitoring wells at SWMUs 8/58 (SNL November 2011) as shown on Figure 8-2. These two new wells were sampled for the first time in October and November 2011, and were sampled for four quarters in CY 2014 as described in Section 8.1.5.

8.1.4 Current Monitoring Network

Currently two groundwater monitoring wells are installed at SWMUs 8/58 (Figure 8-2). Monitoring well CCBA-MW1 is located approximately 0.2 miles north of the ephemeral channel in Lurance Canyon and approximately 0.7 miles east of Coyote Springs. Lurance Canyon is the eastern extension of Arroyo del Coyote (Plate 1). Monitoring well CCBA-MW2 is located approximately 0.4 miles north of the ephemeral channel in Lurance Canyon and approximately 1 mile northeast of Coyote Springs.

Monitoring wells CCBA-MW1 and CCBA-MW2 were monitored quarterly for VOCs, SVOCs, HE compounds, NPN, major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, perchlorate, total cyanide, gross alpha/beta activity, and radionuclides by gamma spectroscopy. In CY 2014 isotopic uranium analysis was discontinued because the uncorrected gross alpha activities have consistently been reported below the MCL of 15 picocuries per liter (pCi/L).

8.1.5 Summary of Calendar Year 2014 Activities

The following activities occurred for SWMUs 8/58 during CY 2014:

- Quarterly groundwater sampling was conducted at monitoring wells CCBA-MW1 and CCBA-MW2 in January, April, July, and October 2014 (SNL December 2013, March 2014, July 2014, and September 2014a).

- Quarterly reporting of analytical results from monitoring wells CCBA-MW1 and CCBA-MW2.

- Tables of analytical results (Attachment 8A), concentration versus time plots (Attachment 8B), and hydrographs (Attachment 8C) were prepared.

Table 8-1. Historical Timeline of SWMUs 8/58

Month	Year	Event	Reference
	1950-1960s	More than 100 tests were performed at SWMUs 8/58.	DOE September 1987
	1987	Identified as potential SWMUs in Comprehensive Environmental Assessment and Response Program Investigation due to the extensive testing done in these areas.	DOE September 1987
February	1992	Boundaries for the Radioactive Material Management Areas at SWMUs 8/58 are delineated.	SNL February 1992
October	1993	KAFB EOD conducted a visual UXO/HE survey of military debris. Material related to military training exercises was identified and removed.	Young and Byrd 1994
October	1993	RUST Geotech conducted surface gamma radiation survey across both sites. Point and area anomalies were detected, identified, and removed during the 1995 VCM.	RUST Geotech, Inc. 1994
	1994	Sensitive species survey was conducted. Three sensitive species were identified for SWMU 58 (including SWMU 8). Since the survey, the three species have been removed from the New Mexico endangered plant species list and are no longer considered sensitive.	NMFRCD August 1995
	1994	Cultural resources survey identified seven discrete cultural resource areas.	SNL February 1995a
	1994-2004	VCM and VCA conducted from 1994 until 2004 to remove surface and buried contaminated soil and wastes. Housekeeping activities were conducted during same time to remove debris such as concrete, wood, metal, and shrapnel.	SNL April 1994 SNL February 1995b SNL August 1998 SNL October 2000 SNL January 2004
	1995-2004	RFI sampling activities conducted at SWMUs 8/58 to characterize the sites.	SNL August 1996 SNL November 1998
	1996-2004	UXO/HE visual surface surveys were conducted by SNL/NM personnel. Material identified was subsequently removed by KAFB EOD personnel.	SNL September 1994
February	1996	Housekeeping activities removed surface debris in preparation for soil sampling during the RFI activities.	SNL May 1997
March	1997	Soil sampled at Burn Test Feature and contingency borehole sampling performed at Feature 58OO.	SNL April 2005
February	1998	Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report (SNL/NM December 1995) containing a description of SWMUs 8 and 58 hydrogeology was submitted to NMED.	SNL February 1998
October	1998	Radiological survey of UCS conducted.	SNL April 2005
November	1998	SAP submitted for collecting additional RFI soil samples at SWMUs 8/58.	SNL November 1998
August	1999	SAP submitted to NMED for Feature 58FF.	SNL August 1999
February	2000	Met with NMED to discuss cleanup levels for lead at SWMU 8. It was proposed that the cleanup level for lead should be 750 mg/kg at surface and subsurface soil.	Olson and Moats 2000
October	2000	Prepared VCA plan for UCS at SWMU 58.	SNL October 2000
October	2000	Debris removed from UCS; radiological survey conducted.	SNL December 2000
January	2004	VCA plan submitted to NMED. Plan was to remove remaining debris and metal-contaminated (mainly lead) surface and subsurface soil at various features at SWMU 8.	SNL January 2004
April	2005	CAC Proposal for SWMUs 8/58 submitted to NMED. DOE/NNSA and Sandia requested a determination of CAC without controls for SWMUs 8/58 as a whole.	SNL April 2005

Refer to footnotes on page 8-8.

Table 8-1. Historical Timeline of SWMUs 8/58 *(Continued)*

Month	Year	Event	Reference
June	2005	SWMU 8 was designated as "CAC without controls" from NMED. NMED also issued an RSI for seven features of SWMU 58. Additional sampling and analysis was requested for these features to characterize the depth and lateral extent of contamination.	NMED June 2005
June	2005	Response to RSI submitted. Additional sampling will take place at the features under discussion. A SAP was included as an appendix to the response.	SNL June 2005
September	2005	NMED stated the additional sampling was adequate to complete the CAC proposal pending the outcome of the sampling results. Additional field sampling began.	NMED September 2005
March	2006	The first supplemental response and proposal for CAC for SWMUs 8/58 were submitted. The new sampling analysis revealed no COCs present at levels considered hazardous to human health. DOE/NNSA and Sandia requested CAC without controls for SWMUs 8/58.	SNL March 2006
June	2006	NMED RSI stated that the elevated levels of lead and nickel at Feature 58FF were not sufficiently defined horizontally or vertically; therefore, additional sampling was needed.	NMED June 2006
August	2006	A SAP was submitted to NMED outlining additional sampling to be completed at Feature 58FF. Planned boreholes will be sampled for lead and nickel only.	SNL August 2006
September	2006	Lead and nickel samples were collected from five boreholes at Feature 58FF.	SNL January 2007
October	2006	NMED officially approved the SAP for fall 2006 sampling (after the sampling was completed).	NMED October 2006
January	2007	A second supplemental response and proposal for CAC submitted to NMED for SWMUs 8/58. The September 2006 sampling for lead and nickel revealed no COCs present at levels considered hazardous to human health. DOE/NNSA again requested CAC without controls for SWMUs 8/58.	SNL January 2007
June	2007	NMED approved the second RSI response and issued a Certificate of Completion for CAC with Controls for SWMUs 8/58.	NMED June 2007
January	2008	Justification for Class III Permit Modification SWMUs 8/58, Volumes 1 through 4. Includes CAC Proposal (Volumes 1–3) and RSI and Notice of Disapproval (Volume 4).	SNL January 2008
June	2009	NMED provided comments that influenced out year planning for the ER Project. E-mail documenting important comments from a meeting with NMED, including the decision to remove SWMUs 8/58 from the CAC process.	SNL June 2009
April	2010	Letter from NMED received that formally stated additional corrective action was needed at SWMUs 8/58, and the specific requirements for what the additional corrective action should entail.	NMED April 2010
September	2010	Groundwater Characterization Work Plan for SWMUs 8/58 submitted to NMED (in response to April 8, 2010 letter).	SNL September 2010
January	2011	NMED approved the SWMUs 8/58 Groundwater Characterization Work Plan.	NMED January 2011

Refer to footnotes on page 8-8.

Table 8-1. Historical Timeline of SWMUs 8/58 *(Concluded)*

Month	Year	Event	Reference
May	2011	Letter proposing Groundwater Monitoring Well Location Adjustment for SWMUs 8/58 was submitted to NMED.	SNL May 2011a
June	2011	NMED approved SWMUs 8/58 Proposed Groundwater Monitoring Well Location Adjustment.	NMED June 2011
June	2011	Requested Extension to Complete the Final Well Installation Report for five Groundwater Monitoring Wells at SWMUs 8/58.	SNL June 2011
August	2011	Monitoring wells CCBA-MW1 and CCBA-MW2 were installed.	SNL November 2011
August	2011	NMED approved the Request for Extension to Complete Well Installation Report for Groundwater Monitoring Wells at SWMUs 8/58.	NMED August 2011
October/ November	2011	First quarterly sampling events were conducted for monitoring wells CCBA-MW1 and CCBA-MW2.	SNL September 2012
November	2011	SWMUs 8/58 Groundwater Monitoring Well Installation Report was submitted.	SNL November 2011
January	2012	Slug tests were performed on monitoring wells CCBA-MW1 and CCBA-MW2.	SNL June 2012
April	2012	NMED approved the Well Installation Report for SWMUs 8/58 and SWMU 68.	NMED April 2012
June	2012	Hydraulic conductivity was calculated for monitoring wells CCBA-MW1 and CCBA-MW2.	SNL June 2012
July	2013	The eighth and final sampling event required by NMED for monitoring wells CCBA-MW1 and CCBA-MW2 was completed.	SNL January 2014
October	2014	NMED was notified that groundwater monitoring at SWMUs 8/58 has been completed, and has been discontinued.	SNL October 2014

NOTES:

CAC = Corrective Action Complete.
CCBA = Coyote Canyon Blast Area.
COC = Constituent of concern.
DOE = U.S. Department of Energy.
EOD = Explosive Ordnance Disposal.
ER = Environmental Restoration.
HE = High explosive.
KAFB = Kirtland Air Force Base.
mg/kg = Milligrams per kilogram.
MW = Monitoring well.
NMED = New Mexico Environment Department.
NMFRCD = New Mexico Forestry and Resources Conservation Division.
NNSA = National Nuclear Security Administration.
RCRA = Resource Conservation and Recovery Act.
RFI = RCRA Facility Investigation.
RSI = Request for Supplemental Information.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SNL/NM = Sandia National Laboratories, New Mexico.
SWMU = Solid Waste Management Unit.
UCS = Underground Conduit System.
UXO = Unexploded ordnance.
VCA = Voluntary Corrective Action.
VCM = Voluntary Corrective Measure.

8.1.6 Summary of Future Activities

The following activities are anticipated for SWMUs 8/58 during CY 2015:

- No groundwater sampling will be conducted at monitoring wells CCBA-MW1 and CCBA-MW2 in CY 2015 unless NMED requires additional sampling.

8.1.7 Current Conceptual Model

This section presents a comprehensive discussion of the hydrogeologic regime, conceptual site model, and contaminant findings for SWMUs 8/58.

8.1.7.1 Regional Hydrogeologic Conditions

SWMUs 8/58 are located in the Arroyo del Coyote watershed that captures runoff from the western flank of the Manzanita Mountains. The elevation at SWMUs 8/58 ranges from approximately 5,880 to 6,280 ft above mean sea level (amsl). SWMU 8 and the central portion of SWMU 58 are generally flat with a moderate slope to the south-southwest towards the ephemeral channel of Lurance Canyon. SWMU 58 is bordered on the northwest and northeast by ridges. No surface water bodies are located at either site. A small arroyo runs from the north to the south through the western portion of the sites and is a tributary of Arroyo del Coyote. Both arroyos are dry except during and immediately following significant thunderstorms. The sites are sparsely vegetated by bunch grasses, cacti, junipers, and pine trees.

Alluvium fills the canyon floor and a veneer of weathered bedrock (colluvium) covers the surrounding slopes. Where present, soil types across the two sites consist of Gila sandy loam, the Tesajo-Millet gravelly loam, and the Salas Complex (clayey to gravelly loam) (SNL December 1995). The soil is poorly developed. The central portion of SWMUs 8/58 is covered with alluvium derived from the surrounding outcrops of Precambrian units (i.e., quartzite, greenstone, metarhyolite, and granite) and from Paleozoic sedimentary units (i.e., limestone, sandstone, and conglomerate). A thin veneer of colluvium covers the steeper slopes that surround the western and northern portions of SWMU 58.

The depth to bedrock is variable across the sites. The northern portion of SWMU 58 is underlain by Precambrian granite (SNL December 1995). Subsurface bedrock beneath the central and southern portions of SWMUs 8/58 consists of Precambrian quartzite. Fractured and moderately dipping quartzite is exposed on the steep hillside south of the sites (Karlstrom et al. April 2000).

The regional potentiometric surface map (Plate 1) shows that groundwater flow is generally toward the west in the vicinity of SWMUs 8/58. Topographic features and faults modify the flow direction at various locations. Faults to the west of the sites may serve as hydraulic barriers or conduits depending on the type and amount of fault gouge.

8.1.7.2 Hydrogeologic Conditions at SWMUs 8/58

The amount of precipitation available for groundwater recharge is minimal due to scant rainfall and high evapotranspiration rates. Summer (monsoonal) thunderstorms are responsible for the majority of rainfall. The average rainfall, as measured at the nearest active rain gauge (the National Weather Service station at the Albuquerque International Sunport) during the period from 1915 through 2005 was 8.67 inches per year (in/yr) (WRCC-DRI 2012). The station is located 8.7 miles northwest of SWMUs 8/58 at an elevation of 5,310 ft amsl. The estimated average annual precipitation for SWMUs 8/58 is estimated to be approximately 11.5 in/yr. The estimate was extrapolated by using the precipitation model from the Canyon Area conceptual model of groundwater flow and contaminant transport (SNL May 2004) and the average elevation of approximately 6,000 ft amsl. Intense sunlight and low humidity throughout much of the year creates high rates of evapotranspiration. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

Monitoring wells CCBA-MW1 and CCBA-MW2 were installed by the air-rotary casing hammer drilling method at SWMUs 8/58 in August 2011. Monitoring well CCBA-MW1 is located at the southwestern edge of SWMU 8 and approximately 0.2 miles north of the ephemeral channel in Lurance Canyon (Figure 8-2). Monitoring well CCBA-MW2 is located near the center of SWMU 58 and approximately 1,446 ft northeast of monitoring well CCBA-MW1.

At monitoring well CCBA-MW1 borehole, quaternary alluvium, comprised mostly of poorly sorted sands and gravels, was encountered from the ground surface to a depth of approximately 70 ft below ground surface (bgs). Saturated alluvium was encountered at 62 ft bgs, but the quantity of water produced was low. From approximately 65 to 70 ft bgs, the sand and gravel contained a significant amount of cobbles. Quartzite bedrock was encountered at a depth of approximately 70 ft bgs. A significant amount of borehole sloughing resulted in erratic returns of drill cuttings. The borehole was advanced to a total depth of 90 ft bgs to accommodate the 20-foot long well screen required by NMED, a 5-ft long sump, and additional 5-ft of borehole (rathole) to deal with the severe borehole sloughing problem. Approximately 8 ft of saturated alluvium was encountered.

The well is screened across the water table from 60 to 80 ft bgs (Table 8-2). After installation, the water level in the well rose to 45 ft bgs, which indicates that the borehole most likely intercepted a saturated bedrock fracture zone with a positive pressure head. The uppermost saturated fracture is inferred to have been encountered at a depth of approximately 75 ft bgs in fractured quartzite, which produced a greater volume of water than the alluvium.

An unusually large volume of sand pack was required for building monitoring well CCBA-MW1. A total of 118 bags of sand were used to fill the annulus from the bottom of the sump to the required height above the screen. A monitoring well of similar design would typically require approximately 25 bags of sand. The large annular volume for monitoring well CCBA-MW1 indicates that a borehole with a much larger than normal diameter was created during the drilling process due to the significant amount of borehole sloughing. The large sand pack was considered when the slug tests were interpreted.

At monitoring well CCBA-MW2, dry alluvium consisting of poorly sorted sand and gravel was encountered from the ground surface to a depth of 30 ft bgs. Precambrian granite and gneiss were penetrated from 30 ft bgs to the borehole total depth of 123 ft bgs. The uppermost saturated fracture was encountered at a depth of 100 ft bgs, and the well was screened in fractured bedrock from 98 to 118 ft bgs. Competent bedrock was encountered from 30 ft bgs to the total depth of 123 ft bgs; borehole sloughing did not affect well construction.

Figure 8-2 depicts the potentiometric surface for SWMUs 8/58. The apparent hydraulic gradient between the two monitoring wells (CCBA-MW1 and CCBA-MW2) is steep. The potentiometric surface elevation in monitoring well CCBA-MW2 was 13.15 ft higher than it was in monitoring well CCBA-MW1 in October 2014. The distance between the wells is 1,446 ft. The resulting gradient between the two wells was approximately 0.01 feet per foot to the southwest. The potentiometric surface map is based on the assumptions that the two wells are screened in the same fractured bedrock zone and are hydraulically connected; the fractured bedrock system is isotropic (the series of fractures is uniformly distributed and interconnected); and the contribution of water from the saturated alluvium at monitoring well CCBA-MW1 is negligible.

Table 8-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Wells at SWMUs 8/58

Well ID	Ground Surface Elevation (ft amsl)	Depth to Bedrock (ft bgs)	Depth to Uppermost Saturated Fracture (ft bgs[a])	Elevation of Uppermost Saturated Fracture (ft amsl)	Depth of Screened Interval (ft bgs)	Potentiometric Surface, October 2014 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Approximate Pressure Head (ft[b])	Completion Zone
CCBA-MW1	5,899.89	70	75	5,825	60 - 80	5,854.22	5,829.90	24	Alluvium and quartzite
CCBA-MW2	5,936.95	30	100	5,837	98 - 118	5,867.37	5,829.00	38	Granite and gneiss

NOTES:
[a]Observed during drilling.
[b]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CCBA = Coyote Canyon Blast Area.
ft = Foot (feet).
ID = Identification.
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

Groundwater in the fractured bedrock system is inferred to flow to the southwest. However, if the fractured bedrock system was anisotropic, groundwater would tend to follow the orientation of the fractures and not necessarily migrate normal to the potentiometric surface contours. The potentiometric surfaces represented by the groundwater elevations measured in both wells are above the top of each screen. This indicates that the groundwater in the saturated bedrock fractures is under semiconfined or confined conditions at both wells.

Geochemical analyses of major cations and anions are depicted on the Piper Trilinear Diagram shown on Figure 8-3. The groundwater composition for both wells is of the bicarbonate type dominated by calcium. The geochemical signatures from CY 2014 are consistent with CY 2013 and CY 2012 results (SNL September 2013; and September 2014b) and show two separate groupings for monitoring wells CCBA-MW1 and CCBA-MW2. In contrast, results from CY 2011 indicated that mixing of groundwater sources was occurring (SNL September 2012).

During sampling, the drawdown in both wells was not excessive. The quantity of water produced by each well was clearly adequate for typical groundwater sampling. Groundwater samples were collected using pneumatic (nitrogen gas) Bennett™ piston pumps. Slug tests were performed on monitoring wells CCBA-MW1 and CCBA-MW2 in January 2012. Calculated hydraulic conductivity values for monitoring well CCBA-MW1 vary from 4.19×10^{-05} to 8.13×10^{-04} feet per minute (ft/min) and for monitoring well CCBA-MW2 from 3.49×10^{-03} to 4.28×10^{-03} ft/min (SNL June 2012). It should be noted that the slug test analyses were developed for use in unconsolidated deposits and analyses of bedrock aquifers is dominated by fracture flow. The results for monitoring wells CCBA-MW1 and CCBA-MW2 are within the range of conductivities (1.0×10^{-05} to 1.0×10^{-02} ft/min) determined for the regional aquifer within the unconsolidated Santa Fe Group sediments west of SWMUs 8/58 and SWMU 68 (SNL March 1999). This qualitatively suggests that fracture flow at the SWMUs 8/58 wells is capable of moving significant amounts of groundwater.

8.1.7.3 Conceptual Site Model for SWMUs 8/58

The conceptual site model for SWMUs 8/58 is based on the findings from two on-site monitoring wells (CCBA-MW1 and CCBA-MW2), several nearby monitoring wells located upgradient and downgradient of the site in Lurance Canyon (Plate 1), and extensive field mapping conducted by the Site-Wide Hydrogeologic Characterization Project (GRAM and Lettis 1995). Lurance Canyon is deeply incised into Paleozoic and Precambrian bedrock and drains westward toward Arroyo del Coyote. No perennial surface water bodies are located at the site. Coyote Springs is located approximately 0.25 miles to the west and downslope of the site.

Groundwater in the area of SWMUs 8/58 predominantly occurs in a fractured bedrock system under semiconfined or confined conditions. Drilling indicates that the depth to groundwater in the fractured Precambrian quartzite and granite is approximately 75 to 100 ft bgs across the site and is dependent on the depth to the uppermost water-bearing fracture. A minor amount of groundwater was encountered in alluvium at 62 ft bgs during the drilling for monitoring well CCBA-MW1.

The geochemical signature is of the bicarbonate type dominated by calcium. The overlying bedrock with naturally filled fractures probably serves as the confining layer. Groundwater flows to the southwest. The apparent hydraulic gradient in the fractured bedrock system is approximately 0.01 feet per foot. Groundwater underflow from the site probably discharges to the unconsolidated basin fill deposits (primarily the Santa Fe Group) of the Albuquerque Basin after crossing the Sandia Fault and the Tijeras Fault. No potable water supply wells are located within 4 miles of the site.

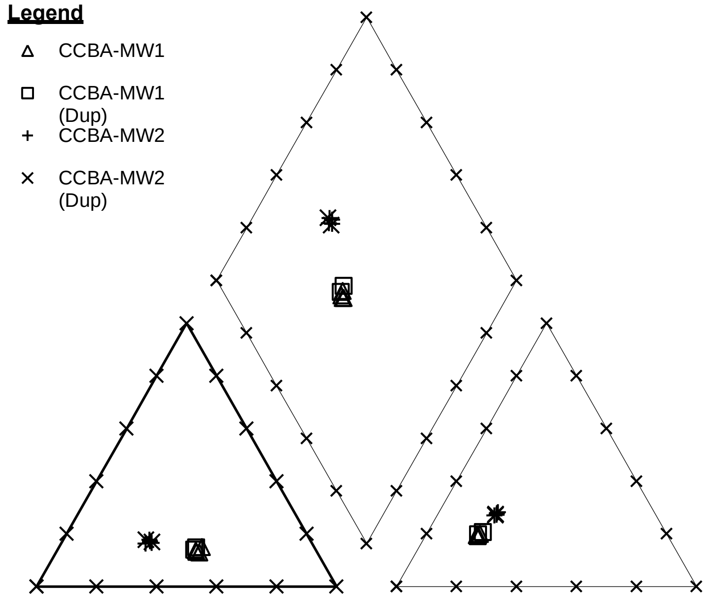

Figure 8-3. Piper Trilinear Diagram of Major Ion Chemistry for Monitoring Wells CCBA-MW1 and CCBA-MW2 at SWMUs 8/58, CY 2014

The amount of precipitation available for groundwater recharge is minimal due to the scant rainfall, high evapotranspiration rates, and the shallow sequence of bedrock. The annual precipitation is estimated to be 9 in/yr. Most rainfall occurs during summer thunderstorms. Seasonal effects probably do not significantly influence groundwater levels in the fractured bedrock system near the site.

8.1.7.4 Contaminant Sources

Sixty localized areas of interest, known as features, were investigated at SWMUs 8/58. The features consisted of test devices, various apparatus, debris piles, communication cable systems, and shrapnel. Numerous radiological and ordnance surveys were conducted and hazardous materials were removed. Additional remedial activities were conducted and approximately 1,390 cubic yards of testing debris were removed. Several phases of confirmatory soil sampling were conducted. Human health and ecological risk assessments show that remaining COC concentrations in soil are acceptable for both industrial and residential land use scenarios.

8.1.7.5 Contaminant Distribution and Transport in Groundwater

No groundwater contamination is suspected at SWMUs 8/58. Fluoride is the only analyte that exceeds the MCL in groundwater samples collected at SWMUs 8/58. In CY 2014, fluoride was detected above the MCL of 4.0 mg/L in monitoring well CCBA-MW1 groundwater samples at concentrations that ranged from 4.68 to 5.02 mg/L. However, this detection is most likely attributable to localized hydrothermal mineralization in faults and fractures within the quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities. Review of nearby ore deposits demonstrates that there are large, but uneconomic, deposits of fluorite-bearing minerals in the Precambrian and Paleozoic rocks in the eastern portion of KAFB (Skelly August 2013). This indicates that the fluorite-bearing minerals are the source of fluoride in the groundwater samples from CCBA-MW1 and not SNL/NM activities. Fluoride concentrations from monitoring well CCBA-MW2 ranged from 1.46 to 1.63 mg/L.

8.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM Environmental Restoration (ER) Operations (formerly ER Project) and implements and enforces regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER Operations SWMUs are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (NMED 1993).

In April 2004, the Consent Order (NMED April 2004) was issued between the NMED, DOE, and Sandia specifically identified SWMUs 8/58 as requiring further investigation. All corrective action requirements pertaining to SWMUs 8/58 are contained in the Consent Order (NMED April 2004).

A proposal for Corrective Action Complete (CAC) for SWMUs 8/58 was submitted to the NMED in April 2005 (SNL April 2005). The NMED responded to the CAC proposal with a Request for Supplemental Information (RSI) in June 2005 and required additional characterization at the site (NMED June 2005). DOE/NNSA and Sandia responded to this RSI in June 2005 (SNL June 2005) and agreed to complete the additional site characterization work. The NMED approved the RSI response contingent on the results of field investigations proposed in the response (NMED September 2005). SNL/NM personnel completed the fieldwork in September and October 2005, and the results of the field investigations were submitted to the NMED in March 2006 (SNL March 2006). The NMED reviewed the March 2006 supplemental response and issued a second RSI, which required additional site characterization work, in June 2006 (NMED June 2006). DOE/NNSA and Sandia responded to the second RSI in August 2006 (SNL August 2006), and again agreed to complete the additional site characterization work. The second RSI response was verbally approved by the NMED in early August 2006, and the additional fieldwork was completed in September 2006. The NMED officially approved the second RSI response in October 2006 (NMED October 2006), after fieldwork had been completed. The NMED approved SWMUs 8/58 for CAC with controls in June 2007 (NMED June 2007).

In a meeting with the NMED and participating members of the public, held on June 9, 2009 , the NMED decided that characterization of SWMUs 8/58 had not satisfied the requirements for CAC and that additional corrective actions were required due to insufficient information about the site hydrogeology and insufficient information about the contaminant source terms. The NMED required DOE/NNSA and Sandia to submit a Groundwater Characterization Work Plan for SWMUs 8/58 (NMED April 2010).

The Groundwater Characterization Work Plan for SWMUs 8/58 was submitted to the NMED in September 2010 (SNL September 2010) and described the activities and procedures to install and sample groundwater monitoring wells to comply with the NMED requirements and guidance of the New Mexico Office of the State Engineer (NMOSE) (NMOSE August 2005). The Work Plan was approved by the NMED in January 2011 (NMED January 2011). Due to the presence of cultural resources in the area and land use permit issues with KAFB, the locations of the proposed monitoring wells were adjusted (SNL May 2011a and NMED June 2011).

Monitoring wells CCBA-MW1 and CCBA-MW2 were installed in August 2011 and quarterly sampling began in October 2011. The well installation report describing field activities was submitted to the NMED in November 2011 (SNL November 2011). The eighth sampling event required by NMED for monitoring wells CCBA-MW1 and CCBA-MW2 was completed in July 2013. In October 2014 DOE and Sandia notified NMED that after 13 quarters groundwater monitoring at SWMUs 8/58 had been completed, and would be discontinued (SNL October 2014).

In this report, monitoring data for SWMUs 8/58 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 Sandia. 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 (NMED April 2004).

8.3 Scope of Activities

Groundwater monitoring sampling and analysis during CY 2014 is summarized in Table 8-3. The analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 for each sampling event are listed in Table 8-4.

8.4 Field Methods and Measurements

According to the requirements of the Consent Order (NMED April 2004) addressing Section VII.D.6 and the NMED letter of April 8, 2010 (NMED April 2010), SNL/NM personnel will perform groundwater sampling at SWMUs 8/58. The CY 2014 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures for groundwater sampling activities and the site-specific Mini-SAP for SWMUs 8/58 (SNL December 2013; March 2014; July 2014; and September 2014a).

Groundwater samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2 in January, April, July, and October 2014. Samples were submitted to GEL Laboratories LLC for all chemical analyses. Groundwater samples were analyzed for VOCs, SVOCs, HE compounds, NPN, major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, perchlorate, total cyanide, gross alpha/beta activity, and radionuclides by gamma spectroscopy.

Table 8-3. Groundwater Monitoring Well Network and Sampling Dates for SWMUs 8/58, Calendar Year 2014

Date of Sampling Event	Wells Sampled	SAP
January 2014	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2014* (SNL December 2013)
April 2014	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2014* (SNL March 2014)
July 2014	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2014* (SNL July 2014)
October 2014	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for First Quarter Fiscal Year 2015* (SNL September 2014a)

NOTES:
CCBA = Coyote Canyon Blast Area.
MW = Monitoring well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

Table 8-4. Parameters Sampled at SWMUs 8/58 for Each Sampling Event, Calendar Year 2014

Parameter	Sampling Period	
Anions	**January 2014**	**April 2014**
Alkalinity	CCBA-MW1	CCBA-MW1
Filtered Cations	CCBA-MW1 (dup)	CCBA-MW2
Gamma Spec*	CCBA-MW2	CCBA-MW2 (dup)
Gross Alpha		
Gross Beta		
HE compounds	**July 2014**	**October 2014**
NPN	CCBA-MW1	CCBA-MW1
Perchlorate	CCBA-MW1 (dup)	CCBA-MW2
SVOCs	CCBA-MW2	CCBA-MW2 (dup)
TAL Metals, plus Total Uranium		
Total Cyanide		
VOCs		

NOTES:
CCBA = Coyote Canyon Blast Area.
dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
HE = High explosive.
MW = Monitoring well.
NPN = Nitrate plus nitrate (reported as nitrogen).
SVOC = Semivolatile organic compound.
SWMU = Solid waste management unit.
TAL = Target Analyte List.
VOC = Volatile organic compound.

The monitoring procedures are consistent with procedures identified in the EPA Technical Enforcement Guidance Document (EPA 1986) and are described in detail in Section 1.3.

The NMED DOE Oversight Bureau collected split samples with DOE/NNSA and Sandia during the April and October 2014 sampling events. The NMED DOE Oversight Bureau analytical results are not reported in this document, but are available through the DOE NNSA Sandia Field Office.

8.5 Groundwater Elevation

Throughout CY 2014, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table elevations. The water level information was used to create the base-wide potentiometric surface map discussed in Section 2.6.2.2 and shown in Plate 1. The potentiometric surface contours presented in Figure 8-2 are derived from the base-wide potentiometric surface map. The hydrograph for SWMUs 8/58 monitoring wells is shown in Figure 8C-1 (Attachment 8C).

8.6 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA- and DOE-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6). Parameters analyzed and sampling periods in CY 2014 are presented in Table 8-4.

8.7 Summary of Analytical Results

This section discusses analytical results and field measurements for the CY 2014 sampling events at SWMUs 8/58. Data are presented in Tables 8A-1 through 8A-10 (Attachment 8A). Data qualifiers are explained in the footnotes following Table 8A-10. Analytical reports, including certificates of analyses, analytical methods, method detection limits (MDLs), practical quantitation limits, dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Customer Funded Record Center.

The analytical data were reviewed and qualified in accordance with Administrative Operating Procedure 00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 3 and Revision 4* (SNL May 2011b; June 2014). No problems were identified with the analytical data that resulted in qualification of the data as unusable. The data are acceptable and reported QC measures are adequate.

No VOCs, SVOCs, or HE compounds were detected above laboratory MDLs in any groundwater samples collected from SWMUs 8/58. Tables 8A-1 through 8A-3 list the MDLs for associated VOCs, SVOCs, and HE compounds, respectively (Attachment 8A).

Table 8A-4 summarizes NPN results (Attachment 8A). NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at concentrations from 1.59 to 3.89 mg/L.

Table 8A-5 summarizes alkalinity, major anion (i.e., bromide, chloride, fluoride, and sulfate), and total cyanide results (Attachment 8A). Fluoride was detected above the established MCL of 4.0 mg/L in all samples from monitoring well CCBA-MW1 at concentrations from 4.68 to 5.02 mg/L and is shown on Figure 8B-1. This detection is most likely attributable to the presence of fluorite mineralization in the unconsolidated alluvium and possible weathered quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities. Fluoride concentrations in monitoring well CCBA-MW2 samples ranged from of 1.46 to 1.63 mg/L. No other anions or total cyanide were detected above established MCLs.

Perchlorate was not detected above the screening level/MDL of 0.004 mg/L in any groundwater sample. Table 8A-6 presents perchlorate results (Attachment 8A).

TAL metals plus uranium were analyzed for all samples from monitoring wells at SWMUs 8/58. No metal parameters were detected above established regulatory limits in any groundwater sample. Metal results are summarized in Table 8A-7 (Attachment 8A).

Filtered fractions for major cations as calcium, magnesium, potassium, and sodium were analyzed for all samples. The results are presented in Table 8A-8 (Attachment 8A). These parameters have no established MCLs.

The results for gamma spectroscopy and gross alpha/beta activity are presented in Table 8A-9 (Attachment 8A). Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4 should not include uranium. 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. All radionuclide activity results are below MCLs, where established.

Table 8A-10 summarizes field water quality measurements collected prior to sampling (Attachment 8A). Field water quality measurements include turbidity, pH, temperature, specific conductance, oxidation-reduction potential, and dissolved oxygen.

8.8 Quality Control Results

Field and laboratory QC samples were prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. The results for each QC sample, and the impact on data quality for the SWMUs 8/58 quarterly sampling events, are discussed in the following sections.

8.8.1 Field Quality Control Samples

Field QC samples included duplicate environmental samples, field blanks (FBs), trip blanks (TBs), and equipment blanks (EBs). The following sections discuss the analytical results for each QC sample type.

8.8.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed to estimate the overall reproducibility of the sampling and analytical process. Relative percent difference (RPD) calculations, between duplicate samples, were performed for detected chemical analytes. The duplicate samples collected in January, April, July, and October (Table 8-4) all show good agreement (RPD values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

8.8.1.2 Equipment Blank Samples

EB or rinsate samples were collected to verify the equipment decontamination process. The results for EB analyses are as follows:

- **January 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW1 and submitted for all analyses. Bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, copper, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CCBA-MW1 environmental and environmental duplicate samples during data validation, since copper was reported in the EB sample at a concentration greater than associated environmental samples.

- **April 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW2 and submitted for all analyses. Bromodichloromethane, chloroform, chloride, copper, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CCBA-MW2 environmental and environmental duplicate samples during data validation, since copper was reported in the EB sample at a concentration greater than associated environmental samples.

- **July 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW1 and submitted for all analyses. Acetone, bromodichloromethane, chloroform, chromium, copper, dibromochloromethane, and gross beta were detected above the laboratory MDLs or minimum detectable activities (MDAs). With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CCBA-MW1 environmental and environmental duplicate samples during data validation, since copper was reported in the EB sample at a concentration greater than associated environmental samples.

- **October 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW2 and submitted for all analyses. Acetone, bromodichloromethane, chloroform, and copper were detected above the laboratory MDLs or MDAs. With the exception of copper, no corrective action was necessary since compounds were not detected in environmental samples. Copper was qualified as not detected in both the CCBA-MW2 environmental and environmental duplicate samples during data validation, since copper was reported in the EB sample at a concentration greater than associated environmental samples.

8.8.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analyses to assess whether contamination of the samples had occurred during shipment and storage. A total of 12 TBs were submitted during CY 2014, three per quarter. No VOCs were detected above associated laboratory MDLs for all TB samples.

8.8.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions: The results of the FB analysis are provided below:

- **January 2014 Sampling Event**—Analysis of the monitoring well CCBA-MW2 FB sample detected the VOC compounds bromodichloromethane, bromoform, chloroform, and dibromochloromethane above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

- **April 2014 Sampling Event**—Analysis of the monitoring well CCBA-MW1 FB sample detected the VOC compounds bromodichloromethane and chloroform above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

- **July 2014 Sampling Event**—Analysis of the monitoring well CCBA-MW1 FB sample detected the VOC compounds acetone and chloroform above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

- **October 2014 Sampling Event—**Analysis of the monitoring well CCBA-MW1 FB sample detected the VOCs compounds bromodichloromethane and chloroform above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

8.8.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with all groundwater samples. Some analytical results were qualified during the data validation process, but no significant data quality problems were noted in CY 2014**.**

8.9 Variances and Nonconformances

No variances or nonconformances from requirements specified in the Mini-SAPs for SWMUs 8/58 (SNL December 2013, March 2014, July 2014, and September 2014a) were noted during sampling activities. However, project-specific issues identified during CY 2014 sampling activities are noted as follows:

- **January 2014 Sampling Event**—Isotopic uranium analysis was discontinued because the uncorrected gross alpha activities have consistently been reported below the MCL of 15 pCi/L.

8.10 Summary and Conclusions

Two groundwater monitoring wells were installed at SWMUs 8/58 in August 2011. During January, April, July, and October of 2014, groundwater samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2. Analytical parameters included VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride. Fluoride was detected above the established MCL of 4.0 mg/L in monitoring well CCBA-MW1 samples that ranged from 4.68 to 5.02 mg/L. This detection is most likely attributable to the quartzite bedrock that is rich in subeconomic deposits of fluorite in which the well is completed and not associated with SNL/NM testing activities.

In October 2014, DOE and Sandia notified NMED that additional groundwater monitoring at SWMUs 8/58 had been completed and would be discontinued (SNL October 2014). No further groundwater sampling will be conducted at monitoring wells CCBA-MW1 and CCBA-MW2 unless NMED requires additional sampling.

The current conceptual model described in Section 8.1.7 does not require modification based on the analytical results for this reporting period.

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Attachment 8A
Solid Waste Management Units 8/58
Analytical Results Tables

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Attachment 8A Tables

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Table 8A-1
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B),
Solid Waste Management Units 8/58 Groundwater Investigation,
Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300–0.500	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	0.300–3.00
1,2-Dichloropropane	0.300	Methylene chloride	1.70–3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50–3.00	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 8A-33.

Table 8A-2
Method Detection Limits for Semivolatile Organic Compounds (EPA Method[g] SW846-8270C), Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1'-Biphenyl 1	3.00–3.26	Butylbenzyl phthalate	3.00–3.26
1,2,4-Trichlorobenzene	3.00–3.26	Caprolactam	3.00–3.26
2,4,5-Trichlorophenol	3.00–3.26	Carbazole	0.300–0.326
1,4-Dioxane	3.00–3.26	Chrysene	0.300–0.326
2,4,6-Trichlorophenol	3.00–3.26	Di-n-butyl phthalate	3.00–3.26
2,4-Dichlorophenol	3.00–3.26	Di-n-octyl phthalate	3.00–3.26
2,4-Dimethylphenol	3.00–3.26	Dibenz[a,h]anthracene	0.300–0.326
2,4-Dinitrophenol	5.00–5.43	Dibenzofuran	3.00–3.26
2,4-Dinitrotoluene	3.00–3.26	Diethylphthalate	3.00–3.26
2,6-Dinitrotoluene	3.00–3.26	Dimethylphthalate	3.00–3.26
2-Chloronaphthalene	0.410–0.446	Dinitro-o-cresol	3.00–3.26
2-Chlorophenol	3.00–3.26	Diphenyl amine	3.00–3.26
2-Methylnaphthalene	0.300–0.326	Fluoranthene	0.300–0.326
2-Nitroaniline	3.00–3.26	Fluorene	0.300–0.326
2-Nitrophenol	3.00–3.26	Hexachlorobenzene	3.00–3.26
3,3'-Dichlorobenzidine	3.00–3.26	Hexachlorobutadiene	3.00–3.26
3-Nitroaniline	3.00–3.26	Hexachlorocyclopentadiene	3.00–3.26
4-Bromophenyl phenyl ether	3.00–3.26	Hexachloroethane	3.00–3.26
4-Chloro-3-methylphenol	3.00–3.26	Indeno(1,2,3-c,d)pyrene	0.300–0.326
4-Chlorobenzenamine	3.30–3.59	Isophorone	3.50–3.26
4-Chlorophenyl phenyl ether	3.00–3.26	Naphthalene	0.300–0.326
4-Nitroaniline	3.00–3.26	Nitro-benzene	3.00–3.26
4-Nitrophenol	3.00–3.26	Pentachlorophenol	3.00–3.26
Acenaphthene	0.300–0.326	Phenanthrene	0.300–0.326
Acenaphthylene	0.300–0.326	Phenol	3.00–3.26
Acetophenone	3.00–3.26	Pyrene	0.300–0.326
Anthracene	0.300–0.326	bis(2-Chloroethoxy)methane	3.00–3.26
Atrazine	3.00–3.26	bis(2-Chloroethyl)ether	3.00–3.26
Benzaldehyde	3.00–3.26	bis(2-Chloroisopropyl)ether	3.00–3.09
Benzo(a)anthracene	0.300–0.326	bis(2-Ethylhexyl)phthalate	3.00–3.26
Benzo(a)pyrene	0.300–0.326	m,p-Cresol	3.70–4.02
Benzo(b)fluoranthene	0.300–0.326	n-Nitrosodipropylamine	3.00–3.26
Benzo(ghi)perylene	0.300–0.326	o-Cresol	3.00–3.26
Benzo(k)fluoranthene	0.300–0.326		

Refer to footnotes on page 8A-33.

Table 8A-3
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0833–0.0874
1,3-Dinitrobenzene	0.0833–0.0874
2,4,6-Trinitrotoluene	0.0833–0.0874
2,4-Dinitrotoluene	0.0833–0.0874
2,6-Dinitrotoluene	0.0833–0.0874
2-Amino-4,6-dinitrotoluene	0.0833–0.0874
2-Nitrotoluene	0.0854–0.0896
3-Nitrotoluene	0.0833–0.0874
4-Amino-2,6-dinitrotoluene	0.0833–0.0874
4-Nitrotoluene	0.156–0.164
HMX	0.0833–0.0874
Nitro-benzene	0.0833–0.0874
Pentaerythritol tetranitrate	0.104–0.109
RDX	0.0833–0.0874
Tetryl	0.0833–0.0874

Refer to footnotes on page 8A-33.

Table 8A-4
Summary of Nitrate plus Nitrate Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1 27-Jan-14	Nitrate plus nitrite	2.07	0.170	0.500	10.0			095213-018	EPA 353.2
CCBA-MW1 (Duplicate) 27-Jan-14	Nitrate plus nitrite	1.99	0.085	0.250	10.0			095214-018	EPA 353.2
CCBA-MW2 23-Jan-14	Nitrate plus nitrite	3.62	0.170	0.500	10.0			095208-018	EPA 353.2
CCBA-MW1 07-Apr-14	Nitrate plus nitrite	1.80	0.085	0.250	10.0			095725-018	EPA 353.2
CCBA-MW2 08-Apr-14	Nitrate plus nitrite	3.62	0.170	0.500	10.0			095730-018	EPA 353.2
CCBA-MW2 (Duplicate) 08-Apr-14	Nitrate plus nitrite	3.89	0.170	0.500	10.0			095731-018	EPA 353.2
CCBA-MW1 22-Jul-14	Nitrate plus nitrite	1.61	0.085	0.250	10.0			096269-018	EPA 353.2
CCBA-MW1 (Duplicate) 22-Jul-14	Nitrate plus nitrite	1.64	0.085	0.250	10.0			096270-018	EPA 353.2
CCBA-MW2 21-Jul-14	Nitrate plus nitrite	3.41	0.170	0.500	10.0			096263-018	EPA 353.2
CCBA-MW1 13-Oct-14	Nitrate plus nitrite	1.59	0.085	0.250	10.0			096685-018	EPA 353.2
CCBA-MW2 14-Oct-14	Nitrate plus nitrite	3.32	0.085	0.250	10.0			096691-018	EPA 353.2
CCBA-MW2 (Duplicate) 14-Oct-14	Nitrate plus nitrite	3.47	0.085	0.250	10.0			096692-018	EPA 353.2

Refer to footnotes on page 8A-33.

Table 8A-5
Summary of Alkalinity, Anion, and Total Cyanide Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Bicarbonate Alkalinity	180	0.725	1.00	NE			095213-022	SM2320B
27-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095213-022	SM2320B
	Bromide	0.323	0.067	0.200	NE			095213-016	SW846 9056
	Chloride	28.3	0.335	1.00	NE			095213-016	SW846 9056
	Fluoride	**4.68**	0.165	0.500	4.0			095213-016	SW846 9056
	Sulfate	57.6	0.665	2.00	NE			095213-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095213-027	SW846 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	177	0.725	1.00	NE			095214-022	SM2320B
27-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095214-022	SM2320B
	Bromide	0.325	0.067	0.200	NE			095214-016	SW846 9056
	Chloride	28.4	0.335	1.00	NE			095214-016	SW846 9056
	Fluoride	**4.74**	0.165	0.500	4.0			095214-016	SW846 9056
	Sulfate	57.9	0.665	2.00	NE			095214-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095214-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	178	0.725	1.00	NE			095208-022	SM2320B
23-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095208-022	SM2320B
	Bromide	0.517	0.067	0.200	NE			095208-016	SW846 9056
	Chloride	36.8	0.670	2.00	NE			095208-016	SW846 9056
	Fluoride	1.46	0.033	0.100	4.0			095208-016	SW846 9056
	Sulfate	92.9	1.33	4.00	NE			095208-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095208-027	SW846 9012
CCBA-MW1	Bicarbonate Alkalinity	181	0.725	1.00	NE			095725-022	SM2320B
07-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095725-022	SM2320B
	Bromide	0.334	0.067	0.200	NE			095725-016	SW846 9056
	Chloride	29.2	0.335	1.00	NE			095725-016	SW846 9056
	Fluoride	**4.97**	0.165	0.500	4.0			095725-016	SW846 9056
	Sulfate	58.0	0.665	2.00	NE			095725-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095725-029	SW846 9012

Refer to footnotes on page 8A-33.

Table 8A-5 *(Continued)*
Summary of Alkalinity, Anion, and Total Cyanide Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2 08-Apr-14	Bicarbonate Alkalinity	178	0.725	1.00	NE			095730-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095730-022	SM2320B
	Bromide	0.554	0.067	0.200	NE			095730-016	SW846 9056
	Chloride	38.6	0.670	2.00	NE			095730-016	SW846 9056
	Fluoride	1.59	0.033	0.100	4.0			095730-016	SW846 9056
	Sulfate	97.7	1.33	4.00	NE			095730-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095730-029	SW846 9012
CCBA-MW2 (Duplicate) 08-Apr-14	Bicarbonate Alkalinity	178	0.725	1.00	NE			095731-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095731-022	SM2320B
	Bromide	0.569	0.067	0.200	NE			095731-016	SW846 9056
	Chloride	37.8	0.670	2.00	NE			095731-016	SW846 9056
	Fluoride	1.63	0.033	0.100	4.0			095731-016	SW846 9056
	Sulfate	95.8	1.33	4.00	NE			095731-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095731-029	SW846 9012
CCBA-MW1 22-Jul-14	Bicarbonate Alkalinity	172	0.725	2.00	NE			096269-022	SM2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096269-022	SM2320B
	Bromide	0.320	0.067	0.200	NE			096269-016	SW846 9056
	Chloride	28.9	0.335	1.00	NE			096269-016	SW846 9056
	Fluoride	**4.99**	0.033	0.100	4.0			096269-016	SW846 9056
	Sulfate	57.5	0.665	2.00	NE			096269-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		096269-027	SW846 9012
CCBA-MW1 (Duplicate) 22-Jul-14	Bicarbonate Alkalinity	166	0.725	2.00	NE			096270-022	SM2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096270-022	SM2320B
	Bromide	0.316	0.067	0.200	NE			096270-016	SW846 9056
	Chloride	29.5	0.335	1.00	NE			096270-016	SW846 9056
	Fluoride	**5.02**	0.033	0.100	4.0			096270-016	SW846 9056
	Sulfate	58.6	0.665	2.00	NE			096270-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		096270-027	SW846 9012

Refer to footnotes on page 8A-33.

Table 8A-5 *(Concluded)*
Summary of Alkalinity, Anion, and Total Cyanide Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2	Bicarbonate Alkalinity	170	0.725	1.00	NE			096263-022	SM2320B
21-Jul-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096263-022	SM2320B
	Bromide	0.568	0.067	0.200	NE			096263-016	SW846 9056
	Chloride	37.5	0.670	2.00	NE			096263-016	SW846 9056
	Fluoride	1.47	0.033	0.100	4.0			096263-016	SW846 9056
	Sulfate	95.7	1.33	4.00	NE			096263-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		096263-027	SW846 9012
CCBA-MW1	Bicarbonate Alkalinity	178	0.725	1.00	NE			096685-022	SM2320B
13-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096685-022	SM2320B
	Bromide	0.320	0.067	0.200	NE			096685-016	SW846 9056
	Chloride	28.8	0.335	1.00	NE			096685-016	SW846 9056
	Fluoride	**4.81**	0.033	0.100	4.0			096685-016	SW846 9056
	Sulfate	55.9	0.665	2.00	NE			096685-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096685-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	175	0.725	1.00	NE			096691-022	SM2320B
14-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096691-022	SM2320B
	Bromide	0.558	0.067	0.200	NE			096691-016	SW846 9056
	Chloride	38.2	0.670	2.00	NE			096691-016	SW846 9056
	Fluoride	1.50	0.033	0.100	4.0			096691-016	SW846 9056
	Sulfate	93.8	1.33	4.00	NE			096691-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096691-027	SW846 9012
CCBA-MW2 (Duplicate)	Bicarbonate Alkalinity	179	0.725	1.00	NE			096692-022	SM2320B
14-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096692-022	SM2320B
	Bromide	0.553	0.067	0.200	NE			096692-016	SW846 9056
	Chloride	37.9	0.670	2.00	NE			096692-016	SW846 9056
	Fluoride	1.50	0.033	0.100	4.0			096692-016	SW846 9056
	Sulfate	94.1	1.33	4.00	NE			096692-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096692-027	SW846 9012

Refer to footnotes on page 8A-33.

Table 8A-6
Summary of Perchlorate Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1 27-Jan-14	ND	0.004	0.012	NE	U	UJ	095213-020	EPA 314.0
CCBA-MW1 (Duplicate) 27-Jan-14	ND	0.004	0.012	NE	U	UJ	095214-020	EPA 314.0
CCBA-MW2 23-Jan-14	ND	0.004	0.012	NE	U	UJ	095208-020	EPA 314.0
CCBA-MW1 07-Apr-14	ND	0.004	0.012	NE	U		095725-020	EPA 314.0
CCBA-MW2 08-Apr-14	ND	0.004	0.012	NE	U		095730-020	EPA 314.0
CCBA-MW2 (Duplicate) 08-Apr-14	ND	0.004	0.012	NE	U		095731-020	EPA 314.0
CCBA-MW1 22-Jul-14	ND	0.004	0.012	NE	U		096269-020	EPA 314.0
CCBA-MW1 (Duplicate) 22-Jul-14	ND	0.004	0.012	NE	U		096270-020	EPA 314.0
CCBA-MW2 21-Jul-14	ND	0.004	0.012	NE	U		096263-020	EPA 314.0
CCBA-MW1 13-Oct-14	ND	0.004	0.012	NE	U		096685-020	EPA 314.0
CCBA-MW2 14-Oct-14	ND	0.004	0.012	NE	U		096691-020	EPA 314.0
CCBA-MW2 (Duplicate) 14-Oct-14	ND	0.004	0.012	NE	U		096692-020	EPA 314.0

Refer to footnotes on page 8A-33.

Table 8A-7
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Aluminum	0.0368	0.015	0.050	NE	J		095213-009	SW846 6020
27-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095213-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095213-009	SW846 6020
	Barium	0.00226	0.0006	0.002	2.00	B	0.0059U	095213-009	SW846 6020
	Beryllium	0.000471	0.0002	0.0005	0.004	J		095213-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095213-009	SW846 6020
	Calcium	46.3	0.060	0.200	NE			095213-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095213-009	SW846 6020
	Cobalt	0.0001	0.0001	0.001	NE	J		095213-009	SW846 6020
	Copper	0.000545	0.00035	0.001	NE	J	0.0063U	095213-009	SW846 6020
	Iron	0.117	0.033	0.100	NE			095213-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095213-009	SW846 6020
	Magnesium	11.1	0.010	0.030	NE			095213-009	SW846 6020
	Manganese	0.00331	0.001	0.005	NE	J		095213-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095213-009	SW846 7470
	Nickel	0.000838	0.0005	0.002	NE	J		095213-009	SW846 6020
	Potassium	4.03	0.080	0.300	NE		J	095213-009	SW846 6020
	Selenium	0.00219	0.0015	0.005	0.050	J		095213-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095213-009	SW846 6020
	Sodium	65.4	0.400	1.25	NE			095213-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095213-009	SW846 6020
	Uranium	0.00222	0.000067	0.0002	0.03			095213-009	SW846 6020
	Vanadium	0.00129	0.001	0.005	NE	J	0.0053U	095213-009	SW846 6010
	Zinc	0.00681	0.0035	0.010	NE	J		095213-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1 (Duplicate)	Aluminum	0.0298	0.015	0.050	NE	J		095214-009	SW846 6020
27-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095214-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095214-009	SW846 6020
	Barium	0.0022	0.0006	0.002	2.00	B	0.0059U	095214-009	SW846 6020
	Beryllium	0.000473	0.0002	0.0005	0.004	J		095214-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095214-009	SW846 6020
	Calcium	47.2	0.060	0.200	NE			095214-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095214-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095214-009	SW846 6020
	Copper	0.000508	0.00035	0.001	NE	J	0.0063U	095214-009	SW846 6020
	Iron	0.113	0.033	0.100	NE			095214-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095214-009	SW846 6020
	Magnesium	10.7	0.010	0.030	NE			095214-009	SW846 6020
	Manganese	0.00327	0.001	0.005	NE	J		095214-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095214-009	SW846 7470
	Nickel	0.000876	0.0005	0.002	NE	J		095214-009	SW846 6020
	Potassium	4.19	0.080	0.300	NE		J	095214-009	SW846 6020
	Selenium	0.00225	0.0015	0.005	0.050	J		095214-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095214-009	SW846 6020
	Sodium	60.7	0.400	1.25	NE			095214-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095214-009	SW846 6020
	Uranium	0.00226	0.000067	0.0002	0.03			095214-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095214-009	SW846 6010
	Zinc	0.00437	0.0035	0.010	NE	J		095214-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		095208-009	SW846 6020
23-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095208-009	SW846 6020
	Arsenic	0.0018	0.0017	0.005	0.010	J		095208-009	SW846 6020
	Barium	0.0474	0.0006	0.002	2.00			095208-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095208-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095208-009	SW846 6020
	Calcium	77.9	0.600	2.00	NE			095208-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095208-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095208-009	SW846 6020
	Copper	0.000645	0.00035	0.001	NE	J		095208-009	SW846 6020
	Iron	0.0936	0.033	0.100	NE	J		095208-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095208-009	SW846 6020
	Magnesium	15.5	0.010	0.030	NE			095208-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095208-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095208-009	SW846 7470
	Nickel	0.00119	0.0005	0.002	NE	J		095208-009	SW846 6020
	Potassium	1.42	0.080	0.300	NE			095208-009	SW846 6020
	Selenium	0.00363	0.0015	0.005	0.050	J		095208-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095208-009	SW846 6020
	Sodium	47.5	0.080	0.250	NE			095208-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095208-009	SW846 6020
	Uranium	0.00485	0.000067	0.0002	0.03			095208-009	SW846 6020
	Vanadium	0.0105	0.001	0.005	NE			095208-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095208-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Aluminum	0.0733	0.015	0.050	NE			095725-009	SW846 6020
07-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095725-009	SW846 6020
	Arsenic	0.00179	0.0017	0.005	0.010	J		095725-009	SW846 6020
	Barium	0.00242	0.0006	0.002	2.00			095725-009	SW846 6020
	Beryllium	0.000414	0.0002	0.0005	0.004	J		095725-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095725-009	SW846 6020
	Calcium	48.5	0.060	0.200	NE			095725-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095725-009	SW846 6020
	Cobalt	0.000158	0.0001	0.001	NE	J		095725-009	SW846 6020
	Copper	0.000442	0.00035	0.001	NE	J		095725-009	SW846 6020
	Iron	0.147	0.033	0.100	NE			095725-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095725-009	SW846 6020
	Magnesium	9.57	0.010	0.030	NE		J	095725-009	SW846 6020
	Manganese	0.0044	0.001	0.005	NE	J		095725-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095725-009	SW846 7470
	Nickel	0.00165	0.0005	0.002	NE	J		095725-009	SW846 6020
	Potassium	4.35	0.080	0.300	NE		J	095725-009	SW846 6020
	Selenium	0.00227	0.0015	0.005	0.050	J		095725-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095725-009	SW846 6020
	Sodium	65.4	0.400	1.25	NE			095725-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095725-009	SW846 6020
	Uranium	0.00236	0.000067	0.0002	0.03			095725-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095725-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095725-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		095730-009	SW846 6020
08-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095730-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095730-009	SW846 6020
	Barium	0.0429	0.0006	0.002	2.00			095730-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095730-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095730-009	SW846 6020
	Calcium	80.1	0.300	1.00	NE			095730-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095730-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095730-009	SW846 6020
	Copper	0.000586	0.00035	0.001	NE	J	0.0038U	095730-009	SW846 6020
	Iron	0.132	0.033	0.100	NE			095730-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095730-009	SW846 6020
	Magnesium	14.1	0.010	0.030	NE		J	095730-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095730-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095730-009	SW846 7470
	Nickel	0.00156	0.0005	0.002	NE	J		095730-009	SW846 6020
	Potassium	1.19	0.080	0.300	NE		J	095730-009	SW846 6020
	Selenium	0.00409	0.0015	0.005	0.050	J		095730-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095730-009	SW846 6020
	Sodium	46.1	0.080	0.250	NE			095730-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095730-009	SW846 6020
	Uranium	0.00534	0.000067	0.0002	0.03			095730-009	SW846 6020
	Vanadium	0.00997	0.001	0.005	NE			095730-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095730-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095731-009	SW846 6020
08-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095731-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095731-009	SW846 6020
	Barium	0.0435	0.0006	0.002	2.00			095731-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095731-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095731-009	SW846 6020
	Calcium	75.5	0.300	1.00	NE			095731-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095731-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095731-009	SW846 6020
	Copper	0.000483	0.00035	0.001	NE	J	0.0038U	095731-009	SW846 6020
	Iron	0.130	0.033	0.100	NE			095731-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095731-009	SW846 6020
	Magnesium	14.7	0.010	0.030	NE		J	095731-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095731-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095731-009	SW846 7470
	Nickel	0.00169	0.0005	0.002	NE	J		095731-009	SW846 6020
	Potassium	1.22	0.080	0.300	NE		J	095731-009	SW846 6020
	Selenium	0.00414	0.0015	0.005	0.050	J		095731-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095731-009	SW846 6020
	Sodium	43.1	0.080	0.250	NE			095731-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095731-009	SW846 6020
	Uranium	0.00535	0.000067	0.0002	0.03			095731-009	SW846 6020
	Vanadium	0.00977	0.001	0.005	NE			095731-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095731-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Aluminum	0.0221	0.015	0.050	NE	J		096269-009	SW846 6020
22-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096269-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096269-R09	SW846 6020
	Barium	0.00231	0.0006	0.002	2.00			096269-009	SW846 6020
	Beryllium	0.000515	0.0002	0.0005	0.004	N	J+	096269-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096269-009	SW846 6020
	Calcium	48.9	0.060	0.200	NE	B		096269-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096269-009	SW846 6020
	Cobalt	0.000119	0.0001	0.001	NE	J		096269-009	SW846 6020
	Copper	0.000491	0.00035	0.001	NE	J	0.0031U	096269-009	SW846 6020
	Iron	0.0928	0.033	0.100	NE	J		096269-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096269-009	SW846 6020
	Magnesium	10.0	0.010	0.030	NE			096269-009	SW846 6020
	Manganese	0.00249	0.001	0.005	NE	J		096269-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096269-009	SW846 7470
	Nickel	0.000908	0.0005	0.002	NE	J		096269-009	SW846 6020
	Potassium	4.12	0.080	0.300	NE			096269-009	SW846 6020
	Selenium	0.00196	0.0015	0.005	0.050	J		096269-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096269-009	SW846 6020
	Sodium	62.4	0.400	1.25	NE			096269-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096269-009	SW846 6020
	Uranium	0.00249	0.000067	0.0002	0.03			096269-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	096269-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096269-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1 (Duplicate) 22-Jul-14	Aluminum	0.025	0.015	0.050	NE	J		096270-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		096270-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096270-R09	SW846 6020
	Barium	0.00233	0.0006	0.002	2.00			096270-009	SW846 6020
	Beryllium	0.000546	0.0002	0.0005	0.004	N	J+	096270-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096270-009	SW846 6020
	Calcium	49.2	0.300	1.00	NE	B		096270-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096270-009	SW846 6020
	Cobalt	0.000122	0.0001	0.001	NE	J		096270-009	SW846 6020
	Copper	0.000512	0.00035	0.001	NE	J	0.0031U	096270-009	SW846 6020
	Iron	0.0958	0.033	0.100	NE	J		096270-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096270-009	SW846 6020
	Magnesium	10.2	0.010	0.030	NE			096270-009	SW846 6020
	Manganese	0.00273	0.001	0.005	NE	J		096270-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096270-009	SW846 7470
	Nickel	0.00104	0.0005	0.002	NE	J		096270-009	SW846 6020
	Potassium	3.83	0.080	0.300	NE			096270-009	SW846 6020
	Selenium	0.00195	0.0015	0.005	0.050	J		096270-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096270-009	SW846 6020
	Sodium	61.6	0.400	1.25	NE			096270-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096270-009	SW846 6020
	Uranium	0.00267	0.000067	0.0002	0.03			096270-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	096270-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096270-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		096263-009	SW846 6020
21-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096263-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096263-009	SW846 6020
	Barium	0.0471	0.0006	0.002	2.00			096263-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	N, U		096263-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096263-009	SW846 6020
	Calcium	75.7	0.300	1.00	NE	B		096263-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096263-009	SW846 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		096263-009	SW846 6020
	Copper	0.000665	0.00035	0.001	NE	J		096263-009	SW846 6020
	Iron	0.119	0.033	0.100	NE			096263-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096263-009	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			096263-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096263-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096263-009	SW846 7470
	Nickel	0.00103	0.0005	0.002	NE	J		096263-009	SW846 6020
	Potassium	1.18	0.080	0.300	NE			096263-009	SW846 6020
	Selenium	0.00395	0.0015	0.005	0.050	J		096263-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096263-009	SW846 6020
	Sodium	47.0	0.400	1.25	NE			096263-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096263-009	SW846 6020
	Uranium	0.00587	0.000067	0.0002	0.03			096263-009	SW846 6020
	Vanadium	0.00981	0.001	0.005	NE			096263-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096263-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Aluminum	0.0199	0.015	0.050	NE	J		096685-010	SW846 6020
13-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096685-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096685-010	SW846 6020
	Barium	0.00193	0.0006	0.002	2.00	J		096685-010	SW846 6020
	Beryllium	0.000467	0.0002	0.0005	0.004	J		096685-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096685-010	SW846 6020
	Calcium	54.0	0.300	1.00	NE			096685-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096685-010	SW846 6020
	Cobalt	0.0001	0.0001	0.001	NE	J		096685-010	SW846 6020
	Copper	0.000509	0.00035	0.001	NE	J		096685-010	SW846 6020
	Iron	0.0617	0.033	0.100	NE	J		096685-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096685-010	SW846 6020
	Magnesium	10.6	0.010	0.030	NE			096685-010	SW846 6020
	Manganese	0.00221	0.001	0.005	NE	J		096685-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096685-010	SW846 7470
	Nickel	0.000673	0.0005	0.002	NE	J		096685-010	SW846 6020
	Potassium	4.36	0.080	0.300	NE			096685-010	SW846 6020
	Selenium	0.00207	0.0015	0.005	0.050	J		096685-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096685-010	SW846 6020
	Sodium	67.3	0.400	1.25	NE			096685-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096685-010	SW846 6020
	Uranium	0.00249	0.000067	0.0002	0.03			096685-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096685-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096685-010	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		096691-010	SW846 6020
14-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096691-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096691-010	SW846 6020
	Barium	0.0464	0.0006	0.002	2.00			096691-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096691-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096691-010	SW846 6020
	Calcium	84.1	0.300	1.00	NE			096691-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096691-010	SW846 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		096691-010	SW846 6020
	Copper	0.000561	0.00035	0.001	NE	J	0.0042U	096691-010	SW846 6020
	Iron	0.0812	0.033	0.100	NE	J		096691-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096691-010	SW846 6020
	Magnesium	15.6	0.010	0.030	NE			096691-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096691-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096691-010	SW846 7470
	Nickel	0.00086	0.0005	0.002	NE	J		096691-010	SW846 6020
	Potassium	1.33	0.080	0.300	NE			096691-010	SW846 6020
	Selenium	0.00418	0.0015	0.005	0.050	J		096691-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096691-010	SW846 6020
	Sodium	52.3	0.400	1.25	NE			096691-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096691-010	SW846 6020
	Uranium	0.00585	0.000067	0.0002	0.03			096691-010	SW846 6020
	Vanadium	0.00999	0.001	0.005	NE			096691-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096691-010	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-7 *(Concluded)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW2 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096692-010	SW846 6020
14-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096692-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096692-010	SW846 6020
	Barium	0.0458	0.0006	0.002	2.00			096692-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096692-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096692-010	SW846 6020
	Calcium	82.1	0.300	1.00	NE			096692-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096692-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096692-010	SW846 6020
	Copper	0.000569	0.00035	0.001	NE	J	0.0042U	096692-010	SW846 6020
	Iron	0.0814	0.033	0.100	NE	J		096692-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096692-010	SW846 6020
	Magnesium	15.5	0.010	0.030	NE			096692-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096692-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096692-010	SW846 7470
	Nickel	0.00087	0.0005	0.002	NE	J		096692-010	SW846 6020
	Potassium	1.31	0.080	0.300	NE			096692-010	SW846 6020
	Selenium	0.00385	0.0015	0.005	0.050	J		096692-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096692-010	SW846 6020
	Sodium	50.7	0.400	1.25	NE			096692-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096692-010	SW846 6020
	Uranium	0.00611	0.000067	0.0002	0.03			096692-010	SW846 6020
	Vanadium	0.0107	0.001	0.005	NE			096692-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096692-010	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8
Summary of Cation Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1 27-Jan-14	Calcium	46.8	0.060	0.200	NE			095213-017	SW846 6020
	Magnesium	10.9	0.010	0.030	NE			095213-017	SW846 6020
	Potassium	4.12	0.080	0.300	NE		J	095213-017	SW846 6020
	Sodium	65.2	0.400	1.25	NE			095213-017	SW846 6020
CCBA-MW1 (Duplicate) 27-Jan-14	Calcium	46.9	0.060	0.200	NE			095214-017	SW846 6020
	Magnesium	11.3	0.010	0.030	NE			095214-017	SW846 6020
	Potassium	4.26	0.080	0.300	NE		J	095214-017	SW846 6020
	Sodium	62.3	0.400	1.25	NE			095214-017	SW846 6020
CCBA-MW2 23-Jan-14	Calcium	79.8	0.600	2.00	NE			095208-017	SW846 6020
	Magnesium	15.8	0.010	0.030	NE			095208-017	SW846 6020
	Potassium	1.48	0.080	0.300	NE			095208-017	SW846 6020
	Sodium	48.3	0.080	0.250	NE			095208-017	SW846 6020
CCBA-MW1 07-Apr-14	Calcium	48.2	0.060	0.200	NE			095725-017	SW846 6020
	Magnesium	10.5	0.050	0.150	NE			095725-017	SW846 6020
	Potassium	4.34	0.080	0.300	NE	N		095725-017	SW846 6020
	Sodium	61.1	0.400	1.25	NE			095725-017	SW846 6020
CCBA-MW2 08-Apr-14	Calcium	75.5	0.300	1.00	NE			095730-017	SW846 6020
	Magnesium	15.5	0.050	0.150	NE			095730-017	SW846 6020
	Potassium	1.22	0.080	0.300	NE	N		095730-017	SW846 6020
	Sodium	48.2	0.080	0.250	NE			095730-017	SW846 6020
CCBA-MW2 (Duplicate) 08-Apr-14	Calcium	78.4	0.300	1.00	NE			095731-017	SW846 6020
	Magnesium	16.5	0.050	0.150	NE			095731-017	SW846 6020
	Potassium	1.29	0.080	0.300	NE	N		095731-017	SW846 6020
	Sodium	49.2	0.080	0.250	NE			095731-017	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(Concluded)*
Summary of Cation Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Calcium	49.2	0.060	0.200	NE	B		096269-017	SW846 6020
22-Jul-14	Magnesium	9.98	0.010	0.030	NE			096269-017	SW846 6020
	Potassium	4.20	0.080	0.300	NE			096269-017	SW846 6020
	Sodium	62.7	0.400	1.25	NE			096269-017	SW846 6020
CCBA-MW1 (Duplicate)	Calcium	48.4	0.060	0.200	NE	B		096270-017	SW846 6020
22-Jul-14	Magnesium	9.94	0.010	0.030	NE			096270-017	SW846 6020
	Potassium	4.03	0.080	0.300	NE			096270-017	SW846 6020
	Sodium	63.3	0.400	1.25	NE			096270-017	SW846 6020
CCBA-MW2	Calcium	75.7	0.300	1.00	NE	B		096263-017	SW846 6020
21-Jul-14	Magnesium	14.7	0.010	0.030	NE			096263-017	SW846 6020
	Potassium	1.24	0.080	0.300	NE			096263-017	SW846 6020
	Sodium	45.0	0.080	0.250	NE			096263-017	SW846 6020
CCBA-MW1	Calcium	54.1	0.300	1.00	NE			096685-017	SW846 6020
13-Oct-14	Magnesium	10.7	0.010	0.030	NE			096685-017	SW846 6020
	Potassium	4.41	0.080	0.300	NE			096685-017	SW846 6020
	Sodium	69.9	0.400	1.25	NE			096685-017	SW846 6020
CCBA-MW2	Calcium	83.2	0.300	1.00	NE			096691-017	SW846 6020
14-Oct-14	Magnesium	15.5	0.010	0.030	NE			096691-017	SW846 6020
	Potassium	1.30	0.080	0.300	NE			096691-017	SW846 6020
	Sodium	53.2	0.400	1.25	NE			096691-017	SW846 6020
CCBA-MW2 (Duplicate)	Calcium	81.1	0.300	1.00	NE			096692-017	SW846 6020
14-Oct-14	Magnesium	15.5	0.010	0.030	NE			096692-017	SW846 6020
	Potassium	1.30	0.080	0.300	NE			096692-017	SW846 6020
	Sodium	52.0	0.400	1.25	NE			096692-017	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-9
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Americium-241	5.62 ± 9.02	12.9	6.36	NE	U	BD	095213-033	EPA 901.1
27-Jan-14	Cesium-137	3.01 ± 2.47	3.75	1.82	NE	U	BD	095213-033	EPA 901.1
	Cobalt-60	0.932 ± 3.25	4.17	2.00	NE	U	BD	095213-033	EPA 901.1
	Potassium-40	-26.2 ± 36.4	46.5	22.5	NE	U	BD	095213-033	EPA 901.1
	Gross Alpha	2.26	NA	NA	15 pCi/L	NA	None	095213-034	EPA 900.0
	Gross Beta	3.71 ± 0.996	0.998	0.472	4mrem/yr		J	095213-034	EPA 900.0
CCBA-MW1 (Duplicate)	Americium-241	14.5 ± 16.6	23.5	11.6	NE	U	BD	095214-033	EPA 901.1
27-Jan-14	Cesium-137	0.440 ± 3.99	3.53	1.71	NE	U	BD	095214-033	EPA 901.1
	Cobalt-60	-0.767 ± 2.12	3.58	1.71	NE	U	BD	095214-033	EPA 901.1
	Potassium-40	0.575 ± 39.0	46.4	22.3	NE	U	BD	095214-033	EPA 901.1
	Gross Alpha	0.74	NA	NA	15 pCi/L	NA	None	095214-034	EPA 900.0
	Gross Beta	2.65 ± 0.898	0.993	0.464	4mrem/yr		J	095214-034	EPA 900.0
CCBA-MW2	Americium-241	0.728 ± 11.4	17.6	8.66	NE	U	BD	095208-033	EPA 901.1
23-Jan-14	Cesium-137	0.523 ± 3.10	4.00	1.94	NE	U	BD	095208-033	EPA 901.1
	Cobalt-60	0.374 ± 2.05	3.62	1.72	NE	U	BD	095208-033	EPA 901.1
	Potassium-40	17.5 ± 48.8	34.6	16.3	NE	U	BD	095208-033	EPA 901.1
	Gross Alpha	5.17	NA	NA	15 pCi/L	NA	None	095208-034	EPA 900.0
	Gross Beta	1.88 ± 0.793	0.994	0.469	4mrem/yr		J	095208-034	EPA 900.0

Refer to footnotes on page 8A-33.

Table 8A-9 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Americium-241	7.72 ± 15.7	24.5	12.0	NE	U	BD	095725-033	EPA 901.1
07-Apr-14	Cesium-137	2.57 ± 2.51	3.52	1.70	NE	U	BD	095725-033	EPA 901.1
	Cobalt-60	-1.22 ± 2.11	3.54	1.68	NE	U	BD	095725-033	EPA 901.1
	Potassium-40	-6.16 ± 36.7	51.3	24.7	NE	U	BD	095725-033	EPA 901.1
	Gross Alpha	3.48	NA	NA	15 pCi/L	NA	None	095725-034	EPA 900.0
	Gross Beta	5.06 ± 1.12	1.01	0.488	4mrem/yr		J	095725-034	EPA 900.0
CCBA-MW2	Americium-241	-57.8 ± 27.4	8.01	3.95	NE	U	R	095730-033	EPA 901.1
08-Apr-14	Cesium-137	-2.73 ± 3.65	4.80	2.32	NE	U	BD	095730-033	EPA 901.1
	Cobalt-60	0.494 ± 2.99	5.25	2.50	NE	U	BD	095730-033	EPA 901.1
	Potassium-40	-18.5 ± 52.6	59.1	28.3	NE	U	BD	095730-033	EPA 901.1
	Gross Alpha	4.55	NA	NA	15 pCi/L	NA	None	095730-034	EPA 900.0
	Gross Beta	3.17 ± 0.927	0.992	0.468	4mrem/yr			095730-034	EPA 900.0
CCBA-MW2 (Duplicate)	Americium-241	0.491 ± 18.4	29.4	14.4	NE	U	BD	095731-033	EPA 901.1
08-Apr-14	Cesium-137	-0.13 ± 2.43	3.69	1.77	NE	U	BD	095731-033	EPA 901.1
	Cobalt-60	0.956 ± 2.48	4.40	2.08	NE	U	BD	095731-033	EPA 901.1
	Potassium-40	-37.7 ± 46.9	49.5	23.5	NE	U	BD	095731-033	EPA 901.1
	Gross Alpha	8.82	NA	NA	15 pCi/L	NA	None	095731-034	EPA 900.0
	Gross Beta	2.60 ± 0.882	0.993	0.464	4mrem/yr		J	095731-034	EPA 900.0

Refer to footnotes on page 8A-33.

Table 8A-9 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Americium-241	-17.1 ± 23.0	21.3	10.4	NE	U	BD	096269-033	EPA 901.1
22-Jul-14	Cesium-137	1.71 ± 2.14	3.60	1.73	NE	U	BD	096269-033	EPA 901.1
	Cobalt-60	-2.88 ± 2.53	3.39	1.58	NE	U	BD	096269-033	EPA 901.1
	Potassium-40	17.6 ± 43.4	35.2	16.5	NE	U	BD	096269-033	EPA 901.1
	Gross Alpha	1.66	NA	NA	15 pCi/L	NA	None	096269-034	EPA 900.0
	Gross Beta	4.62 ± 1.18	1.27	0.610	4mrem/yr		7.5U	096269-034	EPA 900.0
CCBA-MW1 (Duplicate)	Americium-241	4.90 ± 5.91	8.67	4.25	NE	U	BD	096270-033	EPA 901.1
22-Jul-14	Cesium-137	-0.163 ± 1.64	2.86	1.38	NE	U	BD	096270-033	EPA 901.1
	Cobalt-60	-0.92 ± 2.13	3.05	1.45	NE	U	BD	096270-033	EPA 901.1
	Potassium-40	26.1 ± 51.0	28.0	13.2	NE	U	BD	096270-033	EPA 901.1
	Gross Alpha	0.79	NA	NA	15 pCi/L	NA	None	096270-034	EPA 900.0
	Gross Beta	4.91 ± 1.26	1.39	0.672	4mrem/yr		7.5U	096270-034	EPA 900.0
CCBA-MW2	Americium-241	-8.17 ± 6.90	9.26	4.53	NE	U	BD	096263-033	EPA 901.1
21-Jul-14	Cesium-137	1.84 ± 1.54	2.62	1.26	NE	U	BD	096263-033	EPA 901.1
	Cobalt-60	0.0694 ± 1.84	2.88	1.35	NE	U	BD	096263-033	EPA 901.1
	Potassium-40	-35.1 ± 35.9	37.7	18.0	NE	U	BD	096263-033	EPA 901.1
	Gross Alpha	4.65	NA	NA	15 pCi/L	NA	None	096263-034	EPA 900.0
	Gross Beta	3.93 ± 1.05	1.15	0.550	4mrem/yr			096263-034	EPA 900.0

Refer to footnotes on page 8A-33.

Table 8A-9 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CCBA-MW1	Americium-241	7.63 ± 11.7	17.6	8.62	NE	U	BD	096685-033	EPA 901.1
13-Oct-14	Cesium-137	0.457 ± 2.06	3.54	1.70	NE	U	BD	096685-033	EPA 901.1
	Cobalt-60	1.33 ± 2.06	3.64	1.72	NE	U	BD	096685-033	EPA 901.1
	Potassium-40	-11.5 ± 36.2	46.2	22.1	NE	U	BD	096685-033	EPA 901.1
	Gross Alpha	1.62	NA	NA	15 pCi/L	NA	None	096685-034	EPA 900.0
	Gross Beta	4.88 ± 1.38	1.70	0.825	4mrem/yr		J	096685-034	EPA 900.0
CCBA-MW2	Americium-241	0.919 ± 25.1	29.1	14.2	NE	U	BD	096691-033	EPA 901.1
14-Oct-14	Cesium-137	0.105 ± 2.17	3.90	1.86	NE	U	BD	096691-033	EPA 901.1
	Cobalt-60	1.51 ± 2.28	4.20	1.96	NE	U	BD	096691-033	EPA 901.1
	Potassium-40	-3.67 ± 47.9	52.9	25.0	NE	U	BD	096691-033	EPA 901.1
	Gross Alpha	5.39	NA	NA	15 pCi/L	NA	None	096691-034	EPA 900.0
	Gross Beta	2.76 ± 1.04	1.44	0.694	4mrem/yr		J	096691-034	EPA 900.0
CCBA-MW2 (Duplicate)	Americium-241	4.06 ± 5.66	7.89	3.88	NE	U	BD	096692-033	EPA 901.1
14-Oct-14	Cesium-137	-2.89 ± 3.47	5.28	2.53	NE	U	BD	096692-033	EPA 901.1
	Cobalt-60	-3.78 ± 5.01	6.16	2.90	NE	U	BD	096692-033	EPA 901.1
	Potassium-40	-8.69 ± 55.1	68.6	32.5	NE	U	BD	096692-033	EPA 901.1
	Gross Alpha	6.61	NA	NA	15 pCi/L	NA	None	096692-034	EPA 900.0
	Gross Beta	1.22 ± 0.997	1.62	0.783	4mrem/yr	U	BD	096692-034	EPA 900.0

Refer to footnotes on page 8A-33.

Table 8A-10
Summary of Field Water Quality Measurements[h], Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	27-Jan-14	13.53	395.0	324.6	6.76	0.49	32.3	3.45
CCBA-MW2	23-Jan-14	12.09	439.4	299.0	7.69	0.29	58.2	6.26
CCBA-MW1	07-Apr-14	15.68	452.5	194.3	6.70	1.19	32.4	3.21
CCBA-MW2	08-Apr-14	16.18	531.1	184.3	7.63	0.23	64.9	6.37
CCBA-MW1	22-Jul-14	20.12	490.2	299.6	6.57	0.41	34.1	3.07
CCBA-MW2	21-Jul-14	18.87	550.2	322.4	7.53	0.17	68.0	6.28
CCBA-MW1	13-Oct-14	16.10	481.5	305.4	6.42	0.32	33.3	3.28
CCBA-MW2	14-Oct-14	16.52	559.0	297.4	7.38	0.16	63.6	6.20

Refer to footnotes on page 8A-33.

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Footnotes for Solid Waste Management Units 8/58 Analytical Results Tables

%	= Percent.
CCBA	= Coyote Canyon Blast Area.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
HMX	= Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	= Identification.
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.
SWMU	= Solid Waste Management Unit.
Tetryl	= Methyl-2,4,6-trinitrophenylnitramine.

[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 Table 8A-1 through 8A-8. MDA applies to Table 8A-9.

MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.

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

NA = Not applicable for gross alpha activities. The MDA could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.

[c]PQL or Critical Level

The PQL applies to Table 8A-4 through 8A-8. Critical level applies to Table 8A-9.

Critical Level = The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

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. MCLs were established by the EPA Office of Water, National Primary Water Regulations (EPA May 2009).

The following are the MCLs for gross alpha particles and beta particles in community water systems:

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

NE = Not established.

Footnotes for Solid Waste Management Units 8/58 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 detected in the blank above the effective MDL.
J	= Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N	= Results associated with a spike analysis that was outside control limits.
NA	= Not applicable.
U	= Analyte is absent or below the MDL.

[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.
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

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1990, “Environmental Measurements Laboratory Procedures Manual,” 27th ed., Vol. 1, Rev. 1992, HASL-300.

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

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.

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 8B
Solid Waste Management Units 8/58
Plots

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Attachment 8B Plots

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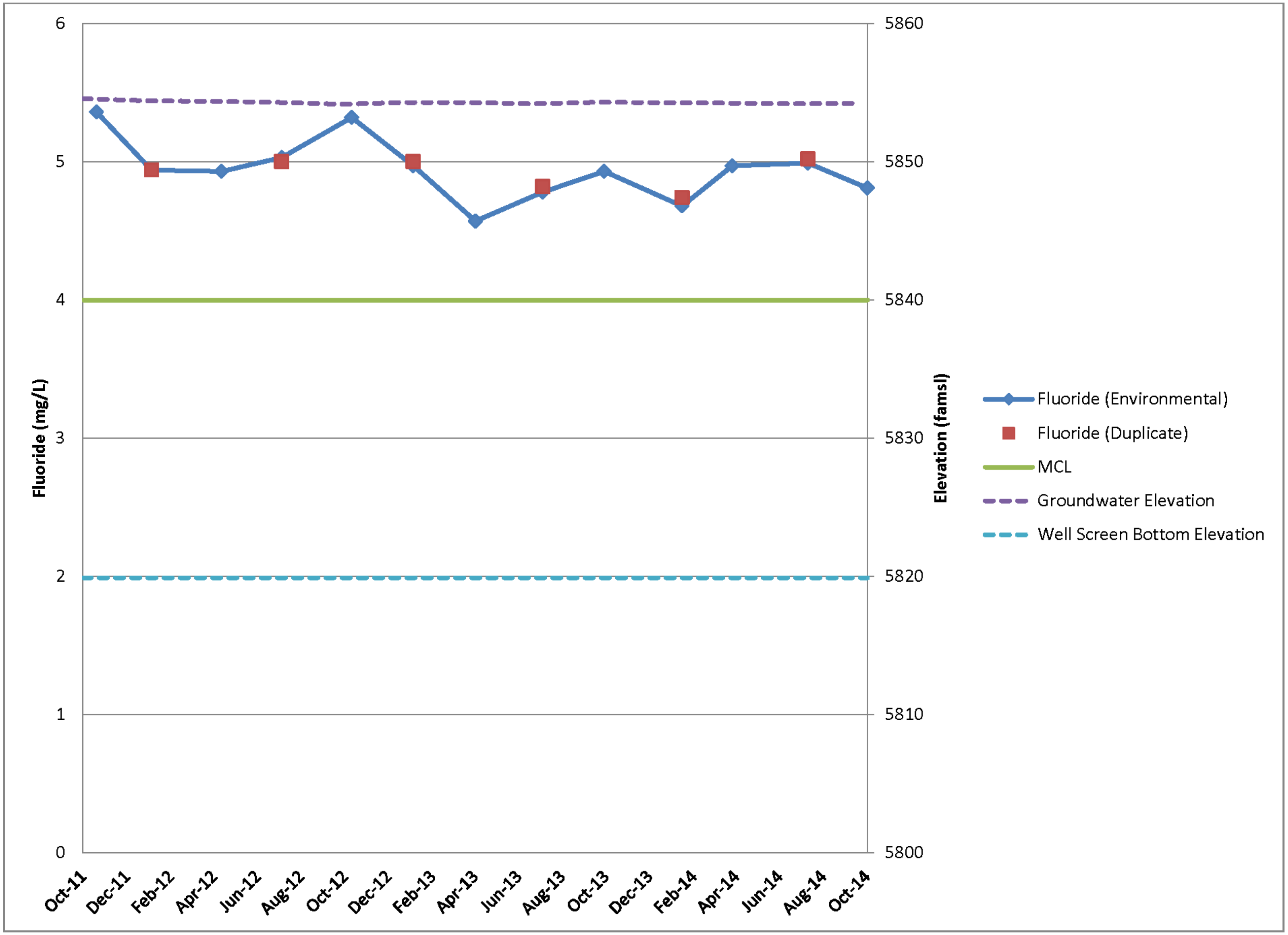

Figure 8B-1. Fluoride Concentrations, CCBA-MW1

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Attachment 8C
Solid Waste Management Units 8/58
Hydrographs

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Attachment 8C Hydrographs

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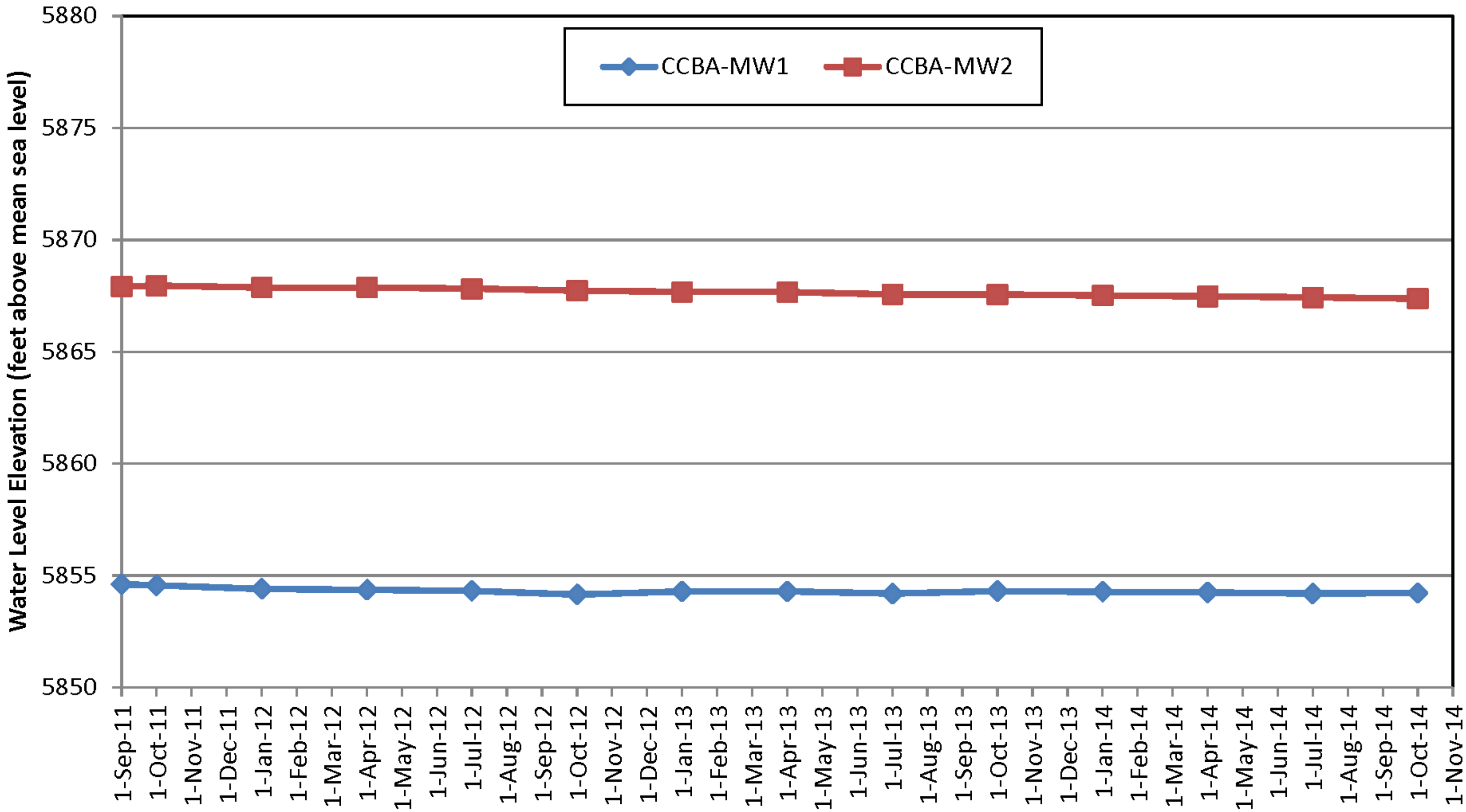

Figure 8C-1. SWMUs 8/58 Study Area Wells

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9.0 Solid Waste Management Unit 49

9.1 Introduction

Drain and Septic System (DSS) Solid Waste Management Unit (SWMU) 49 is located in Lurance Canyon of the Manzanita Mountains (Figure 9-1). Results for groundwater samples from the fractured bedrock have historically been reported as nondetected, or were detected at background concentrations for the constituents of concern (COCs).

9.1.1 Location

The Coyote Canyon Test Area at Sandia National Laboratories, New Mexico (SNL/NM) is located in the eastern portion of Kirtland Air Force Base (KAFB).

SWMU 49, the Building 9820 Drains, is located within the boundaries of the U.S. Forest Service Withdrawn Area on federally-owned land controlled by KAFB and permitted to the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA). The 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 east of SWMU 49. These three canyons form the headwaters of Arroyo del Coyote. The Manzanita Mountains border the eastern margin of the Albuquerque Basin, and the terrain near the site 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.

9.1.2 Site History

SWMU 49 consists of two former ground surface discharge areas that cover a combined 1,584 square feet (approximately 0.04 acres) near inactive Building 9820 (Figure 9-1). The first area (shown as SWMU 49A in Figure 9-1) is located on the west side of the building where a former trailer was used as a darkroom. Photo-processing chemicals may have been discharged there. The second area (shown as SWMU 49B in Figure 9-1) is located approximately 80 ft south of the building where a drainpipe discharged. Wastewater from the building floor drains and a sink discharged there. Building 9820 was constructed in 1958 and used until 1988 (Table 9-1) (SNL June 1996). Due to its remote location, Building 9820 was not connected to the base-wide water supply or sanitary waste systems. A tanker truck was used to haul nonpotable water to a 1,000-gallon storage tank at the building.

Environmental concern about SWMU 49 is based on the potential release of COCs in wastewater discharged to the ground surface at the trailer and the drainpipe outfall. The site is located in a side canyon that slopes to the northwest and drains into the ephemeral channel of Lurance Canyon, approximately 1,750 ft north of the site. Coyote Springs is located approximately 6,000 ft west of the site. The surrounding area is unpaved and sparsely vegetated by bunch grasses, cacti, junipers, and pine trees. No storm sewers are used to direct surface water away from the site.

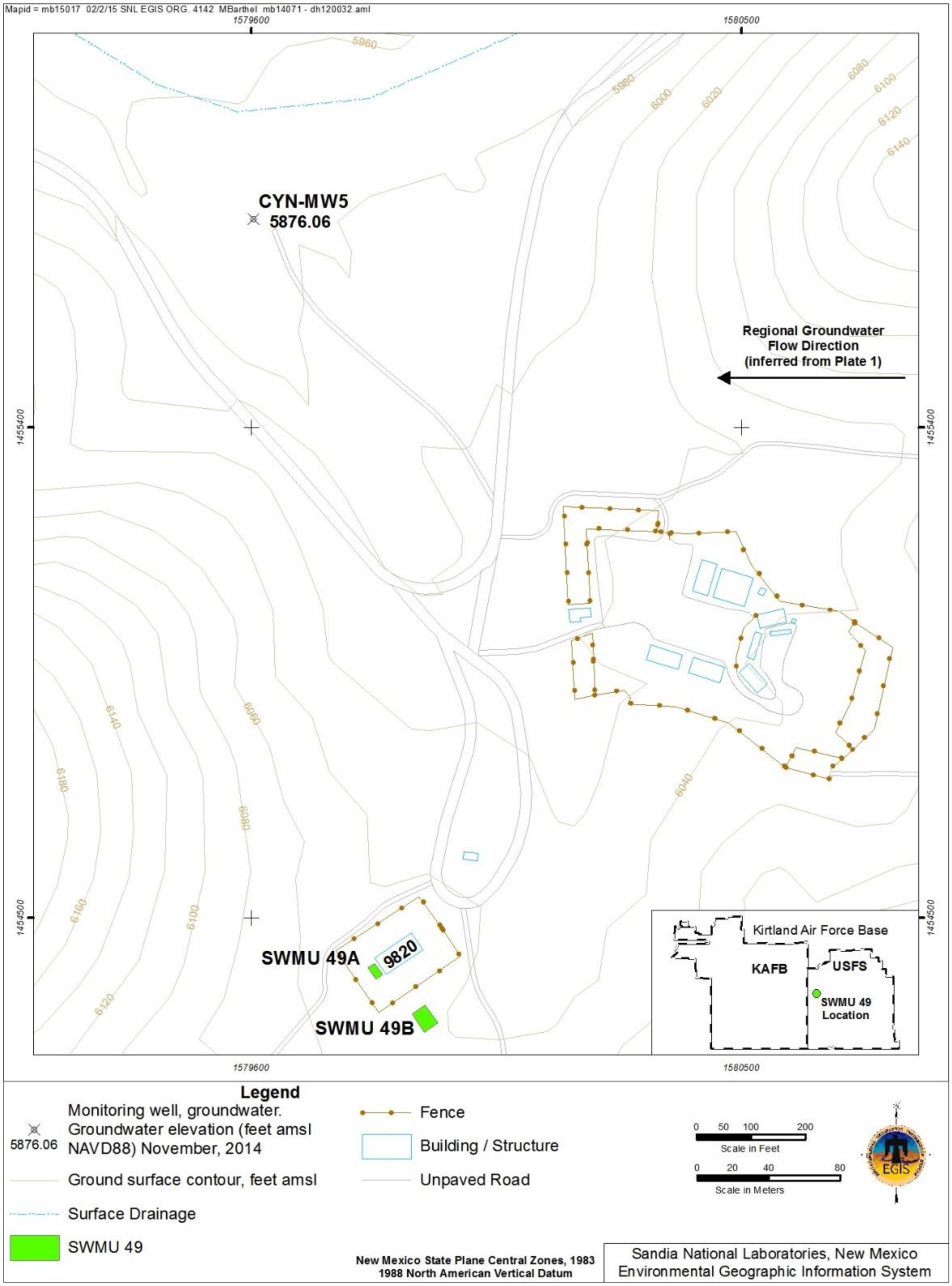

Figure 9-1. Location and Groundwater Elevation at SWMU 49

Table 9-1. Historical Timeline of SWMU 49

Month	Year	Event	Reference
--	1958	Building 9820 and drainpipe constructed.	SNL June 1996
September	1987	DSS SWMU 49 first identified as a potential release site in the September 1987 Comprehensive Environmental Assessment and Response Program Report.	SNL June 1996
--	1988	Use of Building 9820 discontinued.	SNL June 1996
March	1993	Septic Tanks and Drainfields (OU 1295) RCRA Facility Investigation Work Plan submitted to the EPA.	SNL March 1993
--	1993 -1995	Field Investigations completed at SWMU 49.	SNL June 1996
June	1996	NFA proposal for SWMU 49 submitted to the NMED.	SNL June 1996
June	1998	NMED responded with an RSI on the SWMU 49 NFA proposal.	NMED June 1998
November	1998	Response submitted to the first NMED RSI for SWMU 49.	SNL November 1998
October	1998	A SAP describing technical procedures to be used to complete environmental investigations at the SWMU and AOC sites submitted to the NMED.	SNL October 1999
January	2000	October 1999 SAP approved by the NMED.	NMED January 2000
June	2000	NMED issued a second RSI on the SWMU 49 NFA proposal and submitted the first response for SWMU 49.	NMED June 2000
September	2000	Response submitted to the second NMED RSI for SWMU 49.	SNL September 2000
August	2001	Groundwater monitoring well CYN-MW5 is installed downslope of SWMU 49.	SNL June 2005
November	2001	FIP documenting specific investigation procedures to be completed at DSS AOC sites submitted to the NMED.	SNL November 2001
February	2002	The DSS FIP approved by the NMED.	NMED February 2002
April	2004	Completion of eight quarters of groundwater sampling for monitoring well CYN-MW5.	SNL June 2005
May	2004	Well CYN-MW5 incorporated into the Burn Site Groundwater Study Area.	SNL October 2005
June	2005	A third RSI response submitted to the NMED that included the results of fieldwork completed at SWMU 49 since the June 1996 NFA report and an updated risk assessment.	SNL June 2005
September	2005	NMED issues Certificate of Completion for CAC without Controls for SWMU 49.	NMED September 2005
March	2006	Request for Class III Permit Modification submitted. Public Notice meeting published. Documents supporting NFA (CAC) for DSS SWMU 49 compiled.	SNL March 2006
February	2005	NMED states that well CYN-MW5 is too distant to be considered part of the Burn Site Groundwater Study Area. Groundwater sampling discontinued.	NMED February 2005
April	2010	NMED requires that well CYN-MW5 be sampled annually as part of LTS requirements for SWMU 49.	NMED April 2010
March	2011	Well CYN-MW5 sampled as part of LTS.	SNL February 2011
January	2012	Well CYN-MW5 sampled as part of LTS.	SNL January 2012
January	2013	Well CYN-MW5 sampled as part of LTS.	SNL December 2012
January	2014	Well CYN-MW5 sampled as part of LTS.	SNL January 2014

NOTES:

AOC = Area of Concern.
CAC = Corrective Action Complete.
CYN = Canyons.
DSS = Drain and Septic System.
EPA = U.S. Environmental Protection Agency.
FIP = Field Implementation Plan.
LTS = Long-Term Stewardship.
MW = Monitoring Well.
NFA = No Further Action.
NMED = New Mexico Environment Department.
OU = Operable Unit.
RCRA = Resource Conservation and Recovery Act.
RSI = Request for Supplemental Information.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

Building 9820 is a small, one-story building that was used for the synthesis of high explosive (HE) compounds, photo-processing, woodworking, and metal machining in support of weapons testing. Five floor drains and a hand sink were connected to a 4-inch diameter drain line. The machine shop opened in the mid-1960s and may have discharged solvents into the floor drains. Small quantities of photographic film were processed from the mid-1970s to 1988 inside the building and also in the darkroom trailer. Occasional washing of nickel-cadmium batteries with dilute acetic acid may have discharged wastewater into the building floor drains or sink. Based on the activities performed at the building and trailer, the primary COCs for SWMU 49 are HE compounds (e.g., Baratol), photo-processing chemicals (e.g., fixers and developers), various metals (i.e., cadmium, hexavalent chromium, cyanide, and silver), and volatile organic compounds (VOCs; e.g., methanol, toluene, and trichloroethene).

Groundwater monitoring well CYN-MW5 is located approximately 1,350 ft to the north and downslope of Building 9820. The ground surface at the wellhead is approximately 60 ft lower than the elevation near the building. The well is located near a small arroyo that directs stormwater from the site into the channel in Lurance Canyon. The well is screened in fractured Precambrian quartzite at a depth of 135 to 155 ft below ground surface (bgs) (SNL June 2005). The primary channel of the Lurance Canyon arroyo is located about 350 ft to the north of the well.

9.1.3 Monitoring History

Groundwater monitoring well CYN-MW5 was installed in August 2001 as part of the DSS investigation of SWMU 49. Eight sampling events occurred during the initial DSS investigation (July 2002 through May 2004) and the results were submitted to the New Mexico Environment Department (NMED) in the SNL/NM Environmental Restoration (ER) Project response to the third Request for Supplemental Information (SNL June 2005).

Following the May 2004 sampling event, monitoring well CYN-MW5 was incorporated into the Burn Site Groundwater (BSG) monitoring network as a downgradient well. The analytical results for monitoring well CYN-MW5 were reported in the BSG chapter of the Annual Groundwater Monitoring Reports for several years (SNL April 2004). 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 June 2005. Most recently, sampling at monitoring well CYN-MW5 has been incorporated into the SNL/NM Long-Term Stewardship groundwater sampling program in response to other NMED requirements (NMED April 2010).

9.1.4 Current Monitoring Network

Monitoring well CYN-MW5 is the only groundwater monitoring well in the SWMU 49 study area. This well was installed in August 2001 and is screened from 135 to 155 ft bgs in fractured Precambrian quartzite.

9.1.5 Summary of Calendar Year 2014 Activities

The following activities took place for the SWMU 49 investigation during Calendar Year (CY) 2014 (January through December 2014):

- Annual groundwater sampling was conducted at monitoring well CYN-MW5 in January 2014.
- Periodic groundwater elevation data were obtained from monitoring well CYN-MW5.

- Tables of analytical results (Attachment 9A) and a hydrograph (Attachment 9B) were prepared in support of this report.

9.1.6 Summary of Future Activities

NMED approved completion of corrective action at SWMU 49 in conjunction with renewal of the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (Permit) (NMED December 2014). No long-term controls are needed and no future sampling activities are planned at SWMU 49.

9.1.7 Current Conceptual Model

The following sections present an updated discussion of the hydrogeologic regime, conceptual site model, and contaminant findings for SWMU 49.

9.1.7.1 Regional Hydrogeologic Conditions

SWMU 49 is located in a side canyon on the south side of Lurance Canyon (Plate 1). Alluvium covers the canyon floor. The surrounding ridges consist of Precambrian outcrops (e.g., granite, gneiss, and quartzite) and Paleozoic outcrops (e.g., limestone, sandstone, and conglomerate). The outcrops are sporadically covered by colluvium. The base-wide potentiometric surface map (Plate 1) shows that groundwater flow in fractured bedrock is generally toward the west. The regional groundwater flow direction is depicted in Figure 9-1. No potable water-supply wells are located within 5 miles of the site.

9.1.7.2 Hydrogeologic Conditions at SWMU 49

SWMU 49 consists of two small areas (SWMUs 49A and 49B) near Building 9820 where wastewater discharged from 1958 to 1988 (Figure 9-1). The site is covered by colluvium that is underlain by bedrock. Building 9820 is situated at an elevation of approximately 6,040 ft above mean sea level (amsl). Overall, the terrain slopes northwest and west. No perennial surface water features, such as springs, are located within 1 mile of SWMU 49. Monitoring well CYN-MW5 is located approximately 1,350 ft to the north and downslope of Building 9820. The ground surface at the wellhead is approximately 60 ft lower than at the building.

The amount of precipitation available for groundwater recharge at SWMU 49 is minimal due to scant rainfall and high evapotranspiration rates. Summer (monsoonal) thunderstorms are responsible for the majority of rainfall. The average rainfall, as measured at the nearest active rain gauge (the National Weather Service station at the Albuquerque International Sunport) during the period from 1914 through 2013 was 8.65 inches per year (WRCC-DRI 2015). The station is located 10 miles northwest of SWMU 49 at an elevation of 5,310 ft amsl. By extrapolation of the precipitation model presented in SNL/NM conceptual model of groundwater flow and contaminant transport at the canyon area (SNL May 2004), the average annual precipitation for SWMU 49, where the elevation is approximately 6,040 ft amsl, is estimated to be approximately 11.5 inches per year. Intense sunlight and low humidity throughout much of the year creates high rates of evapotranspiration, resulting in minimal groundwater recharge. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

In 2001, a location downslope of SWMU 49 was agreed on by NMED, DOE/NNSA, and Sandia Corporation (Sandia) personnel for the installation of groundwater monitoring well CYN-MW5. The well was installed in August 2001 using the air-rotary casing hammer technique, and the borehole was temporarily cased to 50 ft bgs. Dry alluvium consisting of silty sand and fine-to-coarse gravel was encountered from the ground surface to 90 ft bgs. Fractured Precambrian quartzite was encountered from 90 ft bgs to the borehole total depth of 190 ft bgs. During drilling, groundwater was encountered at a depth of 140 ft bgs. The most productive zone in the borehole was 140 to 160 ft bgs and corresponded to the most highly fractured interval. The borehole was blown dry and allowed to recover overnight. The water level was at 102 ft bgs on the following morning, which indicates that groundwater in the area is mostly likely under confined condition. The well was screened from 135 to 155 ft bgs in fractured quartzite (Table 9-2).

Table 9-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Well CYN-MW5 at SWMU 49

Well ID	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, November 2014 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Approximate Pressure Head (ft[a])
CYN-MW5	5,981.30	135 – 155	5,846.30	5,876.06	5,836.30	40

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CYN = Canyons.
ft = Foot (feet).
ID = Identification.
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The November 2014 groundwater elevation at monitoring well CYN-MW5 was 5,806 ft amsl. Compared to the mid-point elevation of the screen, the pressure head was approximately 40 ft and indicative of confined conditions. Groundwater flows to the west through a fractured bedrock system. Based on the potentiometric surface depicted on Plate 1, the horizontal gradient is approximately 0.01 feet per foot.

During sampling, the drawdown in monitoring well CYN-MW5 is not excessive and the quantity of water produced is clearly adequate for low-flow sampling purposes. Groundwater samples are collected using pneumatic (nitrogen gas activated) Bennett™ piston pumps.

9.1.7.3 Local Direction of Flow

The conceptual hydrogeologic model for SWMU 49 is based on data and findings obtained from monitoring well CYN-MW5, several nearby monitoring wells located upgradient and downgradient in Lurance Canyon (Plate 1), and hydrogeologic investigations conducted at the Burn Site (SNL May 2004) and at SWMU 58 (Chapter 8.0). Groundwater in the SWMU 49 area occurs in a fractured bedrock system under confined conditions. The depth to groundwater at monitoring well CYN-MW5 is approximately 140 ft bgs in a fractured interval of Precambrian quartzite. Groundwater in the bedrock predominantly moves through a confined, low-permeability fracture system. A series of naturally filled fractures in the upper bedrock probably serves as a confining unit. In November 2014, the potentiometric surface at monitoring well CYN-MW5 has an elevation of approximately 5,876 ft amsl. The amount of precipitation available for groundwater recharge at SWMU 49 is minimal due to the scant rainfall and high evapotranspiration. Historical water level data indicate that seasonal effects, primarily due to thunderstorms, rarely occur. The hydrograph (Figure 9B-1 of Attachment 9B) shows that significant water level increases only occurred twice in the last 10 years. During 2002 through 2014, the overall trend has been downward. For the last five years, the water level in monitoring well CYN-MW5 has declined at approximately 0.3 feet per year. Groundwater underflow along Lurance Canyon probably discharges to the unconsolidated basin-fill deposits (primarily the Santa Fe Group) of the Albuquerque Basin after crossing the Tijeras and Sandia faults. The hydraulic gradient is approximately 0.01 feet per foot near the well. No potable water supply wells are located within 5 miles of the site.

9.1.7.4 Contaminant Sources

From 1958 to 1988, wastewater discharged to the ground surface at two locations at SWMU 49. The water possibly contained photo-processing chemicals, HE compounds, and VOCs. The areas around the discharge points were characterized by soil sampling as part of the DSS investigation.

9.1.7.5 Contaminant Distribution and Transport in Groundwater

No COCs exceed the applicable U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) (EPA May 2009) in the CY 2014 groundwater samples collected from monitoring well CYN-MW5. No groundwater contamination is suspected at SWMU 49.

9.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM ER Operations (formerly ER Project) as well as implements and enforces regulations mandated by the RCRA. All ER Operations SWMUs and Areas of Concern (AOCs) are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (EPA August 1993). All corrective action requirements pertaining to SWMUs and AOCs are contained in the Compliance Order on Consent (the Consent Order) (NMED April 2004) between the DOE, Sandia, and NMED.

The DOE/NNSA and Sandia received a letter from the NMED dated April 8, 2010, entitled *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001* (NMED April 2010). The NMED letter lists SWMU 49 under the heading of "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls" and further stated that pursuant to Section III.W.3.b of the Consent Order (NMED April 2004); SWMU 49 requires long-term monitoring of groundwater on an annual basis as a site control. The NMED specified that for SWMU 49, the analytes to be monitored include general chemistry, VOCs, HE compounds, perchlorate, metals, cyanide, nitrate plus nitrite (NPN), gross alpha/beta activity, and radionuclides by gamma spectroscopy.

In this report SWMU 49 groundwater monitoring data are presented for both hazardous and radioactive constituents; however, the monitoring data for radionuclides (i.e., gamma spectroscopy and gross alpha/beta activity) are provided voluntarily by the DOE/NNSA and Sandia. 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 (NMED April 2004).

9.3 Scope of Activities

The activities conducted for SWMU 49 during this reporting period are listed in Section 9.1.5 and involved groundwater monitoring that consisted of water level measurements and sampling and analysis as summarized in Table 9-3.

The analytical parameters are listed in Table 9-4. Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples may include duplicate environmental, split, equipment blank (EB), and trip blank (TB) samples.

Table 9-3. Groundwater Monitoring Well Network and Sampling Date for SWMU 49, Calendar Year 2014

Date of Sampling Event	Wells Sampled	SAP
January 2014	CYN-MW5	*SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2014 Annual Sampling* (SNL January 2014)

NOTES:
CYN = Canyons.
MW = Monitoring Well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

Table 9-4. Parameters Sampled at SWMU 49

Parameter	January 2013
Alkalinity (total, bicarbonate, carbonate) Anions Cations Gamma Spec* Gross Alpha Activity Gross Beta Activity High Explosive Compounds NPN Perchlorate TAL Metals, plus Total Uranium Total Cyanide VOCs	CYN-MW5

NOTES:
CYN = Canyons.
Gamma Spec* = Gamma spectroscopy short list (americium-241, cesium-137, cobalt-60, and potassium-40).
MW = Monitoring well.
NPN = Nitrate plus nitrate.
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.
VOC = Volatile organic compound.

9.4 Field Methods and Measurements

The monitoring procedures conducted for SWMU 49 groundwater monitoring are described in detail in Section 1.3. The groundwater elevation is shown on Figure 9-1 and depicted on the hydrograph presented on Figure 9B-1 (Attachment 9B).

9.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

9.6 Summary of Analytical Results

This section discusses analytical results, exceedances of regulatory standards, and pertinent trends in COC concentrations. The analytical results and field measurements for the CY 2014 SWMU 49 sampling event are presented in Tables 9A-1 through 9A-8 (Attachment 9A). Data qualifiers are explained in the footnotes following Table 9A-8.

No VOCs were detected. The method detection limits (MDLs) for all analyzed VOCs are listed in Table 9A-1 (Attachment 9A).

No HE compounds were detected. The MDLs for all analyzed HE compounds are listed in Table 9A-2 (Attachment 9A).

The analytical results for NPN (reported as nitrogen) are presented in Table 9A-3 (Attachment 9A). No NPN results exceed the MCL of 10 milligrams per liter (mg/L). The NPN concentration in the environmental sample was 2.20 mg/L

The results for alkalinity, anion, cation, and total cyanide results are provided in Table 9A-4 (Attachment 9A). No detections of these constituents exceed MCLs, where established.

The analytical results for perchlorate are presented in Table 9A-5 (Attachment 9A). There were no detections of perchlorate. Currently, no MCL is established for perchlorate. Perchlorate results do not exceed the NMED-specified screening level/MDL of 4 micrograms per liter (NMED April 2004).

Total metal results are presented in Table 9A-6 (Attachment 9A). No metals exceed established MCLs.

Groundwater samples were analyzed for gross alpha/beta activity and radionuclides by gamma spectroscopy. The results are presented in Table 9A-7 (Attachment 9A). All gross alpha/beta activity results are below MCLs, where established. Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4 should not include uranium. 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. Gamma spectroscopy analysis detected no isotopes above the associated minimum detectable activity.

Field water quality parameters are measured during purging of the well, prior to sampling, and include temperature, specific conductance, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. Parameter measurements obtained immediately prior to sample collection are presented in Table 9A-8 (Attachment 9A).

9.7 Quality Control Results

Field and laboratory QC samples were collected and prepared as described in Section 1.3. Data validation qualifiers are presented with the analytical results in Tables 9A-3 through 9A-7 (Attachment 9A). The results of QC samples and the impact on data quality for the SWMU 49 sampling event are discussed in the following sections.

All reported values for any QC sample did not exceed established MCLs.

No VOCs were detected above laboratory MDLs in any TB sample.

The compounds detected in the FB sample included bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was required because these compounds were not detected in the environmental sample.

Laboratory data qualifiers are provided with the analytical results in Tables 9A-3 through 9A-7 (Attachment 9A).

9.8 Variances and Nonconformances

No variances or nonconformances from field or sampling requirements as specified in the SWMU 49 groundwater monitoring Mini-Sampling and Analysis Plan (SNL January 2014) occurred during CY 2014 sampling activities.

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted, and all data are determined as acceptable and reported QC measures appear adequate. Data validation qualifiers are provided with the analytical results in Tables 9A-3 through 9A-7 (Attachment 9A).

9.9 Summary and Conclusions

This section provides a brief summary of activities, discussion of COCs, if any, that exceed standards, trends of concentrations versus time, and the current conceptual site model.

SWMU 49 is located in western Lurance Canyon. The DSS groundwater investigation was initiated in 2001 at the request of the NMED to evaluate the discharge areas associated with Building 9820. The one groundwater monitoring well in the study area (CYN-MW5) is located downgradient of the site and was sampled in January 2014. The samples were analyzed for alkalinity (total, bicarbonate, carbonate), anions, cations, HE compounds, NPN, perchlorate, Target Analyte List metals (plus total uranium), total cyanide, VOCs, gross alpha/beta activity, and radionuclides by gamma spectroscopy. Analytical results were compared with EPA MCL guidelines for drinking water (EPA May 2009). No parameters were detected above established MCLs in the groundwater samples.

The analytical results for this reporting period are consistent with historical concentrations. The conceptual model described in Section 9.1.7 does not require modification based on the analytical results for this reporting period.

Annual groundwater monitoring at SWMU 49 will be discontinued. NMED approved completion of corrective action at SWMU 49 in conjunction with renewal of the Permit (NMED December 2014). No long-term controls are needed, and no future sampling activities are planned at SWMU 49.

9.10 References

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SNL May 2004 Sandia National Laboratories, New Mexico (SNL/NM), May 2004. *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Canyon Area*, Sandia Report SAND2004-2673P, May 2004.

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SNL November 2001 Sandia National Laboratories, New Mexico (SNL/NM), November 2001. *Field Implementation Plan, Characterization of Non-Environmental Restoration Drain and Septic Systems*, Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

SNL September 2000 Sandia National Laboratories, New Mexico (SNL/NM), September 2000. *Environmental Restoration Project Responses to NMED Request for Supplemental Information, No Further Action Proposals (4th Round) Dated June 1996*, Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

SNL October 1999 Sandia National Laboratories, New Mexico (SNL/NM), October 1999. *Sampling and Analysis Plan (SAP) for Characterizing and Assessing Potential Releases to the Environment from Septic and Other Miscellaneous Drain Systems at Sandia National Laboratories/New Mexico*, Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

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Attachment 9A
Solid Waste Management Unit 49
Analytical Results Tables

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Attachment 9A Tables

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Table 9A-1
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300	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	3.00
1,2-Dichloropropane	0.300	Methylene chloride	3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	3.00	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 9A-13.

Table 9A-2
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0838
1,3-Dinitrobenzene	0.0838
2,4,6-Trinitrotoluene	0.0838
2,4-Dinitrotoluene	0.0838
2,6-Dinitrotoluene	0.0838
2-Amino-4,6-dinitrotoluene	0.0838
2-Nitrotoluene	0.0859
3-Nitrotoluene	0.0838
4-Amino-2,6-dinitrotoluene	0.0838
4-Nitrotoluene	0.157
HMX	0.0838
Nitro-benzene	0.0838
Pentaerythritol tetranitrate	0.105
RDX	0.0838
Tetryl	0.0838

Refer to footnotes on page 9A-13.

Table 9A-3
Summary of Nitrate plus Nitrite Results, Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW5 28-Jan-14	Nitrate plus nitrite	2.20	0.085	0.250	10.0			095241-018	EPA 353.2

Refer to footnotes on page 9A-13.

Table 9A-4
Summary of Alkalinity, Anion, Cation, and Total Cyanide Results,
Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW5	Bicarbonate Alkalinity	149	0.725	1.00	NE			095241-022	SM2320B
28-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095241-022	SM2320B
	Bromide	0.160	0.067	0.200	NE	J		095241-016	SW846 9056
	Chloride	15.7	0.134	0.400	NE			095241-016	SW846 9056
	Fluoride	0.334	0.033	0.100	4.0			095241-016	SW846 9056
	Sulfate	27.7	0.266	0.800	NE			095241-016	SW846 9056
	Calcium	56.3	0.600	2.00	NE	B		095241-017	SW846 6020
	Magnesium	10.4	0.010	0.030	NE			095241-017	SW846 6020
	Potassium	2.49	0.080	0.300	NE			095241-017	SW846 6020
	Sodium	14.4	0.080	0.250	NE		J	095241-017	SW846 6020
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095241-027	SW846 9012B

Refer to footnotes on page 9A-13.

Table 9A-5
Summary of Perchlorate Results,
Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW5 28-Jan-14	ND	0.004	0.012	NE	U	UJ	095241-020	EPA 314.0

Refer to footnotes on page 9A-13.

Table 9A-6
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW5	Aluminum	0.0633	0.015	0.050	NE			095241-009	SW846 6020
28-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095241-009	SW846 6020
	Arsenic	0.00538	0.0017	0.005	0.010			095241-009	SW846 6020
	Barium	0.172	0.0006	0.002	2.00			095241-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095241-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095241-009	SW846 6020
	Calcium	58.1	0.600	2.00	NE	B		095241-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095241-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095241-009	SW846 6020
	Copper	0.000646	0.00035	0.001	NE	J		095241-009	SW846 6020
	Iron	0.214	0.033	0.100	NE			095241-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095241-009	SW846 6020
	Magnesium	10.7	0.010	0.030	NE			095241-009	SW846 6020
	Manganese	0.00131	0.001	0.005	NE	J		095241-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095241-009	SW846 7470
	Nickel	0.00185	0.0005	0.002	NE	J		095241-009	SW846 6020
	Potassium	2.55	0.080	0.300	NE			095241-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		095241-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095241-009	SW846 6020
	Sodium	15.5	0.080	0.250	NE		J	095241-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095241-009	SW846 6020
	Uranium	0.000723	0.000067	0.0002	0.03			095241-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095241-009	SW846 6010
	Zinc	0.00534	0.0035	0.010	NE	B, J	0.018U	095241-009	SW846 6020

Refer to footnotes on page 9A-13.

Table 9A-7
Summary of Gamma Spectroscopy, Gross Alpha, and Gross Beta Results, Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[f]	Validation Qualifier[g]	Sample No.	Analytical Method[h]
CYN-MW5	Americium-241	-0.975 ± 10.2	17.2	8.47	NE	U	BD	095241-033	EPA 901.1
28-Jan-14	Cesium-137	1.78 ± 2.03	3.28	1.59	NE	U	BD	095241-033	EPA 901.1
	Cobalt-60	-1.24 ± 1.97	3.15	1.50	NE	U	BD	095241-033	EPA 901.1
	Potassium-40	-19 ± 32.1	44.0	21.2	NE	U	BD	095241-033	EPA 901.1
	Gross Alpha	0.374	NA	NA	15 pCi/L	NA	None	095241-034	EPA 900.0
	Gross Beta	3.96 ± 1.04	0.987	0.464	NE		J	095241-034	EPA 900.0

Refer to footnotes on page 9A-13.

Table 9A-8
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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-MW5	28-Jan-14	14.40	275.5	340.5	6.15	1.32	46.4	4.73

Refer to footnotes on page 9A-13.

Footnotes for Solid Waste Management Unit 49 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 = Identification.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
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

Values in **bold** exceed the established MCL.
Activities of zero or less are considered to be not detected.
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).

[b]MDL or MDA

MDA = Minimum detectable activity. 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

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. MCLs were established by the EPA Office of Water, National Primary Water Regulations (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 Solid Waste Management Unit 49 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 = Analyte was detected in the blank above the effective MDL.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
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 = Associated value is an estimated quantity.
None = No data validation for corrected gross alpha activity.
U = Analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ = Analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

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

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.

[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 9B
Solid Waste Management Unit 49
Hydrographs

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Attachment 9B Hydrographs

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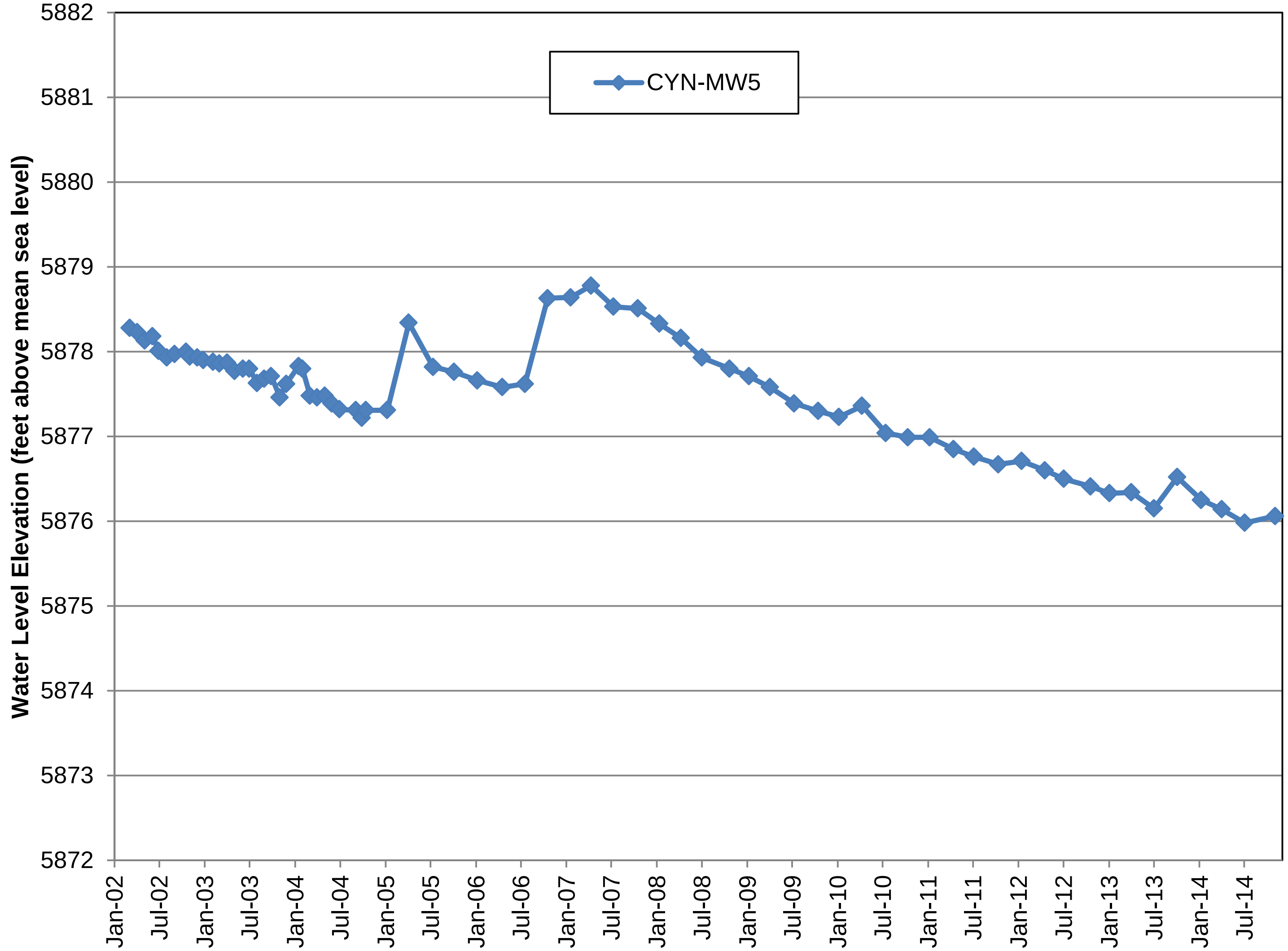

Figure 9B-1. SWMU 49 Study Area Well

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10.0 Solid Waste Management Unit 68

10.1 Introduction

This chapter summarizes the Calendar Year (CY) 2014 quarterly groundwater sampling events for Old Burn Site monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3, located within Solid Waste Management Unit (SWMU) 68 at Sandia National Laboratories, New Mexico (SNL/NM).

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were installed at SWMU 68 in August 2011. The installation report was approved by the New Mexico Environment Department (NMED) in April 2012 (NMED April 2012). The installation and monitoring of these wells are designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) (NMED April 2004) between the NMED, U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), and the NMED letter dated April 8, 2010, from the NMED Hazardous Waste Bureau requiring additional corrective action, and specifically additional groundwater monitoring at SWMU 68 (NMED April 2010). In October 2014, DOE and Sandia notified NMED that the additional groundwater monitoring at SWMU 68 had been completed, and would be discontinued (SNL October 2014).

Monitoring well OBS-MW1 was sampled on January 14, 2014; April 14, 2014; July 16, 2014; and October 6, 2014. Monitoring well OBS-MW2 was sampled on January 22, 2014; April 15, 2014; July 16, 2014; and October 7, 2014. Monitoring well OBS-MW3 was sampled on January 21, 2014; April 16, 2014; July 17, 2014; and October 8, 2014. The groundwater samples were collected in accordance with the NMED-approved Groundwater Characterization Work Plan (SNL September 2010) and Mini-Sampling and Analysis Plans (SAPs) (SNL December 2013, March 2014, July 2014, and September 2014a). The groundwater samples from each well were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, hexavalent chromium, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

Analytical results for the CY 2014 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA May 2009). No parameters were detected above established MCLs.

The eighth quarter of groundwater monitoring required by NMED (NMED April 2010) was conducted in July 2013 (SNL September 2014b). The thirteenth and final quarterly groundwater sampling event at SWMU 68 was conducted in October 2014.

10.1.1 Location

SWMU 68 is located in the Coyote Test Field, approximately 0.8 miles north of the southern boundary of Kirtland Air Force Base (KAFB), and approximately 0.6 miles to the west of the U.S. Forest Service Withdrawn Area (Figure 10-1). SWMU 68 encompasses approximately 6.5 acres of generally flat and gently westerly sloping terrain at an average elevation of approximately 5,860 feet (ft) above mean sea level (amsl).

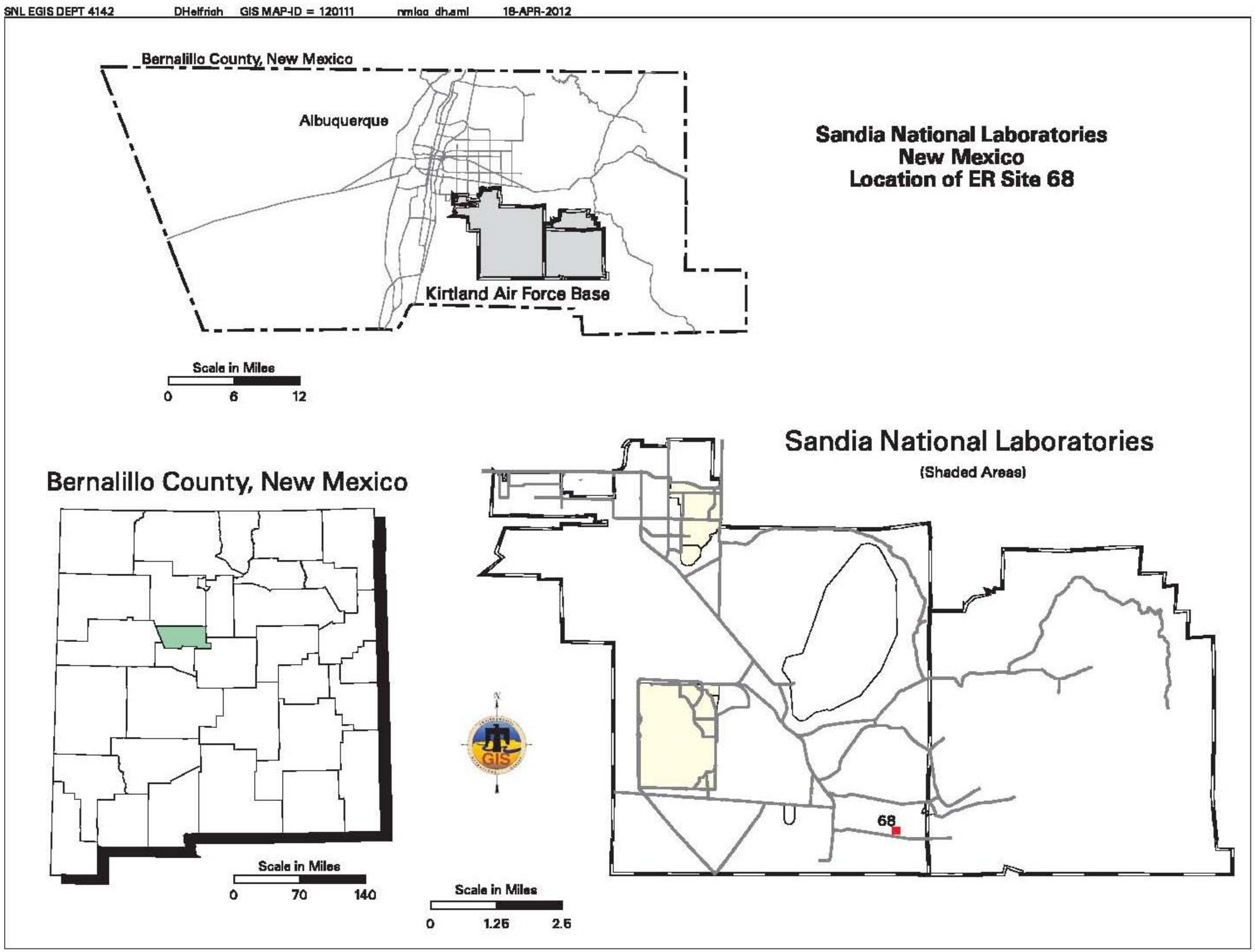

Figure 10-1. Location of SWMU 68

10.1.2 Site History

From 1965 to 1978, pool fire tests were conducted at SWMU 68 to study the effects of fire on weapons components, and to determine the potential for release of radioactive material in case of a transportation (i.e., air, truck, and rail) accident. The primary fuel used for the pool fire tests was jet fuel. Prior to investigative and remedial activities that were completed in 2004 (Table 10-1), SWMU 68 consisted of an aboveground, approximately 3-ft deep, steel burn pool; a drainage ditch; an overflow basin; a rectangular burn pit that was once lined with plastic; three debris piles; and two irregularly shaped borrow pits.

From 1995 to 2004, multiple surveys and remediation projects were conducted at SWMU 68 to identify and remove nonhazardous and hazardous materials from the site. Wastes removed from SWMU 68 included soil contaminated with radionuclides and metals (primarily lead), assorted metal fragments, scrap metal, concrete, wire, scrap wood, cardboard, plastic fencing, and burn debris. All testing materials and features were removed. As a final measure, the disturbed areas were graded and reseeded in 2004.

A total of 499 confirmatory soil samples were collected at SWMU 68 from 1996 to 2004. Soil samples were collected from the plastic-lined pit, the overflow basin, the drainage ditch running from the burn pan to the overflow basin, the soil underneath the burn pan, and other remediated areas of the site. The sample results were used in the final risk assessment for SWMU 68.

In April 2004, the Consent Order (NMED April 2004) specifically identified SWMU 68 as requiring additional investigation. All corrective action requirements pertaining to SWMUs are contained in the Consent Order (NMED April 2004). Additional soil samples were collected in January 2005.

In September 2005, DOE/National Nuclear Security Administration (NNSA) and Sandia submitted a letter to the NMED requesting a Corrective Action Complete (CAC) status determination for SWMU 68 (SNL September 2005). The NMED approved SWMU 68 as CAC without controls in October 2005 (NMED October 2005).

In March 2006, DOE/NNSA and Sandia submitted a letter to the NMED justifying a Class 3 Permit Modification Request for SWMU 68 (SNL March 2006). In April 2010, the NMED responded to the Permit Modification Request, stating that SWMU 68 required additional site characterization work, including the installation of three groundwater monitoring wells. The wells were required to be installed near the former locations of the burn pan and associated ditch/surface impoundment (Figure 10-2). The NMED also required the submittal of a well installation work plan (NMED April 2010).

DOE/NNSA and Sandia submitted a groundwater characterization work plan for the installation of three monitoring wells at SWMU 68 (SNL September 2010), which was approved by the NMED (January 2011). Three groundwater monitoring wells (OBS-MW1, OBS-MW2, and OBS-MW3) were installed at SWMU 68 in August 2011 (SNL November 2011) and the first quarterly groundwater sampling event occurred in October 2011.

Table 10-1. Historical Timeline of SWMU 68

Month	Year	Event	Reference
	Mid 1950s	The site was used for pool fire tests. Features at this testing site consisted of an aboveground earthen-bermed burn pan, drainage ditch and overflow basin, rectangular burn pit once lined with plastic, three debris piles, and two irregularly shaped borrow pits. Constituents of concern are metals, VOCs, SVOCs, and radionuclides.	SNL September 2005
	1981 & 1983	Cultural resources surveys were conducted at SWMU 68 in 1981 and again in 1983. No cultural resources were identified in either survey.	SNL February 1995
April	1987	SWMU 68 identified in the RCRA Facility Assessment Report.	EPA 1987
September	1987	SWMU 68 discussed in the Comprehensive Environmental Assessment and Response Program report.	DOE September 1987
September	1992	SWMU 68 added to Hazardous and Solid Waste Amendments module of the RCRA permit.	SNL September 1992
November	1993	KAFB EOD personnel conducted a visual survey for UXO/HE materials. No live ordnance found; only empty shells and shell fragments were found.	SNL September 1994
	1993-1994	Phase I surface radiation survey was conducted at SWMU 68. Gamma anomalies were identified and attributed to fragments of radioactive material buried just beneath the soil surface.	RUST Geotech, Inc. 1994
	1993-1994	Alpha radiation survey at SWMU 68 conducted by Los Alamos National Laboratory. No readings above background detected.	Bounds 1994
June	1994	Sensitive species survey performed. No sensitive species were found.	IT Corporation 1995
October	1994	Draft RFI Work Plan submitted to NMED.	SNL October 1994
January-March	1995	Surface radiological VCM remediation conducted at SWMU 68**.** Point and small area sources identified during the 1993 Phase I survey were removed.	RUST Geotech, Inc. 1994
March	1995	NMED comments on RFI Work Plan received.	NMED March 1995
May	1995	DOE and SNL/NM ER respond to NMED comments on RFI Work Plan.	SNL May 1995
June	1995	SWMU 68 investigated as part of a site-wide scoping sampling program	Chain-of-custody
October	1995	DOE and SNL/NM ER performed a Housekeeping VCM and removed steel test stands and piping from the site and screened three debris mounds.	SNL November 1995
November	1995	EPA's NOD on Work Plan received. Additional sampling required at SWMU 68; consisting of sampling beneath debris piles for total constituents (metals and SVOCs); and collecting VOC samples at 3 ft beneath the overflow basin and plastic lined pit.	EPA 1995
January-March	1996	Resurveying of SWMU 68 performed. Point and area sources identified during this survey were removed during cleanup activities.	Lambert et al. 1997
February	1996	Response to EPA NOD on RFI Work Plan submitted.	SNL February 1996
August	1996	DOE and SNL/NM ER conducted RFI sampling. A buried concrete slab was discovered while trenching across the overflow basin. No elevated readings were measured on its surface. A large mound (68A Mound) was discovered.	Field logs

Refer to footnotes on page 10-6.

Table 10-1. Historical Timeline of SWMU 68 *(Continued)*

Month	Year	Event	Reference
August	1997	NMED issued an RSI on the Work Plan. Additional soil sampling for VOCs, SVOCs, total metals, gross alpha/beta, and gamma spectroscopy was needed at and below various features including below a shallow arroyo channel. The newly discovered mound, 68A, was administratively added as a subsite of SWMU 68.	NMED August 1997
November	1997	RSI responses submitted to NMED, agreeing to conduct additional soil and sediment sampling.	SNL November 1997
February	1998	Site-Wide Hydrological Characterization Project, Calendar Year 1995 Annual Report (SNL/NM December 1995) containing a description of SWMU 68 hydrogeology was submitted to NMED.	SNL February 1998
March	1998	NMED issued an NOD on the Work Plan. Additional soil sampling must be conducted, and the large debris mound (68A) must be investigated.	NMED March 1998
May-June	1998	Surface radiological VCM activities continued to complete remediation of three area source anomalies. During the remediation a single area source, buried debris, and other materials were discovered. An area approximately 30 by 36 feet wide and 4 feet deep was excavated.	SNL July 1998
July	1998	Responses submitted to NMED on the Work Plan NOD.	SNL July 1998
August	1998	Soil vapor survey conducted at SWMU 68. Insignificant, trace concentrations of VOCs in soil vapor were detected.	
November/ December	1998	Geophysical surveys conducted at SWMU 68 around the burn pan and surrounding area to detect possible locations of additional buried waste; 68A Mound also surveyed. No anomalies indicative of buried waste were identified at either site.	Hyndman 1998
December	1998	Soil sampling conducted at SWMU 68. Additional sampling specified in the NOD is performed.	NMED March 1998
February	1999	Another soil mound was discovered; the mound was trenched and sampled. No evidence for waste disposal was detected with field screening instruments or visually observed. No contamination was detected in the soil samples. Following regulator inspection and approval, the mound was leveled and the area graded.	Chain-of-custody
August	2001	The soil piles and scrap materials were removed from the site and disposed of at appropriate off-site facilities.	Photos
April	2004	The Compliance Order on Consent identified SWMU 68 as requiring investigation.	NMED April 2004
May	2004	DOE/NNSA and SNL/NM ER requested radiological restrictions be removed from SWMU 68.	SNL May 2004a
July	2004	Removal of radiological restrictions approved by Sandia Field Office.	NNSA July 2004
October	2004	VCA Plan for SWMU 68; excavation of lead-contaminated soil was submitted to NMED. Conducted confirmatory sampling and removed debris from other areas at SWMU 68.	SNL October 2004
January	2005	Soil sampling of the earthen berm was conducted. The soil used to create the earthen berm surrounding the burn pan assembly at SWMU 68 was the last remaining area at the site with the potential for radiological contamination. Removal of the earthen berm completed in order to remove the burn pan assembly and restore the site to acceptable conditions for closure.	SNL January 2005
September	2005	Final investigation report and proposal for CAC submitted to NMED.	SNL September 2005

Refer to footnotes on page 10-6.

Table 10-1. Historical Timeline of SWMU 68 *(Concluded)*

Month	Year	Event	Reference
October	2005	Letter received approving CAC without controls for SWMU 68.	NMED October 2005
March	2006	Request for Class III Permit Modification submitted.	SNL March 2006
June	2009	NMED removed SWMU 68 from the CAC process.	SNL June 2009
April	2010	Letter from NMED received that formally states requirements for corrective action at SWMU 68.	NMED April 2010
September	2010	SWMU 68 Groundwater Characterization Work Plan submitted to NMED (in response to April 8, 2010 letter).	SNL September 2010
January	2011	NMED approved the SWMU 68 Groundwater Characterization Work Plan.	NMED January 2011
June	2011	Request for Extension to Complete the Well Installation Report for SWMUs 8/58 and 68 submitted.	SNL June 2011
August	2011	Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 installed.	SNL November 2011
August	2011	NMED approved the Request for Extension to complete the Well Installation Report for SWMUs 8/58 and 68.	NMED August 2011
October	2011	First quarterly sampling event for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 at SWMU 68 conducted.	SNL September 2012
November	2011	Well Installation Report for SWMU 68 submitted.	SNL November 2011
January	2012	Slug tests performed on monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3.	SNL June 2012
April	2012	NMED approved the Well Installation Report for SWMUs 8/58 and 68	NMED April 2012
June	2012	Hydraulic conductivity calculated for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3.	SNL June 2012
July	2013	The eighth and final sampling event required by NMED for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 completed.	SNL January 2014
October	2014	NMED was notified that quarterly groundwater monitoring at SWMU 68 has been completed, and has been discontinued.	SNL October 2014

NOTES:

CAC	= Corrective Action Complete.
DOE	= U.S. Department of Energy.
EOD	= Explosive Ordnance Disposal.
EPA	= U.S. Environmental Protection Agency.
ER	= Environmental Restoration.
ft	= Foot (feet).
HE	= High explosive.
IT	= International Technology.
KAFB	= Kirtland Air Force Base.
MW	= Monitoring well.
NMED	= New Mexico Environment Department.
NNSA	= National Nuclear Security Administration.
NOD	= Notice of Disapproval.
OBS	= Old Burn Site.
RCRA	= Resource Conservation and Recovery Act.
RFI	= RCRA Facility Investigation.
RSI	= Request for Supplemental Information.
SNL	= Sandia National Laboratories.
SNL/NM	= Sandia National Laboratories, New Mexico.
SVOC	= Semivolatile organic compound.
SWMU	= Solid Waste Management Unit.
UXO	= Unexploded ordnance.
VCA	= Voluntary Corrective Action.
VCM	= Voluntary Corrective Measure.
VOC	= Volatile organic compound.

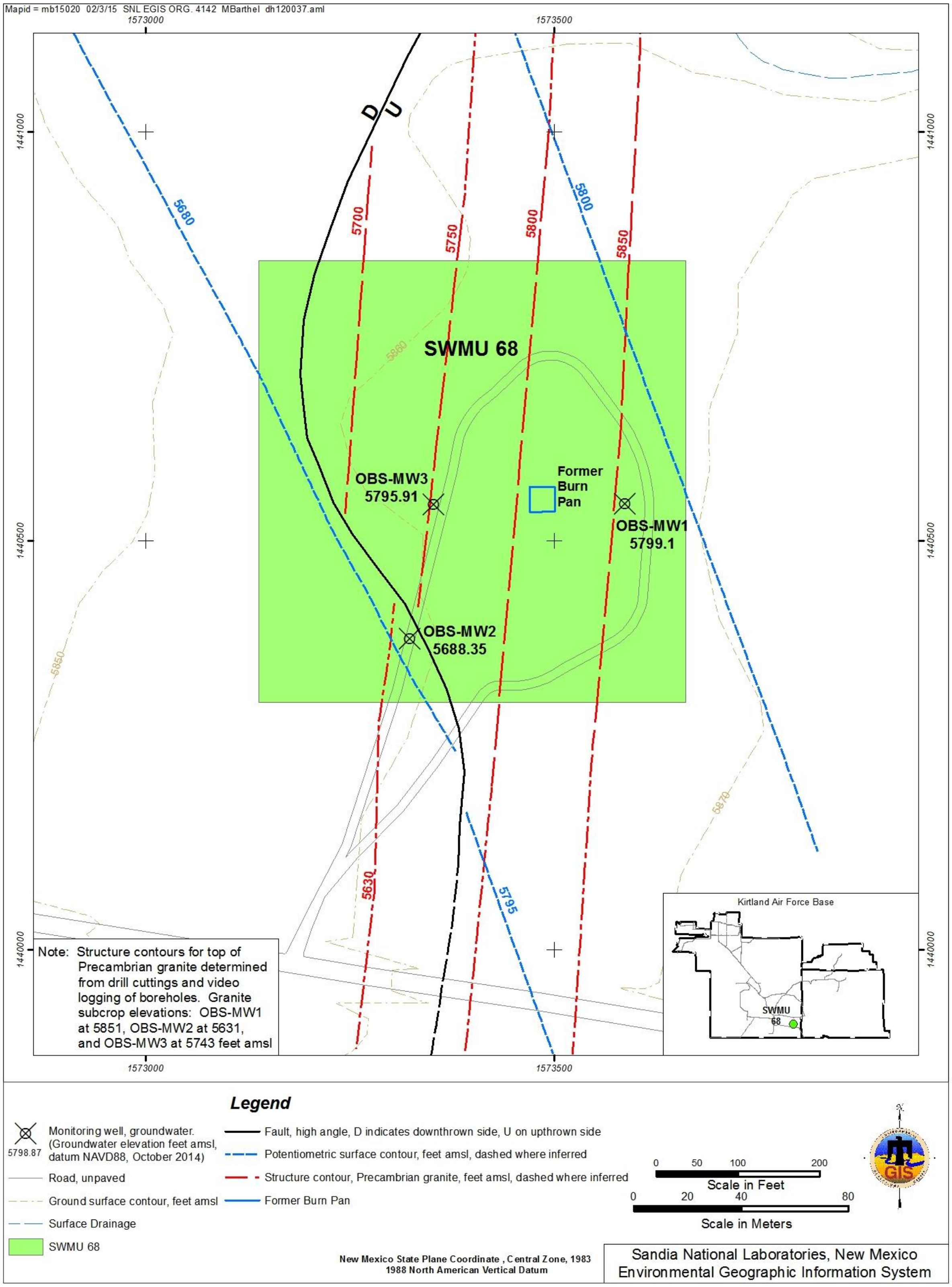

Figure 10-2. Groundwater Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 Installed at SWMU 68 and Potentiometric Surface Map (October 2014)

10.1.3 Monitoring History

In 2011, SNL/NM personnel installed three groundwater monitoring wells at SWMU 68 (SNL November 2011) as shown in Figure 10-2. These three monitoring wells were sampled for the first time in October 2011, and were sampled for four quarters in CY 2014 as described in Section 10.1.5.

10.1.4 Current Monitoring Network

Currently there are three groundwater monitoring wells at SWMU 68 (Figure 10-2). Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are monitored quarterly for VOCs, SVOCs, HE compounds, NPN, major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, perchlorate, total cyanide, hexavalent chromium, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

10.1.5 Summary of Calendar Year 2014 Activities

The following activities occurred for SWMU 68 in CY 2014:

- Quarterly groundwater sampling was conducted at monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 in January, April, July and October 2014 (SNL December 2013; March 2014 July 2014; and September 2014a).

- Quarterly reporting of analytical results from monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 .

- Tables of analytical results (Attachment 10A) and a hydrograph (Attachment 10B) were prepared in support of this report.

10.1.6 Summary of Future Activities

The following activities are anticipated for SWMU 68 during CY 2015:

- No quarterly groundwater sampling at monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 will be conducted in CY 2015 unless additional guidance is received from NMED.

10.1.7 Current Conceptual Model

This section presents a comprehensive discussion of the hydrogeologic regime, conceptual site model, and previous contaminant findings for SWMU 68.

10.1.7.1 Regional Hydrogeologic Conditions

SWMU 68 is located in the central portion of the Coyote Test Field, approximately 7 miles southeast of Technical Area-I and 0.5 miles southwest of the Starfire Optical Range. SWMU 68 covers approximately 6.5 acres of generally flat and gently westerly sloping terrain at an average elevation of approximately 5,860 ft amsl. The site is sparsely vegetated by bunch grasses, cacti, and a few junipers. No perennial surface water features, such as springs, are located within 1 mile of SWMU 68. A minor arroyo is located approximately 300 ft north of SWMU 68, but trends from east to west and does not cross the site.

In the mid-1990s, the Site-Wide Hydrogeologic Characterization Project conducted extensive mapping of the surface geology in the Coyote Test Field (GRAM and Lettis 1995). SWMU 68 is located approximately 1 to 2 miles to the west of the mountain front that undulates along the western edge of the Manzanita Mountains. The mountain front is defined as the slope break between the nearly horizontal alluvial fan sediments and the bedrock outcrops that comprise the mountains. Most of SWMU 68 is covered with a thin veneer of soil and unconsolidated alluvial fan sediments that have a combined maximum thickness of approximately 5 ft. Paleozoic limestone of the Madera Group outcrops at the northwest portion of the site. The Coyote Fault trends north to south across the eastern edge of the site and is buried by soil and sediment. At KAFB, the Coyote Fault consists of a series of high-angle faults and splays with a composite down to the west displacement of approximately 700 to 1,000 ft.

The regional potentiometric surface map (Plate 1) shows that groundwater flow is generally toward the west in the vicinity of SWMU 68. Topographic features and faults modify the flow direction at various locations. Faults to the west of the site may serve as hydraulic barriers or conduits depending on the type and amount of fault gouge.

10.1.7.2 Hydrogeologic Conditions at SWMU 68

The amount of precipitation available for groundwater recharge is minimal due to scant rainfall and high evapotranspiration. Summer (monsoonal) thunderstorms are responsible for the majority of rainfall. The average rainfall, as measured at the nearest active rain gauge (the National Weather Service station at the Albuquerque International Sunport), during the period from 1915 through 2005 was 8.67 inches per year (in/yr) (WRCC-DRI 2012). The station is located 10 miles northwest of SWMU 68 at an elevation of 5,310 ft amsl. By extrapolation of the precipitation model presented in SNL/NM conceptual model of groundwater flow and contaminant transport for Lurance Canyon (SNL May 2004b), the average annual precipitation for SWMU 68, where the elevation averages approximately 5,860 ft amsl, is estimated to be approximately 11 in/yr. Intense sunlight and low humidity throughout much of the year creates high rates of evapotranspiration. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

Three monitoring wells (OBS-MW1, OBS-MW2, and OBS-MW3) were installed at SWMU 68 using the air-rotary casing hammer drilling method in August 2011 (SNL November 2011). No petroleum odors, stains, or sheens were observed on the cuttings or groundwater samples. During drilling of the three boreholes, groundwater was encountered at depths ranging from approximately 135 to 240 ft below ground surface (bgs), and was dependent on the depth of the uppermost water-bearing fracture at a particular borehole (Table 10-2). Monitoring wells OBS-MW1 and OBS-MW3 are located closest to the former location of the burn pan and are most similar. Therefore, these two wells are discussed first as follows.

At the monitoring well OBS-MW1 borehole, poorly sorted sand was encountered from the ground surface to a depth of approximately 3 ft bgs. Hard limestone, most likely of the Sandia Formation, was encountered from 3 to 18 ft bgs. The Precambrian granite contact was at 18 ft bgs. Saturated granitic cuttings were encountered at 135 ft bgs, and monitoring well OBS-MW1 was screened in granite at 135 to 155 ft bgs (Table 10-2).

At the monitoring well OBS-MW3 borehole, soil and silty gravelly sand were encountered from the ground surface to a depth of approximately 2 ft bgs. Hard cherty limestone, most likely of the Madera Group, was encountered from 2 to 102 ft bgs. A conglomerate layer extended from 102 to 105 ft bgs. A sequence of the Sandia Formation consisting of coarse sandstone, claystone, black shale, and limestone was encountered from 105 to 120 ft bgs. The Precambrian granite contact was at 120 ft bgs. Saturated granitic cuttings were encountered at 190 ft bgs. Monitoring well OBS-MW3 was screened in Precambrian granite at an interval of 190 to 210 ft bgs (Table 10-2).

Table 10-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Wells at SWMU 68

Well ID	Ground Surface Elevation (ft amsl)	Depth to Granite (ft bgs)	Top Granite Elevation (ft amsl)	Depth to Uppermost Saturated Fracture (ft bgs[a])	Elevation of Uppermost Saturated Fracture (ft amsl[a])	Depth of Screened Interval (ft bgs)	Potentiometric Surface October 2014 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Pressure Head (ft[b])
OBS-MW1	5,869.08	18	5,851	135	5,734	135 - 155	5,799.10	5,724.10	75
OBS-MW2	5,860.75	230	5,631	240	5,621	234 - 254	5,688.35	5,616.80	72
OBS-MW3	5,863.31	120	5,743	190	5,673	190 - 210	5,795.91	5,663.30	133

NOTES:
[a]Observed during drilling.
[b]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
ft = Foot (feet).
ID = Identification.
MW = Monitoring Well.
OBS = Old Burn Site.
SWMU = Solid Waste Management Unit.

At the monitoring well OBS-MW2 borehole, poorly sorted sand was encountered from the ground surface to a depth of approximately 3 ft bgs. Hard cherty limestone, most likely of the Madera Group, was encountered from 3 to 184 ft bgs. From 184 to 190 ft bgs, sandstone of the Sandia Formation was encountered. Limestone was encountered from 190 to 205 ft bgs. No drill cuttings were returned from 205 to 305 ft bgs where the borehole apparently intercepted a splay of the Coyote Fault. Saturated granitic cuttings were returned starting at 305 ft bgs. Video logging of the borehole was used for selecting the screen depth. The flowing groundwater visible on the video log from approximately 240 to 250 ft bgs represents the uppermost saturated fracture zone. The well was screened across the flowing zone at 234 to 254 ft bgs.

Because cloudy water obscured the borehole lithology below a depth of 182 ft bgs and no drill cuttings were returned from 205 to 305 ft bgs at monitoring well OBS-MW2 borehole, the lithology of the screened interval has been inferred using the geochemical composition of water samples that were collected during CY 2014. As shown on the Piper diagram (Figure 10-3), the geochemical composition is similar, nearly identical, for groundwater samples collected from all three of the wells. The similar geochemical signature is indicative of a single water source and hydrofacies. The CY 2014 Piper diagram and interpretation of a single water source is consistent with the data and interpretation provided in the Calendar Year 2011, 2012, and 2013 Annual Groundwater Reports (SNL September 2012; September 2013; September 2014b). Because the completion zones are known for monitoring wells OBS-MW1 and OBS-MW3 (i.e., screened in granite), it is postulated that monitoring well OBS-MW2 is also screened in fractured granite. The groundwater composition for all three wells is of the bicarbonate type and dominated by calcium.

An unusually large volume of sand pack was required for building monitoring well OBS-MW2. A total of 125 bags of sand were used to fill the annulus from the bottom of the sump to the required height above the screen. A monitoring well of similar design would typically be expected to require approximately 25 bags of sand. The large annular volume for monitoring well OBS-MW2 indicates that a borehole with a much larger than normal diameter was created during the drilling process and/or a void exists along the fault zone. The large amount of sand pack was considered when slug tests were interpreted.

Structure contours for the granite subcrop are shown in Figure 10-2 with the corresponding elevations listed in Table 10-2. The amount of throw on the fault splay is estimated to be approximately 110 ft. The orientation of the fault splay and the structure contours are interpreted to mimic the north-south structural grain of the Manzanita Mountains and associated faults. The fault splay is probably high-angle with a down to the west offset.

The potentiometric surface contours for SWMU 68 are shown in Figure 10-2. The water-level elevation in monitoring well OBS-MW1 was 3.19 ft higher than monitoring well OBS-MW3 in October 2014. The distance between the two wells is 248 ft. The horizontal gradient between monitoring wells OBS-MW1 and OBS-MW3 is approximately 0.01 feet per foot to the west. The groundwater elevation at monitoring well OBS-MW2 is much lower by approximately 110 ft, and indicates that the fault splay is a hydraulic barrier between monitoring well OBS-MW2 and the other two monitoring wells (OBS-MW1 and OBS-MW3). The potentiometric surface at each well is above the top of each respective screen and is indicative of semi-confined or confined conditions in the SWMU 68 area.

During sampling, the drawdown in each of the three wells was not excessive. The quantity of water produced by each well was clearly adequate for typical groundwater sampling. Groundwater samples were collected using pneumatic (nitrogen gas) Bennett™ piston pumps. Slug tests were performed on monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 in January 2012. Calculated hydraulic conductivity values for the three monitoring wells varied from 3.02×10^{-4} to 5.22×10^{-2} feet per

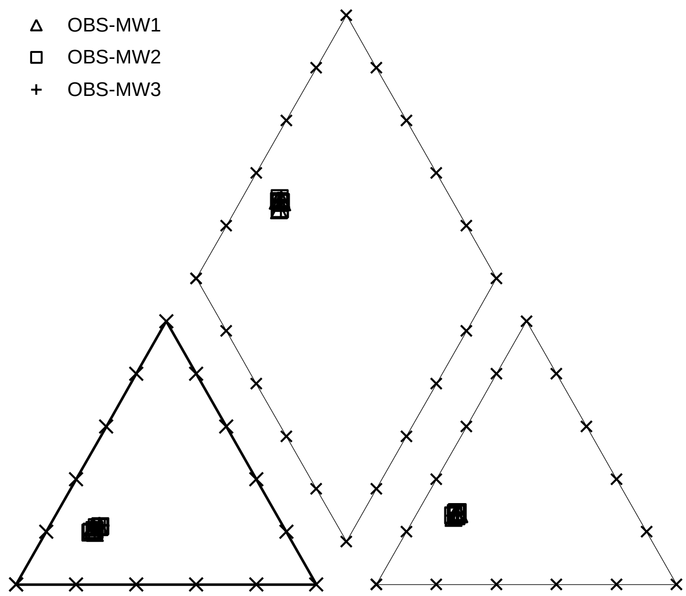

Figure 10-3. Piper Trilinear Diagram of Major Ion Chemistry for Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 at SWMU 68, CY 2014

minute (SNL June 2012). It should be noted that the slug test analyses were developed for use in unconsolidated deposits and analyses of bedrock aquifers are dominated by fracture flow. The results for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are within the range of conductivities (10^{-5} to 10^{-2} feet per minute) determined for the regional aquifer within the unconsolidated Santa Fe Group sediments west of SWMUs 8/58 and SWMU 68 (SNL March 1999). This qualitatively suggests that fracture flow at the SWMU 68 wells is capable of moving significant amounts of groundwater.

10.1.7.3 Conceptual Site Model for SWMU 68

The conceptual site model for SWMU 68 is based on the findings from three on-site monitoring wells (OBS-MW1, OBS-MW2, and OBS-MW3), several nearby monitoring wells located across the Coyote Test Field (Plate 1), and extensive field mapping conducted by the Site-Wide Hydrogeologic Characterization Project (GRAM and Lettis 1995). The site is relatively flat and slopes gently to the west. No arroyos or perennial surface water bodies are located near the site. The infrequent stormwater drains westward across the site and typically dissipates nearby on the flat terrain. Most of the site is covered by a thin layer of soil. Madera Group limestone outcrops at the northwest corner of the site.

The August 2011 drilling encountered Paleozoic units (limestone, sandstone, claystone, and shale) overlying Precambrian granite. Groundwater was encountered in fractured granite at depths ranging from approximately 135 to 240 ft bgs, and was dependent on the depth of the uppermost water-bearing fracture at a particular borehole. Groundwater in the SWMU 68 area occurs in a fractured bedrock system under semi-confined or confined conditions. The geochemical signature is of the bicarbonate type dominated by calcium.

The overlying granitic bedrock with naturally filled fractures probably serves as the confining layer. A buried splay of the Coyote Fault trends across the western side of the site and restricts the migration rate of groundwater. The amount of throw is estimated to be 110 ft. The hydraulic gradient on the east side of the fault is approximately 0.01 feet per foot to the west. The amount of precipitation available for groundwater recharge is minimal due to the scant rainfall (approximately 9 in/yr) and high evapotranspiration rates. Seasonal effects probably do not influence groundwater levels near the site. Groundwater from the site probably discharges to the unconsolidated basin fill deposits (primarily the Santa Fe Group) of the Albuquerque Basin after crossing the Sandia and Tijeras faults (SNL February 1998). No potable water supply wells are located within 6 miles of the site.

10.1.7.4 Contaminant Sources

At SWMU 68, soil contamination was suspected at the burn pan, the overflow basin, a plastic-lined pit, and three shallow earthen pits. During 1995 to 2004, radiological and ordnance surveys were conducted and hazardous materials were removed. Additional remedial activities were conducted in 2004, and all the testing features were removed. Approximately 425 cubic yards of lead-contaminated soil and 3 cubic ft of radiologically contaminated soil were removed along with approximately 120 cubic yards of construction debris. Confirmatory soil sampling was conducted in 2004 to validate the results of the soil removal activities. Human health and ecological risk assessments show that the remaining constituents of concern concentrations in soil are acceptable for both industrial and residential land use scenarios.

10.1.7.5 Contaminant Distribution and Transport in Groundwater

Three groundwater monitoring wells were installed at SWMU 68 in August 2011. During CY 2014, groundwater samples were collected from monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3. Analytical parameters included VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. No parameters were detected above established MCLs.

10.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM Environmental Restoration (ER) Operations (formerly ER Project) and implements and enforces regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER Operations SWMUs are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (NMED 1993).

In April 2004, the Consent Order (NMED April 2004) specifically identified SWMU 68 as requiring investigation. All corrective action requirements pertaining to SWMU 68 are contained in the Consent Order (NMED April 2004).

In September 2005, DOE/NNSA and Sandia submitted a letter to the NMED requesting a CAC status determination for SWMU 68 (SNL September 2005). The NMED approved SWMU 68 as CAC without controls in October 2005 (NMED October 2005).

On March 1, 2006, DOE/NNSA and Sandia submitted a letter to the NMED justifying a Class 3 Permit Modification Request for SWMU 68 (SNL March 2006). On April 8, 2010, the NMED responded to the Permit Modification request, stating that SWMU 68 required additional site characterization work, including the installation of three groundwater monitoring wells near the previous locations of the burn pan and associated ditch/surface impoundment. The NMED also required the submittal of a Well Installation Work Plan (NMED April 2010). On September 23, 2010, DOE/NNSA and Sandia responded to the NMED by submitting a Groundwater Characterization Work Plan for the installation of three monitoring wells at SWMU 68 (SNL September 2010). The NMED responded to the SNL/NM September 2010 submittal in January 2011, and approved the SWMU 68 Well Installation Work Plan (NMED January 2011).

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were installed in August 2011 and quarterly sampling began in October 2011. The well installation report describing field activities was submitted to NMED in November 2011. The eighth and final sampling event required by NMED for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 was completed in July 2013. In October 2014, DOE and Sandia notified NMED that after 13 quarters, groundwater monitoring at SWMU 68 had been completed, and that groundwater monitoring would be discontinued (SNL October 2014).

In this report, monitoring data for SWMU 68 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 Sandia. 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 (NMED April 2004).

10.3 Scope of Activities

The field activity discussed in this section is groundwater monitoring sampling and analysis during CY 2014 sampling events (Table 10-3). The analytical parameters for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 for each sampling event are listed in Table 10-4.

Table 10-3. Groundwater Monitoring Well Network and Sampling Dates for SWMU 68, Calendar Year 2014

Date of Sampling Event	Monitoring Wells Sampled	SAP
January 2014	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2014* (SNL December 2013)
April 2014	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2014* (SNL March 2014)
July 2014	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2014* (SNL July 2014)
October 2014	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for First Quarter Fiscal Year 2015* (SNL September 2014a)

NOTES:
MW = Monitoring well.
OBS = Old Burn Site.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

Table 10-4. Parameters Sampled at SWMU 68 for Each Sampling Event, Calendar Year 2014

Parameter	Sampling Period	
Anions Alkalinity Filtered Cations Gamma Spec* Gross Alpha Gross Beta HE compounds Hexavalent Chromium Isotopic Uranium NPN Perchlorate SVOCs TAL Metals, plus Total Uranium Total Cyanide VOCs	**January 2014** OBS-MW1 OBS-MW2 OBS-MW2 (dup) OBS-MW3 **July 2014** OBS-MW1 OBS-MW1 (dup) OBS-MW2 OBS-MW3	**April 2014** OBS-MW1 OBS-MW2 OBS-MW3 OBS-MW3 (dup) **October 2014** OBS-MW1 OBS-MW2 OBS-MW2 (dup) OBS-MW3

NOTES:
dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
HE = High explosive.
MW = Monitoring well.
NPN = Nitrate plus nitrate (reported as nitrogen).
OBS = Old Burn Site.
SVOC = Semivolatile organic compound.
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.
VOC = Volatile organic compound.

10.4 Field Methods and Measurements

According to the requirements of Section VII.D.6 of the Consent Order (NMED April 2004) and the NMED letter of April 8, 2010 (NMED April 2010), groundwater sampling was performed at SWMU 68. The CY 2014 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures for groundwater sampling activities, the SWMU 68 site-specific SAP (SNL September 2010), and the SWMU 68 site-specific Mini-SAPs (SNL December 2013, March 2014, July 2014, and September 2014a).

Groundwater samples were collected from monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 in January, April, July, and October 2014. Samples were submitted to GEL Laboratories, LLC for all chemical analyses. All samples were analyzed for VOCs, SVOCs, HE compounds, NPN, major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

The monitoring procedures for SWMU 68 are consistent with the procedures identified in the EPA Technical Enforcement Guidance Document (EPA 1986) and are described in detail in Section 1.3.

The NMED DOE Oversight Bureau collected split samples with Sandia during April and July 2014 sampling events. The NMED DOE Oversight Bureau analytical results are not reported in this document, but are available through the DOE NNSA Sandia Field Office.

10.5 Groundwater Elevation

During the quarterly CY 2014 sampling, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in potentiometric surface elevations. The CY 2014 water level information was used to create the base-wide potentiometric surface map discussed in Section 2.6.2.2 and shown in Plate 1. The potentiometric surface contours presented in Figure 10-2 are derived from the base-wide potentiometric surface map. The hydrograph for SWMU 68 monitoring wells is shown in Figure 10B-1 (Attachment 10B).

10.6 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA- and DOE-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6). Parameters analyzed and sampling periods in CY 2014 are presented in Table 10-4.

10.7 Summary of Analytical Results

This section discusses analytical results and field measurements for the CY 2014 SWMU 68 sampling events. Data are presented in Tables 10A-1 through 10A-11 (Attachment 10A). Data qualifiers are explained in the footnotes following Table 10A-11. Analytical reports, including certificates of analyses, analytical methods, method detection limits (MDLs), practical quantitation limits, dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Customer Funded Record Center.

The analytical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure 00-03 *Data Validation Procedure for Chemical and Radiochemical Data, Revision 3 and Revision 4* (SNL May 2011; June 2014). No problems were identified with the analytical data that resulted in qualification of the data as unusable. The data are acceptable and reported QC measures are adequate.

In CY 2014, no VOCs, SVOCs, or HE compounds were detected above laboratory MDLs in any of the SWMU 68 groundwater samples. Table 10A-1 lists the MDLs for associated VOCs, Table 10A-2 the MDLs for SVOCs, and Table 10A-3 the MDLs for HE compounds.

Table 10A-4 (Attachment 10A) summarizes NPN results. NPN values were compared with the nitrate MCL of 10 milligrams per liter (mg/L). NPN was not detected above the MCL in any groundwater sample. NPN concentrations range from 1.54 to 1.95 mg/L.

Table 10A-5 (Attachment 10A) summarizes alkalinity, major anion (as bromide, chloride, fluoride, and sulfate) and total cyanide results. No parameters were detected above established MCLs.

There were no detections of perchlorate. Currently, no MCL is established for perchlorate. Perchlorate was not detected above the NMED-specified screening level/MDL of 0.004 mg/L (NMED April 2004) in any of the SWMU 68 groundwater sample. Table 10A-6 (Attachment 10A) presents the perchlorate results.

Hexavalent chromium results are summarized in Table 10A-7 (Attachment 10A). No hexavalent chromium was detected above laboratory MDLs. No MCL is established for hexavalent chromium.

TAL metals plus uranium were analyzed in samples from all SWMU 68 monitoring wells. No metal parameters were detected above established regulatory limits in any groundwater sample. Metal results are summarized in Table 10A-8 (Attachment 10A).

Filtered fractions for major cations as calcium, magnesium, potassium, and sodium were analyzed in all SWMU 68 samples. The results are summarized in Table 10A-9 (Attachment 10A). No MCLs are established for these analytes.

The results for gamma spectroscopy, gross alpha, gross beta, and isotopic uranium are presented in Table 10A-10 (Attachment 10A). Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations, Parts 9, 141, and 142; and Table I-4 should not include uranium. 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. All radionuclide activity results are below MCLs, where established.

Table 10A-11 (Attachment 10A) summarizes field water quality measurements collected prior to sampling. Field water quality measurements include turbidity, pH, temperature, specific conductance, oxidation-reduction potential, and dissolved oxygen.

10.8 Quality Control Results

Field and laboratory QC samples were prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. The results for each QC sample and the impact on data quality for the SWMU 68 quarterly sampling events are discussed in the following sections.

10.8.1 Field Quality Control Samples

Field QC samples included duplicate environmental samples, field blanks (FBs), trip blanks (TBs), and equipment blanks (EBs). The following sections discuss the analytical results for each QC sample type.

10.8.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed to estimate the overall reproducibility of the sampling and analytical process. Relative percent difference (RPD) calculations, between duplicate samples, were performed for detected chemical analytes. Duplicate environmental samples were collected and analyzed in January, April, July, and October 2014 (Table 10-4). Results show good agreement (RPD values less than 20 percent for organic compounds and less than 35 percent for inorganic analyses).

10.8.1.2 Equipment Blank Samples

EB or rinsate samples were collected to verify the equipment decontamination process. The results for EB analyses are as follows:

- **January 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW1 and submitted for all analyses. Bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, copper, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the OBS-MW2 environmental and environmental duplicate samples during data validation, because copper was reported in the EB sample at a concentration greater than associated environmental samples.

- **April 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW3 and submitted for all analyses. Alkalinity, bromodichloromethane, chloroform, chloride, copper, magnesium, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the OBS-MW3 environmental and environmental duplicate samples during data validation, because copper was reported in the EB sample at a concentration greater than associated environmental samples.

- **July 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW2 and submitted for all analyses. Acetone, bromodichloromethane, chloroform, chloride, copper, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the OBS-MW1 environmental and environmental duplicate samples during data validation, because copper was reported in the EB sample at a concentration within five times the associated environmental sample results.

- **October 2014 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW1 and submitted for all analyses. Acetone, bromodichloromethane, chloroform, chloride, and copper were detected above the laboratory MDLs. No corrective action was necessary since these analytes were not detected in associated environmental samples.

10.8.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analyses to assess whether contamination of the samples had occurred during shipment and storage. A total of 16 TB samples were submitted in CY 2014 with 4 submitted for each sampling event in January, April, July, and October. No VOCs were detected above the associated laboratory MDLs in any TB sample, with the following exception:

- **April 2014 Sampling Event**—Toluene was detected above the MDL in the TB sample associated with monitoring well OBS-MW2. No corrective action was required, because this compound was not detected in the environmental sample.

10.8.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions. The results of the FB analysis are provided below:

- **January 2014 Sampling Event**—Analysis of the monitoring well OBS-MW3 FB sample detected the VOC compounds bromodichloromethane, bromoform, chloroform, and dibromochloromethane above associated laboratory MDLs. No corrective action was required, because these compounds were not detected in the associated environmental sample.

- **April 2014 Sampling Event—**Analysis of the monitoring well OBS-MW2 FB sample detected the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane above associated laboratory MDLs. No corrective action was required, because these compounds were not detected in the associated environmental sample.

- **July 2014 Sampling Event—**Analysis of the monitoring well OBS-MW2 FB sample detected the VOC compounds acetone and chloroform above associated laboratory MDLs. No corrective action was required, because these compounds were not detected in the associated environmental sample.

- **October 2014 Sampling Event—**Analysis of the monitoring well OBS-MW3 FB sample detected the VOC compound acetone, bromodichloromethane, and chloroform above associated laboratory MDLs. No corrective action was required, because these compounds were not detected in the associated environmental sample.

10.8.2 Laboratory Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with all groundwater samples. Some analytical results were qualified during the data validation process, but no significant data quality problems were noted in CY 2014.

10.9 Variances and Nonconformances

No variances or nonconformances from requirements specified in the SWMU 68 Groundwater Monitoring Mini-SAPs (SNL December 2013; March 2014; July 2014; and September 2014a) were noted during sampling activities.

10.10 Summary and Conclusions

Three groundwater monitoring wells were installed at SWMU 68 in August 2011. In January, April, July, and October 2014, groundwater samples were collected from monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3. Analytical parameters included VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, gross alpha beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. No parameters were detected above established MCLs.

The current conceptual model described in Section 10.1.7 does not require modification based on the analytical results for this reporting period.

In October 2014, DOE and Sandia notified NMED that additional groundwater monitoring at SWMU 68 had been completed, and would be discontinued (SNL October 2014). No further groundwater sampling will be conducted at monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 unless additional guidance is received from NMED.

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Attachment 10A
Solid Waste Management Unit 68
Analytical Results Tables

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Attachment 10A Tables

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Table 10A-1
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300–0.500	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	0.300–3.00
1,2-Dichloropropane	0.300	Methylene chloride	1.70–3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50–3.00	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 10A-39.

Table 10A-2
Method Detection Limits for Semivolatile Organic Compounds (EPA Method[g] SW846-8270C), Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1'-Biphenyl 1	3.00–3.26	Butylbenzyl phthalate	3.00–3.26
1,2,4-Trichlorobenzene	3.00–3.26	Caprolactam	3.00–3.26
2,4,5-Trichlorophenol	3.00–3.26	Carbazole	0.300–0.326
1,4-Dioxane	3.00–3.26	Chrysene	0.300–0.326
2,4,6-Trichlorophenol	3.00–3.26	Di-n-butyl phthalate	3.00–3.26
2,4-Dichlorophenol	3.00–3.26	Di-n-octyl phthalate	3.00–3.26
2,4-Dimethylphenol	3.00–3.26	Dibenz[a,h]anthracene	0.300–0.326
2,4-Dinitrophenol	4.10–5.43	Dibenzofuran	3.00–3.26
2,4-Dinitrotoluene	3.00–3.26	Diethylphthalate	3.00–3.26
2,6-Dinitrotoluene	3.00–3.26	Dimethylphthalate	3.00–3.26
2-Chloronaphthalene	0.410–0.446	Dinitro-o-cresol	3.00–3.26
2-Chlorophenol	3.00–3.26	Diphenyl amine	3.00–3.26
2-Methylnaphthalene	0.300–0.326	Fluoranthene	0.300–0.326
2-Nitroaniline	3.00–3.26	Fluorene	0.300–0.326
2-Nitrophenol	3.00–3.26	Hexachlorobenzene	3.00–3.26
3,3'-Dichlorobenzidine	3.00–3.26	Hexachlorobutadiene	3.00–3.26
3-Nitroaniline	3.00–3.26	Hexachlorocyclopentadiene	3.00–3.26
4-Bromophenyl phenyl ether	3.00–3.26	Hexachloroethane	3.00–3.26
4-Chloro-3-methylphenol	3.00–3.26	Indeno(1,2,3-c,d)pyrene	0.300–0.326
4-Chlorobenzenamine	3.30–3.59	Isophorone	3.50–3.80
4-Chlorophenyl phenyl ether	3.00–3.26	Naphthalene	0.300–0.326
4-Nitroaniline	3.00–3.26	Nitro-benzene	3.00–3.26
4-Nitrophenol	3.00–3.26	Pentachlorophenol	3.00–3.26
Acenaphthene	0.300–0.326	Phenanthrene	0.300–0.326
Acenaphthylene	0.300–0.326	Phenol	3.00–3.26
Acetophenone	3.00–3.26	Pyrene	0.300–0.326
Anthracene	0.300–0.326	bis(1-Chloroisopropyl)ether	3.00–3.13
Atrazine	3.00–3.26	bis(2-Chloroethoxy)methane	3.00–3.26
Benzaldehyde	3.00–5.38	bis(2-Chloroethyl)ether	3.00–3.26
Benzo(a)anthracene	0.300–0.326	bis(2-Chloroisopropyl)ether	3.00–3.26
Benzo(a)pyrene	0.300–0.473	bis(2-Ethylhexyl)phthalate	3.00–3.26
Benzo(b)fluoranthene	0.300–0.326	m,p-Cresol	3.70–4.02
Benzo(ghi)perylene	0.300–0.326	n-Nitrosodipropylamine	3.00–3.26
Benzo(k)fluoranthene	0.300–0.326	o-Cresol	3.00–3.26

Refer to footnotes on page 10A-39.

Table 10A-3
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0816–0.0914
1,3-Dinitrobenzene	0.0816–0.0914
2,4,6-Trinitrotoluene	0.0816–0.0914
2,4-Dinitrotoluene	0.0816–0.0914
2,6-Dinitrotoluene	0.0816–0.0914
2-Amino-4,6-dinitrotoluene	0.0816–0.0914
2-Nitrotoluene	0.0837–0.0937
3-Nitrotoluene	0.0816–0.0914
4-Amino-2,6-dinitrotoluene	0.0816–0.0914
4-Nitrotoluene	0.1523–0.171
HMX	0.0816–0.0914
Nitro-benzene	0.0816–0.0914
Pentaerythritol tetranitrate	0.102–0.114
RDX	0.0816–0.0914
Tetryl	0.0816–0.0914

Refer to footnotes on page 10A-39.

Table 10A-4
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1 20-Jan-14	Nitrate plus nitrite	1.95	0.085	0.250	10.0			095196-018	EPA 353.2
OBS-MW2 22-Jan-14	Nitrate plus nitrite	1.58	0.085	0.250	10.0			095201-018	EPA 353.2
OBS-MW2 (Duplicate) 22-Jan-14	Nitrate plus nitrite	1.54	0.085	0.250	10.0			095202-018	EPA 353.2
OBS-MW3 21-Jan-14	Nitrate plus nitrite	1.85	0.085	0.250	10.0			095205-018	EPA 353.2
OBS-MW1 14-Apr-14	Nitrate plus nitrite	1.91	0.085	0.250	10.0			095733-018	EPA 353.2
OBS-MW2 15-Apr-14	Nitrate plus nitrite	1.68	0.085	0.250	10.0			095736-018	EPA 353.2
OBS-MW3 16-Apr-14	Nitrate plus nitrite	1.92	0.170	0.500	10.0			095741-018	EPA 353.2
OBS-MW3 (Duplicate) 16-Apr-14	Nitrate plus nitrite	1.89	0.170	0.500	10.0			095742-018	EPA 353.2
OBS-MW1 16-Jul-14	Nitrate plus nitrite	1.79	0.085	0.250	10.0			096255-018	EPA 353.2
OBS-MW1 (Duplicate) 16-Jul-14	Nitrate plus nitrite	1.83	0.085	0.250	10.0			096256-018	EPA 353.2
OBS-MW2 15-Jul-14	Nitrate plus nitrite	1.57	0.085	0.250	10.0			096251-018	EPA 353.2
OBS-MW3 17-Jul-14	Nitrate plus nitrite	1.81	0.085	0.250	10.0			096259-018	EPA 353.2
OBS-MW1 06-Oct-14	Nitrate plus nitrite	1.79	0.085	0.250	10.0			096653-018	EPA 353.2
OBS-MW2 07-Oct-14	Nitrate plus nitrite	1.55	0.085	0.250	10.0			096658-018	EPA 353.2
OBS-MW2 (Duplicate) 07-Oct-14	Nitrate plus nitrite	1.56	0.085	0.250	10.0			096659-018	EPA 353.2
OBS-MW3 08-Oct-14	Nitrate plus nitrite	1.89	0.085	0.250	10.0			096661-018	EPA 353.2

Refer to footnotes on page 10A-39.

Table 10A-5
Summary of Alkalinity, Anions, and Total Cyanide Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Bicarbonate Alkalinity	177	0.725	1.00	NE			095196-022	SM2320B
20-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095196-022	SM2320B
	Bromide	0.317	0.067	0.200	NE			095196-016	SW846 9056
	Chloride	23.6	0.670	2.00	NE			095196-016	SW846 9056
	Fluoride	2.04	0.033	0.100	4.00			095196-016	SW846 9056
	Sulfate	79.1	1.33	4.00	NE			095196-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095196-027	SW846 9012B
OBS-MW2	Bicarbonate Alkalinity	178	0.725	1.00	NE			095201-022	SM2320B
22-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095201-022	SM2320B
	Bromide	0.332	0.067	0.200	NE			095201-016	SW846 9056
	Chloride	22.7	0.670	2.00	NE			095201-016	SW846 9056
	Fluoride	2.16	0.033	0.100	4.00			095201-016	SW846 9056
	Sulfate	83.0	1.33	4.00	NE			095201-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095201-027	SW846 9012B
OBS-MW2 (Duplicate)	Bicarbonate Alkalinity	176	0.725	1.00	NE			095202-022	SM2320B
22-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095202-022	SM2320B
	Bromide	0.361	0.067	0.200	NE			095202-016	SW846 9056
	Chloride	22.1	0.670	2.00	NE			095202-016	SW846 9056
	Fluoride	2.17	0.033	0.100	4.00			095202-016	SW846 9056
	Sulfate	82.7	1.33	4.00	NE			095202-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095202-027	SW846 9012B
OBS-MW3	Bicarbonate Alkalinity	173	0.725	1.00	NE			095205-022	SM2320B
21-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095205-022	SM2320B
	Bromide	0.311	0.067	0.200	NE			095205-016	SW846 9056
	Chloride	22.5	0.670	2.00	NE			095205-016	SW846 9056
	Fluoride	2.20	0.033	0.100	4.00			095205-016	SW846 9056
	Sulfate	81.5	1.33	4.00	NE			095205-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095205-027	SW846 9012B

Refer to footnotes on page 10A-39.

Table 10A-5 *(Continued)*
Summary of Alkalinity, Anions, and Total Cyanide Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Bicarbonate Alkalinity	183	0.725	1.00	NE			095733-022	SM2320B
14-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095733-022	SM2320B
	Bromide	0.383	0.067	0.200	NE			095733-016	SW846 9056
	Chloride	24.3	0.670	2.00	NE			095733-016	SW846 9056
	Fluoride	2.24	0.033	0.100	4.00			095733-016	SW846 9056
	Sulfate	83.0	1.33	4.00	NE			095733-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095733-029	SW846 9012B
OBS-MW2	Bicarbonate Alkalinity	179	0.725	1.00	NE			095736-022	SM2320B
15-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095736-022	SM2320B
	Bromide	0.347	0.067	0.200	NE			095736-016	SW846 9056
	Chloride	23.0	0.670	2.00	NE			095736-016	SW846 9056
	Fluoride	2.36	0.033	0.100	4.00			095736-016	SW846 9056
	Sulfate	85.9	1.33	4.00	NE			095736-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095736-029	SW846 9012B
OBS-MW3	Bicarbonate Alkalinity	181	0.725	1.00	NE			095741-022	SM2320B
16-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095741-022	SM2320B
	Bromide	0.370	0.067	0.200	NE			095741-016	SW846 9056
	Chloride	23.6	0.670	2.00	NE			095741-016	SW846 9056
	Fluoride	2.39	0.033	0.100	4.00			095741-016	SW846 9056
	Sulfate	86.1	1.33	4.00	NE			095741-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095741-029	SW846 9012B
OBS-MW3 (Duplicate)	Bicarbonate Alkalinity	182	0.725	1.00	NE			095742-022	SM2320B
16-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095742-022	SM2320B
	Bromide	0.344	0.067	0.200	NE			095742-016	SW846 9056
	Chloride	23.9	0.670	2.00	NE			095742-016	SW846 9056
	Fluoride	2.39	0.033	0.100	4.00			095742-016	SW846 9056
	Sulfate	86.9	1.33	4.00	NE			095742-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095742-029	SW846 9012B

Refer to footnotes on page 10A-39.

Table 10A-5 *(Continued)*
Summary of Alkalinity, Anions, and Total Cyanide Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Bicarbonate Alkalinity	181	0.725	1.00	NE			096255-022	SM2320B
16-Jul-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096255-022	SM2320B
	Bromide	0.367	0.067	0.200	NE			096255-016	SW846 9056
	Chloride	25.6	0.670	2.00	NE			096255-016	SW846 9056
	Fluoride	2.24	0.033	0.100	4.00			096255-016	SW846 9056
	Sulfate	85.5	1.33	4.00	NE			096255-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096255-027	SW846 9012B
OBS-MW1 (Duplicate)	Bicarbonate Alkalinity	182	0.725	1.00	NE			096256-022	SM2320B
16-Jul-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096256-022	SM2320B
	Bromide	0.377	0.067	0.200	NE			096256-016	SW846 9056
	Chloride	25.5	0.670	2.00	NE			096256-016	SW846 9056
	Fluoride	2.21	0.033	0.100	4.00			096256-016	SW846 9056
	Sulfate	85.2	1.33	4.00	NE			096256-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096255-027	SW846 9056
OBS-MW2	Bicarbonate Alkalinity	181	0.725	2.00	NE			096251-022	SW846 9056
15-Jul-14	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096251-022	SW846 9012B
	Bromide	0.371	0.067	0.200	NE			096251-016	SM2320B
	Chloride	23.9	0.670	2.00	NE			096251-016	SM2320B
	Fluoride	2.36	0.033	0.100	4.00			096251-016	SW846 9056
	Sulfate	87.2	1.33	4.00	NE			096251-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096251-027	SW846 9056
OBS-MW3	Bicarbonate Alkalinity	180	0.725	1.00	NE			096259-022	SW846 9056
17-Jul-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096259-022	SW846 9012B
	Bromide	0.391	0.067	0.200	NE			096259-016	SM2320B
	Chloride	24.4	0.670	2.00	NE			096259-016	SM2320B
	Fluoride	2.37	0.033	0.100	4.00			096259-016	SW846 9056
	Sulfate	86.4	1.33	4.00	NE			096259-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096259-027	SW846 9056

Refer to footnotes on page 10A-39.

Table 10A-5 *(Concluded)*
Summary of Alkalinity, Anions, and Total Cyanide Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Bicarbonate Alkalinity	186	0.725	1.00	NE			096653-022	SM2320B
06-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096653-022	SM2320B
	Bromide	0.359	0.067	0.200	NE			096653-016	SW846 9056
	Chloride	23.0	0.670	2.00	NE			096653-016	SW846 9056
	Fluoride	2.01	0.033	0.100	4.00			096653-016	SW846 9056
	Sulfate	79.3	1.33	4.00	NE			096653-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096653-027	SW846 9012B
OBS-MW2	Bicarbonate Alkalinity	183	0.725	1.00	NE			096658-022	SM2320B
07-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096658-022	SM2320B
	Bromide	0.343	0.067	0.200	NE			096658-016	SW846 9056
	Chloride	21.9	0.670	2.00	NE			096658-016	SW846 9056
	Fluoride	2.13	0.033	0.100	4.00			096658-016	SW846 9056
	Sulfate	81.5	1.33	4.00	NE			096658-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096658-027	SW846 9012B
OBS-MW2 (Duplicate)	Bicarbonate Alkalinity	183	0.725	1.00	NE			096659-022	SM2320B
07-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096659-022	SM2320B
	Bromide	0.367	0.067	0.200	NE			096659-016	SW846 9056
	Chloride	21.9	0.670	2.00	NE			096659-016	SW846 9056
	Fluoride	2.15	0.033	0.100	4.00			096659-016	SW846 9056
	Sulfate	81.3	1.33	4.00	NE			096659-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096659-027	SW846 9012B
OBS-MW3	Bicarbonate Alkalinity	181	0.725	1.00	NE			096661-022	SM2320B
08-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096661-022	SM2320B
	Bromide	0.375	0.067	0.200	NE			096661-016	SW846 9056
	Chloride	22.4	0.670	2.00	NE			096661-016	SW846 9056
	Fluoride	2.16	0.033	0.100	4.00			096661-016	SW846 9056
	Sulfate	80.8	1.33	4.00	NE			096661-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096661-027	SW846 9012B

Refer to footnotes on page 10A-39.

Table 10A-6
Summary of Perchlorate Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1 20-Jan-14	ND	0.004	0.012	NE	U	UJ	095196-020	EPA 314.0
OBS-MW2 22-Jan-14	ND	0.004	0.012	NE	U	UJ	095201-020	EPA 314.0
OBS-MW2 (Duplicate) 22-Jan-14	ND	0.004	0.012	NE	U	UJ	095202-020	EPA 314.0
OBS-MW3 21-Jan-14	ND	0.004	0.012	NE	U	UJ	095205-020	EPA 314.0
OBS-MW1 14-Apr-14	ND	0.004	0.012	NE	U		095733-020	EPA 314.0
OBS-MW2 15-Apr-14	ND	0.004	0.012	NE	U		095736-020	EPA 314.0
OBS-MW3 16-Apr-14	ND	0.004	0.012	NE	U		095741-020	EPA 314.0
OBS-MW3 (Duplicate) 16-Apr-14	ND	0.004	0.012	NE	U		095742-020	EPA 314.0
OBS-MW1 16-Jul-14	ND	0.004	0.012	NE	U		096255-020	EPA 314.0
OBS-MW1 (Duplicate) 16-Jul-14	ND	0.004	0.012	NE	U		096256-020	EPA 314.0
OBS-MW2 15-Jul-14	ND	0.004	0.012	NE	U		096251-020	EPA 314.0
OBS-MW3 17-Jul-14	ND	0.004	0.012	NE	U		096259-020	EPA 314.0
OBS-MW1 06-Oct-14	ND	0.004	0.012	NE	U		096653-020	EPA 314.0
OBS-MW2 07-Oct-14	ND	0.004	0.012	NE	U		096658-020	EPA 314.0
OBS-MW2 (Duplicate) 07-Oct-14	ND	0.004	0.012	NE	U		096659-020	EPA 314.0
OBS-MW3 08-Oct-14	ND	0.004	0.012	NE	U		096661-020	EPA 314.0

Refer to footnotes on page 10A-39.

Table 10A-7
Summary of Hexavalent Chromium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Hexavalent Chromium 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]
OBS-MW1 20-Jan-14	ND	0.0033	0.010	NE	U		095196-014	SW846 7196A
OBS-MW2 22-Jan-14	ND	0.0033	0.010	NE	U		095201-014	SW846 7196A
OBS-MW2 (Duplicate) 22-Jan-14	ND	0.0033	0.010	NE	U		095202-014	SW846 7196A
OBS-MW3 21-Jan-14	ND	0.0033	0.010	NE	U		095205-014	SW846 7196A
OBS-MW1 14-Apr-14	ND	0.003	0.010	NE	U		095733-014	SW846 7196A
OBS-MW2 15-Apr-14	ND	0.003	0.010	NE	U		095736-014	SW846 7196A
OBS-MW3 16-Apr-14	ND	0.003	0.010	NE	U		095741-014	SW846 7196A
OBS-MW3 (Duplicate) 16-Apr-14	ND	0.003	0.010	NE	U		095742-014	SW846 7196A
OBS-MW1 16-Jul-14	ND	0.003	0.010	NE	U	UJ	096255-014	SW846 7196A
OBS-MW1 (Duplicate) 16-Jul-14	0.00438	0.003	0.010	NE	J	0.017UJ	096256-014	SW846 7196A
OBS-MW2 15-Jul-14	ND	0.003	0.010	NE	U		096251-014	SW846 7196A
OBS-MW3 17-Jul-14	ND	0.003	0.010	NE	U		096259-014	SW846 7196A
OBS-MW1 06-Oct-14	ND	0.003	0.010	NE	U	UJ	096653-014	SW846 7196A
OBS-MW2 07-Oct-14	ND	0.003	0.010	NE	U		096658-014	SW846 7196A
OBS-MW2 (Duplicate) 07-Oct-14	ND	0.003	0.010	NE	U		096659-014	SW846 7196A
OBS-MW3 08-Oct-14	ND	0.003	0.010	NE	U		096661-014	SW846 7196A

Refer to footnotes on page 10A-39.

Table 10A-8
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Aluminum	0.0189	0.015	0.050	NE	J		095196-009	SW846 6020
20-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095196-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095196-009	SW846 6020
	Barium	0.0176	0.0006	0.002	2.00			095196-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095196-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095196-009	SW846 6020
	Calcium	83.8	0.600	2.00	NE			095196-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095196-009	SW846 6020
	Cobalt	0.000157	0.0001	0.001	NE	J		095196-009	SW846 6020
	Copper	0.000571	0.00035	0.001	NE	J		095196-009	SW846 6020
	Iron	0.154	0.033	0.100	NE			095196-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095196-009	SW846 6020
	Magnesium	16.0	0.010	0.030	NE			095196-009	SW846 6020
	Manganese	0.00242	0.001	0.005	NE	J		095196-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095196-009	SW846 7470
	Nickel	0.00173	0.0005	0.002	NE	J		095196-009	SW846 6020
	Potassium	1.79	0.080	0.300	NE			095196-009	SW846 6020
	Selenium	0.00302	0.0015	0.005	0.050	J		095196-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095196-009	SW846 6020
	Sodium	20.9	0.080	0.250	NE		J	095196-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095196-009	SW846 6020
	Uranium	0.0107	0.000067	0.0002	0.03			095196-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095196-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095196-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		095201-009	SW846 6020
22-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095201-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095201-009	SW846 6020
	Barium	0.0191	0.0006	0.002	2.00			095201-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095201-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095201-009	SW846 6020
	Calcium	82.9	0.600	2.00	NE			095201-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095201-009	SW846 6020
	Cobalt	0.000123	0.0001	0.001	NE	J		095201-009	SW846 6020
	Copper	0.000505	0.00035	0.001	NE	J	0.0044U	095201-009	SW846 6020
	Iron	0.150	0.033	0.100	NE			095201-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095201-009	SW846 6020
	Magnesium	15.4	0.010	0.030	NE			095201-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095201-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095201-009	SW846 7470
	Nickel	0.00169	0.0005	0.002	NE	J		095201-009	SW846 6020
	Potassium	1.83	0.080	0.300	NE			095201-009	SW846 6020
	Selenium	0.00348	0.0015	0.005	0.050	J		095201-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095201-009	SW846 6020
	Sodium	21.3	0.080	0.250	NE		J	095201-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095201-009	SW846 6020
	Uranium	0.0141	0.000067	0.0002	0.03			095201-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095201-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095201-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW2 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095202-009	SW846 6020
22-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095202-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095202-009	SW846 6020
	Barium	0.0195	0.0006	0.002	2.00			095202-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095202-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095202-009	SW846 6020
	Calcium	83.6	0.600	2.00	NE			095202-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095202-009	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		095202-009	SW846 6020
	Copper	0.00065	0.00035	0.001	NE	J	0.0044U	095202-009	SW846 6020
	Iron	0.154	0.033	0.100	NE			095202-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095202-009	SW846 6020
	Magnesium	16.3	0.010	0.030	NE			095202-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095202-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095202-009	SW846 7470
	Nickel	0.00204	0.0005	0.002	NE			095202-009	SW846 6020
	Potassium	1.75	0.080	0.300	NE			095202-009	SW846 6020
	Selenium	0.00342	0.0015	0.005	0.050	J		095202-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095202-009	SW846 6020
	Sodium	23.0	0.080	0.250	NE		J	095202-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095202-009	SW846 6020
	Uranium	0.0144	0.000067	0.0002	0.03			095202-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095202-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095202-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		095205-009	SW846 6020
21-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095205-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095205-009	SW846 6020
	Barium	0.0253	0.0006	0.002	2.00			095205-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095205-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095205-009	SW846 6020
	Calcium	77.4	0.600	2.00	NE			095205-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095205-009	SW846 6020
	Cobalt	0.000152	0.0001	0.001	NE	J		095205-009	SW846 6020
	Copper	0.000777	0.00035	0.001	NE	J		095205-009	SW846 6020
	Iron	0.148	0.033	0.100	NE			095205-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095205-009	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			095205-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095205-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095205-009	SW846 7470
	Nickel	0.00173	0.0005	0.002	NE	J		095205-009	SW846 6020
	Potassium	1.84	0.080	0.300	NE			095205-009	SW846 6020
	Selenium	0.0031	0.0015	0.005	0.050	J		095205-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095205-009	SW846 6020
	Sodium	20.2	0.080	0.250	NE		J	095205-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095205-009	SW846 6020
	Uranium	0.0125	0.000067	0.0002	0.03			095205-009	SW846 6020
	Vanadium	0.00124	0.001	0.005	NE	J		095205-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095205-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Aluminum	ND	0.015	0.050	NE	U		095733-009	SW846 6020
14-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095733-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095733-009	SW846 6020
	Barium	0.0178	0.0006	0.002	2.00			095733-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095733-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095733-009	SW846 6020
	Calcium	83.4	0.300	1.00	NE			095733-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095733-009	SW846 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		095733-009	SW846 6020
	Copper	0.000853	0.00035	0.001	NE	J		095733-009	SW846 6020
	Iron	0.170	0.033	0.100	NE			095733-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095733-009	SW846 6020
	Magnesium	17.0	0.010	0.030	NE			095733-009	SW846 6020
	Manganese	0.00101	0.001	0.005	NE	J		095733-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095733-009	SW846 7470
	Nickel	0.00178	0.0005	0.002	NE	J		095733-009	SW846 6020
	Potassium	1.71	0.080	0.300	NE			095733-009	SW846 6020
	Selenium	0.00315	0.0015	0.005	0.050	J		095733-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095733-009	SW846 6020
	Sodium	21.6	0.080	0.250	NE			095733-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095733-009	SW846 6020
	Uranium	0.0107	0.000067	0.0002	0.03			095733-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095733-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095733-009	SW846 6020

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Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		095736-009	SW846 6020
15-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095736-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095736-009	SW846 6020
	Barium	0.0191	0.0006	0.002	2.00			095736-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095736-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095736-009	SW846 6020
	Calcium	78.2	0.300	1.00	NE			095736-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095736-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095736-009	SW846 6020
	Copper	0.000351	0.00035	0.001	NE	J		095736-009	SW846 6020
	Iron	0.161	0.033	0.100	NE			095736-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095736-009	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			095736-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095736-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095736-009	SW846 7470
	Nickel	0.00162	0.0005	0.002	NE	J		095736-009	SW846 6020
	Potassium	1.65	0.080	0.300	NE			095736-009	SW846 6020
	Selenium	0.0031	0.0015	0.005	0.050	J		095736-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095736-009	SW846 6020
	Sodium	22.2	0.080	0.250	NE			095736-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095736-009	SW846 6020
	Uranium	0.0141	0.000067	0.0002	0.03			095736-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095736-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095736-009	SW846 6020

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Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		095741-009	SW846 6020
16-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095741-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095741-009	SW846 6020
	Barium	0.0265	0.0006	0.002	2.00			095741-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095741-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095741-009	SW846 6020
	Calcium	76.9	0.300	1.00	NE			095741-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095741-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095741-009	SW846 6020
	Copper	0.000375	0.00035	0.001	NE	J	0.0029U	095741-009	SW846 6020
	Iron	0.156	0.033	0.100	NE			095741-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095741-009	SW846 6020
	Magnesium	15.5	0.010	0.030	NE			095741-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095741-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095741-009	SW846 7470
	Nickel	0.00164	0.0005	0.002	NE	J		095741-009	SW846 6020
	Potassium	1.71	0.080	0.300	NE			095741-009	SW846 6020
	Selenium	0.00316	0.0015	0.005	0.050	J		095741-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095741-009	SW846 6020
	Sodium	21.5	0.080	0.250	NE			095741-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095741-009	SW846 6020
	Uranium	0.0129	0.000067	0.0002	0.03			095741-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095741-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095741-009	SW846 6020

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Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW3 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095742-009	SW846 6020
16-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095742-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095742-009	SW846 6020
	Barium	0.0264	0.0006	0.002	2.00			095742-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095742-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095742-009	SW846 6020
	Calcium	75.2	0.300	1.00	NE			095742-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095742-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		095742-009	SW846 6020
	Copper	0.000384	0.00035	0.001	NE	J	0.0029U	095742-009	SW846 6020
	Iron	0.157	0.033	0.100	NE			095742-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095742-009	SW846 6020
	Magnesium	16.8	0.010	0.030	NE			095742-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095742-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095742-009	SW846 7470
	Nickel	0.00157	0.0005	0.002	NE	J		095742-009	SW846 6020
	Potassium	1.67	0.080	0.300	NE			095742-009	SW846 6020
	Selenium	0.00334	0.0015	0.005	0.050	J		095742-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095742-009	SW846 6020
	Sodium	22.3	0.080	0.250	NE			095742-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095742-009	SW846 6020
	Uranium	0.0129	0.000067	0.0002	0.03			095742-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095742-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095742-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Aluminum	0.0271	0.015	0.050	NE	J		096255-009	SW846 6020
16-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096255-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096255-009	SW846 6020
	Barium	0.018	0.0006	0.002	2.00			096255-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096255-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096255-009	SW846 6020
	Calcium	79.7	0.600	2.00	NE			096255-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096255-009	SW846 6020
	Cobalt	0.000135	0.0001	0.001	NE	J		096255-009	SW846 6020
	Copper	0.00116	0.00035	0.001	NE		0.0035U	096255-009	SW846 6020
	Iron	0.203	0.033	0.100	NE			096255-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096255-009	SW846 6020
	Magnesium	15.0	0.010	0.030	NE			096255-009	SW846 6020
	Manganese	0.00168	0.001	0.005	NE	J		096255-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096255-009	SW846 7470
	Nickel	0.00185	0.0005	0.002	NE	J		096255-009	SW846 6020
	Potassium	1.76	0.080	0.300	NE			096255-009	SW846 6020
	Selenium	0.00261	0.0015	0.005	0.050	J		096255-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096255-009	SW846 6020
	Sodium	21.2	0.080	0.250	NE			096255-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096255-009	SW846 6020
	Uranium	0.00973	0.000067	0.0002	0.03			096255-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096255-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096255-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1 (Duplicate)	Aluminum	0.0252	0.015	0.050	NE	J		096256-009	SW846 6020
16-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096256-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096256-009	SW846 6020
	Barium	0.0187	0.0006	0.002	2.00			096256-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096256-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096256-009	SW846 6020
	Calcium	78.5	0.600	2.00	NE			096256-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096256-009	SW846 6020
	Cobalt	0.000128	0.0001	0.001	NE	J		096256-009	SW846 6020
	Copper	0.000746	0.00035	0.001	NE	J	0.0035U	096256-009	SW846 6020
	Iron	0.186	0.033	0.100	NE			096256-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096256-009	SW846 6020
	Magnesium	14.4	0.010	0.030	NE			096256-009	SW846 6020
	Manganese	0.00228	0.001	0.005	NE	J		096256-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096256-009	SW846 7470
	Nickel	0.00149	0.0005	0.002	NE	J		096256-009	SW846 6020
	Potassium	1.69	0.080	0.300	NE			096256-009	SW846 6020
	Selenium	0.00273	0.0015	0.005	0.050	J		096256-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096256-009	SW846 6020
	Sodium	22.3	0.080	0.250	NE			096256-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096256-009	SW846 6020
	Uranium	0.00982	0.000067	0.0002	0.03			096256-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096256-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096256-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW2	Aluminum	0.0268	0.015	0.050	NE	J		096251-009	SW846 6020
15-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096251-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096251-009	SW846 6020
	Barium	0.0194	0.0006	0.002	2.00			096251-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096251-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096251-009	SW846 6020
	Calcium	81.0	0.600	2.00	NE			096251-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096251-009	SW846 6020
	Cobalt	0.000124	0.0001	0.001	NE	J		096251-009	SW846 6020
	Copper	0.000678	0.00035	0.001	NE	J		096251-009	SW846 6020
	Iron	0.219	0.033	0.100	NE			096251-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096251-009	SW846 6020
	Magnesium	14.7	0.010	0.030	NE			096251-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096251-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096251-009	SW846 7470
	Nickel	0.00145	0.0005	0.002	NE	J		096251-009	SW846 6020
	Potassium	1.73	0.080	0.300	NE			096251-009	SW846 6020
	Selenium	0.0028	0.0015	0.005	0.050	J		096251-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096251-009	SW846 6020
	Sodium	20.2	0.080	0.250	NE			096251-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096251-009	SW846 6020
	Uranium	0.0133	0.000067	0.0002	0.03			096251-009	SW846 6020
	Vanadium	0.00125	0.001	0.005	NE	J		096251-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096251-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		096259-009	SW846 6020
17-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096259-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096259-009	SW846 6020
	Barium	0.0286	0.0006	0.002	2.00			096259-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096259-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096259-009	SW846 6020
	Calcium	76.5	0.600	2.00	NE			096259-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096259-009	SW846 6020
	Cobalt	0.000135	0.0001	0.001	NE	J		096259-009	SW846 6020
	Copper	0.000692	0.00035	0.001	NE	J		096259-009	SW846 6020
	Iron	0.191	0.033	0.100	NE			096259-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096259-009	SW846 6020
	Magnesium	14.7	0.010	0.030	NE			096259-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096259-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096259-009	SW846 7470
	Nickel	0.0015	0.0005	0.002	NE	J		096259-009	SW846 6020
	Potassium	1.61	0.080	0.300	NE			096259-009	SW846 6020
	Selenium	0.00254	0.0015	0.005	0.050	J		096259-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096259-009	SW846 6020
	Sodium	21.2	0.080	0.250	NE			096259-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096259-009	SW846 6020
	Uranium	0.0124	0.000067	0.0002	0.03			096259-009	SW846 6020
	Vanadium	0.00105	0.001	0.005	NE	J		096259-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096259-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Aluminum	ND	0.015	0.050	NE	U		096653-009	SW846 6020
06-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096653-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096653-009	SW846 6020
	Barium	0.0175	0.0006	0.002	2.00			096653-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096653-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096653-009	SW846 6020
	Calcium	81.6	0.300	1.00	NE			096653-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096653-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096653-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		096653-009	SW846 6020
	Iron	ND	0.033	0.100	NE	U		096653-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096653-009	SW846 6020
	Magnesium	17.5	0.010	0.030	NE			096653-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096653-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096653-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		096653-009	SW846 6020
	Potassium	1.84	0.080	0.300	NE			096653-009	SW846 6020
	Selenium	0.00278	0.0015	0.005	0.050	J		096653-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096653-009	SW846 6020
	Sodium	25.0	0.080	0.250	NE			096653-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096653-009	SW846 6020
	Uranium	0.00945	0.000067	0.0002	0.03			096653-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096653-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096653-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		096658-009	SW846 6020
07-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096658-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096658-009	SW846 6020
	Barium	0.0206	0.0006	0.002	2.00			096658-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096658-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096658-009	SW846 6020
	Calcium	81.6	0.300	1.00	NE			096658-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096658-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096658-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		096658-009	SW846 6020
	Iron	ND	0.033	0.100	NE	U		096658-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096658-009	SW846 6020
	Magnesium	17.8	0.010	0.030	NE			096658-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096658-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096658-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		096658-009	SW846 6020
	Potassium	1.84	0.080	0.300	NE			096658-009	SW846 6020
	Selenium	0.00327	0.0015	0.005	0.050	J		096658-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096658-009	SW846 6020
	Sodium	25.2	0.080	0.250	NE			096658-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096658-009	SW846 6020
	Uranium	0.0128	0.000067	0.0002	0.03			096658-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096658-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096658-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Continued)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW2 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096659-009	SW846 6020
07-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096659-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096659-009	SW846 6020
	Barium	0.0205	0.0006	0.002	2.00			096659-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096659-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096659-009	SW846 6020
	Calcium	81.0	0.300	1.00	NE			096659-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096659-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096659-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		096659-009	SW846 6020
	Iron	ND	0.033	0.100	NE	U		096659-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096659-009	SW846 6020
	Magnesium	17.3	0.010	0.030	NE			096659-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096659-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096659-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		096659-009	SW846 6020
	Potassium	1.72	0.080	0.300	NE			096659-009	SW846 6020
	Selenium	0.00289	0.0015	0.005	0.050	J		096659-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096659-009	SW846 6020
	Sodium	24.7	0.080	0.250	NE			096659-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096659-009	SW846 6020
	Uranium	0.0128	0.000067	0.0002	0.03			096659-009	SW846 6020
	Vanadium	0.00108	0.001	0.005	NE	J		096659-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096659-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-8 *(Concluded)*
Summary of Target Analyte List Metals and Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		096661-009	SW846 6020
08-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096661-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096661-009	SW846 6020
	Barium	0.0268	0.0006	0.002	2.00			096661-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096661-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096661-009	SW846 6020
	Calcium	81.5	0.300	1.00	NE			096661-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096661-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096661-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		096661-009	SW846 6020
	Iron	ND	0.033	0.100	NE	U		096661-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096661-009	SW846 6020
	Magnesium	18.2	0.010	0.030	NE			096661-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096661-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096661-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U		096661-009	SW846 6020
	Potassium	1.88	0.080	0.300	NE			096661-009	SW846 6020
	Selenium	0.00363	0.0015	0.005	0.050	J		096661-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096661-009	SW846 6020
	Sodium	25.9	0.080	0.250	NE			096661-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096661-009	SW846 6020
	Uranium	0.0122	0.000067	0.0002	0.03			096661-009	SW846 6020
	Vanadium	0.00124	0.001	0.005	NE	J		096661-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096661-009	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-9
Summary of Cation Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Calcium	83.7	0.600	2.00	NE			095196-017	SW846 6020
20-Jan-14	Magnesium	16.6	0.010	0.030	NE			095196-017	SW846 6020
	Potassium	1.79	0.080	0.300	NE			095196-017	SW846 6020
	Sodium	22.9	0.080	0.250	NE		J	095196-017	SW846 6020
OBS-MW2	Calcium	81.2	0.600	2.00	NE			095201-017	SW846 6020
22-Jan-14	Magnesium	16.9	0.010	0.030	NE			095201-017	SW846 6020
	Potassium	1.76	0.080	0.300	NE			095201-017	SW846 6020
	Sodium	21.4	0.080	0.250	NE		J	095201-017	SW846 6020
OBS-MW2 (Duplicate)	Calcium	81.3	0.600	2.00	NE			095202-017	SW846 6020
22-Jan-14	Magnesium	15.0	0.010	0.030	NE			095202-017	SW846 6020
	Potassium	1.67	0.080	0.300	NE			095202-017	SW846 6020
	Sodium	21.9	0.080	0.250	NE		J	095202-017	SW846 6020
OBS-MW3	Calcium	82.1	0.600	2.00	NE			095205-017	SW846 6020
21-Jan-14	Magnesium	16.3	0.010	0.030	NE			095205-017	SW846 6020
	Potassium	1.75	0.080	0.300	NE			095205-017	SW846 6020
	Sodium	22.3	0.080	0.250	NE		J	095205-017	SW846 6020
OBS-MW1	Calcium	78.2	0.300	1.00	NE			095733-017	SW846 6020
14-Apr-14	Magnesium	16.3	0.010	0.030	NE			095733-017	SW846 6020
	Potassium	1.89	0.080	0.300	NE			095733-017	SW846 6020
	Sodium	21.5	0.080	0.250	NE			095733-017	SW846 6020
OBS-MW2	Calcium	77.5	0.300	1.00	NE			095736-017	SW846 6020
15-Apr-14	Magnesium	15.0	0.010	0.030	NE			095736-017	SW846 6020
	Potassium	1.82	0.080	0.300	NE			095736-017	SW846 6020
	Sodium	21.5	0.080	0.250	NE			095736-017	SW846 6020
OBS-MW3	Calcium	76.9	0.300	1.00	NE			095741-017	SW846 6020
16-Apr-14	Magnesium	16.2	0.010	0.030	NE			095741-017	SW846 6020
	Potassium	1.82	0.080	0.300	NE			095741-017	SW846 6020
	Sodium	21.3	0.080	0.250	NE			095741-017	SW846 6020
OBS-MW3 (Duplicate)	Calcium	80.7	0.300	1.00	NE			095742-017	SW846 6020
16-Apr-14	Magnesium	16.1	0.010	0.030	NE			095742-017	SW846 6020
	Potassium	1.91	0.080	0.300	NE			095742-017	SW846 6020
	Sodium	22.6	0.080	0.250	NE			095742-017	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-9 *(Concluded)*
Summary of Cation Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Calcium	82.2	0.300	1.00	NE			096255-017	SW846 6020
16-Jul-14	Magnesium	16.7	0.010	0.030	NE			096255-017	SW846 6020
	Potassium	1.78	0.080	0.300	NE			096255-017	SW846 6020
	Sodium	23.0	0.080	0.250	NE			096255-017	SW846 6020
OBS-MW1 (Duplicate)	Calcium	81.2	0.300	1.00	NE			096256-017	SW846 6020
16-Jul-14	Magnesium	16.4	0.010	0.030	NE			096256-017	SW846 6020
	Potassium	1.60	0.080	0.300	NE			096256-017	SW846 6020
	Sodium	23.6	0.080	0.250	NE			096256-017	SW846 6020
OBS-MW2	Calcium	79.9	0.300	1.00	NE			096251-017	SW846 6020
15-Jul-14	Magnesium	15.4	0.010	0.030	NE			096251-017	SW846 6020
	Potassium	1.64	0.080	0.300	NE			096251-017	SW846 6020
	Sodium	22.1	0.080	0.250	NE			096251-017	SW846 6020
OBS-MW3	Calcium	80.2	0.300	1.00	NE			096259-017	SW846 6020
17-Jul-14	Magnesium	15.5	0.010	0.030	NE			096259-017	SW846 6020
	Potassium	1.68	0.080	0.300	NE			096259-017	SW846 6020
	Sodium	22.1	0.080	0.250	NE			096259-017	SW846 6020
OBS-MW1	Calcium	80.3	0.300	1.00	NE			096653-017	SW846 6020
06-Oct-14	Magnesium	17.0	0.010	0.030	NE			096653-017	SW846 6020
	Potassium	1.74	0.080	0.300	NE			096653-017	SW846 6020
	Sodium	23.5	0.080	0.250	NE			096653-017	SW846 6020
OBS-MW2	Calcium	78.3	0.300	1.00	NE			096658-017	SW846 6020
07-Oct-14	Magnesium	16.9	0.010	0.030	NE			096658-017	SW846 6020
	Potassium	1.72	0.080	0.300	NE			096658-017	SW846 6020
	Sodium	23.7	0.080	0.250	NE			096658-017	SW846 6020
OBS-MW2 (Duplicate)	Calcium	81.6	0.300	1.00	NE			096659-017	SW846 6020
07-Oct-14	Magnesium	17.3	0.010	0.030	NE			096659-017	SW846 6020
	Potassium	1.76	0.080	0.300	NE			096659-017	SW846 6020
	Sodium	24.0	0.080	0.250	NE			096659-017	SW846 6020
OBS-MW3	Calcium	79.0	0.300	1.00	NE			096661-017	SW846 6020
08-Oct-14	Magnesium	17.0	0.010	0.030	NE			096661-017	SW846 6020
	Potassium	1.70	0.080	0.300	NE			096661-017	SW846 6020
	Sodium	24.4	0.080	0.250	NE			096661-017	SW846 6020

Refer to footnotes on page 10A-39.

Table 10A-10
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Americium-241	-2.94 ± 14.0	21.6	10.6	NE	U	BD	095196-033	EPA 901.1
20-Jan-14	Cesium-137	-1.08 ± 1.84	3.09	1.47	NE	U	BD	095196-033	EPA 901.1
	Cobalt-60	-0.623 ± 2.05	3.61	1.69	NE	U	BD	095196-033	EPA 901.1
	Potassium-40	0.586 ± 45.6	31.3	14.4	NE	U	BD	095196-033	EPA 901.1
	Gross Alpha	-1.95	NA	NA	15 pCi/L	NA	None	095196-034	EPA 900.0
	Gross Beta	4.14 ± 1.10	0.997	0.475	4 mrem/yr		J	095196-034	EPA 900.0
	Uranium-233/234	18.5 ± 2.39	0.0607	0.0237	NE			095196-035	HASL-300
	Uranium-235/236	0.169 ± 0.0683	0.0547	0.0192	NE			095196-035	HASL-300
	Uranium-238	3.38 ± 0.493	0.0381	0.0124	NE			095196-035	HASL-300
OBS-MW2	Americium-241	11.3 ± 12.1	18.3	8.93	NE	U	BD	095201-033	EPA 901.1
22-Jan-14	Cesium-137	0.346 ± 4.85	3.89	1.87	NE	U	BD	095201-033	EPA 901.1
	Cobalt-60	0.773 ± 2.29	4.10	1.93	NE	U	BD	095201-033	EPA 901.1
	Potassium-40	-0.611 ± 44.8	51.5	24.6	NE	U	BD	095201-033	EPA 901.1
	Gross Alpha	4.93	NA	NA	15 pCi/L	NA	None	095201-034	EPA 900.0
	Gross Beta	3.95 ± 1.16	1.06	0.507	4 mrem/yr		J	095201-034	EPA 900.0
	Uranium-233/234	23.2 ± 2.96	0.0585	0.0229	NE			095201-035	HASL-300
	Uranium-235/236	0.187 ± 0.0841	0.0527	0.0185	NE			095201-035	HASL-300
	Uranium-238	4.28 ± 0.605	0.0367	0.0119	NE			095201-035	HASL-300
OBS-MW2 (Duplicate)	Americium-241	-3.86 ± 8.21	9.44	4.62	NE	U	BD	095202-033	EPA 901.1
22-Jan-14	Cesium-137	2.67 ± 2.25	3.33	1.60	NE	U	BD	095202-033	EPA 901.1
	Cobalt-60	1.00 ± 2.02	3.66	1.73	NE	U	BD	095202-033	EPA 901.1
	Potassium-40	8.54 ± 37.5	46.3	22.2	NE	U	BD	095202-033	EPA 901.1
	Gross Alpha	3.77	NA	NA	15 pCi/L	NA	None	095202-034	EPA 900.0
	Gross Beta	2.89 ± 1.31	0.999	0.471	4 mrem/yr		J	095202-034	EPA 900.0
	Uranium-233/234	22.1 ± 2.82	0.0582	0.0227	NE			095202-035	HASL-300
	Uranium-235/236	0.388 ± 0.107	0.0524	0.0184	NE			095202-035	HASL-300
	Uranium-238	4.54 ± 0.634	0.0365	0.0119	NE			095202-035	HASL-300
OBS-MW3	Americium-241	-0.657 ± 13.8	24.2	11.7	NE	U	BD	095205-033	EPA 901.1
21-Jan-14	Cesium-137	-0.509 ± 1.77	3.11	1.48	NE	U	BD	095205-033	EPA 901.1
	Cobalt-60	3.22 ± 3.69	3.75	1.76	NE	U	BD	095205-033	EPA 901.1
	Potassium-40	10.3 ± 36.5	28.4	13.0	NE	U	BD	095205-033	EPA 901.1
	Gross Alpha	5.18	NA	NA	15 pCi/L	NA	None	095205-034	EPA 900.0
	Gross Beta	3.24 ± 1.32	0.993	0.463	4 mrem/yr		J	095205-034	EPA 900.0
	Uranium-233/234	20.5 ± 2.72	0.0745	0.0291	NE			095205-035	HASL-300
	Uranium-235/236	0.260 ± 0.0968	0.0671	0.0235	NE			095205-035	HASL-300
	Uranium-238	3.86 ± 0.580	0.0467	0.0152	NE			095205-035	HASL-300

Refer to footnotes on page 10A-39.

Table 10A-10 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Americium-241	14.7 ± 11.2	14.8	4.77	NE	U	BD	095733-033	EPA 901.1
14-Apr-14	Cesium-137	-2.74 ± 4.03	5.38	2.61	NE	U	BD	095733-033	EPA 901.1
	Cobalt-60	0.336 ± 3.31	5.78	2.76	NE	U	BD	095733-033	EPA 901.1
	Potassium-40	23.8 ± 60.1	71.8	34.6	NE	U	BD	095733-033	EPA 901.1
	Gross Alpha	-2.77	NA	NA	15 pCi/L	NA	None	095733-034	EPA 900.0
	Gross Beta	1.52 ± 0.931	0.954	0.453	4 mrem/yr		J	095733-034	EPA 900.0
	Uranium-233/234	16.9 ± 2.19	0.0959	0.0415	NE			095733-035	HASL-300
	Uranium-235/236	0.366 ± 0.105	0.0686	0.0263	NE			095733-035	HASL-300
	Uranium-238	3.50 ± 0.507	0.0796	0.0333	NE			095733-035	HASL-300
OBS-MW2	Americium-241	1.54 ± 12.9	22.2	10.9	NE	U	BD	095736-033	EPA 901.1
15-Apr-14	Cesium-137	0.653 ± 3.89	5.93	2.86	NE	U	BD	095736-033	EPA 901.1
	Cobalt-60	-0.197 ± 4.24	6.39	3.02	NE	U	BD	095736-033	EPA 901.1
	Potassium-40	-42.4 ± 55.5	72.8	34.6	NE	U	BD	095736-033	EPA 901.1
	Gross Alpha	13.74	NA	NA	15 pCi/L	NA	None	095736-034	EPA 900.0
	Gross Beta	6.05 ± 1.41	1.14	0.546	4 mrem/yr		J	095736-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.63	0.0487	0.0211	NE			095736-035	HASL-300
	Uranium-235/236	0.381 ± 0.0813	0.0349	0.0134	NE			095736-035	HASL-300
	Uranium-238	4.28 ± 0.558	0.0404	0.0169	NE			095736-035	HASL-300
OBS-MW3	Americium-241	-1.77 ± 19.5	29.2	14.3	NE	U	BD	095741-033	EPA 901.1
16-Apr-14	Cesium-137	1.22 ± 2.91	4.35	2.10	NE	U	BD	095741-033	EPA 901.1
	Cobalt-60	0.0547 ± 2.69	4.68	2.23	NE	U	BD	095741-033	EPA 901.1
	Potassium-40	13.2 ± 46.5	59.1	28.4	NE	U	BD	095741-033	EPA 901.1
	Gross Alpha	10.16	NA	NA	15 pCi/L	NA	None	095741-034	EPA 900.0
	Gross Beta	4.07 ± 1.33	0.986	0.469	4 mrem/yr		J	095741-034	EPA 900.0
	Uranium-233/234	20.5 ± 2.56	0.0549	0.0237	NE			095741-035	HASL-300
	Uranium-235/236	0.371 ± 0.0841	0.0393	0.0151	NE			095741-035	HASL-300
	Uranium-238	4.07 ± 0.541	0.0455	0.0191	NE			095741-035	HASL-300
OBS-MW3 (Duplicate)	Americium-241	6.06 ± 15.1	24.2	11.9	NE	U	BD	095742-033	EPA 901.1
16-Apr-14	Cesium-137	-0.369 ± 2.37	3.45	1.66	NE	U	BD	095742-033	EPA 901.1
	Cobalt-60	-0.252 ± 2.62	4.01	1.91	NE	U	BD	095742-033	EPA 901.1
	Potassium-40	-40 ± 39.4	45.4	21.7	NE	U	BD	095742-033	EPA 901.1
	Gross Alpha	7.03	NA	NA	15 pCi/L	NA	None	095742-034	EPA 900.0
	Gross Beta	5.16 ± 1.29	1.32	0.639	4 mrem/yr		J	095742-034	EPA 900.0
	Uranium-233/234	20.7 ± 2.62	0.0607	0.0263	NE			095742-035	HASL-300
	Uranium-235/236	0.355 ± 0.0858	0.0434	0.0167	NE			095742-035	HASL-300
	Uranium-238	4.02 ± 0.545	0.0504	0.0211	NE			095742-035	HASL-300

Refer to footnotes on page 10A-39.

Table 10A-10 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Americium-241	10.4 ± 8.49	10.4	4.33	NE	U	BD	096255-033	EPA 901.1
16-Jul-14	Cesium-137	-0.0433 ± 3.68	5.39	2.61	NE	U	BD	096255-033	EPA 901.1
	Cobalt-60	-0.228 ± 3.09	5.36	2.55	NE	U	BD	096255-033	EPA 901.1
	Potassium-40	-28.3 ± 46.9	61.1	29.2	NE	U	BD	096255-033	EPA 901.1
	Gross Alpha	-2.89	NA	NA	15 pCi/L	NA	None	096255-034	EPA 900.0
	Gross Beta	7.11 ± 1.81	2.06	1.01	4 mrem/yr			096255-034	EPA 900.0
	Uranium-233/234	17.3 ± 2.17	0.0676	0.0301	NE			096255-035	HASL-300
	Uranium-235/236	0.175 ± 0.054	0.0407	0.0158	NE			096255-035	HASL-300
	Uranium-238	3.21 ± 0.436	0.0603	0.0265	NE			096255-035	HASL-300
OBS-MW1 (Duplicate)	Americium-241	15.9 ± 23.2	35.7	17.5	NE	U	BD	096256-033	EPA 901.1
16-Jul-14	Cesium-137	0.146 ± 2.88	4.37	2.11	NE	U	BD	096256-033	EPA 901.1
	Cobalt-60	1.33 ± 2.83	4.96	2.36	NE	U	BD	096256-033	EPA 901.1
	Potassium-40	-20 ± 46.0	60.5	29.0	NE	U	BD	096256-033	EPA 901.1
	Gross Alpha	-2.36	NA	NA	15 pCi/L	NA	None	096256-034	EPA 900.0
	Gross Beta	7.35 ± 1.82	1.91	0.930	4 mrem/yr			096256-034	EPA 900.0
	Uranium-233/234	17.9 ± 2.22	0.0608	0.0271	NE			096256-035	HASL-300
	Uranium-235/236	0.209 ± 0.0563	0.0366	0.0142	NE			096256-035	HASL-300
	Uranium-238	3.25 ± 0.433	0.0543	0.0238	NE			096256-035	HASL-300
OBS-MW2	Americium-241	21.9 ± 18.6	24.5	12.1	NE	U	BD	096251-033	EPA 901.1
15-Jul-14	Cesium-137	-3.42 ± 3.70	4.11	2.00	NE	U	BD	096251-033	EPA 901.1
	Cobalt-60	-0.897 ± 3.41	3.84	1.83	NE	U	BD	096251-033	EPA 901.1
	Potassium-40	53.1 ± 62.2	35.0	16.7	NE	X	R	096251-033	EPA 901.1
	Gross Alpha	6.34	NA	NA	15 pCi/L	NA	None	096251-R34	EPA 900.0
	Gross Beta	9.14 ± 1.92	1.64	0.798	4 mrem/yr		J	096251-R34	EPA 900.0
	Uranium-233/234	22.6 ± 3.07	0.392	0.171	NE			096251-R35	HASL-300
	Uranium-235/236	0.357 ± 0.227	0.288	0.114	NE		J	096251-R35	HASL-300
	Uranium-238	4.10 ± 0.744	0.227	0.0892	NE			096251-R35	HASL-300
OBS-MW3	Americium-241	-1.66 ± 10.8	18.4	9.06	NE	U	BD	096259-033	EPA 901.1
17-Jul-14	Cesium-137	0.233 ± 2.11	3.15	1.52	NE	U	BD	096259-033	EPA 901.1
	Cobalt-60	-4.19 ± 3.35	3.32	1.58	NE	U	BD	096259-033	EPA 901.1
	Potassium-40	13.4 ± 42.0	31.8	15.1	NE	U	BD	096259-033	EPA 901.1
	Gross Alpha	10.99	NA	NA	15 pCi/L	NA	None	096259-034	EPA 900.0
	Gross Beta	6.66 ± 1.49	1.20	0.580	4 mrem/yr			096259-034	EPA 900.0
	Uranium-233/234	20.9 ± 2.63	0.0707	0.0315	NE			096259-035	HASL-300
	Uranium-235/236	0.258 ± 0.0685	0.0425	0.0165	NE			096259-035	HASL-300
	Uranium-238	3.85 ± 0.518	0.0631	0.0277	NE			096259-035	HASL-300

Refer to footnotes on page 10A-39.

Table 10A-10 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
OBS-MW1	Americium-241	-2.95 ± 7.02	11.8	5.75	NE	U	BD	096653-033	EPA 901.1
06-Oct-14	Cesium-137	-0.302 ± 3.41	3.41	1.64	NE	U	BD	096653-033	EPA 901.1
	Cobalt-60	-0.133 ± 1.82	3.17	1.48	NE	U	BD	096653-033	EPA 901.1
	Potassium-40	41.4 ± 39.0	30.4	14.2	NE		J	096653-033	EPA 901.1
	Gross Alpha	7.13	NA	NA	15 pCi/L	NA	None	096653-034	EPA 900.0
	Gross Beta	5.79 ± 1.47	1.64	0.795	4 mrem/yr		J	096653-034	EPA 900.0
	Uranium-233/234	16.3 ± 2.12	0.104	0.0465	NE			096653-035	HASL-300
	Uranium-235/236	0.220 ± 0.0754	0.0729	0.0295	NE			096653-035	HASL-300
	Uranium-238	2.75 ± 0.406	0.0555	0.0221	NE			096653-035	HASL-300
OBS-MW2	Americium-241	-10.8 ± 17.6	29.4	14.3	NE	U	BD	096658-033	EPA 901.1
07-Oct-14	Cesium-137	-0.468 ± 2.27	3.93	1.87	NE	U	BD	096658-033	EPA 901.1
	Cobalt-60	2.21 ± 3.01	4.84	2.27	NE	U	BD	096658-033	EPA 901.1
	Potassium-40	9.73 ± 54.6	42.9	20.0	NE	U	BD	096658-033	EPA 901.1
	Gross Alpha	-0.81	NA	NA	15 pCi/L	NA	None	096658-034	EPA 900.0
	Gross Beta	6.76 ± 1.50	1.38	0.669	4 mrem/yr		J	096658-034	EPA 900.0
	Uranium-233/234	21.7 ± 2.77	0.0836	0.0373	NE			096658-035	HASL-300
	Uranium-235/236	0.345 ± 0.0863	0.0585	0.0237	NE			096658-035	HASL-300
	Uranium-238	4.27 ± 0.585	0.0445	0.0178	NE			096658-035	HASL-300
OBS-MW2 (Duplicate)	Americium-241	-0.956 ± 6.74	10.4	5.10	NE	U	BD	096659-033	EPA 901.1
07-Oct-14	Cesium-137	1.59 ± 2.14	3.63	1.75	NE	U	BD	096659-033	EPA 901.1
	Cobalt-60	-0.696 ± 2.88	3.62	1.71	NE	U	BD	096659-033	EPA 901.1
	Potassium-40	-35.6 ± 38.2	46.5	22.2	NE	U	BD	096659-033	EPA 901.1
	Gross Alpha	2.41	NA	NA	15 pCi/L	NA	None	096659-034	EPA 900.0
	Gross Beta	7.12 ± 1.70	1.81	0.880	4 mrem/yr		J	096659-034	EPA 900.0
	Uranium-233/234	22.4 ± 2.88	0.0877	0.0391	NE			096659-035	HASL-300
	Uranium-235/236	0.693 ± 0.139	0.0614	0.0249	NE			096659-035	HASL-300
	Uranium-238	4.60 ± 0.631	0.0467	0.0186	NE			096659-035	HASL-300
OBS-MW3	Americium-241	3.56 ± 5.80	9.83	4.81	NE	U	BD	096661-033	EPA 901.1
08-Oct-14	Cesium-137	-0.854 ± 1.92	3.24	1.56	NE	U	BD	096661-033	EPA 901.1
	Cobalt-60	-0.454 ± 1.90	3.32	1.56	NE	U	BD	096661-033	EPA 901.1
	Potassium-40	40.8 ± 44.8	33.6	15.8	NE	X	R	096661-033	EPA 901.1
	Gross Alpha	4.59	NA	NA	15 pCi/L	NA	None	096661-034	EPA 900.0
	Gross Beta	7.31 ± 1.61	1.44	0.698	4 mrem/yr		J	096661-034	EPA 900.0
	Uranium-233/234	21.6 ± 2.78	0.0863	0.0385	NE			096661-035	HASL-300
	Uranium-235/236	0.330 ± 0.0859	0.0604	0.0245	NE			096661-035	HASL-300
	Uranium-238	4.18 ± 0.577	0.046	0.0183	NE			096661-035	HASL-300

Refer to footnotes on page 10A-39.

Table 10A-11
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
OBS-MW1	20-Jan-14	15.81	427.6	270.1	7.51	0.52	36.2	3.58
OBS-MW2	22-Jan-14	15.61	420.1	301.2	7.51	0.12	34.6	3.44
OBS-MW3	21-Jan-14	16.30	427.6	290.8	7.51	0.46	44.8	4.47
OBS-MW1	14-Apr-14	14.56	462.2	-199.9	7.54	0.31	36.4	3.71
OBS-MW2	15-Apr-14	16.14	464.0	189.7	7.52	0.19	36.2	3.55
OBS-MW3	16-Apr-14	16.7	471.0	197.7	7.56	0.24	46.6	4.52
OBS-MW1	16-Jul-14	18.09	479.1	301.3	7.40	0.41	37.9	3.58
OBS-MW2	15-Jul-14	18.10	473.8	291.1	7.38	0.28	37.1	3.50
OBS-MW3	17-Jul-14	19.00	484.6	303.6	7.39	0.56	47.3	4.38
OBS-MW1	06-Oct-14	17.89	511.0	298.8	7.27	0.22	38.8	3.66
OBS-MW2	07-Oct-14	18.70	517.1	301.1	7.22	0.23	37.3	3.47
OBS-MW3	08-Oct-14	17.46	503.1	254.0	7.21	0.18	46.9	4.48

Refer to footnotes on page 10A-39.

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Footnotes for Solid Waste Management Unit 68 Analytical Results Tables

%	= Percent.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
HMX	= Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	= Identification.
μg/L	= Micrograms per liter.
mg/L	= Milligrams per liter.
mrem/yr	= Millirem per year.
MW	= Monitoring well.
OBS	= Old Burn Site.
No.	= Number.
pCi/L	= Picocuries per liter.
RDX	= Hexahydro-1,3,5-trinitro-1,3,5-triazineN
Tetryl	= Methyl-2,4,6-trinitrophenylnitramine.

[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 = Indicates the value exceed the established MCL.

ND = Not detected (at MDL).

Activities of zero or less are considered to be not detected.

[b]MDL or MDA

MDL applies to the data listed in Tables 10A-1 through 10A-9. MDA applies to radiological data in Table 10A-10.

MDA = Minimum detectable activity. 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 10A-1 through 10A-9. Critical level applies to Table 10A-10.

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

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.

MCL = Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Office of Water, National Primary Water Regulations (EPA May 2009).

The following are MCLs for gross alpha particles and beta particles in community water systems:

- Gross alpha particle activity, excluding total uranium = 15 pCi/L= (40 CFR Parts 9, 141, and 142, Table 10A- 1-4).
- Any combination of beta and/or gamma emitting radionuclides = 4 mrem/yr = (as dose rate).

NE = Not established.

Footnotes for Solid Waste Management Unit 68 Analytical Results Tables (Concluded)

[e]Lab 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 effective PQL.
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.
None = No data validation for corrected gross alpha activity.
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.
R = The data are unusable (compound may or may not be present). Resampling and reanalysis are for verification.

[g]Analytical Method

Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1990, "EML [Environmental Measurements Laboratory] Procedures Manual," 27th ed., Vol. 1, Rev. 1992, 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.

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 10B
Solid Waste Management Unit 68
Hydrographs

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Attachment 10B Hydrographs

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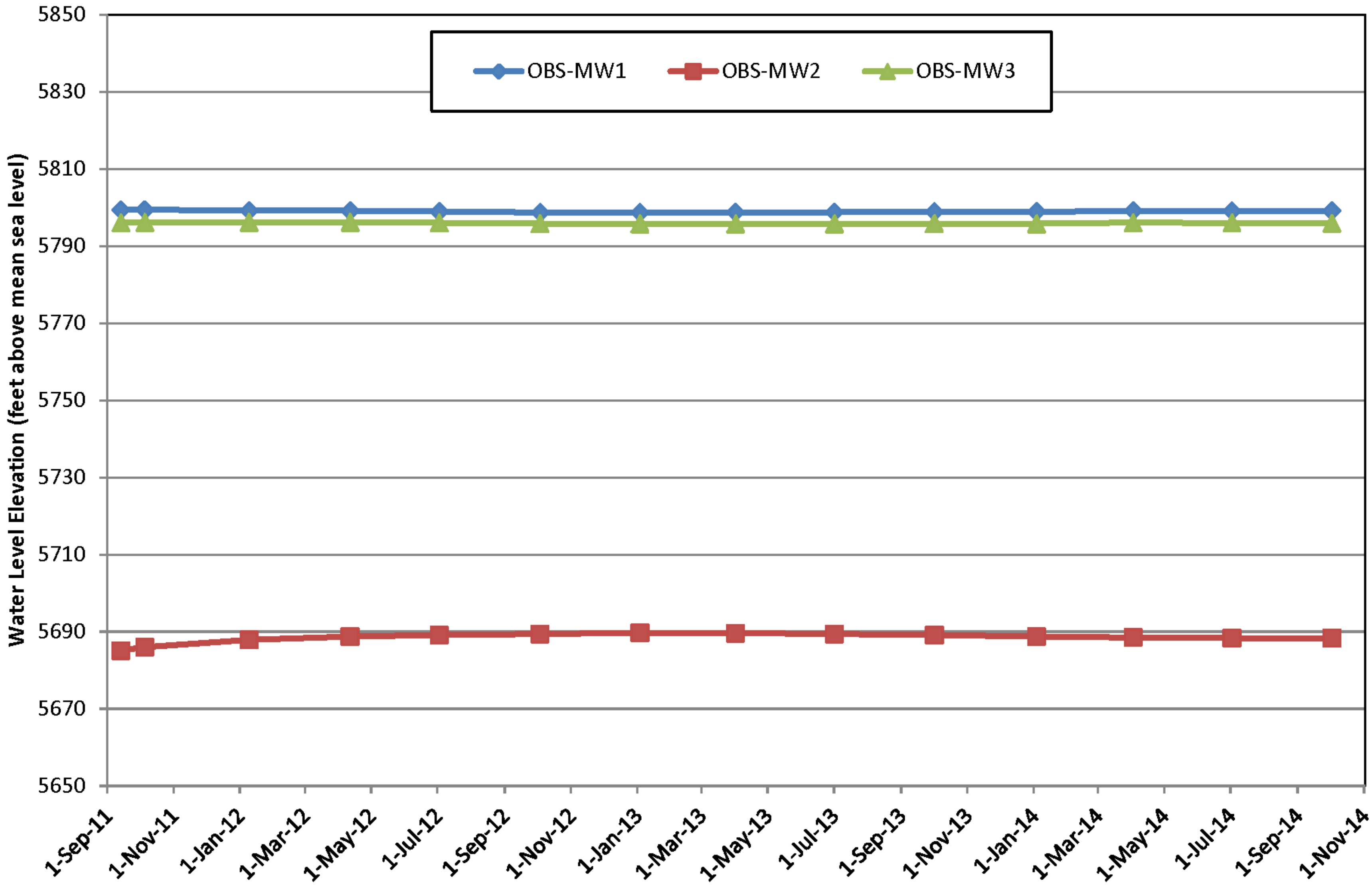

Figure 10B-1. SWMU 68 Study Area Wells

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11.0 Solid Waste Management Unit 116

11.1 Introduction

Drain and Septic System (DSS) Solid Waste Management Unit (SWMU) 116 is located in the Coyote Test Field on the western margin of the Manzanita Mountains. Analytical results for groundwater samples from the fractured bedrock have historically been reported as nondetected or detected at background concentrations for constituents of concern (COCs).

11.1.1 Location

The Coyote Canyon Test Area at Sandia National Laboratories, New Mexico (SNL/NM) is located in the eastern portion of Kirtland Air Force Base (KAFB).

SWMU 116 is located on the western margin of the Manzanita Mountain foothills within the U.S. Forest Service Withdrawn Area. The site lies in a minor southwesterly-sloping tributary that drains to the alluvial fan along the mountain front. This short tributary drains mountainous terrain immediately north and east of the site. Outcrops in the immediate area include Precambrian granite, gneiss, metarhyolite, and amphibolites that are unconformably overlain by Pennsylvanian limestone, sandstone, and conglomerate (SNL March 1993). Recent sediments include a thin discontinuous veneer of stream-deposited alluvium along the floor of the tributary and also colluvium on nearby hillsides. Vegetation in the vicinity consists predominantly of sparse juniper and pinon woodlands, low-lying shrubs (including sand sage, winter fat, saltbush, and rabbitbush), cacti (i.e., cholla, pincushion, strawberry, and prickly pear), and bunch grasses (i.e., grama, muhly, dropseed, and galleta).

SWMU 116 contains five seepage pits on the south side of Building 9990. Four of the seepage pits were connected to a septic tank. A fifth seepage pit was connected directly to floor drains and a sink in the building. The site is located approximately 50 feet (ft) south of Building 9990 and covers 2,473 square feet (approximately 0.06 acres). The site elevation is 6,120 ft above mean sea level (amsl).

11.1.2 Site History

Building 9990, the Electroexplosive Research Facility, was constructed in 1969 and was used as an explosive test facility from 1969 to 1986 (Table 11-1). Explosive testing was discontinued in 1986 and no significant research activity has occurred since 1994. Tests were conducted north of the building, and debris from the blasts, which often used depleted uranium, were dispersed over the nearby hillside.

Environmental concern about SWMU 116 is based on the potential release of COCs in sanitary waste or wastewater that discharged at the Building 9990 seepage pits. While in operation, the DSS is estimated to have discharged approximately 60 to 600 gallons per day of sanitary waste and wastewater. The DSS at SWMU 116 was removed from service in 1989, but remains in place. The 750-gallon septic tank is connected to a distribution box and four seepage pits, each 5 ft in diameter. Three of the four seepage pits are 13 ft deep, and the fourth is 11 ft deep. The septic system received sanitary waste from restrooms and possibly wastewater from floor drains (SNL March 1993).

A fifth seepage pit received wastewater from the upstairs darkroom sink and from floor drains on the west side of the building. This seepage pit probably received the largest volume of wastewater. The pit is 13 ft deep and received photo-processing chemicals from an upstairs sink. Floor drains connected to the fifth seepage pit may have received polychlorinated biphenyl-contaminated capacitor oil that leaked from a bank of 72 capacitors. Although undocumented, the floor drains may have also received methylene chloride that leaked from drums stored in the building, and small quantities of dilute copper sulfate from high-voltage water resistors may have been discharged to either the septic system or the fifth seepage pit.

Table 11-1. Historical Timeline of SWMU 116

Month	Year	Event	Reference
--	1969	Building 9990 and septic system constructed.	SNL June 1996
September	1987	SWMU 116 first identified as a potential release site.	SNL June 1996
--	1989	SWMU 116 septic tank pumped for the last time.	SNL June 1996
June	1992	Waste characterization samples collected from SWMU 116 septic tank.	SNL June 1996
March	1993	Septic Tanks and Drainfields (OU 1295), RCRA Facility Investigation Work Plan submitted to the EPA.	SNL March 1993
March	1994	OU 1295 SAP prepared.	IT March 1994
--	1993-1995	Field Investigations and Voluntary Corrective Measures completed at SWMU 116.	SNL June 1996
June	1996	NFA proposal for SWMU 116 submitted to the NMED.	SNL June 1996
June	1998	NMED responded with an RSI on the SWMU 116 NFA proposal.	NMED June 1998
November	1998	Response submitted to the first NMED RSI for SWMU 116.	SNL November 1998
October	1999	A SAP describing technical procedures to be used for environmental investigations at DSS sites and AOCs submitted to the NMED.	SNL October 1999
January	2000	October 1999 DSS SAP approved by the NMED.	NMED January 2000
June	2000	NMED issued a second RSI on the SWMU 116 NFA proposal, and the first SNL/NM response for SWMU 116.	NMED June 2000
September	2000	Response submitted to NMED for the second RSI for SWMU 116.	SNL September 2000
August	2001	Groundwater monitoring well CTF-MW1 installed near SWMU 116.	SNL June 2005
November	2001	Follow-up FIP documenting specific investigation procedures to be completed at DSS sites and AOCs submitted to the NMED.	SNL November 2001
February	2002	The DSS FIP approved by the NMED.	NMED February 2002
May	2004	Completion of eight quarters of groundwater sampling from monitoring well CTF-MW1.	SNL June 2005
June	2005	A third RSI response was submitted to the NMED describing the results of investigation work completed at SWMU 116 since the June 1996 NFA report that also included an updated risk assessment evaluation.	SNL June 2005
September	2005	NMED issues Certificate of Completion for CAC without Controls for SWMU 116.	NMED September 2005
March	2006	Request for Class 3 Permit Modification submitted. Public Notice meeting published. Documents supporting NFA (CAC) for SWMU 116 compiled.	SNL March 2006
April	2010	NMED requires that monitoring well CTF-MW1 be sampled annually as part of LTS requirements for SWMU 116.	NMED April 2010
March	2011	Monitoring well CTF-MW1 sampled as part of LTS.	SNL September 2012
February	2012	Monitoring well CTF-MW1 sampled as part of LTS.	SNL January 2012
January	2013	Monitoring well CTF-MW1 sampled as part of LTS.	SNL December 2012
January	2014	Monitoring well CTF-MW1 sampled as part of LTS.	SNL January 2014

NOTES:

AOC = Area of Concern.
CAC = Corrective Action Complete.
CTF = Coyote Test Field.
DSS = Drain and Septic System.
EPA = U.S. Environmental Protection Agency.
FIP = Field Implementation Plan.
IT = International Technology Corporation.
LTS = Long-term Stewardship.
MW = Monitoring well.
NFA = No Further Action.
NMED = New Mexico Environment Department.
OU = Operable Unit.
RCRA = Resource Conservation and Recovery Act.
RSI = Request for Supplemental Information.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SNL/NM = Sandia National Laboratories, New Mexico.
SWMU = Solid Waste Management Unit.

11.1.3 Monitoring History

For the DSS investigation, groundwater monitoring well CTF-MW1 (Figure 11-1) was installed in 2001. The well is located approximately 500 ft to the south and downslope of Building 9990. The ground surface at the wellhead is approximately 40 ft lower than the elevation at the site. The well is located along a small arroyo that directs stormwater southwestward from the site to an alluvial fan adjoining the mountain front. The well is screened in fractured Precambrian granite at a depth of 240 to 260 ft below ground surface (bgs) (SNL June 2005).

Monitoring well CTF-MW1 was sampled on a quarterly basis from July 2002 to May 2004 to acquire the eight quarters of groundwater data as required by the New Mexico Environment Department (NMED) in the June 2000 Request for Supplemental Information (NMED June 2000). No analytes exceeded maximum contaminant levels (MCLs) or other groundwater standards during the eight sampling events. After the eight quarters of data were collected, the well became part of the Groundwater Protection Program monitoring network and was sampled sporadically. Most recently, annual sampling at monitoring well CTF-MW1 has been reinstated based on NMED requirements (NMED April 2010).

11.1.4 Current Monitoring Network

Monitoring well CTF-MW1 is the only well in the SWMU 116 area. This monitoring well was installed in 2001 and monitors groundwater that migrates through fractured Precambrian granite.

11.1.5 Summary of Calendar Year 2014 Activities

The following activities were conducted for the SWMU 116 monitoring effort during Calendar Year (CY) 2014 (January through December 2014):

- Annual groundwater sampling was conducted at monitoring well CTF-MW1 in January 2014.
- Periodic groundwater elevation data were obtained from monitoring well CTF-MW1.
- Tables of analytical results (Attachment 11A) and a hydrograph (Attachment 11B) were prepared in support of this report.

11.1.6 Summary of Future Activities

NMED approved completion of corrective action at SWMU 116 in conjunction with renewal of the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (Permit) (NMED December 2014). No long-term controls are needed, and no future sampling activities are planned at SWMU 116.

11.1.7 Current Conceptual Model

The following sections present an updated discussion of the hydrogeologic regime, conceptual model, and previous contaminant findings for SWMU 116.

11.1.7.1 Regional Hydrogeologic Conditions

SWMU 116 is located on the western margin of the Manzanita Mountains (Figure 11-1). Alluvium covers the canyon floor where Building 9990 is located. The surrounding ridges consist of Precambrian outcrops (i.e., granite, gneiss, metarhyolite, and amphibolites) that are unconformably overlain by Paleozoic limestone, sandstone, and conglomerate. The outcrops are sporadically covered by colluvium. The base-wide potentiometric surface map (Plate 1) shows that groundwater flow in fractured bedrock is generally toward the west. The regional groundwater flow direction is depicted in Figure 11-1. No potable water supply wells are located within 5 miles of the site.

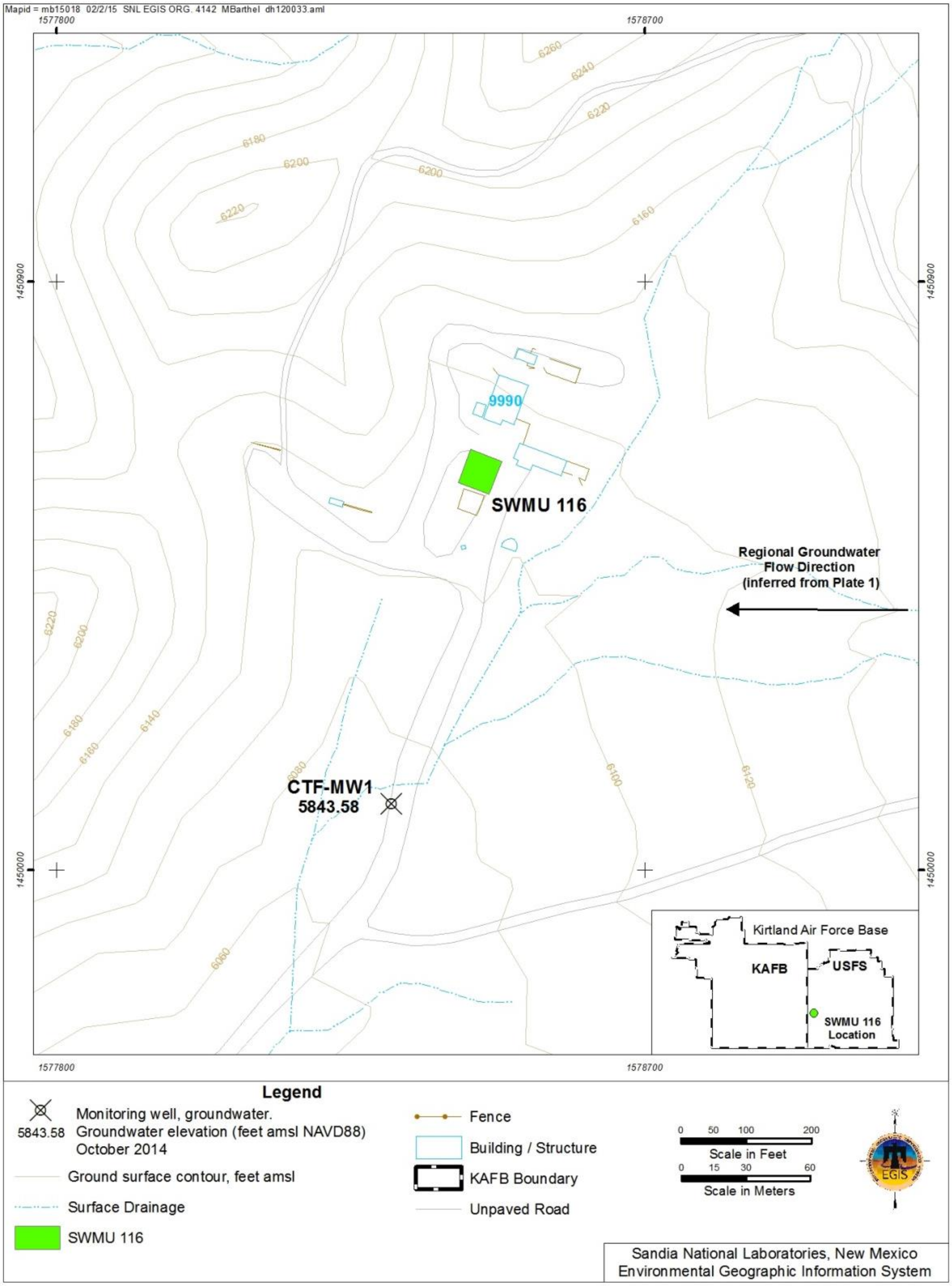

Figure 11-1. Location and Groundwater Elevation at SWMU 116

11.1.7.2 Hydrogeologic Conditions at SWMU 116

SWMU 116 consists of five seepage pits near Building 9990 where sanitary waste and wastewater discharged from 1969 to 1989. The site is covered by colluvium that is underlain by bedrock. The site elevation is approximately 6,120 ft amsl (Figure 11-1). Overall, the terrain slopes to the southwest (Plate 1). No perennial surface water features, such as springs, are located within 1 mile of SWMU 116. Monitoring well CTF-MW1 is located approximately 500 ft downslope of Building 9990. The ground surface at the wellhead is approximately 40 ft lower than at the site.

The amount of precipitation available for groundwater recharge at SWMU 116 is minimal due to scant rainfall and high evapotranspiration rates. Summer (monsoonal) thunderstorms are responsible for the majority of rainfall. The average rainfall, as measured at the nearest active rain gauge (the National Weather Service station at the Albuquerque International Sunport) during the period from 1914 through 2013, was 8.65 inches per year (WRCC-DRI 2015). The station is located 10 miles northwest of SWMU 116 at an elevation of 5,310 ft amsl. By extrapolation of the precipitation model presented in SNL/NM conceptual model of groundwater flow and contaminant transport at the canyon area (SNL May 2004), the average annual precipitation for SWMU 116, where the elevation is approximately 6,120 ft amsl, is estimated to be approximately 11.5 inches per year. Intense sunlight and low humidity throughout much of the year creates high rates of evapotranspiration, resulting in minimal groundwater recharge. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

In 2001, a location downslope from SWMU 116, and agreed upon by NMED and SNL/NM, was selected for the installation of groundwater monitoring well CTF-MW1. The well was installed in August 2001 using the air rotary casing hammer drilling technique; the borehole was temporarily cased to 8 ft bgs. Dry alluvium consisting of silty sand and fine to medium gravel was encountered from the ground surface to 12 ft bgs. Competent (unfractured) Precambrian granite was encountered from 16 to 240 ft bgs. Groundwater was encountered at 240 ft bgs in slightly fractured granite. Water production increased steadily to the borehole total depth of 270 ft bgs. The well was screened from 240 to 260 ft bgs in fractured granite (Table 11-2).

Table 11-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Well CTF-MW1 at SWMU 116

Well ID	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2014 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Approximate Pressure Head (ft[a])
CTF-MW1	6,079.70	240 – 260	5,839.70	5,843.58	5,829.70	14

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CTF = Coyote Test Field.
ft = Foot (feet).
ID = Identification.
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The October 2014 groundwater elevation at monitoring well CTF-MW1 was 5,843.58 ft amsl. Compared to the mid-point elevation of the screen, the pressure head was approximately 14 ft and is indicative of confined conditions. Based on the potentiometric surface depicted on Plate 1, the horizontal gradient is steep and on the order of approximately 0.02 feet per foot near the monitoring well. Groundwater flows to the west through a fractured bedrock system.

During sampling, the drawdown in monitoring well CTF-MW1 is not excessive and the quantity of water produced is clearly adequate for low-flow sampling purposes. Groundwater samples are collected using a portable pneumatic (nitrogen-gas activated) Bennett™ piston pump.

11.1.7.3 Local Direction of Flow

The conceptual hydrogeologic model for SWMU 116 is based on the findings for monitoring well CTF-MW1, other wells located along the mountain front (Plate 1), and extensive field mapping conducted by the Site-Wide Hydrogeologic Characterization Project (GRAM and Lettis 1995). Groundwater in the SWMU 116 area occurs in a fractured bedrock system under confined conditions. During drilling, the depth to groundwater at monitoring well CTF-MW1 was approximately 240 ft bgs in a fractured interval of Precambrian quartzite. Groundwater in the bedrock predominantly moves through a confined, low-permeability fracture system. A series of naturally filled fractures in the upper bedrock most likely serves as a confining unit.

The amount of precipitation available for groundwater recharge at SWMU 116 is minimal due to the scant rainfall and high evapotranspiration rates. Historical water level data indicate that seasonal effects, primarily due to thunderstorms, rarely occur. The hydrograph (Figure 11B-1 from Attachment 11B) shows that significant water level increases occurred only twice in the last 10 years. During 2002 through 2014, the overall trend was downward. For the last five years, the water level in monitoring well CTF-MW1 has declined at approximately 0.5 foot per year. Groundwater most likely discharges to the unconsolidated basin fill deposits (primarily the Santa Fe Group) of the Albuquerque Basin after crossing the Coyote, Tijeras, and Sandia Faults (SNL February 1998). No potable water supply wells are located within 5 miles of the site (Plate 1).

11.1.7.4 Contaminant Sources

From 1969 to 1989, sanitary waste and wastewater discharged to five buried seepage pits near Building 9990. The sanitary waste and wastewater possibly contained sewage, photo-processing chemicals, high explosive (HE) compounds, and volatile organic compounds (VOCs). The areas around the seepage pits were characterized by soil sampling as part of the DSS investigation.

11.1.7.5 Contaminant Distribution and Transport in Groundwater

No COCs exceeded applicable U.S. Environmental Protection Agency (EPA) MCLs (EPA May 2009) in the CY 2014 groundwater samples collected from monitoring well CTF-MW1. No groundwater contamination is suspected at SWMU 116.

11.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM Environmental Restoration (ER) Operations (formerly ER Project), as well as implements and enforces regulations mandated by RCRA. All ER Operations SWMUs and Areas of Concern (AOCs) are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (EPA August 1993). All corrective action requirements pertaining to SWMUs and AOCs are contained in the Compliance Order on Consent (the

Consent Order) between the U.S. Department of Energy (DOE), Sandia Corporation (Sandia), and NMED (April 2004).

The DOE/National Nuclear Security Administration (NNSA) and Sandia received a letter from the NMED dated April 8, 2010, entitled *Class III Permit Modification Requests for Granting Corrective Action Complete status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001* (NMED April 2010). The NMED's letter lists SWMU 116 under the heading of "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls" and further states that pursuant to Section III.W.3.b of the Consent Order (NMED April 2004), SWMU 116 requires long-term monitoring of groundwater on an annual basis as a site control. The NMED specified that the following analytes are to be monitored for SWMU 116 general chemistry parameters: VOCs, HE compounds, perchlorate, metals, cyanide, and nitrate plus nitrite (NPN).

11.3 Scope of Activities

The groundwater monitoring activities for SWMU 116 conducted during this reporting period consisted of the measurement of water levels and sampling and analysis as summarized in Table 11-3.

Table 11-3. Groundwater Monitoring Well Network and Sampling Dates for SWMU 116, Calendar Year 2014

Date of Sampling Event	Wells Sampled	SAP
January 2014	CTF-MW1	*SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2014 Annual Sampling* (SNL January 2014)

NOTES:
CTF = Coyote Test Field.
MW = Monitoring Well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

The analytical parameters are listed in Table 11-4. Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples may include duplicate environmental, equipment blank (EB), and trip blank (TB) samples. A duplicate environmental and an EB sample was collected at monitoring well CTF-MW1 during the CY 2014 sampling event.

11.4 Field Methods and Measurements

The monitoring procedures conducted for SWMU 116 groundwater monitoring are described in detail in Section 1.3.

The groundwater elevation is shown on Figure 11-1 and depicted in the hydrograph presented on Figure 11B-1 (Attachment 11B).

11.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols described in Section 1.3.2 (Tables 1-5 and 1-6).

Table 11-4. Parameters Sampled at SWMU 116

Parameter	January 2014
Alkalinity (total, bicarbonate, carbonate) Anions Cations HE Compounds NPN Perchlorate TAL Metals, plus Total Uranium Total Cyanide VOCs	CTF-MW1 CTF-MW1 (duplicate)

NOTES:

CTF = Coyote Test Field.
HE = High explosive.
MW = Monitoring Well.
NPN = Nitrate plus nitrate.
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.
VOC = Volatile organic compound.

11.6 Summary of Analytical Results

This section discusses analytical results, exceedances of regulatory standards, and pertinent trends in COC concentrations. The analytical results and field measurements for the CY 2014 SWMU 116 sampling event are presented in Tables 11A-1 through 11A-8 (Attachment 11A). Data qualifiers are explained in the footnotes following Table 11A-8.

One VOC (1,1,2-trichloro-1,2,2-trifluoroethane) was detected in the CTF-MW1 environmental and environmental duplicate samples at concentrations of 13.9 micrograms per liter (µg/L) and 13.6 µg/L, respectively. Results are listed in Table 11A-1 (Attachment 11A). There is not an established MCL for this compound. The method detection limits (MDLs) for all analyzed VOCs are listed in Table 11A-2 (Attachment 11A). No HE compounds were detected above MDLs. The MDLs for all analyzed HE compounds are listed in Table 11A-3 (Attachment 11A).

The analytical result for NPN is presented in Table 11A-4 (Attachment 11A). No NPN result exceeded the MCL of 10 milligrams per liter (mg/L). For CY 2014, NPN was reported at concentrations of 8.78 mg/L and 9.16 mg/L in the CTF-MW1 environmental and environmental duplicate samples.

The results for alkalinity, anion, cation, and total cyanide results are provided in Table 11A-5 (Attachment 11A). No detections of the constituents exceed applicable MCLs.

The analytical result for perchlorate is presented in Table 11A-6 (Attachment 11A). Currently, no MCL is established for perchlorate and perchlorate does not exceed the NMED-specified screening level/MDL of 4 µg/L (NMED April 2004).

Total metal results are presented in Table 11A-7 (Attachment 11A). No metals exceed established MCLs.

Field water quality parameters are measured during purging of the well prior to sampling and include temperature, specific conductance, oxidation-reduction potential, pH, turbidity, and dissolved oxygen. The parameter measurements obtained immediately prior to sample collection are presented in Table 11A-8 (Attachment 11A).

11.7 Quality Control Results

Field and laboratory QC samples were collected and prepared as described in Section 1.3. Data validation qualifiers are presented with the analytical results in Table 11A-1 and Tables 11A-4 through 11A-7 (Attachment 11A). The results of QC samples and the impact on data quality for the SWMU 116 sampling event are discussed in the following sections.

All reported values for any QC did not exceed established MCLs.

A duplicate environmental sample was collected at CTF-MW1 and analyzed in order to estimate the overall reproducibility of the sampling and analytical process. The duplicate sample was collected immediately after the original environmental sample, in order to reduce variability caused by time and/or sampling mechanics. Duplicate samples were analyzed for all parameters. Relative percent difference (RPD) calculations, between duplicate samples, were performed for detected chemical analytes. The January 2014 duplicate sample data results show good agreement (low RPD values < 20 percent for organic compounds and < 35 percent for inorganic analyses) for all calculated parameters.

An EB sample was collected prior to sampling monitoring well CTF-MW1, and submitted for all analyses. Acetone, bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, and copper were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CTF-MW1 environmental and environmental duplicate samples during data validation, because copper was reported in the EB sample at a concentration greater than associated environmental samples.

No VOCs were detected above laboratory MDLs in any TB sample.

Laboratory data qualifiers are provided with the analytical results (Attachment 11A).

11.8 Variances and Nonconformances

The following sections describe differences between planned work and actual work, findings of the data validation process, and any impacts to the schedule.

11.8.1 Variances and Nonconformances

No variances or nonconformances from field or sampling requirements, as specified in the SWMU 116 groundwater monitoring Mini-Sampling and Analysis Plan (SNL January 2014), occurred during sampling activities.

11.8.2 Data Validation

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted, and all data are determined as acceptable and reported QC measures appear adequate. Data validation qualifiers are provided with the analytical results in Attachment 11A.

11.9 Summary and Conclusions

This section provides a brief summary of activities, discussion of COCs in relation to MCLs, trends of concentrations versus time, and the current conceptual model.

SWMU 116 is located in the western Manzanita Mountains. Groundwater investigations were initiated in 2001 at the request of the NMED to evaluate the DSS associated with Building 9990. One monitoring well at SWMU 116 (CTF-MW1) was sampled in January 2014, and the sample was analyzed for VOCs, HE compounds, NPN, alkalinity (total, bicarbonate, carbonate), anions, cations, perchlorate, Target Analyte List metals (plus total uranium), and total cyanide. Analytical results were compared with EPA MCL guidelines for drinking water (EPA May 2009). No parameters were detected above established MCLs in the groundwater samples.

The analytical results for CY 2014 are consistent with historical concentrations. The conceptual model described in Section 11.1.7 does not require modification based on the analytical results for this reporting period.

Annual groundwater monitoring at SWMU 116 will be discontinued. NMED approved completion of corrective action at SWMU 116 in conjunction with renewal of the Permit (NMED December 2014). No long-term controls are needed, and no future sampling activities are planned at SWMU 116.

11.10 References

EPA May 2009 U.S. Environmental Protection Agency (EPA), 2009. *National Primary Drinking Water Regulations*, EPA 816-F 09-004, U.S. Environmental Protection Agency, Washington, D.C., May.

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NMED September 2005 New Mexico Environment Department (NMED), September 2005. *RE: Notice of Approval/Disapproval: Responses to Request for Supplemental Information for Proposals for Corrective Action Complete, Drain and Septic Systems SWMUs 49, 101, 116, 138, 149, 154, and 161, June 2005, Sandia National Laboratories EPA ID# NM5890110518 HWB-SNL-99-008, HWB-SNL-99-012,* New Mexico Environment Department, Santa Fe, New Mexico.

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SNL March 1993 Sandia National Laboratories, New Mexico (SNL/NM), March 1993, *Septic Tanks and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan*, Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

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Attachment 11A
Solid Waste Management Unit 116
Analytical Results Tables

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Attachment 11A Tables

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Table 11A-1
Summary of Detected Volatile Organic Compounds and High Explosive Compounds, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW1 29-Jan-14	1,1,2-Trichloro-1,2,2-trifluoroethane	13.9	1.50	5.00	NE			095246-001	SW846-8260B
CTF-MW1 (Duplicate) 29-Jan-14	1,1,2-Trichloro-1,2,2-trifluoroethane	13.6	1.50	5.00	NE			095247-001	SW846-8260B

Refer to footnotes on page 11A-15.

Table 11A-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300	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	3.00
1,2-Dichloropropane	0.300	Methylene chloride	3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	3.00	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 11A-15.

Table 11A-3
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (μg/L)
1,3,5-Trinitrobenzene	0.0860–0.0870
1,3-Dinitrobenzene	0.0860–0.0870
2,4,6-Trinitrotoluene	0.0860–0.0870
2,4-Dinitrotoluene	0.0860–0.0870
2,6-Dinitrotoluene	0.0860–0.0870
2-Amino-4,6-dinitrotoluene	0.0860–0.0870
2-Nitrotoluene	0.0882–0.0891
3-Nitrotoluene	0.0860–0.0870
4-Amino-2,6-dinitrotoluene	0.0860–0.0870
4-Nitrotoluene	0.161–0.163
HMX	0.0860–0.0870
Nitro-benzene	0.0860–0.0870
Pentaerythritol tetranitrate	0.108–0.109
RDX	0.0860–0.0870
Tetryl	0.0860–0.0870

Refer to footnotes on page 11A-15.

Table 11A-4
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW1 29-Jan-14	Nitrate plus nitrite	8.78	0.170	0.500	10.0			095246-018	EPA 353.2
CTF-MW1 (Duplicate) 29-Jan-14	Nitrate plus nitrite	9.16	0.170	0.500	10.0			095247-018	EPA 353.2

Refer to footnotes on page 11A-15.

Table 11A-5
Summary of Alkalinity, Anion, Cation, and Total Cyanide Results, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW1	Bicarbonate Alkalinity	203	0.725	1.00	NE			095246-022	SM2320B
29-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095246-022	SM2320B
	Bromide	0.620	0.067	0.200	NE			095246-016	SW846 9056
	Chloride	41.9	0.670	2.00	NE			095246-016	SW846 9056
	Fluoride	1.45	0.033	0.100	4.0			095246-016	SW846 9056
	Sulfate	87.3	1.33	4.00	NE			095246-016	SW846 9056
	Calcium	95.9	0.600	2.00	NE	B		095246-017	SW846 6020
	Magnesium	19.2	0.010	0.030	NE			095246-017	SW846 6020
	Potassium	1.81	0.080	0.300	NE			095246-017	SW846 6020
	Sodium	34.0	0.080	0.250	NE		J	095246-017	SW846 6020
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095246-027	SW846 9012B
CTF-MW1 (Duplicate)	Bicarbonate Alkalinity	203	0.725	1.00	NE			095247-022	SM2320B
29-Jan-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095247-022	SM2320B
	Bromide	0.607	0.067	0.200	NE			095247-016	SW846 9056
	Chloride	41.8	0.670	2.00	NE			095247-016	SW846 9056
	Fluoride	1.45	0.033	0.100	4.0			095247-016	SW846 9056
	Sulfate	87.2	0.133	0.400	NE			095247-016	SW846 9056
	Calcium	98.3	0.600	2.00	NE	B		095247-017	SW846 6020
	Magnesium	18.6	0.010	0.030	NE			095247-017	SW846 6020
	Potassium	1.82	0.080	0.300	NE			095247-017	SW846 6020
	Sodium	32.6	0.080	0.250	NE		J	095247-017	SW846 6020
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095247-027	SW846 9012B

Refer to footnotes on page 11A-15.

Table 11A-6
Summary of Perchlorate Results,
Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW1 29-Jan-14	ND	0.004	0.012	NE	U	UJ	095246-020	EPA 314.0
CTF-MW1 (Duplicate) 29-Jan-14	ND	0.004	0.012	NE	U	UJ	095247-020	EPA 314.0

Refer to footnotes on page 11A-15.

Table 11A-7
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW1	Aluminum	ND	0.015	0.050	NE	U		095246-009	SW846 6020
29-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095246-009	SW846 6020
	Arsenic	0.00259	0.0017	0.005	0.010	J		095246-009	SW846 6020
	Barium	0.0434	0.0006	0.002	2.00			095246-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095246-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095246-009	SW846 6020
	Calcium	96.3	0.600	2.00	NE	B		095246-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095246-009	SW846 6020
	Cobalt	0.000296	0.0001	0.001	NE	J		095246-009	SW846 6020
	Copper	0.000702	0.00035	0.001	NE	J	0.0036U	095246-009	SW846 6020
	Iron	0.238	0.033	0.100	NE			095246-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095246-009	SW846 6020
	Magnesium	17.8	0.010	0.030	NE			095246-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095246-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095246-009	SW846 7470
	Nickel	0.00145	0.0005	0.002	NE	J		095246-009	SW846 6020
	Potassium	1.88	0.080	0.300	NE			095246-009	SW846 6020
	Selenium	0.00501	0.0015	0.005	0.050			095246-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095246-009	SW846 6020
	Sodium	32.6	0.080	0.250	NE		J	095246-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095246-009	SW846 6020
	Uranium	0.010	0.000067	0.0002	0.03			095246-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095246-009	SW846 6010
	Zinc	0.00409	0.0035	0.010	NE	B, J	0.018U	095246-009	SW846 6020

Refer to footnotes on page 11A-15.

Table 11A-7 *(Concluded)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW1 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095247-009	SW846 6020
29-Jan-14	Antimony	ND	0.001	0.003	0.006	U		095247-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095247-009	SW846 6020
	Barium	0.0446	0.0006	0.002	2.00			095247-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095247-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095247-009	SW846 6020
	Calcium	95.2	0.600	2.00	NE	B		095247-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095247-009	SW846 6020
	Cobalt	0.000292	0.0001	0.001	NE	J		095247-009	SW846 6020
	Copper	0.000648	0.00035	0.001	NE	J	0.0036U	095247-009	SW846 6020
	Iron	0.237	0.033	0.100	NE			095247-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095247-009	SW846 6020
	Magnesium	19.3	0.010	0.030	NE			095247-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		095247-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095247-009	SW846 7470
	Nickel	0.00145	0.0005	0.002	NE	J		095247-009	SW846 6020
	Potassium	1.99	0.080	0.300	NE			095247-009	SW846 6020
	Selenium	0.00472	0.0015	0.005	0.050	J		095247-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095247-009	SW846 6020
	Sodium	31.8	0.080	0.250	NE		J	095247-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095247-009	SW846 6020
	Uranium	0.010	0.000067	0.0002	0.03			095247-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095247-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		095247-009	SW846 6020

Refer to footnotes on page 11A-15.

Table 11A-8
Summary of Field Water Quality Measurements[h],
Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CTF-MW1	29-Jan-14	16.55	527.7	304.9	7.46	0.24	71.7	6.97

Refer to footnotes on page 11A-15.

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Footnotes for Solid Waste Management Unit 116 Analytical Results Tables

CTF = Coyote Test Field.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID = Identification..
MW = Monitoring well.
No. = Number.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Tetryl = Methyl-2,4,6-trinitrophenylnitramine.

[a]Result
Values in bold exceed the established MCL.
ND = Not detected (at method detection limit).
µg/L = Micrograms per liter
mg/L = Milligrams per liter

[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. Established by the U.S. Environmental Protection Agency (EPA) Office of Water, National Primary Water Regulations (EPA May 2009).
NE = Not established.

[e]Lab Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective MDL.
J = Estimated value; the analyte concentration fell above the effective MDL and below the effective PQL.
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 value is an estimated quantity.
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 not detected. The associated value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method
Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.
EPA, 1999 (and updates), "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014.
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.

[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).

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Attachment 11B
Solid Waste Management Unit 116
Hydrographs

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Attachment 11B Hydrographs

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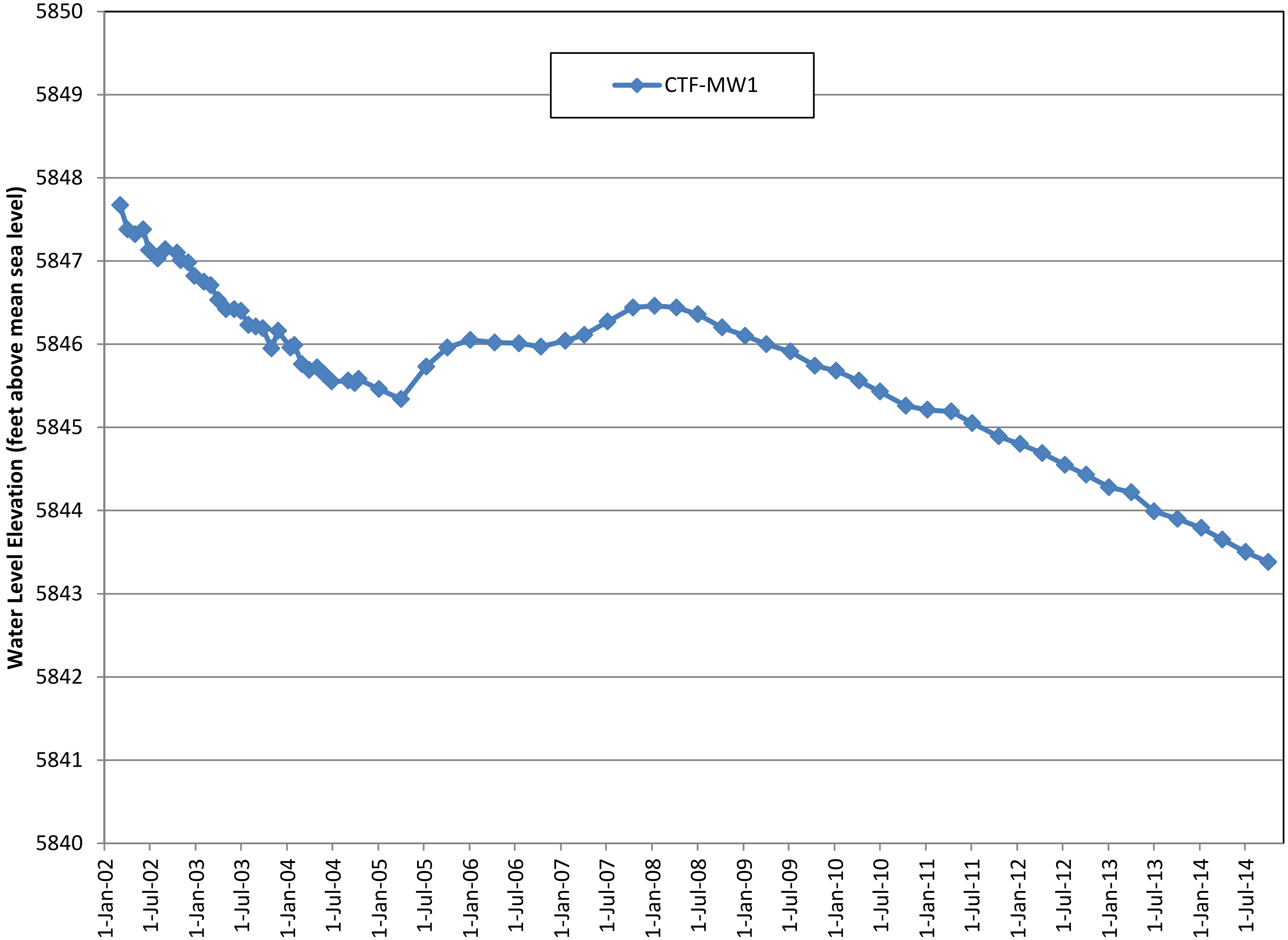

Figure 11B-1. Solid Waste Management Unit 116 Study Area Well

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12.0 Solid Waste Management Unit 149

12.1 Introduction

This chapter summarizes Calendar Year (CY) 2014 quarterly groundwater sampling events for Coyote Test Field (CTF) monitoring well CTF-MW3, located near Solid Waste Management Unit (SWMU) 149 at Sandia National Laboratories, New Mexico (SNL/NM).

This supplemental groundwater monitoring at monitoring well CTF-MW3 is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) (New Mexico Environment Department [NMED] April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010).

Monitoring well CTF-MW3 was sampled on March 14, June 14, and September 14, 2014. In October 2014, the U.S. Department of Energy (DOE) and Sandia Corporation (Sandia) notified NMED that groundwater monitoring at SWMU 149 had been completed and would be discontinued (SNL October 2014). The CY 2014 groundwater samples were collected in accordance with the NMED-approved Sampling and Analysis Plan (SAP) (SNL June 2010) and Mini-SAPs (SNL February 2014, June 2014a, and August 2014). The samples from monitoring well CTF-MW3 were analyzed for all required constituents, consisting of volatile organic compounds (VOCs), Target Analyte List (TAL) metals (including selenium), general chemistry parameters, perchlorate, and nitrate plus nitrite (NPN).

Analytical results for the CY 2014 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA May 2009). No analytical results for the monitoring well CTF-MW3 groundwater samples exceed the corresponding MCLs.

The eighth quarter of groundwater monitoring required by NMED (NMED April 2010) occurred on December 14, 2012 (SNL September 2013). The fourteenth and final quarterly groundwater sampling event at SWMU 149 occurred on September 12, 2014. All NMED requirements for groundwater monitoring at SWMU 149 have been met.

12.1.1 Location

SWMU 149, the Building 9930 Septic System, is located in the CTF on federally-owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the DOE/National Nuclear Security Administration (NNSA). Monitoring well CTF-MW3 (Figure 12-1) is located approximately 290 feet (ft) to the west and downgradient of SWMU 149 and is screened in Precambrian bedrock.

12.1.2 Site History

Building 9930 was constructed in 1961 (SNL March 1993), and it is assumed that the septic system was constructed at the same time. The building included a darkroom, laboratory and shop area, bathroom, and a compressor room. These areas were served by a septic system consisting of one 750-gallon septic tank and a 4-ft diameter seepage pit with a gravel bottom that is 7 ft below ground surface (bgs).

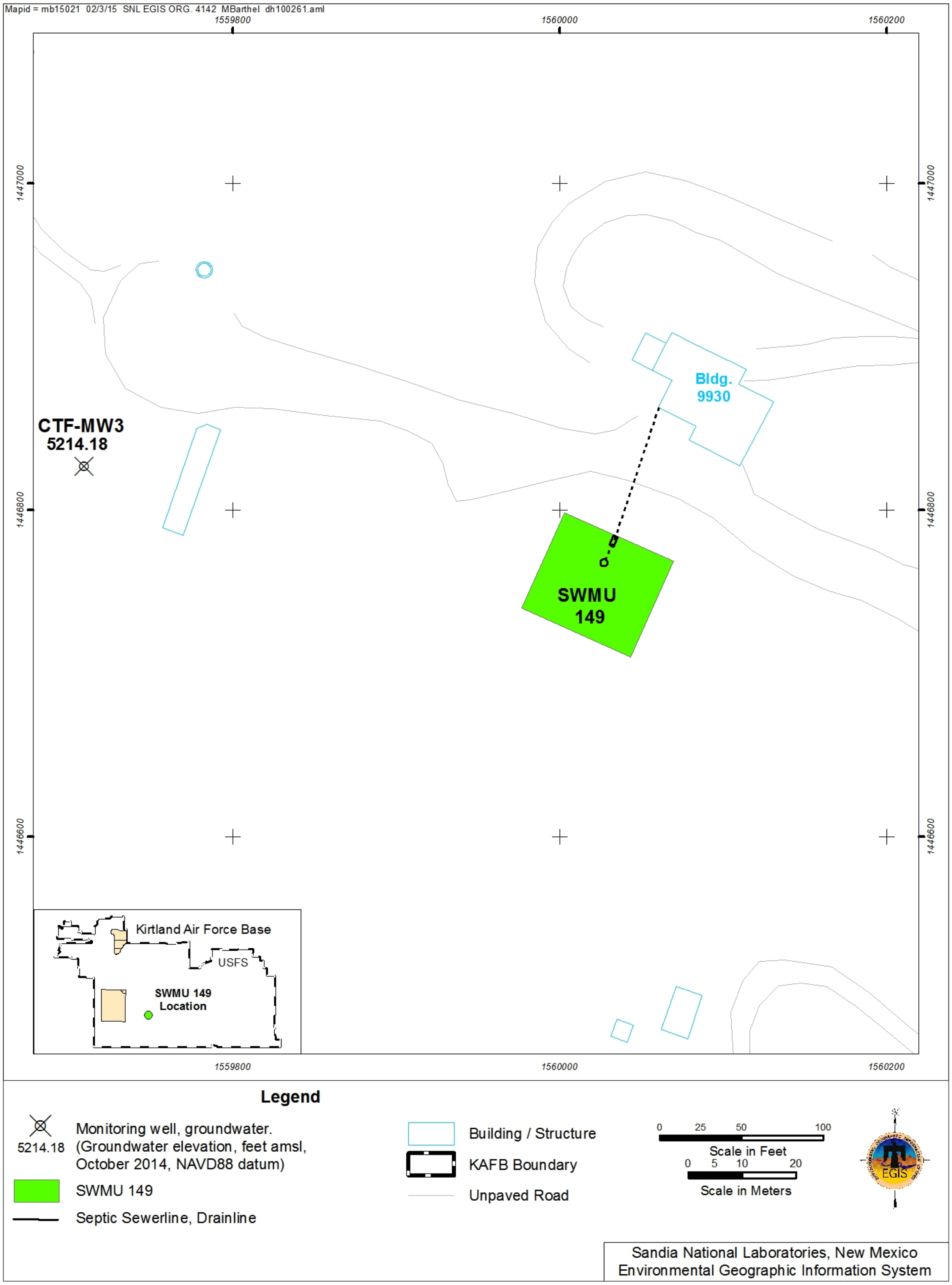

Figure 12-1. Location of Monitoring Well CTF-MW3 near SWMU 149

In the past, the following operations were conducted at Building 9930: photographic reproduction, explosives testing, and general laboratory operations. Water discharged to the septic system contained sanitary waste and waste water containing photographic chemicals, including alkaline-based developers, acetic acid, ammonium thiosulfate fixer, and small quantities of sulfuric acid associated with photographic reproduction. Testing of explosives was performed adjacent to the building in a concrete-bunkered area that contains no drains. SWMU 149 was first listed as a potential release site in 1987 (SNL June 1996) because sanitary and industrial wastes may have been discharged to septic tanks and drain fields during past operations.

By 1993, the septic system was connected to the City of Albuquerque sanitary sewer system (Jones July 1993). The old septic system line was disconnected, capped, and the system was abandoned in place (Romero September 2003). Waste in the septic tank was removed and managed according to SNL/NM policy. The empty and decontaminated septic tank was inspected by the NMED and a closure form was signed (SNL November 1995). The septic tank and seepage pit were then backfilled with clean, native soil from the area in early 1996 (Table 12-1).

In June 1996, a No Further Action proposal was submitted to the NMED for SWMU 149 (SNL June 1996) to which the NMED responded with a Request for Supplemental Information (RSI) (NMED June 1998). The general and site-specific comments were addressed in the Environmental Restoration (ER) Project Responses to the RSI in November 1998 (SNL November 1998). Negotiations were in process after the RSI response submittal, and a SAP (SNL October 1999) was prepared that documented investigations planned for SWMU 149. The SAP was approved by the NMED in January 2000 (NMED January 2000).

After the October 1999 SAP was submitted, the NMED issued a second RSI (NMED June 2000) that required the collection of additional samples for high explosive (HE) compound analysis. A downgradient groundwater monitoring well would be required if samples could not be collected as specified in the SAP (SNL October 1999). The DOE/NNSA and Sandia responded to this second RSI (SNL September 2000) and agreed to collect additional samples for HE compound analysis, as well as install a groundwater monitoring well at a location agreed upon by the NMED. Groundwater samples would be collected from this well for a minimum of eight quarters and analyzed for VOCs, Resource Conservation and Recovery Act (RCRA) metals, cyanide, and HE compounds.

Technical details for soil sampling procedures, soil sampling locations, laboratory analytical methods, and passive soil vapor sampling requirements at SWMU 149 were specified in a follow-up Field Implementation Plan (SNL November 2001) that was approved by the NMED (February 2002).

Monitoring well CTF-MW3 was installed near SWMU 149 in August 2001 and sampled on a quarterly basis from July 2002 to June 2004 to acquire the eight quarters of groundwater data required by the NMED. Analytical results for these sampling events were included in a third RSI response and Corrective Action Complete (CAC) proposal submitted to the NMED (SNL June 2005).

In September 2005, the NMED issued a Certificate of Completion for CAC without Controls for SWMU 149 (NMED September 2005). In March 2006, DOE/NNSA and Sandia requested a Class 3 Permit Modification (SNL March 2006). In April 2010, the NMED responded to the Permit Modification Request with a letter requiring further corrective action at SWMU 149 (NMED April 2010) in the form of an additional eight quarters of groundwater monitoring at monitoring well CTF-MW3. In June 2010, DOE/NNSA and Sandia submitted a SAP for monitoring well CTF-MW3 (SNL June 2010), which the NMED approved (NMED December 2010). Quarterly groundwater sampling was resumed at monitoring well CTF-MW3 in March 2011 and continued through the third quarter of CY 2014. The CY 2014 analytical results are presented in Section 12.6.

Table 12-1. Historical Timeline of SWMU 149

Month	Year	Event	Reference
	1961	Building 9930 was constructed, and it is assumed that the septic system was constructed at the same time.	SNL June 1996
April	1987	SWMU 149 first identified as a potential release site.	SNL June 1996
June	1992	Waste characterization samples collected from SWMU 149 septic tank.	SNL June 1996
	1993	Building 9930 connected to the City of Albuquerque sanitary sewer system. The old septic system line was disconnected and capped, and the system was abandoned in place. Waste in the septic tank was removed and managed according to SNL/NM policy.	Jones July 1993, Romero September 2003, SNL June 1996
March	1993	Septic Tanks and Drainfields (OU 1295) RCRA Facility Investigation Work Plan submitted.	SNL March 1993
March	1994	OU 1295 SAP prepared.	IT March 1994
April	1994	Additional waste characterization samples collected from SWMU 149 septic tank.	SNL June 1996
July	1994	A PETREX™ passive soil vapor survey was completed on the septic system to identify any releases of VOCs and SVOCs from the seepage pit.	SNL June 1996
September	1994	EPA provided comments on the March 1993 OU 1295 work plan as a NOD.	EPA September 1994
October	1994	Backhoe used at SWMU 149 to determine depth to shallow bedrock at the site.	SNL June 1996
November	1994	Response to the September 1994 EPA NOD submitted.	SNL November 1994
November	1994	Additional waste characterization samples collected from SWMU 149 septic tank.	SNL June 1996
January	1995	Confirmatory soil samples were collected from four boreholes next to the septic tank and seepage pit.	Field logs
November	1995	The empty and decontaminated septic tank was inspected by the NMED, and a closure form was signed.	SNL November 1995
June	1996	Proposal for NFA ER Project Site 149, Building 9930 Septic System OU 1295 submitted.	SNL June 1996
February	1998	Revised Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report, Revised February 1998 contained a description of SWMU 149 hydrogeology that was submitted to NMED.	SNL February 1998
June	1998	NMED responded with RSI on the SWMU 149 NFA proposal.	NMED June 1998
November	1998	DOE and SNL/NM ER Project submitted the first response to the first NMED RSI for SWMU 149.	SNL November 1998
October	1999	A SAP describing technical procedures to be used to complete environmental investigations at SWMU 149 submitted to the NMED.	SNL October 1999
January	2000	SAP approved by NMED.	NMED January 2000
June	2000	NMED issued a second RSI.	NMED June 2000
September	2000	DOE/NNSA and SNL/NM ER Project response for the second RSI submitted to NMED.	SNL September 2000
August	2001	Monitoring well CTF-MW3 installed near SWMU 149.	SNL June 2005
November	2001	An FIP documenting specific investigation procedure to be completed at SWMU 149 submitted to the NMED.	SNL November 2001
February	2002	The FIP approved by the NMED.	NMED February 2002
	2002-2004	Monitoring well CTF-MW3 was sampled on a quarterly basis from July 2002 to June 2004 to acquire the eight quarters of groundwater data required by the NMED.	SNL June 2005
October	2002	A soil sample collected from a borehole drilled beneath the former seepage pit was analyzed for HE compounds.	SNL June 2005

Refer to footnotes on page 12-5.

Table 12-1. Historical Timeline of SSWMU 149 *(Concluded)*

Month	Year	Event	Reference
June	2005	Third RSI response to RSI and CAC Proposal submitted to NMED.	SNL June 2005
September	2005	NMED issued Certificate of Completion for CAC without Controls for SWMU 149.	NMED September 2005
March	2006	Request for Class 3 Permit Modification submitted.	SNL March 2006
April	2010	Letter from NMED requiring additional corrective action for SWMU 149.	NMED April 2010
June	2010	SWMU 149 SAP submitted to NMED.	SNL June 2010
December	2010	SAP approved by the NMED.	NMED December 2010
March	2011	Quarterly sampling of monitoring well CTF-MW3 resumed.	SNL September 2012
December	2012	Eight quarters of additional groundwater sampling of monitoring well CTF-MW3 completed.	SNL September 2013
October	2014	NMED was notified that groundwater monitoring at SWMU 149 has been completed, and was being discontinued.	SNL October 2014

NOTES:

CAC = Corrective Action Complete.
CTF = Coyote Test Field.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
FIP = Field Implementation Plan.
HI = High explosive.
IT = IT Corporation.
MW = Monitoring Well.
NFA = No Further Action.
NMED = New Mexico Environment Department.
NNSA = National Nuclear Security Administration.
NOD = Notice of Deficiency.
OU = Operable Unit.
RCRA = Resource Conservation and Recovery Act.
RSI = Request for Supplemental Information.
SAP = Sampling and Analysis Plan.
SNL/NM = Sandia National Laboratories, New Mexico.
SVOC = Semivolatile organic compound.
SWMU = Solid Waste Management Unit.
VOC = Volatile organic compound.

12.1.3 Monitoring History

Monitoring well CTF-MW3 was installed in August 2001 and sampled on a quarterly basis from July 2002 to June 2004 to acquire the eight quarters of groundwater data required by the NMED. The groundwater samples were analyzed for VOCs, HE compounds, RCRA metals, and cyanide. Although not required by the NMED, additional samples were also collected and analyzed for NPN and anions and cations. These additional samples were collected to further characterize the general ion chemistry of groundwater in this well and for purge-water waste characterization purposes. Results for the eight quarters of groundwater sampling are as follows:

- **VOCs**—Trace amounts of five VOCs were detected in the groundwater samples collected. Acetone was detected in the July 2002 sample. Bromodichloromethane was detected in two samples collected in March and June 2004. Dibromochloromethane was detected during three of the eight sampling events. Chloroform was detected in samples collected during six of the eight sampling events. Toluene was detected in the sample collected in June 2004 and the associated trip blank (TB) sample. No other VOCs were detected in the TB samples associated with these samples.

- **HE Compounds**—A trace amount of 2-amino-4,6-dinitrotoluene was detected in the sample collected in July 2002. No HE compounds were detected in any subsequent groundwater sample collected from this well.

- **RCRA Metals**—Selenium was detected in all eight groundwater samples, slightly above background levels. All other metal concentrations were below both background levels and regulatory limits.

- **Total Cyanide, NPN, Anions, and Cations**—Cyanide was detected in one of the eight groundwater samples collected. NPN was detected at concentrations slightly above background in the first five samples collected. Fluoride was reported at concentrations slightly above background. Fluoride detected is most likely naturally occurring and derived from Paleozoic and Precambrian bedrock (Skelly August 2013). None of the known activities conducted at Building 9930 would have produced wastewater containing fluoride.

12.1.4 Current Monitoring Network

Currently, one groundwater monitoring well is installed at SWMU 149 (Figure 12-1). Monitoring well CTF-MW3 was monitored quarterly for VOCs, TAL metals, general chemistry parameters, perchlorate, and NPN.

12.1.5 Summary of Calendar Year 2014 Activities

The following activities for monitoring well CTF-MW3 near SWMU 149 occurred during CY 2014:

- Quarterly groundwater sampling was conducted at monitoring well CTF-MW3 in March, June, and September 2014 (SNL February 2014, June 2014a, and August 2014).

- Quarterly reporting of analytical results for monitoring well CTF-MW3 groundwater samples for the first three quarters of CY 2014.

- Tables of analytical results (Attachment 12A) and a hydrograph (Attachment 12B) were prepared in support of this report.

12.1.6 Summary of Future Activities

The following activities are anticipated for monitoring well CTF-MW3 near SWMU 149 during CY 2015:

- No groundwater sampling will be conducted at monitoring well CTF-MW3 in CY 2015 unless NMED requires additional sampling.

12.1.7 Current Conceptual Model

This section presents a revised discussion of the hydrogeologic regime, conceptual site model, and contaminant findings for SWMU 149.

12.1.7.1 Regional Hydrogeologic Conditions

SWMU 149 is located in the Travertine Hills within the western portion of the CTF. The site is located between the Sandia and Tijeras faults. One splay of the Tijeras Fault is exposed about 800 ft south of the site. Nearby outcrops are composed of the Sandia Formation (i.e., carbonate cemented sandstone and conglomerate), Madera Group limestone, and Precambrian quartzite, and granite (GRAM and Lettis 1995). The base-wide potentiometric surface map (Plate 1) shows that groundwater flow in the regional aquifer is generally toward the west. Faults in the vicinity of the site may serve as hydraulic barriers or conduits depending on the type and amount of fault gouge. No potable water supply wells are located within 4 miles of the site.

12.1.7.2 Hydrogeologic Conditions at SWMU 149

SWMU 149 covers 4,686 square feet (approximately 0.1 acres) and is located approximately 70 ft southwest of Building 9930 and approximately 0.8 miles east of Technical Area-III. The site is covered with a layer of soil and colluvium approximately 12- to 16-ft thick that is underlain by caliche and bedrock. SWMU 149 consists of an inactive septic system that was used from 1961 to 1993. Building 9930 is located in a notch of the Travertine Hills at an elevation of approximately 5,520 ft above mean sea level (amsl). The surrounding area is moderately rugged and sparsely vegetated by bunch grasses, cacti, and a few junipers. Monitoring well CTF-MW3 is located approximately 290 ft west of the site on the floor of a shallow arroyo. The arroyo channel slopes down to the west. No perennial surface water features, such as springs, are located within one mile of SWMU 149.

The amount of precipitation available for groundwater recharge is minimal due to scant rainfall and high evapotranspiration. Summer (i.e., monsoonal) thunderstorms are responsible for the majority of rainfall. The average rainfall, as measured at the nearest active rain gauge (the National Weather Service station at the Albuquerque International Sunport), during the period from 1915 through 2005 was 8.67 inches per year (WRCC-DRI 2012). The station is located 7.2 miles northwest of the site at an elevation of 5,310 ft amsl, which is similar enough to the site elevation to infer that the annual rainfall at SWMU 149 is approximately 9 inches per year. Intense sunlight and low humidity throughout much of the year creates high rates of evapotranspiration. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

In 2001, a drilling location downgradient of SWMU 149 was selected for the installation of monitoring well CTF-MW3. The location was selected using the historical potentiometric surface for the regional aquifer. The well was installed in August 2001 using the air-rotary casing hammer drilling technique. Alluvium consisting of silty fine-grained sand was encountered from the ground surface to 28 ft bgs. Precambrian granite and gneiss were encountered from 28 to 345 ft bgs. From 345 ft bgs to the borehole total depth of 430 ft bgs, Precambrian quartzite was encountered. The drilling rate from 28 to 430 ft bgs was relatively consistent and no significantly fractured zones were encountered. Drilling was paused at several depths and the borehole blown dry and allowed to recover. However, due to the low yield of the borehole, the water-bearing zone was not initially apparent. Geophysical logging (temperature and neutron) of the open borehole and drilling observations were used to select the screen interval. The caliper log recorded a fairly consistent borehole diameter that did not reflect any significantly fractured intervals. The depth to groundwater was estimated to be approximately 345 ft bgs. The well was screened from 340 to 360 ft bgs in Precambrian quartzite (Table 12-2).

The October 2014 groundwater elevation was 5,214.18 ft amsl. Compared to the mid-point elevation of the screen, the pressure head was approximately 45 ft and indicative of confined conditions. Based on the potentiometric surface depicted on Plate 1, the horizontal gradient is steep and approximately 0.15 feet per foot westward in the vicinity of the well. Groundwater in the bedrock most likely migrates through a confined low-permeability fracture system. The groundwater composition is of the bicarbonate type and dominated by calcium.

During sampling, the drawdown in monitoring well CTF-MW3 was not excessive and the quantity of water produced was clearly adequate for typical groundwater sampling. Groundwater samples were collected using pneumatic (nitrogen gas) Bennett™ piston pumps.

Table 12-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Well CTF-MW3 near SWMU 149

Well ID	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2014 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Pressure Head (ft[a])
CTF-MW3	5,519.80	340 – 360	5,179.80	5,214.18	5,169.80	45

NOTES:

[a]From mid-point of screen.

amsl = Above mean sea level.
bgs = Below ground surface.
CTF = Coyote Test Field.
ft = Foot (feet).
ID = Identification.
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The conceptual hydrogeologic model for SWMU 149 is based on information from monitoring well CTF-MW3, several nearby monitoring wells located across CTF (Plate 1), and extensive field mapping conducted by the Site-Wide Hydrogeologic Characterization Project (SNL February 1998). Groundwater in the SWMU 149 area occurs in the fractured bedrock system under confined conditions. The depth to groundwater at monitoring well CTF-MW3 at the time of installation was approximately 345 ft bgs in a slightly fractured interval of Precambrian quartzite. The overlying granite, which has naturally calcium carbonate-filled fractures, likely serves as the confining layer. The amount of precipitation available for groundwater recharge is minimal due to the scant rainfall and high evapotranspiration rates. Hydrographs of historical water level data (Figure 12B-1 in Attachment 12B) indicate that seasonal effects, primarily due to thunderstorms, do not influence groundwater levels near the site. The groundwater level at well CTF-MW3 has steadily declined at approximately 0.7 ft per year. Groundwater underflow from the site most likely discharges to the unconsolidated basin fill deposits (primarily the Santa Fe Group) of the Albuquerque Basin after crossing the Sandia Fault. The steep hydraulic gradient, approximately 0.15 feet per foot near the well, indicates that the fault limits the rate of groundwater migration near the site. No potable water supply wells are located within 4 miles of the site.

12.1.7.3 Contaminant Sources

From 1961 to 1993, wastewater from the SWMU 149 septic system discharged to the subsurface via a single seepage pit. The septic water contained photo processing chemicals and sanitary waste. The area around the seepage pit and septic tank was characterized using soil vapor samplers and soil samples collected from five boreholes.

12.1.7.4 Contaminant Distribution and Transport in Groundwater

The first phase of quarterly groundwater sampling for monitoring well CTF-MW3 was conducted from July 2002 to June 2004. Trace amounts of VOCs, cyanide, nitrate, and one HE compound (2-amino-4,6-dinitrotoluene) were detected. Concentrations decreased over time. Selenium and fluoride were reported at concentrations slightly above background and are mostly likely attributable to the local bedrock. The second phase of quarterly groundwater sampling began in March 2011. During CY 2014, no metals, VOCs, NPN, alkalinity, or major ions exceed the respective MCLs. Perchlorate was not detected.

12.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM ER Operations as well as implements and enforces regulations mandated by RCRA. All ER Operations SWMUs are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit*

(Module IV), Sandia National Laboratories, NM5890110518 (NMED 1993). All corrective action requirements pertaining to SWMUs are contained in the Consent Order (NMED April 2004).

In March 2006, a Class 3 Permit Modification Request was submitted to the NMED (SNL March 2006). In April 2010, the NMED responded to the Permit Modification Request with a letter requiring further corrective action at SWMU 149 (NMED April 2010) in the form of an additional eight quarters of groundwater monitoring at monitoring well CTF-MW3. In June 2010, a SAP for monitoring well CTF-MW2 was submitted (SNL June 2010), which the NMED approved (NMED December 2010).

Quarterly groundwater sampling resumed at monitoring well CTF-MW3 in CY 2011 (NMED April 2010). The eighth quarter of required groundwater monitoring was conducted in December 2012. In October 2014 DOE and Sandia notified NMED that after 14 quarters, groundwater monitoring at SWMU 149 had been completed and would be discontinued (SNL October 2014).

12.3 Scope of Activities

Groundwater monitoring sampling and analysis during CY 2014 is summarized in Table 12-3. The analytical parameters for monitoring well CTF-MW3 for each sampling event are listed in Table 12-4.

Table 12-3. Sampling Dates and SAPs for Monitoring Well CTF-MW3 near SWMU 149, Calendar Year 2014

Date of Sampling Event	SAP
March 14, 2014	*SWMU 149 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2014* (SNL February 2014)
June 27, 2014	*SWMU 149 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2014* (SNL June 2014a)
September 12, 2014	*SWMU 149 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2014* (SNL August 2014)

NOTES:
CTF = Coyote Test Field.
MW = Monitoring Well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

Table 12-4. Parameters Sampled at SWMU 149 for Each Sampling Event, Calendar Year 2014

Parameter	Sampling Period	
Anions	**March 2014**	**June 2014**
Alkalinity	CTF-MW3	CTF-MW3
NPN	CTF-MW3 (dup)	CTF-MW3 (dup)
Perchlorate		
TAL Metals	**September 2014**	
VOCs	CTF-MW3	

NOTES:
CTF = Coyote Test Field.
dup = Duplicate sample.
MW = Monitoring well.
NPN = Nitrate plus nitrate (reported as nitrogen).
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.
VOC = Volatile organic compound.

12.4 Field Methods and Measurements

According to the requirements of the Consent Order (NMED April 2004) addressing Section VII.D.6, and the NMED letter of April 8, 2010 (NMED April 2010), groundwater sampling was performed at SWMU 149. The CY 2014 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures for groundwater sampling activities, the SWMU 149 site-specific SAP (SNL June 2010), and Mini-SAPs (SNL February 2014, June 2014a, and August 2014).

Environmental groundwater samples were collected from monitoring well CTF-MW3 in March, June, and September 2014. Samples were submitted to GEL Laboratories LLC for all chemical analyses. Groundwater samples were analyzed for VOCs, NPN, major anions (i.e., bromide, chloride, fluoride, and sulfate), alkalinity, TAL metals, and perchlorate.

The monitoring procedures are consistent with procedures identified in the EPA Technical Enforcement Guidance Document (EPA 1986) and are described in detail in Section 1.3.

The NMED DOE Oversight Bureau collected split samples with DOE/NNSA and Sandia during the June 2014 sampling event. The NMED DOE Oversight Bureau analytical results are not reported in this document, but are available through the DOE/NNSA Sandia Field Office.

12.5 Groundwater Elevation

Throughout CY 2014, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table elevations. The water level information used to create the base-wide potentiometric surface map discussed in Section 2.6.2.2 and shown in Plate 1. From the base-wide potentiometric surface map, the local groundwater flow direction was inferred and is presented in Figure 12-2. The hydrograph for monitoring well CTF-MW3 is provided in Figure 12B-1 (Attachment 12B).

12.6 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA analytical methods and protocols described in Section 1.3.2 (Tables 1-5 and 1-6). Parameters analyzed and sampling periods in CY 2014 are presented in Table 12-4.

12.7 Summary of Analytical Results

This section discusses analytical results and field measurements for the CY 2014 SWMU 149 sampling events. Data are presented in Tables 12A-1 through 12A-8 (Attachment 12A). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA May 2009). Data qualifiers are explained in the footnotes following Table 12A-8. Analytical reports, including certificates of analyses, analytical methods, method detection limits (MDLs), practical quantitation limits, dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Customer Funded Record Center.

The analytical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure 00-03, *Data Validation Procedure for Chemical and Radiochemical Data, Revision 3 and Revision 4* (SNL May 2011, June 2014b). No problems were identified with the analytical data that resulted in qualification of the data as unusable. The data are acceptable and reported QC measures are adequate.

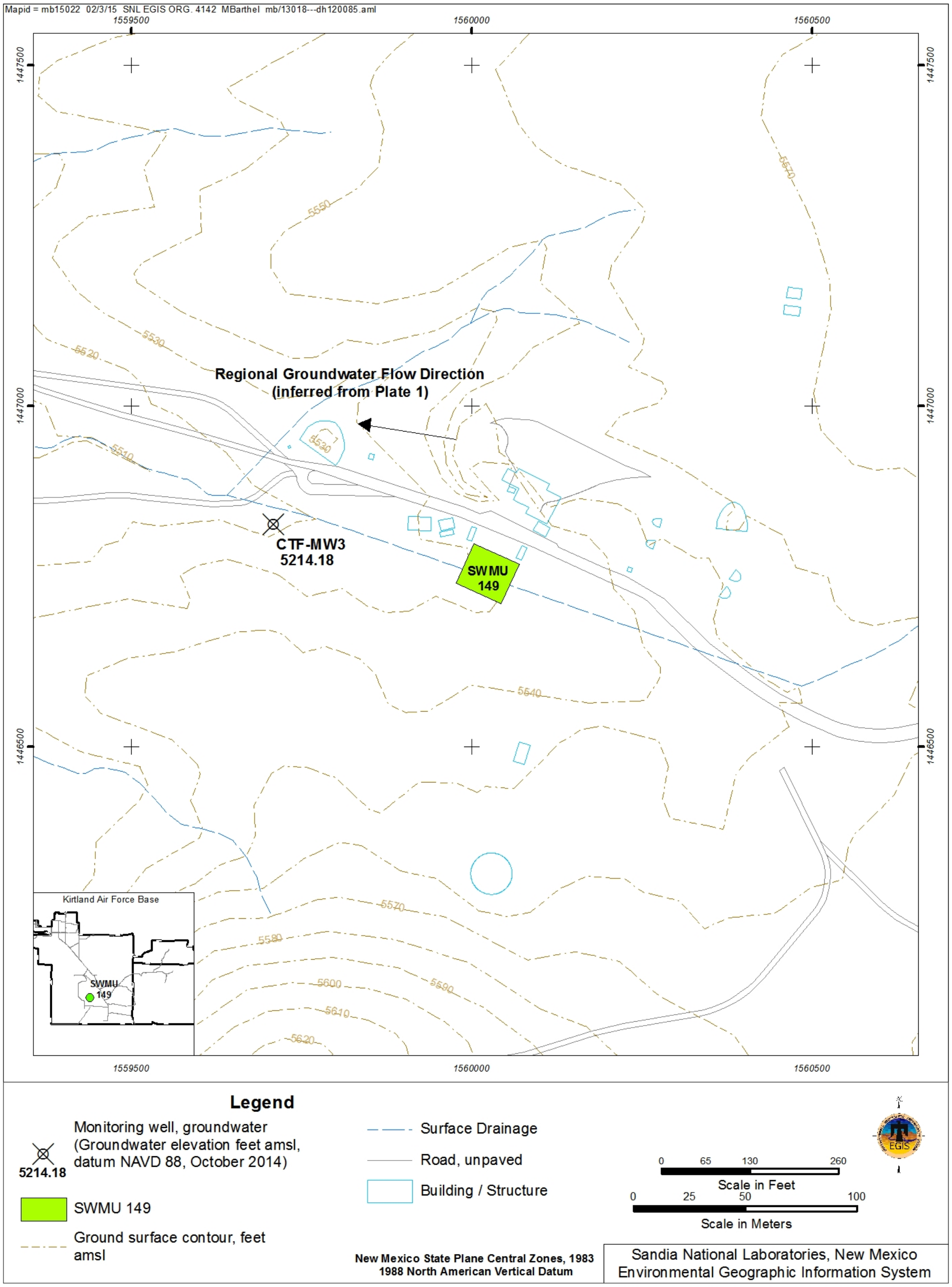

Figure 12-2. SWMU 149 Groundwater Flow Direction (October 2014)

No VOCs were detected at concentrations above established MCLs for any of the monitoring well CTF-MW3 groundwater samples. During CY 2014, the compounds bromodichloromethane, chloroform, and dibromochloromethane were detected at low concentrations above the laboratory MDL and are comparable to historical values. These compounds are all breakdown (degradation) products of chlorine and their detection in both the groundwater and equipment decontamination samples suggests the source is the deionized water used for decontaminating the sampling system.

In March 2014, acetone at a low concentration above the laboratory MDL in the groundwater duplicate was qualified as not detected during data validation because acetone was detected in the laboratory method blank sample at a concentration within 10 times the environmental result. Table 12A-1 summarizes detected VOCs in environmental groundwater samples (Attachment 12A), and Table 12A-2 lists the MDLs for associated VOCs analyzed.

Table 12A-3 (Attachment 12A) summarizes NPN results. NPN values were compared with the nitrate MCL of 10 milligrams per liter. NPN was not detected above the MCL.

Table 12A-4 (Attachment 12A) summarizes alkalinity and major anion (i.e., bromide, chloride, fluoride, and sulfate) results. No parameters were detected above established MCLs.

Perchlorate was not detected in monitoring well CTF-MW3 samples. The NMED-specified screening level/MDL for perchlorate is 4 micrograms per liter (NMED April 2004). Table 12A-5 presents perchlorate results (Attachment 12A).

TAL metals, both in unfiltered and filtered fractions, were analyzed in monitoring well CTF-MW3 samples. No metal parameters were detected above established MCLs in any groundwater sample. Arsenic reanalysis was requested for the June groundwater sample and duplicate groundwater sample because there was variability between the initial results, and historically arsenic was not consistently detected. The analytical laboratory indicated that there may have been a small amount of arsenic carryover in equipment on the day of original analysis. Arsenic was not detected in the reanalysis, and the original results were qualified as unusable during data validation. Metal results for both unfiltered and filtered samples are summarized in Tables 12A-6 and 12A-7 (Attachment 12A), respectively.

Table 12A-8 (Attachment 12A) summarizes field water quality measurements collected prior to sampling. Field water quality measurements include turbidity, pH, temperature, specific conductance, oxidation-reduction potential, and dissolved oxygen.

12.8 Quality Control Results

Field and laboratory QC samples were prepared to determine the accuracy of the methods used, and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. The results for each QC sample, and the impact on data quality for the SWMU 149 monitoring well CTF-MW3 quarterly sampling events, are discussed in the following sections.

12.8.1 Field Quality Control Samples

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

12.8.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed to estimate the overall reproducibility of the sampling and analytical process. Relative percent difference (RPD) calculations, between duplicate samples, were performed for detected chemical analytes. The March and June 2014 duplicate sample data results show good agreement (low RPD values < 20 percent for organic compounds and < 35 percent for inorganic analyses) for all calculated parameters, except for the following. In March, the RPD for unfiltered aluminum, chromium, cobalt, iron, and zinc in the original analysis were calculated at 190, 52, 51, 51, and 62, respectively. The RPD for unfiltered aluminum, barium, cobalt, iron, and nickel in the reanalysis were calculated at 194, 44, 75, 154, and 77, respectively. The RPDs for aluminum, chromium, and cobalt are considered estimated values since sample results were detected below the PQL. The source (sampling, analytical preparation, or laboratory analysis) of the discrepancies was not determined, and additional corrective action was not performed.

12.8.1.2 Equipment Blank Samples

EB or rinsate samples were collected to verify the equipment decontamination process. The results for EB analyses are as follows.

- **March 2014 Sampling Event**—Bromodichloromethane, chloroform, copper, and chloride were detected above the laboratory MDLs. Bromodichloromethane and chloroform were detected above associated laboratory MDLs, but associated sample results were not qualified based upon assessment of historical data. No corrective action was necessary for chloride since the environmental and environmental duplicate samples are reported at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CTF-MW3 environmental and environmental duplicate samples during data validation, since copper was reported in the EB sample at a concentration less than five times the associated environmental samples**.**

- **March 2014 Sampling Event**—Magnesium was detected above the laboratory MDL. No corrective action was necessary since the environmental and environmental duplicate samples report magnesium at concentrations greater than five times the EB result.

12.8.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analyses to assess whether contamination of the samples had occurred during shipment and storage. A total of five TB samples were submitted during CY 2014. Two TBs were submitted for the March and June sampling events and one sample was submitted in September. No VOCs were detected above the associated laboratory MDLs in all TB samples.

12.8.1.4 Field Blank Samples

Two FB samples were collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions in March and June 2014. In the March 2014 FB sample, the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above associated laboratory MDLs. The associated sample results were not qualified based upon assessment of historical data. These compounds are common by-products of the deionization water purification process. No VOCs were detected above the associated laboratory MDLs in the June FB sample.

12.8.2 Laboratory Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples were analyzed concurrently with all groundwater samples. No significant data quality problems were noted during the data validation process for all four quarters of CY 2014 sampling events.

12.9 Variances and Nonconformances

No variances or nonconformances from requirements in the SWMU 149 Groundwater Monitoring SAP (SNL June 2010) or Mini-SAPs (SNL February 2014, June 2014a, and August 2014) were identified during any of the CY 2014 sampling events. However, project-specific issues identified during CY 2014 sampling activities are noted as follows:

- **June 2014 Sampling Event**—A new deionized (DI) water source was used for equipment decontamination and QC samples due to continuous detections of trihalomethanes at low level concentrations in the existing DI water supply. As a result, no VOCs were reported above MDLs in any subsequent EB or FB samples.

12.10 Summary and Conclusions

Quarterly sampling at monitoring well CTF-MW3 near SWMU 149 was conducted for three quarters (March, June, and September) in CY 2014. A December 2014 sampling event was not conducted because in October 2014, DOE and Sandia notified NMED that the supplemental groundwater monitoring at SWMU 149 had been completed, and would be discontinued (SNL October 2014). No further groundwater sampling will be conducted at monitoring well CTF-MW3 unless NMED requires additional sampling.

Analytical parameters included VOCs, NPN, major anions, alkalinity, TAL total metals, and perchlorate. Results were consistent with historical concentrations, and were compared with EPA MCL guidelines for drinking water (EPA May 2009). No parameters were detected above established MCLs.

The current conceptual model described in Section 12.1.7 does not require modification based on the analytical results for this reporting period.

12.11 References

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Attachment 12A
Solid Waste Management Unit 149
Analytical Results Tables

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Attachment 12A Tables

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Table 12A-1
Summary of Detected Volatile Organic Compounds, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 14-Mar-14	Bromodichloromethane	0.570	0.300	1.00	NE	J		095572-001	SW846 8260B
	Chloroform	0.760	0.300	1.00	NE	J		095572-001	SW846 8260B
	Dibromochloromethane	0.490	0.300	1.00	NE	J		095572-001	SW846 8260B
CTF-MW3 (Duplicate) 14-Mar-14	Acetone	5.14	3.00	10.0	NE	B, J	10UJ	095573-001	SW846 8260B
	Bromodichloromethane	0.590	0.300	1.00	NE	J		095573-001	SW846 8260B
	Chloroform	0.730	0.300	1.00	NE	J		095573-001	SW846 8260B
	Dibromochloromethane	0.480	0.300	1.00	NE	J	J+	095573-001	SW846 8260B
CTF-MW3 27-Jun-14	Bromodichloromethane	0.450	0.300	1.00	NE	J		096142-001	SW846 8260B
	Chloroform	0.720	0.300	1.00	NE	J		096142-001	SW846 8260B
CTF-MW3 (Duplicate) 27-Jun-14	Bromodichloromethane	0.440	0.300	1.00	NE	J		096143-001	SW846 8260B
	Chloroform	0.720	0.300	1.00	NE	J		096143-001	SW846 8260B
CTF-MW3 12-Sep-14	Bromodichloromethane	0.400	0.300	1.00	NE	J		096595-001	SW846 8260B
	Chloroform	0.650	0.300	1.00	NE	J		096595-001	SW846 8260B
	Dibromochloromethane	0.320	0.300	1.00	NE	J		096595-001	SW846 8260B
	Trichloroethene	0.660	0.300	1.00	5.00	B, J	1.0U	096595-001	SW846 8260B

Refer to footnotes on page 12A-25.

Table 12A-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260), Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300–0.005	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	0.300–3.00
1,2-Dichloropropane	0.300	Methylene chloride	1.70–3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50–3.00	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 12A-25.

Table 12A-3
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 14-Mar-14	Nitrate plus nitrite	6.35	0.170	0.500	10.0			095572-018	EPA 353.2
CTF-MW3 (Duplicate) 14-Mar-14	Nitrate plus nitrite	6.38	0.170	0.500	10.0			095573-018	EPA 353.2
CTF-MW3 27-Jun-14	Nitrate plus nitrite	5.97	0.170	0.500	10.0			096142-018	EPA 353.2
CTF-MW3 12-Sep-14	Nitrate plus nitrite	5.61	0.170	0.500	10.0			096595-018	EPA 353.2

Refer to footnotes on page 12A-25.

Table 12A-4
Summary of Anion and Alkalinity Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Bicarbonate Alkalinity	319	0.725	1.00	NE			095572-022	SM2320B
14-Mar-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095572-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			095572-016	SW846 9056
	Chloride	124	3.35	10.0	NE			095572-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			095572-016	SW846 9056
	Sulfate	515	6.65	20.0	NE			095572-016	SW846 9056
CTF-MW3 (Duplicate)	Bicarbonate Alkalinity	321	0.725	1.00	NE			095573-022	SM2320B
14-Mar-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095573-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			095573-016	SW846 9056
	Chloride	120	3.35	10.0	NE			095573-016	SW846 9056
	Fluoride	2.35	0.033	0.100	4.0			095573-016	SW846 9056
	Sulfate	495	6.65	20.0	NE			095573-016	SW846 9056
CTF-MW3	Bicarbonate Alkalinity	328	0.725	1.00	NE			096142-022	SM2320B
27-Jun-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096142-022	SM2320B
	Bromide	1.17	0.067	0.200	NE			096142-016	SW846 9056
	Chloride	123	3.35	10.0	NE			096142-016	SW846 9056
	Fluoride	2.54	0.033	0.100	4.0			096142-016	SW846 9056
	Sulfate	507	6.65	20.0	NE			096142-016	SW846 9056
CTF-MW3	Bicarbonate Alkalinity	318	0.725	1.00	NE			096595-022	SM2320B
12-Sep-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096595-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			096595-016	SW846 9056
	Chloride	121	3.35	10.0	NE			096595-016	SW846 9056
	Fluoride	2.64	0.033	0.100	4.0			096595-016	SW846 9056
	Sulfate	483	6.65	20.0	NE			096595-016	SW846 9056

Refer to footnotes on page 12A-25.

Table 12A-5
Summary of Perchlorate Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 14-Mar-14	ND	0.004	0.012	NE	U		095572-020	EPA 314.0
CTF-MW3 (Duplicate) 14-Mar-14	ND	0.004	0.012	NE	U		095573-020	EPA 314.0
CTF-MW3 27-Jun-14	ND	0.004	0.012	NE	U		096142-020	EPA 314.0
CTF-MW3 12-Sep-14	ND	0.004	0.012	NE	U		096595-020	EPA 314.0

Refer to footnotes on page 12A-25.

Table 12A-6
Summary of Unfiltered Target Analyte List Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	1.38	0.015	0.050	NE			095572-009	SW846 6020
14-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095572-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095572-009	SW846 6020
	Barium	0.0366	0.0006	0.002	2.00			095572-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095572-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095572-009	SW846 6020
	Calcium	212	0.600	2.00	NE			095572-009	SW846 6020
	Chromium	0.00419	0.002	0.010	0.100	J		095572-009	SW846 6020
	Cobalt	0.000757	0.0001	0.001	NE	J		095572-009	SW846 6020
	Copper	0.00515	0.00035	0.001	NE		J-	095572-009	SW846 6020
	Iron	1.28	0.033	0.100	NE	B		095572-009	SW846 6020
	Lead	0.00209	0.0005	0.002	NE			095572-009	SW846 6020
	Magnesium	43.7	0.010	0.030	NE		J	095572-009	SW846 6020
	Manganese	0.134	0.001	0.005	NE	B	J	095572-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095572-009	SW846 7470
	Nickel	0.00695	0.0005	0.002	NE			095572-009	SW846 6020
	Potassium	11.3	0.080	0.300	NE			095572-009	SW846 6020
	Selenium	0.0276	0.0015	0.005	0.050			095572-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095572-009	SW846 6020
	Sodium	157	0.800	2.50	NE			095572-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095572-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095572-009	SW846 6010
	Zinc	0.00958	0.0035	0.010	NE	J		095572-009	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-6 *(Continued)*
Summary of Unfiltered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 (Reanalysis)	Aluminum	2.74	0.150	0.500	NE			095572-R09	SW846 6020
14-Mar-14	Antimony	ND	0.010	0.030	0.006	U		095572-R09	SW846 6020
	Arsenic	ND	0.017	0.050	0.010	U		095572-R09	SW846 6020
	Barium	0.0483	0.006	0.020	2.00		J	095572-R09	SW846 6020
	Beryllium	ND	0.002	0.005	0.004	U		095572-R09	SW846 6020
	Cadmium	ND	0.0011	0.010	0.005	U		095572-R09	SW846 6020
	Calcium	182	3.00	10.0	NE	B		095572-R09	SW846 6020
	Chromium	ND	0.020	0.100	0.100	U		095572-R09	SW846 6020
	Cobalt	0.00114	0.001	0.010	NE	J		095572-R09	SW846 6020
	Copper	0.0085	0.0035	0.010	NE	J	J-	095572-R09	SW846 6020
	Iron	2.42	0.330	1.00	NE	B		095572-R09	SW846 6020
	Lead	ND	0.005	0.020	NE	U		095572-R09	SW846 6020
	Magnesium	45.2	0.100	0.300	NE			095572-R09	SW846 6020
	Manganese	0.196	0.010	0.050	NE	B		095572-R09	SW846 6020
	Nickel	0.00796	0.005	0.020	NE	J	J-	095572-R09	SW846 7470
	Potassium	11.3	0.800	3.00	NE			095572-R09	SW846 6020
	Selenium	0.0282	0.015	0.050	0.050	J		095572-R09	SW846 6020
	Silver	ND	0.002	0.010	NE	U		095572-R09	SW846 6020
	Sodium	150	4.00	12.5	NE			095572-R09	SW846 6020
	Thallium	ND	0.0045	0.020	0.002	U		095572-R09	SW846 6020
	Zinc	ND	0.035	0.100	NE	U		095572-R09	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-6 *(Continued)*
Summary of Unfiltered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 (Duplicate)	Aluminum	0.0348	0.015	0.050	NE	J		095573-009	SW846 6020
14-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095573-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095573-009	SW846 6020
	Barium	0.0303	0.0006	0.002	2.00			095573-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-009	SW846 6020
	Calcium	195	0.600	2.00	NE			095573-009	SW846 6020
	Chromium	0.00247	0.002	0.010	0.100	J		095573-009	SW846 6020
	Cobalt	0.000451	0.0001	0.001	NE	J		095573-009	SW846 6020
	Copper	0.00313	0.00035	0.001	NE		0.0045UJ	095573-009	SW846 6020
	Iron	0.759	0.033	0.100	NE	B		095573-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095573-009	SW846 6020
	Magnesium	45.2	0.050	0.150	NE		J	095573-009	SW846 6020
	Manganese	0.00631	0.001	0.005	NE	B	0.012UJ	095573-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095573-009	SW846 7470
	Nickel	0.00701	0.0005	0.002	NE			095573-009	SW846 6020
	Potassium	11.2	0.080	0.300	NE			095573-009	SW846 6020
	Selenium	0.0269	0.0015	0.005	0.050			095573-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095573-009	SW846 6020
	Sodium	156	0.800	2.50	NE			095573-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095573-009	SW846 6010
	Zinc	0.00502	0.0035	0.010	NE	J		095573-009	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-6 *(Continued)*
Summary of Unfiltered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	0.042	0.015	0.050	NE	J		095573-R09	SW846 6020
(Duplicate Reanalysis)	Antimony	ND	0.001	0.003	0.006	U		095573-R09	SW846 6020
14-Mar-14	Arsenic	ND	0.0017	0.005	0.010	U		095573-R09	SW846 6020
	Barium	0.0309	0.0006	0.002	2.00		J	095573-R09	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-R09	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-R09	SW846 6020
	Calcium	210	0.600	2.00	NE	B		095573-R09	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095573-R09	SW846 6020
	Cobalt	0.00251	0.0001	0.001	NE	J		095573-R09	SW846 6020
	Copper	0.00199	0.00035	0.001	NE		0.0045UJ	095573-R09	SW846 6020
	Iron	0.316	0.033	0.100	NE	B		095573-R09	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095573-R09	SW846 6020
	Magnesium	55.8	0.100	0.300	NE			095573-R09	SW846 6020
	Manganese	0.00527	0.001	0.005	NE	B	0.0065U	095573-R09	SW846 6020
	Nickel	0.00353	0.0005	0.002	NE		J-	095573-R09	SW846 7470
	Potassium	13.0	0.800	3.00	NE			095573-R09	SW846 6020
	Selenium	0.0272	0.0015	0.005	0.050			095573-R09	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095573-R09	SW846 6020
	Sodium	186	0.800	2.50	NE			095573-R09	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-R09	SW846 6020
	Zinc	0.0055	0.0035	0.010	NE	J		095573-R09	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-6 *(Continued)*
Summary of Unfiltered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	0.0226	0.015	0.050	NE	J		096142-009	SW846 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096142-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096142-009	SW846 6020
	Barium	0.0319	0.0006	0.002	2.00			096142-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096142-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096142-009	SW846 6020
	Calcium	197	3.00	10.0	NE	B		096142-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096142-009	SW846 6020
	Cobalt	0.000396	0.0001	0.001	NE	J		096142-009	SW846 6020
	Copper	0.00243	0.00035	0.001	NE		J-	096142-009	SW846 6020
	Iron	0.322	0.033	0.100	NE			096142-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096142-009	SW846 6020
	Magnesium	45.1	0.010	0.030	NE			096142-009	SW846 6020
	Manganese	0.00172	0.001	0.005	NE	J	J+	096142-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096142-009	SW846 7470
	Nickel	0.00338	0.0005	0.002	NE		J-	096142-009	SW846 6020
	Potassium	11.5	0.400	1.50	NE			096142-009	SW846 6020
	Selenium	0.0286	0.0015	0.005	0.050			096142-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096142-009	SW846 6020
	Sodium	163	4.00	12.5	NE			096142-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096142-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096142-009	SW846 6010
	Zinc	0.00497	0.0035	0.010	NE	J		096142-009	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-6 *(Continued)*
Summary of Unfiltered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 (Duplicate)	Aluminum	0.018	0.015	0.050	NE	J		096143-009	SW846 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096143-009	SW846 6020
	Arsenic	0.00292	0.0017	0.005	0.010	J		096143-009	SW846 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096143-R09	SW846 6020
	Barium	0.0317	0.0006	0.002	2.00			096143-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096143-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096143-009	SW846 6020
	Calcium	194	3.00	10.0	NE	B		096143-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096143-009	SW846 6020
	Cobalt	0.000404	0.0001	0.001	NE	J		096143-009	SW846 6020
	Copper	0.00257	0.00035	0.001	NE		J-	096143-009	SW846 6020
	Iron	0.319	0.033	0.100	NE			096143-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096143-009	SW846 6020
	Magnesium	43.9	0.010	0.030	NE			096143-009	SW846 6020
	Manganese	0.00168	0.001	0.005	NE	J	J+	096143-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096143-009	SW846 7470
	Nickel	0.00352	0.0005	0.002	NE		J-	096143-009	SW846 6020
	Potassium	11.3	0.400	1.50	NE			096143-009	SW846 6020
	Selenium	0.0272	0.0015	0.005	0.050			096143-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096143-009	SW846 6020
	Sodium	158	4.00	12.5	NE			096143-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096143-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096143-009	SW846 6010
	Zinc	0.00458	0.0035	0.010	NE	J		096143-009	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-6 *(Concluded)*
Summary of Unfiltered Target Analyte List Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	0.0304	0.015	0.050	NE	J		096595-009	SW846 6020
12-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096595-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096595-009	SW846 6020
	Barium	0.0325	0.0006	0.002	2.00			096595-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096595-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096595-009	SW846 6020
	Calcium	173	0.300	1.00	NE			096595-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096595-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096595-009	SW846 6020
	Copper	0.000386	0.00035	0.001	NE	J		096595-009	SW846 6020
	Iron	0.0447	0.033	0.100	NE	J	0.18U	096595-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096595-009	SW846 6020
	Magnesium	44.6	0.050	0.150	NE			096595-009	SW846 6020
	Manganese	0.00175	0.001	0.005	NE	J		096595-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096595-009	SW846 7470
	Nickel	0.000598	0.0005	0.002	NE	J		096595-009	SW846 6020
	Potassium	12.1	0.400	1.50	NE			096595-009	SW846 6020
	Selenium	0.0296	0.0015	0.005	0.050			096595-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096595-009	SW846 6020
	Sodium	76.7	2.00	6.25	NE			096595-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096595-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096595-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096595-009	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7
Summary of Filtered Target Analyte List Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		095572-010	SW846 6020
14-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095572-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095572-010	SW846 6020
	Barium	0.0313	0.0006	0.002	2.00			095572-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095572-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095572-010	SW846 6020
	Calcium	200	0.600	2.00	NE			095572-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095572-010	SW846 6020
	Cobalt	0.000416	0.0001	0.001	NE	J		095572-010	SW846 6020
	Copper	0.00247	0.00035	0.001	NE		0.0035UJ	095572-010	SW846 6020
	Iron	0.599	0.033	0.100	NE	B		095572-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095572-010	SW846 6020
	Magnesium	48.8	0.050	0.150	NE		J	095572-010	SW846 6020
	Manganese	0.0016	0.001	0.005	NE	B, J	0.012UJ	095572-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095572-010	SW846 7470
	Nickel	0.00579	0.0005	0.002	NE			095572-010	SW846 6020
	Potassium	11.9	0.080	0.300	NE			095572-010	SW846 6020
	Selenium	0.0269	0.0015	0.005	0.050			095572-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095572-010	SW846 6020
	Sodium	171	0.800	2.50	NE			095572-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095572-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095572-010	SW846 6010
	Zinc	0.00466	0.0035	0.010	NE	J		095572-010	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7 *(Continued)*
Summary of Filtered Target Analyte List Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 (Reanalysis)	Aluminum	ND	0.015	0.050	NE	U		095572-R10	SW846 6020
14-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095572-R10	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095572-R10	SW846 6020
	Barium	0.0301	0.0006	0.002	2.00		J	095572-R10	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095572-R10	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095572-R10	SW846 6020
	Calcium	201	0.600	2.00	NE	B		095572-R10	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095572-R10	SW846 6020
	Cobalt	0.000236	0.0001	0.001	NE	J		095572-R10	SW846 6020
	Copper	0.00172	0.00035	0.001	NE		0.0035UJ	095572-R10	SW846 6020
	Iron	0.260	0.033	0.100	NE	B		095572-R10	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095572-R10	SW846 6020
	Magnesium	52.1	0.100	0.300	NE			095572-R10	SW846 6020
	Manganese	0.00169	0.001	0.005	NE	B, J	0.0065U	095572-R10	SW846 6020
	Nickel	0.00302	0.0005	0.002	NE		J-	095572-R10	SW846 7470
	Potassium	12.2	0.800	3.00	NE			095572-R10	SW846 6020
	Selenium	0.0273	0.0015	0.005	0.050			095572-R10	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095572-R10	SW846 6020
	Sodium	174	0.800	2.50	NE			095572-R10	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095572-R10	SW846 6020
	Zinc	0.00529	0.0035	0.010	NE	J		095572-R10	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7 *(Continued)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 (Duplicate) 14-Mar-14	Aluminum	ND	0.015	0.050	NE	U		095573-010	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		095573-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095573-010	SW846 6020
	Barium	0.0305	0.0006	0.002	2.00			095573-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-010	SW846 6020
	Calcium	207	0.600	2.00	NE			095573-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095573-010	SW846 6020
	Cobalt	0.000462	0.0001	0.001	NE	J		095573-010	SW846 6020
	Copper	0.00313	0.00035	0.001	NE		0.0035UJ	095573-010	SW846 6020
	Iron	0.799	0.033	0.100	NE	B		095573-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095573-010	SW846 6020
	Magnesium	51.0	0.050	0.150	NE		J	095573-010	SW846 6020
	Manganese	0.00357	0.001	0.005	NE	B, J	0.012UJ	095573-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095573-010	SW846 7470
	Nickel	0.0069	0.0005	0.002	NE			095573-010	SW846 6020
	Potassium	11.6	0.080	0.300	NE			095573-010	SW846 6020
	Selenium	0.0285	0.0015	0.005	0.050			095573-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095573-010	SW846 6020
	Sodium	169	0.800	2.50	NE			095573-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095573-010	SW846 6010
	Zinc	0.00465	0.0035	0.010	NE	J		095573-010	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7 *(Continued)*
Summary of Filtered Target Analyte List Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		095573-R10	SW846 6020
(Duplicate Reanalysis)	Antimony	ND	0.001	0.003	0.006	U	UJ	095573-R10	SW846 6020
14-Mar-14	Arsenic	ND	0.0017	0.005	0.010	U		095573-R10	SW846 6020
	Barium	0.0304	0.0006	0.002	2.00		J	095573-R10	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-R10	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-R10	SW846 6020
	Calcium	219	0.600	2.00	NE	B		095573-R10	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095573-R10	SW846 6020
	Cobalt	0.000230	0.0001	0.001	NE	J		095573-R10	SW846 6020
	Copper	0.00175	0.00035	0.001	NE		0.0035UJ	095573-R10	SW846 6020
	Iron	0.253	0.033	0.100	NE	B		095573-R10	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095573-R10	SW846 6020
	Magnesium	58.3	0.100	0.300	NE			095573-R10	SW846 6020
	Manganese	0.00138	0.001	0.005	NE	B, J	0.0065U	095573-R10	SW846 6020
	Nickel	0.003	0.0005	0.002	NE		J-	095573-R10	SW846 6020
	Potassium	13.5	0.800	3.00	NE			095573-R10	SW846 6020
	Selenium	0.0271	0.0015	0.005	0.050			095573-R10	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095573-R10	SW846 6020
	Sodium	194	0.800	2.50	NE			095573-R10	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-R10	SW846 6010
	Zinc	0.00531	0.0035	0.010	NE	J		095573-R10	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7 *(Continued)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		096142-010	SW846 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096142-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096142-R10	SW846 6020
	Barium	0.031	0.0006	0.002	2.00			096142-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096142-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096142-010	SW846 6020
	Calcium	197	3.00	10.0	NE	B		096142-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096142-010	SW846 6020
	Cobalt	0.000378	0.0001	0.001	NE	J		096142-010	SW846 6020
	Copper	0.00233	0.00035	0.001	NE		J-	096142-010	SW846 6020
	Iron	0.293	0.033	0.100	NE			096142-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096142-010	SW846 6020
	Magnesium	44.8	0.010	0.030	NE			096142-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096142-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096142-010	SW846 7470
	Nickel	0.00347	0.0005	0.002	NE		J-	096142-010	SW846 6020
	Potassium	11.4	0.400	1.50	NE			096142-010	SW846 6020
	Selenium	0.0272	0.0015	0.005	0.050			096142-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096142-010	SW846 6020
	Sodium	159	4.00	12.5	NE			096142-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096142-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096142-010	SW846 6010
	Zinc	0.00455	0.0035	0.010	NE	J		096142-010	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7 *(Continued)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096143-010	SW846 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096143-010	SW846 6020
	Arsenic	0.00363	0.0017	0.005	0.010	J	R	096143-010	SW846 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096143-R10	SW846 6020
	Barium	0.0324	0.0006	0.002	2.00			096143-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096143-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096143-010	SW846 6020
	Calcium	218	3.00	10.0	NE	B		096143-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096143-010	SW846 6020
	Cobalt	0.000431	0.0001	0.001	NE	J		096143-010	SW846 6020
	Copper	0.00274	0.00035	0.001	NE		J-	096143-010	SW846 6020
	Iron	0.325	0.033	0.100	NE			096143-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096143-010	SW846 6020
	Magnesium	44.6	0.010	0.030	NE			096143-010	SW846 6020
	Manganese	0.00103	0.001	0.005	NE	J	J+	096143-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096143-010	SW846 7470
	Nickel	0.00355	0.0005	0.002	NE		J-	096143-010	SW846 6020
	Potassium	11.7	0.400	1.50	NE			096143-010	SW846 6020
	Selenium	0.0277	0.0015	0.005	0.050			096143-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096143-010	SW846 6020
	Sodium	177	4.00	12.5	NE			096143-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096143-010	SW846 6020
	Vanadium	0.00107	0.001	0.005	NE	J		096143-010	SW846 6010
	Zinc	0.00482	0.0035	0.010	NE	J		096143-010	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-7 *(Concluded)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		096595-010	SW846 6020
12-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096595-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096595-010	SW846 6020
	Barium	0.0336	0.0006	0.002	2.00			096595-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096595-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096595-010	SW846 6020
	Calcium	184	0.300	1.00	NE			096595-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096595-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		096595-010	SW846 6020
	Copper	0.000471	0.00035	0.001	NE	J		096595-010	SW846 6020
	Iron	ND	0.033	0.100	NE	U		096595-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096595-010	SW846 6020
	Magnesium	47.7	0.050	0.150	NE			096595-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		096595-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096595-010	SW846 7470
	Nickel	0.000624	0.0005	0.002	NE	J		096595-010	SW846 6020
	Potassium	10.3	0.400	1.50	NE			096595-010	SW846 6020
	Selenium	0.0292	0.0015	0.005	0.050			096595-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096595-010	SW846 6020
	Sodium	75.9	2.00	6.25	NE			096595-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		096595-010	SW846 6020
	Vanadium	0.00166	0.001	0.005	NE	J		096595-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		096595-010	SW846 6020

Refer to footnotes on page 12A-25.

Table 12A-8
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CTF-MW3	14-Mar-14	18.57	1398.5	193.2	7.08	0.71	53.6	5.01
CTF-MW3	27-Jun-14	22.11	1651.1	296.9	6.96	0.51	79.6	6.92
CTF-MW3	12-Sep-14	19.29	1625.6	284.2	6.62	1.36	81.4	7.48

Refer to footnotes on page 12A-25.

Footnotes for Solid Waste Management Unit 149 Analytical Results Tables

% = Percent.
CFR = Code of Federal Regulations.
CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
ID = Identification..
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
MW = Monitoring well.
No. = Number.

[a]Result
Bold indicates the value exceed the established MCL.
ND = Not detected (at MDL).

[b]MDL
The MDL applies to Table 12A-1 through 12A-7.
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
The PQL applies to Table 12A-1 through 12A-7.
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 Water Regulations (EPA May 2009).
NE = Not established.

[e]Lab Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective MDL.
J = Amount detected is 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 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.
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
Clesceri, Greenburg, and Eaton, 1998, Standard Methods for the Examination of Water and Wastewater, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.
EPA, 1999 (and updates), “Perchlorate in Drinking Water Using Ion Chromatography,” EPA 815/R-00-014.
EPA, 1986 (and updates), “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” SW-846, 3rd ed.
EPA, 1983, “The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0,” EPA-600/4-84-017.

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

Footnotes for Solid Waste Management Unit 149 Analytical Results Tables (Concluded)

[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 12B
Solid Waste Management Unit 149
Hydrographs

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Attachment 12B Hydrographs

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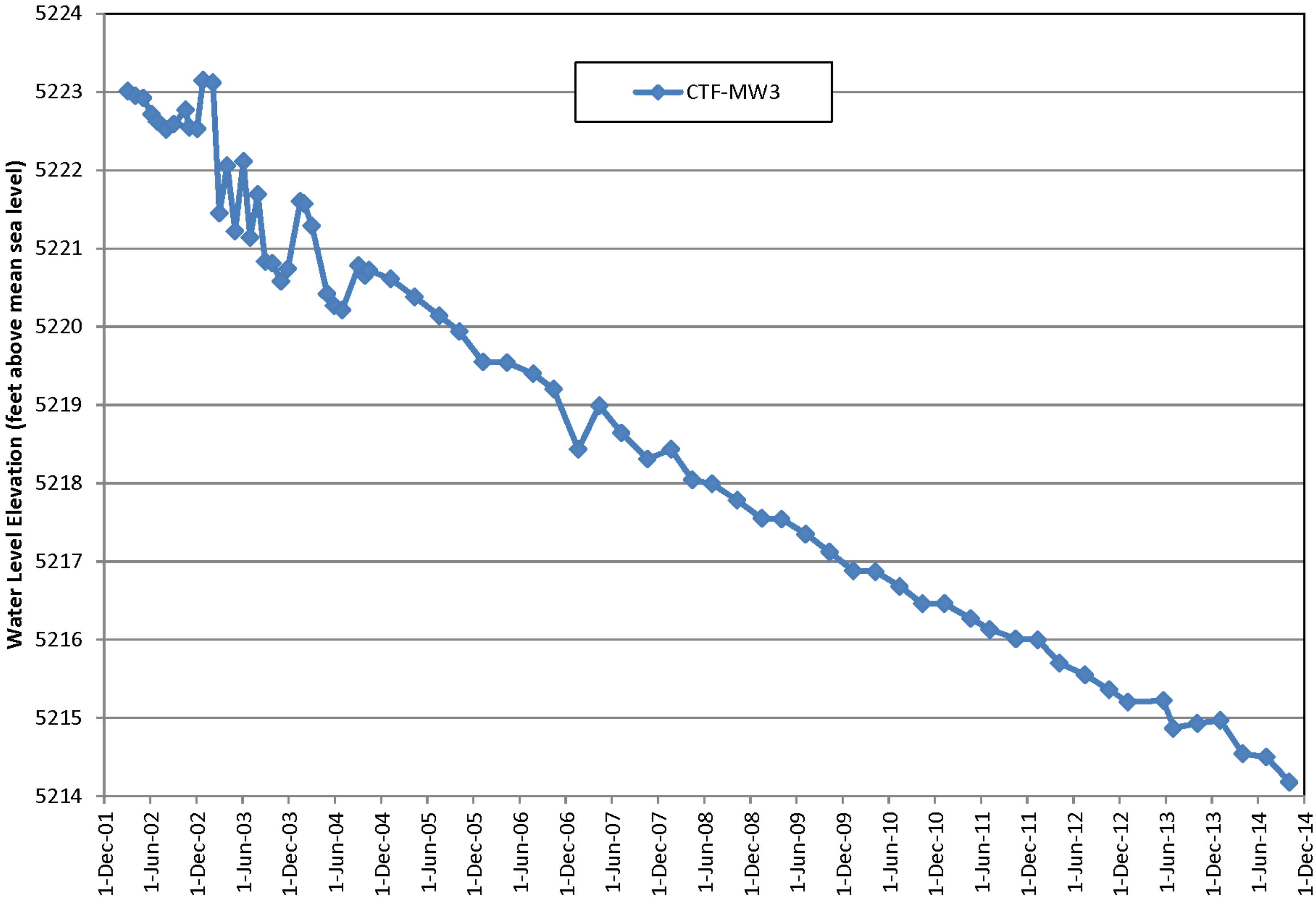

Figure 12B-1. Solid Waste Management Unit 149 Study Area Well

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13.0 Solid Waste Management Unit 154

13.1 Introduction

This chapter summarizes Calendar Year (CY) 2014 quarterly groundwater sampling events for Coyote Test Field (CTF) monitoring well CTF-MW2, located near Solid Waste Management Unit (SWMU) 154 at Sandia National Laboratories, New Mexico (SNL/NM).

Supplemental groundwater monitoring at SWMU 154 is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) (New Mexico Environment Department [NMED] April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010).

During CY 2014, three quarterly groundwater samples were collected from monitoring well CTF-MW2 on March 18, June 6, and September 8, 2014. In October 2014, U.S. Department of Energy (DOE) and Sandia Corporation (Sandia) notified NMED that groundwater monitoring at SWMU 154 had been completed, and would be discontinued (SNL October 2014). The groundwater samples were collected in accordance with the NMED-approved Sampling and Analysis Plan (SAP) (SNL June 2010) and Mini-SAPs. Analytical parameters included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions, alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

Analytical results were compared with U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA May 2009). During all three quarters, arsenic was detected above the established MCL and is most likely attributable to naturally occurring background (geogenic source) because monitoring well CTF-MW2 is screened in a highly fractured interval of Precambrian granite and gneiss. Detailed results for all quarterly sampling events are discussed in Section 13.6.

The eighth quarter of groundwater monitoring required by NMED (NMED April 2010) was conducted on December 18, 2012 (SNL September 2013). The fifteenth and final quarterly groundwater sampling event at SWMU 154 occurred on September 8, 2014. All NMED requirements for groundwater monitoring at SWMU 154 have been met (NMED April 2010).

13.1.1 Location

SWMU 154, the Building 9960 Septic Systems, is located in the CTF on federally-owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the DOE/National Nuclear Security Administration (NNSA). It is approximately 1.3 miles east of SNL/NM Technical Area-III, 0.4 miles west of Lovelace Road, and 1.3 miles north of the Solar Power Tower, a prominent landmark in the area (Figure 13-1).

13.1.2 Site History

SWMU 154 was identified as a potential release site in 1987 (SNL August 1997; Table 13-1) and is composed of two adjacent, but separate waste water systems. The east septic system (SWMU 154-B) is located north of Building 9960 and consists of a 900-gallon septic tank that discharged to a 5-foot (ft) diameter, 10-ft deep seepage pit. The west septic system (SWMU 154-A) consists of a pair of HE seepage pits located southwest of Building 9960 (Figure 13-2).

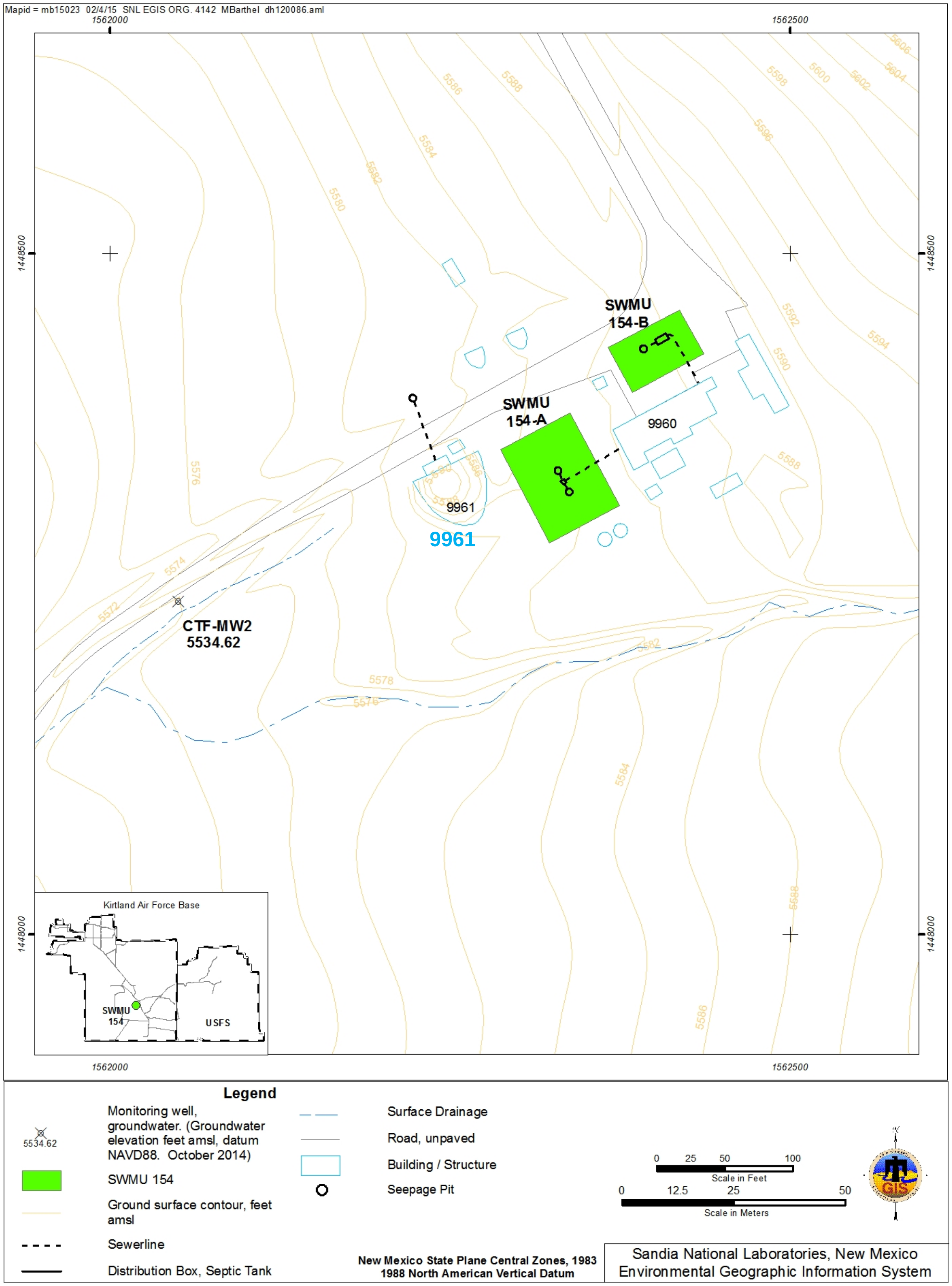

Figure 13-1. Location of Monitoring Well CTF-MW2 near SWMU 154

Table 13-1. Historical Timeline of SWMU 154

Month	Year	Event	Reference
	1965	Building 9960 and 9961 are constructed.	SNL August 1997
April	1987	SWMU 154 is identified as a potential release site. Building 9960 HE two seepage pits (SWMU 154A) and septic system (SWMU 154B).	SNL August 1997
June	1992	Waste characterization samples collected from SWMU 154 septic tank.	SNL August 1997
	1993	Building 9960 connected to the City of Albuquerque sanitary sewer system.	SNL August 1997
March	1993	Septic Tanks and Drainfields (OU 1295) RCRA Facility Investigation Work Plan submitted.	SNL March 1993
March	1994	OU 1295 SAP prepared.	IT March 1994
	1994	Cultural Resources and Sensitive Species Surveys conducted at SMWU 154.	SNL August 1997
May	1994	Additional waste characterization samples collected from SWMU 154 septic tank.	SNL August 1997
May-June	1994	A PETREX™ passive soil vapor survey completed at the septic system area at SWMU 154.	SNL August 1997
September	1994	EPA comments on the March 1993 OU 1295 work plan received as a NOD.	EPA September 1994
November	1994	Response to the September 1994 EPA NOD submitted.	SNL November 1994
October	1994	Confirmatory soil samples collected from SWMU 154.	SNL August 1997
October	1995	A second round of soil samples collected from two boreholes next to the two HE seepage pits at SWMU 154.	Chain-of-Custody
January	1996	Remaining waste removed from SWMU 154 septic system septic tank, and the tank was decontaminated and backfilled in place with clean soil. The septic system seepage pit was also backfilled in place with clean fill.	SNL January 1996
June-July	1996	A third round of soil samples collected from four previous and six new borehole locations around the HE seepage pits at SWMU 154.	Chain-of-Custody
March	1997	A fourth round of soil samples collected from four additional boring locations in the HE seepage pits area at SWMU 154.	Chain-of-Custody
August	1997	NFA proposal for SWMU 154 submitted to the NMED.	SNL August 1997
January	1998	SWMU 154 was one of five OU 1295 SWMUs selected by the NMED for additional soil sampling through the center and beneath seepage pits.	NMED January 1998
January	1998	SNL/NM collected samples down through the center of and beneath the two HE seepage pits at SWMU 154.	Chain-of-Custody
February	1998	Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report (SNL/NM 1995) containing description of SWMU 154 hydrogeology submitted to NMED.	SNL February 1998
June	1999	The NMED responded with an RSI on the SWMU 154 NFA proposal. Installation of a groundwater monitoring well downgradient of SWMU 154 was requested.	NMED June 1999
September	1999	First response submitted to the June 1999 NMED RSI for SWMU 154.	SNL September 1999a
October	1999	A SAP describing technical procedures to complete environmental investigations submitted to the NMED.	SNL September 1999b
January	2000	SAP approved by the NMED.	NMED January 2000
August	2001	Groundwater monitoring well CTF-MW2 installed downgradient from SWMU 154.	SNL June 2005

Refer to footnotes on page 13-4.

Table 13-1. Historical Timeline of SWMU 154 *(Concluded)*

Month	Year	Event	Reference
November	2001	A follow-up FIP documenting specific investigation procedure to be completed submitted to the NMED.	SNL November 2001
February	2002	The FIP approved by the NMED.	NMED February 2002
June	2004	Completed eight quarters of sampling for groundwater monitoring well CTF-MW2 near SWMU 154.	SNL June 2005
June	2005	A third RSI response submitted to the NMED. This document described the results of the investigations completed at SWMU 154 since the August 1997 NFA report was written and an updated risk assessment evaluation for the site.	SNL June 2005
August	2005	As required by the NMED, additional soil samples were collected and analyzed from beneath a fourth seepage pit associated with Building 9961 near SWMU 154.	Chain-of-Custody
September	2005	The NMED issued a NOD requiring soil sampling at a Building 9961 seepage pit not located within the SWMU border.	NMED September 2005
January	2006	Response to NOD submitted, consisting of a report summarizing results of soil sampling beneath the Building 9961 HE seepage pit. No significant contamination is detected in the soil samples.	SNL January 2006
March	2006	The NMED issues a Certificate of Completion for CAC.	NMED March 2006
March	2006	Request for Class 3 Permit Modification submitted.	SNL March 2006
April	2010	NMED issues a letter requiring additional corrective action is needed at SWMU 154. It specifies eight additional quarters of groundwater monitoring at CTF-MW2.	NMED April 2010
June	2010	SAP for SWMU 154 submitted to the NMED.	SNL June 2010
December	2010	SAP approved by the NMED.	NMED December 2010
March	2011	Quarterly sampling of CTF-MW2 resumed.	SNL September 2012
December	2012	Eight quarters of additional groundwater sampling of CTF-MW2 completed. April 2010 NMED requirements met.	SNL September 2013
October	2014	NMED was notified that groundwater monitoring at SWMU 154 has been completed, and was being discontinued.	SNL October 2014

NOTES:

CAC = Corrective Action Complete.
CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
FIP = Field Implementation Plan.
HE = High explosive.
MW = Monitoring Well.
NFA = No Further Action.
NMED = New Mexico Environment Department.
NOD = Notice of Disapproval.
OU = Operable Unit.
RCRA = Resource Conservation and Recovery Act.
RSI = Request for Supplemental Information.
SAP = Sampling and Analysis Plan.
SNL/NM = Sandia National Laboratories, New Mexico.
SWMU = Solid Waste Management Unit.

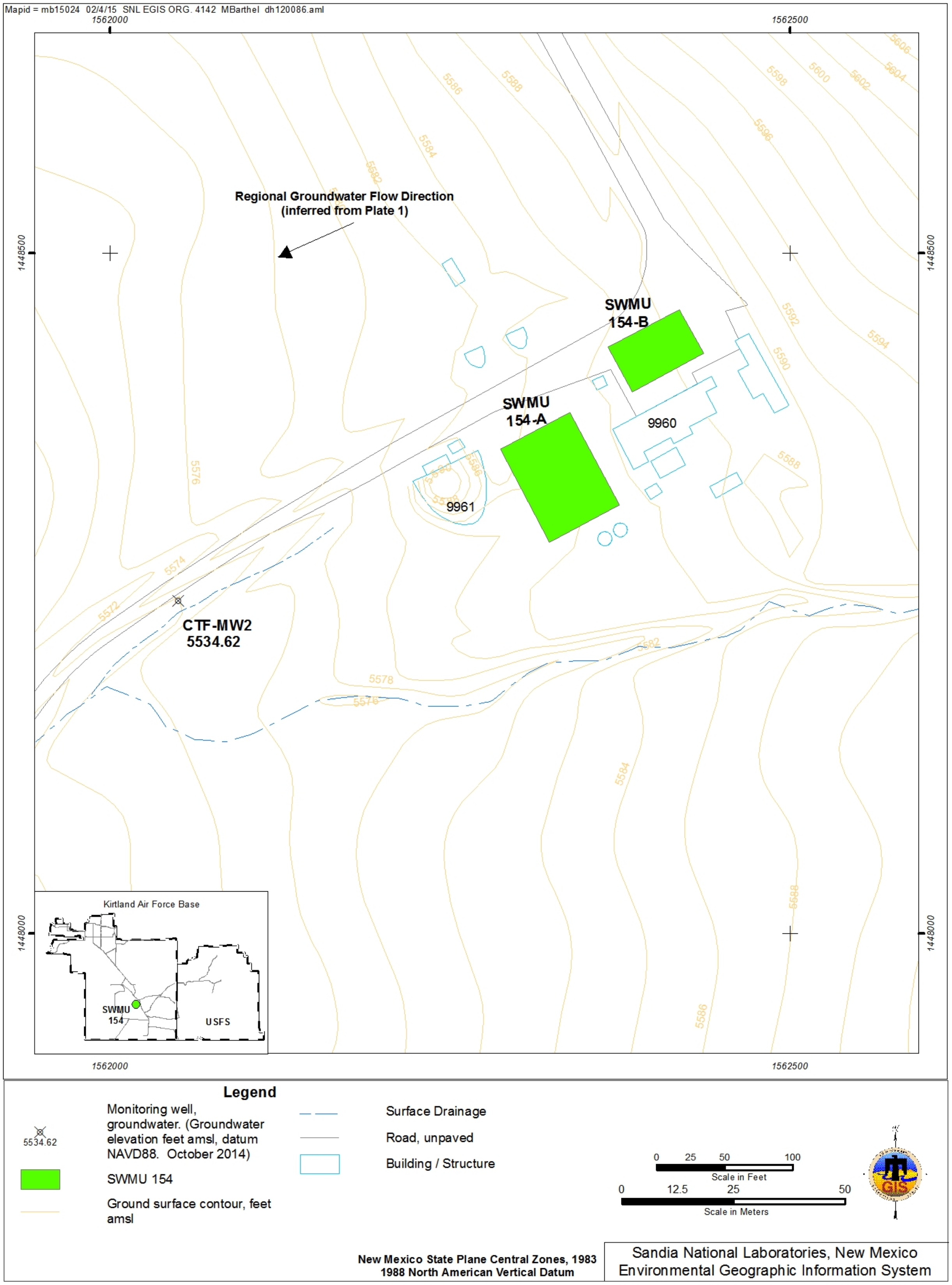

Figure 13-2. SWMU 154 Groundwater Flow Direction (October 2014)

The two HE compound seepage pits (SWMU 154A) are 5 ft in diameter and were installed to approximately 23 ft below ground surface (bgs). Combined, the two SWMU 154 septic systems encompass approximately 0.15 acres of essentially flat-lying land at an average mean elevation of 5,585 ft above mean sea level (amsl).

Available information indicates that Building 9960 was constructed in 1965, and it is assumed that the septic and HE drain systems were also constructed at that time. In 1993, the septic systems were connected to the City of Albuquerque sanitary sewer system (Jones July 1993). The obsolete septic system lines were disconnected and capped, and the system was abandoned in place (Romero September 2003). Waste in the SWMU 154B septic tank was removed and managed according to SNL/NM requirements. The empty and decontaminated septic tank was inspected by the NMED on January 26, 1996, and a closure form was signed by the NMED (SNL January 1996). The septic tank and associated seepage pit were then backfilled with clean, native soil from the area in early 1996. The two SWMU 154A HE seepage pits are inactive and have not been backfilled. Rinse water from HE machining operations at the facility are currently directed to polypropylene tanks that are routinely analyzed and the contents properly disposed.

SWMU 154 environmental concerns are based upon the potential for the release of contaminants of concern (COCs) in effluent discharged to the environment via the septic and HE seepage pits. Because operational records were not available, the initial investigation was planned to be consistent with other Drain and Septic System site investigations, and to sample for possible COCs that may have been released during facility operations.

In August 1997, a No Further Action (NFA) proposal was submitted to the NMED for SWMU 154 (SNL August 1997). The NMED stated that the NFA proposal would not be approved without groundwater characterization. Subsequently, monitoring well CTF-MW2 was installed in August 2001, and groundwater samples were collected for the required minimum of eight quarters. Groundwater samples were analyzed for VOCs, Resource Conservation and Recovery Act (RCRA) metals, and HE compounds. Analytical results for these sampling events were presented in the third Request for Supplemental Information (RSI) responses and a Corrective Action Complete (CAC) proposal submitted to the NMED (SNL June 2005). In September 2005, the NMED issued a Notice of Disapproval (NOD) (NMED September 2005) requiring DOE/NNSA and Sandia to characterize an uninvestigated seepage pit associated with Building 9961 in accordance with the approved SAP (SNL October 1999). In January 2006, the NOD response summarizing the results of the soil sampling submitted (SNL January 2006), and the NMED then issued a Certificate of Completion for CAC (NMED March 2006).

In March 2006, a request for Class 3 Permit Modification was submitted to the NMED (SNL March 2006). In April 2010, the NMED responded to the Permit Modification Request with a letter requiring further corrective action at SWMU 154 (NMED April 2010), in the form of an additional eight quarters of groundwater monitoring at monitoring well CTF-MW2. In June 2010, the SAP for monitoring well CTF-MW2 was submitted (SNL June 2010), which was approved by the NMED (December 2010). Quarterly groundwater sampling was resumed at monitoring well CTF-MW2 in March 2011 and continued through CY 2014. The analytical results for CY 2014 are presented in Section 13.6.

13.1.3 Monitoring History

Monitoring well CTF-MW2 was installed in August 2001 and was sampled on a quarterly basis from July 2002 to June 2004 to acquire the eight quarters of groundwater data required by the NMED. The groundwater samples were analyzed for VOCs, HE compounds, and RCRA metals. Although not required by the NMED, additional samples were also collected and analyzed for NPN, anions, and cations. These additional samples were collected to further characterize the general geochemistry of groundwater and for purge water waste characterization purposes. Results for these eight quarters of groundwater sampling are as follows:

- **VOCs**—Acetone was detected only in the first groundwater sample collected in July 2002 as well as in the August 2003 trip blank (TB) and equipment blank (EB) samples. Bromoform was detected only in the December 2003 EB sample and dibromochloromethane was detected in the February and April 2003 EB samples. Methylene chloride and toluene were detected only in TB samples.

- **HE Compounds**—The compound 1,3,5-trinitrobenzene was detected in the February 2003 groundwater sample. No other HE compounds were detected in the groundwater samples associated with this monitoring well. A trace of methyl 2,4,6-trinitrophenylnitramine (tetryl) and 4-amino-2,6-dinitrotoluene were detected in separate EB samples associated with sampling of this well.

- **RCRA Metals**—Arsenic exceeded the EPA MCL in all groundwater samples. SNL/NM personnel identified that the arsenic concentrations were greater than background values and promulgated limits, as well as explained that these concentrations were most likely naturally occurring and not caused by a release at SWMU 154 (SNL September 2002). All other metal concentrations were below regulatory limits.

- **NPN, Anions, and Cations**—Fluoride was detected in all eight primary and two duplicate environmental samples collected, but in all cases, were less than the MCL of 4.0 milligrams per liter (mg/L). The fluoride detected was most likely naturally occurring. None of the known activities conducted at Building 9960 would have produced wastewater containing fluoride.

- **Field Water Quality Parameters:** Compared to other monitoring wells in the same hydrogeologic region CTF-MW2 specific conductivity values were two to three times higher, oxidation and reduction potential values were much lower, and dissolved oxygen values were much lower.

13.1.4 Current Monitoring Network

Currently, one monitoring well (CTF-MW2) is located southwest of SWMU 154 (Figure 13-2). Monitoring well CTF-MW2 was monitored quarterly for VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

13.1.5 Summary of Calendar Year 2014 Activities

The following activities took place for monitoring well CTF-MW2 near SWMU 154 during CY 2014:

- Quarterly groundwater sampling was conducted at monitoring well CTF-MW2 in March, June, and September 2014 (SNL February 2014, May 2014, and August 2014).

- Quarterly reporting of analytical results for monitoring well CTF-MW2 groundwater samples for the first three quarters of CY 2014.

- Tables of analytical results (Attachment 13A), arsenic concentration versus time plots (Attachment 13B), and a hydrograph (Attachment 13C) were prepared in support of this report.

13.1.6 Summary of Future Activities

The following activities are anticipated for monitoring well CTF-MW2 near SWMU 154 during CY 2015:

- No groundwater sampling will be conducted at monitoring well CTF-MW2 in CY 2015 unless additional guidance is received from NMED.

13.1.7 Conceptual Model

For the resumption of quarterly groundwater sampling at monitoring well CTF-MW2, this section presents a revised discussion of the hydrogeologic regime, conceptual model, and contaminant findings for SWMU 154.

13.1.7.1 Regional Hydrogeologic Conditions

SWMU 154 is located in the Travertine Hills within the western portion of CTF. The site is located approximately 1,000 ft east of the Tijeras Fault (Plate 1). Nearby outcrops are composed of the Sandia Formation (carbonate-cemented sandstone and conglomerate), Madera Group limestone, and Precambrian quartzite and granite (GRAM and Lettis 1995). The base-wide potentiometric surface map (Plate 1) shows that groundwater flow in the regional aquifer is generally towards the west. Faults in the vicinity of the site may serve as hydraulic barriers or conduits depending on the type and amount of fault gouge. No potable water supply wells are located within 4 miles of the site.

13.1.7.2 Hydrogeologic Conditions at SWMU 154

SWMU 154 consists of two septic systems (SWMUs 154-A and 154-B) located near Building 9960. SWMU 154-A is located approximately 20 ft to the west of the building, and SWMU 154-B is located approximately 20 ft to the north of the building (Figure 13-2). The combined area of SWMU 154 comprises 6,710 square ft (approximately 0.15 acres). The site is covered by colluvium that is underlain by caliche and bedrock. The septic systems were used from 1965 to 1993. Building 9960 is located on the northeastern edge of the Travertine Hills at an elevation of approximately 5,585 ft amsl. The area surrounding Building 9960 consists of rolling hills and is sparsely vegetated by bunch grasses, cacti, and junipers. Overall, the terrain slopes gently to the southwest. No perennial surface water features, such as springs, are located within 1 mile of SWMU 154. Monitoring well CTF-MW2 is located approximately 330 ft to the southwest and slightly downslope of Building 9960.

The amount of precipitation available for groundwater recharge is minimal due to scant rainfall and high evapotranspiration rates. Summer (i.e., monsoonal) thunderstorms are responsible for the majority of rainfall. The average rainfall, as measured at the nearest active rain gauge (the National Weather Service station at the Albuquerque International Sunport), during the period from 1915 through 2005 was 8.67 inches per year (WRCC-DRI 2012). The station is located 7.2 miles northwest of the site at an elevation of 5,310 ft amsl, which is similar enough to the site elevation to infer that the annual rainfall at SWMU 154 is approximately 9 inches. Intense sunlight and low humidity throughout much of the year creates high rates of evapotranspiration. Estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL February 1998).

In 2001, a location west of SWMU 154 was selected with NMED's approval for the installation of monitoring well CTF-MW2. The well was installed in August 2001 using the air rotary casing hammer drilling technique. Alluvium consisting of silty fine- to medium-grained sand was encountered from the ground surface to 10 ft bgs. Silty gravel extended from 10 to 17 ft bgs. A hard layer of caliche with a gravel matrix was encountered from 17 to 32 ft bgs. From 32 to 44 ft bgs, the strata consisted of silty gravel and Abo Formation siltstone. Clayey fine gravel was encountered from 44 to 110 ft bgs. Fractured granite and gneiss was encountered from 110 ft bgs to the borehole total depth of 190 ft bgs. Groundwater was encountered at a depth of 120 ft bgs. Borehole sloughing, especially below 135 ft bgs, in the highly fractured Precambrian granite and gneiss made for difficult drilling. Fault breccia (indicated by manganese and iron cementation) was possibly encountered at 145 ft bgs. The most productive zone in the borehole was 120 to 135 ft bgs. The well was screened from 110 to 130 ft bgs in fractured Precambrian granite and gneiss (Table 13-2).

Table 13-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Well CTF-MW2 near SWMU 154

Well ID	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2014 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Pressure Head (ft[a])
CTF-MW2	5,575.60	110–130	5,465.60	5,534.62	5,455.60	79

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CTF = Coyote Test Field.
ft = Foot (feet).
ID = Identification.
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The October 2014 groundwater elevation was 5,534.62 ft amsl (Figure 13-2). Compared to the mid-point elevation of the screen, the pressure head was approximately 79 ft and indicative of confined conditions. Groundwater in the bedrock most likely migrates through a confined fracture system. The geochemical signature for monitoring well CTF-MW2 is of the bicarbonate type dominated by calcium.

During sampling, the drawdown in monitoring well CTF-MW2 was not excessive and the quantity of water produced was clearly adequate for low flow sampling purposes. Groundwater samples are collected using pneumatic (nitrogen-gas activated) Bennett™ piston pumps.

The conceptual hydrogeologic model for SWMU 154 is based on the findings for monitoring well CTF-MW2, several nearby monitoring wells located across the CTF (Plate 1), and extensive field mapping conducted by the Site-Wide Hydrogeologic Characterization Project (SNL February 1998). Groundwater in the SWMU 154 area occurs in the fractured bedrock system under confined conditions. The depth to groundwater at monitoring well CTF-MW2 at the time of installation was approximately 120 ft bgs in a severely fractured interval of Precambrian granite and gneiss. A thick sequence of clayey fine gravel overlying the fractured granite probably serves as the confining layer. The borehole possibly intercepted a splay of the Tijeras Fault at 145 ft bgs that yielded only a minor amount of groundwater.

The amount of precipitation available for groundwater recharge at SWMU 154 is minimal due to the scant rainfall, high evapotranspiration rates, and the shallow sequence of competent bedrock. Historical water level data indicate that seasonal effects, primarily due to thunderstorms, do not influence groundwater levels near the site. Groundwater underflow from the site probably discharges to the unconsolidated basin fill deposits (primarily the Santa Fe Group) of the Albuquerque Basin after crossing the Tijeras and Sandia faults (SNL February 1998). No potable water supply wells are located within 4 miles of the site.

13.1.7.3 Contaminant Sources

From 1965 to 1993, water from the two SWMU 154 septic systems discharged to the subsurface via three seepage pits. The septic water contained photo-processing chemicals, HE compounds, and sanitary waste.

The areas around the seepage pits and septic tanks were characterized using soil vapor samplers and soil samples collected from 14 boreholes.

13.1.7.4 Contaminant Distribution and Transport in Groundwater

The first phase of quarterly groundwater sampling for monitoring well CTF-MW2 was conducted from July 2002 to June 2004. Trace amounts of VOCs and one HE compound (1,3,5-trinitrobenzene) were detected. Concentrations decreased over time. NPN and fluoride concentrations reported were less than the MCLs. Except for arsenic, no metals exceeded the MCLs. Arsenic exceeded the MCL in all first phase groundwater samples and was attributed to natural sources, and not to research activities conducted at Building 9960.

The second phase of quarterly groundwater sampling began in March 2011. During CY 2014, three quarterly groundwater events were conducted at monitoring well CTF-MW2. The analytical parameters included VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. Except for arsenic and gross alpha, no constituents exceed the respective MCLs. The occurrence of arsenic and gross alpha in groundwater samples from monitoring well CTF-MW2 is mostly likely attributable to natural sources. Analysis of trace gases and helium isotope data from groundwater samples collected from CTF-MW2 in December 2011 show that it is a mixture of shallow and upwelling endogenic (deeply derived) fluids (Williams *et al*., October 2012). The elevated arsenic, uranium, and gross alpha values in samples from CTF-MW2 are consistent with and indicate that upwelling deeply derived fluids are the source.

13.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM Environmental Restoration (ER) Operations (formerly ER Project), as well as implements and enforces regulations mandated by RCRA. All ER Operations SWMUs are listed in Module IV of the SNL/NM RCRA Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (NMED 1993). All corrective action requirements pertaining to SWMUs are contained in the Consent Order (NMED April 2004).

In August 1997, an NFA proposal was submitted to the NMED for SWMU 154 (SNL August 1997). In January 1998, as part of a five site sampling comparison study required by the NMED (January 1998), additional samples were collected at SWMU 154 from boreholes drilled through the center of, and beneath, the two SWMU 154-A HE compound seepage pits. The analytical results were submitted to the NMED, and in June 1999, the NMED responded with an RSI on the NFA proposal (NMED June 1999). The NMED also stated that no septic system NFA proposals would be approved without groundwater characterization unless the NMED received assurance that such approvals would be protective of human health and the environment.

The general and site-specific comments were addressed in a response to the RSI submitted in September 1999 (SNL September 1999a). As specified in the subsequently approved SAP (SNL October 1999), DOE/NNSA and Sandia agreed to install a groundwater monitoring well. The SAP was approved by the NMED in January 2000 (NMED January 2000). Technical details for soil sampling procedures, soil sampling locations, laboratory analytical methods, and passive soil vapor sampling requirements at these sites were specified in a follow-up Field Implementation Plan (SNL November 2001), which was also approved by the NMED (February 2002). DOE/NNSA and Sandia were required to collect groundwater samples for a minimum of eight quarters and analyze the samples for VOCs, RCRA metals, and HE compounds.

Analytical results for these sampling events were included in a third RSI response and the CAC proposal submitted to the NMED (SNL June 2005). In September 2005, the NMED issued a NOD (NMED September 2005) requiring DOE/NNSA and Sandia to characterize an uninvestigated seepage pit associated with Building 9961 in accordance with the approved SAP (SNL October 1999). In January 2006, a response summarizing the results of the soil sampling was submitted (SNL January 2006), and the NMED then issued a Certificate of Completion for CAC (NMED March 2006).

In March 2006, a Class 3 Permit Modification Request was submitted to the NMED (SNL March 2006). In April 2010, the NMED responded to the Permit Modification Request with a letter requiring further corrective action at SWMU 154 (NMED April 2010) in the form of an additional eight quarters of groundwater monitoring at monitoring well CTF-MW2. In June 2010, a SAP for monitoring well CTF-MW2 was submitted (SNL June 2010), which the NMED approved (NMED December 2010).

Quarterly groundwater sampling resumed at monitoring well CTF-MW2 in CY 2011 (NMED April 2010). The eighth quarter of groundwater monitoring required by NMED was completed in December 2012. In October 2014, DOE and Sandia notified NMED that after 15 quarters, groundwater monitoring at SWMU 154 had been completed, and would be discontinued (SNL October 2014).

In this report, SWMU 154 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 Sandia. The voluntary inclusion of 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 (NMED April 2004).

13.3 Scope of Activities

Groundwater monitoring sampling and analysis during CY 2014 is summarized in Table 13-3. The analytical parameters for monitoring well CTF-MW2 for each sampling event are listed in Table 13-4.

Table 13-3. Sampling Dates and SAPs for Monitoring Well CTF-MW2 near SWMU 154, Calendar Year 2014

Date of Sampling Event	SAP
March 18, 2014	*SWMU 154 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2014* (SNL February 2014)
June 6, 2014	*SWMU 154 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2014* (SNL May 2014)
September 8, 2014	*SWMU 154 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2014* (SNL August 2014)

NOTES:
CTF = Coyote Test Field.
MW = Monitoring Well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

Table 13-4. Parameters Sampled at SWMU 154 for Each Sampling Event, Calendar Year 2014

Parameter	Sampling Period	
Anions Alkalinity Gamma Spec* Gross Alpha Gross Beta HE Compounds Isotopic Uranium NPN Perchlorate SVOCs TAL Metals, plus Total Uranium VOCs	**March 18, 2014** CTF-MW2 CTF-MW2 (dup) **September 8, 2014** CTF-MW2	**June 6, 2014** CTF-MW2

NOTES:
CTF = Coyote Test Field.
Dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
HE = High explosive.
MW = Monitoring well.
NPN = Nitrate plus nitrite (reported as nitrogen).
SVOC = Semivolatile organic compound.
TAL = Target Analyte List.
VOC = Volatile organic compound.
SWMU = Solid Waste Management Unit.

13.4 Field Methods and Measurements

According to the requirements of the Consent Order (NMED April 2004) addressing Section VII.D.6, and the NMED letter of April 8, 2010 (NMED April 2010), groundwater sampling was performed at SWMU 154. The CY 2014 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures for groundwater sampling activities, the SWMU 154 site-specific SAP (SNL June 2010), and Mini-SAPs (SNL February 2014, May 2014, and August 2014).

Environmental groundwater samples were collected from monitoring well CTF-MW2 in March, June, and September 2014. Samples were submitted to GEL Laboratories LLC for all analyses. Groundwater samples were analyzed for VOCs, SVOCs, HE compounds, NPN, major anions (i.e., bromide, chloride, fluoride, and sulfate), alkalinity, TAL metals plus uranium, perchlorate, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

The monitoring procedures are consistent with procedures identified in the EPA Technical Enforcement Guidance Document (EPA 1986) and are described in detail in Section 1.3.

13.5 Groundwater Elevation

Throughout CY 2014, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table elevations. The water level information was used to create the base-wide potentiometric surface map discussed in Section 2.6.2.2 and shown in Plate 1. The hydrograph for monitoring well CTF-MW2 is provided in Figure 13C-1 (Attachment 13C).

13.6 Analytical Methods

EPA and DOE analytical methods are discussed in Section 1.3.2. Parameters analyzed and sampling periods in CY 2014 are presented in Table 13-4.

13.7 Summary of Analytical Results

This section discusses analytical results, exceedances of standards, and field measurements for the CY 2014 SWMU 154 sampling events. Data are presented in Tables 13A-1 through 13A-11 (Attachment 13A). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA May 2009). A concentration trend plot for arsenic, which exceeded the MCL, is presented in Attachment 13B, Figure 13B-1. Data qualifiers are explained in the footnotes following Table 13A-11. Analytical reports, including certificates of analyses, analytical methods, method detection limits (MDLs), minimum detectable activity, critical level, practical quantitation limits, dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Customer Funded Record Center.

The analytical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure (AOP) 00-03 (SNL May 2011 and June 2014). No problems were identified with the analytical data that resulted in qualification of the data as unusable. The data are acceptable and reported QC measures are adequate.

No VOCs, SVOCs, or HE compounds were detected at concentrations exceeding established MCLs in any of the monitoring well CTF-MW2 groundwater samples. No SVOCs were reported above laboratory MDLs. Table 13A-1 summarizes detected VOCs, SVOCs, and HE compounds for monitoring well CTF-MW2 environmental groundwater samples (Attachment 13A). Table 13A-2 lists the MDLs for associated VOCs. Table 13A-3 lists the MDLs for associated SVOCs. The MDLs for HE compounds are presented in Table 13A-4. Detected compounds for the CY 2014 sampling events are summarized as follows:

- **March 2014 Sampling Event**—The HE compound hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) was detected in monitoring well CTF-MW2 environmental and duplicate environmental samples at concentrations of 0.267 and 0.340 micrograms per liter (µg/L), respectively.

- **June 2014 Sampling Event—**The HE compound RDX was detected at a concentration of 0.208 µg/L.

Table 13A-5 summarizes NPN results (Attachment 13A). NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the established MCL in monitoring well CTF-MW2 samples for CY 2014.

Table 13A-6 summarizes major anion (i.e., bromide, chloride, fluoride, and sulfate) and alkalinity results (Attachment 13A). No parameters were detected above established MCLs in monitoring well CTF-MW2 samples for CY 2014.

Table 13A-7 presents the perchlorate results (Attachment 13A). Currently, no MCL is established for perchlorate. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L in CY 2014 monitoring well CTF-MW2 samples.

Metal analysis includes two sets of analyses and results. Samples were collected as both filtered and unfiltered fractions. One sample was filtered, using an in-line disposable filter, to remove suspended solids. Unfiltered and filtered metal results are summarized in Tables 13A-8 and 13A-9, respectively (Attachment 13A). The only metal detected above established MCLs in monitoring well CTF-MW2 CY 2014 groundwater samples is arsenic, discussed as follows:

- **March 2014 Sampling Event**—Arsenic was detected above the MCL of 0.010 mg/L in both unfiltered and filtered environmental and duplicate environmental samples. Unfiltered arsenic was reported at concentrations of 0.0365 and 0.0355 mg/L, and filtered arsenic at 0.0365 and 0.0329 mg/L.

- **June 2014 Sampling Event—**Arsenic was detected above the MCL of 0.010 mg/L in both unfiltered and filtered groundwater samples. Unfiltered arsenic was reported at a concentration of 0.0341 mg/L, and filtered arsenic at 0.0261 mg/L.

- **September 2014 Sampling Event**—Arsenic was detected above the MCL of 0.010 mg/L in both unfiltered and filtered groundwater samples. Unfiltered arsenic was reported at a concentration of 0.0458 mg/L, and filtered arsenic at 0.0398 mg/L.

Arsenic concentrations in groundwater samples collected since March 2002 are plotted on Figure 13B-1 (Attachment 13B).

The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium analyses are presented in Table 13A-10 (Attachment 13A). Gross alpha activity is measured as a radiological screening tool and in accordance with 40 Code of Federal Regulations; Parts 9, 141, and 142; and Table I-4 should not include uranium. Naturally occurring uranium is measured independently (i.e., total uranium concentration determined by metal 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. All radionuclide activity results are below the MCLs, where established.

Table 13A-11 summarizes field water quality measurements collected prior to sampling (Attachment 13A). Field water quality measurements include turbidity, pH, temperature, specific conductance, oxidation-reduction potential, and dissolved oxygen.

13.8 Quality Control Results

Field and laboratory QC samples were prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. The results for each QC sample, and the impact on data quality for the SWMU 154 monitoring well CTF-MW2 quarterly sampling events, are discussed in the following sections.

13.8.1 Field Quality Control Samples

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

13.8.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed to estimate the overall reproducibility of the sampling and analytical process. Relative percent difference (RPD) calculations, between duplicate samples, were performed for detected chemical analytes. The March 2014 duplicate sample data results show good agreement (low RPD values less than or equal to 20 percent for organic compounds, and less than or equal to 35 for inorganic analyses) for all calculated parameters.

13.8.1.2 Equipment Blank Samples

EB (rinsate) samples were collected to verify the equipment decontamination process. The March 2014 EB, or rinsate, sample was collected prior to sampling monitoring well CTF-MW3 and submitted for all analyses. Bromodichloromethane, chloroform, copper, iron, lead, manganese, nickel, and sodium were detected above the laboratory MDLs. All metals listed were detected in the unfiltered metals sample. No metals were reported above the MDL in the filtered metals sample. With the exception of copper, no corrective action was necessary since analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CTF-MW2 environmental and environmental duplicate samples during data validation, since copper was reported in the EB sample at a concentration less than five times the associated environmental samples.

13.8.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analyses to assess whether contamination of the samples had occurred during shipment and storage. A total of four TB samples were submitted during CY 2014. Two TBs were submitted for the March 2014 sampling event and one sample each was submitted in June and September 2014. No VOCs were detected above the associated laboratory MDLs in any of the TB samples.

13.8.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions. The March 2014 FB sample from the monitoring well CTF-MW3 detected the VOCs bromodichloromethane and chloroform. No correction action was applied during data validation, because these compounds were not detected in the environmental samples. These compounds are common by-products of the deionization water purification process.

13.8.2 Laboratory Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with all groundwater samples. During the March 2014 sampling event, no significant data quality problems were noted during the data validation process. In June and September 2014 some analytical results were qualified as unusable during the data validation process; however, no significant data quality problems were noted for project COCs. All analytical data are acceptable and reported QC measures appear adequate.

13.9 Variances and Nonconformances

No variances or nonconformances from requirements in the SWMU 154 SAP (SNL June 2010) occurred during the CY 2014 sampling activities.

13.10 Summary and Conclusions

During CY 2014, three quarterly groundwater samples were collected from monitoring well CTF-MW2 (March, May, and September). The December 2014 sampling event was not conducted because in October 2014, DOE and Sandia notified NMED that the additional groundwater monitoring at SWMU 154 had been completed and would be discontinued (SNL October 2014). No further groundwater sampling will be conducted at monitoring well CTF-MW2 unless NMED requires additional sampling.

Analytical parameters included VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. Results were consistent with historical concentrations, were compared with MCL guidelines for drinking water (EPA May 2009), and are summarized as follows:

- **March 2014 Sampling Event**—No parameters were detected above established MCLs, except for arsenic. Arsenic exceeded the MCL of 0.010 mg/L in all monitoring well CTF-MW2 groundwater samples at concentrations ranging from 0.0365 to

0.0355 mg/L in unfiltered samples and ranging from 0.0365 to 0.0329 mg/L in filtered samples, respectively.

- **May 2014 Sampling Event**—No parameters were detected above established MCLs, except for arsenic. Arsenic exceeds the MCL of 0.010 mg/L in both unfiltered and filtered monitoring well CTF-MW2 groundwater samples at concentrations of 0.0341 mg/L, and 0.0261 mg/L, respectively.

- **September 2014 Sampling Event**—No parameters were detected above established MCLs, except for arsenic. Arsenic exceeded the MCL of 0.010 mg/L in both unfiltered and filtered monitoring well CTF-MW2 groundwater samples. Unfiltered arsenic was reported at a concentration of 0.0458 mg/L, and filtered arsenic at 0.0398 mg/L.

The elevated arsenic, trace gases, and helium isotope data all indicate that the groundwater source is deeply derived upwelling fluids. The current conceptual model described in Section 13.1.7 does not require modification based on the analytical results for this reporting period.

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Attachment 13A
Solid Waste Management Unit 154
Analytical Results Tables

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Attachment 13A Tables

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Table 13A-1
Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds, Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2 18-Mar-14	RDX	0.267	0.087	0.272	NE	J	J+	095579-024	SW846 8321A
CTF-MW2 (Duplicate) 18-Mar-14	RDX	0.340	0.086	0.269	NE		J+	095580-024	SW846 8321A
CTF-MW2 06-Jun-14	RDX	0.208	0.0865	0.270	NE	J		096045-024	SW846 8321A

Refer to footnotes on page 13A-23.

Table 13A-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260B), Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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	0.300–0.500	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	0.300–3.00
1,2-Dichloropropane	0.300	Methylene chloride	1.70–3.00
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	1.50	Tetrachloroethene	0.300
2-Butanone	2.00	Toluene	0.300
2-Hexanone	2.20	Trichloroethene	0.300
4-methyl-, 2-Pentanone	1.50	Trichlorofluoromethane	0.300
Acetone	2.50–3.00	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 13A-23.

Table 13A-3
Method Detection Limits for Semivolatile Organic Compounds (EPA Method[g] SW846-8270D), Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1'-Biphenyl 1	3.00–3.09	Butylbenzyl phthalate	3.00–3.09
1,4-Dioxane	3.00–3.09	Caprolactam	3.00–3.09
1,2,4-Trichlorobenzene	3.00–3.09	Carbazole	0.300–0.309
2,4,5-Trichlorophenol	3.00–3.09	Chrysene	0.300–0.309
2,4,6-Trichlorophenol	3.00–3.09	Di-n-butyl phthalate	3.00–3.09
2,4-Dichlorophenol	3.00–3.09	Di-n-octyl phthalate	3.00–3.09
2,4-Dimethylphenol	3.00–3.09	Dibenz[a,h]anthracene	0.300–0.309
2,4-Dinitrophenol	5.00–5.15	Dibenzofuran	3.00–3.09
2,4-Dinitrotoluene	3.00–3.09	Diethylphthalate	3.00–3.09
2,6-Dinitrotoluene	3.00–3.09	Dimethylphthalate	3.00–3.09
2-Chloronaphthalene	0.410–0.423	Dinitro-o-cresol	3.00–3.09
2-Chlorophenol	3.00–3.09	Diphenyl amine	3.00–3.09
2-Methylnaphthalene	0.300–0.309	Fluoranthene	0.300–0.309
2-Nitroaniline	3.00–3.09	Fluorene	0.300–0.309
2-Nitrophenol	3.00–3.09	Hexachlorobenzene	3.00–3.09
3,3'-Dichlorobenzidine	3.00–3.09	Hexachlorobutadiene	3.00–3.09
3-Nitroaniline	3.00–3.09	Hexachlorocyclopentadiene	3.00–3.09
4-Bromophenyl phenyl ether	3.00–3.09	Hexachloroethane	3.00–3.09
4-Chloro-3-methylphenol	3.00–3.09	Indeno(1,2,3-c,d)pyrene	0.300–0.309
4-Chlorobenzenamine	3.30–3.40	Isophorone	3.50–3.61
4-Chlorophenyl phenyl ether	3.00–3.09	Naphthalene	0.300–0.309
4-Nitroaniline	3.00–3.09	Nitro-benzene	3.00–3.09
4-Nitrophenol	3.00–3.09	Pentachlorophenol	3.00–3.09
Acenaphthene	0.300–0.309	Phenanthrene	0.300–0.309
Acenaphthylene	0.300–0.309	Phenol	3.00–3.09
Acetophenone	3.00–3.09	Pyrene	0.300–0.309
Anthracene	0.300–0.309	bis(2-Chloroethoxy)methane	3.00–3.09
Atrazine	3.00–3.09	bis(2-Chloroethyl)ether	3.00–3.09
Benzaldehyde	3.00–3.09	bis(2-Chloroisopropyl)ether	3.00–3.09
Benzo(a)anthracene	0.300–0.309	bis(2-Ethylhexyl)phthalate	3.00–3.09
Benzo(a)pyrene	0.300–0.309	m,p-Cresol	3.70–3.81
Benzo(b)fluoranthene	0.300–0.309	n-Nitrosodipropylamine	3.00–3.09
Benzo(ghi)perylene	0.300–0.309	o-Cresol	3.00–3.09
Benzo(k)fluoranthene	0.300–0.309		

Refer to footnotes on page 13A-23.

Table 13A-4
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0860–0.0870
1,3-Dinitrobenzene	0.0860–0.0870
2,4,6-Trinitrotoluene	0.0860–0.0870
2,4-Dinitrotoluene	0.0860–0.0870
2,6-Dinitrotoluene	0.0860–0.0870
2-Amino-4,6-dinitrotoluene	0.0860–0.0870
2-Nitrotoluene	0.0882–0.0891
3-Nitrotoluene	0.0860–0.0870
4-Amino-2,6-dinitrotoluene	0.0860–0.0870
4-Nitrotoluene	0.161– 0.163
HMX	0.0860–0.0870
Nitro-benzene	0.0860–0.0870
Pentaerythritol tetranitrate	0.108–0.109
RDX	0.0860–0.0870
Tetryl	0.0860–0.0870

Refer to footnotes on page 13A-23.

Table 13A-5
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2 18-Mar-14	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		095579-018	EPA 353.2
CTF-MW2 (Duplicate) 18-Mar-14	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		095580-018	EPA 353.2
CTF-MW2 06-Jun-14	Nitrate plus nitrite	ND	0.085	0.250	10.0	U		096045-018	EPA 353.2
CTF-MW2 08-Sep-14	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		096593-018	EPA 353.2

Refer to footnotes on page 13A-23.

Table 13A-6
Summary of Anion and Alkalinity Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Bicarbonate Alkalinity	1440	0.725	1.00	NE			095579-022	SM2320B
18-Mar-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095579-022	SM2320B
	Bromide	1.76	0.335	1.00	NE			095579-016	SW846 9056
	Chloride	468	3.35	10.0	NE			095579-016	SW846 9056
	Fluoride	2.42	0.033	0.100	4.0			095579-016	SW846 9056
	Sulfate	149	6.65	20.0	NE			095579-016	SW846 9056
CTF-MW2 (Duplicate)	Bicarbonate Alkalinity	1410	0.725	1.00	NE			095580-022	SM2320B
18-Mar-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095580-022	SM2320B
	Bromide	1.69	0.335	1.00	NE			095580-016	SW846 9056
	Chloride	460	3.35	10.0	NE			095582-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			095580-016	SW846 9056
	Sulfate	148	6.65	20.0	NE			095580-016	SW846 9056
CTF-MW2	Bicarbonate Alkalinity	1530	0.725	1.00	NE			096045-022	SM2320B
06-Jun-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096045-022	SM2320B
	Bromide	ND	0.067	0.200	NE	N, U		096045-016	SW846 9056
	Chloride	460	6.70	20.0	NE			096045-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			096045-016	SW846 9056
	Sulfate	158	13.3	40.0	NE			096045-016	SW846 9056
CTF-MW2	Bicarbonate Alkalinity	1540	0.725	1.00	NE		J	096593-022	SM2320B
08-Sep-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	096593-022	SM2320B
	Bromide	ND	0.067	0.200	NE	U		096593-016	SW846 9056
	Chloride	447	6.70	20.0	NE			096593-016	SW846 9056
	Fluoride	2.67	0.033	0.100	4.0			096593-016	SW846 9056
	Sulfate	153	13.3	40.0	NE			096593-016	SW846 9056

Refer to footnotes on page 13A-23.

Table 13A-7
Summary of Perchlorate Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2 18-Mar-14	ND	0.004	0.012	NE	U		095579-020	EPA 314.0
CTF-MW2 (Duplicate) 18-Mar-14	ND	0.004	0.012	NE	U		095580-020	EPA 314.0
CTF-MW2 06-Jun-14	ND	0.004	0.012	NE	U		096045-020	EPA 314.0
CTF-MW2 08-Sep-14	ND	0.004	0.012	NE	U		096593-020	EPA 314.0

Refer to footnotes on page 13A-23.

Table 13A-8
Summary of Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Aluminum	0.108	0.015	0.050	NE			095579-009	SW846 6020
18-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095579-009	SW846 6020
	Arsenic	**0.0365**	0.0017	0.005	0.010			095579-009	SW846 6020
	Barium	0.0768	0.0006	0.002	2.00	B		095579-009	SW846 6020
	Beryllium	0.00212	0.0002	0.0005	0.004			095579-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095579-009	SW846 6020
	Calcium	335	0.600	2.00	NE			095579-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095579-009	SW846 6020
	Cobalt	0.00871	0.0001	0.001	NE			095579-009	SW846 6020
	Copper	0.00121	0.00035	0.001	NE		0.0040UJ	095579-009	SW846 6020
	Iron	2.68	0.033	0.100	NE			095579-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095579-009	SW846 6020
	Magnesium	77.4	0.100	0.300	NE			095579-009	SW846 6020
	Manganese	2.85	0.050	0.250	NE		J	095579-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095579-009	SW846 7470
	Nickel	0.0179	0.0005	0.002	NE			095579-009	SW846 6020
	Potassium	43.6	0.080	0.300	NE			095579-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		095579-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095579-009	SW846 6020
	Sodium	465	4.00	12.5	NE			095579-009	SW846 6020
	Thallium	0.00154	0.00045	0.002	0.002	J		095579-009	SW846 6020
	Uranium	0.0257	0.000067	0.0002	0.03			095579-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095579-009	SW846 6010
	Zinc	0.230	0.0175	0.050	NE			095579-009	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-8 *(Continued)*
Summary of Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2 (Duplicate) 18-Mar-14	Aluminum	0.114	0.015	0.050	NE			095580-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		095580-009	SW846 6020
	Arsenic	**0.0355**	0.0017	0.005	0.010			095580-009	SW846 6020
	Barium	0.0825	0.0006	0.002	2.00	B		095580-009	SW846 6020
	Beryllium	0.00217	0.0002	0.0005	0.004			095580-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095580-009	SW846 6020
	Calcium	354	0.600	2.00	NE			095580-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095580-009	SW846 6020
	Cobalt	0.00872	0.0001	0.001	NE			095580-009	SW846 6020
	Copper	0.00139	0.00035	0.001	NE		0.0040UJ	095580-009	SW846 6020
	Iron	2.67	0.033	0.100	NE			095580-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095580-009	SW846 6020
	Magnesium	83.6	0.100	0.300	NE			095580-009	SW846 6020
	Manganese	2.84	0.050	0.250	NE		J	095580-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095580-009	SW846 7470
	Nickel	0.0171	0.0005	0.002	NE			095580-009	SW846 6020
	Potassium	42.4	0.080	0.300	NE			095580-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		095580-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095580-009	SW846 6020
	Sodium	475	4.00	12.5	NE			095580-009	SW846 6020
	Thallium	0.00131	0.00045	0.002	0.002	J		095580-009	SW846 6020
	Uranium	0.0254	0.000067	0.0002	0.03			095580-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095580-009	SW846 6010
	Zinc	0.227	0.0175	0.050	NE			095580-009	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-8 *(Continued)*
Summary of Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Aluminum	0.116	0.015	0.050	NE			096045-009	SW846 6020
06-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096045-009	SW846 6020
	Arsenic	**0.0341**	0.0017	0.005	0.010			096045-009	SW846 6020
	Barium	0.0797	0.0006	0.002	2.00			096045-009	SW846 6020
	Beryllium	0.00274	0.0002	0.0005	0.004			096045-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096045-009	SW846 6020
	Calcium	347	6.00	20.0	NE			096045-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096045-009	SW846 6020
	Cobalt	0.0091	0.0001	0.001	NE			096045-009	SW846 6020
	Copper	0.000987	0.00035	0.001	NE	J	J-	096045-009	SW846 6020
	Iron	2.14	0.033	0.100	NE			096045-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096045-009	SW846 6020
	Magnesium	73.7	1.00	3.00	NE			096045-009	SW846 6020
	Manganese	2.84	0.100	0.500	NE		J	096045-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096045-009	SW846 7470
	Nickel	0.0157	0.0005	0.002	NE		J-	096045-009	SW846 6020
	Potassium	47.9	0.080	0.300	NE		J	096045-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096045-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096045-009	SW846 6020
	Sodium	444	8.00	25.0	NE			096045-009	SW846 6020
	Thallium	0.0013	0.00045	0.002	0.002	J	2.5U	096045-009	SW846 6020
	Uranium	0.0258	0.000067	0.0002	0.03			096045-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096045-009	SW846 6010
	Zinc	0.104	0.0035	0.010	NE			096045-009	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-8 *(Concluded)*
Summary of Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Aluminum	0.189	0.015	0.050	NE			096593-009	SW846 6020
08-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096593-009	SW846 6020
	Arsenic	**0.0458**	0.0017	0.005	0.010			096593-009	SW846 6020
	Barium	0.0786	0.0006	0.002	2.00			096593-009	SW846 6020
	Beryllium	0.00263	0.0002	0.0005	0.004			096593-009	SW846 6020
	Cadmium	0.000143	0.00011	0.001	0.005	J		096593-009	SW846 6020
	Calcium	381	0.600	2.00	NE			096593-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096593-009	SW846 6020
	Cobalt	0.0105	0.0001	0.001	NE			096593-009	SW846 6020
	Copper	0.00082	0.00035	0.001	NE	J	J-	096593-009	SW846 6020
	Iron	2.65	0.033	0.100	NE			096593-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096593-009	SW846 6020
	Magnesium	83.3	0.100	0.300	NE			096593-009	SW846 6020
	Manganese	2.98	0.010	0.050	NE		J	096593-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	096593-009	SW846 7470
	Nickel	0.0167	0.0005	0.002	NE		J-	096593-009	SW846 6020
	Potassium	49.5	0.080	0.300	NE			096593-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096593-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096593-009	SW846 6020
	Sodium	485	0.800	2.50	NE			096593-009	SW846 6020
	Thallium	0.00117	0.00045	0.002	0.002	J		096593-009	SW846 6020
	Uranium	0.0261	0.000067	0.0002	0.03			096593-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096593-009	SW846 6010
	Zinc	0.0366	0.0035	0.010	NE			096593-009	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-9
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Aluminum	0.103	0.015	0.050	NE			095579-010	SW846 6020
18-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095579-010	SW846 6020
	Arsenic	**0.0365**	0.0017	0.005	0.010			095579-010	SW846 6020
	Barium	0.0813	0.0006	0.002	2.00	B		095579-010	SW846 6020
	Beryllium	0.00215	0.0002	0.0005	0.004			095579-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095579-010	SW846 6020
	Calcium	357	0.600	2.00	NE			095579-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095579-010	SW846 6020
	Cobalt	0.00892	0.0001	0.001	NE			095579-010	SW846 6020
	Copper	0.00108	0.00035	0.001	NE		J-	095579-010	SW846 6020
	Iron	2.71	0.033	0.100	NE			095579-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095579-010	SW846 6020
	Magnesium	84.4	0.100	0.300	NE			095579-010	SW846 6020
	Manganese	2.91	0.050	0.250	NE		J	095579-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095579-010	SW846 7470
	Nickel	0.018	0.0005	0.002	NE			095579-010	SW846 6020
	Potassium	43.3	0.080	0.300	NE			095579-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		095579-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095579-010	SW846 6020
	Sodium	518	4.00	12.5	NE			095579-010	SW846 6020
	Thallium	0.0014	0.00045	0.002	0.002	J		095579-010	SW846 6020
	Uranium	0.0264	0.000067	0.0002	0.03			095579-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095579-010	SW846 6010
	Zinc	0.221	0.0175	0.050	NE			095579-010	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-9 *(Continued)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2 (Duplicate)	Aluminum	0.104	0.015	0.050	NE			095580-010	SW846 6020
18-Mar-14	Antimony	ND	0.001	0.003	0.006	U		095580-010	SW846 6020
	Arsenic	**0.0329**	0.0017	0.005	0.010			095580-010	SW846 6020
	Barium	0.0814	0.0006	0.002	2.00	B		095580-010	SW846 6020
	Beryllium	0.00201	0.0002	0.0005	0.004			095580-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095580-010	SW846 6020
	Calcium	349	0.600	2.00	NE			095580-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		095580-010	SW846 6020
	Cobalt	0.00828	0.0001	0.001	NE			095580-010	SW846 6020
	Copper	0.00132	0.00035	0.001	NE		J-	095580-010	SW846 6020
	Iron	2.64	0.033	0.100	NE			095580-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		095580-010	SW846 6020
	Magnesium	84.6	0.100	0.300	NE			095580-010	SW846 6020
	Manganese	2.84	0.050	0.250	NE		J	095580-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095580-010	SW846 7470
	Nickel	0.0171	0.0005	0.002	NE			095580-010	SW846 6020
	Potassium	43.9	0.080	0.300	NE			095580-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		095580-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		095580-010	SW846 6020
	Sodium	498	4.00	12.5	NE			095580-010	SW846 6020
	Thallium	0.00128	0.00045	0.002	0.002	J		095580-010	SW846 6020
	Uranium	0.0248	0.000067	0.0002	0.03			095580-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		095580-010	SW846 6010
	Zinc	0.215	0.0175	0.050	NE			095580-010	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-9 *(Continued)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Aluminum	0.100	0.015	0.050	NE			096045-010	SW846 6020
06-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096045-010	SW846 6020
	Arsenic	**0.0261**	0.0017	0.005	0.010			096045-010	SW846 6020
	Barium	0.0782	0.0006	0.002	2.00			096045-010	SW846 6020
	Beryllium	0.00246	0.0002	0.0005	0.004			096045-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096045-010	SW846 6020
	Calcium	343	6.00	20.0	NE			096045-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096045-010	SW846 6020
	Cobalt	0.00867	0.0001	0.001	NE			096045-010	SW846 6020
	Copper	0.0551	0.00035	0.001	NE		J-	096045-010	SW846 6020
	Iron	1.97	0.033	0.100	NE			096045-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096045-010	SW846 6020
	Magnesium	72.8	1.00	3.00	NE			096045-010	SW846 6020
	Manganese	2.71	0.100	0.500	NE		J	096045-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096045-010	SW846 7470
	Nickel	0.017	0.0005	0.002	NE		J-	096045-010	SW846 6020
	Potassium	49.6	0.080	0.300	NE		J	096045-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096045-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096045-010	SW846 6020
	Sodium	433	8.00	25.0	NE			096045-010	SW846 6020
	Thallium	0.00131	0.00045	0.002	0.002	J		096045-010	SW846 6020
	Uranium	0.0123	0.000067	0.0002	0.03			096045-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096045-010	SW846 6010
	Zinc	0.832	0.0035	0.010	NE			096045-010	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-9 *(Concluded)*
Summary of Filtered Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Aluminum	0.161	0.015	0.050	NE			096593-010	SW846 6020
08-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096593-010	SW846 6020
	Arsenic	**0.0398**	0.0017	0.005	0.010			096593-010	SW846 6020
	Barium	0.075	0.0006	0.002	2.00			096593-010	SW846 6020
	Beryllium	0.00275	0.0002	0.0005	0.004			096593-010	SW846 6020
	Cadmium	0.000216	0.00011	0.001	0.005	J		096593-010	SW846 6020
	Calcium	367	0.600	2.00	NE			096593-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		096593-010	SW846 6020
	Cobalt	0.00958	0.0001	0.001	NE			096593-010	SW846 6020
	Copper	0.000999	0.00035	0.001	NE	J	J-	096593-010	SW846 6020
	Iron	2.39	0.033	0.100	NE			096593-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		096593-010	SW846 6020
	Magnesium	81.2	0.100	0.300	NE			096593-010	SW846 6020
	Manganese	2.84	0.010	0.050	NE		J	096593-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	096593-010	SW846 7470
	Nickel	0.0157	0.0005	0.002	NE		J-	096593-010	SW846 6020
	Potassium	47.7	0.080	0.300	NE			096593-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		096593-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		096593-010	SW846 6020
	Sodium	479	0.800	2.50	NE			096593-010	SW846 6020
	Thallium	0.00139	0.00045	0.002	0.002	J		096593-010	SW846 6020
	Uranium	0.0278	0.000067	0.0002	0.03			096593-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		096593-010	SW846 6010
	Zinc	0.055	0.0035	0.010	NE			096593-010	SW846 6020

Refer to footnotes on page 13A-23.

Table 13A-10
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Americium-241	2.46 ± 10.3	16.1	7.87	NE	U	BD	095579-033	EPA 901.1
18-Mar-14	Cesium-137	-1.43 ± 4.28	3.89	1.88	NE	U	BD	095579-033	EPA 901.1
	Cobalt-60	-1.53 ± 2.00	3.09	1.45	NE	U	BD	095579-033	EPA 901.1
	Potassium-40	39.4 ± 43.6	32.6	15.4	NE	X	R	095579-033	EPA 901.1
	Gross Alpha	6.99	NA	NA	15 pCi/L	NA	None	095579-034	EPA 900.0
	Gross Beta	65.2 ± 13.2	9.39	4.53	4mrem/yr			095579-034	EPA 900.0
	Uranium-233/234	57.2 ± 7.12	0.0701	0.0293	NE			095579-035	HASL 300
	Uranium-235/236	0.633 ± 0.139	0.0669	0.0264	NE			095579-035	HASL 300
	Uranium-238	8.38 ± 1.10	0.0655	0.027	NE			095579-035	HASL 300
CTF-MW2 (Duplicate)	Americium-241	4.19 ± 6.53	9.54	4.67	NE	U	BD	095580-033	EPA 901.1
18-Mar-14	Cesium-137	-2.25 ± 2.77	2.87	1.38	NE	U	BD	095580-033	EPA 901.1
	Cobalt-60	1.09 ± 1.70	3.05	1.44	NE	U	BD	095580-033	EPA 901.1
	Potassium-40	39.2 ± 41.7	27.1	12.7	NE	X	R	095580-033	EPA 901.1
	Gross Alpha	7.63	NA	NA	15 pCi/L	NA	None	095580-034	EPA 900.0
	Gross Beta	63.2 ± 12.9	9.32	4.49	4mrem/yr			095580-034	EPA 900.0
	Uranium-233/234	60.5 ± 8.55	0.105	0.0437	NE			095580-035	HASL 300
	Uranium-235/236	0.585 ± 0.159	0.0998	0.0393	NE			095580-035	HASL 300
	Uranium-238	8.69 ± 1.30	0.0977	0.0403	NE			095580-035	HASL 300
CTF-MW2	Americium-241	-0.726 ± 11.8	20.5	10.0	NE	U	BD	096045-033	EPA 901.1
06-Jun-14	Cesium-137	-0.0079 ± 1.77	3.19	1.52	NE	U	BD	096045-033	EPA 901.1
	Cobalt-60	-1.16 ± 3.22	3.55	1.66	NE	U	BD	096045-033	EPA 901.1
	Potassium-40	32.1 ± 44.4	32.0	14.8	NE	X	R	096045-033	EPA 901.1
	Gross Alpha	-6.64	NA	NA	15 pCi/L	NA	None	096045-034	EPA 900.0
	Gross Beta	56.6 ± 24.5	31.3	14.2	4mrem/yr		J	096045-034	EPA 900.0
	Uranium-233/234	56.9 ± 7.24	0.132	0.0589	NE			096045-035	HASL 300
	Uranium-235/236	0.566 ± 0.138	0.110	0.0466	NE			096045-035	HASL 300
	Uranium-238	8.77 ± 1.18	0.0739	0.030	NE			096045-035	HASL 300

Refer to footnotes on page 13A-23.

Table 13A-10 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

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]
CTF-MW2	Americium-241	6.64 ± 8.69	14.3	7.01	NE	U	BD	096593-033	EPA 901.1
08-Sep-14	Cesium-137	-0.151 ± 1.61	2.72	1.31	NE	U	BD	096593-033	EPA 901.1
	Cobalt-60	0.987 ± 1.84	3.23	1.54	NE	U	BD	096593-033	EPA 901.1
	Potassium-40	90.6 ± 40.7	24.8	11.6	NE			096593-033	EPA 901.1
	Gross Alpha	-7.72	NA	NA	15 pCi/L	NA	None	096593-034	EPA 900.0
	Gross Beta	53.2 ± 17.5	23.7	11.6	4mrem/yr		J	096593-034	EPA 900.0
	Uranium-233/234	62.1 ± 7.94	0.115	0.0504	NE			096593-035	EPA 900.0
	Uranium-235/236	0.761 ± 0.171	0.0846	0.0334	NE			096593-035	EPA 900.0
	Uranium-238	8.86 ± 1.20	0.0668	0.0262	NE			096593-035	HASL 300

Refer to footnotes on page 13A-23.

Table 13A-11
Summary of Field Water Quality Measurements[h],
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2014

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CTF-MW2	18-Mar-14	13.65	3299	-40.6	5.64	0.39	3.5	0.36
CTF-MW2	06-Jun-14	19.17	3195.0	35.2	5.86	0.86	0.9	0.09
CTF-MW2	08-Sep-14	17.83	3316.1	31.9	5.58	0.54	1.3	0.12

Refer to footnotes on page 13A-23.

Footnotes for Solid Waste Management Unit 154 Analytical Results Tables

%	= Percent.
CFR	= Code of Federal Regulations.
CTF	= Coyote Test Field.
EPA	= U.S. Environmental Protection Agency,
HMX	= Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	= Identification.
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

Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Parts 9, 141, and 142, Table 2A- 1-4).

Bold = Indicates the value exceed the established MCL.

ND = Not detected (at MDL).

Activities of zero or less are considered to be not detected.

[b]MDL or MDA

MDL applies to the data listed in Tables 13A-1 through 13A-9. MDA applies to Table 13A-10.

MDA = Minimum detectable activity. 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 13A-1 through 13A-9. MDA applies to Table 13A-10.

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. MCLs were established by the EPA Office of Water, National Primary Water Regulations (EPA May 2009).

The following are the MCLs for gross alpha particles and beta particles in community water systems:

- Gross alpha particle activity, excluding total uranium = 15 pCi/L (40 CFR Parts 9, 141, and 142, Table 2A-1-4).
- Beta and/or Gamma-emitting radionuclides (any combination) = 4 mrem/yr (as dose rate).

NE = Not established.

Footnotes for Solid Waste Management Unit 154 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 MDL.
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. Resampling and 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

Clesceri, Greenburg, and Eaton, 1998, Standard Methods for the Examination of Water and Wastewater, 20th ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

DOE, 1990, "Environmental Measurements Laboratory Procedures Manual," 27th ed., Vol. 1, Rev. 1992, HASL-300.

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

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.

DOE	= U.S. Department of Energy.
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 13B
Solid Waste Management Unit 154
Plots

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Attachment 13B Plots

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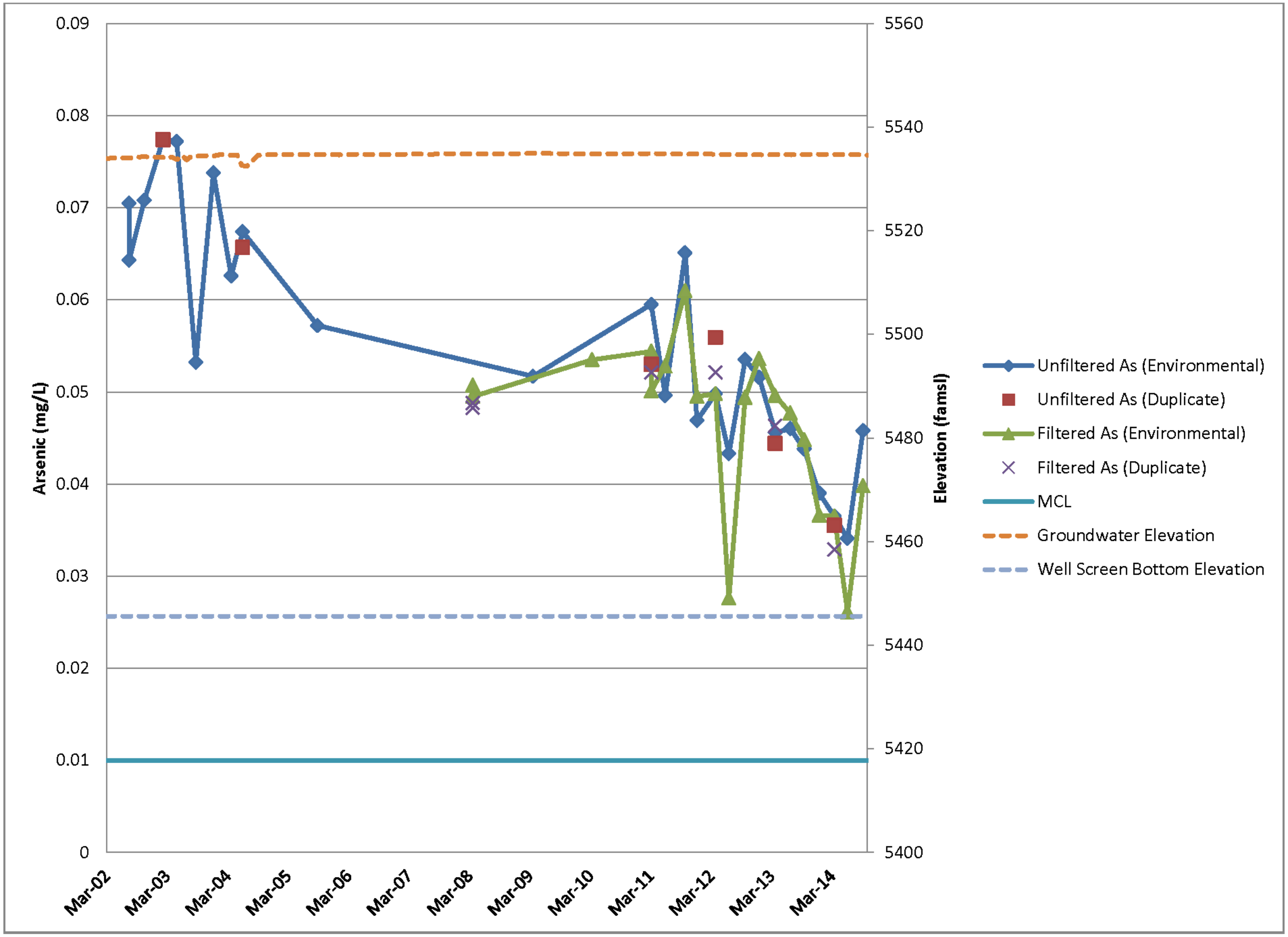

Figure 13B-1. Arsenic Concentrations, CTF-MW2

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Attachment 13C
Solid Waste Management Unit 154
Hydrographs

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Attachment 13C Hydrographs

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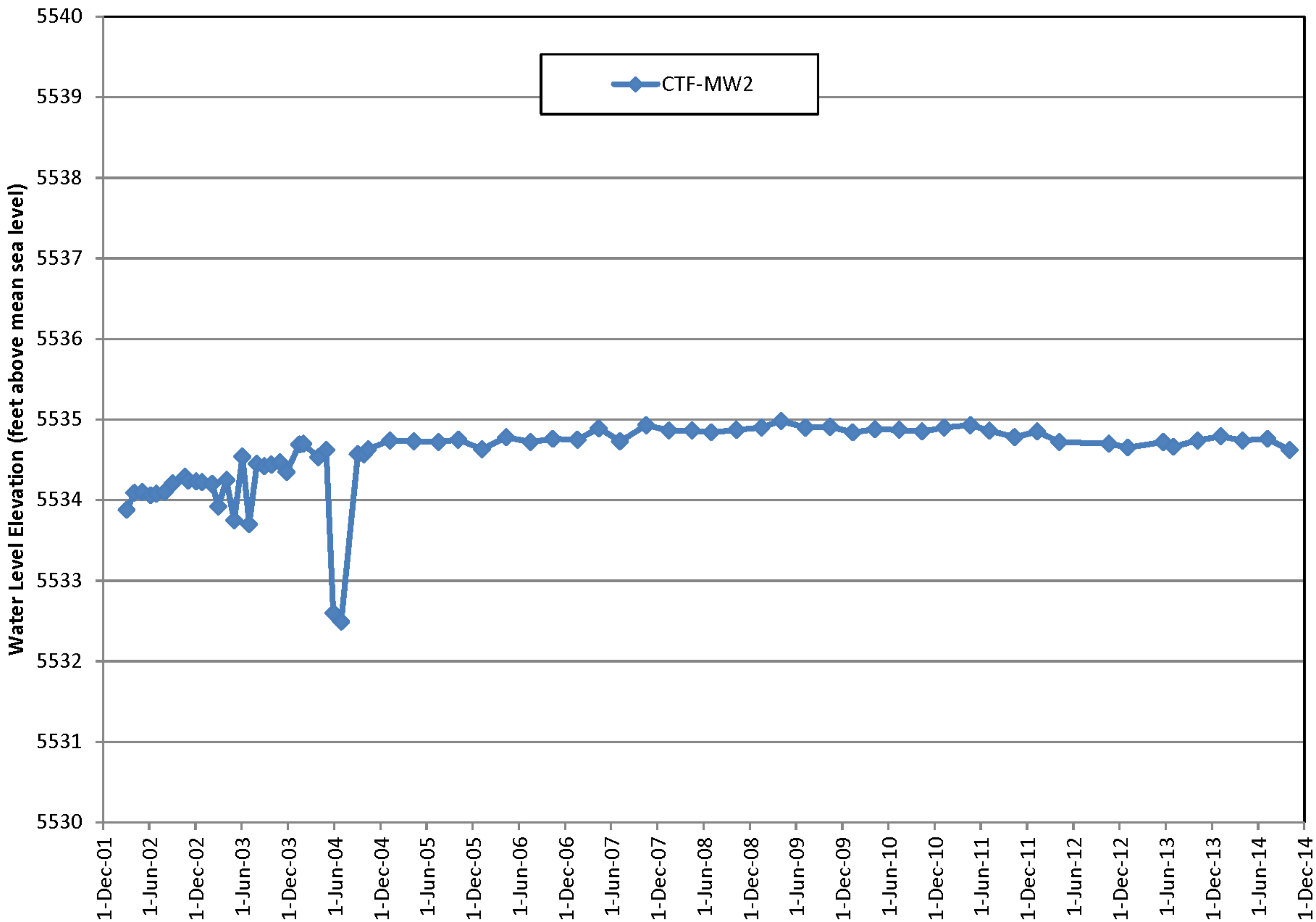

Figure 13C-1. Solid Waste Management Unit 154 Study Area Well

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Table 1. Inventory of Groundwater Monitoring and Production Wells Located at SNL/NM and Surrounding Areas

Well	Type	Measuring Point (feet amsl)	Ground Surface (feet amsl)	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	Santa Fe Group sediments	8-Jul-85	Aug-03
CWL-BW2	MW	5436.21	5434.3	490.0	980.0	4944.3	4454.3	980.0	5.6	CS/SS	Santa Fe Group sediments	17-Sep-85	2003
CWL-BW3	MW	5432.76	5431.6	485.0	505.0	4946.6	4926.6	507.5	4.8	PVC	Santa Fe Group sediments	22-Sep-88	12-Nov-12
CWL-BW4	MW	5427.67	5431.7	485.0	505.0	4946.7	4926.7	510.0	4.8	PVC	Santa Fe Group sediments	6-May-1994	Jan-97
CWL-BW4A	MW	5434.03	5431.84**	485.0	505.0	4946.8	4926.8	510.0	4.8	PVC	Santa Fe Group sediments	16-May-94	14-Apr-10
CWL-BW5	MW	5434.79	5432.2	500.0	520.0	4932.2	4912.2	525.0	4.8	PVC	Santa Fe Group sediments	11-May-10	
CWL-MW1	MW	5425.88	5423.7	535.0	575.0	4888.7	4848.7	610.0	2.1	SS	Santa Fe Group sediments	1-Sep-85	Sep-97
CWL-MW1A	MW	5424.16	5423.1	474.0	494.0	4949.1	4929.1	495.0	4.8	PVC	Santa Fe Group sediments	31-Jul-88	11-Nov-12
CWL-MW2	MW	5421.22	5419.1	520.0	650.0	4899.1	4769.1	650.0	2.1	SS	Santa Fe Group sediments	22-Sep-85	Sep-97
CWL-MW2A	MW	5421.25	5419.8	473.0	493.0	4946.8	4926.8	495.0	5.0	PVC	Santa Fe Group sediments	1-Aug-88	Jun-04
CWL-MW2BL	MW	5421.85	5420.1	532.5	552.5	4887.6	4867.6	557.5	4.8	PVC	Santa Fe Group sediments	5-Jun-94	10-Nov-12
CWL-MW2BU	MW	5421.88	5420.1	476.0	496.0	4944.1	4924.1	501.0	1.9	PVC	Santa Fe Group sediments	5-Jun-94	10-Nov-12
CWL-MW3	MW	5421.50	5419.5	525.0	565.0	4894.5	4854.5	615.0	2.1	SS	Santa Fe Group sediments	26-Sep-85	Sep-97
CWL-MW3A	MW	5420.45	5419.1	470.0	490.0	4949.1	4929.1	492.0	4.8	PVC/SS	Santa Fe Group sediments	11-Aug-88	10-Nov-12
CWL-MW4	MW	5423.00	5420.99**	478.0	498.0	4943.0	4923.0	503.0	3.8	PVC/SS	Santa Fe Group sediments	4-May-90	14-Apr-10
CWL-MW5L	MW	5418.47	5416.7	533.0	553.0	4883.7	4863.7	558.0	1.9	PVC	Santa Fe Group sediments	19-Apr-94	14-Apr-10
CWL-MW5U	MW	5418.68	5416.7	477.0	497.0	4939.7	4919.7	502.0	4.8	PVC	Santa Fe Group sediments	19-Apr-94	14-Apr-10
CWL-MW6L	MW	5419.80	5417.3	539.0	559.0	4878.3	4858.3	564.0	1.9	PVC	Santa Fe Group sediments	4-May-94	14-Apr-10
CWL-MW6U	MW	5419.45	5417.3	477.0	497.0	4940.3	4920.3	502.0	4.8	PVC	Santa Fe Group sediments	4-May-94	14-Apr-10
CWL-MW7	MW	5421.98	5419.9	618.0	638.0	4801.9	4781.9	643.0	4.8	PVC	Santa Fe Group sediments	20-Mar-03	12-Nov-12
CWL-MW8	MW	5421.71	5419.8	612.0	632.0	4807.8	4787.8	637.0	4.8	PVC	Santa Fe Group sediments	2-Apr-03	12-Nov-12
CWL-MW9	MW	5426.12	5423.5	495.0	515.0	4928.5	4908.5	520.0	4.8	PVC	Santa Fe Group sediments	13-May-10	
CWL-MW10	MW	5424.58	5422.2	493.0	513.0	4929.2	4909.2	518.0	4.8	PVC	Santa Fe Group sediments	27-May-10	
CWL-MW11	MW	5423.24	5420.8	491.0	511.0	4929.8	4909.8	516.0	4.8	PVC	Santa Fe Group sediments	27-May-10	
MRN-1	MW	5308.54	5306.4	546.7	586.7	4759.7	4719.7	606.7	4.8	SS	Santa Fe Group sediments	22-Jan-95	Aug-01
MRN-2	MW	5308.18	5306.2	410.0	440.0	4896.2	4866.2	450.0	3.7	PVC	Santa Fe Group sediments	28-Jan-95	
MRN-3D	MW	5309.34	5306.8	660.3	680.3	4646.5	4626.5	685.3	4.8	PVC	Santa Fe Group sediments	20-Jul-03	
SWTA-3	MW	5323.24	5321.6	407.2	427.2	4914.4	4894.4	432.2	4.8	PVC/SS	Santa Fe Group sediments	6-Sep-89	Apr-98
SWTA3-MW2	MW	5325.60	5323.2	455.0	475.0	4868.2	4848.2	480.0	4.8	PVC	Santa Fe Group sediments	7-May-02	
SWTA3-MW3	MW	5323.94	5321.4	619.0	639.0	4702.4	4682.4	659.4	4.8	PVC	Santa Fe Group sediments	20-Feb-04	
SWTA3-MW4	MW	5324.81	5322.3	430.0	450.0	4892.3	4872.3	460.0	4.7	PVC	Santa Fe Group sediments	26-Aug-05	
Lurance Canyon and 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)	1-Sep-11	
CCBA-MW2	MW	5939.28	5937.0	98.0	118.0	5839.0	5819.0	123.0	4.7	PVC	Bedrock (granite)	31-Aug-11	
CYN-MW1D	MW	6239.59	6236.7	372.0	382.0	5864.7	5854.7	392.0	5.1	CS	Bedrock (granitic gneiss)	22-Dec-97	15-Nov-02
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-97	15-Nov-02
CYN-MW3	MW	6313.26	6311.9	120.0	130.0	6191.9	6181.9	135.0	5.0	PVC	Bedrock (metamorphics)	18-Jun-99	
CYN-MW4	MW	6455.48	6454.7	260.0	280.0	6194.7	6174.7	290.0	5.0	PVC	Bedrock (quartzite)	18-Jun-99	
CYN-MW5	MW	5984.23	5981.3	135.0	155.0	5846.3	5826.3	160.0	5.0	PVC	Bedrock (quartzite)	15-Aug-01	
CYN-MW6	MW	6343.37	6340.5	141.5	161.3	6199.0	6179.2	161.7	5.0	PVC	Bedrock (metamorphics)	9-Dec-05	
CYN-MW7	MW	6216.35	6213.7	315.0	334.2	5898.7	5879.5	339.9	5.0	PVC	Bedrock (granitic gneiss)	6-Dec-05	
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-06	
CYN-MW9	MW	6360.67	6358.5	175.8	195.8	6182.7	6162.7	200.8	4.8	PVC	Bedrock (metamorphics)	27-Jul-10	
CYN-MW10	MW	6345.45	6342.8	150.4	170.4	6192.4	6172.4	175.4	4.8	PVC	Bedrock (metamorphics)	28-Jul-10	
CYN-MW11	MW	6374.41	6371.9	229.8	249.8	6142.1	6122.1	254.8	4.8	PVC	Bedrock (metamorphics)	29-Jul-10	
CYN-MW12	MW	6345.16	6342.9	252.5	272.5	6090.4	6070.4	277.5	4.8	PVC	Bedrock (metamorphics)	29-Jul-10	

Table 1. Inventory of Groundwater Monitoring and Production Wells Located at SNL/NM and Surrounding Areas *(Continued)*

Well	Type	Measuring Point (feet amsl)	Ground Surface (feet amsl)	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 Vicinity (Continued)													
CYN-MW13	MW	6237.79	6236.03	376.8	396.8	5859.2	5839.2	402.2	4.8	PVC	Bedrock (granitic gneiss)	5-Dec-2012	
CYN-MW14A	MW	6315.85	6313.46	263.6	293.6	6047.4	6017.4	298.6	4.8	PVC	Bedrock (metamorphics)	9-Dec-14	
CYN-MW15	MW	6344.44	6342.33	162.2	192.2	6178.8	6148.8	195.0	4.8	PVC	Bedrock (metamorphics)	8-Dec-14	
Burn Site Well	P	6374.52	6373.7**	231.0	341.0	6142.7	6032.7	341.0	4.0	PVC	Bedrock (schist and granite)	20-Feb-86	
Greystone-MW2	MW	5814.20	5811.4	60.0	80.0	5751.4	5731.4	85.0	4.8	PVC	Alluvium	25-Apr-02	
HERTF	P		6229.7	449.0*	500.0*	5780.7*	5729.7*	449.0?*	5.0	OH?	Bedrock (granite)	13-Jul-1990	Yes
TSA-1	P	6063.68	6060.2	190.0	210.0	5870.2	5850.2	300.0	6.0	CS	Bedrock (metamorphics)	10-Nov-87	Aug-01
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	Santa Fe Group sediments	1-Jul-89	24-Jan-08
MWL-BW2	MW	5391.02	5388.7	467.0	497.0	4921.7	4891.7	502.0	4.8	PVC	Santa Fe Group sediments	22-Jan-08	
MWL-MW1	MW	5384.21	5381.8	456.0	476.0	4925.8	4905.8	478.0	5.0	PVC/CS	Santa Fe Group sediments	1-Oct-88	Jul-08
MWL-MW2	MW	5379.93	5378.4	452.0	472.0	4926.4	4906.4	477.0	5.0	PVC/SS	Santa Fe Group sediments	1-Aug-89	Jul-08
MWL-MW3	MW	5383.99	5381.7	451.3	471.3	4930.4	4910.4	476.3	4.8	PVC/SS	Santa Fe Group sediments	22-Aug-89	Jul-08
MWL-MW4	MW	5391.70	5390.2	488.4	508.4	4901.8	4881.8	553.9	4.8	PVC	Santa Fe Group sediments	10-Feb-93	
MWL-MW5	MW	5382.56	5380.4	496.5	516.5	4883.9	4863.9	521.5	4.8	PVC	Santa Fe Group sediments	19-Nov-00	
MWL-MW6	MW	5375.31	5372.7	505.5	525.5	4867.2	4847.2	505.5	4.8	PVC	Santa Fe Group sediments	19-Oct-00	
MWL-MW7	MW	5383.30	5380.9	464.7	494.0	4916.2	4886.9	498.8	4.8	PVC	Santa Fe Group sediments	24-Jun-08	
MWL-MW8	MW	5384.67	5382.4	465.0	495.0	4917.4	4887.4	500.0	4.8	PVC	Santa Fe Group sediments	26-Jun-08	
MWL-MW9	MW	5381.91	5379.3	465.0	495.0	4914.3	4884.3	500.0	4.8	PVC	Santa Fe Group sediments	30-Jun-08	
NWTA3-MW1	MW	5336.48	5332.9	434.9	454.9	4898.0	4878.0	460.4	4.8	PVC	Santa Fe Group sediments	20-Sep-89	12-Sep-02
NWTA3-MW2	MW	5337.49	5335.5	455.0	475.0	4880.5	4860.5	505.0	4.8	PVC	Santa Fe Group sediments	25-Aug-00	
NWTA3-MW3D	MW	5340.80	5335.7	654.4	674.4	4681.3	4661.3	679.4	4.8	PVC	Santa Fe Group sediments	9-Jul-03	
PL-1	MW	5334.99	5333.4	440.0	470.0	4893.4	4863.4	480.0	2.0	PVC	Santa Fe Group sediments	28-Oct-94	12-Sep-09
PL-2	MW	5336.01	5333.0	577.0	597.0	4756.0	4736.0	617.0	4.8	SS	Santa Fe Group sediments	18-Nov-94	
PL-3	MW	5334.64	5332.8	445.0	465.0	4887.8	4867.8	475.0	3.8	PVC	Santa Fe Group sediments	4-Dec-94	12-Sep-09
PL-4	MW	5334.98	5332.7	464.0	494.0	4868.7	4838.7	499.0	4.8	PVC	Santa Fe Group sediments	28-Sep-09	
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-11	
OBS-MW2	MW	5863.16	5860.8	234.0	254.0	5626.8	5606.8	259.0	4.7	PVC	Bedrock (granite)	30-Aug-11	
OBS-MW3	MW	5865.50	5863.3	190.0	210.0	5673.3	5653.3	215.0	4.7	PVC	Bedrock (granite)	30-Aug-11	
CTF-MW1	MW	6082.63	6079.7	240.0	260.0	5839.7	5819.7	265.0	5.0	PVC	Bedrock (granite)	16-Aug-01	
CTF-MW2	MW	5578.60	5575.6	110.0	130.0	5465.6	5445.6	135.0	5.0	PVC	Bedrock (granite)	18-Aug-01	
CTF-MW3	MW	5522.82	5519.8	340.0	360.0	5179.8	5159.8	365.0	5.0	PVC	Bedrock (granite)	21-Aug-01	
LMF-1	MW	5628.60	5626.5	310.0	350.0	5316.5	5276.5	360.0	4.1	PVC	Bedrock (limestone)	11-Aug-95	15-Jan-98
School House Well	MW	5796.33	5799.0	103.0*	107.0*	5696.0*	5692.0*	103.0*	6.0	CS	Bedrock (Sandia Formation)		
SFR-1D	MW	5399.13	5396.9	348.0	368.0	5048.9	5028.9	378.0	3.8	PVC	Santa Fe Group sediments	6-Aug-92	
SFR-1S	MW	5399.16	5396.9	152.0	172.0	5244.9	5224.9	182.0	1.9	PVC	Santa Fe Group sediments	8-Aug-92	
SFR-2S	MW	5432.77	5430.3	97.0	117.0	5333.3	5313.3	122.0	3.8	PVC	Santa Fe Group sediments	20-Aug-92	
SFR-3D	MW	5497.94	5496.1	311.5	351.5	5184.6	5144.6	361.5	1.9	PVC	Santa Fe Group sediments	5-Nov-92	
SFR-3P	MW	5499.63	5497.2	175.0	195.0	5322.2	5302.2	205.0	3.8	PVC	Santa Fe Group sediments	12-Jul-93	
SFR-3S	MW	5498.24	5496.1	182.0	212.0	5314.1	5284.1	222.0	1.9	PVC	Santa Fe Group sediments	10-Nov-92	
SFR-3T	MW	5498.66	5496.9	713.0	733.0	4783.9	4763.9	753.0	5.4	SS	Bedrock (sandstone)	23-Sep-93	
SFR-4P	MW	5573.33	5571.3	344.0	354.0	5227.3	5217.3	364.0	1.9	PVC	Bedrock (sandstone)	29-Jul-93	
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-93	
STW-1	MW	5535.53	5533.3	149.8	169.8	5383.5	5363.5	179.8	4.3	PVC	Santa Fe Group sediments	18-Jun-95	23-Sep-97
TRE-1	MW	5497.25	5495.2	255.0	295.0	5240.2	5200.2	305.0	4.3	PVC	Santa Fe Group sediments	31-Jul-95	

Table 1. Inventory of Groundwater Monitoring and Production Wells Located at SNL/NM and Surrounding Areas *(Continued)*

Well	Type	Measuring Point (feet amsl)	Ground Surface (feet amsl)	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 (Continued)													
TRE-2	MW	5497.20	5495.2	150.0	170.0	5345.2	5325.2	190.0	2.0	PVC	Santa Fe Group sediments	31-Jul-95	
TRN-1	MW	5735.62	5733.6	320.0	340.0	5413.6	5393.6	350.0	3.8	PVC	Bedrock (sandstone)	12-Oct-94	
TRS-1	MW	5780.18	5777.5	134.0*	500.0*	5643.5*	5277.5*	134.0	6.4	OH	Bedrock (limestone)	4-Sep-94	converted
TRS-1D	MW	5779.80	5777.5	266.4	306.4	5511.1	5471.1	316.4	1.9	PVC	Bedrock (limestone)	6-Sep-95	
TRS-1S	MW	5780.07	5777.5	164.0	204.0	5613.5	5573.5	214.8	1.9	PVC	Bedrock (limestone)	6-Sep-95	
TRS-2	MW	5780.76	5778.3	165.0	205.0	5613.3	5573.3	210.0	4.5	CS	Bedrock (limestone)	9-Sep-95	
Tijeras Arroyo Groundwater													
TA1-W-01	MW	5403.82	5401.8	575.0	595.0	4826.8	4806.8	600.0	4.8	PVC	Santa Fe Group sediments	22-Mar-97	
TA1-W-02	MW	5416.62	5416.9	540.0	560.0	4876.9	4856.9	565.6	5.0	PVC	Santa Fe Group sediments	27-Feb-98	
TA1-W-03	MW	5457.03	5454.9	337.0	357.0	5117.9	5097.9	362.6	5.0	PVC	Santa Fe Group sediments	27-Jan-98	
TA1-W-04	MW	5460.98	5458.3	576.0	596.0	4882.3	4862.3	601.7	5.0	PVC	Santa Fe Group sediments	6-Oct-98	
TA1-W-05	MW	5433.84	5434.2	597.5	617.5	4836.7	4816.7	623.2	5.0	PVC	Santa Fe Group sediments	16-Nov-98	
TA1-W-06	MW	5417.10	5417.4	300.0	320.0	5117.4	5097.4	325.6	5.0	PVC	Santa Fe Group sediments	27-Feb-98	
TA1-W-07	MW	5404.92	5402.8	268.6	288.6	5134.2	5114.2	289.1	5.0	PVC	Santa Fe Group sediments	13-Aug-98	
TA1-W-08	MW	5434.19	5434.7	302.0	322.0	5132.7	5112.7	327.0	4.5	PVC	Santa Fe Group sediments	3-Aug-01	
TA2-NW1-325	MW	5421.94	5420.0	295.0	325.0	5125.0	5095.0	330.3	4.8	PVC	Santa Fe Group sediments	1-Apr-93	
TA2-NW1-595	MW	5421.26	5420.0	535.0	555.0	4885.0	4865.0	598.0	4.8	PVC	Santa Fe Group sediments	27-Jul-93	
TA2-SW1-320	MW	5411.85	5410.1	299.6	319.6	5110.5	5090.5	324.6	3.8	PVC	Santa Fe Group sediments	30-Nov-92	12-Dec-14
TA2-W-01	MW	5419.99	5417.4	312.0	332.0	5105.4	5085.4	332.0	4.8	PVC	Santa Fe Group sediments	27-Jun-94	
TA2-W-19	MW	5351.21	5349.0	265.9	285.9	5083.1	5063.1	285.9	4.8	PVC	Santa Fe Group sediments	9-Nov-95	
TA2-W-24	MW	5363.66	5361.8	465.0	485.0	4896.8	4876.8	490.6	5.0	PVC	Santa Fe Group sediments	9-Feb-98	
TA2-W-25	MW	5374.86	5372.5	492.0	512.0	4880.5	4860.5	517.8	4.8	PVC	Santa Fe Group sediments	1-Apr-97	
TA2-W-26	MW	5375.77	5373.8	276.0	296.0	5097.8	5077.8	301.6	5.0	PVC	Santa Fe Group sediments	19-Jan-98	
TA2-W-27	MW	5362.85	5360.8	275.0	295.0	5085.8	5065.8	300.6	5.0	PVC	Santa Fe Group sediments	9-Feb-98	
TA2-W-28	MW	5412.41	5409.99	310.5	330.5	5099.5	5079.5	335.45	4.8	PVC	Santa Fe Group sediments	5-Dec-14	
TJA-2	MW	5353.20	5351.3	275.0	295.0	5076.3	5056.3	305.0	3.8	PVC	Santa Fe Group sediments	12-Jul-94	
TJA-3	MW	5390.56	5387.8	496.0	516.0	4891.8	4871.8	521.7	5.0	PVC	Santa Fe Group sediments	31-Aug-98	
TJA-4	MW	5341.16	5338.5	360.0	380.0	4978.5	4958.5	385.7	5.0	PVC	Santa Fe Group sediments	4-Aug-98	
TJA-5	MW	5341.33	5338.5	267.0	287.0	5071.5	5051.5	292.7	5.0	PVC	Santa Fe Group sediments	7-Aug-98	
TJA-6	MW	5343.16	5340.6	454.9	474.9	4885.7	4865.7	480.7	5.0	PVC	Santa Fe Group sediments	4-Feb-01	
TJA-7	MW	5391.27	5388.4	290.5	310.5	5097.9	5077.9	316.3	5.0	PVC	Santa Fe Group sediments	7-Mar-01	
WYO-1	MW	5392.50	5390.4	510.0	560.0	4880.4	4830.4	570.0	4.3	PVC	Santa Fe Group sediments	27-Aug-95	Jul-01
WYO-2	MW	5392.50	5390.4	265.0	285.0	5125.4	5105.4	295.0	2.0	PVC	Santa Fe Group sediments	27-Aug-95	Jul-01
WYO-3	MW	5392.09	5390.0	520.0	540.0	4870.0	4850.0	545.0	4.5	PVC	Santa Fe Group sediments	31-Jul-01	
WYO-4	MW	5392.57	5390.2	275.0	295.0	5115.2	5095.2	300.0	4.5	PVC	Santa Fe Group sediments	22-Jul-01	
EUBANK-1	MW	5460.02	5458.1	550.0	610.0	4908.1	4848.1	615.0	4.0	SS	Santa Fe Group sediments	16-Jul-88	
PGS-1	MW	5407.41	5407.9	503.0	513.0	4904.9	4894.9	538.0	5.0	SS	Santa Fe Group sediments	9-Aug-94	Apr-98
PGS-2	MW	5408.29	5407.9	535.0	565.0	4872.9	4842.9	655.0	5.0	SS	Santa Fe Group sediments	22-Sep-95	
Technical Area V													
AVN-1	MW	5443.00	5440.2	570.0	590.0	4870.2	4850.2	600.0	5.0	SS	Santa Fe Group sediments	23-May-95	
AVN-2	MW	5442.39	5440.6	495.0	515.0	4945.6	4925.6	520.0	3.8	PVC	Santa Fe Group sediments	5-Jun-95	
TAV-MW1	MW	5437.81	5435.2	489.5	509.5	4945.7	4925.7	509.5	5.0	PVC	Santa Fe Group sediments	28-Feb-95	5-Feb-08
TAV-MW2	MW	5427.33	5424.3	497.0	513.5	4927.3	4910.8	513.5	4.8	PVC	Santa Fe Group sediments	30-Mar-95	
TAV-MW3	MW	5464.26	5461.6	532.0	552.0	4929.6	4909.6	557.7	4.8	PVC	Santa Fe Group sediments	11-Apr-97	
TAV-MW4	MW	5427.89	5425.4	495.0	515.0	4930.4	4910.4	520.7	4.8	PVC	Santa Fe Group sediments	18-Apr-97	
TAV-MW5	MW	5408.71	5406.6	487.0	507.0	4919.6	4899.6	512.7	4.8	PVC	Santa Fe Group sediments	26-Apr-97	

Table 1. **Inventory of Groundwater Monitoring and Production Wells Located at SNL/NM and Surrounding Areas** *(Continued)*

Well	Type	Measuring Point (feet amsl)	Ground Surface (feet amsl)	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-MW6	MW	5431.17	5431.5**	507.0	527.0	4924.5	4904.5	532.0	4.8	PVC	Santa Fe Group sediments	24-Apr-01	
TAV-MW7	MW	5430.40	5430.9**	597.0	617.0	4833.9	4813.9	622.0	4.8	PVC	Santa Fe Group sediments	6-Apr-01	
TAV-MW8	MW	5417.00	5417.4**	491.0	511.0	4926.4	4906.4	516.0	4.8	PVC	Santa Fe Group sediments	11-Apr-01	
TAV-MW9	MW	5416.27	5416.9**	582.0	602.0	4834.9	4814.9	607.0	4.8	PVC	Santa Fe Group sediments	17-Mar-01	
TAV-MW10	MW	5437.03	5434.7	508.0	528.0	4926.7	4906.7	533.0	4.8	PVC	Santa Fe Group sediments	6-Feb-08	
TAV-MW11	MW	5440.12	5440.4**	512.0	532.0	4928.4	4908.4	537.0	4.8	PVC	Santa Fe Group sediments	19-Nov-10	
TAV-MW12	MW	5435.72	5432.9	507.0	527.0	4925.9	4905.9	532.0	4.8	PVC	Santa Fe Group sediments	16-Nov-10	
TAV-MW13	MW	5409.02	5406.0	525.0	545.0	4881.0	4861.0	550.0	4.8	PVC	Santa Fe Group sediments	12-Nov-10	
TAV-MW14	MW	5441.52	5438.6	512.0	532.0	4926.6	4906.6	538.0	4.8	PVC	Santa Fe Group sediments	9-Nov-10	
LWDS-MW1	MW	5423.83	5424.5**	495.0	515.0	4929.5	4909.5	520.3	3.9	PVC	Santa Fe Group sediments	3-May-93	
LWDS-MW2	MW	5412.41	5411.5	506.0	526.0	4905.5	4885.5	531.0	3.9	PVC	Santa Fe Group sediments	30-Oct-92	
Albuquerque Bernalillo County Water Utility Authority													
MESA DEL SOL - S	MW	5302.67	5302.7	420.0	520.0	4882.7	4782.7	525.0	2.2	PVC	Santa Fe Group sediments	14-May-97	
MONTESSA PARK - S	MW	5102.67	5102.7	260.0	320.0	4842.7	4782.7	330.0	2.2	PVC	Santa Fe Group sediments	10-Sep-97	
YALE-MW9	MW	5271.06		382.0	422.0			427.0	4.0	PVC	Santa Fe Group sediments	19-May-97	
EUBANK-2	MW	5474.39		552.0	592.0			597.0	4.0	PVC	Santa Fe Group sediments	15-Nov-96	
EUBANK-3	MW	5498.73		590.0	650.0			655.0	4.0	PVC	Santa Fe Group sediments	15-Nov-96	
EUBANK-5	MW	5507.40		605.0	665.0			670.0	4.0	PVC	Santa Fe Group sediments	15-Nov-96	
Kirtland Air Force Base													
EOD Well	MW	5829.70	5828.7	206.0*	247.0*	5622.7*	5581.7*	206.0*	6.0	OH	Bedrock (granite)	1970?	
KAFB-0118	MW	5320.69	5321.2	458.0	488.0	4863.2	4833.2	499.6	5.0	PVC	Santa Fe Group sediments		
KAFB-0119	MW	5315.76	5315.6	452.3	482.3	4863.3	4833.3	482.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0120	MW	5292.29	5288.7	429.0	459.0	4859.7	4829.7	461.5	4.0	PVC	Santa Fe Group sediments	12-Jun-06	
KAFB-0121	MW	5307.60	5305.0	445.8	475.8	4859.2	4829.2	480.8	4.0	PVC	Santa Fe Group sediments	24-Nov-06	
KAFB-0213	MW	5282.00	5297.3	378.0	428.0	4919.3	4869.3	438.0		PVC	Santa Fe Group sediments	10-Jan-84	
KAFB-0219	MW	5263.69	5262.7	396.0	426.0	4866.7	4836.7	428.5	4.0	PVC	Santa Fe Group sediments	8-Jun-06	
KAFB-0220	MW	5265.10	5262.5	424.0	454.0	4838.5	4808.5	456.0	4.0	PVC/SS	Santa Fe Group sediments	15-Jul-06	
KAFB-0307	MW	5364.53	5362.7	405.0	450.0	4957.7	4912.7	460.0	3.8	PVC	Santa Fe Group sediments	4-Aug-91	
KAFB-0308	MW	5381.65	5380.7	463.0	488.0	4917.7	4892.7	498.0	3.8	PVC	Santa Fe Group sediments	31-Jul-91	
KAFB-0310	MW	5416.48	5413.2	400.0	445.0	5013.2	4968.2	455.0	3.8	PVC	Santa Fe Group sediments	27-Aug-91	
KAFB-0311	MW	5353.29	5351.7	433.0	458.0	4918.7	4893.7	468.0	3.8	PVC	Santa Fe Group sediments	24-Jul-92	
KAFB-0312	MW	5432.17	5430.2	503.0	528.0	4927.2	4902.2	533.0	4.5	PVC	Santa Fe Group sediments	26-Aug-98	
KAFB-0313	MW	5418.98	5416.9	348.0	368.0	5068.9	5048.9	373.0	4.5	PVC	Santa Fe Group sediments	13-Aug-98	
KAFB-0314	MW	5455.75	5453.9	428.0	448.0	5025.9	5005.9	453.0	4.5	PVC	Santa Fe Group sediments	30-Sep-98	
KAFB-0315	MW	5466.11	5464.1	447.0	472.0	5017.1	4992.1	477.0	4.5	PVC	Santa Fe Group sediments	8-Sep-00	
KAFB-0417	MW	5313.07	5310.0	430.0	455.0	4880.0	4855.0	465.0	3.8	PVC	Santa Fe Group sediments	6-Jun-92	
KAFB-0505	MW	5362.81	5360.8	495.4	520.5	4865.4	4840.3	521.3	4.5	PVC	Santa Fe Group sediments	22-Jul-99	
KAFB-0506	MW	5363.47	5361.0	200.0	220.0	5161.0	5141.0	220.0	4.5	PVC	Santa Fe Group sediments	31-Aug-98	
KAFB-0507	MW	5358.82	5355.7	482.3	507.3	4873.4	4848.4	512.3	3.5	PVC	Santa Fe Group sediments	21-Feb-01	
KAFB-0508	MW	5351.88	5349.7	481.0	506.0	4868.7	4843.7	507.0	3.5	PVC	Santa Fe Group sediments	2-May-01	
KAFB-0510	MW	5367.10	5364.7	511.0	536.0	4853.7	4828.7	537.0	3.5	PVC	Santa Fe Group sediments	17-May-01	
KAFB-0512	MW	5304.07	5301.1	424.0	449.0	4877.1	4852.1	450.0	3.5	PVC	Santa Fe Group sediments	25-Apr-01	
KAFB-0514	MW	5206.41	5204.5	340.0	365.0	4864.5	4839.5	366.0	3.5	PVC	Santa Fe Group sediments	18-May-01	
KAFB-0517	MW	5197.10	5194.6	325.0	350.0	4869.6	4844.6	352.0	4.0	PVC	Santa Fe Group sediments	8-Nov-02	

Table 1. Inventory of Groundwater Monitoring and Production Wells Located at SNL/NM and Surrounding Areas *(Continued)*

Well	Type	Measuring Point (feet amsl)	Ground Surface (feet amsl)	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-0518	MW	5177.76	5175.5	305.0	335.0	4870.5	4840.5	337.0	4.0	PVC	Santa Fe Group sediments	22-Dec-02	
KAFB-0520	MW	5247.90	5246.2	379.5	404.5	4866.7	4841.7	410.0	4.0	PVC	Santa Fe Group sediments	15-Jun-04	
KAFB-0522	MW	5267.48	5265.7	405.0	430.0	4860.7	4835.7	432.5	4.0	PVC	Santa Fe Group sediments	23-Jun-04	
KAFB-0523	MW	5352.62	5350.5	600.0	625.0	4750.5	4725.5	627.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0524	MW	5345.61	5343.4	484.0	509.0	4859.4	4834.4	511.0	4.0	PVC	Santa Fe Group sediments	31-Oct-06	
KAFB-0525	MW	5229.75	5227.9	371.0	396.0	4856.9	4831.9	398.0	4.0	PVC	Santa Fe Group sediments	19-Nov-06	
KAFB-0608	MW	5361.17	5359.9	307.0	327.0	5052.9	5032.9	338.0	4.0	PVC	Santa Fe Group sediments	28-Mar-90	
KAFB-0611	MW	5386.09	5383.5	498.0	508.0	4885.5	4875.5	513.0	4.0	PVC	Santa Fe Group sediments	13-Nov-02	
KAFB-0612	MW	5385.45	5383.5	290.0	315.0	5093.5	5068.5	317.0	4.0	PVC	Santa Fe Group sediments	21-Nov-02	
KAFB-0613	MW	5390.78	5391.3	420.0	450.0	4971.3	4941.3	452.0	4.0	PVC	Santa Fe Group sediments	8-Dec-02	
KAFB-0614	MW	5390.89	5391.4	360.0	370.0	5031.4	5021.4	372.0	4.0	PVC	Santa Fe Group sediments	12-Dec-02	
KAFB-0615	MW	5638.43	5636.3	300.0	325.0	5336.3	5311.3	327.0	4.0	PVC	Bedrock (granite)	27-Nov-02	
KAFB-0616	MW	5481.07	5478.7	472.0	497.0	5006.7	4981.7	499.0	4.0	PVC	Santa Fe Group sediments	24-Nov-02	
KAFB-0617	MW	5505.78	5503.3	565.0	590.0	4938.3	4913.3	592.0	4.0	PVC	Santa Fe Group sediments	18-May-04	
KAFB-0618	MW	5410.05	5408.2	535.0	560.0	4873.2	4848.2	562.0	4.0	PVC	Santa Fe Group sediments	15-Jun-04	
KAFB-0619	MW	5410.78	5409.0	389.0	404.0	5020.0	5005.0	406.0	4.0	PVC	Santa Fe Group sediments	4-Jun-04	
KAFB-0620	MW	5334.64	5332.0	447.0	472.0	4885.0	4860.0	474.5	4.0	PVC	Santa Fe Group sediments	18-Jun-04	
KAFB-0621	MW	5569.89	5568.0	624.0	649.0	4944.0	4919.0	650.0	4.0	PVC	Santa Fe Group sediments	17-Jun-04	
KAFB-0622	MW	5488.64	5486.2	529.0	554.0	4957.2	4932.2	555.0	4.0	PVC	Santa Fe Group sediments	25-Jun-04	
KAFB-0623	MW	5328.94	5327.0	265.0	290.0	5062.0	5037.0	292.5	4.0	PVC	Santa Fe Group sediments	29-Jun-04	
KAFB-0625	MW	5392.90	5387.5								Santa Fe Group sediments		
KAFB-0901	MW	5390.07	5389.8	465.0	527.0	4924.8	4862.8	537.0	4.0	PVC	Santa Fe Group sediments	15-Mar-90	
KAFB-0904	MW	5291.90		343.0	368.0			368.0	4.0	PVC	Santa Fe Group sediments	2002	
KAFB-1006	MW	5257.01	5257.0	363.0	383.0	4894.0	4874.0	383.0	4.0	SS	Santa Fe Group sediments	10-Aug-96	
KAFB-1007	MW	5260.11	5260.1	362.0	382.0	4898.1	4878.1	382.0	4.0	SS	Santa Fe Group sediments	27-Aug-96	
KAFB-1008	MW	5258.16	5258.8	367.6	397.6	4891.2	4861.2	400.0	4.0	PVC	Santa Fe Group sediments		
KAFB-1901	MW	5751.58	5748.7	79.0	104.0	5669.7	5644.7	114.0	3.8	PVC	Santa Fe Group sediments	1-Jul-92	
KAFB-2005	MW	5624.27	5624.6	126.0	156.0	5498.6	5468.6	158.5	4.0	PVC	Santa Fe Group sediments	10-May-06	
KAFB-2007	MW	5567.18	5564.8	273.0	303.0	5291.8	5261.8	305.5	4.0	PVC	Santa Fe Group sediments	13-May-06	
KAFB-2009	MW	5655.63									Santa Fe Group sediments		
KAFB-2622	MW	5358.41	5356.5	195.0	215.0	5161.5	5141.5	217.0	4.0	PVC	Santa Fe Group sediments	2-Dec-04	
KAFB-2623	MW	5635.27	5365.3	199.8	219.8	5165.5	5145.5	221.8	4.0	PVC	Santa Fe Group sediments	30-Dec-04	
KAFB-2624	MW	5356.59	5354.8	195.0	215.0	5159.8	5139.8	217.0	4.0	PVC	Santa Fe Group sediments		
KAFB-2625	MW	5359.26	5355.8								Santa Fe Group sediments		
KAFB-3391	MW	5396.60	5393.6	262.3	282.3	5131.3	5111.3	284.3	4.0	PVC	Santa Fe Group sediments	1-Aug-98	
KAFB-3392	MW	5394.51	5393.4	536.0	561.0	4857.4	4832.4	562.0	4.0	PVC	Santa Fe Group sediments	8-Oct-99	
KAFB-3411	MW	5342.81	5340.5	477.0	502.0	4863.5	4838.5	503.0		PVC	Santa Fe Group sediments	10-Nov-99	
KAFB-6243	MW	5426.22	5421.0								Santa Fe Group sediments		
KAFB-6301	MW	5459.64	5457.3	535.0	560.0	4922.3	4897.3	561.0	3.5	PVC	Santa Fe Group sediments	8-Sep-99	
KAFB-8351	MW	5325.51	5323.3	474.0	499.0	4849.3	4824.3	505.0	4.0	PVC	Santa Fe Group sediments	23-Nov-99	
ST105-MW107	MW	5621.97								PVC	Santa Fe Group sediments	2013?	
ST105-MW108	MW	5221.68								PVC	Santa Fe Group sediments	2013?	
ASL PD	PW			337.0	401.6			401.6	4.0	PVC	Bedrock (granite)	11-Jan-1990	

Table 1. Inventory of Groundwater Monitoring and Production Wells Located at SNL/NM and Surrounding Areas *(Concluded)*

Well	Type	Measuring Point (feet amsl)	Ground Surface (feet amsl)	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)													
Greystone Well	PW	5822.87	5820.8	44.0	54.0	5776.8	5766.8	54.0	4.0	PVC/CS	Alluvium	1-Jan-02	12-Sep-02
KAFB-3	PW		5356.9	452.0	900.0	4904.9	4456.9	920.0	14.0	CS	Santa Fe Group sediments	1-Oct-1949	
KAFB-4	PW		5360.2	494.0	858.0	4866.2	4502.2	1000.0	14.0	CS	Santa Fe Group sediments	1-Dec-1949	
KAFB-14	PW	5324.67	5324.2	380.0	1000.0	4944.2	4324.2	1000.0	16.0	CS	Santa Fe Group sediments	1-Jan -1969	
KAFB-15	PW		5347.0	697.0	993.0	4650.0	4354.0	1600.0		CS	Santa Fe Group sediments	2000?	
KAFB-16	PW		5370.0	697.0	993.0	4673.0	4377.0	1600.0		CS	Santa Fe Group sediments	2000?	
KAFB-20	PW			710.0	1180.0			1250.0	20.0	CS	Santa Fe Group sediments	2010?	
RG-1598-S-4	PW	5369.90	5368.4	290.0	440.0	5078.4	4928.4	455.0	12.0	SS	Santa Fe Group sediments	14-Oct-98	
KAFB-0602	PW	5365.47	5364.2	437.0	457.0	4927.2	4907.2	467.0	4.0	PVC/SS	Santa Fe Group sediments	20-Mar-1990	
KAFB-0609	PW	5365.87	5364.7	316.0	336.0	5048.7	5028.7	345.0	4.0	PVC/SS	Santa Fe Group sediments	31-Mar-1990	22-Jun-14
KAFB-0610	PW	5359.47	5357.3	333.0	353.0	5024.3	5004.3	363.0	4.0	PVC/SS	Santa Fe Group sediments	4-Apr-1990	
Optical Range Well	PW		5965.7	160.0	320.0	5805.7	5645.7	320.0	5.0	PVC	Bedrock (metarhyolite)	19-Aug-1987	
VA-2	PW			590.0	990.0			1010.0	13.4	SS	Santa Fe Group sediments	18-Apr-1997	
Yates Well	PW	6104.67	6102.7							CS	Bedrock (granite)	1-Jan-1930	

Notes:

Measuring point is the top of casing elevation used for calculating groundwater elevations.

Survey coordinates are relative to the North American Datum of 1983 (NAD83), New Mexico State Plane Coordinate System, Central Zone. Previously reported data were converted as necessary.

Elevations are relative to the North American Vertical Datum of 1988 (NAVD88), New Mexico State Plane Coordinate System, Central Zone. Previously reported data were converted as necessary. Conversion was 2.672 feet.

Well RG-1598-S-4 is also known as the Golf Course Main Pond well. Some KAFB documents also use the name RG-1589-S-4.

blank cell = Indicates that the corresponding data were either not available or not applicable.
* = Indicates that depth or elevation corresponds to open hole completion, no screen is present.
** = Indicates elevation of concrete pad.
amsl = Above mean sea level.
ASL PD = Albuquerque Seismological Laboratory Production.
AVN = Area V (North).
bgs = Below ground surface.
BW = Background well.
CCBA = Coyote Canyon Blast Area,
CS = Carbon steel.
CS/SS = Composition of blank well casing is carbon steel and composition of well screen is stainless steel.
CTF = Coyote Test Field.
CWL = Chemical Waste Landfill.
CYN = Lurance Canyon.
EOD = Explosive Ordnance Disposal.
HERTF = High Energy Research Test Facility.
KAFB = Kirtland Air Force Base.
L = Lower.
LMF = Large Melt Facility.
LWDS = Liquid Waste Disposal System.
MRN = Magazine Road North.
MW = Monitoring well.
MWL = Mixed Waste Landfill.
NWTA3 = Northwest Technical Area III.
OBS = Old Burn Site.
OH = Open hole completion (no well screen).
P&A = Plugged and abandoned.
PGS = Parade Ground South.
PL = Power Line Road, west of TA-III.
PVC = Polyvinyl chloride.
PVC/CS = Composition of blank well casing is PVC and composition of well screen is carbon steel.
PVC/SS = Composition of blank well casing is PVC and composition of well screen is stainless steel.
PW = Production well.
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.
TJA = Tijeras Arroyo.
TRE = Thunder Road East.
TRN = Target Road North.
TRS = Target Road South.
TSA = Transportation Safeguards Academy.
U = Upper.
WYO = Wyoming.
Yes = Indicates that the well was plugged and abandoned, but the date is not known.

Table 2. CY 2014 Base-Wide AGMR Groundwater Levels, updated 13 April 2015

Well ID	2014 Date Measured	Measurement Point (ft amsl)	2014 Depth to Water (ft btoc)	2014 Water Level Elevation (ft amsl)	Owner	Data Source	Screened Unit
AVN-1	1-Oct-14	5443.00	524.64	4918.36	SNL/NM	SNL/NM	SFG - regional aquifer
CCBA-MW1	2-Oct-14	5902.34	48.12	5854.22	SNL/NM	SNL/NM	Alluvium and bedrock (granite)
CCBA-MW2	2-Oct-14	5939.28	71.91	5867.37	SNL/NM	SNL/NM	Bedrock (granite)
CTF-MW1	2-Oct-14	6082.63	239.25	5843.38	SNL/NM	SNL/NM	Bedrock (granite)
CTF-MW2	3-Oct-14	5578.60	43.98	5534.62	SNL/NM	SNL/NM	Bedrock (granite)
CTF-MW3	3-Oct-14	5522.82	308.64	5214.18	SNL/NM	SNL/NM	Bedrock (granite)
CWL-BW5	10-Oct-14	5434.79	511.61	4923.18	SNL/NM	SNL/NM	SFG - regional aquifer
CWL-MW9	10-Oct-14	5426.12	503.62	4922.50	SNL/NM	SNL/NM	SFG - regional aquifer
CWL-MW10	10-Oct-14	5424.58	500.65	4923.93	SNL/NM	SNL/NM	SFG - regional aquifer
CWL-MW11	10-Oct-14	5423.24	499.06	4924.18	SNL/NM	SNL/NM	SFG - regional aquifer
CYN-MW3	3-Nov-14	6313.26	132.07	6181.19	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW4	3-Nov-14	6455.48	230.96	6224.52	SNL/NM	SNL/NM	Bedrock (quartzite)
CYN-MW5	3-Nov-14	5984.23	108.17	5876.06	SNL/NM	SNL/NM	Bedrock (quartzite)
CYN-MW6	3-Nov-14	6343.37	155.13	6188.24	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW7	3-Nov-14	6216.35	303.61	5912.74	SNL/NM	SNL/NM	SFG - PGWS
CYN-MW8	3-Nov-14	6230.11	319.32	5910.79	SNL/NM	SNL/NM	Bedrock (granitic gneiss)
CYN-MW9	3-Nov-14	6360.67	167.30	6193.37	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW10	3-Nov-14	6345.45	115.25	6230.20	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW11	3-Nov-14	6374.41	83.25	6291.16	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW12	3-Nov-14	6345.16	216.79	6128.37	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW13	n.m.	6237.79	n.m.	n.m.	SNL/NM	SNL/NM	Bedrock (granitic gneiss)
CYN-MW14A	n.m.	6315.85	n.m.	n.m.	SNL/NM	SNL/NM	Bedrock (metamorphics)
CYN-MW15	n.m.	6344.44	n.m.	n.m.	SNL/NM	SNL/NM	Bedrock (metamorphics)
GREYSTONE-MW2	2-Oct-14	5814.20	53.82	5760.38	SNL/NM	SNL/NM	Alluvium
LWDS-MW1	1-Oct-14	5423.83	502.4	4921.43	SNL/NM	SNL/NM	SFG - regional aquifer
LWDS-MW2	1-Oct-14	5412.41	491.34	4921.07	SNL/NM	SNL/NM	SFG - regional aquifer
MRN-2	13-Oct-14	5308.18	435.74	4872.44	SNL/NM	SNL/NM	SFG - regional aquifer
MRN-3D	13-Oct-14	5309.34	436.17	4873.17	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-BW2	9-Oct-14	5391.02	479.96	4911.06	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-MW4	9-Oct-14	5391.70	501.81	4889.89	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-MW5	9-Oct-14	5382.56	493.71	4888.85	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-MW6	10-Oct-14	5375.31	487.56	4887.75	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-MW7	9-Oct-14	5383.30	489.83	4893.47	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-MW8	9-Oct-14	5384.67	491.4	4893.27	SNL/NM	SNL/NM	SFG - regional aquifer
MWL-MW9	9-Oct-14	5381.91	491.95	4889.96	SNL/NM	SNL/NM	SFG - regional aquifer
NWTA3-MW2	24-Oct-14	5337.49	468.01	4869.48	SNL/NM	SNL/NM	SFG - regional aquifer

Table 2. CY 2014 Base-Wide AGMR Groundwater Levels, updated 13 April 2015 *(Continued)*

Well ID	2014 Date Measured	Measurement Point (ft amsl)	2014 Depth to Water (ft btoc)	2014 Water Level Elevation (ft amsl)	Owner	Data Source	Screened Unit
NWTA3-MW3D	24-Oct-14	5340.80	467.04	4873.76	SNL/NM	SNL/NM	SFG - regional aquifer
OBS-MW1	2-Oct-14	5871.42	72.32	5799.10	SNL/NM	SNL/NM	Bedrock (granite)
OBS-MW2	2-Oct-14	5863.16	174.81	5688.35	SNL/NM	SNL/NM	Bedrock (granite)
OBS-MW3	2-Oct-14	5865.50	69.59	5795.91	SNL/NM	SNL/NM	Bedrock (granite)
PGS-2	3-Oct-14	5408.29	546.88	4861.41	SNL/NM	SNL/NM	SFG - regional aquifer
PL-2	13-Oct-14	5336.01	468.06	4867.95	SNL/NM	SNL/NM	SFG - regional aquifer
PL-4	13-Oct-14	5334.98	467.24	4867.74	SNL/NM	SNL/NM	SFG - regional aquifer
SFR-1D	3-Oct-14	5399.13	139.81	5259.32	SNL/NM	SNL/NM	SFG - regional aquifer
SFR-1S	3-Oct-14	5399.16	89.93	5309.23	SNL/NM	SNL/NM	SFG - regional aquifer
SFR-2S	3-Oct-14	5432.77	100.66	5332.11	SNL/NM	SNL/NM	SFG - regional aquifer
SFR-3D	3-Oct-14	5497.94	161.84	5336.10	SNL/NM	SNL/NM	SFG - regional aquifer
SFR-3P	3-Oct-14	5499.63	162.01	5337.62	SNL/NM	SNL/NM	SFG - regional aquifer
SFR-3S	3-Oct-14	5498.24	160.98	5337.26	SNL/NM	SNL/NM	Bedrock (sandstone)
SFR-3T	3-Oct-14	5498.66	69.61	5429.05	SNL/NM	SNL/NM	Bedrock (sandstone)
SFR-4P	3-Oct-14	5573.33	149.04	5424.29	SNL/NM	SNL/NM	Bedrock (sandstone)
SFR-4T	3-Oct-14	5573.95	145.06	5428.89	SNL/NM	SNL/NM	Bedrock (sandstone)
SWTA3-MW2	24-Oct-14	5325.60	451.28	4874.32	SNL/NM	SNL/NM	SFG - regional aquifer
SWTA3-MW3	24-Oct-14	5323.94	448.55	4875.39	SNL/NM	SNL/NM	SFG - regional aquifer
SWTA3-MW4	24-Oct-14	5324.81	449.21	4875.60	SNL/NM	SNL/NM	SFG - regional aquifer
TA1-W-01	2-Oct-14	5403.82	540.92	4862.90	SNL/NM	SNL/NM	SFG - regional aquifer
TA1-W-02	3-Oct-14	5416.62	523.82	4892.80	SNL/NM	SNL/NM	SFG - regional aquifer
TA1-W-03	2-Oct-14	5457.03	351.53	5105.50	SNL/NM	SNL/NM	SFG - PGWS
TA1-W-04	15-Oct-14	5460.98	570.58	4890.40	SNL/NM	SNL/NM	SFG - regional aquifer
TA1-W-05	3-Oct-14	5433.84	569.04	4864.80	SNL/NM	SNL/NM	SFG - regional aquifer
TA1-W-06	2-Oct-14	5417.10	307.67	5109.43	SNL/NM	SNL/NM	SFG - PGWS
TA1-W-07	2-Oct-14	5404.92	286.08	5118.84	SNL/NM	SNL/NM	SFG - PGWS
TA1-W-08	3-Oct-14	5434.19	311.04	5123.15	SNL/NM	SNL/NM	SFG - PGWS
TA2-NW1-325	15-Oct-14	5421.94	318.33	5103.61	SNL/NM	SNL/NM	SFG - PGWS
TA2-NW1-595	15-Oct-14	5421.26	523.31	4897.95	SNL/NM	SNL/NM	SFG - regional aquifer
TA2-SW1-320	9-Oct-14	5411.85	318.52	5093.33	SNL/NM	SNL/NM	SFG - PGWS
TA2-W-01	15-Oct-14	5419.99	328.23	5091.76	SNL/NM	SNL/NM	SFG - PGWS
TA2-W-19	2-Oct-14	5351.21	271.82	5079.39	SNL/NM	SNL/NM	SFG - PGWS
TA2-W-24	2-Oct-14	5363.66	442.68	4920.98	SNL/NM	SNL/NM	SFG - intermediate
TA2-W-25	2-Oct-14	5374.86	469.52	4905.34	SNL/NM	SNL/NM	SFG - regional aquifer
TA2-W-26	2-Oct-14	5375.77	287.03	5088.74	SNL/NM	SNL/NM	SFG - PGWS
TA2-W-27	2-Oct-14	5362.85	279.93	5082.92	SNL/NM	SNL/NM	SFG - PGWS

Table 2. CY 2014 Base-Wide AGMR Groundwater Levels, updated 13 April 2015 *(Continued)*

Well ID	2014 Date Measured	Measurement Point (ft amsl)	2014 Depth to Water (ft btoc)	2014 Water Level Elevation (ft amsl)	Owner	Data Source	Screened Unit
TA2-W-28	n.m.	5412.41	n.m.	n.m.	SNL/NM	SNL/NM	SFG - PGWS
TAV-MW2	1-Oct-14	5427.33	506.66	4920.67	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW3	1-Oct-14	5464.26	545.38	4918.88	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW4	1-Oct-14	5427.89	506.77	4921.12	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW5	1-Oct-14	5408.71	490.67	4918.04	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW6	1-Oct-14	5431.17	510.29	4920.88	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW7	1-Oct-14	5430.40	513.06	4917.34	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW8	1-Oct-14	5417.00	495.38	4921.62	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW9	1-Oct-14	5416.27	499.17	4917.10	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW10	1-Oct-14	5437.03	516.34	4920.69	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW11	1-Oct-14	5440.12	519.32	4920.80	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW12	1-Oct-14	5435.72	515.87	4919.85	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW13	1-Oct-14	5409.02	495.74	4913.28	SNL/NM	SNL/NM	SFG - regional aquifer
TAV-MW14	1-Oct-14	5441.52	522.46	4919.06	SNL/NM	SNL/NM	SFG - regional aquifer
TJA-2	1-Oct-14	5353.20	277.19	5076.01	SNL/NM	SNL/NM	SFG - PGWS
TJA-3	1-Oct-14	5390.56	499.04	4891.52	SNL/NM	SNL/NM	SFG - regional aquifer
TJA-4	1-Oct-14	5341.16	300.82	5040.34	SNL/NM	SNL/NM	SFG - intermediate
TJA-5	1-Oct-14	5341.33	269.75	5071.58	SNL/NM	SNL/NM	SFG - PGWS
TJA-6	1-Oct-14	5343.16	451.35	4891.81	SNL/NM	SNL/NM	SFG - regional aquifer
TJA-7	9-Oct-14	5391.27	303.31	5087.96	SNL/NM	SNL/NM	SFG - PGWS
TRE-1	13-Oct-14	5497.25	177.27	5319.98	SNL/NM	SNL/NM	SFG - regional aquifer
TRN-1	2-Oct-14	5735.62	91.42	5644.20	SNL/NM	SNL/NM	Bedrock (sandstone)
TRS-1D	2-Oct-14	5779.80	127.38	5652.42	SNL/NM	SNL/NM	Bedrock (limestone)
TRS-1S	2-Oct-14	5780.07	134.03	5646.04	SNL/NM	SNL/NM	Bedrock (limestone)
TRS-2	2-Oct-14	5780.76	134.62	5646.14	SNL/NM	SNL/NM	Bedrock (limestone)
WYO-3	15-Oct-14	5392.09	528.40	4863.69	SNL/NM	SNL/NM	SFG - regional aquifer
WYO-4	15-Oct-14	5392.57	292.91	5099.66	SNL/NM	SNL/NM	SFG - PGWS
Non Sandia Wells							
EOD	19-Dec-14	5829.70	143.05	5686.65	KAFB	SNL/NM	Bedrock (limestone and granite)
Eubank-1	2-Oct-14	5460.02	549.51	4910.51	ABCWUA	SNL/NM	SFG - regional aquifer
Eubank-2	14-Oct-14	5471.72	577.97	4893.75	ABCWUA	ABCWUA	SFG - regional aquifer
Eubank-3	14-Oct-14	5496.06	606.40	4889.66	ABCWUA	ABCWUA	SFG - regional aquifer
Eubank-5	14-Oct-14	5504.73	615.34	4889.39	ABCWUA	ABCWUA	SFG - regional aquifer
KAFB-0118	1-Jun-14	5320.69	457.39	4863.30	KAFB	KAFB	SFG - regional aquifer
KAFB-0119	1-Jun-14	5315.76	452.87	4862.89	KAFB	KAFB	SFG - regional aquifer
KAFB-0120	1-Jun-14	5289.56	425.41	4864.15	KAFB	KAFB	SFG - regional aquifer

Table 2. CY 2014 Base-Wide AGMR Groundwater Levels, updated 13 April 2015 *(Continued)*

Well ID	2014 Date Measured	Measurement Point (ft amsl)	2014 Depth to Water (ft btoc)	2014 Water Level Elevation (ft amsl)	Owner	Data Source	Screened Unit
KAFB-0121	1-Jun-14	5307.60	444.34	4863.26	KAFB	KAFB	SFG - regional aquifer
KAFB-0213	23-Dec-14	5282.00	416.35	4865.65	KAFB	KAFB	SFG - regional aquifer
KAFB-0219	1-Jun-14	5263.69	399.19	4864.50	KAFB	KAFB	SFG - regional aquifer
KAFB-0220	1-Jun-14	5265.10	401.28	4863.82	KAFB	KAFB	SFG - regional aquifer
KAFB-0307	18-Dec-14	5364.53	427.50	4937.03	KAFB	KAFB	SFG - regional aquifer
KAFB-0308	1-Jun-14	5381.65	447.27	4934.38	KAFB	KAFB	SFG - regional aquifer
KAFB-0310	1-Jun-14	5416.48	353.24	5063.24	KAFB	KAFB	SFG - PGWS
KAFB-0311	1-Jun-14	5353.29	420.72	4932.57	KAFB	KAFB	SFG - regional aquifer
KAFB-0312	18-Dec-14	5432.17	417.45	5014.72	KAFB	KAFB	SFG - regional aquifer
KAFB-0313	18-Dec-14	5418.98	349.78	5069.20	KAFB	KAFB	SFG - PGWS
KAFB-0314	18-Dec-14	5455.75	415.90	5039.85	KAFB	KAFB	SFG - regional aquifer
KAFB-0315	18-Dec-14	5466.11	438.15	5027.96	KAFB	KAFB	SFG - regional aquifer
KAFB-0505	1-Jun-14	5362.81	501.76	4861.05	KAFB	KAFB	SFG - regional aquifer
KAFB-0506	1-Jun-14	5363.47	208.63	5154.84	KAFB	KAFB	SFG - PGWS
KAFB-0507	1-Jun-14	5358.82	496.28	4862.54	KAFB	KAFB	SFG - regional aquifer
KAFB-0508	23-Dec-14	5351.88	489.20	4862.68	KAFB	KAFB	SFG - regional aquifer
KAFB-0510	19-Dec-14	5367.10	505.59	4861.51	KAFB	KAFB	SFG - regional aquifer
KAFB-0512	1-Jun-14	5303.15	440.33	4862.82	KAFB	KAFB	SFG - regional aquifer
KAFB-0514	1-Jun-14	5206.41	344.57	4861.84	KAFB	KAFB	SFG - regional aquifer
KAFB-0517	1-Jun-14	5197.10	331.60	4865.50	KAFB	KAFB	SFG - regional aquifer
KAFB-0518	1-Jun-14	5177.76	311.66	4866.10	KAFB	KAFB	SFG - regional aquifer
KAFB-0520	1-Jun-14	5247.90	386.60	4861.30	KAFB	KAFB	SFG - regional aquifer
KAFB-0522	23-Dec-14	5267.48	404.87	4862.61	KAFB	KAFB	SFG - regional aquifer
KAFB-0523	1-Jun-14	5352.62	487.95	4864.67	KAFB	KAFB	SFG - regional aquifer
KAFB-0524	1-Jun-14	5345.61	482.90	4862.71	KAFB	KAFB	SFG - regional aquifer
KAFB-0525	1-Jun-14	5229.75	365.86	4863.89	KAFB	KAFB	SFG - regional aquifer
KAFB-0608	1-Jun-14	5359.90	294.28	5065.62	KAFB	KAFB	SFG - regional aquifer
KAFB-0611	18-Dec-14	5386.09	462.51	4923.58	KAFB	KAFB	SFG - regional aquifer
KAFB-0612	1-Jun-14	5385.45	296.51	5088.94	KAFB	KAFB	SFG - PGWS
KAFB-0613	1-Jun-14	5390.78	354.16	5036.62	KAFB	KAFB	SFG - PGWS
KAFB-0614	1-Jun-14	5390.89	331.90	5058.99	KAFB	KAFB	SFG - PGWS
KAFB-0615	18-Dec-14	5638.43	203.14	5435.29	KAFB	KAFB	Bedrock (granite)
KAFB-0616	1-Jun-14	5481.07	442.87	5038.20	KAFB	KAFB	SFG - regional aquifer
KAFB-0617	19-Dec-14	5505.78	558.50	4947.28	KAFB	KAFB	SFG - regional aquifer
KAFB-0618	1-Jun-14	5410.05	485.26	4924.79	KAFB	KAFB	SFG - regional aquifer
KAFB-0619	18-Dec-14	5410.78	385.81	5024.97	KAFB	KAFB	SFG - PGWS

Table 2. CY 2014 Base-Wide AGMR Groundwater Levels, updated 13 April 2015 *(Continued)*

Well ID	2014 Date Measured	Measurement Point (ft amsl)	2014 Depth to Water (ft btoc)	2014 Water Level Elevation (ft amsl)	Owner	Data Source	Screened Unit
KAFB-0620	19-Dec-14	5334.64	442.63	4892.01	KAFB	KAFB	SFG - regional aquifer
KAFB-0621	19-Dec-14	5569.89	627.52	4942.37	KAFB	KAFB	SFG - regional aquifer
KAFB-0622	19-Dec-14	5488.64	550.41	4938.23	KAFB	KAFB	SFG - regional aquifer
KAFB-0623	1-Jun-14	5328.94	258.97	5069.97	KAFB	KAFB	SFG - PGWS
KAFB-0625	1-Jun-14	5392.90	471.48	4921.42	KAFB	KAFB	SFG - regional aquifer
KAFB-0901	1-Jun-14	5390.07	471.01	4919.06	KAFB	KAFB	SFG - regional aquifer
KAFB-0904	1-Jun-14	5291.90	351.78	4940.12	KAFB	KAFB	SFG - regional aquifer?
KAFB-1006	1-Jun-14	5257.01	380.17	4876.84	KAFB	KAFB	SFG - regional aquifer
KAFB-1007	1-Jun-14	5260.11	384.39	4875.72	KAFB	KAFB	SFG - regional aquifer
KAFB-1008	1-Jun-14	5258.16	379.73	4878.43	KAFB	KAFB	SFG - regional aquifer
KAFB-1901	19-Dec-14	5751.58	85.58	5666.00	KAFB	KAFB	SFG - regional aquifer
KAFB-2005	1-Jun-14	5624.27	123.06	5501.21	KAFB	KAFB	SFG - regional aquifer
KAFB-2007	19-Dec-14	5567.18	263.75	5303.43	KAFB	KAFB	SFG - regional aquifer
KAFB-2009	1-Jun-14	5655.63	70.80	5584.83	KAFB	KAFB	SFG - regional aquifer
KAFB-2622	1-Jun-14	5358.41	202.78	5155.63	KAFB	KAFB	SFG - PGWS
KAFB-2623	1-Jun-14	5635.27	221.59	5413.68	KAFB	KAFB	SFG - PGWS
KAFB-2624	1-Jun-14	5356.59	217.72	5138.87	KAFB	KAFB	SFG - PGWS
KAFB-2625	1-Jun-14	5359.26	197.53	5161.73	KAFB	KAFB	SFG - PGWS
KAFB-3391	1-Jun-14	5396.60	275.82	5120.78	KAFB	KAFB	SFG - PGWS
KAFB-3392	1-Jun-14	5394.51	535.58	4858.93	KAFB	KAFB	SFG - regional aquifer
KAFB-3411	1-Jun-14	5466.50	536.93	4929.57	KAFB	KAFB	SFG - regional aquifer
KAFB-6243	1-Jun-14	5426.22	497.87	4928.35	KAFB	KAFB	SFG - regional aquifer
KAFB-6301	1-Jun-14	5459.64	539.23	4920.41	KAFB	KAFB	SFG - regional aquifer
KAFB-8351	1-Jun-14	5325.51	460.22	4865.29	KAFB	KAFB	SFG - regional aquifer
Mesa del Sol-S	7-Oct-14	5302.67	422.67	4880.00	NMOSE	USGS	SFG - regional aquifer
Montessa Park - S	7-Oct-14	5102.67	220.25	4882.42	ABCWUA	USGS	SFG - regional aquifer
Optical Range Well	31-Oct-14	5965.70	146.00	5819.70	KAFB	KAFB	Bedrock (metarhyolite)
Yale-MW9	14-Oct-14	5271.06	381.07	4889.99	ABCWUA	ABCWUA	SFG - regional aquifer

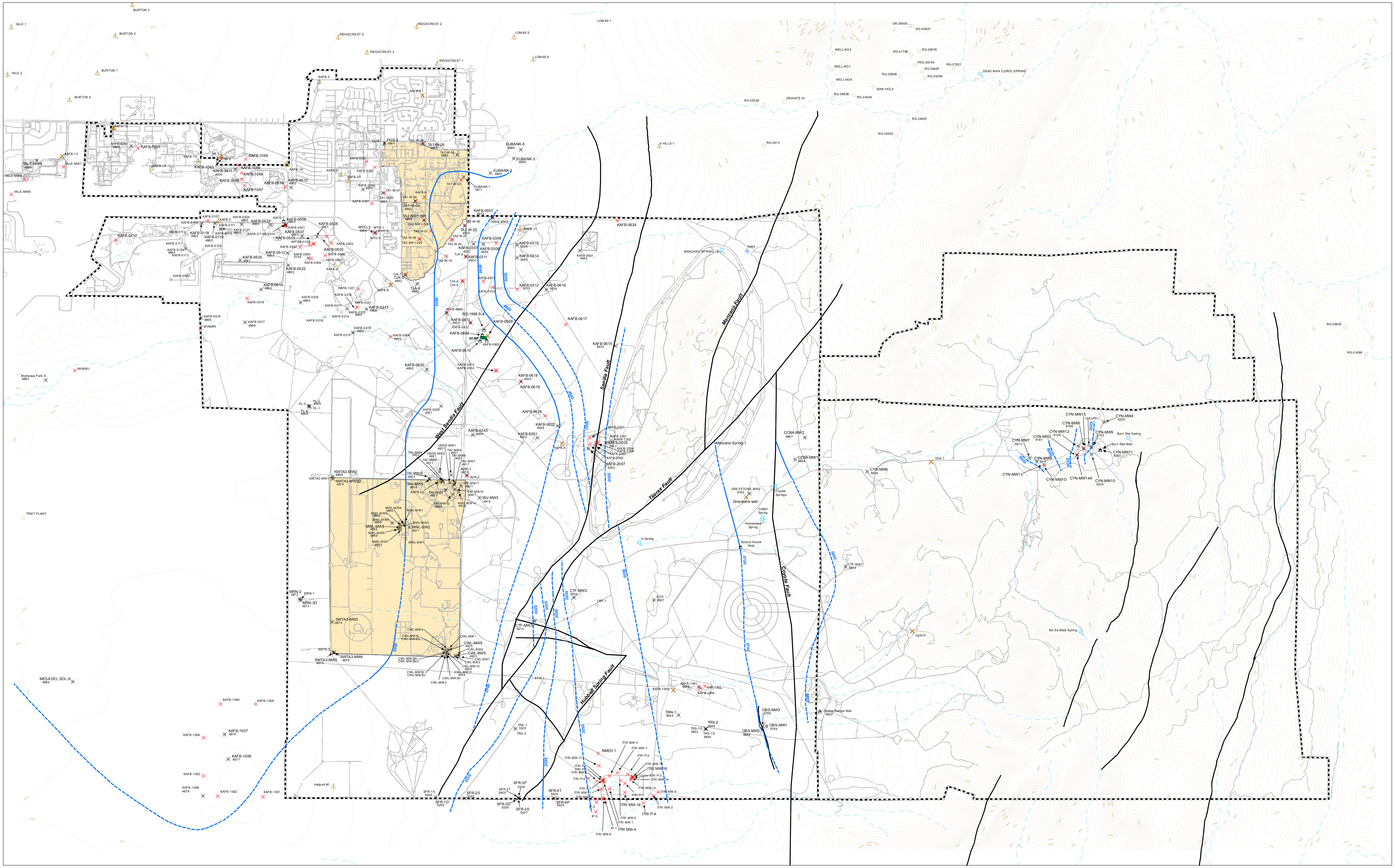
NOTES:

ABCWUA = Albuquerque Bernalillo County Water Utility Authority.
AGMR = Annual Groundwater Monitoring Report.
amsl = Above mean sea level.
AVN = Area V (North).
btoc = Below top of casing.
BW = Background well.
CCBA = Coyote Canyon Blast Area.

Table 2. CY 2014 Base-Wide AGMR Groundwater Levels, updated 13 April 2015 *(Concluded)*

NOTES (continued):

CTF	= Coyote Test Field.
CWL	= Chemical Waste Landfill.
CY	= Calendar year.
CYN	= Lurance Canyon.
EOD	= Explosive Ordnance Disposal.
ft	= Foot (feet).
ID	= Identification.
KAFB	= Kirtland Air Force Base.
LWDS	= Liquid Waste Disposal System.
MRN	= Magazine Road North.
MW	= Monitoring well.
MWL	= Mixed Waste Landfill.
n.m.	= Not measured.
NMOSE	= New Mexico Office of the State Engineer.
NWTA3	= Northwest Technical Area III
OBS	= Old Burn Site.
PGS	= Parade Ground South.
PGWS	= Perched groundwater system.
PL	= Power Line Road, west of TA-III.
SFG	= Santa Fe Group sediments.
SFR	= South Fence Road.
SNL/NM	= Sandia National Laboratories, New Mexico.
SWTA	= Southwest Technical Area III.
TA1-W	= Technical Area I (Well).
TA2-NW	= Technical Area II (Northwest).
TA2-SW	= Technical Area II (Well).
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.
USGS	= U.S. Geological Survey.
WYO	= Wyoming.



Legend

- KAFB Boundary
- Topographic Contour, feet amsl (above mean sea level)
- Road
- Drainage Feature
- Fault (exposed or concealed)
- SNL/NM Technical Areas
- Potentiometric Surface Contour, feet amsl (dashed where inferred)
- Golf Course Main Pond (GCMP)
- Monitoring Well - contoured
- Monitoring Well - not contoured
- Monitoring Well (Plugged and
- Production Well (Potable)
- Production Well (Non Potable)
- Production Well (Plugged and Abandoned); GREYSTONE WELL
- Off-base Well with Private Use
- Spring

NOTE:
1. Contours for the potentiometric surface are shown using two intervals: below 5000 feet amsl the contour interval is 40 feet, and above 5000 feet amsl the contour interval is 100 feet.
2. Fault locations are from GRAM and Lettis (1995), Karlstrom et al., (2000), and Van Hart (2003). The West Sandia fault does not affect the alluvial-fan sediments at the water table.
3. West of the Sandia Fault, the regional aquifer is present within the unconsolidated Santa Fe Group sediments. Groundwater within and east of the Tijeras Fault Zone (bounded by the Sandia and Tijeras Faults) is primarily present in Paleozoic and Precambrian bedrock.
4. Water levels were measured in SNL/NM, KAFB, USGS, and ABCWUA, monitoring wells in June-December 2014.
   Specific dates are listed in Table 2.
5. Groundwater elevations are rounded to the nearest foot.
6. Wells screened in the perched groundwater system near Tijeras Arroyo were not contoured.
7. Water Levels from Production wells were not contoured.

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Plate 1
SNL/NM Monitoring Well Locations and Base-Wide Potentiometric Surface Map of the Regional Aquifer for the Kirtland Air Force Base Vicinity, 2014

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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