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2012 Annual Site Environmental Report for Sandia National Laboratories, New Mexico

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185

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 National Laboratories

U.S. DEPARTMENT OF ENERGY

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Calendar Year 2012
Annual Site Environmental Report for
Sandia National Laboratories, Albuquerque, New Mexico

PRODUCED BY:
Sandia National Laboratories
P.O. Box 5800
Albuquerque, New Mexico 87185-0730

ABSTRACT

Sandia National Laboratories, New Mexico is a government-owned/contractor-operated facility. Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates the laboratory 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. This annual report summarizes data and the compliance status of Sandia Corporation's sustainability, environmental protection, and monitoring programs through December 31, 2012. Major environmental programs include air quality, water quality, groundwater protection, terrestrial surveillance, waste management, pollution prevention, environmental restoration, oil and chemical spill prevention, and implementation of the National Environmental Policy Act. Environmental monitoring and surveillance programs are required by DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE 2012).

Calendar Year 2012 Annual Site Environmental Report
Sandia National Laboratories, Albuquerque, New Mexico
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PROJECT COORDINATOR
Rebecca Sanchez (Sandia)

DOE PROJECT LEAD/TECHNICAL REVIEWER
Karen Agogino (DOE/NNSA/SFO)

TECHNICAL REVIEWER
Mark Miller (Sandia)

STATISTICS/DATA & PRODUCTION SUPPORT
Susan Gorman (SSA)

WORD PROCESSING/PRODUCTION SUPPORT
Nancy White (Sandia)

CONTRIBUTING AUTHORS

Bailey-White, Brenda
Bayliss, Linda
Bonaguidi, Joseph
Brown, Mendy
Byrd, Caroline
Deola, Regina
du Mond, Michael
Eckstein, Joanna
Evelo, Stacie
Goetsch, Bob
Gorman, Susan
Herring III, Allen
Herrera, Lorraine
Jackson, Tim
Krauss, Maryann
Little, Bonnie
Mauser, Joseph
Mayeux, Lucie
McCord, Samuel
Miller, Mark
Nagy, Michael
Perini, Robin
Reiser, Anita
Ricketson, Sherry
Rogers, Jessica
Roma, Charles
Salinas, Stephanie
Sanchez, Rebecca
Skelly, Michael
Ullrich, Rebecca
Wagner, Katrina
Wrons, Ralph

NOTE TO THE READER

The goal of the SNL/NM Annual Site Environmental Report is to present summary environmental data regarding environmental performance, compliance with environmental standards and requirements, and to highlight significant facility programs. In addition, the U.S. Department of Energy views this document as a valuable tool for maintaining a dialogue with our community about the environmental health of this site. We are striving to improve the quality of the contents as well as include information that is important to you. Please provide feedback, comments, questions, or requests for copies of this report and/or appendices to:

U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
P.O. Box 5400
Albuquerque, NM 87185-5400
Attention: Karen Agogino

The SNL/NM Annual Site Environmental Report can be found at the following website:
http://www.sandia.gov/news/publications/environmental/index.html

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NOTE: See Appendix B for Groundwater Levels. All appendices are located on attached CD on the back inside cover of this report.

FIGURES

TABLES

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Acronyms and Abbreviations

A	ABCWUA	Albuquerque Bernalillo County Water Utility Authority
	AEA	Atomic Energy Act
	ACRR	Annular Core Research Reactor
	AHCF	Auxiliary Hot Cell Facility
	AQC	Air Quality Compliance
	ANOVA	Analysis of Variance
	AOC	Area of Concern
	ASER	Annual Site Environmental Report
	AST	aboveground storage tank
	AWN	Acid Waste Neutralization
B	BGS	below ground surface
	BMP	best management practice
	BSG	Burn Site Groundwater
C	C&D	Construction and Demolition
	CAA	Clean Air Act
	CAC	Corrective Action Complete
	CAMU	Corrective Action Management Unit
	CAN	Clean Air Network
	CAP88	CAA Assessment Package-1988
	CEP	Chemical Exchange Program
	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
	CFR	Code of Federal Regulations
	CINT	Center for Integrated Nanotechnologies
	CIS	Chemical Information System
	CME	Corrective Measures Evaluation
	CMI	Corrective Measures Implementation
	CMS	Corrective Measures Study
	COA	City of Albuquerque
	COC	contaminant of concern
	COOC	Compliance Order on Consent
	CPG	Comprehensive Procurement Guidelines
	CPMS	Criteria Pollutant Monitoring Station
	CSS	CWL/sanitary sewer line
	CWA	Clean Water Act
	CWL	Chemical Waste Landfill
	CY	Calendar Year
D	D&D	decontaminated and demolished
	DOE	U.S. Department of Energy
	DP-530	Discharge Permit-530
	DWB	Drinking Water Bureau
E	ECF	Explosive Components Facility
	EDE	effective dose equivalent
	EEANM	Environmental Education Association of New Mexico
	ELM	Environmental Life-cycle Management

	EMS	Environmental Management System
	EO	Executive Order
	EPA	Environmental Protection Agency
	EPCRA	Emergency Planning and Community Right-to-Know Act
	EPEAT	Electronic Product Environmental Assessment Tool
	ER	Environmental Restoration
	ESA	Endangered Species Act
	ES&H	Environment, Safety, and Health
	ET	evapotranspirative
F	FFCA	Federal Facilities Compliance Act
	FFCO	Federal Facilities Compliance Order
	FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
	Final Order	NMED Final Order for MWL
	FOP	field operating procedure
	FY	Fiscal Year
G	GCP	General Construction Permit
	GHG	greenhouse gas
	GP	Guiding Principle
	GSA	General Services Administration
	GSF	gross square footage
	GWPP	Groundwater Protection Program
H	HAP	hazardous air pollutant
	HBWSF	High Bay Waste Storage Facility
	HE	high explosives
	HERMES-III	High Energy Radiation Megavolt Electron Source-III
	HLW	high-level radioactive waste
	HPML	High Power Microwave Laboratory
	HSWA	Hazardous and Solid Waste Amendment
	HVAC	Heating, Ventilation, and Air Conditioning
	HWMF	Hazardous Waste Management Facility
I	I-40	Interstate 40
	IBL	Ion Beam Laboratory
	IC	institutional control
	ICM	Interim Corrective Measure
	ISMS	Integrated Safety Management System
	ISO	International Organization for Standardization
	IT	Information Technology
K	KAFB	Kirtland Air Force Base
	KTF	Kauai Test Facility
	KTF/HI	Kauai Test Facility, Hawaii
L	LANL	Los Alamos National Laboratory
	LE	Landfill Excavation
	LECS	Liquid Effluent Control System
	LED	Light-emitting Diode

	LEED	Leadership in Energy and Environmental Design
	LLW	low-level waste
	LMC	Lockheed Martin Corporation
	LTMMP	Long-Term Monitoring and Maintenance Plan
	LTTD	Low Temperature Thermal Desorption
	LTS	Long Term Stewardship Program
M	M&O	Management and Operating
	MAC	maximum allowable concentration
	MBTA	Migratory Bird Treaty Act
	MCL	maximum contaminant level
	MDL	Microelectronics Development Laboratory
	MEI	maximally exposed individual
	MESA	Microsystems and Engineering Sciences Applications
	MLLW	mixed low-level waste
	MS4	Municipal Separate Storm Sewer System
	MSB	Manzano Storage Bunker
	MSDS	Material Safety Data Sheet
	MSGP	Multi-Sector General Permit
	MSP2	Materials Sustainability and Pollution Prevention
	MTRU	mixed transuranic waste
	MW	mixed waste
	MWL	Mixed Waste Landfill
N	NAAQS	National Ambient Air Quality Standards
	NESHAP	National Emission Standards for Hazardous Air Pollutants
	NEPA	National Environmental Policy Act
	NGF	Neutron Generator Facility
	NHPA	National Historic Preservation Act
	NMAAQS	New Mexico Ambient Air Quality Standards
	NMAC	New Mexico Administrative Code
	NMDOA	New Mexico Department of Agriculture
	NMED	New Mexico Environment Department
	NMHWA	New Mexico Hazardous Waste Act
	NMWQCC	New Mexico Water Quality Control Commission
	NNSA	National Nuclear Security Administration
	NOD	Notice of disapproval
	NOI	Notice of Intent
	NPDES	National Pollutant Discharge Elimination System
	NPL	National Priorities List
	NPN	nitrate plus nitrite
	NSPS	New Source Performance Standard
	NSR	New Source Review
O	ODS	ozone depleting substance
	ORPS	Occurrence Reporting and Processing System
	OSHA	Occupational Safety and Health Act
P	P2	Pollution Prevention
	PCB	polychlorinated biphenyl

	PCCP	Post-Closure Care Plan
	PEP	Performance Evaluation Plan
	(the) Permit	Permit NM5890110518-1
	PGWS	perched groundwater system
	pH	potential of hydrogen
	PM	particulate matter
	$PM_{2.5}$	respirable particulate matter (diameter equal to or less than 2.5 microns)
	PM_{10}	respirable particulate matter (diameter equal to or less than 10 microns)
	POTW	Publicly-Owned Treatment Works
	PPE	personal protective equipment
	PRD	Process Research Development
	PSL	primary subliner
	PWS	Public Water System
Q	QA	Quality Assurance
R	RAP	Remedial Action Plan
	RCRA	Resource Conservation and Recovery Act
	RFQ	Request for Quotation
	RICE	Reciprocating Internal Combustion Engine
	RMWMF	Radioactive and Mixed Waste Management Facility
	RPICL	Radiation Protection Instrument Calibration Laboratory
S	SA	sustainable acquisition
	SARA	Superfund Amendments and Reauthorization Act
	Sandia	Sandia Corporation
	SDWA	Safe Drinking Water Act
	SF6	sulfur hexafluoride
	SFO	Sandia Field Office
	SHPO	State Historic Preservation Office
	SNL	Sandia National Laboratories
	SNL/CA	Sandia National Laboratories, California
	SNL/NM	Sandia National Laboratories, New Mexico
	SWP3	Storm Water Pollution Prevention Plan
	SPCC	Spill Prevention Control and Countermeasures
	SSL	soil screening level
	SSP	Site Sustainability Plan
	SSPP	Strategic Sustainability Performance Plan
	ST	stabilization treatment
	START	Sandia Tomography and Radionuclide Transport
	STP	Site Treatment Plan
	SUWCO	Sewer Use and Waste Water Control Ordinance
	SWCRC	Solid Waste Collection and Recycling Center
	SWEIS	Site-Wide Environmental Impact Statement
	SWMP	Storm Water Monitoring Point
	SWMU	Solid Waste Management Unit
T	TA	technical area
	TAG	Tijeras Arroyo Groundwater
	TAL	target analyte list
	TCC	Thermal Test Complex

	TCE	trichloroethene
	TLD	thermoluminescent dosimeter
	TLV	threshold limit value
	TRI	Toxic Release Inventory
	TRU	transuranic waste
	TSCA	Toxic Substances Control Act
	TSD	treatment, storage and disposal
	TSS	total suspended solids
	TTF	Thermal Treatment Facility
	TTR	Tonopah Test Range
	TTR/NV	Tonopah Test Range, Nevada
U	USAF	U.S. Air Force
	USFS	U.S. Forest Service
	UST	underground storage tank
V	VCM	Voluntary Corrective Measure
	VOC	volatile organic compound
	VSA	vertical sensory array
	VZMS	Vadose Zone Monitoring System

Units of Measure

Ci	curies
cu yd	cubic yards
ft	feet
°F	degrees Fahrenheit
g	grams
gal	gallons
lbs	pounds
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
$\mu g/m^3$	micrograms per cubic meter
mi	miles
MPH	miles per hour
mrem/yr	millirems per year
mSv	millisievert
person-rem/year	person-roentgen equivalent, man per year
pCi/g	picocuries per gram
sq ft	square feet
sq mi	square miles
tpy	tons per year
µg/L	micrograms per liter

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Executive Summary

Sandia National Laboratories, New Mexico (SNL/NM) is one of the nation's premier multi-program national security laboratories. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates the laboratory for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA). The DOE/NNSA, Sandia Field Office (SFO) administers the contract and oversees contractor operations at the site. This Annual Site Environmental Report (ASER) was prepared in accordance with and as required by DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE 2012). This ASER summarizes the environmental protection, restoration, and monitoring programs in place at SNL/NM during Calendar Year (CY) 2012. It also discusses Sandia's compliance with environmental statutes, regulations, and DOE directives and permit provisions; and it highlights significant environmental program efforts and accomplishments. This ASER is a key component of DOE's effort to keep the public informed about environmental conditions throughout the DOE/NNSA nuclear weapons complex.

Environmental Programs

Sandia's methodology for managing and implementing its Environment, Safety and Health Program is outlined in the Integrated Safety Management System (ISMS). The ISMS is centered upon five safety management functions that provide processes to guide management in identifying and controlling hazards. Furthermore, Sandia implemented an Environmental Management System (EMS) to enhance the ISMS. The EMS is the component of ISMS that addresses the environmental aspects and impacts of SNL/NM's activities, products, and services. Sandia continued to improve environmental management and work processes and received International Organization for Standardization 14001 Certification in 2009 and recertification in 2012. For additional information about EMS and ISMS refer to Chapters 3 and 7 of this report.

While all 2012 program activities are performed continuously, they are reported in this ASER on a CY basis, unless otherwise noted (programs based on the Fiscal Year run from October 1st through September 30th, annually). A summary of the primary environmental programs in place at SNL/NM are summarized below.

Waste Management

Waste at SNL/NM is managed at twelve facilities: the Hazardous Waste Management Facility, the Thermal Treatment Facility, the Radioactive and Mixed Waste Management Facility (RMWMF), the Auxiliary Hot Cell Facility, seven Manzano Storage Bunkers, and the Solid Waste Collection and Recycling Center. In addition, the Reutilization Yard processes material and equipment for recycling, after it is determined that it cannot be reapplied, sent for auction or donated to K-12 schools. For additional information about waste management programs and activities refer to Chapters 2 and 3 of this report.

Materials Sustainability and Pollution Prevention (MSP2)

The MSP2 Program provides assessment, guidance, and assistance to the laboratories' workforce to implement measures that reduce resource use, generated waste, and to enhance the overall efficiency of processes and organizations within SNL/NM. Additionally, the MSP2 Program works with several facilities to continue or initiate new recycle avenues for waste. In 2012, Sandia received four awards for environmental accomplishments. For additional information about MSP2 refer to Chapter 3 of this report.

Environmental Restoration (ER) Operations

The current status of the ER Operations site closure is as follows:

- There are 278 SNL/NM Solid Waste Management Units (SWMUs)/Areas of Concern (AOCs) not currently requiring corrective action (Davis 2012).
- There are 36 SWMUs/AOCs requiring corrective action (Davis 2012).
- Six of the 36 SWMUs/AOCs require additional corrective action or investigation (such as groundwater monitoring at SWMUs 8, 52, 58, 68, 149, and 154) (Bearzi 2010).

Included in the 36 SWMUs/AOCs requiring corrective action (Davis 2012) are three groundwater AOCs (Technical Area V [TA-V], Tijeras Arroyo Groundwater [TAG], and Burn Site Groundwater [BSG]) that have final remedies pending. Also included in the 36 SWMUs/AOCs requiring corrective action (Davis 2012) are three sites at active test facilities (SWMUs 83, 84, and 240) with potential solid contamination that will be evaluated at the end of their test operations. For additional information about ER Operations refer to Chapter 3 of this report. Detailed information about Environmental Management cleanup efforts throughout DOE can be found at DOE's website, and at Sandia's Environmental Responsibility website:

http://www.em.doe.gov/pages/emhome.aspx

http://www.sandia.gov/about/environment/index.html

Environmental Life-cycle Management (ELM)

The ELM Program provides environmental stewardship for past, present, and future activities. ELM "promotes the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle" (DOE/SNL 2006). The environmental programs referred to in this document support that stewardship. For additional information about ELM refer to Chapter 3 of this report.

Long Term Stewardship Program (LTS)

Stewardship of legacy sites is necessary to maintain long-term protection of human health, the environment, and natural and cultural resources from hazards associated with residual radioactive and hazardous contamination at former ER sites. Sandia's LTS activities are increasing as remedial activities at ER sites are completed. The LTS Program conducts Compliance Oversight, Institutional Control, and Community Liaison and Stakeholder Involvement activities. For additional information about LTS refer to Chapter 3 of this report.

LTS Compliance Oversight activities include groundwater monitoring, and various types of monitoring at the Corrective Action Management Unit (CAMU) and Chemical Waste Landfill (CWL) to meet New Mexico Environment Department (NMED) regulatory requirements.

The LTS consolidated groundwater program consists of monitoring at or near the legacy sites, and a Groundwater Protection Program (GWPP), which ensures an understanding of the regional groundwater, including at the perimeter of SNL/NM. The groundwater monitoring well network of approximately 80 wells near the legacy sites is sampled for presence of contaminants of concern at various intervals during the year. Groundwater levels are measured as a part of the GWPP. Monitoring well network maintenance is also performed by the LTS Program, as necessary.

Under LTS, 67 groundwater monitoring wells associated with former ER sites are monitored to meet NMED requirements. Sandia personnel collect groundwater samples at six project areas—CWL, Mixed Waste Landfill, TA-V, TAG, BSG, and miscellaneous SWMUs. CY 2012 water quality results for these six areas were consistent with results from past years. The groundwater analytical results are summarized in Chapter 3 of this report and provided in detail in *SNL/NM's Calendar Year 2012 Annual Groundwater Monitoring Report* (Appendix B).

GWPP activities include general surveillance of water quality from a network of wells not directly associated with legacy sites. Annual samples were collected from 12 wells and one spring. Groundwater levels are measured in 103 wells on a quarterly or monthly basis. Wells that have stable trends are measured quarterly; wells that have fluctuating water levels due to seasonal pumping at nearby extractive wells are measured monthly. Water level data are used to generate a regional water table elevation contour map from which groundwater flow directions can be obtained. The GWPP groundwater analytical results are summarized in Chapter 3 of this report and provided in detail in *SNL/NM's Calendar Year 2012 Annual Groundwater Monitoring Report* (Appendix B). Groundwater elevation tables, hydrographs, and contour maps derived from the GWPP data are provided in *SNL/NM's Calendar Year 2012 Annual Groundwater Monitoring Report* (Appendix B).

The LTS Program conducts the long-term monitoring of the CAMU as required by the NMED. Leachate is pumped weekly, and is periodically sampled and disposed of as hazardous waste. Additional information on activities conducted can be found in Chapter 3 of this report and the *CAMU VZMS Annual Monitoring Results Report* (SNL 2012).

Monitoring, inspections, maintenance/repairs, and annual reporting are being performed at the CWL by the LTS Program in accordance with the CWL Post-Closure Care Permit. In 2012, CWL groundwater samples were collected in January and July (two sampling events). Analytical results for CWL groundwater monitoring are summarized in *SNL/NM's Calendar Year 2012 Annual Groundwater Monitoring Report* (Appendix B). The first CWL annual post-closure care report, *Chemical Waste Landfill Annual Post-Closure Care Report*, *Calendar Year 2011,* was submitted to the NMED on March 31, 2012.

Administrative and physical institutional controls (ICs) are in place at SNL/NM to appropriately limit access to and use of legacy sites. Legacy sites are periodically inspected and maintained when necessary. A total of 21 IC site inspections were completed in 2012. In order to mitigate safety concerns identified during IC inspections, an abandoned test structure was removed from Site 50, the Old Centrifuge Site in 2012. Site-specific information is maintained in an IC tracking database.

It is important that the public be made aware of the work being conducted at SNL/NM to maintain long-term protection of human health, the environment, and natural and cultural resources from hazards associated with residual radioactive and hazardous contamination at legacy sites. In addition to making technical documents available to the public, stakeholders participate in semi-annual DOE, U.S. Department of Defense meetings on environmental activities.

Terrestrial Surveillance

The Terrestrial Surveillance Program conducts sampling activities to detect any potential releases or migration of radiological or non-radiological contaminated material to off-site locations (community locations outside Kirtland Air Force Base [KAFB] boundaries). Soil, sediment, and vegetation are collected from on-site, perimeter, and off-site locations. In 2012, there were no terrestrial sample results that indicated concerns or that required further investigation or corrective action. For additional information refer to Chapter 4 of this report.

Air Quality

Ambient Air Monitoring – Sandia measures ambient air quality at six locations throughout SNL/NM, and compares results with National Ambient Air Quality Standards and local ambient air regulations. The network monitors criteria pollutants and volatile organic compounds.

Air Quality Compliance (AQC) – Air quality standards are implemented by regulations promulgated by local and federal governments in accordance with the Clean Air Act (CAA) and the CAA Amendments of 1990. The Albuquerque Bernalillo County/Air Quality Control Board, the State of New Mexico and the U.S. Environmental Protection Agency (EPA) determine applicable air quality standards for non-radiological pollutants. The AQC Program currently maintains 13 issued authority-to-construct New Source Review (NSR) permits; and 27 issued NSR registrations from the City of Albuquerque (COA). Currently, there are no new NSR applications pending issuance with the COA.

Radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) Compliance – Subpart H of NESHAP regulates radionuclide air emissions from DOE/NNSA facilities, with the exception of naturally occurring radon. The Radiological NESHAP Program annually evaluates facilities that have the potential to release emissions to the environment. In 2012, the primary radionuclides released from SNL/NM facilities were tritium and argon-41. The on-site maximally exposed individual (MEI) was located on KAFB. The on-site MEI dose of 1.00E-03 millirems per year (mrem/yr) at the Chestnut Site resulted primarily from tritium releases at the RMWMF. The off-site MEI was located at the Eubank Gate Area. The off-site MEI dose of 3.16E-03 mrem/yr at the Eubank Gate Area resulted also primarily from tritium releases at the RMWMF. Both doses are well below the 10 mrem/yr EPA standard. For additional information refer to Chapter 5 of this report.

Water Quality

Wastewater – Wastewater from SNL/NM is discharged from six on-site outfalls permitted by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). Wastewater monitoring is conducted to ensure that all discharges meet the standards set by the ABCWUA's Publicly-Owned Treatment Works. In CY 2012, there was one reportable event. The event was discovered and reported by SNL/NM. The event was discovered when a continuous wastewater monitor was activated for low pH in Permitted Flow Basin 2069I. See Section 6.1.1 for details. All discharge parameters at the other permitted locations were met resulting in SNL/NM receiving six "Gold Pre-Treatment Awards" from the ABCWUA for the 2011-2012 treatment year.

Surface Discharge – All water that will be discharged to the ground surface, either directly or to lined containments, must meet State of New Mexico surface discharge standards. All internal discharges approved by Sandia in 2012 met NMED New Mexico Water Quality Control Commission standards with the exception of the unauthorized discharge at Building 9939, which was approved for discharge to the sanitary sewer but was inappropriately discharged to the surface. See Section 2.2.1 and Chapter 6 for additional information. Routine surface discharges are made to two evaporation lagoons that service the pulsed power facilities under an existing discharge permit. During CY 2012, all permit requirements were met for both NMED-permitted lagoons. There were three surface releases reported to NMED. For additional information on these releases refer to Chapters 2 and 6 of this report.

Storm Water Runoff – Quarterly visual sampling and analytical sampling were conducted in 2012. All monitoring data collected was submitted to EPA and can be found in Appendix D of this report. Visual observations of storm water were performed when there was adequate runoff to collect a sample. The majority of the visual observations of storm water quality were done in the summer months and these assessments did not produce any indications of storm water pollution.

Oil Storage and Spill Control – The Spill Prevention Control and Countermeasures Plan (required under the Clean Water Act) describes the oil storage facilities at SNL/NM and the mitigation controls in place to prevent inadvertent discharges of oil. Oil storage facilities subject to regulations include oil storage tanks (aboveground storage tanks [ASTs] and underground storage tanks [USTs]), bulk storage areas (multiple containers), and temporary or portable tanks. Sandia currently operates 46 ASTs and three USTs at SNL/NM. For additional information refer to Chapter 6 of this report.

National Environmental Policy Act (NEPA) Activities

In CY 2012, personnel from the DOE continued the development of a new Site-Wide Environmental Impact Statement (SWEIS). Environmental Programs Department personnel met with representatives from various SNL/NM programmatic missions to discuss and compile data on their current and anticipated future operations. Discussions targeted mission work that could potentially impact the environment. In addition, DOE personnel compiled an array of information and data including environmental, safety, and health policies and procedures; descriptions of the natural environment at SNL/NM; environmental stewardship programs; overall site operations; and agreements between DOE and other governmental entities. This information and data will help DOE in developing environmental analyses for the in-progress SWEIS.

Further, the NEPA Team reviewed a total of 1,020 proposed projects in the ISMS NEPA Module and other corporate applications. To support mission activities at Sandia, 72 DOE NEPA checklists were transmitted to the DOE/NNSA/SFO for review and determination.

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Chapter 1
Introduction

This Annual Site Environmental Report (ASER) was prepared in accordance with and as required by U.S. Department of Energy (DOE) Order 231.1B, *Environment, Safety, and Health Reporting* (DOE 2012). This ASER describes the environmental protection programs currently in place at Sandia National Laboratories, New Mexico (SNL/NM). This report is made available to the general public in printed and electronic form.

1.1 Sandia Corporation's History and Mission

Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation (LMC), manages and operates the laboratory for the DOE, National Nuclear Security Administration (NNSA). The DOE/NNSA, Sandia Field Office (SFO) administers the contract and oversees contractor operations at the site. Over its history, Sandia has developed technologies for nuclear weapons, non-proliferation, homeland security, energy and infrastructure, defense systems and assessments, and research and development programs to support a wide variety of national security missions.

1.1.1 History

SNL/NM began operations in 1945 as Z Division, the ordnance design, testing, and assembly arm of Los Alamos Scientific Laboratory (now Los Alamos National Laboratory [LANL]). The division moved to Sandia Base (now merged into Kirtland Air Force Base [KAFB]) on the perimeter of the City of Albuquerque (COA), to be near an airfield and to work closely with the military. Due to its growth, Z Division became a separate branch of Los Alamos in 1948, and was renamed Sandia Laboratory. On November 1, 1949, Sandia, a wholly owned subsidiary of Western Electric, began managing SNL/NM. In 1979, Congress recognized the facility as a national laboratory. In 1993, Sandia became a wholly owned subsidiary of Martin Marietta, now LMC.

1.1.2 Mission

Sandia's enduring core mission is to provide science and engineering support for the nation's nuclear weapons stockpile. Today, the mission encompasses additional critical aspects of national security, including the non-proliferation of weapons of mass destruction, developing technologies and strategies for responding to emerging threats, and protecting and preventing the disruption of critical infrastructures. Sandia also collaborates with representatives from other government agencies, the industrial sector, and universities to develop and commercialize new technologies. Information about recent technologies developed at SNL/NM can be found at:

http://www.sandia.gov/news/index.html

1.1.3 Sandia's Operations Contract

Sandia complies with specific environmental regulations established by local, state, and federal agencies. The Management and Operating (M&O) Contract between Sandia and the DOE defines the primary contractual obligations for operating SNL/NM. This contract also drives Sandia's Environment, Safety, and Health (ES&H) standards and requirements.

The M&O Contract states that Sandia must comply with DOE directives that establish specific requirements for environmental programs. The four primary DOE directives currently on the contract that pertain to environmental protection and management are listed below:

- DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE 2012),
- DOE Order 435.1, Chg 1, *Radioactive Waste Management* (DOE 2001),
- DOE Order 458.1, Chg 3, *Radiation Protection of the Public and the Environment* (DOE 2013), and
- DOE Order 232.2, *Occurrence Reporting and Processing of Operations Information* (DOE 2011b).

1.2 SNL/NM's Site Location and Characteristics

1.2.1 General Site Characteristics

KAFB is a 51,559-acre military installation that includes 20,486 acres withdrawn from the Cibola National Forest through an agreement with the U.S. Forest Service (USFS). Located at the foot of the Manzanita Mountains, it has a mean elevation of 5,384 feet (ft) and a maximum elevation of 7,986 ft. KAFB is host to more than 150 tenant groups.

In 2012, Sandia conducted operations on 5,817 acres of Air Force property leased to DOE/NNSA and on 2,841 acres of property owned by DOE. A staff of 9,530 operated in approximately 5.4 million square feet (sq ft) of on-site building space and an additional 300,000 sq ft of off-site building space leased by DOE/NNSA for SNL/NM. Most operations are within five technical areas (TAs), TA-I,-II,-III,-IV, and -V. An additional 9,000 acres serve as a buffer zone near the southwest boundary of KAFB. This buffer zone, leased from the State of New Mexico and Isleta Pueblo, provides margins of safety and sound buffers for SNL/NM testing activities (Figure 1-1).

Borders

KAFB and SNL/NM are located adjacent to the COA, which borders KAFB on its north, northeast, west, and southwest boundaries. The Albuquerque International Sunport (airport) and Mesa del Sol, an emerging 12,500-acre mixed-use urban development, are just beyond the base's western borders, as is the Rio Grande. The development's master plan projects that the community will ultimately reach 90,000 residents. To date, several business and industrial facilities have been completed; however, no residential development has begun.

Mountains on the east and plains on the west create a diverse range of geological, hydrological, climatic, and ecological settings, and are further detailed in this chapter.

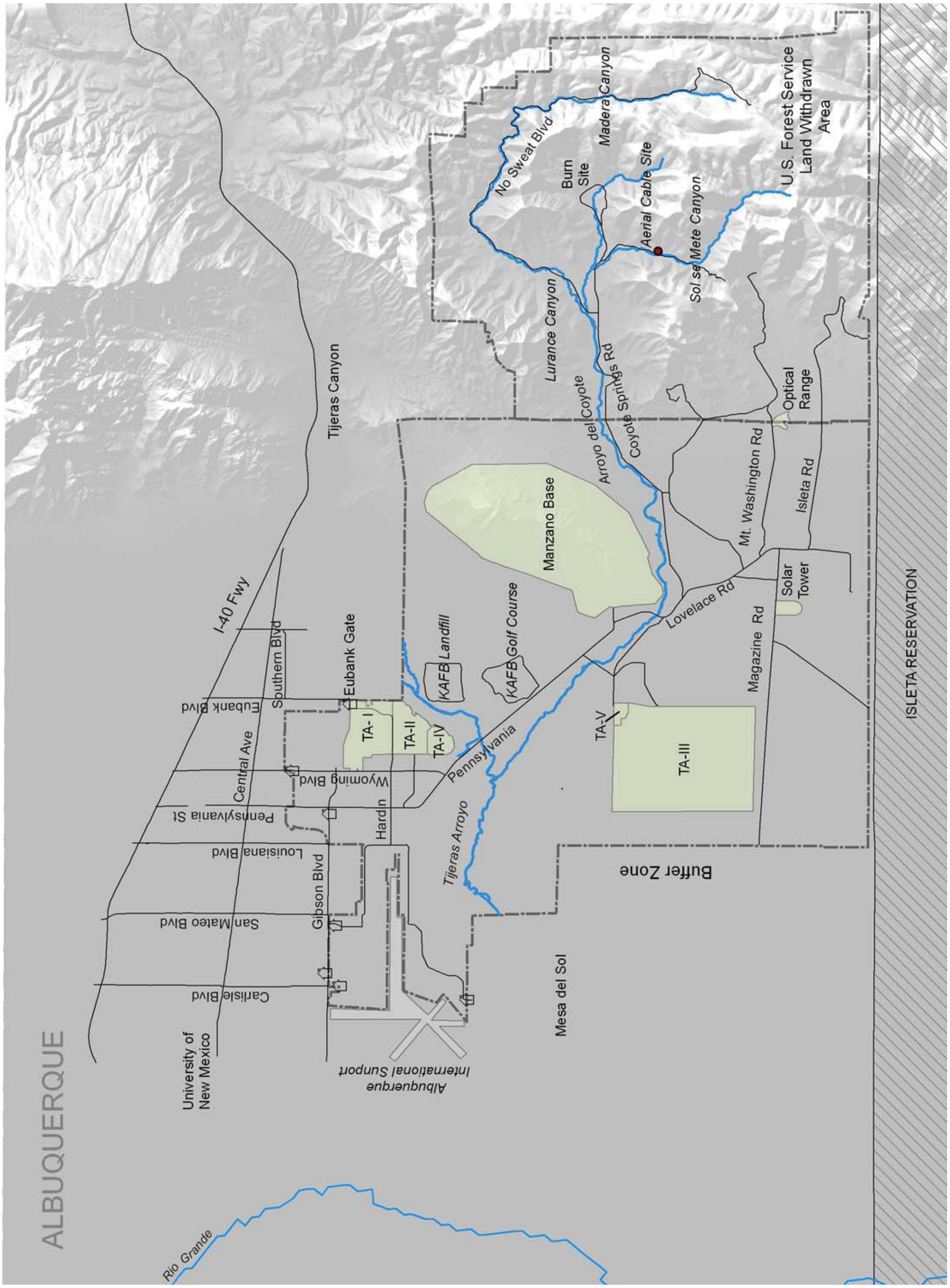

FIGURE 1-1. SNL/NM Technical Areas and the U.S. Forest Service Land Withdrawn Area

Areas within Borders

SNL/NM consists of five secured TAs, buildings in non-secured areas, and several remote testing areas. These remote test areas are collectively known as the Coyote Test Field and are located in the canyons on the west side of the Manzano Mountains. The Burn Site is located in the northeast region of KAFB and the Thermal Test Complex (TTC) is located within TA-III. The National Solar Thermal Test Facility is located southeast of TA-III.

1.2.2 Technical Areas

TA-I

TA-I is the focus of SNL/NM's operations, housing the main administrative center and a close grouping of laboratories and offices. A majority of activities performed in TA-I are dedicated to weapon design, research and development on weapon systems, limited production of weapon systems components, technology transfer, high-performance computing, and energy research programs. Facilities in TA-I include the new Ion Beam Laboratory, the main technical library, several assembly/manufacturing areas, environmental test facilities, and various laboratories, such as the Advanced Manufacturing Processes Laboratory, the Neutron Generator Facility, the Processing and Environmental Technology Laboratory, the Joint Computational Engineering Laboratory, Sandia Tomography and Radionuclide Transport Laboratory, and the Microsystems and Engineering Sciences Applications (MESA) Complex. The MESA Complex provides the systems designers, component designers, processes, and equipment to design and prototype qualified microsystem-based components for maintaining a national nuclear deterrent.

TA-II

TA-II includes facilities and lands south of the TA-I boundary at Hardin Boulevard and extends to the northern boundary of TA-IV. It includes both technical facilities and infrastructure support. The Explosive Components Facility, the Hazardous Waste Management Facility, the Solid Waste Collection and Recycling Center, the Construction and Demolition Recycle Center, and the National Infrastructure Simulation & Analysis Center are all within TA-II.

TA-III

TA-III is the largest and most remote of all the TAs, housing large environmental test facilities separated by extensive undeveloped areas. TA-III is used to accommodate large-scale engineering test activities requiring large safety and/or security area buffers, such as collision-testing sled tracks, centrifuges, vibration test facilities, impact test complexes, and the TTC. Other facilities include the Radioactive and Mixed Waste Management Facility, the Chemical Waste Landfill, the Mixed Waste Landfill, the Classified Waste Landfill, and the Corrective Action Management Unit.

TA-IV

TA-IV, located south of TA-II, houses facilities used to conduct research and development activities in inertial-confinement fusion, pulsed power, and nuclear particle acceleration. Accelerators located in TA-IV include the Z Accelerator (Z-Machine), the Advanced Pulsed Power Research Module, the Radiographic Integrated Test Stand, the High Energy Radiation Megavolt Electron Source-III, the Saturn Accelerator, the Repetitive High Energy Pulsed Power I Accelerator, the High Power Microwave Laboratory (HPML), and the Short-Pulse High Intensity Nanosecond X Radiator.

TA-V

TA-V, located adjacent to the northeast section of TA-III, includes facilities that routinely handle radioactive materials used in experimental research and development programs. TA-V houses the Gamma Irradiation Facility, the Annular Core Research Reactor, the Hot Cell Facility, and the Auxiliary Hot Cell Facility.

1.2.3 Other Facilities

Remote Test Areas

Several remote test areas are located east and southeast of TA-III and within the canyons and foothills of the USFS withdrawn area (Arroyo del Coyote, Lurance, Madera, and Sol se Mete Canyons). These areas are used for explosive ordnance testing, impact testing, rocket firing experiments, and open-burn thermal tests.

Facilities Outside of KAFB's Boundaries

Sandia personnel occupy some facilities outside the boundaries of KAFB. These are a mixture of properties either leased or owned by DOE. The Center for Integrated Nanotechnologies, the MESA Technology and Operations Prototype, the International Programs Building, the Innovation Parkway Office Center, and the National Museum of Nuclear Science & History are all located on Eubank Boulevard Southeast within one mile of KAFB. There are many other small-scale, off-site SNL/NM projects, including the Advanced Materials Laboratory at the University of New Mexico.

1.3 ES&H at SNL/NM

Sandia's ES&H Program is detailed in the ES&H Corporate Policy System Documents, a dynamic online resource available to all Sandia personnel. These documents describe ES&H requirements for conducting all levels of work at SNL/NM.

http://www.sandia.gov/esh/

Improved waste management practices have been implemented, and state-of-the-art waste-handling facilities have been constructed to handle and properly dispose of hazardous, radioactive, and solid waste. Waste minimization and recycling practices have been very successful in reducing SNL/NM's environmental impact. Several audits have been conducted in recent years by the U.S. Environmental Protection Agency, various DOE/NNSA offices, the COA, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), and the State of New Mexico. The results of these audits, as well as SNL/NM internal audits, support Sandia's ongoing commitment to ES&H practices at SNL/NM.

Implementing ES&H

Sandia's strategy for managing and implementing its ES&H Program is described by the Integrated Safety Management System (ISMS) which is structured around the following five safety-based management functions:

(1) Define the scope of work,

(2) Analyze the hazards,

(3) Develop and implement hazard controls,

(4) Perform work within controls, and

(5) Provide feedback and continuous improvement.

The ISMS provides processes that guide line management to identify and control hazards.

Environmental Management System

As part of its mission, Sandia addresses ES&H issues through its Environmental Management System (EMS). EMS programs include Waste Management, Pollution Prevention (P2), Environmental

Restoration (ER), Long-Term Stewardship, Water Quality (surface discharge, groundwater, storm water, and waste water), Oil Storage, Environmental Life-cycle Management, Air Quality, National Environmental Policy Act (NEPA), Terrestrial Surveillance, Ecological Surveillance, and Quality Assurance (QA).

Sandia strives to be a leader in environmental stewardship through the implementation of an EMS. In 2009, Sandia upgraded the EMS Program to fully conform to the international standard for EMS, International Organization for Standardization (ISO) 14001-2004 (ISO 2004) and received third-party certification to the standard. Sandia received ISO 14001 certification in 2009 and recertification in 2012. The EMS is utilized to plan, review, execute, and improve work processes, with the intent of improving upon the environmental elements in the ISMS. ES&H considerations are incorporated into each element of all work processes conducted by Sandia. For additional information on the EMS, refer to Section 3.1.

1.3.1 Managing a Legacy of Contamination

SNL/NM was ranked as one of the least-contaminated DOE facilities. The current status of ER Operations site closure is as follows:

- There are 278 SNL/NM Solid Waste Management Units (SWMUs)/Areas of Concern (AOCs) not currently requiring corrective action (Davis 2012).
- There are 36 SWMUs/AOCs requiring corrective action (Davis 2012).
- Six of the 36 SWMUs/AOCs require additional corrective action or investigation (such as groundwater monitoring at SWMUs 8, 52, 58, 68, 149, and 154) (Bearzi 2010).

Included in the 36 SWMUs/AOCs requiring corrective action (Davis 2012) are three groundwater AOCs (TA-V, Tijeras Arroyo Groundwater [TAG], and Burn Site Groundwater [BSG]) that have final remedies pending. Also included in the 36 SWMUs/AOCs requiring corrective action (Davis 2012) are three sites at active test facilities (SWMUs 83, 84, and 240) with potential solid contamination that will be evaluated at the end of their test operations.

Some sites require long-term monitoring to ensure that any residual contamination does not migrate from the site. For additional information about ER Operations, refer to Chapter 3. Detailed information about Environmental Management cleanup efforts throughout DOE can be found at DOE's website, and at Sandia's Environmental Responsibility website:

http://www.em.doe.gov/pages/emhome.aspx

http://www.sandia.gov/about/environment/index.html

1.4 Regional Characteristics

SNL/NM is set in a high desert region in central New Mexico. The adjacent land areas are the most densely populated area in New Mexico. Refer to Figures 1-1 and 1-2 for illustrations of the regions described below.

1.4.1 Regional Topography and Layout

KAFB has a widely varied topography, ranging from rugged mountains on the east to flat plains on the west. The maximum elevation of 7,986 ft occurs on the eastern edges of KAFB, which includes 20,486 acres withdrawn from the Cibola National Forest (through an agreement with the USFS).

The mean elevation of 5,384 ft is typical of the remainder of KAFB, which is situated on gently west-sloping foothills that grade into wide, flat areas; this topography is where the majority of SNL/NM facilities are situated.

The Mountains

The most prominent topographic feature in the Albuquerque region is the Sandia Mountains, which form an impressive backdrop to the east of the COA and KAFB. The Sandia Mountains form a 13-mile long escarpment distinguished by steep cliffs, pinnacles, and narrow canyons; the tallest point is Sandia Crest at 10,678 ft. At sunset, the Sandia Mountains are often bathed briefly in a pinkish glow, which is how they got their name (“sandia” is Spanish for “watermelon”).

The Sandia Mountains are divided from the Manzanita and Manzano Mountains (to the south) by Tijeras Canyon, which is traversed by Interstate 40 (I-40). KAFB is located a few miles south of I-40 (Figure 1-1).

Tijeras Arroyo

At approximately ¾ of a mile wide, Tijeras Arroyo is a significant topographic feature that cuts diagonally northeast to southwest across KAFB. The watershed drained by Tijeras Arroyo includes the southern Sandia Mountains, the Manzanita Mountains, and the north end of the Manzano Mountains. The arroyo is normally dry except during heavy downpours, which can cause significant flash floods. The arroyo originates in Tijeras Canyon and runs coincident with the Tijeras Fault for several miles before deviating to the southwest; it discharges to the Rio Grande about ten miles from the west boundary of KAFB.

1.4.2 Population

New Mexico is the fifth largest state in the U.S., comprising 121,000 square miles (sq mi). The population of New Mexico in 2012 was approximately 2,082,224 and is projected to be approximately 2.5 million by 2025, according to the U.S. Census. The largest city in New Mexico is Albuquerque, with about 671,000 metro-area residents. Other neighboring metro areas, including the City of Rio Rancho (population of 89,320), raise that total to over 760,000 residents.

The estimated population within an 80-kilometer/50-mile radius of SNL/NM is approximately 1,044,290 residents (DOC 2013); nine counties are contained or partially included in that radius (Figure 1-2).

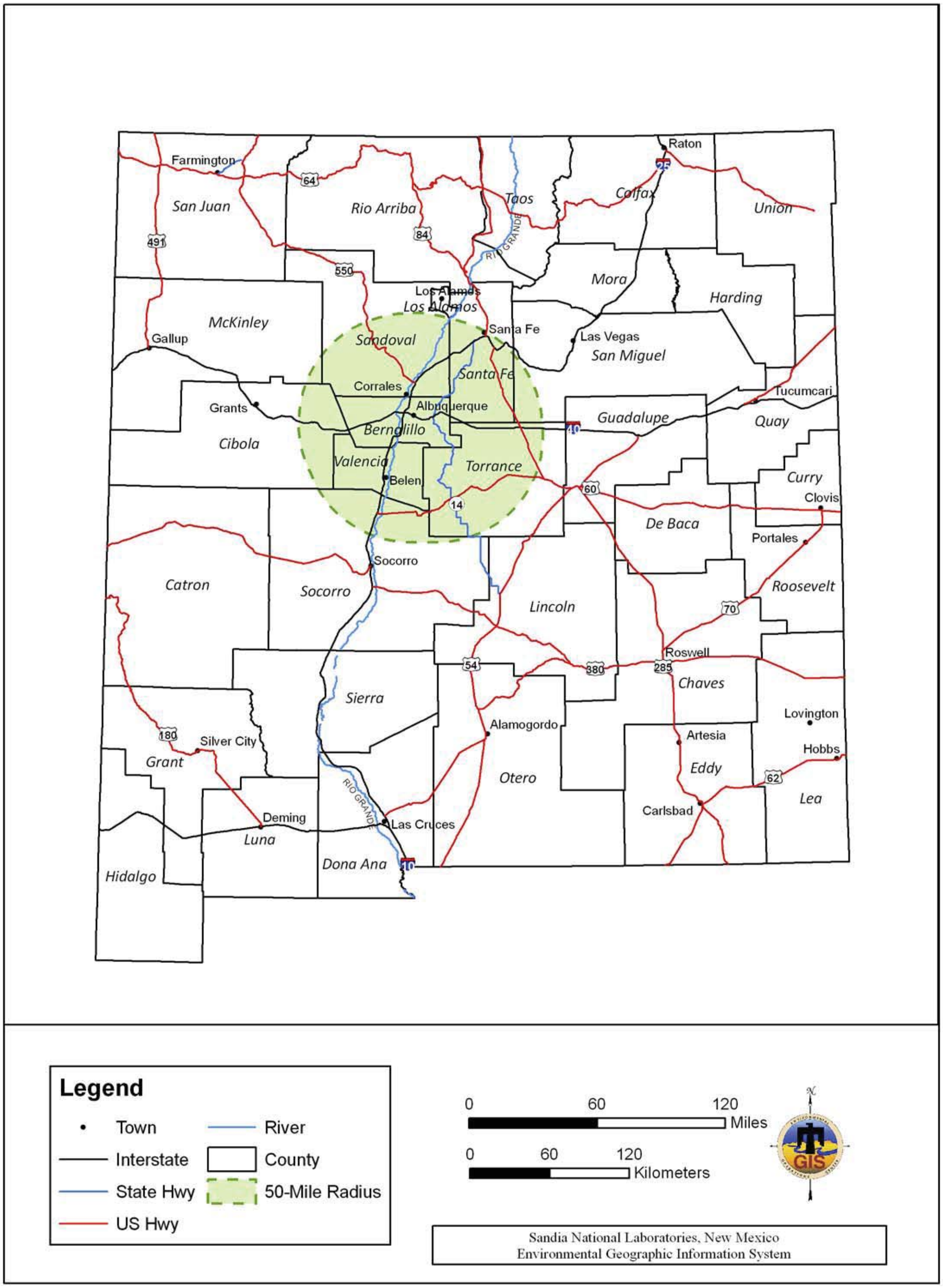

FIGURE 1-2. State of New Mexico Map

The overlay shows major roads, cities, and county lines. The dashed circle encompasses the 50-mile radius from SNL/NM facilities.

1.5 Regional Geologic Setting

The regional geologic setting in which SNL/NM and KAFB are situated has been subjected to relatively recent episodes of basaltic volcanism and ongoing regional rifting (crustal extension). The Rio Grande Rift has formed a series of connected down-dropped basins filled with sediment deposits. The Rio Grande Rift extends for about 450 miles from Leadville, Colorado into New Mexico; Albuquerque and the KAFB are within a rift valley.

1.5.1 Albuquerque Basin

The Albuquerque Basin is one of several north-south-trending sediment-filled basins formed by the Rio Grande Rift. This major structural feature is approximately 30 miles wide, 100 miles long, and 3,000 sq mi in area (Grant 1982). On the east, uplifted fault blocks manifested by the Sandia, Manzanita, and Manzano Mountains bound the basin. The western side of the basin is bound by the Lucero Uplift to the south, the Rio Puerco Fault Belt, and the Nacimiento Uplift at the northern end. There is relatively little topographic relief along the Rio Puerco Fault Belt on the northwestern side of the basin. The Albuquerque Basin is drained to the south through the Rio Puerco and the Rio Grande.

1.5.2 Regional Fault Systems

Several faults run through KAFB (Figure 1-3). Tijeras Fault, which has been traced as far north as Madrid, New Mexico, trends southwesterly through Tijeras Canyon and across KAFB. The Tijeras Fault is a strike-slip fault on which movement is horizontal parallel to the strike of the fault. Early movement along the Tijeras Fault can be traced to the late Precambrian Period, 570 million years ago, and the fault has been active as recently as the late Pleistocene epoch, 12,000 years ago. The system of minor faults associated with the Tijeras Fault on KAFB is collectively referred to as the Tijeras Fault Complex. The Tijeras Fault Complex marks a distinct boundary between the bedrock geology on the east and the sediment-filled basin to the west. This geologic boundary also forms a boundary between the two major groundwater regimes at KAFB. For further information on hydrological settings, refer to Section 1.6.

The Sandia Fault establishes the eastern boundary of the Albuquerque Basin on KAFB. The up-thrown side of the fault is manifested as the Sandia Mountains. The stratigraphic section exposed at the top of the mountain is buried under the sediments of the basin. The total vertical offset is on the order of 7 kilometers (4.3 miles). The eastern boundary of the basin south of KAFB is the Hubbell Spring Fault. Both the Sandia and Hubbell Spring Faults are north-trending, down-to-the-west, en echelon normal faults, which are Tertiary in age (63 million to 1.8 million years ago) (Lozinsky et al. 1991; Woodward 1982; Kelley 1977). The Sandia Fault converges with the Tijeras Fault and the Hubbell Spring Fault in the region of KAFB, identified as the Tijeras Fault Complex.

1.6 Regional Settings

The hydrogeological system is divided into two areas separated by the Tijeras Fault Complex, which marks a distinct geological boundary (Figure 1-4). To the east of the Tijeras Fault Complex, the hydrogeology is characterized by fractured and faulted bedrock covered by a thin layer of alluvium with depths to groundwater ranging from 45 to 325 ft below ground surface (bgs) within the basin. On the west side of the Tijeras Fault Complex, groundwater is contained in alluvial sediments and depths to groundwater range from 295 ft to 570 ft bgs.

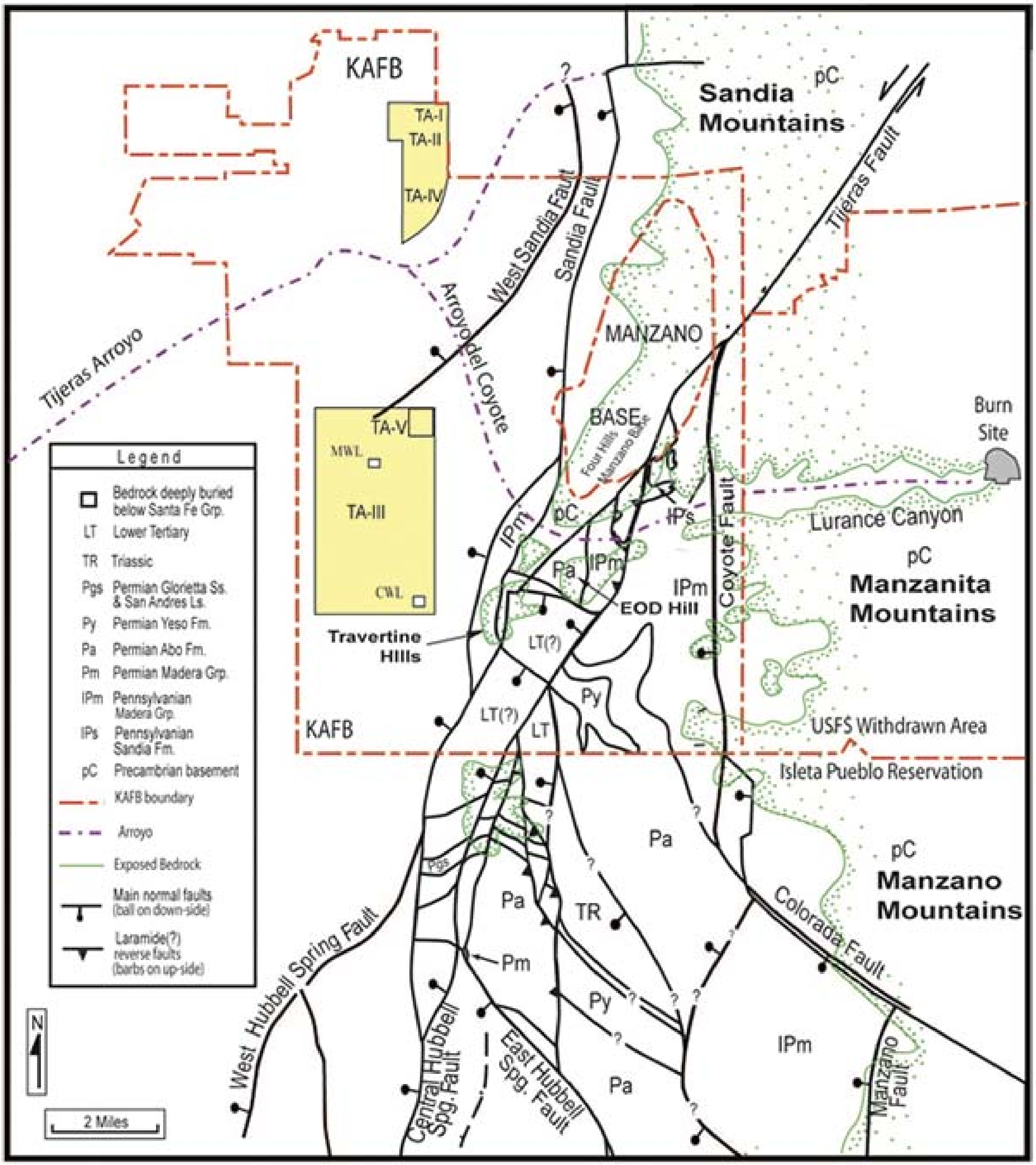

FIGURE 1-3. Generalized Geology in the Vicinity of SNL/NM and KAFB (Van Hart 2003)

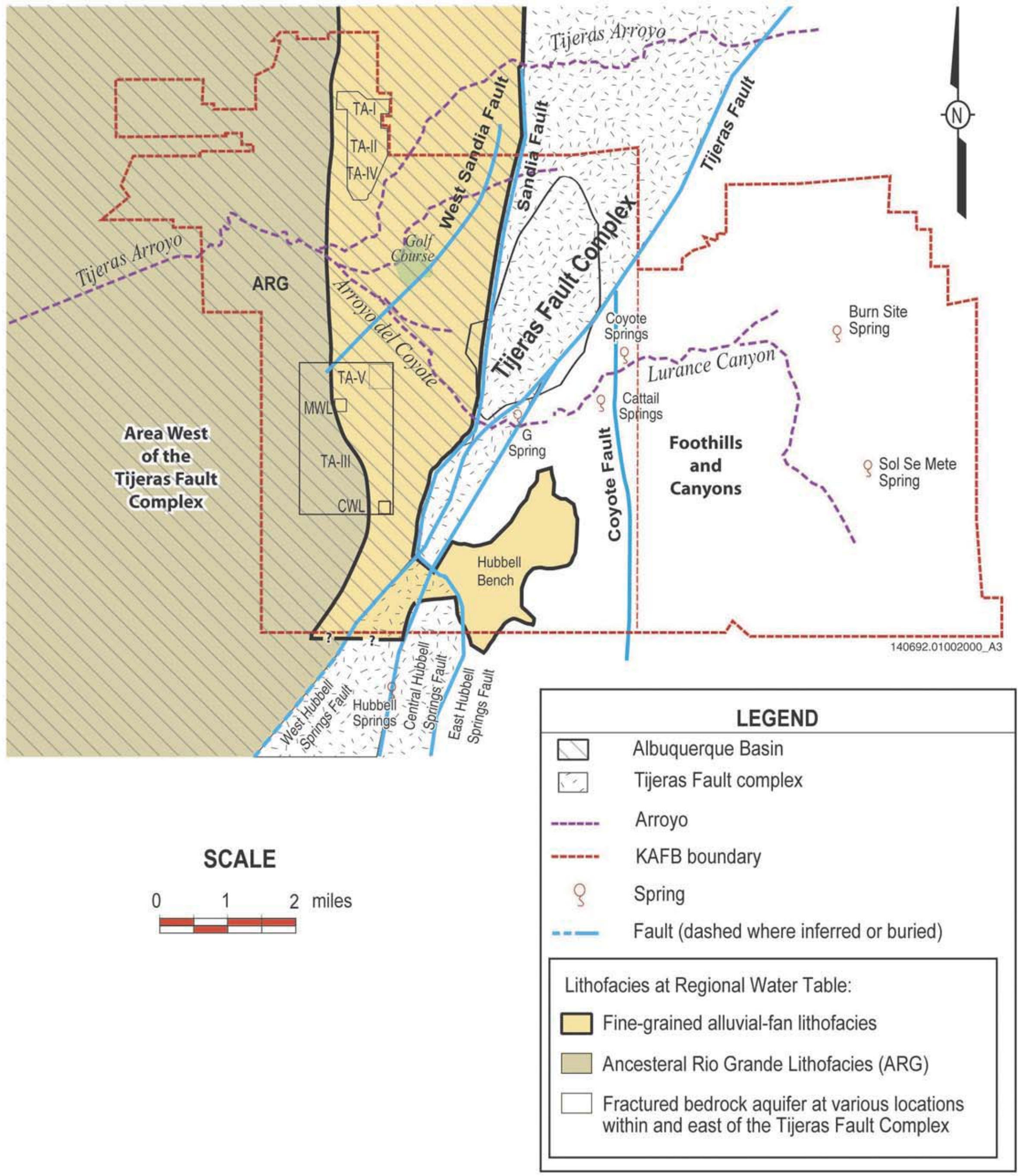

FIGURE 1-4. Hydrogeologically Distinct Areas Primarily Controlled by Faults (Modified from SNL 1995)

A perched groundwater system (PGWS) overlies the regional aquifer in the north portion of KAFB. The PGWS extends from TA-I to the KAFB Golf Course. The western extent of the PGWS lies between Wyoming Boulevard and the Albuquerque International Sunport's (airport) east-west runway. The eastern extent is just east of the KAFB landfill and may be bounded by the West Sandia Fault. The groundwater gradient within the PGWS is to the southeast with the depth to groundwater approximately 270 ft bgs in the west and 420 ft bgs in the east.

1.6.1 Natural Springs

Two perennial springs are located on KAFB (Coyote Springs and Sol se Mete Spring). Additionally, there is one perennial spring (Hubbell Spring) located immediately south of the KAFB boundary on Isleta Pueblo. Numerous ephemeral springs occur within the foothills and in the eastern reach of Arroyo del Coyote.

1.6.2 Groundwater Production

The primary regional aquifer in the Albuquerque Basin is within the upper unit and, to a lesser degree, the middle unit of the Santa Fe Group Aquifer System. Most ABCWUA water supply wells are located on the east side of the Rio Grande, which is the most productive portion of the aquifer. The highest-yield wells are screened in the sediments associated with the ancestral river channel. Prior to extensive urban development in the Albuquerque area beginning in the 1950s, the direction of regional groundwater flow in the area of KAFB was primarily to the southwest. As a result of groundwater withdrawal, the local water table has dropped by as much as 141 ft (Thorn et al. 1993). Groundwater withdrawal from KAFB and ABCWUA wells at the north end of KAFB have created a trough-like depression in the water table, causing flow to be diverted northeast in the direction of the well fields.

1.7 Regional Climate

Large diurnal temperature ranges, summer monsoons, and frequent drying winds are characteristic of the regional climate in the Albuquerque Basin and the Sandia, Manzanito, and Manzano Mountains.

1.7.1 Temperature

Temperatures are typical of mid-latitude dry continental climates with summer high temperatures in the basin around 90 degrees Fahrenheit (°F) and winter high temperatures around 50°F. Daily low temperatures range from around 60°F in the summer to around 20°F in the winter. The dry continental climate also produces low average humidity in the late spring and summer prior to the onset of the monsoon season. Daytime relative humidity can be between 10 and 20 percent in the spring and early summer, with an average humidity near 30 percent. Winter relative humidity averages near 50 percent.

1.7.2 Precipitation

Precipitation varies across the region with many locations in the higher elevations of the mountains receiving annual rainfall twice that of locations in the Albuquerque Basin. Most precipitation falls between July and October, mainly in the form of brief, heavy rain showers. Average annual precipitation, based on 15 years of data collected between 1995 and 2009, is approximately 9.0 inches at SNL/NM, with 10.9 inches in the lower foothills. Annual precipitation recorded at the National Weather Service cooperative stations in mountain elevations varies between 10 and 23 inches. The winter season in the Albuquerque Basin and around SNL/NM is generally dry, with an average of less than 1.5 inches of precipitation falling between December and February.

1.7.3 Climate

While the regional climate is described by the atmospheric state variables of temperature and humidity, site-specific meteorology at SNL/NM is influenced by the proximity to topographic features such as mountains, canyons, and arroyos. These features influence local wind patterns across the site. Canyons and arroyos tend to channel or funnel wind, whereas mountains create an upslope/downslope diurnal pattern to wind flows. Winds tend to blow toward the mountains or up the Rio Grande Valley during the day, and nocturnal winds tend to blow down the mountain towards the Rio Grande Valley. These topographically induced wind flows can be enhanced or negated by weather systems that move across the southwestern U.S. The strongest winds occur in the spring when monthly wind speeds average 10.3 miles per hour (mph). Wind gusts commonly reach 50 mph.

1.8 Regional Ecology

The ecology of SNL/NM is influenced by two major physiographic provinces - Mesa and Plains, and mountains. The various elevations in these provinces provide a varied range of life zones on KAFB.

1.8.1 Physiographic Provinces

Mesa and Plains - A significant portion of central New Mexico, including the middle Rio Grande and much of SNL/NM, is comprised of this physiography. Major landforms include valleys, lowlands, outwash plains, and alluvial fans and terraces. Grama and galleta grasses, four-wing saltbush, and sand sage cover lower elevations, with piñon pine and juniper species characterizing the higher elevations. Riparian areas grow in strips along water courses and include cottonwood, willow and non-native salt cedar trees.

Mountains - The Sandia and Manzano Mountains are south of (but not part of) the Rocky Mountains. The eastern portion of SNL/NM is located in, and bordered by, the Manzano Mountains. Vegetation in these steep, rugged mountains varies greatly on the basis of elevation and aspect. Forests tend to be patchy due to topography, weather, fire, insect outbreaks, and disease. The landscape is a complex mosaic of open meadows, and forest stands of varying ages and species.

These physiographic provinces each have an influence on the typical landforms, flora, and fauna predominant within the SNL/NM area. The topography at KAFB ranges from lowland grasslands to high-elevation coniferous forests. With much of the area undeveloped, there is great diversity in plant and animal communities living on KAFB. At least 267 plant species and 195 animal species are found on KAFB (DOE 1999). Table 1-1 lists the most common species of birds, mammals, reptiles, amphibians, and plants that have been identified on-site.

TABLE 1-1. Common Plants and Animals Identified at KAFB

BIRDS			
American robin	*Turdus migratorius*	Horned lark	*Eremophila alpestris*
American kestrel	*Falco sparverius*	Killdeer	*Charadrius vociferus*
Black-chinned hummingbird	*Archilochus alexandris*	Loggerhead shrike	*Lanius ludovicianus*
Black-headed grosbeak	*Pheucticus melanocephalus*	Mountain bluebird	*Sialia currucoides*
Broad-tailed hummingbird	*Selasphorus platycercus*	Red-tailed hawk	*Buteo jamaicensis*
Dark-eyed junco	*Junco hyemalis*	Spotted towhee	*Pipilo maculatus*
MAMMALS			
Black bear	*Ursus americanus*	Deer mouse	*Peromyscus maniculatus*
Bobcat	*Felis rufus*	Gunnison's prairie dog	*Cynomys gunnisoni*
Banner-tailed kangaroo rat	*Dipodomys spectabilis*	Gray fox	*Urocyon cinereoargenteus*
Black-tailed jackrabbit	*Lepus californicus*	Mule deer	*Odocoileus hemionus*
Desert cottontail	*Sylvilagus audubonii*		
REPTILES AND AMPHIBIANS			
Collared lizard	*Crotaphytus collaris*	Great plains skink	*Eumeces obsoletus*
Chihuahuan spotted whiptail	*Aspidoscelis exsanguis*	New Mexico spadefoot toad	*Spea multiplicata*
Round-tailed horned lizard	*Phrynosoma modestum*	Western diamondback rattlesnake	*Crotalus atrox*
Prairie lizard	*Sceloporus consobrinus*	Side-blotched lizard	*Uta stansburiana*
Gopher snake	*Pituophis catenifer*	Short-horned lizard	*Phrynosoma hernandesi*
PLANTS			
Apache plume	*Fallugia paradoxa*	Goathead	*Tribulus terrestris*
One-seed juniper	*Juniperus monosperma*	India ricegrass	*Achnatherum hymenoides*
New Mexico feathergrass	*Hesperostipa neomexicana*	Ring muhly	*Muhlenbergia torreyi*
Purple three-awn	*Aristida purpurea*	Bush muhly	*Muhlenbergia porteri*
Shrub live oak	*Quercus turbinella*	Soapweed yucca	*Yucca glauca*
Galleta	*Pleruaphis jamesii*	Black grama	*Bouteloua eriopoda*

NOTES: KAFB = Kirtland Air Force Base

1.8.2 Regional Life Zones Occurring on KAFB

Ponderosa Pine Forest or Transition Life Zone (7,000 to 8,000 ft) – a closed canopy of ponderosa pine, piñon-pine, juniper, scrub oak, grassy meadows, streams, marshes, and canyons are typical of this zone. The USFS withdrawn area in the eastern portion of KAFB reaches an elevation of just over 7,900 ft.

Piñon-Juniper Woodland Zone (6,000 to 7,000 ft) – a mostly open canopy of piñon-pine and juniper sparsely populate this zone of foothills and mesas. Animals typical of this woodland include the piñon mouse and piñon jay. Much of the rolling terrain in the withdrawn area is comprised of this zone.

Upper Sonoran Life Zone (below 6,000 ft) – this short grass prairie zone occurs on alluvial fans, mesas, and gently rolling or sloping plains. Pioneer plants include tumbleweed, goat head, and spurge; intermediate plants include galleta and burro grass, cactus, and mixed weeds; climax vegetation is grama grass. Animals include prairie dogs, burrowing owls, and kangaroo rats. Most of KAFB land falls within this zone (Figure 1-1).

1.9 Glass Bottle Recycling Pilot

Due to the isolated and rural nature of New Mexico, glass recycling has not been economically feasible until recently. While the COA would divert glass from its residents, it was often just piled and stored or used as daily landfill cover. Only in the past few years has glass started to be a material of local value for a small manufacturing company. The City has sold its backlog of material and is now moving glass material in and out in a functioning process. That being the case, the City is allowing outside entities, generally other municipalities, to deliver glass materials to be processed and recycled. Sandia has been in a position of having to justify local inability to recycle glass with regards to the now-mandatory federal green building construction requirements. Glass is a basic material listed in the required recycling availability section of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system that Sandia follows. Sandia's outside contractor for waste management obtained new hauling and tipping permits to use the City's recycle facility, and had the Sandia-owned rolloff truck modified to haul and dump the gabled rolloffs of glass.

Center 2700 at SNL/NM was identified as large-quantity generator of glass waste, and its processes had to be reviewed to understand how to segregate the glass waste from other industrial solid wastes. Using revenues from other materials recycled such as cardboard and scrap metal, P2 provided the seed money to obtain the new outdoor and indoor containers needed for segregating the glass. In August 2012, two outdoor glass recycling rolloffs were deployed to the eastern half of TA-I for this pilot. The recycling rolloffs were advertised in nearby buildings to raise awareness of the program to building residents. Each site that received a rolloff had to be reviewed and prepared before the rolloffs could be delivered for long-term placement. In the first quarter of 2012, Center 2700 realized an 87 percent weight reduction of industrial solid waste.

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Chapter 2
Compliance Summary

Sandia Corporation (Sandia) conducts operations based on environmental regulations, statutes, and U.S. Department of Energy (DOE) directives through a variety of programs at Sandia National Laboratories, New Mexico (SNL/NM) that work together to pursue complete compliance with applicable regulations. As a part of these federal, state, and local mandates, Sandia adheres to strict reporting and permitting requirements.

This chapter summarizes Sandia's compliance status with major environmental regulations, statutes, and DOE directives that are applicable to operations conducted at SNL/NM (Table 2-1 and Section 2.1.16). Compliance issues, corrective actions, environmental occurrences, and environmental audits and appraisals are also discussed in this chapter.

Current permits held by Sandia, DOE, the National Nuclear Security Administration (NNSA), and the Sandia Field Office (SFO) are listed in Chapter 8.

Compliance Order on Consent (COOC)

On April 29, 2004, the New Mexico Environment Department (NMED), DOE, and Sandia entered into the COOC. The COOC provides requirements and establishes schedules and deliverables for corrective action pursuant to the New Mexico Hazardous Waste Act (NMHWA) as well as requirements concerning perchlorate and nitrate pursuant to the New Mexico Solid Waste Act.

Federal Facilities Compliance Order (FFCO)

On October 4, 1995, NMED issued the FFCO to DOE and Sandia. The FFCO was developed pursuant to the Federal Facilities Compliance Act (FFCA), and provides requirements for achieving compliance with the requirements of Title 40 of the Code of Federal Regulations (CFR), Part 268.50 for mixed hazardous/radioactive waste at SNL/NM.

2.1 Compliance Status with Federal Regulations

Most environmental regulations and statutes applicable to SNL/NM are shown in Table 2-1. The following subsections detail the regulations.

2.1.1 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly referred to as the "Superfund," provides cleanup funds and/or assessment requirements for inactive waste sites at all federal facilities. A Preliminary Assessment/Site Inspection, as required by CERCLA, was performed at SNL/NM in 1988. This inspection confirmed that Sandia does not own any sites that would qualify for the National Priorities List (NPL), which lists the nation's high priority cleanup or "Superfund" sites. Therefore, with respect to inactive hazardous waste sites, Sandia has no CERCLA reporting requirements. Amendments under the Superfund Amendments and Reauthorization Act (SARA) require additional reporting in the event of a reportable quantity release. Sandia was in full compliance with CERCLA/SARA in 2012, as illustrated in this chapter.

TABLE 2-1. Major Environmental Regulations & Statutes Applicable to SNL/NM

Regulation/Statute	Description
Atomic Energy Act (AEA)	Directs U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) in the management of nuclear materials and radioactive waste
Clean Air Act (CAA) and CAA Amendments (CAAA)	Provides standards to protect the nation's air quality
Clean Water Act (CWA)	Provides general water quality standards to protect the nation's water sources and byways
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	Provides federal funding for cleanup of inactive waste sites on the National Priorities List (NPL) and mandates requirements for reportable releases of hazardous substances
Cultural Resources Acts	Includes various acts that protect archeological, historical, religious sites, and resources
Endangered Species Act (ESA)	Provides special protection status for federally listed endangered or threatened species
Executive Orders (EOs)	Several EOs provide specific protection for wetlands, floodplains, environmental justice in minority and low-income populations, and encourages greening the government through leadership in EM
Federal Facility Compliance Act (FFCA)	Directs federal agencies regarding environmental compliance
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	Controls the distribution and use of various pesticides
Migratory Bird Treaty Act (MBTA) of 1918	Prevents the taking, killing, possession, transportation and importation of migratory birds, their eggs, parts, and nests
National Emission Standards for Hazardous Air Pollutants (NESHAP)	Specifies standards for radionuclide air emissions and other hazardous air releases under the CAA
National Environmental Policy Act (NEPA)	Requires federal agencies to review all proposed activities so as to include environmental aspects in agency decision-making
Resource Conservation and Recovery Act (RCRA)	Mandates the management of solid and hazardous waste and certain materials stored in underground storage tanks (USTs)
Safe Drinking Water Act (SDWA)	Enacts specific health standards for drinking water sources
Superfund Amendments and Reauthorization Act (SARA)	SARA, Title III, also known as the Emergency Planning and Community-Right-to-Know Act (EPCRA), mandates communication standards for hazardous materials over a threshold amount that are stored or used in a community
Toxic Substance Control Act (TSCA)	Specifies rules for the manufacture, distribution, and disposal of specific toxic materials such as asbestos and polychlorinated biphenyls (PCBs)

NOTES: EM = Environmental Management
SNL/NM = Sandia National Laboratories, New Mexico

2.1.2 Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as SARA Title III, establishes emergency planning requirements for federal, state, and local governments and industry.

EPCRA ensures that communities have the right to know about and be informed of potential hazards including the type and location of large quantities of toxic chemicals used and stored by facilities in or near the community. EPCRA specifically mandates that chemical information be made available to local emergency response organizations, such as fire departments and hospitals. Any inadvertent release must be reported to appropriate state and local authorities. All subsequent reports must be made accessible to the public. The four major reporting requirements designated by specific sections of EPCRA are shown in Table 2-2.

Information on EPCRA can be found at the following U.S. Environmental Protection Agency (EPA) website:

http://www.epa.gov/emergencies/content/epcra

Toxic Release Inventory (TRI) Reporting

EPCRA regulations require that facilities with activities described in the Standard Industrial Classification Codes 20 through 39 that use toxic chemicals listed in SARA Title III over a threshold value must submit a TRI report. The threshold value for listed chemicals requiring a TRI report is 10,000 pounds per year, unless otherwise specified.

TABLE 2-2. 2012 SARA Title III (or EPCRA) Reporting Requirements Applicable to SNL/NM

Section	SARA Title III Section Title	Requires Reporting? Yes	No	Description
302 - 303	Emergency Planning	Yes		Sandia submits an annual report listing chemical inventories above the reportable Threshold Planning Quantities listed in 40 CFR Part 355 Appendix B, the location of the chemicals, and emergency contacts. The report is prepared for the DOE/NNSA/SFO, which distributes it to the required entities.
304	Emergency Notification		No	There was no reportable RQ release in 2012.
311-312	Hazardous Chemical Storage Reporting Requirements	Yes		There are two "Community Right-to-Know" reporting requirements: (a) Sandia completes the EPA Tier II forms for all hazardous chemicals present at the facility at any one time in amounts equal to or greater than 10,000 lb and for all extremely hazardous substances present at the facility in an amount greater than or equal to 500 lb or the Threshold Planning Quantity, whichever is lower; (b) Sandia provides MSDSs electronically for each chemical entry on a Tier II form unless it decides to comply with the EPA's alternative MSDS reporting, which is detailed in 40 CFR Part 370.21.
313	Toxic Chemical Release Forms		No	Sandia was below the reporting thresholds for CY 2012 for submitting a TRI Report for lead compounds.

NOTES: CFR = Code of Federal Regulations
CY = Calendar Year
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
EPCRA = Emergency Planning and Community Right-to-Know Act
lb = pounds ,
MSDS = Material Safety Data Sheet (gives relevant chemical information)
NNSA = National Nuclear Security Administration
R&D = research and development
RQ = reportable quantity
Sandia = Sandia Corporation
SARA = Superfund Amendments and Reauthorization Act
SFO = Sandia Field Office
SNL/NM = Sandia National Laboratories, New Mexico
TRI = Toxic Release Inventory

Each year, nearly 23,000 facilities report to the EPA under the TRI Program. The proposed TRI Reporting Forms Modification Rule (1674 Federal Register/Vol. 70, No. 6/ Monday, January 10, 2005) sought comment on eliminating certain information from the reports, simplifying other reporting data, and, in some cases, reducing duplicate data collection efforts. The options proposed were to reduce the cost of compiling and submitting TRI reports, while maintaining the quality and practical utility of the TRI data. This rule became effective on September 12, 2005.

In 2012, chemical use at SNL/NM was below the reporting threshold for submitting a TRI report for lead compounds. Sandia continues to document its toxic chemical use in the *Chemical Inventory Report Calendar Year (CY) 2012* (SNL 2013b), which documents all purchases of chemicals at SNL/NM, Tonopah Test Range (TTR), and Kauai Test Facility (KTF) for CY 2012. This chemical inventory supports compliance with SARA Title III. Summary TRI Reporting information for TTR and KTF is provided in the CY 2012 Annual Site Environmental Report for TTR/KTF.

2.1.3 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) regulates the generation, transportation, treatment, storage, and disposal (TSD) of hazardous chemical waste and non-hazardous solid waste, and the storage of hazardous or petroleum products in underground storage tanks. Under the authority of the NMHWA, and with delegated authority from the EPA under RCRA, the NMED administers hazardous and solid waste regulatory programs in New Mexico. Hazardous and solid waste management activities at SNL/NM are conducted under NMED regulations. Some additional RCRA requirements and EPA regulations also apply. Applicable regulations are listed in Chapter 8.

The hazardous component of hazardous/radioactive mixed waste (MW) is regulated as hazardous waste and is subject to the requirements of state and federal regulations. The radioactive component of MW is regulated under the Atomic Energy Act (AEA) of 1946.

Sandia generates hazardous waste and MW through normal operations and through its ongoing Environmental Restoration (ER) Operations, which is responsible for the cleanup of sites that were formerly used for operations such as testing and disposal. Sandia currently implements an active and successful program to minimize hazardous waste and MW through product substitutions, process changes, material re-use, and recycling. For a summary of Sandia's hazardous waste management activities during 2012 refer to Chapter 3.

Operating Permits – Sandia operates hazardous waste management units at SNL/NM under the following permits issued by NMED:

- Hazardous Waste Management Facility, under Permit NM5890110518-1,
- Thermal Treatment Facility, under Permit NM5890110518-2, and
- Corrective Action Management Unit (CAMU), under Permit NM5890110518-1, Module IV.

On February 6, 2002, Sandia and DOE/NNSA/SFO submitted a comprehensive RCRA Part B request to renew the operating permits for these units. The request also included updated permit applications for nine MW management units: the Radioactive and Mixed Waste Management Facility, the High Bay Waste Storage Facility (HBWSF), seven Manzano Storage Bunkers (MSBs); and a new application for operation of the Auxiliary Hot Cell Facility. Sandia continues to operate under the existing permits and under interim status during the permit application and renewal process. The HBWSF and two of the seven MSBs were withdrawn from the permit application in 2003, and RCRA closure of those units was completed in 2006. Treatment operations were completed at the CAMU in 2003. Closure of the unit was completed later that year, and DOE/NNSA/SFO and Sandia currently conduct post-closure care and maintenance, as detailed in Section 3.4.1. DOE/NNSA/SFO and Sandia submitted an updated Part B permit request to NMED on May 4, 2012.

On August 20, 2007, NMED issued a draft operating permit to DOE/NNSA/SFO and Sandia and invited public comments. DOE/NNSA/SFO, Sandia, and several citizens submitted comments to NMED. During 2009, NMED met with interested commenters to discuss their comments and propose modifications to the draft permit. On September 17, 2012, NMED issued a revised draft operating permit to DOE/NNSA/SFO and Sandia, and proposed granting corrective action complete (CAC) status for 24 solid waste management units and areas of concern. NMED invited public comments on the draft permit and proposed CAC status. The comment period ended November 16, 2012, but was extended into 2013.

TA-III Classified Waste Landfill – The TA-III Classified Waste Landfill was used to store non-hazardous classified media (e.g. floppy disks) and components. Sandia and DOE/NNSA/SFO, instead of seeking permit coverage, plan to excavate the contents of the landfill and revegetate the area. An excavation plan was approved by NMED on April 6, 2010.

Post-Closure Care Permit, Chemical Waste Landfill (CWL) – The CWL was used for hazardous waste disposal under interim status until 1985. From 1981 to 1989, the CWL was also used for surface storage of hazardous wastes in drums. Waste management operations ceased and closure activities began in 1989. Closure included two voluntary corrective measures: extraction of solvent vapors (primarily trichloroethylene) and excavation of the entire landfill. Sandia and DOE/NNSA/SFO submitted a Post-Closure Care Plan in 2005 as a permit application.

On October 15, 2009, NMED issued a final post-closure care permit and a notice of approval for the final remedy and closure plan amendment. The permit became effective on June 2, 2011, when NMED issued written approval of DOE/NNSA/SFO and Sandia's certification of the closure of the CWL. Details about closure and post-closure care activities are detailed in Section 3.4.1.

2.1.4 Federal Facility Compliance Act

The FFCA requires federal facilities to comply with all federal, state, and local requirements for hazardous and solid waste, including full compliance with the restrictions and prohibitions on extended storage of wastes that do not meet the applicable hazardous waste treatment standards. On October 4, 1995, NMED issued a FFCO (developed pursuant to the FFCA) to DOE and Sandia. A general *Site Treatment Plan (STP)* (SNL 2012a) and a schedule for processing the waste were developed. The STP does not include any 2012 deadlines. In 2012, Sandia continued to characterize and treat MW and to package wastes for shipment to permitted off-site TSD facilities.

2.1.5 Atomic Energy Act

In 1946, the AEA was enacted to encourage the development and use of nuclear energy for general welfare, common defense, and security. The purpose of the AEA is to assure the proper management of nuclear materials and radioactive waste. The AEA, as amended, delegates control of nuclear energy and nuclear materials primarily to DOE/NNSA/SFO, the U.S. Nuclear Regulatory Commission and the EPA. Federal regulations control radioactive emissions and the transportation of nuclear materials. The authority for controlling radioactive waste is retained by DOE/NNSA/SFO and governed by DOE directives.

2.1.6 Clean Air Act

The objectives of the Clean Air Act (CAA), as amended, are to protect and enhance the nation's air quality. The EPA is responsible for describing and regulating air pollutants from stationary and mobile sources and for setting ambient air quality standards. The City of Albuquerque has direct delegation from EPA Region VI to locally administer these standards as well as specific air emission permits and registrations, as shown in Chapter 8, Table 8-1.

The CAA requires the EPA to develop a list of air pollutants from all sources that could harm public health or the environment. The EPA identified six substances as "criteria pollutants" and subsequently developed National Ambient Air Quality Standards (NAAQS) for these pollutants.

The EPA program for the attainment and maintenance of NAAQS requires local agencies to develop a comprehensive permitting program. The Air Quality Control Board has developed a set of regulations governing mobile and stationary sources of air pollution.

In addition to the regulations for criteria pollutants, the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) Program prescribes emission limitations for hazardous air pollutants (HAPs).

Radiological NESHAP

Subpart H of 40 CFR 61 specifically regulates radionuclide emissions (other than radon) from DOE facilities. As required by the regulation, Sandia calculates an annual dose from actual or calculated emissions to potentially exposed members of the public. The regulation requires that Sandia determine the maximum possible dose that could be delivered to an individual residing at a nearby location 24 hours-per-day. The result is the effective dose equivalent to the maximally exposed individual (MEI). The dose is compared to the EPA standard of 10 millirems per year (mrem/yr) allowed from radioactive air emissions from a DOE facility. For perspective, the annual radiation dose from natural background radiation is approximately 311 mrem/yr (NCRP 2009). Sandia met all NESHAP compliance requirements in 2012 as detailed in Section 5.4.2.

Fugitive Dust Permitting

The COA enforces 20.11.20 New Mexico Administrative Code (NMAC) to ensure that all persons conducting active operations that result in disturbed surface areas, or that involve bulk material handling, use reasonably available control measures (or other effective measures) on an ongoing basis to prevent or abate injury to human health, animal and plant life, and to prevent or abate unreasonable interference with public welfare, visibility, and the reasonable use of property.

National Emissions Inventory

As required by the Consolidated Emission Reporting Rule (EPA 2002), the emission inventory requests annual emissions of volatile organic compounds, nitrogen oxide, carbon monoxide, sulfur dioxide, lead, ammonia, particulate matter with a diameter of equal to or less than 10 microns (PM_{10}), particulate matter with a diameter of equal to or less than 2.5 microns ($PM_{2.5}$), and HAP.

New Source Review (NSR) Requirements

The NSR permitting program was established as part of the 1977 Amendments to the CAA.

NSR requirements provide assurance to the public that any large, new, or modified industrial source in their neighborhood will be protective of human health and the environment, and that advances in pollution control occur concurrently with industrial expansion.

New Source Performance Standard (NSPS) Requirements

As part of an effort to control pollution in the U.S., the EPA provides NSPS requirements that dictate the level of pollution that a new stationary source may produce. These standards are authorized by Section 111 of the CAA, and the regulations are published in 40 CFR Part 60. An NSPS has been established for a number of individual industrial or source categories, including boilers and generators.

Reciprocating Internal Combustion Engine (RICE) NESHAP Requirements

As part of an effort to control pollution in the U.S., the EPA provides NESHAP requirements that dictate the level of pollution that stationary sources may produce within an area source for hazardous air pollutants. These standards are authorized by Section 111 of the CAA, and the regulations are published in 40 CFR Part 63. The RICE NESHAP has been established to address stationary generators and the potential ambient air impact within an area source for HAP.

Open Burn Permitting

The COA enforces 20.11.21 NMAC to ensure that all persons conduct open burning in a manner that prevents or abates emissions that are visible and that produce noxious by-products of combustion.

Ozone Depleting Substances Requirements

Based on the requirements of the CAA, the EPA has established regulations that affect many aspects of the refrigeration industry.

Title V Operating Permit

The CAA Amendments of 1990 contained provisions under Title V requiring all existing major air emission sources to obtain an operating permit. A major source is defined as the combined emissions from any facility with the potential to emit:

- 100 tons per year (tpy) or greater of any criteria pollutant,
- 100,000 carbon-dioxide-equivalent greenhouse gas emissions,
- 10 tpy of any HAP, or
- 25 tpy of any combination of HAPs.

Details on the applicability of Title V to SNL/NM and activities are in Section 5.5.2.

2.1.7 Clean Water Act

The Clean Water Act (CWA) establishes guidelines to protect the "Waters of the U.S." by regulating the discharge of pollutants. At SNL/NM, the CWA applies to sanitary and septic system wastewater effluents, storm water runoff, and surface water discharges.

The CWA is implemented through local, state, and federal water quality standards as follows:

(1) the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) administers regulations for sanitary sewer discharges based on federal pretreatment standards,

(2) the EPA and the NMED administer regulations concerning oil storage and surface discharges, and

(3) the EPA has authority over National Pollutant Discharge Elimination System (NPDES) permits.

New Mexico Stream Standards

EPA Region VI is the permitting agency for discharges under the NPDES. NMED Surface Water Quality Bureau assists EPA in regulation of storm water discharges by performing inspections on behalf of EPA and by serving as a local point of contact for providing information to permit holders. New Mexico has enacted "Standards for Interstate and Intrastate Surface Waters" (20.6.4 NMAC) to protect the quality of surface waters in the state.

ABCWUA Sewer Discharge Regulations

There are six wastewater monitoring stations, or outfalls, operating under the ABCWUA permits at SNL/NM. During 2012, there was one reported event that exceeded permitted limits established by the ABCWUA. For additional information refer to Section 6.1.1.

Surface Discharge

All discharges made to the ground or to containment areas must be evaluated for compliance with regulations implemented through the New Mexico Water Quality Control Commission standards for the protection of ground waters and surface waters prior to discharge. Sandia reviewed and approved 25 one-time internal surface discharge permits in 2012. Sandia also investigated three reportable environmental releases that met NMED reporting standards. Detailed information regarding these releases can be found in Section 2.2.2 and Section 6.2.2 of this report. Sandia maintains two evaporation lagoons in Technical Area (TA)-IV which are permitted by NMED Discharge Permit-530 (DP-530). The TA-IV lagoons are used to contain and evaporate accumulated storm water pumped from the secondary containment areas around seven oil tanks that support the pulsed power accelerators. All permit conditions for the TA-IV permitted lagoons were met in 2012. The current permit for DP-530 was re-issued on September 12, 2007 and was to expire on September 12, 2012. Permit renewal for DP-530 was submitted within the required 180-days prior to its expiration date. On September 11, 2012, NMED informed Sandia that because the permit renewal application had been submitted in time, the lagoons are still permitted.

NPDES

NPDES implements the requirements that are specific to all discharges made to "Waters of the U.S." as defined in the CWA and "Surface Waters of the State" and as defined in New Mexico's "Standards for Interstate and Intrastate Surface Waters" (20.6.4 NMAC). At SNL/NM, all point sources discharge to either state or federal waters and are evaluated for compliance with their respective regulations.

Historically, collecting visual and analytical samples at SNL/NM has been a challenge due to Albuquerque's climate. Analytical sampling and visual assessments are conducted, sufficient runoff permitting. For additional information refer to Section 6.3.

2.1.8 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) authorizes the EPA to set national standards for drinking water sources, treatment systems, and water distribution. These standards are promulgated by the EPA as primary and secondary drinking water regulations. Specific drinking water quality criteria are established to protect human health, which limits the maximum contaminant level (MCL) of specific organic and inorganic chemical substances and biological organisms in potable water. Under the authority of the SDWA, and with delegated authority from the EPA, the NMED administers the safe drinking water regulatory program in New Mexico. Safe drinking water protection activities at SNL/NM are conducted under NMED regulations (20.7.10 NMAC). These state drinking water rules have requirements not covered by the SDWA. Applicable regulations are listed in Chapter 8.

The triennial Sanitary Survey for the Kirtland Air Force Base (KAFB) (including SNL/NM) Public Water System (PWS) was conducted on June 14, 2012, by NMED's Drinking Water Bureau (DWB). During the survey, seven significant and three minor deficiencies were identified. Only one each of the significant and minor deficiencies was attributed to SNL/NM's portion of the PWS. The significant deficiency, "Inadequate sanitary setback from potential sources of contamination", states: "DWB was informed that a land applied synthetic organic carbon herbicide (Hexazinone) is used to control vegetative growth in some areas of the water system." Although Hexazinone was never actually applied around the two elevated water storage tanks in question, a procedure with maps was formalized to exclude application of herbicides near any fill stand, pump house, or storage tank on SNL/NM's portion of the PWS. The minor deficiency states: "A water hose attached to a frost free water hydrant was observed at the Coyote Test Tank." Although the water hose was not actually attached to the frost free hydrant at the time of the survey, the hydrant will be removed during the tank refurbishment project scheduled during 2013. The next triennial Sanitary Survey is due in 2015.

Drinking Water Supply at SNL/NM

Potable water for most facilities on KAFB (including SNL/NM) is provided by the KAFB PWS. The system derives its water from deep groundwater wells (Appendix B). KAFB routinely samples its water and conducts analyses to establish that its water quality conforms to EPA's MCL standards. In support of KAFB compliance with NMED Drinking Water Standards, Sandia operates the water distribution system on DOE/NNSA/SFO property in conformance with the SDWA regulations. Sandia provides DOE/NNSA/SFO with an annual certification for KAFB that all backflow preventers installed in the potable water distribution system have been properly tested and maintained.

Information on the KAFB PWS is located on the EPA's SDWA website, which details the compliance status for all drinking water systems in the U.S.

http://www.epa.gov/safewater

Specific water quality data and system performance are published by KAFB in the annual Consumer Confidence Report on the Quality of Drinking Water at the following website:

http://www.kirtland.af.mil/shared/media/document/AFD-110623-041.pdf

From November 26 through December 7, 2012, KAFB conducted a Drinking Water Survey and Water Vulnerability Assessment of their PWS (including SNL/NM's portion). SFO is awaiting receipt of KAFB's classified report.

2.1.9 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) provides regulations regarding the import, export, use, and disposal of specifically listed toxic chemicals. At SNL/NM, compliance with TSCA primarily involves the handling and disposal of polychlorinated biphenyls. Details related to TSCA are in Section 3.5.

2.1.10 Federal Insecticide, Fungicide, and Rodenticide Act

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulates pesticide use and is enforced under the New Mexico Pesticide Control Act. Sandia's Biological Control Activity compiles information on pesticide use at SNL/NM, as discussed in Section 3.6. Sandia was in full compliance with FIFRA in 2012.

2.1.11 National Environmental Policy Act

National Environmental Policy Act (NEPA) requires federal agencies (and other organizations that perform federally sponsored projects) to consider environmental issues associated with proposed actions, be aware of the potential environmental impacts associated with these issues, and include this information in early project planning and decision making. Additionally, if a proposed action is not within a class of actions previously determined to have environmentally "insignificant" impacts, the agency must prepare an environmental assessment or an environmental impact statement before making an irretrievable commitment of resources or funding. Although a major objective of NEPA is to preserve the environment for future generations, the law does not require an agency to choose a course of action with the least environmental impacts. Additional information is provided in Section 3.7.

2.1.12 Endangered Species Act

The Endangered Species Act (ESA) ensures that any action authorized, funded, or carried out by a party will not jeopardize the continued existence of a "threatened or endangered species" or result in adverse modifications to its habitat. At SNL/NM, ESA compliance is coordinated through NEPA reviews and the Ecology Program. Table 2-3 lists the threatened and endangered species potentially occurring in Bernalillo County.

2.1.13 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 put the 1916 Convention for the Protection of Migratory Birds into effect. The original statute implemented the agreement between the U.S. and Great Britain (for Canada), and later amendments implemented treaties between the U.S. and Mexico, the U.S. and Japan, and the U.S. and Russia. The MBTA prevents the taking, possession, killing, transportation, or importation of migratory birds, their eggs, parts, or nests. At SNL/NM, the MBTA is coordinated through NEPA reviews and the Ecology Program.

2.1.14 Cultural Resources Acts

The three primary cultural resources acts applicable at SNL/NM are:

- National Historic Preservation Act (NHPA),
- Archaeological Resources Protection Act, and
- American Indian Religious Freedom Act.

At SNL/NM, cultural resources compliance is coordinated through the NEPA Program. Actions that could adversely affect cultural resources are initially analyzed in a NEPA checklist. Historic properties, as defined by NHPA and other implementing regulations, include both archaeological sites and historic buildings and structures. Historic buildings and structures may include those over 50 years of age that are historically significant or younger structures of exceptional significance. There are historic buildings on property owned by DOE/NNSA. Planning through the NEPA process identifies potential impacts to these sites, and appropriate historic documentation is undertaken to mitigate adverse effects when necessary.

There are no known archaeological sites located on DOE/NNSA-owned property. However, archaeological sites do exist on and in close proximity to DOE/NNSA-permitted property and ER sites. These areas are located on U.S. Air Force (USAF) property and on portions of the Cibola National Forest land withdrawn area. Sandia activities are planned to avoid potential impacts to these cultural resource sites. DOE/NNSA has a responsibility to ensure that impacts to cultural resources are assessed and appropriate actions are taken to mitigate any impact.

TABLE 2-3. Threatened and Endangered Species Potentially Occurring in Bernalillo County, New Mexico

Common Name	Scientific Name	Federal Status	State Status	Observed at KAFB
Animals				
Spotted bat	*Euderma maculatum*	---	Threatened	
Pale Townsend’s big-eared bat	*Plecotus townsendii pallescens*	SOC	---	
New Mexican jumping mouse	*Zapus hudsonius luteus*	Candidate	Endangered	
Fish				
Rio Grande silvery minnow	*Hybognathus amarus*	Endangered	Endangered	
Birds				
Northern goshawk	*Accipiter gentilis*	SOC		
Baird's sparrow	*Ammodramus bairdii*	SOC	Threatened	
Sprague’s pipit	*Anthus spragueii*	Candidate		
Western burrowing owl	*Athene cunicularia hypugea*	SOC	---	
Common black-hawk	*Buteogallus anthracinus anthracinus*	SOC	Threatened	
Black tern	*Childonias niger*	SOC	---	
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	---	
Broad-billed hummingbird	*Cynanthus latirostris magicus*	---	Threatened	
Southwest willow flycatcher	*Empidonax traillii extimus*	Endangered	Endangered	
Aplomado falcon	*Falco femoralis septentrionalis*	Endangered	Endangered	
American peregrine falcon	*Falco peregrinus anatum*	SOC	Threatened	X
Arctic peregrine falcon	*Falco peregrinus tundrius*	SOC	Threatened	
Bald eagle	*Haliaeetus leucocephalus*	---	Threatened	
White-eared hummingbird	*Hylocharis leucotis borealis*	---	Threatened	
Brown pelican	*Pelecanus occidentalis carolinensis*	---	Endangered	
Neotropic cormorant	*Phalacrocorax brasilianus*	---	Threatened	
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	---	
Bell's vireo	*Vireo bellii*	---	Threatened	X
Gray vireo	*Vireo vicinior*	---	Threatened	X
Insects				
Slate millipede	*Comanchelus chihuanus*	SOC	---	

NOTE: There are no listed endangered or threatened plant, reptile or amphibian species in Bernalillo County for Calendar Year 2012.
KAFB = Kirtland Air Force Base
SOC = species of concern

Historic Building Assessment
In 2012, Sandia, DOE/NNSA/SFO undertook consultation with the New Mexico State Historic Preservation Office (SHPO) on actions at five individual buildings, with two actions each on three of the five buildings. None of the actions were found to have an adverse effect on cultural resources.

In 2010, Sandia undertook a site-wide survey and historic building assessment of the SNL/NM site. The final recommendation to DOE/NNSA/SFO included eight historic districts and three individually eligible buildings. DOE/NNSA/SFO has not yet completed consultation with SHPO on the recommendation. As properties face renovation, DOE/NNSA/SFO conducts consultation with NM SHPO; for 2012, those consultations are included in eight properties mentioned above. Sandia is treating the properties recommended as eligible in the 2010 survey and assessment as historic. Documentation continues on buildings previously found eligible for the National Register of Historic Places.

2.1.15 Environmental Compliance Executive Orders

Floodplain Management (Executive Order [EO] 11988), as amended, has minimal impact for SNL/NM since all active SNL/NM facilities are located outside the 500-year floodplain as described by the U.S. Army Corps of Engineers (USACE 1979). This applies to both major on-site drainages: Tijeras Arroyo and Arroyo del Coyote.

Protection of Wetlands (EO 11990), as amended. Wetlands are areas inundated by surface or groundwater with a frequency sufficient to support a prevalence of aquatic plant and/or animal life. Wetlands generally include swamps, bogs, potholes, ponds, mud flats, and areas around natural springs. There are several natural springs on KAFB with a limited wetland setting. These springs, located on lands withdrawn from Cibola National Forest, are managed by the USAF and the U.S. Forest Service. These springs provide an important source of drinking water for wildlife and create a unique biological niche in an otherwise arid habitat.

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898), as amended. To the greatest extent practicable and permitted by law, consistent with the principles set forth in the Report on the National Performance Review (Gore 1993), each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the U.S. and its territories and possessions. DOE/NNSA/SFO and Sandia perform a periodic analysis to assess whether their existing or proposed operations cause any disproportionate impacts on minority or low-income populations within the area of influence of Sandia operations.

Strengthening Federal Environmental, Energy, and Transportation Management (EO 13423), was issued in January 2007. EO 13423 sets goals in the areas of energy efficiency, acquisition, renewable energy, toxin reductions, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. EO 13423 also requires more widespread use of Environmental Management Systems as the framework in which to manage and continually improve these sustainable practices.

Federal Leadership in Environmental, Energy, and Economic Performance (EO 13514), was issued in October 2009. EO 13514 establishes an integrated strategy towards sustainability to safeguard the health of our environment and make greenhouse gas emissions a priority for all federal agencies. EO 13514 sets goals in the areas of promoting electronics stewardship, pollution prevention, increased renewable energy, waste reduction, recycling, and fossil fuel usage reduction.

2.1.16 DOE Directives

DOE directives on the contract baseline that pertain to environmental protection and management are discussed in Chapter 1, "Sandia's Operations Contract." In 2012, Sandia met all requirements stated in these DOE directives.

2.1.17 Summary of Radiological Releases

A summary of radiological releases and public doses resulting from Sandia operations is provided in Table 2-4. Additional detailed information is found in Sections 5.3 and 5.4 of this report.

2.2 2012 Releases, Compliance Issues, and Environmental Occurrences

Under DOE Order 232.2 (DOE 2011b), the current order for occurrence reporting for CY 2012, an *occurrence* is defined as "one or more (i.e., recurring) events or conditions that adversely affect, or may adversely affect, DOE (including NNSA) or contractor personnel, the public, property, the environment, or the DOE mission." Events or conditions meeting criteria thresholds identified in DOE Order 232.2, or determined to be recurring through performance analysis, are considered occurrences. There are environmental releases that may not meet DOE Order 232.2 reporting thresholds; however, they are still reportable to outside agencies (see Chapters 2 and 6).

TABLE 2-4. SNL/NM Radiological Dose Reporting for Calendar Year 2012

Pathway	Dose to Off-Site MEI		Dose to On-Site MEI		Percent of DOE 100 mrem/yr Limit	Estimated Population Dose (80-km radius)		Population within 80-km radius of site	Estimated Background Radiation Population Dose	
	mrem	mSv	mrem	mSv		Person-rem	Person-Sv		Person-rem	Person-Sv
Air	3.16E-03	3.16E-05	1.00E-03	1.00E-5	0.003 percent	2.47E-01	2.47E-03	882,187	-	-
Water	0	0	0	0	0	0	0	0	-	-
Other Pathways	0	0	0	0	0	0	0	0	-	-
All Pathways	3.16E-03	3.16E-05	1.00E-03	1.00E-05	0.003 percent	2.47E-01	2.47E-03	882,187	3.16E+05	3.16E+03

Radiological Atmospheric Releases for 2012 (in Curies)							
Tritium	Noble Gases ($t_{1/2}$ <40 days)	Fission and Activation Products ($t_{1/2}$ <3 hr)	Fission and Activation Products ($t_{1/2}$ >3 hr)	Total Radio-strontium	Total U	Other Actinides	Other
2.65E+02	2.65E+02	7.75E-04	3.26E-08	6.2E-08	0	0	0

Liquid Effluent Releases of Radioactive Material for 2012						
Tritium	Fission and Activation Products ($t_{1/2}$ <3 hr)	Fission & Activation Products ($t_{1/2}$ >3 hr)	Total Radio-iodine	Total Radio-strontium	Total U	Pu
0	0	0	0	0	0	0

NOTES: DOE = U.S. Department of Energy
hr = hour
km = kilometer
MEI = maximally exposed individual
mrem = millirem
mSv = millisievert
Pu = Plutonium
SNL/NM = Sandia National Laboratories, New Mexico
Sv = Sievert
$t_{1/2}$ = half life
U = Uranium

TABLE 2-5. Environmentally-Related Occurrences for Five Years (2008-2012)

Nature of Occurrence or Reporting Criteria*					
	2008	**2009**	**2010**	**2011**	**2012**
Group 2 - Personnel Safety and Health					
Personal exposure to chemical, biological, or physical hazards above limits - 2A(5) (Post-August 2003 Reporting Criteria, but prior to DOE O 232.2).	2	3	1		
Any acute exposure from a chemical, biological, or physical hazard due to DOE operations resulting in a fatality or terminal injury/illness or requiring in-patient hospitalization of three or more personnel – 2B(1).					
Any acute exposure resulting in an occupational injury that requires in-patient hospitalization for 5 days or more, commencing within 7 days from the date the exposure was received or any exposure event resulting in three or more personnel having Days Away, Restricted or Transferred (DART) cases per 29 CFR Section 1904.7, *Recordkeeping Forms and Recording Criteria* – 2B(2).					
Personnel exposure to chemical, biological or physical hazards that exceeds 10 times the limits established in 10 CFR Part 851, *Worker Safety and Health Program* (see 10 CFR Section 851.23 *Safety and Health Standards*) or exceeds levels deemed immediately dangerous to life and health (IDLH) – 2B(3).					
Personnel exposure to chemical, biological or physical hazards (e.g. noise, laser, ultraviolet light, heat, etc.) above limits established in 10 CFR Part 851, *Worker Safety and Health Program* (see 10 CFR Section 851.23, *Safety and Health Standards*), but below levels deemed immediately dangerous to life and health (IDLH), and requires the administration of medical treatment beyond first aid on the same day as the exposure – 2B(4).					
Any exposure including chronic resulting in a serious occupational injury – 2B(5).					
Personnel exposure to chemical, biological or physical hazards (e.g. noise, laser, ultraviolet light, heat, etc.) above limits established in 10 CFR Part 851, but below levels deemed immediately dangerous to life and health (IDLH) – 2B(6).				1	
Group 5 - Environmental					
Any release (onsite or offsite) of a hazardous or extremely hazardous substance, including radionuclides from a DOE facility above federally permitted releases in a quantity equal to or exceeding the federal reportable quantities specified - 5A(1).					
Any release (onsite or offsite) of a pollutant from a DOE facility that is above levels or limits specified by outside agencies in a permit, license, or equivalent authorization, when reporting is required in a format other than routine periodic reports. - 5A(2).	1	1	1	3**	1
Any release (onsite or offsite) that exceeds 100 gallons of oil of any kind or in any form - 5A(3).					
Any discrete release of sulfur hexafluoride (SF6) due to an event or DOE operation equal to or exceeding 115 pounds - 5A(4).					1
Any occurrence including releases causing significant impact to ecological or cultural resource for which DOE has responsibility under applicable laws, regulations, and Executive Orders – 5B(1).					
Any occurrence, including releases, resulting in extensive environmental degradation (e.g., fish kill, notable loss or relocation of native species, need for interdiction of crop sales, or restriction to human access) – 5B(2).					

2.2.1 Occurrence Tracking

DOE occurrence reporting is tracked by the Enabling Processes and Assurance Department. All SNL/NM occurrences are entered into DOE's Occurrence Reporting and Processing System (ORPS) database, which also tracks corrective actions and closure of occurrence reports.

During 2012, there were 38 occurrences for all categories; four of these were environmentally related at SNL/NM.

DOE Order 232.2 2012 Reportable Environmental Occurrences

Table 2-5 lists the DOE Order 232.2 environmental and environmentally related occurrences for the five-year period from 2008 to 2012. The table shows all occurrences for which the "reporting criteria" (post-August 25, 2003) included "environmental." As stated previously, there were four reportable environmental occurrences in 2012 — one was categorized as Significance Category 3 and three were categorized as Significance Category 4 (the lowest level occurrence). Table 2-6 summarizes DOE Order 232.2 2012 Reportable Environmental Occurrences.

2.2.2 Environmental Release Tracking

Environmental releases include notifications that are not tracked through ORPS, as well as notifications to outside agencies.

2012 Environmental Releases

In 2012, there were three surface discharge releases that were reportable to NMED and one release to the sanitary sewer system reported to ABCWUA. One of the surface discharge releases and the sanitary sewer system release were also categorized as occurrences (see Table 2-6). The sewer release is summarized in Section 6.1.1. The surface discharges are summarized in Section 6.2.2.

2.3 2012 Audits and Appraisals

Operations at SNL/NM and DOE/NNSA/SFO are routinely subjected to audits by external regulatory agencies. Sandia also conducts its own self-assessments and appraisals. Environmental audits and appraisals conducted by external agencies in 2012 are listed in Table 2-7.

2.4 Summary of Reporting Requirements

External reporting requirements (other than to DOE) are necessary for both routine and non-routine releases of pollutants or hazardous substances. Release information may be used to evaluate facility operation compliance, waste handling activities, and emergency response programs. Table 2-8 summarizes the primary reporting requirements for releases applicable to SNL/NM.

2.5 Summary of Environmental Permits

Table 8-1 in Chapter 8 lists all environmental permits and registrations that were in effect in 2012. It also includes pending permit applications under review by various agencies.

TABLE 2-5. Environmentally-Related Occurrences for Five Years (2008-2012) (Concluded)

Nature of Occurrence or Reporting Criteria*					
	2008	**2009**	**2010**	**2011**	**2012**
Group 9 - Noncompliance Notifications					
Any written notification from an outside regulatory agency that a site/facility is considered to be in noncompliance with a schedule or requirement (e.g., Notice of Violation, Notice of Intent to Sue, Notice of Noncompliance, Warning Letter, Finding of Violation, Finding of Alleged Violation, Administrative Order, or equivalent notification or enforcement action) - 9(1). Note: This criterion is not applicable to DOE Office of Enforcement actions.			1	3**	1
Any packaging or transportation violation of regulations discovered by DOT during onsite inspections or Compliance Reviews results in fines greater than $5,000 or Unsatisfactory/Conditional Satisfactory ratings – 9(2)					
Group 10 - Management Concerns					
Any event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern to other facilities or activities in the DOE complex - 10(2).	4	1	2	1	
A near miss to an otherwise ORPS reportable event, where something physically happened that was unexpected or unintended, or where no or only one barrier prevented an event from having a reportable consequence - 10(3).	2				1
An event that results in a significance concern by affected state, tribal, or local officials, press, or general population; that could damage the credibility of the Department or that may result in inquiries to Headquarters - 10(4).					
Any occurrence of such significant immediate interest to offsite personnel and organizations that it warrants prompt notification to the DOE HQ OC, and which is not already designated elsewhere in this set of reporting criteria to have prompt notification - 10(5).					

NOTES: *****The reporting criteria provided in the table for ORs in 2012, are based upon DOE Order 232.2, which replaced DOE M 231.1-2 as of August 30, 2011. Any exceptions are noted above. Any ORs accessed in the current DOE occurrence reporting and processing system (ORPS) (including those from previous years) will have reporting criteria in accordance with DOE Order 232.2.

**In 2011 there were 8 occurrences; the July occurrence was listed under the reporting criteria as both a Group 5A (2) and a Group 9(1). In order to avoid the appearance that there were more than eight occurrences, this occurrence was only listed under Group 9(1) and not under 5A (2).

CFR = Code of Federal Regulations
DOE = U.S. Department of Energy
DOT = Department of Transportation
HQ = Headquarters
OC = Operations Center
OR = occurrence report

TABLE 2-6. DOE Order 232.2 Reportable Environmental Occurrences, 2012

Month	Occurrence Significance Category	Reporting Criteria	Description
February	SC4	9(1)	Notice of Violation from the New Mexico Environment Department related to the no-notice hazardous waste audit conducted November 2011, NA--SS-SNL-4000-2012-0001 — 1. SNL failed to keep closed a 2-liter amber glass jar with an Ecco Funnel holding hazardous waste (000 1) tetrahydrofuran. A container holding hazardous waste must be kept closed at all times except when necessary to add or remove waste. The container was located in a laboratory satellite accumulation point in Building 905, Room 1216. The laboratory contained several satellite accumulation points within the room with the same set-up and properly closed Ecco Funnels. 2. SNL failed to keep closed a cardboard box holding spent fluorescent light bulbs being managed as a hazardous waste. A container holding hazardous waste must be kept closed at all times except when necessary to add or remove waste. The container was located in a satellite accumulation point in Building 983, VSL Lab 12' Level. 3. SNL failed to maintain a satellite accumulation point at or near the point of generation. A plastic 5-gallon green bucket holding a generator-declared hazardous waste was located in Building 823, Room 1097, while the waste was initially generated in Room 1089.
August	SC4	5A(4)	Release of SF6 from Cryoquip Reclaimer, NA--SS-SNL-1000-2012-0009 — In preparation for an upcoming test at the Hawk electron beam accelerator facility in Building 963 (operated by Dept. 1654), the Model 5000SMX SF6 Reclaimer purchased commercially from Cryoquip was inspected late in the day, Thursday, August 16. During the inspection, the pressure gauge indicated that there was no SF6 in the unit. The unit is approximately 10 years old and has only been operational for about 33 hours total during that period. The unit is located on the exterior east wall of Building 963 and has been locked out (valved-off) to prevent any flow into the interior of Building 963. Since the reclaimer has not been used and was locked out at the outside of the Building 963, routine inspections have not been formally logged. The last time that the reclaimer was checked, at the beginning of May 2012, both the liquid level indicator and the holding tank pressure gauge on the reclaimer indicated SF6 was present in the system. Based on operational requirements for the upcoming test configuration and the knowledge of 1654 personnel, there was an estimated 6 to 12 cylinders of SF6 in the reclaimer. Assuming that a full cylinder of SF6 is 115 lbs., the range of SF6 released to the atmosphere is 690 to 1380 lbs.

See notes at end of table.

TABLE 2-6. DOE Order 232.2 Reportable Environmental Occurrences, 2012 (Continued)

Month	Occurrence Significance Category	Reporting Criteria	Description
September	SC3	10(3)	Unexpected Chemical Reaction at Site 9939, NA--SS-SNL-5000-2012-0006 — On 9/20/2012, at approximately 2:00 pm, an unexpected chemical reaction happened at Site 9939 inside explosive bunker # 9936, when < 2 grams of picric acid was accidently combined with < 150 grams of R-Salt. When the chemicals were combined, they produced smoke and a small (~2 inch) flame. The chemicals are similar in appearance (powder, yellow in color and porous) and were in two different containers. The container of R-Salt was labeled and the smaller container of picric acid was not properly labeled. Both chemicals were explosives made in a training class, and were left-over material from the class. Following the training class, an authorized operator was consolidating the material in preparation for a training demonstration, and believed each container held the same material. The process took place inside the bunker adjacent to the open door. When the unexpected reaction began, the operator immediately threw the mixture outside the bunker and then covered it with dirt, which stopped the reaction. The operator was not injured. Following the incident, fact finding and research was conducted to try to understand what happened and what the possible outcome of the reaction might have been had it progressed. After fact finding and evaluation of Occurrence Report criteria, the incident was categorized as a Near Miss Occurrence on 10/02/12. As a part of the review process for this occurrence, the Division 5000 team also looked at the internal wastewater discharge approvals. During this process, the team brought attention to the water quality Subject Matter Expert in Dept. 4143 that not all materials in the waste stream (precursor chemicals, products, and bi-products) were included in the original internal discharge approval request. After a new discharge request was completed to reflect the additional materials, it was determined that internal wastewater approval for discharge to the surface would not be granted. Since the facility has been discharging this waste stream to the ground surface, a notification to the New Mexico Environment Department is required to report a release to the environment. The initial response was to call the NMED "Notification of Spills and Unauthorized Discharges" phone number to make a verbal 24-hour report of the release. A phone message was left at 12:15 pm on December 12, 2012 describing the release. After this call, a call was made to the NMED Hazardous Waste Bureau to report this release. There were at least 25 individual surface discharges of this waste water and it is estimated that each discharge to the surface was about ten gallons, for a total of 250 gallons. Corrective action will be coordinated with the NMED Hazardous Waste Bureau under Section V of the Compliance Order on Consent for SNL/NM.

See notes at end of table.

TABLE 2-6. DOE Order 232.2 Reportable Environmental Occurrences, 2012 (Concluded)

Month	Occurrence Significance Category	Reporting Criteria	Description
October	SC4	5A(2)	Ventilation Failure Leads to pH Excursion, NA--SS-SNL-2000-2012-0003 — On Friday, 10/26/2012, at approximately 1010 in Building 905, Room 1105B, a planned lithium ion battery overcharging test to destruction was being conducted. Test Cell F is designed to contain the effects of overpressure and fire is expected during the test. During the test, the battery vented and ignited as expected. Subsequent to battery ignition, a GFCI was tripped which resulted in loss of lights, local exhaust ventilation, and the local scrubber. Laboratory staff located in 1105A visually observed smoke (by video) in Room 1105B. Local notifications were made. The SNL Incident Commander responded, the building was evacuated, and Kirtland Air Force Base Fire Department responded. Subsequent to the loss of power, the pH reading on a facility monitoring-well indicated that there may have been a release of low pH waste water in excess of permitted amounts per Albuquerque Bernalillo County Water Utility Authority Waste Water Permit 2069I. A Notice of Violation was issued by the Albuquerque Bernalillo County Water Utility Authority on October 31, 2012. Work is paused in this space until further notice due to clean-up efforts and to perform causal analyses. There were no injuries or significant damage involved.

NOTES: DOE = U.S. Department of Energy
GFCI = Ground Fault Circuit Interrupter
NMED = New Mexico Environment Department
SF6 = sulfur hexafluoride
SNL = Sandia National Laboratories

TABLE 2-7. Environmental Program Audits and Appraisals Conducted at SNL/NM in 2012

Appraising Agency	Title	Date	Summary
ABCWUA	ABCWUA inspected facilities within Flow Basins 2069A, 2069F, 2069G, 2069I, 2069K and 2238A	Inspected facilities during January, May, and June of 2012	No findings or observations resulted from these inspections
KAFB	Drinking Water Survey and Water Vulnerability Assessment	November 26 through December 7, 2012	Awaiting classified report
NMED (Hazardous Waste Bureau)	Compliance Evaluation Inspection (annual)	November 14, 2011	3 Violations
NMED (Drinking Water Bureau)	Sanitary Survey (triennial)	June 14, 2012	1 Significant Deficiency 1 Minor Deficiency
City of Albuquerque (COA)	Post Inspection Notification (PIN) for Permit #1725-M1 generator testing	November 27, 2012	Testing completed November 9, 2012, no violation
Internal Audits and Appraisals			
BSI	ISO 14001 Assessment	April 9, 2012	4 Minor Findings (non-conformity)
00857 Internal Audit: ES&H, S&S, and IT Operations Department	EMS Corporate Movement of Hazardous Materials, 2012-ES-008	May 18, 2012	3 Findings 2 Observation 3 Remarks 5 Noteworthy Practices

NOTES: ABCWUA = Albuquerque Bernalillo County Water Utility Authority
BSI = British Standards Institute
EMS = Environmental Management System
ES&H = Environment, Safety and Health
ISO = International Organization for Standardization
IT = Information Technology
KAFB = Kirtland Air Force Base
NMED = New Mexico Environment Department
S&S = Safeguards and Security
SNL/NM = Sandia National Laboratories, New Mexico

TABLE 2-8. Summary of Sandia Reporting Requirements to Outside Agencies (other than DOE) for Releases of Pollutants or Hazardous Substances

Report Title	Description	Agency
Annual NESHAP Dose Assessment Report	A dose assessment of the calculated EDE to the MEI is based on the assumption that an exposed individual resides 24 hours-per-day at an area of highest incident radiation. Dose assessment is discussed in Section 5.4 of this report.	EPA 40 CFR 61, Subpart H
RQ Accidental Release Reporting	RQ release reporting is required by CERCLA and SARA Title III, or EPCRA to the NRC. CERCLA and EPCRA are discussed in Section 2.1.1 and 2.1.2 of this report. There were no reportable releases in 2012.	NRC 40 CFR 302
TRI Report	EPCRA, Sections 302, 311, 312, and 313, requires a TRI report to be filed by facilities conducting specifically listed industrial activities and using listed toxic chemicals. As discussed in Section 2.1.2, Sandia is not required to submit a TRI report for 2012.	EPA 40 CFR 372, Subpart B
Notification of Discharge	NMED requires reporting of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or use of the property shall make oral notification as soon as possible after learning of such a discharge, but in no event more than 24 hours thereafter to the NMED. Within one week, the owner and/or operator shall send written notification to the appropriate Bureau Chief verifying the prior oral notification. Within 15 days, the owner and/or operator shall send written notification to the appropriate Bureau Chief describing any corrective actions taken and/or to be taken relative to the discharge. Three surface discharge releases occurred in 2012. Details of these events are summarized in Section 6.2.2.	NMED 20.6.2.1203 NMAC
Accidental Slug Discharge Notification	The ABCWUA requires immediate notification to the Wastewater Utility Division of any accidental/slug discharge that may cause potential problems for the POTW. Within five days following such occurrence, the user is required to provide the Industrial Waste Engineer with a detailed written report describing the cause of the dangerous discharge and measures to be taken to prevent similar future occurrences. During CY 2012 there was one reportable event that exceeded permitted limits and a notification were sent to the ABCWUA.	ABCWUA Sewer Use and Wastewater Control Ordinance

NOTES:
ABCWUA = Albuquerque Bernalillo County Water Utility Authority
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
CY = Calendar Year
DOE = U.S. Department of Energy
EDE = Effective Dose Equivalent
EPA = U.S. Environmental Protection Agency
EPCRA = Emergency Planning and Community Right-to-Know Act
MEI = Maximally Exposed Individual
NESHAP = National Emission Standards for Hazardous Air Pollutants
NMAC = New Mexico Administrative Code
NMED= New Mexico Environment Department
NRC = U.S. Nuclear Regulatory Commission
POTW = Publicly-Owned Treatment Works
RQ = Reportable Quantity
Sandia = Sandia Corporation
SARA = Superfund Amendments and Reauthorization Act
TRI = Toxic Release Inventory

2.6 Environmental Performance Measures

Environmental performance at SNL/NM is tracked through performance measures and indicators. The results are reported through the Environment, Safety and Health (ES&H) Assurance Dashboard, the management review process, management reports and annual summaries (such as this report).

Environmental performance and Sandia's performance measures are also assessed as part of the Performance Evaluation Plan (PEP) agreement between DOE/NNSA/SFO and Sandia. On the basis of the PEP, DOE/NNSA/SFO prepares an annual Performance Evaluation Report (PER) that assesses Sandia's performance for the Fiscal Year (FY). For FY 2012, the overall score for Sandia was listed as "Very Good."

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Chapter 3

Environmental Programs Information

Environmental programs carried out by Sandia Corporation (Sandia) are in place to protect the environment, safety, and health (ES&H) of its employees and the community. These environmental programs meet or exceed the requirements of federal, state, and local environmental regulations, as well as U.S. Department of Energy (DOE) directives in the Prime Contract between Sandia and DOE. Presidential Executive Orders and DOE guidance documents are also used to establish program criteria.

The environmental programs are part of Sandia's Environmental Management System (EMS). Sandia's EMS is its primary management approach for addressing environmental aspects of operations and activities, including energy and transportation functions.

Environmental Monitoring History

Environmental monitoring began at Sandia National Laboratories, New Mexico (SNL/NM) in 1959 when the principal objective was to monitor radioactive effluents and determine any associated environmental impacts. Since then, environmental programs, along with other ES&H activities, have greatly expanded at SNL/NM.

ES&H Policy

It is the policy of Sandia to protect Members of the Workforce and the public, prevent incidents, protect the environment through integration of environmental stewardship and sustainability throughout the life-cycle of its activities, and ensure regulatory compliance. Sandia conserves natural resources and protects the environment.

DOE's Integrated Safety Management System (ISMS) is a key element of Sandia's Integrated Laboratory Management System. ISMS provides the framework for managing ES&H activities and functions while integrating them into all Sandia National Laboratories (SNL) operations.

Sandia has committed to the following:

- Provide a framework for managing environmental activities through an EMS;
- Plan work incorporating safety awareness, protective health practices, environmental management, pollution prevention (P2), and environmental life-cycle management (ELM) of resources;
- Identify hazards and evaluate, monitor, and manage risks with effective ES&H systems;
- Implement controls that prevent injury, exposure to hazardous materials, and the release of materials that could be hazardous to the environment;
- Perform quality work while protecting people, the environment, and our nation's security;
- Continually improve ES&H performance by establishing, meeting, and assessing measurable ES&H goals, objectives, targets, and milestones; and
- Regularly communicate ES&H issues to the Members of the Workforce, the community, regulators, and our stakeholders.

Integrated Safety Management System
Sandia's methodology for managing and implementing its ES&H Program is outlined in ISMS. ISMS is centered on five safety management functions, which provide processes to guide management in identifying and controlling hazards. These include:

(1) Define the scope of work,

(2) Analyze the hazards,

(3) Develop and implement controls for hazards,

(4) Perform work within controls, and

(5) Provide feedback and continuous improvement.

3.1 Sandia Environmental Management System

The requirement for an EMS at SNL/NM is driven by DOE Order 436.1, *Departmental Sustainability*, which was established to ensure that an EMS and site sustainability are at the forefront of environmental excellence. Sandia is subject to DOE Order 436.1 requirements for establishing and implementing an annual Site Sustainability Plan (SSP). Sandia developed a corporate-wide SSP that addresses energy, water, fuels, and a variety of other environmental concerns. SNL/NM personnel follow the corporate Plan, but continue to maintain a site-specific EMS.

SNL/NM personnel implemented its EMS in December 2005 and received third-party International Organization for Standardization (ISO) 14001 Certification in 2009. Since that time, Sandia has worked to fully implement and establish the EMS, in conjunction with the ISMS, in all site operations. The EMS is the framework by which SNL/NM manages, and continually improves, its environmental compliance and sustainability practices. The EMS identifies the environmental consequences of SNL/NM's activities, products, and services and develops objectives and measurable targets to mitigate potential impacts to the environment.

DOE defines its key clean energy and sustainability strategies and goals in its Strategic Sustainability Performance Plan (SSPP). Each DOE site is required to prepare an annual SSP that articulates the site's performance status and planned actions for meeting DOE's SSPP goals and broader sustainability program. Sandia uses its EMS as a platform for SSP implementation as well as for other programs with objectives and measurable targets that contribute to meeting sustainability goals.

Sandia continues to achieve significant environmental accomplishments through the EMS. The following paragraphs describe a number of these important programs and achievements.

In 2012 SNL/NM successfully retained certification under the ISO 14001, Environmental Management Systems, through auditing by a third party registrar. The recertification demonstrates SNL/NM's EMS satisfies specific requirements detailing a systemic approach to handling environmental issues based on the Plan-Do-Check-Act process approach to continual improvement.

In 2012, Sandia won a DOE/ National Nuclear Security Administration (NNSA) Pollution Prevention Best in Class Award and a DOE Sustainability Award for Server Consolidation/Virtualization Project. Accomplishments since 2007 seamlessly transformed how infrastructure servers deliver large-scale applications to the Sandia community. Physical servers are still in use at SNL, but Sandia policy has been "virtual is first" for the past four years. Typical physical servers achieve 10 to 15 percent utilization of total capacity, yet require 100 percent power and cooling. Organizations typically run only one application per server. Server virtualization on an increasing scale has resulted in the retirement and non-replacement of obsolete servers, freeing up floor space, power, and cooling capacity for more virtualization capacity in the future. Since project inception, 61 host servers replaced 700 physical servers, at an estimated cost savings in hardware of $4.2 million. Subtracting the cost of the specialty servers and system partitioning costs, the accumulated host savings are estimated at $3.4M. Direct and indirect (accounting for the cooling of servers) electricity net savings are estimated at 2,235,550 kilowatt-hours per year.

Energy consumption associated with personal computers is also significant at SNL/NM, and in calendar year (CY) 2011 a network-based desktop computer power-management software system was implemented to send computers into automatic standby (or "sleep") during nonstandard work hours. Employing standby or hibernate conditions when a computer is not in use reduces energy use by 93 percent and 100 percent, respectively. In 2012, 10,815 desktop computers were controlled by NightWatchman power management. This includes over 1,000 existing personal computers converted in 2012 to the system and an additional 2,200 new desktops with power management installed as part of the set-up package.

Sandia has and continues to encourage Members of the Workforce to use alternatives to single-passenger commuting through incentive and assistance programs, including preferred parking to incentivize carpooling/vanpooling and bus pass discounts. Commuting alternatives reduce traffic on Albuquerque streets, save money on fuel costs, help the environment, ease the parking situation at SNL/NM, and can even provide exercise. Sandia's web-based Commuter Assistance Program (link below) provides information to connect carpool and vanpool riders; assist bicycle commuters on routes, safety, locker and shower locations; and information on Albuquerque's bus (and train) routes and schedules from Albuquerque's west side communities. Approximately ten percent of Sandia's workforce participates in alternative commuting opportunities.

https://info.sandia.gov/commuter_assistance/index.html

Sandia strives to implement sustainability in the construction of new buildings and operation and maintenance of existing buildings on the New Mexico campus. As such, Sandia implements the Federal High Performance Sustainable Building (HPSB) Guiding Principles (GPs). As part of the GPs, all new building construction projects over 5,000 square feet are required to be certified under the U.S. Green Building Councils Leadership in Energy and Environmental Design (LEED) Green Building Rating System. Sandia currently has seven LEED-certified buildings on the New Mexico campus and another was under construction in 2012. Sandia is also implementing the GPs on existing buildings through measures that improve energy performance, conserve water, enhance indoor environmental quality, and reduce environmental impacts of materials.

Sandia continues installation of "Cool Roofs" at buildings requiring roof replacements. Sandia has approximately 3,451,496 gross square footage (GSF) total roof area, and 130 roofs or approximately 73 percent (2,535,416 GSF) comply with the "cool roof" definition. They are either bright-white installed membrane roofs or existing roof membranes that have been coated with a bright-white roof coating. Cool roofs reduce the increased energy demands associated with heat island effects, and Sandia installs "Cool Roofs" at all new building construction projects and roof-replacement projects. Sandia continually strives to reduce the generation and landfill disposal of nonhazardous solid waste. The SSPP goal for nonhazardous solid waste, excluding construction and demolition (C&D) debris, is to divert 50 percent by 2015. SNL/NM adopted a "stretch" goal to divert 65 percent by the end of 2012, and achieved this goal by diverting 67 percent. SNL/California (CA) diverted 79.5 percent of nonhazardous solid waste generated, excluding C&D debris.

C&D debris differs significantly from the typical office generated solid waste stream. Concrete, asphalt, wood, metal, insulation, and other C&D debris are required to be managed and disposed separately from the typical office solid waste stream. The SSPP goal for C&D debris is to divert 50 percent from landfill disposal by 2015. Between 2011 and 2012, Sandia diverted approximately 87 percent of the C&D debris from landfill disposal. Sandia routinely recycles scrap metal, wood, ceiling tiles, carpet, concrete and asphalt from the C&D debris stream.

Sandia is committed to reducing its greenhouse gas (GHG) emissions; a major source of those emissions is sulfur hexafluoride (SF6). SF6 used in pulsed power and high-voltage research and development applications account for the majority of use at Sandia. In 2012, Sandia began tracking SF6 additions to the systems at several facilities. This method of tracking provides better information about SF6 emissions at the equipment level as well as identification of losses prior to use. Sandia has taken measures to reduce SF6 emissions during storage at several facilities and has developed plans to purchase and install new stationary SF6 reclaimers and associated piping, valves, and gauges to reduce leak rates and improve recovery efficiency. Sandia also plans to purchase a portable SF6 reclaimer to recover gas from other smaller projects and plans to retrofit three pieces of SF6 switchgear equipment. Sandia will retrofit three to four items every year thereafter until all the equipment is upgraded.

The other major source of GHG emissions at Sandia is grid-based electricity use, because the majority of Sandia's grid electricity generation is coal-fired. As a result, there is a direct link between projects supporting electricity-use reduction and GHG emissions reduction. Energy reduction projects implemented in 2012 include:

- Conversion of building controls from pneumatic to direct digital zone controls in several buildings. This allows more efficient operation of building heating, ventilation, and air conditioning (HVAC) systems.
- Installation of combined occupancy/HVAC sensors at several buildings. This allows both lighting and HVAC to be turned off when spaces are unoccupied.
- Installation of new energy efficient chiller systems at several buildings.
- Installation of numerous light-emitting diode (LED) lighting replacement projects.
- Installation of plate-and-frame heat exchangers in several buildings that utilize large-scale evaporative cooling using outside air (referred to as free cooling systems). These systems use outside air as the source of cooling when conditions permit.
- Purchase and utilization of ten portable cooling systems for server rooms to eliminate building operations during non-standard work hours. These systems prevent an entire building HVAC system from operating around the clock in order to provide cooling to a server room.
- Decontaminated and demolished (D&D) over 2,000 GSF of building space

Additional information can be found on the external EMS website:

www.sandia.gov/about/environment/index.html

3.2 Environmental Restoration Operations

Sandia's Environmental Restoration (ER) Operations was created under the DOE Office of Environmental Management to identify, assess, and remediate sites potentially contaminated by past spill, release, or disposal activities in accordance with the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments (HSWAs) of 1984. HSWA requirements apply to ER Operations sites which include Solid Waste Management Units (SWMUs) or areas of concern (AOCs). A SWMU is any unit "from which hazardous constituents might migrate, irrespective of whether the units were intended for the management of solid and/or hazardous waste" (EPA 1985).

There are additional AOCs at SNL/NM that are not regulated as SWMUs (primarily closed-out septic systems) that have also been investigated as a part of ER Operations. These AOCs were not identified at the time of the issuance of Module IV of the RCRA Part B Operating Permit; however, they were identified by the New Mexico Environment Department (NMED) as requiring investigation.

Sandia, DOE, and NMED negotiated a Compliance Order on Consent (COOC) that was signed in April 2004. The COOC governs corrective action for releases of hazardous waste or hazardous constituents at SNL/NM. The COOC will terminate upon the completion of its requirements and the RCRA Part B Operating Permit will remain as the enforceable document.

3.2.1 Waste Cleanup and Site Closures

ER Operations History

The initial identification of ER sites at SNL/NM was completed in 1987. At that time, there were 117 identified sites under Sandia's jurisdiction in the initial *Comprehensive Environmental Assessment and Response Program (CEARP) Phase I: Installation Assessment* (DOE 1987); those at SNL/NM were also identified as potential SWMUs in a RCRA Facility Assessment in 1987 (EPA, 1987). Additional sites were identified in subsequent years and were incorporated into the list of sites subject to the RCRA corrective action requirements in Module IV of the RCRA Part B Operating Permit.

Since then, a total of 500 individual sites, potential sites, or individual historical activities have been identified for investigation. Many of these sites were confirmed to contain little or no contaminants of concern (COCs). In 1992, ER Operations at SNL/NM was officially initiated to implement assessment and remediation activities for sites that had been contaminated or potentially contaminated because of past SNL/NM operations. In addition to the SNL/NM site, other sites included in the original scope of Sandia's ER Operations were SNL/CA, the Kauai Test Facility, Hawaii (KTF/HI), and the Tonopah Test Range, Nevada (TTR/NV). There were also a number of miscellaneous sites located in other areas, nationwide and internationally.

Corrective Action Complete (CAC) Status

DOE and Sandia propose ER sites to NMED for CAC status when they meet NMED criteria, either before or after remediation; the criteria include acceptable levels of risk to human health and the environment presented by the contaminants at the site.

After NMED grants CAC status, DOE and Sandia submit a request for a Class III modification to the HSWA Module (Module IV) of Permit NM5890110518-1 (the Permit) requesting that the site be deleted from Table A.1 "*List of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) Requiring Corrective Action*" of the permit and added to Table A.2 "*List of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) not currently requiring Corrective Action*" of the permit. The majority of ER sites are granted CAC status under a risk-based scenario. Risks to human health and the environment are calculated for sites with residual contamination according to U.S. Environmental Protection Agency (EPA) and NMED guidelines. The level of contamination remaining, and the appropriate land-use category (i.e., industrial, residential, or recreational use) are used, together with the available information and conceptual model for each site, to determine the risk to human health and the environment.

All CAC proposals and Class III Permit modifications are available for review at the University of New Mexico Zimmerman Library.

The current status of the ER Operations site closure is as follows:

- There are 278 SNL/NM SWMU/AOCs not currently requiring corrective action (Davis 2012).
- There are 36 SWMUs/AOCs requiring corrective action (Davis 2012).
- Six of the 36 SWMUs/AOCs require additional corrective action or investigation (such as groundwater monitoring at SWMUs 8, 52, 58, 68, 149, 154) (Bearzi 2010).

Included in the 36 SWMUs/AOCs requiring corrective action (Davis 2012) are three groundwater AOCs (Technical Area [TA]-V, Tijeras Arroyo Groundwater [TAG] and Burn Site Groundwater [BSG]) that have final remedies pending. Also included in the 36 SWMUs/AOCs requiring corrective action (Davis 2012) are three sites at active test facilities (SWMUs 83, 84, and 240) with potential solid contamination that will be evaluated at the end of their test operations.

3.2.2 Selected Units at SNL/NM

Groundwater Management Units

In 2012, SNL/NM Long-Term Stewardship (LTS) personnel performed groundwater monitoring at CWL, Mixed Waste Landfill (MWL), BSG, TAG, TA-V, SWMUs 8, 58, 49, 68, 116, 149, and 154. Analytical results for groundwater monitoring at these sites are summarized in *SNL/NM's CY 2012 Annual Groundwater Monitoring Report* (Appendix B). SNL/NM personnel will continue groundwater monitoring as a part of Corrective Measures Implementation (CMI) and LTS. LTS is discussed more in Section 3.4. ER Operations is responsible for completing the regulatory process at the groundwater sites. The Corrective Measures Evaluation (CME) report for TA-V was submitted to NMED in July 2005 and Notices of Disapproval (NODs) were received from NMED in July 2008, August 2009, and December 2009. The CME report for TAG was submitted in September 2005, but no comments have been received from NMED. After regulatory selection and public review of the preferred remedy, CMI Plans can be prepared for TAG and TA-V. Revised monitoring under the CMI plan for TAG and TA-V cannot begin until NMED reviews and approves the CME reports and CMI plans.

Mixed Waste Landfill

The MWL was established in 1959 as a disposal area for radioactive waste and mixed waste (MW) generated at SNL/NM research facilities. The MWL accepted approximately 100,000 cubic feet of low-level waste (LLW) and minor amounts of MW from March 1959 through December 1988. Tritium is the contaminant of primary concern at the MWL. It has been detected in surface and subsurface soils in and around the classified area of the site. However, there is no indication that tritium or other contaminants have migrated to groundwater, which is approximately 500 feet (ft) below ground surface (bgs) at the MWL. Tritium is released from MWL soils to the atmosphere at low levels, which do not pose a threat to human health or the environment (SNL 2008).

The monitoring network at the MWL consists of seven wells. In 2012, MWL groundwater samples were collected in February and March. Analytical results for MWL groundwater monitoring are summarized in *SNL/NM's CY 2012 Annual Groundwater Monitoring Report* (Appendix B).

On October 11, 2001, NMED directed DOE and Sandia to conduct a Corrective Measures Study (CMS) for the MWL. The MWL CMS Report (SNL 2003b) was submitted to NMED on May 21, 2003 and identified, developed, screened, and evaluated corrective measures alternatives and recommended the preferred final remedy for the MWL. Based upon detailed evaluation and risk assessment using EPA and NMED guidance, DOE and Sandia recommended a vegetative soil cover (i.e., evapotranspirative (ET) cover) with institutional controls (ICs) as the preferred remedy for the MWL. ICs included long-term monitoring, maintenance, and land use restrictions.

As part of the NMED review and approval process for the CMS Report, a public comment period was established and a public hearing held on December 2-3 and 8-9, 2004. On May 26, 2005, the Secretary of the NMED selected a vegetative soil cover with a bio-intrusion barrier as the remedy for the MWL, based upon the information in the administrative record and the hearing officer's report. The decision of the Secretary of the NMED was documented in the NMED Final Order for the MWL (Final Order) (NMED 2005) that was incorporated into the RCRA Part B Operating Permit through a draft Class III modification issued by NMED. The Final Order also required two additional plans be submitted to NMED: a CMI Plan within 180 days of issuance of the Final Order, and a Long-Term Monitoring and Maintenance Plan (LTMMP) within 180 days following NMED approval of the CMI Report documenting installation of the remedy.

On November 9, 2005, DOE and Sandia submitted the MWL CMI Plan to NMED documenting the specifications and requirements for construction of the selected remedy (SNL 2005). The CMI Plan contains a description of the selected remedy, the objectives for the remedy, detailed engineering design drawings, cover performance modeling, construction specifications, a construction quality assurance plan, and a health and safety plan. The CMI Plan also included the results of a comprehensive fate and transport model that was used to assess the performance of the MWL and develop monitoring triggers (i.e., constituent-specific concentrations by media) for future monitoring under the LTMMP. The MWL CMI Plan was conditionally approved by the NMED in December 2008 (Bearzi 2008) after resolution of two NMED NODs that requested additional information regarding ET cover construction plans and performance modeling, and required more extensive and conservative monitoring trigger levels. DOE and Sandia responses to the MWL NODs were submitted to NMED in December 2006 (Wagner 2006), January 2007 (Wagner 2007), and November 2008 (Davis 2008). All conditions related to construction of the MWL ET cover were addressed and incorporated into the CMI Plan through replacement pages (Davis 2009).

Deployment of the MWL ET cover with a bio-intrusion layer was conducted in two main phases. During the first phase in 2006, MWL Borrow Pit and Subgrade construction activities were performed in preparation for cover construction. Soil fill material was excavated, mechanically screened to 2-inch minus, and stockpiled at the MWL Borrow Pit from June through July 2006. Following NMED approval in September 2006, Subgrade construction was performed from October through December 2006, and protective measures were installed on the completed Subgrade surface in April 2007. After NMED conditional approval of the CMI Plan in December 2008, the MWL ET cover with a bio-intrusion layer was constructed during the second phase, which took place from May through September 2009.

The CMI Report documenting installation of the remedy was submitted to NMED in January 2010. NMED held a public meeting on the CMI Report on December 14, 2010 and a public comment period extended from November 29, 2010 through February 28, 2011; this interval included a 30-day extension. NMED issued an NOD in May 2011 with eight comments (Bearzi 2011) and DOE and Sandia submitted comment responses and a revised CMI Report (SNL 2010b) that was approved by NMED on October 14, 2011 (Bearzi 2011a).

The Final Order requires DOE and Sandia to submit an LTMMP to NMED within 180 days after NMED approval of the CMI Report. In September 2007, at the request of NMED, DOE and Sandia submitted the MWL LTMMP in advance of the required submittal date in the Final Order. NMED held a public comment period from October 31, 2007, through January 31, 2008, and posted the 2007 LTMMP on NMED's web site. However, by the December 2010 public meeting for the CMI

Report, NMED had determined that a revised LTMMP would be required due to significant changes at the MWL (e.g., a new groundwater monitoring network that was installed in 2008 and the ET cover that was constructed in 2009). NMED required submittal of the revised LTMMP within 180 days of NMED approval of the CMI Report (Kieling 2011a). In December 2011 DOE and Sandia withdrew the 2007 MWL LTMMP (Wagner 2011); the withdrawal was formally accepted by NMED (Kieling 2011a). The revised MWL LTMMP was submitted to NMED in March 2012 as required by the Final Order. The original NMED 60-day public comment period for the MWL LTMMP began on September 14, 2011 and was extended twice; the comment period is scheduled to end February 11, 2013. NMED held a public meeting on the LTMMP on October 16, 2012.

3.3 Environmental Life-Cycle Management Activities

The SNL/NM ELM involves stewardship for past, present, and future activities at SNL/NM. The ELM Program's purpose is to "promote the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle" (DOE/SNL 2006). The environmental programs mentioned in this document support that stewardship.

The ELM mission ensures long-term protection of human health and the environment and proactive management toward sustainable use and protection of natural and cultural resources affected by Sandia's operations and operational legacies. This mission will be accomplished by working with the line and support organizations in proactively identifying potential environmental impacts and applying environmental processes and guidance.

The objectives of the ELM Program are to:

- Protect human health and the environment from the aspects/impacts of past, present, and future operations,
- Preserve and protect natural and cultural resources, and
- Apply life-cycle cost principles to environmental impacts of SNL operations.

The ELM Program reviews all proposed projects and activities that have the potential to impact the environment through the NEPA process.

Chemical Information System

The Chemical Information System (CIS) is an integrated chemical inventory and Material Safety Data Sheet (MSDS) document management system. The CIS project tracks the containers of a target set of chemicals by Sandia applied barcodes. Information such as the chemical or product name, location, quantity, and information about who is responsible for the chemical is managed in the CIS database. In addition to chemical inventory data, CIS stores MSDSs for the tracked chemicals. The MSDS library in CIS currently contains over 80,000 MSDSs.

The primary drivers for the CIS program are derived from state and federal regulations, among them the *Emergency Planning and Community Right-to-Know Act (EPCRA)* and the *Occupational Safety and Health Act (OSHA)*. These and other regulatory actions determine the nature and type of chemicals tracked by the CIS program.

Beyond regulatory compliance, CIS provides an inventory control and safety management system. This electronic inventory helps chemical users and their managers to assess and manage workplace hazards. Easy access to this inventory facilitates quick availability searches, sharing of chemicals, source reduction, as well as minimizing chemical purchases and waste disposal expenses. The goal of the CIS program is to ensure that chemical containers are tracked and MSDS documents are managed according to all applicable internal and external standards.

Chemical Exchange Program
SNL/NM's Chemical Exchange Program (CEP) was developed in 1989 as a Hazardous Waste Management Waste Minimization program. The goal of the CEP is to reduce the amount of usable chemicals disposed as waste, resulting in cost avoidance for both new acquisitions and disposal. The program has been through multiple transformations since then. In July of 2007, the CEP was revitalized to address the unopened excess chemicals identified during laboratory inventory efforts.

Under direction of the ELM Program, the CEP team also worked with CIS staff to develop a user-friendly, web-based interactive tool for using the CEP. In 2008, the CEP was introduced as a module within CIS available to Members of the Workforce. This tool allows Members of the Workforce to submit, browse, and request chemicals. Once a chemical has been accepted, it goes onto a searchable list of available chemicals and continues to be properly managed by the current owner for up to six months. After six months, the owner is notified automatically via email. If another Member of the Workforce requests the chemical, transportation to the new owner is arranged by the CEP.

3.4 Long-Term Stewardship Activities

The mission of the LTS Program is the long-term protection of human health and the environment from hazards associated with residual contamination at former ER Operations sites, and minimization of Sandia's environmental liability by ensuring compliance with the environmental requirements provided in multiple NMED permits. Stewardship of legacy sites is necessary to maintain long-term protection of human health, the environment, and natural and cultural resources from hazards associated with residual radioactive and hazardous contamination at former ER sites. Sandia's LTS activities are increasing as remedial activities at ER sites are completed. The LTS Program conducts compliance oversight, IC, and community-liaison and stakeholder-involvement activities, which are described below.

3.4.1 Compliance Oversight Activities

LTS compliance oversight activities include groundwater monitoring, and various types of monitoring at the Corrective Action Management Unit (CAMU) and CWL to meet NMED regulatory requirements. Monitoring well network maintenance is also performed as necessary. Comprehensive sample management and information management systems are used to generate legally defensible monitoring data for current and past activities to ensure protection of human health and the environment. Associated regulatory reporting is described in the sub-sections below.

Groundwater Monitoring
The LTS Consolidated Groundwater Monitoring Program consists of monitoring at or near the legacy sites, and a Groundwater Protection Program (GWPP) that ensures an understanding of the regional groundwater, including at the perimeter of SNL. A groundwater monitoring well network of approximately 80 wells is sampled for presence of COCs at various intervals during the year. Sixty seven groundwater monitoring wells associated with former ER sites are monitored to meet NMED requirements. An additional 12 wells and a spring are sampled to assess SNL/NM operations impacts

on groundwater. Water level measurements are obtained from 103 wells. Monitoring wells are maintained or replaced as necessary.

Sandia personnel collect groundwater samples at the following project areas—CWL, MWL, TA-V, TAG, BSG, and miscellaneous SWMUs. CY 2012 water quality results for these six areas were consistent with results from past years, and the groundwater analytical results are provided in *SNL/NM's Calendar Year 2012 Annual Groundwater Monitoring Report* (Appendix B). All analytical results were below applicable Maximum Contaminant Limits (MCLs) at the CWL and MWL. At TA-V, several analytical results exceeded the MCL for trichloroethene (TCE) and nitrate plus nitrite (NPN). TCE exceeded the MCL of 5 micrograms per liter (µg/L) in five wells with a maximum concentration of 18.1µg/L, and NPN exceeded the MCL of 10 milligrams per liter (mg/L) in two wells with a maximum concentration of 12.3 mg/L. At TAG, several analytical results exceeded the MCL for TCE and NPN. TCE exceeded the MCL in one well with a maximum concentration of 9.42 µg/L, and NPN exceeded the MCL in five wells with a maximum concentration of 32.1 mg/L. At BSG, NPN exceeded the MCL in four wells with a maximum concentration of 33.1 mg/L. At SWMUs 8 and 58, fluoride exceeded the MCL of 4.0 mg/L in one well. All other analytical results for groundwater samples from TA-V, TAG, BSG, and miscellaneous SWMUs were below established MCLs.

GWPP activities include general surveillance of water quality from a network of wells not directly associated with legacy sites. Annual samples were collected from 12 wells and one spring. Analyses were conducted for Target Analyte List metals (plus mercury, uranium-234, uranium-235, and uranium-238), volatile organic compounds (VOCs), inorganics (including NPN, major anions, and total cyanide), total phenols, total alkalinity, total halogenated organics, gross alpha, gross beta, and selected radionuclides. Groundwater samples from four wells were analyzed for high explosives (HE). These four designated wells are used to establish background concentrations of HE at the Dynamic Explosives Test Site east and south of TA-III and to monitor potential groundwater impacts from explosives testing. No VOCs or HEs were detected at concentrations above EPA Safe Drinking Water Regulations MCL or New Mexico Water Quality Commission Maximum Allowable Concentrations (MACs). Fluoride was detected above the MAC in Coyote Springs and three groundwater wells. Beryllium concentrations in Coyote Springs exceeded the MCL. The exceedance for each of these elements is attributable to the elevated natural concentrations associated with bedrock groundwater systems at the sampling locations. Please refer to Appendix B of this report for detailed information and results of the analysis of collected groundwater samples.

Groundwater levels are measured in 103 wells on a quarterly or monthly basis. Wells that have stable trends are measured quarterly; wells that have fluctuating water levels due to seasonal pumping at nearby extractive wells are measured monthly. Water level data are used to generate a regional water table elevation contour map from which groundwater flow directions can be obtained. Groundwater elevation tables, hydrographs, and contour maps derived from the data are provided in *SNL/NM's Calendar Year 2012 Annual Groundwater Monitoring Report* (Appendix B). The report also provides information on the overall objectives of the GWPP, the regulatory drivers, the DOE directives that govern the program, and the program related activities that occurred during CY 2012.

Chemical Waste Landfill

Since June 2011, monitoring, inspections, maintenance/repairs, and annual reporting are being performed by the LTS Program in accordance with the CWL Post-Closure Care Permit. The first CWL annual post-closure care report, *Chemical Waste Landfill Annual Post-Closure Care Report*, *Calendar Year 2011,* was submitted to NMED on March 31, 2012 (SNL 2012c).

The CWL, a closed interim status landfill undergoing post-closure care, is approximately 1.9 acres and is located in the southeast corner of TA-III. From 1962 through 1985, the CWL was used for disposal of hazardous wastes, chemicals, solid wastes, and minor amounts of radioactive wastes generated by

SNL/NM research activities. Liquid waste disposal ended in 1982. The CWL was also used as a hazardous waste drum storage facility from 1981 to 1989.

The groundwater monitoring network at the CWL consists of four wells. In 2012, CWL groundwater samples were collected in January and July (two sampling events). Analytical results for CWL groundwater monitoring are summarized in *SNL/NM's CY 2012 Annual Groundwater Monitoring Report* (Appendix B).

The permitting and closure processes for the CWL were initiated during the 1980s. NMED approved the CWL Closure Plan in 1993. Closure activities were conducted through ER Operations and included two voluntary corrective measures (VCM): soil vapor extraction and landfill excavation (LE). Excavation of the landfill began September 30, 1998. Over 52,000 cubic yards (cu yd) of soil and debris were excavated from the landfill between 1998 and 2002. Except for the area around one verification sampling grid point that was excavated in January 2003, all excavation was completed in February 2002. The excavation process, waste management activities, final verification soil sampling analytical results, and final risk assessment were presented in the *LE VCM Final Report* (SNL 2003), which was approved by NMED on December 16, 2003 (Moats 2003). The primary COCs at the CWL were TCE, chromium, and nickel.

Most of the soil excavated from the CWL was managed at the CAMU, which is located adjacent to the CWL. The soils were treated as needed and placed into the CAMU containment cell for long-term management. Sampling and final cleanup of the CWL site was completed in February 2004 and documented in the *CWL Site Operational Boundary Closure Addendum* to the *LE VCM Final Report* (SNL 2005a) approved by NMED in October 2005.

As part of the CWL closure process defined in the amended Closure Plan, DOE and Sandia submitted a compilation of documents to NMED on May 20, 2003 that included the CWL CMS Report, Remedial Action Plan (RAP), and Post-Closure Care Plan, with a request that NMED select the remedy through approval of the CMS Report and RAP, and approve the Post-Closure Care Plan. A revised CMS Report was submitted in December 2004, as requested by NMED; the revised RAP was included as an annex. A revised Post-Closure Care Plan was submitted to NMED as a permit application in September 2005. In May 2004, DOE and Sandia requested NMED approval of an Interim Corrective Measure (ICM) to allow construction of the at-grade ET cover; the design for this cover was originally presented in the May 2003 RAP. NMED approved the ICM in September 2004. Backfilling of the CWL to four feet ft bgs was completed in February 2004. The CWL cover installation began in March 2005 and was completed in September 2005.

On May 21, 2007, NMED issued a draft CWL Post-Closure Care Permit (PCCP) for public comment, together with a notice of intent to approve the CMS Report and the final remedy selected for the CWL (i.e., at-grade ET cover) and a Closure Plan amendment. DOE and Sandia submitted comments and requested a public hearing. Several citizens also submitted comments and requested a public hearing. Informal negotiations were initiated by the NMED in August 2008 with all interested parties requesting a public hearing. These negotiations continued into CY 2009, and in October 2009 the CWL Closure Plan Amendment, as changed, the CWL PCCP, and the CWL CMS Report/Final Remedy were approved by NMED. As part of these negotiations, DOE and Sandia agreed to decommission four groundwater monitoring wells and install four new monitoring wells.

In addition, during the negotiations DOE and Sandia submitted a revegetation plan for the at-grade cover because the initial seeding performed in 2005 was not successful (SNL 2009). NMED approved the PCCP on July 31, 2009 (Bearzi 2009).

Revegetation activities (i.e., weed removal, applying new seed and gravel mulch, and performing supplemental watering) were performed from August through October 2009, with additional weed removal performed in November 2009 and March 2010. Results included robust growth of native grass with minimal weeds. From April through July 2010, the four new groundwater monitoring wells were installed and four existing wells were decommissioned in accordance with the approved Closure Plan Amendment.

All final closure activities are documented in the *CWL Final RCRA Closure Report* (SNL 2010) that was submitted to NMED on September 27, 2010 and approved on June 2, 2011 (Kieling 2011). The CWL PCCP (NMED 2009) became effective upon NMED approval of the CWL Final RCRA Closure Report. Since June 2011, monitoring, inspections, maintenance/repairs, and annual reporting are being performed in accordance with the CWL PCCP. The first CWL annual post-closure care report, for calendar year 2011, was submitted to the NMED in March 2012.

Corrective Action Management Unit

The LTS Program conducts the long-term monitoring of the CAMU as required by the NMED. Leachate is pumped weekly, and is periodically sampled and disposed of as hazardous waste. Additional information on activities conducted, including sampling results, can be found in the *CAMU VZMS Annual Monitoring Results Report* (SNL 2012).

The CAMU (located in TA-III near the CWL) is permitted under RCRA and Toxic Substances Control Act (TSCA) for the management of remediation waste (primarily contaminated soil) generated during the LE VCM at the CWL. Storage, treatment, and containment activities were authorized under the CAMU permit (EPA 1997). Two treatment processes, low temperature thermal desorption (LTTD) for organic compounds and stabilization treatment (ST) for metals, were used as needed to treat soil wastes before they were placed in the containment cell. LTTD treatment operations were completed in December 2002, and ST activities were completed in January 2003.

The staging, treatment, and support areas at the CAMU were clean-closed under the RCRA and TSCA provisions outlined in the CAMU closure plan (SNL 2002). The CAMU containment cell cover was installed in July 2003, which encapsulated the CWL remediation waste in place. The CAMU was certified closed on October 15, 2003 in compliance with the closure requirements documented in the *RCRA Closure Report* (SNL 2003a). The CAMU containment cell, where the treated waste remains, will continue to be monitored and maintained in accordance with post-closure requirements.

The CAMU containment cell consists of engineered barriers and a final cover system, and incorporates a bottom liner system with a leachate collection system and a vadose zone monitoring system (VZMS). The VZMS provides information on soil conditions under the cell for early detection of leaks. The VZMS consists of three subsystems that include the primary subliner (PSL), a vertical sensor array (VSA), and the CWL/sanitary sewer line (CSS) monitoring subsystems. The PSL monitoring subsystem is monitored annually for the composition of soil vapors and quarterly for soil moisture content; and the VSA and CSS monitoring subsystems are monitored quarterly for the composition of soil vapors and soil moisture content.

In 2012, 413 gallons (gal) of leachate were removed from the collection system; 461 gal of leachate were removed during 2011. The leachate is pumped from the containment cell leachate collection system on a weekly basis. The leachate is a listed hazardous waste. The pumped leachate is containerized in 55-gal poly drums and stored in a RCRA 90-Day Storage Area. The waste is characterized by drawing a composite sample which is sent to an off-site laboratory for analysis. The waste is transported to the SNL/NM Hazardous Waste Management Facility (HWMF). The waste is subsequently shipped to an off-site hazardous waste facility for treatment.

Baseline data for soil moisture and soil vapor were established between October 2003 and September 2004. "Baseline" is defined as data collected monthly for one year after the closure of the containment cell in October 2003. The soil moisture monitoring results indicate increases at two of the CSS monitoring subsystem locations when compared to the baseline data. Increasing soil moisture at location CSS-2 (12- and 16-ft depths) was first observed in September 2005, but has remained stable since September 2008 (12-ft depth) and December 2009 (16-ft depth). The increasing soil moisture trend at location CSS-3 (12-ft depth) first observed in March 2007 continues. The soil moisture increase is attributed to a suspected leak in the sanitary sewer line. SNL/NM Facilities relined the sanitary sewer line with a resin sleeve in September 2010. The effect the liner insert has on soil moisture trends at CSS-2 and CSS-3 may take some time to discern. The PSL and VSA monitoring subsystem location soil moisture data have remained consistent with the baseline data indicating that the containment cell is not the source of the moisture.

The 2012 soil vapor monitoring results indicate an influence from the residual soil vapor plume emanating from the location of the former CWL. This is consistent with the conceptual model of the CWL residual soil vapor plume (SNL 2004). VOC concentrations at the CSS and VSA monitoring subsystem locations continue to correlate with soil temperature variations, increasing when the soil temperature is warmer and decreasing when soil temperature is cooler. The VOC concentrations are not attributed to the material in the CAMU containment cell. VZMS monitoring results are compiled and reported on an annual basis; the most recent report was submitted in September 2012 (SNL 2012) as required by the CAMU permit; EPA also receives a copy.

3.4.2 Institutional Controls Activities

Administrative and physical ICs are in place at SNL/NM to appropriately limit access to, and use of, legacy sites. Legacy sites are former ER sites that have not been cleaned up to residential risk standards, and are periodically inspected and maintained when necessary. A total of 21 IC site inspections were completed in 2012. In order to mitigate safety concerns identified during IC inspections, an abandoned test structure was removed from Site 50, the Old Centrifuge Site. Site IC information is maintained in an IC Tracking Database.

3.4.3 Community Liaison and Stakeholder Involvement Activities

It is important that the public be made aware of the work being conducted to maintain long-term protection of human health, the environment, and natural and cultural resources from hazards associated with residual radioactive and hazardous contamination at former ER sites. Stakeholders participate in semi-annual DOE/U.S. Department of Defense joint meetings on environmental activities. Regulatory decision documents for legacy sites are available to the public in the local federal repository (University of New Mexico's Zimmerman Library), and in its electronic documents Lobo Vault collection:

http://repository.unm.edu/handle/1928/10963

3.5 Waste Management

Sandia follows the waste management hierarchy dictated in the Pollution Prevention Act of 1990 and reinforced in amendments to the RCRA. SNL/NM's Materials Sustainability and Pollution Prevention (MSP2) and Waste Management Programs make every attempt to reduce, reuse, or recycle waste, as appropriate, before any treatment or disposal.

Wastes are generated throughout SNL/NM during daily activities that include research and testing; production; maintenance and support operations; construction, renovation, decommissioning and demolition; environmental protection; and waste management. The wastes include the following:

- Radioactive waste (including LLW and transuranic [TRU] waste),
- Mixed waste (including mixed low-level waste [MLLW] and mixed transuranic [MTRU] waste),
- RCRA-regulated hazardous waste,
- TSCA-regulated waste,
- Other regulated wastes, including special waste and industrial solid waste, and
- Commercial solid waste.

Processes at SNL/NM waste management facilities vary according to the specific waste type but generally incorporate one or more of the following tasks in preparation for shipment to off-site facilities for recycling, storage, treatment, or disposal:

- Screening,
- Sorting,
- Repackaging,
- Treatment, and
- Storage.

The wastes and waste management processes are described below (Sections 3.5.1 through 3.5.4). Section 3.5.5 describes MSP2 support and activities at SNL/NM.

3.5.1 Waste Management Facilities and 2012 Activities

Wastes are received and processed at several SNL/NM facilities, as follows: the Radioactive and Mixed Waste Management Facility (RMWMF); seven Manzano Storage Bunkers (MSBs); the Auxiliary Hot Cell Facility (AHCF); the HWMF; the Thermal Treatment Facility (TTF); and the Solid Waste Collection and Recycling Center (SWCRC).

At each facility, wastes are tracked, inspected, and managed at all times to maintain protection of human health and the environment. Wastes are not disposed at SNL/NM.

During 2012, waste management activities at the RMWMF included screening, sorting, repackaging, storage, and treatment. Wastes were treated by one or more of the following methods: solidification and stabilization; chemical deactivation and neutralization; macroencapsulation, and physical treatment (volume reduction). Waste management activities at the MSBs in 2012 consisted of storage. Waste management activities at the AHCF included repackaging.

Waste management activities at the HWMF in 2012 included screening, sorting, repackaging, and storage.

During 2012, Sandia operated the TTF, a RCRA-permitted open burn unit in TA-III, for the on-site treatment of small quantities of unique explosive waste generated by research and test activities at an adjacent facility. Operations at the SWCRC are discussed in Section 3.5.4.

3.5.2 Radioactive Waste and Mixed Waste

The RMWMF, AHCF, and the MSB are used to manage LLW, MW, transuranic (TRU waste, and mixed TRU (MTRU) waste. The LLW and MW managed at SNL/NM are generated through a variety of processes. During 2012, both LLW and MW consisted of wastes from ongoing production processes and research, legacy wastes (wastes originally generated between 1990 and 1998), and wastes generated during waste management activities at the RMWMF. TRU and MTRU wastes managed at SNL/NM consisted of wastes generated during research and legacy wastes. All LLW, TRU, MTRU, and MW generators are instructed to contact the Radioactive Waste Program to obtain prior approval before generating waste; this promotes waste minimization and allows development of a pathway for waste treatment and disposal before the waste is generated.

Radioactive wastes are typically shipped to off-site facilities within one year, but may remain on-site longer than one year if necessary to complete the process for acceptance at an off-site facility and/or to achieve full utilization of transport vehicles.

Sandia's LLW generally consists of laboratory waste, D&D debris, and personal protective equipment (PPE). LLW is primarily contaminated with isotopes of strontium, plutonium, cobalt, americium, thorium, cesium, tritium, and uranium (plutonium and americium in LLW are below the activity level designated for TRU waste).

TRU waste may derive from sealed instrument sources, D&D waste, PPE, and laboratory waste. The radioactive component in TRU is generally americium, plutonium, neptunium, and curium.

MW and MTRU generally consist of inorganic debris and radioactive metallic objects with hazardous waste constituents, and include wastes that have been treated to meet hazardous waste treatment standards. The radioactive components of MW and MTRU are similar to LLW or TRU waste at SNL/NM.

No high-level radioactive waste (HLW) is generated at SNL/NM. Although Sandia operates several nuclear reactors, these are not used for power production; therefore, spent fuel that would be removed from the research reactors would not be classified as HLW.

Mixed Waste Regulatory Status

As discussed in Section 2.1.4, Sandia manages MW that is subject to the Federal Facilities Compliance Order (FFCO) (NMED 2004), however no compliance dates are active. The requirements include:

- Deadlines for processing and/or disposing of various types of waste as specified in the Site Treatment Plan, and
- Providing an annual update of activities and the current inventory of stored waste still on-site.

During 2012, DOE/NNSA/SFO and Sandia met all regulatory deadlines; the compliance history regarding MW and the FFCO is shown in Chapter 8, Table 8-3. DOE/NNSA/SFO and Sandia provided an annual update of MW activities (SNL 2012a). Chapter 8, Table 8-4 lists the quantities of MW subject to the FFCO at the end of fiscal year 2012.

3.5.3 Hazardous Waste and Other Regulated Waste

Hazardous waste generated at SNL/NM includes a wide variety of wastes from research and testing, together with larger quantities of wastes from D&D, production, maintenance, and support operations, including waste management activities. Hazardous wastes that cannot be recycled or treated on site are sent to off-site facilities for treatment as needed before disposal at permitted off-site facilities. Applicable regulations for hazardous waste handled at SNL/NM are listed in Chapter 8.

Explosive waste is a type of hazardous waste that must be treated to render it nonexplosive. Certain types of explosive wastes at SNL/NM are treated at the RMWMF or TTF. Explosive waste at SNL/NM is generally managed at the point of generation until it is shipped to an off-site facility for treatment in accordance with regulatory requirements.

Sandia recycles many types of hazardous waste, where feasible. Recycled hazardous waste includes various batteries, silver compounds, mercury compounds, lamps, capacitors, and toxic metals such as lead. Waste minimization efforts promoted throughout SNL/NM are investigated and implemented by line organizations with the support and technical assistance of the MSP2 Program, as discussed in Section 3.5.5.

In accordance with the requirements of Module IV, Section B.1 of Hazardous Waste Facility Permit NM5890110518, Sandia annually certifies that there is a "program in place to reduce the volume and toxicity of hazardous waste generated by the facility's operation to the degree determined by the Permittee to be economically practicable" at SNL/NM.

Industrial Solid and Special Wastes

Special waste and industrial solid waste generated at SNL/NM includes a wide variety of wastes from research and testing, production, maintenance and support operations, D&D, and waste management activities. Wastes that cannot be recycled or treated on site are sent to off-site facilities for treatment as needed before disposal at permitted off-site facilities. Applicable regulations for special waste and industrial solid waste handled at SNL/NM are listed in Chapter 8.

Sandia recycles many categories of non-hazardous waste, including alkaline batteries, fluorescent lamps, oils, and non-polychlorinated biphenyl (PCB) containing ballasts. Waste minimization efforts promoted throughout SNL/NM are not limited to hazardous waste, but also include non-hazardous waste, as discussed in Section 3.5.5.

Types of waste handled and shipped in 2012 are summarized in Table 3-1. Wastes recycled in 2012 are summarized in Table 3-2.

Polychlorinated Biphenyl and Asbestos Wastes

PCBs are a class of organic chemicals that were widely used in industrial applications due to their practical, physical and chemical properties. Uses of PCBs included dielectric fluids (used in transformers, capacitors, etc.), hydraulic fluids, and other applications requiring stable, fire retardant materials. The domestic production and distribution of PCBs was banned in 1979, and their use continues to be phased out.

Sandia has identified and replaced most PCBs and PCB-containing equipment. Previously, the largest quantity of regulated PCB-containing equipment in use at SNL/NM was capacitors contained inside fluorescent light ballasts manufactured before July 2, 1979. These have been almost completely eliminated due to an aggressive fluorescent lighting fixture retrofit program instituted in 1998. Six additional units of PCB-regulated equipment remain in use at SNL/NM. There are also six discrete areas of existing PCB spill contamination on concrete floors (from old transformers that have since been removed from service) which are being actively managed in compliance with an EPA/TSCA use authorization. PCB waste generated and shipped in 2012 is summarized in Table 3-1.

Asbestos-containing materials are present in older buildings at SNL/NM, and abatement is ongoing. Removal of asbestos material is only done if the material is an inhalation hazard, or if the building is slated to be torn down or renovated. Typical asbestos-containing building materials are present in floors, ceilings, roofing tile, certain types of insulation, and other fire-retardant construction materials. Typical asbestos waste generated from equipment abatement consists of fume hoods, ovens, and cable insulation. In instances where laboratory equipment has asbestos-containing material in good condition in a non-friable form (which poses no inhalation risk), these items are allowed to remain in service or are redistributed through the property reapplication program. Asbestos wastes are managed according to the New Mexico requirements for regulated asbestos waste. Table 3-1 summarizes the quantities of asbestos waste generated and shipped in 2012.

3.5.4 Solid Waste Collection and Recycling Center

The Solid Waste Transfer Facility was renamed the Solid Waste Collection and Recycling Center (SWCRC) in January 2012. This change was made in recognition that the facility falls below the State of New Mexico threshold of commercial solid waste picked up on an average daily basis. The primary function of the SWCRC is to collect, process, and ship for disposal solid waste generated by SNL/NM operations, in compliance with all applicable regulations. It does not accept hazardous, radioactive, residential, or food service wastes.

SWCRC Operations

Processing solid waste at the SWCRC includes screening 100 percent of the waste for prohibited materials, which are removed when identified. While screening 100 percent of the solid waste before it enters the conveyor is not a regulatory requirement, it is a best practice implemented to prevent prohibited materials from inadvertently ending up in the landfill. The conveyor then feeds the waste into a baler where it is compressed and wire-tied into desk-sized bales. The bales are weighed, individually tracked, and loaded into a trailer for transport to a local landfill. Solid waste generated in 2012 by SNL/NM is summarized in Table 3-1.

Recyclables

Another important function of the SWCRC is to collect, process (screen, bale, and track), market, and ship the following recyclable materials from SNL/NM: cardboard, white paper, mixed paper, aluminum cans, scrap metals, printer consumables, and numerous categories of plastics. Recyclables constitute over 50 percent of SNL/NM waste and diverting the recyclables significantly reduces the number of trips to the landfill. Proceeds from the sale of recyclable materials are reinvested in the recycling program. The SWCRC also provides some recycling support for Kirtland Air Force Base (KAFB) on a cost-reimbursable basis, the DOE/NNSA Albuquerque Complex and the DOE/NNSA/SFO.

In support of small SNL/NM construction and demolition projects, the C&D Recycle Center at the SWCRC accepts small quantities of C&D waste (managed separately from the solid waste). SNL/NM construction contractors that bring recyclables to the SWCRC are assisted by SWCRC personnel in loading the roll-offs and hoppers with cardboard, wood, various scrap metals and lastly C&D debris. Materials recycled in 2012 are summarized in Table 3-2.

TABLE 3-1. Waste Shipped by SNL/NM Waste Management Facilities During Calendar Year 2012

Waste Categories	2012 Waste Shipped	
	(kg)	**(lb)**
Radioactive Waste		
Low-Level Waste	25,184	55,520
Transuranic Waste	2,712	5,979
Subtotal Shipped	**27, 896**	**61,499**
Mixed Radioactive/Hazardous Waste		
Mixed Low-Level Waste	47,094	103,824
Mixed Transuranic Waste	0	0
Subtotal Shipped	**47,094**	**103,824**
Resource Conservation and Recovery Act (RCRA)		
Hazardous Waste	47,198	104,053
Subtotal Shipped	**47,198**	**104,053**
Toxic Substances Control Act (TSCA)		
Polychlorinated Biphenyls (PCBs)	1,860	4,100
PCBs and hazardous waste mixture	136	300
Subtotal Shipped	**1,996**	**4,400**
Other Regulated Wastes		
Infectious Waste	703	1,550
Asbestos	45,428	100,151
Chemical Waste (includes Special Waste and Industrial Solid Waste)	323,619	713,450
Used Oil (not recycled)	0	0
Subtotal Shipped	**369,750**	**815,151**
Commercial Solid Waste		
Solid Waste Collection and Recycling Center Dry Waste	632,630	1,394,696
Offsite Office Waste (Sandia Science & Technology Park)	52,510	115,764
Cafeteria Wet Waste	18,500	40,785
Construction and Demolition Waste	1,163,000	2,563,950
Subtotal Shipped	**1,866,640**	**4,115,195**
2012 Total Waste Shipped	**2,360,574**	**5,204,122**

NOTES: All wastes shipped off-site for treatment and/or disposal unless noted otherwise. Wastes that are treated on-site and shipped off-site are included in the quantities of wastes shipped off-site. Waste treatment may increase waste quantity (e.g., adding inert material to treat the waste through macroencapsulation within an outer container).
Construction and demolition waste is now included in this table.
kg = kilogram
lb = pound
SNL/NM = Sandia National Laboratories, New Mexico

TABLE 3-2. Waste Recycled by SNL/NM During Calendar Year 2012

Recycle Categories	Waste Recycled (kg)	(lb)
Regulated or Chemical Waste Recycled		
Batteries	62,969	138,821
Cadmium	182	402
Capacitors	1,807	3,983
Chemical Exchange Program (CEP)	336	740
Computer Electronics	294,407	649,049
Coolant	1,960	4,320
Lead	19,254	42,447
Light Ballasts (non-PCB)	2,098	4,626
Light Bulbs	2,940	6,481
Mercury containing items	143	315
Oil / Grease / Fuel	32,716	72,126
Soil	29,732	65,547
Toner / Ink Cartridges	13,943	30,738
Subtotal	462,485	1,019,595
Commercial, Construction, and Demolition Solid Waste Recycled		
Asphalt	1,800	3,968
Batteries	1,051	2,318
Binder Exchange Program	744	1,641
Cardboard	155,689	343,233
Carpet Tiles	8,773	19,340
Ceiling Tiles	9,086	20,030
Chairs	20,484	45,160
Compost (Food Waste, Green Waste, Paper and Gypsum)	94,633	208,627
Fencing	1,814	4,000
Food Grease	26,300	57,980
Gravel	45,360	100,000
Metals	1,116,049	2,460,441
Paper (Mixed and White)	103,427	228,015
Plastics	33,146	73,074
Tires	9,639	21,250
Wood	96,474	212,687
Subtotal	1,724,469	3,801,764
Total Waste Recycled	2,186,954	4,821,359

NOTES: kg = kilogram
lb = pound
PCB = polychlorinated biphenyl
SNL/NM = Sandia National Laboratories, New Mexico

SWCRC personnel also support the collection of C&D debris and C&D recyclables by delivering roll-offs (20-, 30- and 40-cubic yard) upon request to numerous locations on the site. When requested, the SWCRC personnel pick-up the full roll-offs and take them either to the KAFB landfill (C&D debris only) or to local recycling vendors. Another service is delivery and pickup of green waste roll-offs to the Albuquerque Bernalillo County Water Utility Authority's Soil Amendment Facility and transporting roll-offs of compost for use on the site.

3.5.5 MSP2 Program

Program Scope

The P2 program renamed itself in 2012, to better reflect its efforts in striving for sustainable use of materials in SNL/NM operations. The new group name is Materials Sustainability and Pollution Prevention (MSP2). The MSP2 Program provides guidance and technical support to reduce waste generation and resource consumption and to help improve the overall efficiency of processes and organizations within SNL/NM. To achieve continuous improvement, the program annually sets targets and activities for recycling, waste reduction, sustainable acquisition (SA), and reduction of environmental releases. The MSP2 Program is directed and guided by federal requirements, including DOE directives.

The MSP2 Program partners with numerous organizations at SNL/NM, including ES&H, Facilities Engineering, and Procurement. MSP2 Program staff members research waste reduction technologies and strategies applicable to SNL/NM work processes, seek avenues to reuse and recycle waste streams currently landfilled or incinerated, and assist with cost-effective implementation for new waste reduction or recycling initiatives.

Awareness and Outreach

The MSP2 staff conducts awareness programs and outreach activities that promote and teach MSP2 strategies and technologies to waste generators. MSP2 staff also submit nominations for federal (DOE and EPA) and other award programs. Internal articles and notices are regularly created that showcase MSP2 activities and awards to Sandia for MSP2 accomplishments. MSP2 information and successes can be found at the following website:

http://p2.sandia.gov

The MSP2 Program supports awareness events each year. Sandia's Earth Day event was held in April 2012. A booth was hosted to promote composting and recycling opportunities at work and at home. Four "Zero Waste Events" were hosted by MSP2 with cooperation and support from catering contractors, to teach participants that it is possible to eliminate waste. These Zero Waste Events were in conjunction with other non-environmentally oriented activities: Take Our Daughters and Sons to Work Day; Health Fitness Day; the Division 4000 Team Celebration; and Hispanic Heritage and Diversity Awareness Event. MSP2 also hosts an annual booth at the main cafeteria for November's America Recycle Day and New Mexico's Recycling Awareness Month.

MSP2 staff routinely give presentations at conferences, professional society meetings, and other organized events to disseminate and share Sandia-specific MSP2 knowledge and experience. In 2012, MSP2 staff presentations included:

- Media Sanitization in Used Electronics Processing to the U.S. EPA's Federal Electronics Challenge monthly teleconference (August)
- Pollution Prevention and Waste Minimization to the New Mexico Society of Hazardous Materials Managers continuing education seminar (October)

MSP2 Awards

Four awards were received in 2012 on behalf of outstanding efforts made in 2011:

- Department of Energy NNSA "Best-In-Class" Awards for:
  - The Roofing Recycling Pilot Program,
  - Sandia's Comprehensive Recycling Program, and
  - Computer Server Virtualization
- DOE NNSA "Environmental Stewardship" Award for the Fleet of Copiers Becoming Multi-Function Devices

3.5.5.1 Sustainable Acquisition Program

Through the SA Program, MSP2 works to integrate products with reduced environmental impact into purchase agreements and ongoing operations and maintenance across SNL/NM. Products with high recycled content percentages, renewable biobased source materials, and those that have been labeled by widely recognized environmental certification systems are all part of the Sandia approach to sustainable acquisition. These products reduce demand for virgin materials, while increasing demand on recycled markets; reduce material sent to landfills; use less energy for harvesting, transport, and conversion of raw materials; rely less on petroleum ingredients; and require less energy and water resource use in manufacturing. By seeking out suppliers who share these goals and communicating with Sandia procurement, purchasers, and end users, Sandia is helping to pull many markets toward products that are better for human health and the environment.

MSP2 works continuously to write green purchasing requirements into all applicable contracts with Sandia. Construction specifications are another means of calling out green products and MSP2 works with Facilities groups to put in item specific language. The ultimate goal is to provide products with sustainable alternatives as a first choice to Sandia by contractual obligation. Increasingly, sustainable acquisition is being addressed as early as the Request for Quotation (RFQ) so that a company's environmental stance becomes a component in the contract award process.

For over 50 product types in eight categories cited by the EPA's Comprehensive Procurement Guidelines (CPGs), MSP2 collects quarterly purchase data to tabulate site progress with sustainable acquisition. The CPGs are designed as guidance for federal agencies and their facilities to use in acquiring products with recycled content. While purchasing new products made from recycled content materials is still federally mandated, DOE has begun a new form of tracking based upon the number of contractual agreements containing sustainable acquisition language, rather than the dollar value of all products purchased. Sandia is adjusting its data collection practices to assure the ability to prove our compliance with this new method of reporting. CPG information can be found at the following website:

http://www.epa.gov/epawaste/conserve/tools/cpg/index.htm

MSP2 continues to promote use of biobased products substituting for petroleum-based products used at Fleet Services, Facilities maintenance, and in offices across SNL/NM.

As more experience is gained with green products, lessons learned are shared with other DOE sites, as well as other agencies interested in sustainable procurements.

3.5.5.2 Waste Reduction

MSP2 has continued its contract with a local composting company to divert food waste from onsite cafeterias serving up to 1,200 customers per day and from catered events that are expected to have at least a few hundred participants. There were four such catered events in 2012. During 2012, 48,200 pounds (lbs) of food waste, approximately 54 percent of the total food service waste was diverted from the landfill.

In other waste reduction efforts, the CEP delivered 155 containers to new users, weighing over 335 kilograms (kg), and avoiding the costs of new purchase and waste disposal totaling over $75,000. The Lead Bank continued to be upgraded in 2012 with an online request form and detailed inventory with photos. The Lead Bank reduces the need for purchase of new lead, and provides a location for departments to send excess elemental lead other than for hazardous disposal. In 2012, 24,815 lbs were recycled, and 6,076 lbs were distributed for reuse on-site. Glass bottle and jar recycling was initiated at the end of August, with two campus drop-off locations being piloted. The objective was to reduce glass waste from new product containers, and to make diversion available to beverage consumers. No data is available since neither of the drop-off containers were ready to be emptied by the end of 2012.

3.5.5.3 Electronics Stewardship

Electronics Stewardship covers the lifecycle impacts of information technology equipment and is now routinely addressed in the DOE and federal government as a whole. The impacts of electronics use are many but include a significant portion of an organization's energy use, toxics contributed to the waste stream, and the opportunity for "e-cycling" or capture of the high value materials for use in new equipment. Electronics life cycle management is divided into three stages: purchase, operations, and end of life management. The SNL/NM MSP2 group is tasked with monitoring and facilitating improvements to Sandia performance at all three of these stages.

Sandia is a continuing partner in the Federal Electronics Challenge Program, which promotes a comprehensive approach to reducing the environmental impacts of electronics assets ownership. One part of that approach is use of the Electronic Product Environmental Assessment Tool (EPEAT) in the purchase of electronic equipment. By integrating EPEAT into the Preferred Systems qualifications, Sandia has achieved exceptional compliance in recent years. In 2012, five percent of SNL/NM purchases of computer tower, laptops, and monitors were EPEAT Silver-compliant, and achieving the next higher level of environmental attributes, 93 percent of applicable Information Technology (IT) purchases were EPEAT Gold-compliant. These numbers indicate computing equipment that is recyclable, uses fewer toxins in production, and is more energy efficient.

Operations are currently an aspect of electronics stewardship that has a lot to do with people. All EPEAT-certified equipment is Energy Star-compliant but it is up to each user to take advantage of energy saving features. By the end of 2012, over 18,000 desktop computers hosted a comprehensive power management software suite that allows for precise power management and usage reporting of all networked equipment. This removes much of the user dependence from power savings and brings network down-time closer to a lowest power scenario. Calculations show energy savings in the hundreds of thousands of dollars.

Regarding the end of life for computer equipment, if a unit is not immediately reassigned to another individual for reuse, it enters the Property Reutilization system. Property Reutilization offers a select quality of computers for reuse. Computer systems not designated for reuse are palletized and then stored in the MSP2 Tent until sufficient quantity for a recycling shipment is reached. MSP2 then coordinates a shipment to a certified domestic electronics recycler that dismantles and segregates the material for distribution back to the manufacturing industry or raw materials market. The recycling rate for excess IT equipment (e-scrap) continues to be 100 percent. Considering the number of computing systems purchased annually by Sandia, this practice represents a dramatic reduction of what would otherwise be hazardous waste if not recycled. A total of over 250,000 lbs of e-scrap was recycled by SNL/NM personnel in 2012. To reduce future quantities of e-scrap from ever being produced, two ongoing computer equipment reduction initiatives are making a big impact. The first, using server virtualization to reduce the number of actual servers on-site as well as to host individuals' virtual desktops, has cut down on the physical hardware required and the associated energy use and disposal/recycling. The second is the use of networked copy machines as multifunction devices that can produce both duplex copies and duplex print jobs, in addition to being a full-color scanner. This avoids the use, and can eliminate future purchases, of desk top printers.

3.5.5.4 Recycling

Sandia accounts for its recycling in two separate categories: routine, which is waste from recurring and/or typical office operations, and non-routine, from intermittent clean-up and construction activities. In 2012, 67 percent of Sandia's routine waste and 37 percent of non-routine waste was recycled. See Table 3-2 for the breakdown of recycling by waste stream.

While the majority of recycling operations are conducted at the SWCRC and HWMF, the MSP2 group manages several other recycling functions. This year the major initiatives included continuing to expand mixed paper and alkaline battery recycling, and beginning a glass bottle and jar recycle stream.

Mixed paper recycling continued to rise, to almost 124,000 lbs diverted in 2012. Volunteers continue to be an important cog in the mixed paper recycling effort, moving 90 percent of the material out of buildings to distributed yellow dumpsters designated for mixed paper. In a new initiative by MSP2, Custodial Services piloted servicing rolling carts similar to those used in the white paper recycle process from three highly populated buildings to recycle dumpsters. At the end of a multi-month pilot period, Custodial Services agreed to service the mixed paper rolling carts in five more large buildings starting in 2013 and MSP2 will conduct a study to identify additional buildings to expand Custodial support of mixed paper recycling. Ten new mixed paper dumpsters were deployed in 2012 bringing the total to 49 locations. These dumpsters are also the designated drop-off locations for packing foams intended for recycle. Three packing foams were accepted for recycle in 2012: Expanded polystyrene #6 Styrofoam, low density polyethylene #4 foam, and polyurethane foam.

In summary, the MSP2 Program made further progress in 2012 in its major focus areas of Waste Reduction, Electronics Stewardship, SA, Reuse/Recycling and Awareness. The intent is to institutionalize materials sustainability considerations into daily work activities.

3.6 Biological Control Activities

The Biological Control Activity provides customer support related to animal control issues and compiles information on pesticide use at SNL/NM. Animal control support includes providing general information and resolving issues related to removing nuisance animals. Requests for assistance in resolving nuisance animal problems are relayed and documented through Sandia's Facilities Telecon Department. This effort may involve interacting, as necessary, with the U.S. Air Force and State of New Mexico agencies to resolve animal control issues. The Biological Control Activity also involves providing support in addressing animal-borne disease concerns (e.g., Hantavirus) through activities including disinfecting, sanitizing, and cleaning up areas infested with rodents or pigeons.

Pesticide use at SNL/NM includes the use of herbicides for weed control, rodenticides for controlling mice, and insecticides for the control of insects in food service and work areas. Sandia uses EPA-registered pesticides that are applied by certified pest control agencies. Documents related to the program are listed in Chapter 8.

3.7 National Environmental Policy Act Program

The NEPA Program provides the DOE/NNSA/SFO with technical assistance in support of compliance with NEPA and the National Historic Preservation Act at all of Sandia's locations: SNL/NM; SNL/CA; TTR/NV; KTF/HI; and other remote locations as needed. The SNL/NM NEPA Team reviews projects for conformance to existing DOE NEPA documents and determinations. The use of the ISMS NEPA Module software facilitates SNL/NM NEPA reviews, citing existing NEPA documentation as appropriate. The Module also supports quality assurance activities by providing a consistent framework that makes NEPA documentation and information readily available to customers. The Module also streamlines the DOE/NNSA/SFO in their review and determination of DOE NEPA checklists, when required. A DOE NEPA checklist, or an Air Force Form 813, is prepared for the DOE review and determination, if the proposed action meets any of the following concerns:

- Proposes a new action
- Does not fall within the analysis of an existing SNL/NM NEPA document
- Occurs on KAFB property (permitted or requested for permit for Sandia use)
- NEPA program documents and regulations are listed in Chapter 8. Table 3-3 summarizes the NEPA reviews that were completed in 2012.

SNL/NM Site-Wide Environmental Impact Statement (SWEIS)

During CY 2012, Sandia assisted the DOE in preparation for the development of a new SWEIS. Environmental Programs Department personnel met with Line Customers from various programmatic missions to discuss and compile data on their current and anticipated future operations. These discussions considered the potential impacts to the environment from the anticipated changes in programmatic work now and in the future. In addition, personnel compiled an array of environmental information and data including environmental, safety, and health policies and procedures; descriptions of the natural environment at SNL/NM; environmental stewardship programs; overall site operations; and agreements between the DOE and other governmental entities. This information and data will help the DOE in developing analyses for the next SWEIS.

2012 NEPA Documentation

The SNL/NM NEPA Team participated in or completed the following environmental activities:

- Reviewed and provided comments on the memo provided by DOE Secretary Chu on NEPA Compliance expectations

In addition to the select activity above, the SNL/NM NEPA Team reviewed a total of 1,020 proposed projects in the ISMS NEPA Module and other corporate applications. To support mission activities at Sandia, 72 DOE NEPA checklists were transmitted to the DOE/NNSA/SFO for review and determination.

3.8 Environmental Outreach Program

SNL/NM's Environmental Outreach Program reaches out to the community via various events and provides environmental information to members of Sandia's workforce. Sandia recognizes that in addition to complying with requirements, it is important to communicate with Sandia's workforce and the local community to help reduce environmental impacts at work and at home. Sandia has an integrated approach to communicate environmental awareness to its workforce via various newsletters, awareness campaigns, and outreach events. Sandia collaborates with numerous internal and external organizations such as Sandia's Energy Management Team, the City of Albuquerque (COA), and the Environmental Education Association of New Mexico (EEANM).

Currently, Sandia participates in or holds several internal and external outreach and awareness events. Events conducted in 2012 include Youth Conference on the Environment, School to World, and the annual EMS Excellence Awards Ceremony. Sandia also coordinates the semi-annual DOE Public Meeting. At these events, the outreach team distributes fact sheets and newsletters; when working with children, the team often demonstrates environmental education models on topics including local air quality, landfills, and watershed education. The Outreach team also encourages the Members of the Workforce and the community to provide feedback and ask questions about Sandia's environmental programs.

The Annual Youth Conference on the Environment is a free, one-day conference offered to high school students as a means to educate them on various environmental issues. In 2012, approximately 100 students attended and learned about wildfires, local food production, and butterfly conservation. The event was co-sponsored by Sandia, the EEANM, and the COA.

The annual EMS Excellence Awards Program recognizes Members of the Workforce who demonstrate environmental excellence in five specific categories (energy reduction/water conservation, risk mitigation/environmental protection, environmentally preferable purchasing, waste minimization, and recycling). Since its inception in 2006, the EMS Team has received over 160 nominations from individuals and teams who are contributing to Sandia's vision of EMS.

TABLE 3-3. Summary Data for SNL/NM NEPA Reviews Submitted to DOE/NNSA/SFO During Calendar Year 2012

NEPA Reviews	Review Breakouts		Quantity
Corporate NEPA Software System	Reviewed by SNL/NM NEPA Team		258
	Reviews Completed by DOE/NNSA/SFO		57*
Other Corporate NEPA Reviews	Completed by SNL/NM NEPA Team		690
DOE / U.S. Air Force NEPA Documents	New Land-Use Permit Reviews	1	
	Land-Use Permit Renewal Reviews	9	
	Land-Use Permit Termination Reviews	0	
	Project-Specific Reviews	5	
	Environmental Assessments Under AF Activities	0	
	Subtotal for USAF Reviews Completed		15*
Grand Total of all NEPA Reviews			**1,020**
Percentage of Total Reviews Requiring Submittal to DOE **Total DOE Reviews* (57 + 15 = 72) *divided by Total NEPA Reviews* (1,020) =			7 %

NOTES: AF = Air Force
DOE = U.S. Department of Energy
NEPA = National Environmental Policy Act
NNSA = National Nuclear Security Administration
SFO = Sandia Field Office
SNL/NM = Sandia National Laboratories/New Mexico
USAF = United States Air Force
% = percent

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Chapter 4
Terrestrial and Ecological Surveillance

4.1 Terrestrial Surveillance Program

Terrestrial surveillance is conducted at Sandia National Laboratories, New Mexico (SNL/NM) to detect the possible deposition or migration of contaminants to off-site locations and to determine the impact, if any, of SNL/NM's operations on human health or the environment.

The Terrestrial Surveillance Program samples surface soils, arroyo and river sediments, and vegetation from various on-site, perimeter, and off-site locations. The samples are used to detect the presence of anomalous radiological and non-radiological constituents.

Various locations have been used for sample collection for one to 20 years. When some of the older sampling locations are no longer relevant to current operations these sampling locations may be relocated and placed in areas with greater potential environmental impact. However, the number of samples collected annually should remain approximately the same as in the past.

4.1.1 Program Objectives

The Terrestrial Surveillance Program is designed and conducted to address the requirements of U.S. Department of Energy (DOE) Order 458.1, *Radiation Protection of the Public and the Environment* (DOE 2013) and to satisfy Sandia's Environmental Management System Program standards, which adopt the requirements of International Organization for Standardization (ISO) 14001. Reporting is done in accordance with DOE Order 231.1B, *Environment, Safety and Health Reporting* (DOE 2012) and addresses these objectives:

- Collect and analyze samples in order to characterize environmental conditions and identify trends,
- Establish baseline (or background) levels of radiological and non-radiological constituents,
- Assess the effectiveness of Pollution Prevention and abatement programs,
- Identify new or existing environmental quality problems and their potential impacts on human health or the environment, and
- Verify compliance with applicable laws and regulations, as well as commitments made in official documents (such as Environmental Impact Statements, in accordance with the National Environmental Policy Act [NEPA]).

Standards for Comparison

No regulatory limits are available to directly compare concentrations of some radiological or non-radiological constituents in surface soils, vegetation, or sediments. SNL/NM personnel conduct statistical analyses to compare the results from on-site and perimeter samples to off-site results, and to establish trends in order to identify possible pollutants and their potential impact on human health or the environment. However, if anomalies are observed, there are various documents used for guidance with risk assessment, such as DOE Order 458.1, *Radiation Protection of the Public and the Environment* (DOE 2013).

In addition, sample results for metals in surface soils are compared to U.S. surface soil average concentrations (Kabata-Pendias 2000), local and regional surface soil average concentrations (Dragun and Chekiri 2005), or site-specific surface soil concentrations (Dinwiddie 1997). A summary report of metals-in-soils at SNL/NM collected annually between 1993 and 2005 has been prepared and serves as another point of reference (SNL 2006).

In summary for 2012, the mean value of non-radiological constituents in soils is less than the residential level set by the State of New Mexico soil screening levels (SSLs), with the exception of arsenic. However, the mean value for arsenic is less than the industrial level set by the State of New Mexico SSLs. For an added measure of sample verification, the DOE Oversight Bureau of the New Mexico Environment Department (NMED) splits samples with SNL/NM personnel at several locations.

Statistical Analysis

Samples are generally collected from fixed locations to effectively enable statistical comparisons with results from previous years. Statistical analyses are performed to determine if a specific on-site or perimeter location differs from off-site values and to identify trends at a specific sampling location. Since multiple data points are necessary to provide an accurate view of a system, the Terrestrial Surveillance Program does not rely on the results from any single year's sampling event to characterize on-site environmental conditions. Results from a single sampling event may vary from year to year due to slight changes in sampling locations, differences in climatic conditions, and laboratory variations or errors. Therefore, as the amount of data increases, the accuracy of the characterization increases.

The results of the statistical analyses allow SNL/NM personnel to prioritize sample locations for possible follow-up action. The prioritization process is a decision-making tool used to assist in the determination of the appropriate level of concern for each sample result. The Statistical Analysis Prioritization Methodology (Shyr, Herrera, and Haaker 1998) is based on two "yes or no" questions resulting in a matrix of four priority levels. The matrix is shown in Table 4-1.

In 2000, SNL/NM personnel changed to analytical laboratories with lower detection capabilities for many of the metals. The analyses in 2012 utilized data from the same analytical laboratory since 2000.

In some instances, this qualitative inspection of the data is augmented by the graphical evaluation methodology described and documented in the *Chemical Analyses of Soil Samples Collected from the Sandia National Laboratories, New Mexico Environs, 1993-2005* (SNL 2006).

TABLE 4-1. Decision Matrix for Determining Priority Action Levels

Priority	Are results higher than Off-Site?*	Is there an increasing trend?	Priority for further investigation
1	Yes	Yes	Immediate attention needed. Specific investigation planned and/or notifications made to responsible parties.
2	Yes	No	Some concern based on the level of contaminant present. Further investigation and/or notifications as necessary.
3	No	Yes	A minor concern since contaminants present are not higher than off-site averages. Further investigation and/or notifications as necessary.
4	No	No	No concern. No investigation required.

NOTES: Based on *Statistical Analysis Prioritization Methodology* (Shyr, Herrera, and Haaker 1998).
*Some sites may appear higher than off-site. However, there may not be a statistically significant difference.

This enables the visual identification of anomalies in the data that stand out from the data population for the entire site, or just that location. This step is performed to ensure that anomalous data that would otherwise pass statistical scrutiny is flagged for further investigation. This is particularly useful where insufficient data exists for trending, but comparison of new data to "expected values" is desired.

4.1.2 Sample Media

Samples of surface soils, arroyo and river sediments and vegetation are collected as part of the Terrestrial Surveillance Program and analyzed for radiological and non-radiological constituents.

Soil

Soil samples are collected to ascertain the presence or buildup of pollutants that may have been transported by air or water and deposited on the ground surface. Approximately 1,500 grams (g) of sample is collected from the top two inches of soil in accordance with SNL/NM field operating procedures (FOPs). In 2012, soil samples were collected from locations indicated in Tables 4-2, 4-3 and 4-4.

Sediment

Sediment samples are collected from arroyo beds and from the banks of rivers and creeks to ascertain the presence, or buildup, of pollutants deposited from surface waters. Approximately 1,500 g of sample is collected from the top two inches of soil in accordance with SNL/NM FOPs. Sediment samples were collected from locations listed in Tables 4-2, 4-3 and 4-4.

Vegetation

Vegetation is sampled to monitor for potential uptake of radioactive pollutants, which could provide an exposure pathway to foraging animals and to humans through the food chain. In actuality, human exposure to contaminants through the food chain is highly unlikely on Kirtland Air Force Base (KAFB) since there is no hunting, livestock, or commercial farming within the boundaries of KAFB. Approximately 500 g of sample is collected, preferably from perennial grass, by cutting back several inches of growth from the plant. If grass is not available, samples from small leafy plants may be collected. In 2012, no vegetation was collected due to the on-going drought.

Gamma Radiation Levels

Gamma radiation levels are measured using thermoluminescent dosimeters (TLDs) to determine the impact, if any, of SNL/NM's operations on ambient radiation levels. The TLDs are changed out on a quarterly basis and processed at an on-site laboratory. TLDs were collected from locations listed in Tables 4-2, 4-3 and 4-4.

4.1.3 Sampling Locations

Occasionally, sampling locations are added or dropped for different reasons, including the start-up of a new facility or operation, closure of an existing facility or operation, additional characterization of areas with elevated concentrations or increasing trends, or other technical or budgetary reasons. These locations are illustrated in Figure 4-1. Locations sampled are shown in Tables 4-2, 4-3 and 4-4.

In some instances, special radiological or non-radiological "sampling campaigns" near operations of interest, as described in Section 4.1.5, may be conducted in addition to, or in partial substitution for fixed locations. There were no special sampling campaigns conducted in 2012.

TABLE 4-2. On-Site Terrestrial Surveillance Locations and Sample Types

Location Number	Sampling Location	Soil	Sediment	Vegetation	TLD
1	†Pennsylvania Ave.	X			X
2NE*	†Mixed Waste Landfill (MWL) (northeast)	X		X	
2NW	†MWL (northwest)	X		X	X
2SE	†MWL (southeast)	X			
2SW	†MWL (southwest)	X			
3	†Coyote Canyon Control	X			X
6	†Technical Area (TA) III (east of water tower)	X		X	X
7	†Unnamed Arroyo (north of TA-V)	X			X
20	TA-IV (southwest) (KAFB Skeet Range)				X
31	TA-II Guard Gate				X
33*	†Coyote Springs	X		X	
34	†Lurance Canyon Burn Site	X		X	
35	Chemical Waste Landfill (CWL)	X		X	
41	†TA-V (northeast fence)	X			X
42	†TA-V (east fence)	X		X	X
43	†TA-V (southeast fence)	X		X	X
45	†Radioactive and Mixed Waste Management Facility (RMWMF), TA-III (northwest corner)	X		X	X
46	†TA-II (south corner)	X		X	X
47	Tijeras Arroyo (east of TA-IV)				X
48	Tijeras Arroyo (east of TA-II)				X
49	†Near the Explosive Components Facility (ECF)	X		X	
51	†TA-V (north of culvert)	X		X	
52	†TA-III, northeast of Bldgs. 6716 and 6717	X			
53*	†TA-III south of long sled track	X			
54	†TA-III, Bldg. 6630	X			
55	†Large Melt Facility (LMF), Bldg. 9939	X		X	
56	†TA-V, Bldg. 6588 (west corner)	X			
57	†TA-IV, Bldg. 970 (northeast corner)	X			
66	KAFB Facility	X			X
72	†Arroyo del Coyote (midstream)		X		
74N*	†TA-IV, Tijeras Arroyo (midstream)		X		
75	†Arroyo del Coyote (down-gradient)		X		
76	†Thunder Range (north)	X			
77	†Thunder Range (south)	X			
78	†School House Mesa	X			
79	†Arroyo del Coyote (up-gradient)		X		

See notes at end of table.

TABLE 4-2. On-Site Terrestrial Surveillance Locations and Sample Types (Concluded)

Location Number	Sampling Location	Soil	Sediment	Vegetation	TLD
83	†Tijeras Arroyo Groundwater Well		X		
84	†Storm Water Monitoring Point (S-10)		X		
85	†Arroyo del Coyote Cable Site		X		
86	†Corner of Wyoming and S Street	X			
90	†TA-III Land Mine Test Site	X			
91	†Background Arroyo Near ER-87	X			
92	†New Classified Waste Landfill	X			
93	††Thunder Range Explosive Test Area	X			
94	††Thunder Range, Southeast of R5	X			

NOTES: * = Replicate sampling locations: In addition to single samples taken for each medium, two replicate samples are collected for internal checks on comparability of sampling and analysis.

† These locations may be analyzed periodically for total analyte list (TAL) metals.

†† High Explosives (HE) assay in soil

Bldg = Building
ER = Environmental Restoration
KAFB = Kirtland Air Force Base
N = North
NE = Northeast
NW = Northwest
SE = Southeast
SW = Southwest
TLD = thermoluminescent dosimeter

On-site

On-site locations are selected within or near areas of past or current SNL/NM operations (Figure 4-1 and Table 4-2). Sample locations are chosen near sites with known contamination from past operations, or near facilities that have the potential to discharge radiological or non-radiological pollutants to the environment. Other considerations in the selection of sampling locations include local topography and meteorology.

Perimeter

Perimeter locations (Figure 4-1 and Table 4-3) are selected to determine if contaminants are migrating from SNL/NM sites toward the off-site community. With a few exceptions, perimeter locations are typically situated off SNL/NM property, but within the boundaries of KAFB.

Off-site

Off-site locations are selected to establish concentrations of radiological and non-radiological constituents for comparison with on-site and perimeter results (Figure 4-2 and Table 4-4). Sample locations have been selected within a 25-mile radius of SNL/NM.

4.1.4 Radiological Parameters and Results

Radiological analyses are performed on all soil, sediment, and vegetation samples and are summarized in this section. The 2012 radiological parameters and analytical results can be found in Appendix C of this report. The detailed statistical analyses are documented in the *2012 Data Analysis in Support of the Annual Site Environmental Report* (SNL 2013).

TABLE 4-3. Perimeter Terrestrial Surveillance Locations and Sample Types

Location Number	Sampling Location	Soil	Sediment	Vegetation*	TLD
4	†Isleta Reservation Gate	X			X
5	†McCormick Gate	X			X
12	†Northeast Perimeter	X			
16	†Four Hills	X			X
18	North Perimeter Road				X
19	†USGS Seismic Center Gate	X			X
39	Northwest DOE Complex				X
40	Tech Area I, northeast (by Bldg. 852)				X
58	†North KAFB Housing	X			
59	†Zia Park (southeast)	X			
60	†Tijeras Arroyo (down-gradient)	X	X		
61	†Albuquerque International Sunport (west)	X			
63	†No Sweat Boulevard	X			
64**	†North Manzano Base	X			
73	†Tijeras Arroyo (up-gradient)		X		
80	†Madera Canyon	X			
81	†KAFB West Fence	X			X
82	†Commissary	X			
87	†Mesa del Sol (north)	X			
88	†Mesa del Sol (middle)	X			
89	†Mesa del Sol (south)	X			

NOTES: * = No vegetation samples were collected due to the ongoing drought.
** = Replicate sampling locations: In addition to single samples taken for each medium, two replicate samples are collected for internal checks on comparability of sampling analysis.
† These locations may be analyzed periodically for total analyte list (TAL) metals.
Bldg = Building
DOE = U.S. Department of Energy
KAFB = Kirtland Air Force Base
TLD = thermoluminescent dosimeter
USGS = U.S. Geological Survey

Radiological Results

The results of the statistical analysis showed no on-site or perimeter soil or sediment locations that were Priority-1 (both higher than off-site and with an increasing trend). One location was identified as Priority-2 (higher than off-site) for cesium-137. The Priority-2 location and parameters are listed in Table 4-5. There were no Priority-3 (increasing trend) locations identified.

Cesium-137

One perimeter location (12) continues to be identified as Priority-2 for cesium-137 in surface soils. Location 12 is located on the U.S. Forest Service land withdrawn area. This location is at a slightly higher elevation, which receives greater precipitation and results in slightly higher cesium-137 levels from fallout. Cesium-137 is prevalent in surface soils worldwide as a result of historical nuclear weapons testing. Over the past 12 years, the values for cesium-137 at this perimeter location ranged from 0.07 to 1.82 picocuries per gram (pCi/g). However, these levels are not cause for concern.

All sediment sample locations were identified as Priority-4 (consistent with off-site results and no increasing trend) for cesium-137.

TABLE 4-4. Off-Site Terrestrial Surveillance Locations and Sample Types

Location Number	Sampling Location	Soil	Sediment	Vegetation	TLD
8	†Rio Grande, Corrales Bridge (up-gradient)		X		
9	†Sedillo Hill, I-40 (east of Albuquerque)	X			
10	†Oak Flats	X			X
11*	†Rio Grande, Isleta Pueblo (down-gradient)	X	X		X
21	Bernalillo Fire Station 10, Tijeras				X
22	Los Lunas Fire Station				X
23	Rio Rancho Fire Station, 19th Avenue				X
24	Corrales Fire Station				X
25	†Placitas Fire Station	X		X	X
26	Albuquerque Fire Station 9, Menaul NE				X
27	Albuquerque Fire Station 11, Southern SE				X
28	Albuquerque Fire Station 2, High SE				X
29	Albuquerque Fire Station 7, 47th NW				X
30	Albuquerque Fire Station 6, Griegos NW				X
62*	†East resident	X			
68	†Las Huertas Creek		X		

NOTES: * = Replicate sampling locations: In addition to single samples taken for each medium, two replicate samples are collected for internal checks on comparability of sampling analysis.

†These locations may be analyzed periodically for total analyte list (TAL) metals.
I-40 = Interstate 40
NE = Northeast
NW = Northwest
SE = Southeast
TLD = thermoluminescent dosimeter

TABLE 4-5. Radiological Summary Statistics for Sample Locations Noted as Priority-2 During Calendar Year 2012

Sample Media	Analyte	Units	Location	Number of Samples	Average	Std Dev	Minimum	Maximum	2012 Result
Soil	Cesium-137	pCi/g	12	13	1.01	0.49	0.07	1.82	0.88

NOTES: Data presented is for thirteen years (2000-2012).
pCi/g = picocurie per gram
Std Dev = Standard Deviation

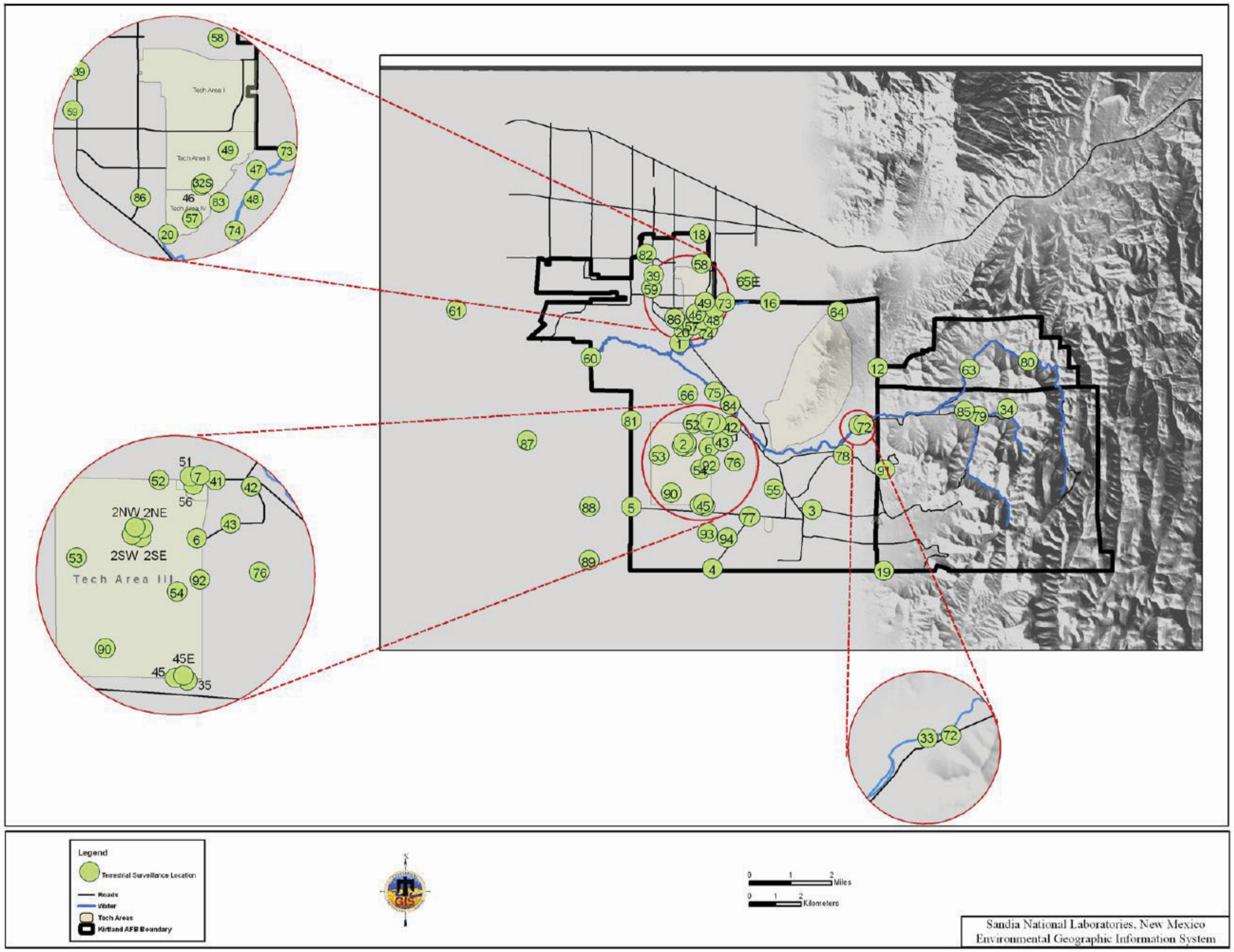

FIGURE 4-1. Terrestrial Surveillance Program On-site and Perimeter Sampling Locations. *On-site locations are within areas of SNL/NM operations. Perimeter locations are located both on and off KAFB property.*

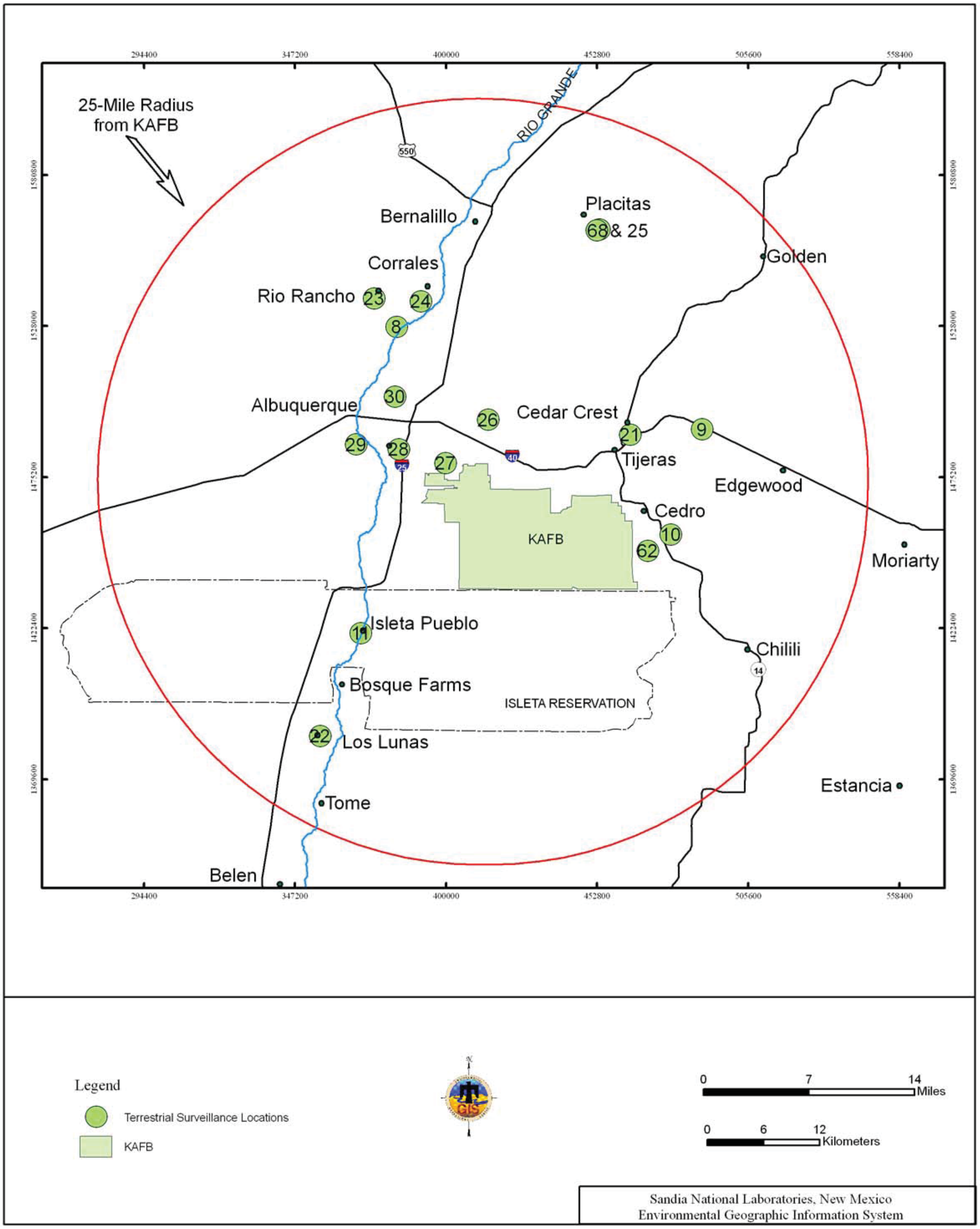

FIGURE 4-2. Terrestrial Surveillance Program Off-Site Sampling Locations

Tritium

Tritium is not a significant indicator radionuclide for operations at SNL/NM, and the low soil moisture in the area will always make low-activity assay difficult. There was no unusual tritium concentrations noted for any of the soil or sediment samples collected.

Total Uranium

No soil or sediment locations were identified as Priority-1, Priority-2 or Priority-3 for total uranium.

TLD

TLD exposure by quarter and the exposure rate for each location class (on-site, perimeter, or off-site) for 2012 can be found in Appendix C of this report. The exposure rate summary statistics for each location class can also be found in Appendix C. All TLDs were collected every quarter in 2012. If a TLD is not collected for a quarter, it is deleted from the statistical analysis.

Data for 2000 through 2012 were analyzed to determine if any statistical differences were observed for either location class or year. Operational locations are excluded from the statistical analysis. In 2012, there was no statistical difference between on-site, perimeter, and off-site locations. Table 4-6 shows the overall exposure rate summary statistics for 2000 through 2012. Figure 4-3 shows the TLD exposure rates by year and location class.

4.1.5 Non-Radiological Parameters and Results

In May 2012, routine samples were collected for trending analysis. Baseline environmental monitoring data, collected from soil samples within the study areas, indicate that currently there is no unusual contamination of soils with target analyte list (TAL) metals or high explosive (HE) compounds. With the exception of arsenic, none of the analyte concentrations detected in the site soils exceed NMED SSLs for industrial/occupational land use (see Table 4-7). In all but five of 60 samples, the arsenic concentrations (0.55 to 11 milligrams per kilogram [mg/kg]) did not exceed NMED residential SSLs of 4 mg/kg. Based on process knowledge of site activities, these arsenic concentrations are most likely naturally occurring.

Site-wide Non-Radiological Results

No sampling locations were noted to be Priority-1 (both higher than off-site and with an increasing trend). Six locations were identified as Priority-2 (higher than off-site). No sampling locations were noted to be Priority 3 (increasing trend). The Priority-2 locations and parameters are listed in Table 4-8. It should be noted that beginning in 2008, all trending analyses include data from 2000 forward, rather than the previous five year window. This change makes the trending analyses more meaningful by including all comparable data since 2000. All results are orders of magnitude below NMED SSLs, levels that would trigger further investigation. Refer to Figure 4-1 for an illustration of the locations listed in the following descriptions.

TABLE 4-6. Summary Statistics for TLD Exposure Rates, 2000 – 2012

Location Class	No. of Obs	Units	Mean	Median	Std Dev	Minimum	Maximum
Community	149	mR/yr	97.7	95.9	14.6	73.2	147.6
Perimeter	101	mR/yr	99.3	99.9	11.2	78.5	132.2
On-Site	177	mR/yr	98.3	97.9	9.1	80.9	119.7

NOTES: mR/yr = milliroentgen per year (10^{-3} roentgen per year)
Obs = observations
Std Dev = Standard Deviation
TLD = Thermoluminescent Dosimeter

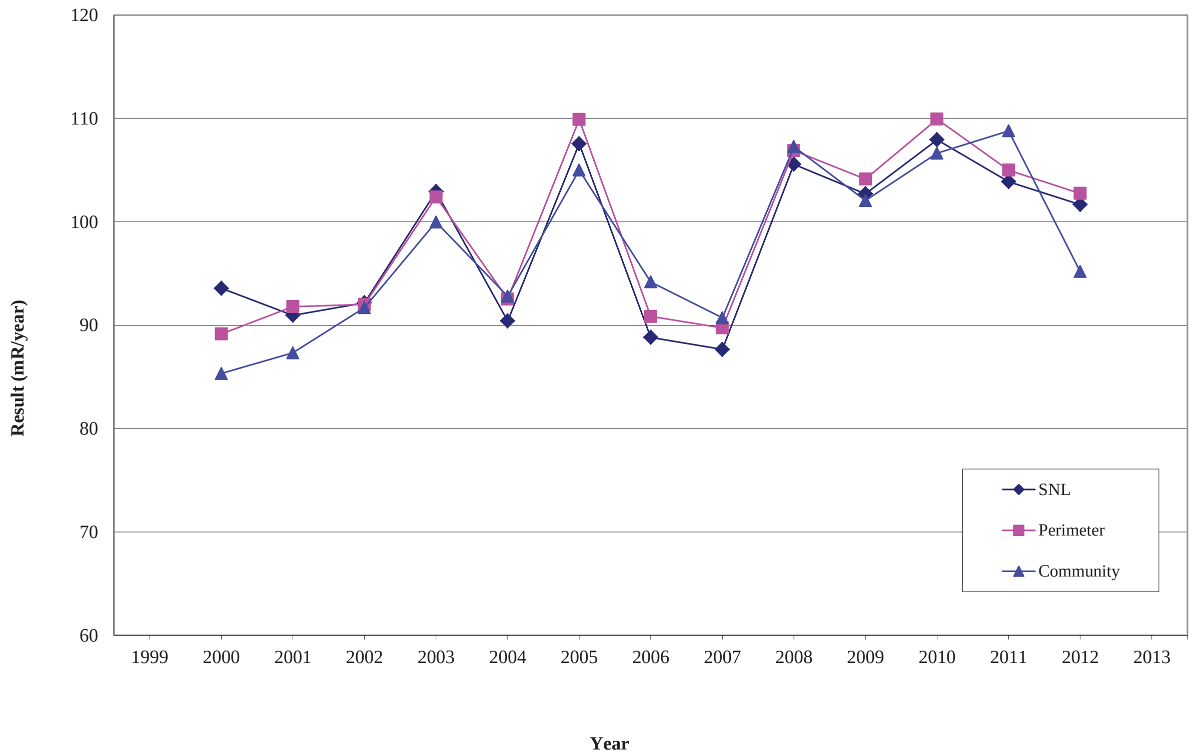

FIGURE 4-3. TLD Exposure Rates by Year and Location Class

<u>Arsenic</u>
One on-site location (33) was identified as Priority-2 (higher than off-site) for arsenic in surface soils. However, all concentrations are within the range of background identified for arsenic in New Mexico surface soils, and are expected to be naturally occurring. All remaining soil and sediment samples were identified as Priority-4 (consistent with off-site results and no increasing trend) for arsenic.

<u>Beryllium</u>
One on-site location (33) was identified as Priority-2 (higher than off-site) for beryllium in surface soils. The concentration of beryllium at this location was within the range of background identified for beryllium in New Mexico surface soils, and is expected to be naturally occurring. All remaining soil, sediment and vegetation samples were identified as Priority-4 (consistent with off-site results and no increasing trend) for beryllium.

<u>Cadmium</u>
One on-site sediment location (54) was identified as Priority-2 (higher than off-site) for cadmium in surface soils. The concentration is consistent with the range of background for cadmium in New Mexico surface soils, and is expected to be naturally occurring. All other soil and sediment samples were identified as Priority-4 (consistent with off-site results and no increasing trend) for cadmium.

<u>Chromium</u>
One on-site location (51) was identified as Priority-2 (higher than off-site) for chromium in surface soils. The concentration is consistent the range of background for chromium in New Mexico surface soils, and is expected to be naturally occurring. All remaining soil and sediment samples were identified as Priority-4 (consistent with off-site results and no increasing trend) for chromium.

TABLE 4-7. Various Reference Values for Metals in Soil (all units in mg/kg)

Analyte	NM Background Soil Concentrations[1]		NMED Soil Screening Levels[2]		U.S. Background Soil Concentrations[3]	
	Lower Limit	Upper Limit	Residential	Industrial	Lower Limit	Upper Limit
Aluminum	5,000	100,000	74,000	100,000	4,500	100,000
Antimony	0.2	1.3	31	454	0.25	0.6
Arsenic	2.5	19	4	17	1	93
Barium	230	1,800	15,600	100,000	20	1,500
Beryllium	1	2.3	156	2,250	0.04	2.54
Cadmium	ND	11	39	564	0.41	0.57
Calcium	600	320,000	N/A	N/A	N/A	N/A
Chromium	7.6	42	100,000	100,000	7	1,500
Cobalt	2.1	11	1,520	20,500	3	50
Copper	2.1	30	3,130	45,400	3	300
Iron	1,000	100,000	23,500	100,000	5,000	50,000
Lead	7.8	21	400	800	10	70
Magnesium	300	100,000	N/A	N/A	N/A	N/A
Manganese	30	5,000	3,590	48,400	20	3,000
Mercury	0.01	0.06	100,000	100,000	0.02	1.5
Nickel	2.8	19	1,560	22,700	5	150
Potassium	1,900	63,000	N/A	N/A	N/A	N/A
Selenium	0.2	0.8	391	5,680	0.1	4
Silica (Silicon)	150,000	440,000	N/A	N/A	24,000	368,000
Silver	0.5	5	3,921	5,680	0.2	3.2
Sodium	500	100,000	N/A	N/A	N/A	N/A
Thallium	N/A	N/A	5.6	74.9	0.02	2.8
Titanium	910	4,000	N/A	N/A	20	1,000
Vanadium	15	94	78.2	1,140	0.7	98
Zinc	18	84	23,500	100,000	13	300

NOTES: mg/kg = milligram per kilogram
N/A = not applicable
ND = not detected
NM = New Mexico
NMED = New Mexico Environment Department
U.S. = United States
(1) Dragun and Chekiri, *Elements in North American Soils*, 2005, Hazardous Materials Control Resources Institute, (Used *San Juan Basin, A Horizon* to determine values).
(2) New Mexico Environment Department (NMED), Hazardous Waste Bureau and the Ground Water Quality Bureau Voluntary Remediation Program, *Risk Assessment Guidance for Site Investigations and Remediation* (2012) (NMED 2012).
(3) U.S. Soil Surface Concentrations, Kabata-Pendias, A., CRC, *Trace Elements in Soils and Plants,* 3rd Edition, 2000.

TABLE 4-8. Summary Statistics for All Locations Identified as Priority-2 for Metals in Soil During Calendar Year 2012 (all units in mg/kg)

Analyte	Location Type	Location	Avg	Std Dev	Min	Max	NMED Soil Screening Level (Residential)	NMED Soil Screening Level (Industrial)	2012 Result
Arsenic	On-Site	33	11.9	8.7	4.5	32.7	4	17	4.99
Beryllium	On-Site	33	1.1	0.29	0.79	1.59	156	2,250	0.31
Cadmium	On-Site	54	0.79	0.32	0.34	1.33	39	564	0.52
Chromium	On-Site	51	31.05	13.4	6.9	51.8	100,000	100,000	44.7
Cobalt	Perimeter	64	8.5	0.71	7.3	9.4	1,520	20,500	8.01
Potassium	On-Site	1	4,456	1,360	1,020	6,050	N/A	N/A	4,510

NOTES: Data presented is for thirteen years (2000-2012).
Avg = Average
Max = Maximum
mg/kg = milligram per kilogram
Min = Minimum
N/A = not applicable
NMED = New Mexico Environment Department
Std Dev = Standard Deviation

Cobalt

One perimeter location (64) was identified as Priority-2 (higher than off-site) for cobalt in surface soils. The concentrations at all locations are within the range of background for cobalt in New Mexico surface soils, and are expected to be naturally occurring. All remaining soil and sediment samples were identified as Priority-4 (consistent with off-site results and no increasing trend) for cobalt.

Potassium

One on-site location (1) was identified as Priority-2 (higher than off-site) for potassium in surface soils. These soil concentrations are within soil concentrations identified for potassium in New Mexico surface soils, and are expected to be naturally occurring. All remaining soil and sediment samples were identified as Priority-4 (consistent with off-site results and no increasing trend) for potassium.

4.2 Ecological Surveillance

Biota monitoring began in 1996 as an additional element of environmental monitoring within the Terrestrial Surveillance Program. The objectives of the Ecological Surveillance Program are to:

- Collect ecological resource inventory data to support site activities while preserving ecological resources and to maintain regulatory compliance,
- Collect information on plant and animal species present to further the understanding of ecological resources on-site,
- Collect biota contaminant data on an as needed basis in support of site projects and regulatory compliance,
- Assist SNL/NM organizations in complying with regulations and laws,
- Educate the SNL/NM community regarding ecological resource conservation, and
- Support line organizations with biological surveys in support of site activities.

Data are collected on mammal, reptile, amphibian, bird, and plant species that currently inhabit SNL/NM. Data collected include information on presence, abundance, species diversity, and land use patterns. Since no significantly elevated levels of radionuclides or metals were observed in soil or vegetation samples, no contaminant analysis of radionuclides and metals on wildlife were performed in 2012. Table 1-1 in Chapter 1 represents common species identified at KAFB.

These data are primarily utilized to support NEPA documentation and land use decisions. Data also support wildlife communication campaigns to ensure safe work environments and sustainable decision-making strategies.

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Chapter 5

Air Quality Compliance & Meteorological Monitoring

Personnel at Sandia National Laboratories, New Mexico (SNL/NM) conduct air quality monitoring and surveillance under the following three programs:

- Clean Air Network (CAN) Program conducts meteorological monitoring (Section 5.1) and ambient air surveillance (Section 5.2).
- National Emission Standards for Hazardous Air Pollutants (NESHAP) Program coordinates with facility owners to meet radiological air emission regulations (Sections 5.3 and 5.4).
- Air Quality Compliance (AQC) Program ensures that all non-radiological air emission sources at SNL/NM (such as generators, boilers, chemical users, and vehicles) meet applicable air quality standards and permitting requirements (Section 5.5).

5.1 Meteorological Monitoring Program

The Meteorological Monitoring Program is part of the CAN program. The main objective of the Meteorological Monitoring Program is to provide site-specific representative data for SNL/NM. Data is used for air dispersion and transport modeling, to support emergency response activities, and to support regulatory permitting and reporting processes. Additional uses of meteorological data include supporting various environmental activities and programs, and providing data to SNL/NM research and development projects.

The U.S. Department of Energy (DOE) directives and regulations applicable to the Meteorological Monitoring Program are listed in Chapter 8.

Tower and Network Instrumentation

Sandia Corporation (Sandia) conducts meteorological monitoring through a network of eight meteorological towers located throughout Kirtland Air Force Base (KAFB). All towers are on or near SNL/NM property, and the network includes:

- Six 10-meter towers,
- One 30-meter tower, and
- One 60-meter tower.

Routine instrument calibrations and weekly tower site visits are performed as part of the Quality Assurance Program for the monitoring network. The CAN network of meteorological towers and ambient air monitoring locations are shown in Figure 5-1.

Meteorological Monitoring Towers

All meteorological towers are instrumented to measure temperature and wind velocity, including the standard deviation of horizontal wind direction (sigma theta), at 3- and 10-meter levels. Temperature and wind velocity are also measured at the top of the two tallest towers (30- and 60-meters).

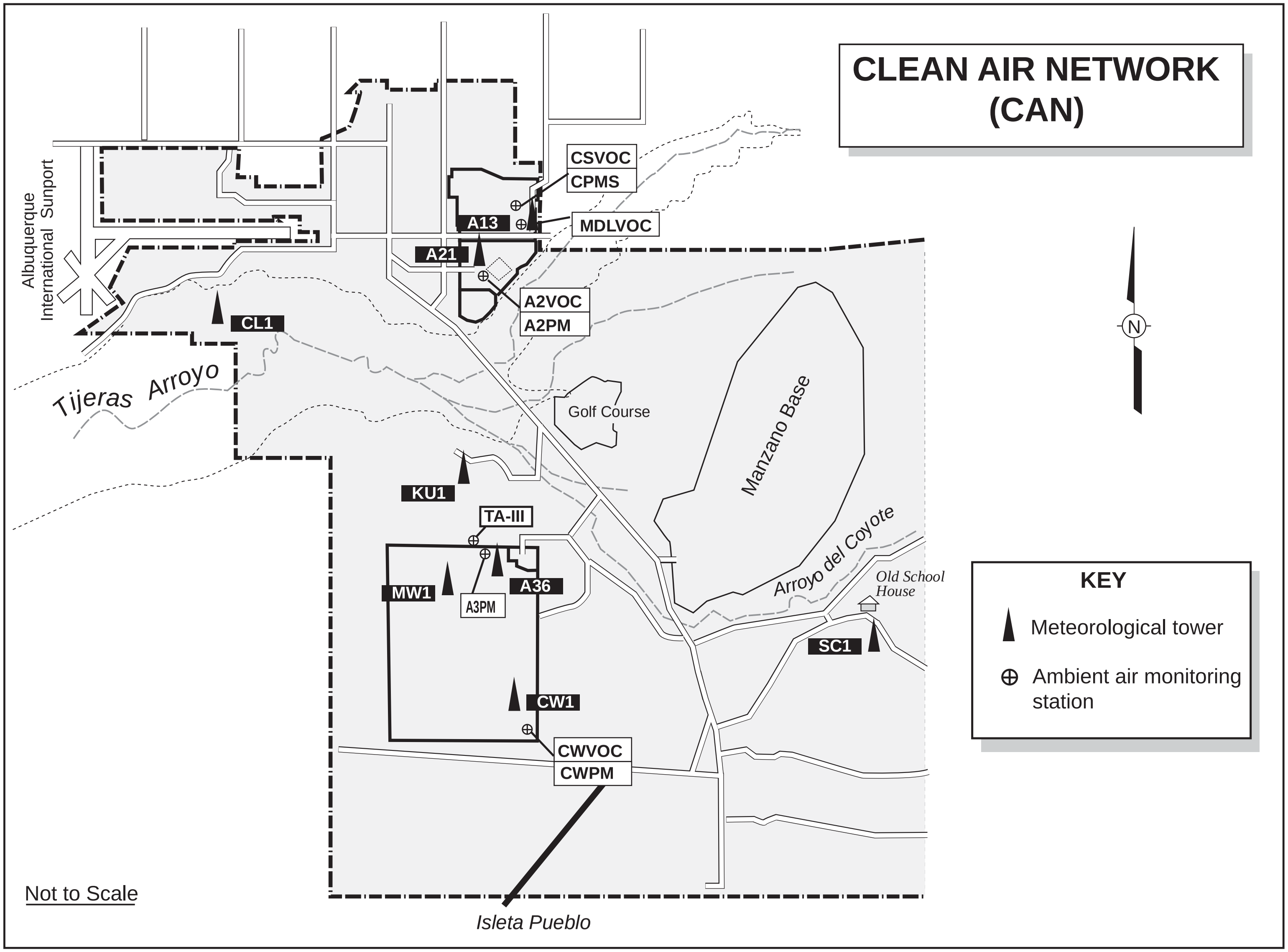

FIGURE 5-1. The Clean Air Network (CAN) of Meteorological Towers and Ambient Air Monitoring Stations

In addition, relative humidity is measured at the 3-meter level. Rainfall is measured at the 1-meter level at towers A36, A21, and SC1. Barometric pressure is measured at the 2-meter level at towers A36 and A21.

5.1.1 Meteorological Monitoring Results

The A36 60-meter tower is used to describe general meteorology at SNL/NM due to its central geographic position and the availability of data at all instrument levels. The 2012 annual climatic summary for tower A36 is shown in Table 5-1.

In general, the annual statistics for each of the towers are similar. However, daily meteorology varies considerably across the meteorological network. This real-time variability of meteorological conditions has implications on the transport and dispersion of pollutants, which are important in atmospheric emergency release scenarios and air dispersion modeling. Figure 5-2 shows some of the variations and extremes found in meteorological measurements across SNL/NM.

Current weather information from the SNL/NM CAN meteorological network can be found at the following website:

http://132.175.200.42/

TABLE 5-1. Annual Climatic Summary from Tower A36 During Calendar Year 2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Temperature (°C)													
Average Daily High	9.82	10.36	17.21	22.08	26.47	33.68	31.92	31.88	27.68	22.83	15.24	8.20	21.45
Average Daily Low	-1.71	-1.51	2.70	7.51	12.17	18.06	18.41	17.46	13.47	7.88	1.44	-3.35	7.71
Monthly Mean	4.51	4.41	10.59	15.26	19.58	26.51	24.90	24.75	20.94	16.01	9.58	2.94	15.00
Extremes (°C)													
High	15.29	18.10	27.96	29.28	33.09	37.19	35.78	35.25	33.66	29.46	21.63	17.03	37.19
Low	-4.91	-5.86	-6.84	-0.43	7.23	14.57	14.59	14.50	8.45	-1.73	-5.72	-11.56	-11.56
Relative Humidity (%)	46.08	48.14	27.73	29.12	24.82	17.58	39.34	36.98	35.39	26.65	35.45	46.96	34.52
Precipitation (cm)													
Monthly	1.12	1.04	0.46	1.50	0.97	0.13	2.06	2.59	0.58	0.00	0.43	0.58	11.46
24 Hour Max	0.97	0.36	0.36	0.97	0.97	0.13	0.69	0.71	0.20	0.00	0.28	0.41	0.97
Wind (m/sec)													
Monthly	2.93	4.35	4.43	3.90	5.08	4.22	3.79	3.84	3.51	3.48	2.68	2.91	3.76
24 Hour Max	5.98	10.03	10.59	7.36	13.29	9.46	7.20	7.17	7.60	6.39	6.62	7.48	13.29
Maximum Gust	21.86	23.18	31.17	30.65	26.26	25.70	25.38	25.54	24.74	25.22	16.86	23.18	31.17
Barometric Pressure (mb)	836.4	833.2	832.3	832.4	832.6	832.5	836.6	836.6	837.4	834.8	837.6	832.8	834.59

NOTES: °C = degree celsius
cm = centimeter
m/sec = meters per second
Max = Maximum
mb = millibar
% = percent

Wind Speed	Minimum (m/sec)	Maximum (m/sec)	Spread (m/sec)
Average Annual Wind Speed	3. 57 Tower A13	3.94 Tower CW1	0.37
Greatest Difference in Average Wind Speed over 24 hours	8.67 Tower SC1	12.35 Tower A13	3.68
Greatest Difference in Daily Maximum Wind Speed	10.94 Tower A13	23.22 Tower KU1	12.28
Average Difference in Daily Wind Speed Variations	1.00 All towers		

Temperature	Minimum (ºC)	Maximum (ºC)	Spread (ºC)
Average Annual Temperature	14.69 Tower SC1	15.33 Tower A13	0.64
Network Annual Extremes	-14.23 Tower MW1	37.96 Tower CL1	52.19
Greatest Difference in Daily Minimum Temperature	-14.23 Tower MW1	-7.86 Tower CW1	6.37
Greatest Difference in Average Daily Temperature	15.69 Tower A13	18.81 Tower CL1	3.12
Greatest Difference in Daily Maximum Temperature	29.71 Tower CL1	33.66 Tower A36	3.95

Precipitation	Minimum (cm)	Maximum (cm)	Spread (cm)
Annual Precipitation (Extremes)	10.11 Tower A21	16.54 Tower SC1	6.43
Daily Rainfall Variation	0.15 Tower A21	2.23 Tower SC1	2.08
Greatest Monthly Precipitation Difference	1.50 Tower A21	4.27 Tower SC1	2.77
Greatest in Monthly Rainfall		4.27 Tower SC1	

Note: Winter precipitation that falls as snow is underestimated (mostly at the SC1 tower)

FIGURE 5-2. Variations and Extremes in Meteorological Measurements Across the Meteorological Tower Network During CY 2012.

5.1.2 Wind Analysis

Annual wind roses for three locations across SNL/NM are illustrated in Figures 5-3 and 5-4. A wind rose is a graphical representation of wind speed and direction frequency distribution. Wind direction is the true bearing when facing the wind (the direction from which the wind is blowing). As shown in Figure 5-3, wind directions and speeds can vary significantly across SNL/NM. The annual wind frequency distribution for Technical Area (TA)-I, not shown, indicates yet another pattern, with the greatest direction frequency from the east and east-northeast, as winds blow from Tijeras Canyon. The predominant wind direction at most locations is produced by topographic influences that also create nocturnal drainage flows.

5.2 Ambient Air Surveillance Program

Ambient air surveillance is conducted under the CAN Program through a network of six air monitoring stations located on or near SNL/NM property (Figure 5-1). The primary objective of the Ambient Air Surveillance Program is to show compliance with the National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] 50) and New Mexico Ambient Air Quality Standards (NMAAQS) (20.11.8 New Mexico Administrative Code [NMAC]). Ambient air surveillance is also important to establish background concentration levels for pollutants of concern and to evaluate the effects, if any, from SNL/NM operations on the public and the environment due to operations at SNL/NM. Applicable requirements are listed in Chapter 8.

5.2.1 Monitoring Stations

Criteria Pollutant Monitoring Station (CPMS) – There is one CPMS in the CAN network. The CPMS is located in the northeast corner of TA-I. Criteria pollutants are the set of six common pollutants for which the U. S. Environmental Protection Agency (EPA) must set national ambient standards according to the Clean Air Act (CAA). For more information on air pollutants, visit the following website:

http://www.epa.gov/air/airpollutants.html

The CPMS is used to perform continuous monitoring for sulfur dioxide, carbon monoxide, nitrogen oxide, and ozone. Data are then compiled into hourly averages. A particulate matter (PM) monitor is a part of the CPMS. Lead, a criteria pollutant, is one of 23 metals analyzed from PM samples at this station.

The CPMS has been in operation for 18 years, collecting ambient air quality data at SNL/NM. Throughout the 18 years of sampling, SNL/NM has created a baseline of the impact that operations have on the background criteria pollutant levels at the CPMS. With the changes in operations that have occurred over the past decade, the results in ambient air sampling have remained consistent. In Calendar Year 2013, Sandia will evaluate further need for CPMS at its current location.

PM_{10} Stations – PM with a diameter equal to or less than 10 microns (PM_{10}) are measured at four monitoring locations (CPMS, A2PM, A3PM, and CWPM). Samples are collected over a 24-hour period, starting and ending at midnight, every sixth day. This schedule is consistent with the National Air Sampling Program. Samples are analyzed for 23 metals and are radiologically screened using gross alpha, gross beta, and gamma spectroscopy.

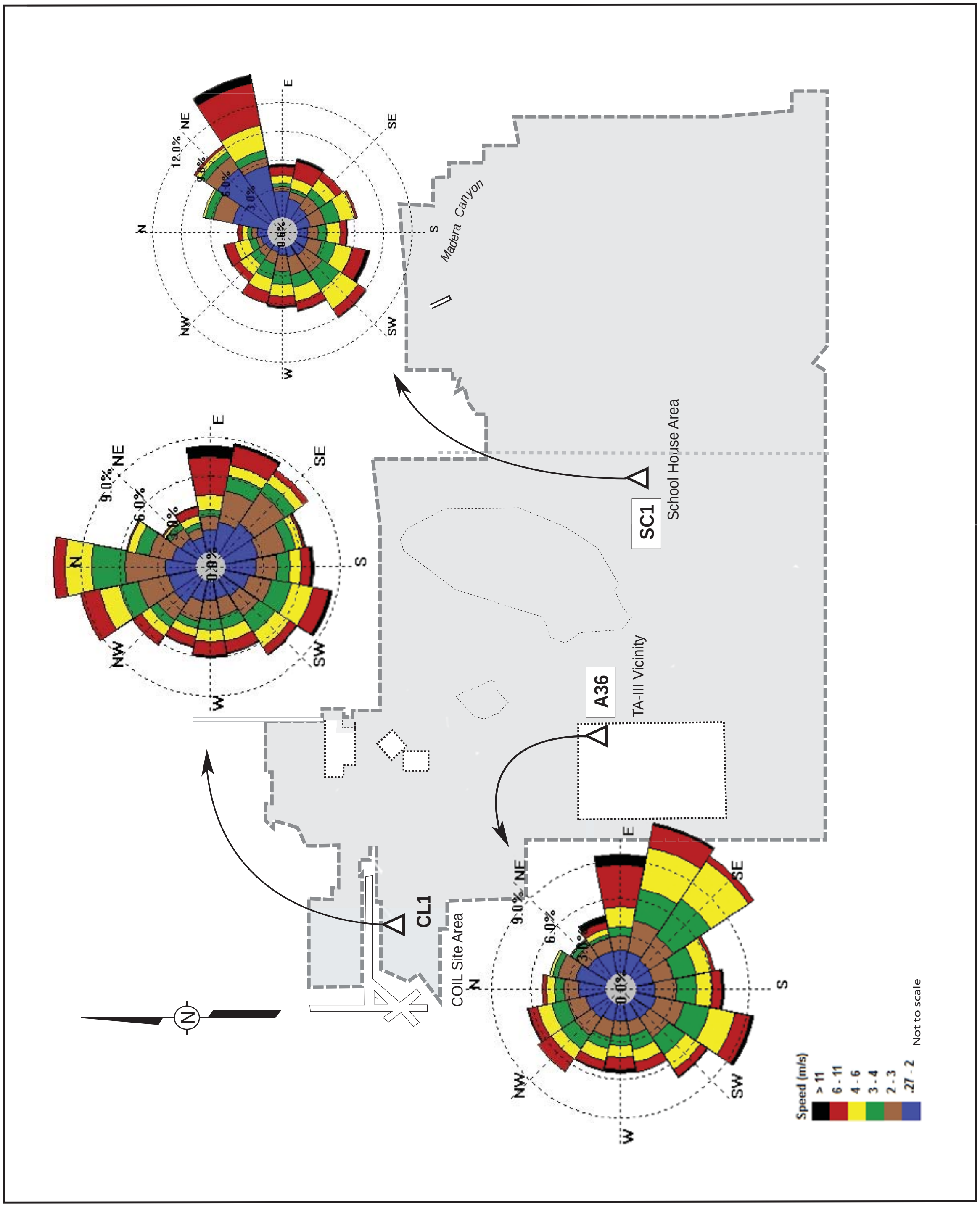

FIGURE 5-3. 2012 Annual Wind Roses for Towers CL1, A36, and SC1

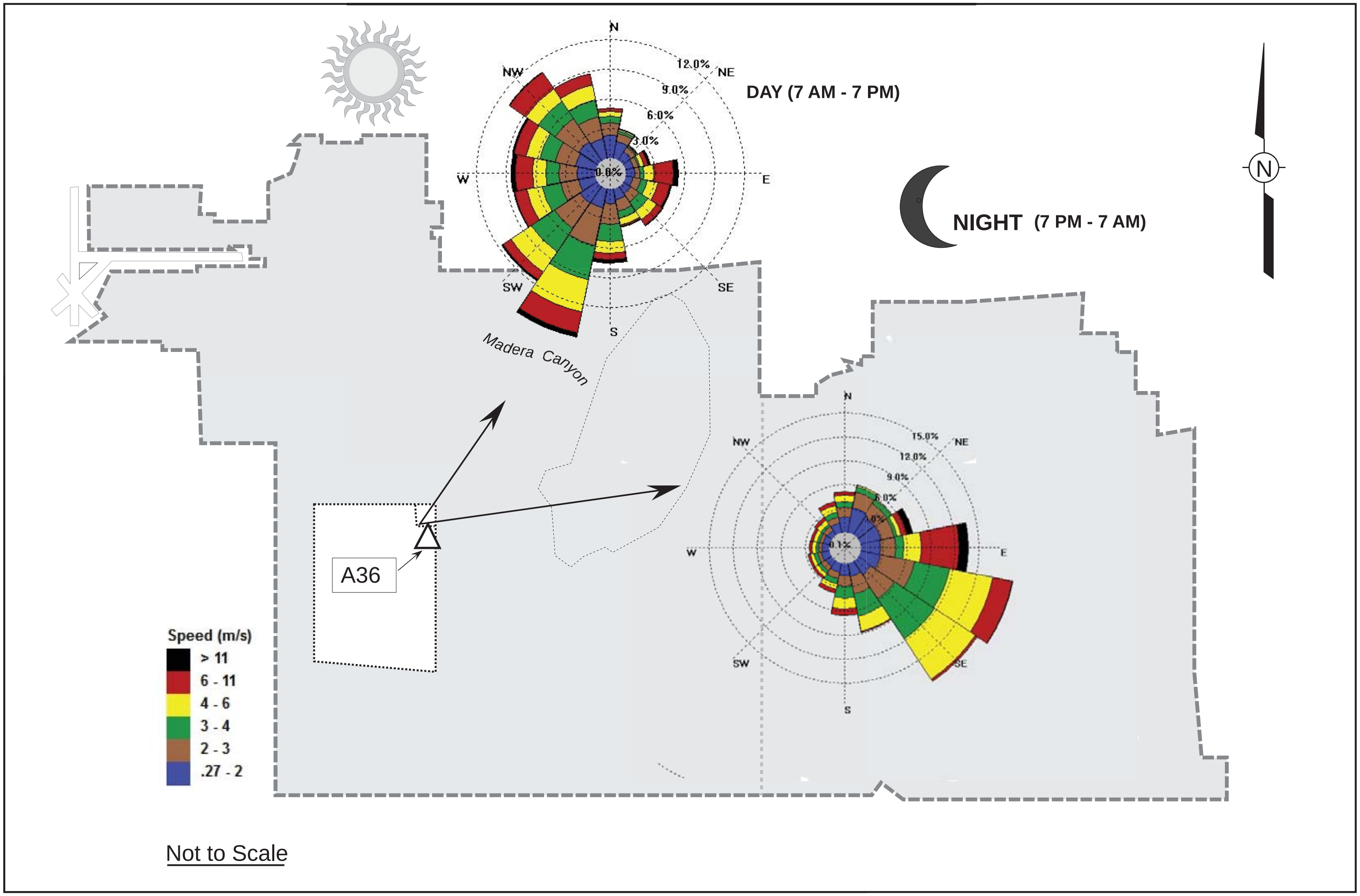

FIGURE 5-4. 2012 Annual Wind Roses for Daytime and Nighttime Wind Frequency at the A36 Tower

$PM_{2.5}$ Stations – PM with a diameter equal to or less than 2.5 microns ($PM_{2.5}$) is measured at two locations (CPMS and TA-III) at SNL/NM. $PM_{2.5}$ is measured continuously and recorded in hourly concentrations 24-hours-a-day, 365-days-per-year. Filters are not manually weighed with this system. The mass is calculated with microprocessor measurements. $PM_{2.5}$ and PM_{10} measurements at SNL/NM are done with different instruments and should not be quantitatively compared with each other due to differing instrument limitations and processing techniques. $PM_{2.5}$ filters are not sent to a laboratory for chemical analysis.

Volatile Organic Compound (VOC) Stations – There are four VOC monitoring stations (CSVOC, MDLVOC, CWVOC, and A2VOC). VOC samples are collected once a month over a 24-hour period.

5.2.2 Ambient Air Monitoring Results

Criteria Pollutants

The latest EPA standards for criteria pollutants can be found at the following website:

http://www.epa.gov/air/criteria.html

In 2012, the automated data recovery for criteria pollutants was approximately 99.9 percent. Table 5-2 lists the results from the CPMS, PM_{10} and monitors and compares them to NAAQS and NMAAQS for criteria pollutants.

Although violations of annual federal standards for criteria pollutants are not allowed, exceedances for short-term standards are allowable once a year. State standards also allow short-term exceedances due to meteorological conditions for example, in the case of an atmospheric inversion where air mixing may be extremely restricted. There were no exceedances of the criteria pollutant standards in 2012.

PM_{10}

Data recovery for PM_{10} was 99.6 percent complete based on a sampling schedule occurring every sixth day. The highest daily particulate loading occurred at the CWPM site. A PM_{10} concentration of 41 micrograms per cubic meter ($\mu g/m^3$) occurred at CWPM in September 2012. The monthly and annual averages for PM_{10} are listed in Table 5-3. The annual PM concentrations for 2012 are comparable to the results for 2011.

All filters collected from the PM_{10} stations that have complete field data are analyzed for 23 metals plus the radiological analyses. Filters are collected every sixth day and are consolidated into monthly composites for analyses. In 2012, monthly composites varied from three to six filters per month, depending on the sampling schedule and sampler power problems. In an attempt to provide better analytical information, results are included in averages only when they are actually higher than the radiological decision levels or instrument detection limits. Table 5-4 lists the averaged results of the PM_{10} analysis. It should be noted that most of the radionuclides are naturally occurring, or are short-lived decay daughter products found while the sample was in the counter, and are not emitted from SNL/NM sources. Many of the radionuclide averages in Table 5-4 are based on the results of one or two samples in the year identifying small concentrations of the constituent.

An Analysis of Variance (ANOVA) was performed to determine if statistical differences existed between stations. The results of the ANOVA indicated that the concentrations of radium-226 at the CPMS stations were statistically different and slightly higher than at the CWPM. The area surrounding the CPMS and CWPM stations varies, with the CWPM fairly remote and the CPMS very high traffic. Radium-226 is the most common radium isotope. It is a product of Uranium-238 decay. Uranium-238

TABLE 5-2. Criteria Pollutant Results as Compared to Regulatory Standards During Calendar Year 2012

Criteria Pollutant	Averaging Time	Unit	NMAAQS Standard	NAAQS Standard	Maximum or Measured Concentrations
Carbon Monoxide	1 hour	ppm	13.1	35	1.8
	8 hours	ppm	8.7	9	0.8
Nitrogen Dioxide	1 hour	ppm	0.053	-	0.02
	Annual	ppm	0.05	0.053	0.01
Sulfur Dioxide§	1 hour	ppb	-	75	1.4E-06[a]
	3 hours	ppm	-	0.50	0.01
	24 hours	ppm	0.10	0.14	0.004
	Annual	ppm	0.02	0.03	0.001
Ozone	1 hour	ppm	-[b]	-[b]	0.1
	8 hour	ppm	-	0.075	0.05[c]
PM_{10}	24 hours	$\mu g/m^3$	-	150[d]	41
	Annual	$\mu g/m^3$	-	50	21.6
$PM_{2.5}$	24 hours	$\mu g/m^3$	-	35	20.6[e]
	Annual	$\mu g/m^3$	-	15.0	8.0
Lead	Any quarter	$\mu g/m^3$	1.5	1.5	0.003

NOTES: EPA = U.S. Environmental Protection Agency
$\mu g/m^3$ = micrograms per cubic meter
NAAQS = National Ambient Air Quality Standards
NMAAQS = New Mexico Ambient Air Quality Standards
$PM_{2.5}$ = respirable particulate matter (diameter equal to or less than 2.5 microns)
PM_{10} = particulate matter (diameter equal to or less than 10 microns)
ppb = parts per billion
ppm = parts per million
§ Standards are defined in $\mu g/m^3$ and have been converted to ppm.
[a] Reported as the three year 98th percentile value - per regulatory standards
[b] As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone non-attainment Early Action Compact (EAC) Areas. Albuquerque, New Mexico is not an EAC Area.
[c] Reported as the fourth highest average of the year – per regulatory standards.
[d] Not to be exceeded more than once per year - per updated regulatory standards
[e] Reported as the three year 98th percentile value - per regulatory standards

TABLE 5-3. Monthly and Annual Averages for PM_{10} (Air) During Calendar Year 2012 (all units in $\mu g/m^3$)

Sample Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
A2PM	7.00	6.75	7.60	27.40	16.20	17.80	13.40	10.67	12.40	13.20	10.25	16.00	13.22
CPMS	4.00	7.60	11.80	22.00	12.40	16.40	13.40	11.50	9.60	9.75	12.75	7.60	11.57
CWPM	7.20	7.60	11.20	25.80	14.20	16.40	11.80	11.40	10.00	9.80	8.25	18.25	12.66
A3PM	3.20	8.00	9.60	24.20	13.80	18.40	16.00	12.00	17.75	16.00	7.50	7.40	12.82

NOTES: PM_{10} = Particulate Matter (diameter equal to or less than 10 microns)
$\mu g/m^3$ = microgram per cubic meter

TABLE 5-4. Averaged Results of PM_{10} Analysis (Air) During Calendar Year 2012

Analyte	Units	A2PM	CPMS	CWPM	A3PM	TLV
Aluminum	$\mu g/m^3$	0.0642045	0.0517961	0.0687241	0.0552733	2,000
Antimony	$\mu g/m^3$	0.0001285	0.0003142	0.0000148	0.0000686	500
Arsenic	$\mu g/m^3$	0.0000147	0.0000101	0.0000091	0.0000058	10
Barium	$\mu g/m^3$	0.0026118	0.0037497	0.0016885	0.0016632	50
Cadmium	$\mu g/m^3$	0.0000003	0.0000169	0.0000062	ND	10
Calcium	$\mu g/m^3$	0.3666087	0.2051947	0.3102186	0.2145891	2,000
Chromium	$\mu g/m^3$	0.0002858	0.0002519	0.0002028	0.0002974	10
Cobalt	$\mu g/m^3$	0.0001875	0.0001010	0.0001542	0.0000793	20
Copper	$\mu g/m^3$	0.0054018	0.0202727	0.0064338	0.0053016	1,000
Iron	$\mu g/m^3$	0.0836580	0.0895647	0.0774029	0.0642135	5,000
Lead	$\mu g/m^3$	0.0004049	0.0005266	0.0004129	0.0004240	150
Magnesium	$\mu g/m^3$	0.0347992	0.0286098	0.0360771	0.0278669	10,000
Manganese	$\mu g/m^3$	0.0022105	0.0020826	0.0021464	0.0016898	200
Nickel	$\mu g/m^3$	0.0001583	0.0003792	0.0001141	0.0001575	50
Potassium	$\mu g/m^3$	0.0348882	0.0365418	0.0300398	0.0292424	2,000
Selenium	$\mu g/m^3$	0.0000163	0.0000156	0.0000374	0.0000635	200
Silver	$\mu g/m^3$	0.0000662	0.0000922	0.0000235	0.0000413	10
Sodium	$\mu g/m^3$	0.0472301	0.0441024	0.0234674	0.0439706	5,000
Thallium	$\mu g/m^3$	ND	0.0002429	0.0000567	ND	100
Vanadium	$\mu g/m^3$	0.0001668	0.0001370	0.0001282	0.0001166	50
Zinc	$\mu g/m^3$	0.0032182	0.0042618	0.0029377	0.0028353	10
Uranium	$\mu g/m^3$	0.0000052	0.0000064	0.0000062	0.0000042	200
Actinium-228	pCi/m^3	0.0017356	0.0087850	0.0039397	0.0118585	100
Alpha, gross	pCi/m^3	0.0028560	0.0026260	0.0036250	0.0024360	N/A
Americium-241	pCi/m^3	0.0001798	0.0002617	ND	0.0036113	N/A
Beryllium-7	pCi/m^3	0.1885309	0.2159747	0.1826306	0.1880710	40,000
Beta, gross	pCi/m^3	0.0190912	0.0195017	0.0189615	0.0212334	N/A
Bismuth-212	pCi/m^3	0.0034700	0.0061429	0.0057192	0.0066035	700
Bismuth-214	pCi/m^3	0.0012891	0.0005809	0.0032481	0.0010255	2,000
Cesium-137	pCi/m^3	ND	ND	0.0005688	ND	400
Cobalt-60	pCi/m^3	0.0005300	0.0004581	ND	0.0012317	80
Lead-212	pCi/m^3	0.0011532	0.0014728	0.0008567	0.0013314	80
Lead-214	pCi/m^3	0.0030374	0.0011074	0.0024469	0.0026526	2,000
Neptunium-237	pCi/m^3	ND	ND	ND	0.0015126	N/A
Potassium-40	pCi/m^3	0.0045632	0.0078377	0.0198309	0.0059845	900
Radium-223	pCi/m^3	ND	ND	ND	0.0065384	N/A
Radium-224	pCi/m^3	0.0055584	0.0069518	0.0111347	0.0264894	4
Radium-226	pCi/m^3	0.0149132	0.0308126	0.0085587	0.0003370	1
Radium-228	pCi/m^3	0.0017356	0.0087850	0.0039397	0.0118585	3
Sodium-22	pCi/m^3	0.0004644	ND	0.0004972	ND	N/A
Thorium-227	pCi/m^3	ND	ND	ND	0.0049444	0.7
Thorium-231	pCi/m^3	0.0044014	0.0004683	0.0142924	0.0083591	N/A
Uranium-235	pCi/m^3	0.0034841	0.0040698	0.0038083	ND	0.1

NOTES: DOE = U.S. Department of Energy
$\mu g/m^3$ = micrograms per cubic meter
mrem = millirem
N/A = not applicable
ND = not detected
pCi/m^3 = picocuries per cubic meter
PM_{10} = Particulate Matter (diameter equal to or less than 10 microns)
TLV = threshold limit value (TLVs are guidelines and not legal standards. TLV guidelines assist in the control of health hazards) (ACGIH 2011). The TLVs listed for radionuclides are derived from DOE Order 458.1 (DOE 2011c) derived concentration guide values defined for 100 mrem.

is a naturally occurring isotope which is found in soil. With the wind conditions that exist, having a slightly higher reading at CPMS does not seem unreasonable.

$PM_{2.5}$

$PM_{2.5}$ is also known as "fine particulate". Fine particulates are thought to be a greater health hazard than PM_{10} because the smaller-sized particles can lodge deep in the lungs. Most $PM_{2.5}$ is created either directly from the combustion of all types of fossil fuels, including wood burning, or by secondary reactions of gases created in the combustion process with other gases in the atmosphere. The data recovery for $PM_{2.5}$ measurements for 2012 was approximately 99 percent. The monthly and annual averages for $PM_{2.5}$ are listed in Table 5-5. In 2012, the highest concentrations were found in June and were most likely the result of wildland fire smoke transported from areas outside of SNL/NM.

VOCs

The VOCs generally observed at SNL/NM are products or by-products of fossil fuels or from laboratory operations. In 2012, the data recovery for VOC monitoring was greater than 97 percent. Monthly VOC samples were analyzed for 32 VOC species plus total non-methane hydrocarbon. Table 5-6 shows the compiled results for compounds detected at four stations.

An ANOVA was performed to determine if statistical differences existed between stations. The results of the ANOVA indicated that the concentrations of isohexane at the CWVOC station were statistically different and slightly higher than the other sites. There is steady traffic flow surrounding this monitor, as well as some laboratory operations in the vicinity. That could explain the slightly higher concentrations found at the CWVOC station.

5.3 Radiological Air Emissions

The EPA regulates radionuclide air emissions in accordance with 40 CFR 61, Subpart H, *National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities*. The EPA has set a maximally exposed individual (MEI) radiological dose limit of 10 millirems per year (mrem/yr) resulting from all radiological air emissions produced from a DOE facility.

TABLE 5-5. Monthly and Annual Averages for $PM_{2.5}$ (Air) During Calendar Year 2012 (all units in $\mu g/m^3$)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
CPMS	5.94	6.12	7.45	8.62	11.20	11.64	9.71	9.33	9.06	8.19	7.35	6.76	**8.45**
TA3	4.98	5.74	8.12	8.37	9.42	10.72	8.26	8.95	7.89	6.43	6.88	5.74	**7.62**

NOTES: $PM_{2.5}$ = Particulate Matter (diameter equal to or less than 2.5 microns)
$\mu g/m^3$ = microgram per cubic meter

TABLE 5-6. VOC Average Concentrations Compiled from Monthly Results at Four Station (Air) During Calendar Year 2012 (*Average was computed using only detected results)* *(all units in ppm bv*)

Compound	CPMSVOC	CWVOC	MDLVOC	TA-II VOC	TLV
1-Butene/Isobutene	0.16	0.50	0.13	0.12	-999
Acetone	3.80	2.86	3.91	3.44	500,000
Benzene	0.60	0.14	0.23	0.18	500
Butane, N-	0.83	0.51	0.65	0.51	N/A
Butanone, 2-	0.42	0.50	0.43	0.40	N/A
Carbon tetrachloride	ND	ND	ND	0.10	5,000
Chloromethane	0.61	0.65	0.62	0.63	50,000
Dichlorodifluoromethane	0.53	0.52	0.52	0.53	1,000,000
Dichloroethane, 1,2-	ND	0.21	ND	ND	N/A
Hexane, N-	0.42	0.46	0.19	ND	N/A
Hydrocarbons, Total Non-Methane	13.05	18.67	12.00	9.85	N/A
Isohexane	0.25	0.99	0.28	ND	100,000
Methylbutane, 2-	1.41	14.37	1.33	1.25	N/A
Methylene chloride	0.83	0.25	ND	ND	50,000
Pentane, N-	0.67	1.51	1.19	1.04	N/A
Pentanone, 4-methyl-, 2-	0.47	10.20	ND	0.19	N/A
Toluene	0.62	4.47	0.54	0.49	50,000
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ND	ND	ND	0.09	N/A
Trichlorofluoromethane	0.30	0.27	0.28	0.30	1,000,000
Xylene, m-, p-	ND	0.60	ND	ND	N/A
Xylene, o-	ND	0.31	ND	ND	N/A

NOTES: N/A = not available
ND = not detected
ppm bv = parts per million by volume
TLV= threshold limit value (TLVs are guidelines and not legal standards. TLV guidelines assist in the control of occupational health hazards) (ACGIH 2011)
VOC = volatile organic compounds. VOCs may be shown as separate species as well as in combination with another analyte.

5.3.1 Compliance Reporting

Sandia prepares an annual NESHAP report that summarizes radionuclide air emission releases from SNL/NM facilities and presents the results of the annual dose assessment. The DOE National Nuclear Security Administration (NNSA), Sandia Field Office (SFO) submits the annual report to EPA and the City of Albuquerque (COA) Environmental Health Department (EHD). The NESHAP report for CY 2012 is prepared in 2013 and is entitled, *NESHAP Annual Report for Calendar Year (CY) 2012, SNL/NM* (SNL 2013a).

5.3.2 SNL/NM NESHAP Facilities

Currently, there are 12 potential NESHAP facilities at SNL/NM shown in Table 5-7 that may be defined as point emission sources at SNL/NM. Of these 12 facilities, nine had emissions in 2012. Point sources are produced from an exhaust stack or vent. The Mixed Waste Landfill (MWL), located in TA-III, was the only diffuse source with the potential to release radionuclides to the environment. In September of 2009, an evapotranspirative (ET) cover was installed at the MWL. Based upon past emissions studies and the new ET cover thickness, any potential release from the MWL is negligible (i.e., essentially zero).

Table 5-7 lists the radionuclides and the total reported emissions (in curies [Ci]) from each of the 12 SNL/NM NESHAP sources in 2012.

TABLE 5-7. Summary of Radionuclide Releases from NESHAP Sources During Calendar Year 2012

Source Name, Location	Description	Source Type	Monitoring Method	Radionuclide Emitted	Reported Release (Ci/yr)
ACRR, TA-V	Reactor used to perform in-pile experiments for severe reactor accident research projects.	Point	Periodic	Argon-41	2.65
AHCF, TA-V	The AHCF is used to identify, sort, characterize, and repackage legacy nuclear materials and transuranic waste (TRU) packages for permanent removal from the SNL/NM site. Legacy material may include accountable nuclear material, TRU waste, spent nuclear fuel, and radiological material.	Point	Periodic	Cobalt-60 Strontium-90 Cesium-137 Promethium-147 Plutonium-241	3.50E-09 7.00E-09 1.28E-08 5.00E-11 8.50E-10
ECF, TA-II	Facility used for testing neutron generator design and manufacturing.	Point	Calculation	Tritium	1.16 E-03
HERMES, TA-IV	Gamma simulator used primarily for simulating the effects of prompt radiation from a nuclear burst on electronics and complete military systems.	Point	Periodic	Nitrogen-13 Oxygen-15	7.75E-04 7.75E-05
IBL, TAI	Ion solid interaction and defect physics accelerator facility.	Point	Calculation	NA	0.00
NGF, TA-I	Principal production facility for neutron generators – Tritium Envelope North Wing.	Point	Continuous	Tritium	11.5
Process Research Development (PRD) Laboratory	Laboratory that conducts research on tritium materials.	Point	Calculation	NA	0.00
Radiation Laboratory, TA-I	Laboratory that performs small-scale experiments.	Point	Calculation	NA	0.00
RMWMF, TA-III	Facility that handles radioactive and mixed waste.	Point	Continuous	Tritium (oxide) Tritium (elemental) Argon-41 Strontium-90 Cesium-137	3.20E+01 2.20E+02 1.14E-05 3.71E-07 5.50E-08
RPICL –TA-I	Laboratory that performs radiation detection equipment calibration.	Point	Calculation	Tritium	3.92E-05
START, TA-I	Small-scale laboratory operation.	Point	Calculation	Uranium-238	6.70E-08
Z Facility, TA-IV	Experimental facility for research on light-ion inertial confinement fusion.	Point	Calculation	Tritium	1.25E-03

NOTES: Monitoring Method: Periodic = Based on periodic measurements
Calculation = Calculated from known parameters
Continuous = Based on continuous air monitoring results
ACRR =Annular Core Research Reactor
AHCF = Auxiliary Hot Cell Facility
Ci/yr = curies per year
ECF = Explosive Components Facility
HERMES = High Energy Radiation Megavolt Electron Source-III
IBL = Ion Beam Laboratory
NA = not available
NESHAP = National Emission Standards for Hazardous Air Pollutants
NGF = Neutron Generator Facility
RMWMF = Radioactive and Mixed Waste Management Facility
RPICL = Radiation Protection Instrument Calibration Laboratory
SNL/NM = Sandia National Laboratories, New Mexico
START = Sandia Tomography and Radionuclide Transport Laboratory

The potential SNL/NM NESHAP facilities are illustrated in Figure 5-5 and are described below.

TA-I Sources

Ion Beam Laboratory (IBL) Accelerator– This is an ion solid interaction and defect physics accelerator facility. Operations at IBL could result in release of trace amounts of tritium.

Neutron Generator Facility (NGF) – The NGF is the nation's principal production facility for neutron generators. This facility currently could emit only tritium. The facility has two stacks, but only utilizes the main stack in the Tritium Envelope North Wing. Although anticipated tritium releases do not exceed the regulatory threshold requiring continuous monitoring, it is performed voluntarily at NGF as a best management practice (BMP).

Process Research Development (PRD) Laboratory - This laboratory is capable of handling and conducting research on tritium materials which could be released in trace amounts. It is currently in standby mode and has yet to become operational.

Radiation Laboratory – Small-scale radiation experiments could result in the release of trace amounts activation products and tritium.

Radiation Protection Instrument Calibration Laboratory (RPICL) – Calibration on radiation detection equipment could result in small releases of tritium.

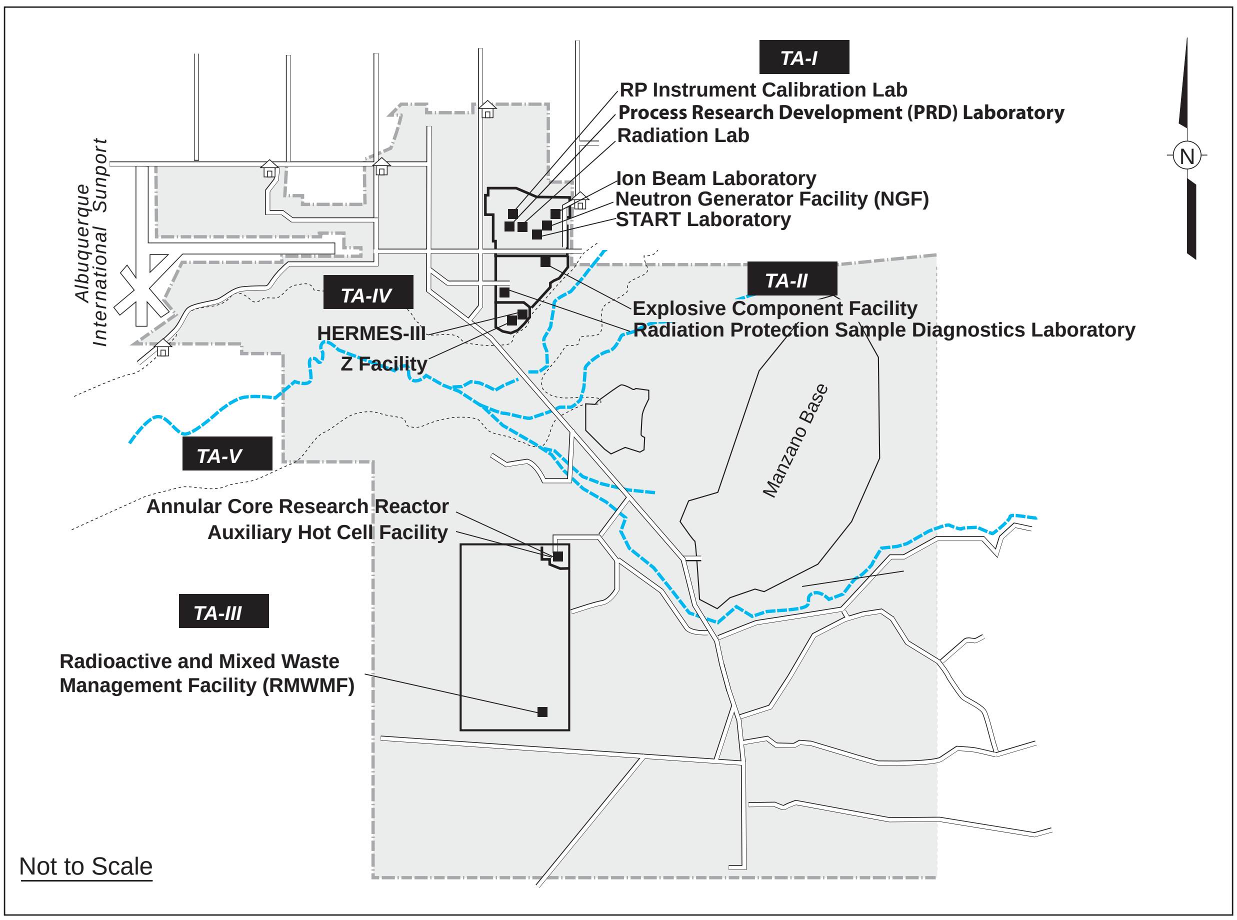

FIGURE 5-5. Locations of Potential NESHAP Facilities at SNL/NM for 2012

Sandia Tomography and Radionuclide Transport (START) Laboratory – The START laboratory is used to perform small-scale experiments. Only trace amounts of radionuclides could be occasionally released.

TA-II Sources

Explosive Components Facility (ECF) – The ECF conducts destructive testing on neutron generators that could result in the release of trace amounts of tritium.

Radiation Protection Sample Diagnostics Laboratory – Small-scale radiometric sample analyses on an as-needed basis. Only trace amounts of radionuclides could occasionally be released.

TA-III Sources

Radioactive and Mixed Waste Management Facility (RMWMF) – The RMWMF primarily handles low-level waste, mixed waste, and some transuranic (TRU) waste that could be released in trace amounts. Although anticipated releases do not exceed the regulatory threshold requiring continuous monitoring, it is performed voluntarily at the RMWMF as a BMP.

TA-IV Sources

High Energy Radiation Megavolt Electron Source-III (HERMES-III) – The HERMES-III accelerator is used to test the effects of prompt radiation on electronics and complete military systems. This facility produces air activation products, primarily nitrogen-13 and oxygen-15.

Z Facility – The Z Facility is an accelerator used for research on light ion inertial confinement fusion. Large amounts of electrical energy are stored over several minutes and then released as an intense concentrated burst (shot) at a target. Some experiments could result in the release of trace amounts of radionuclides.

TA-V Sources

Annular Core Research Reactor (ACRR) – This reactor is used primarily to support defense program projects. Trace amounts of radionuclides could occasionally be released. The ACRR was offline for a period of time in 2012.

Auxiliary Hot Cell Facility (AHCF) – The AHCF is used to identify, sort, characterize, and repackage legacy nuclear materials and TRU packages for permanent removal from the SNL/NM site. Legacy material may include accountable nuclear material, TRU waste, spent nuclear fuel, and radiological material. Trace amounts of radionuclides could occasionally be released.

5.4 Assessment of Potential Dose to the Public

In general, the dose received by a person is dependent on the distance from the source, the available pathways in the environment (food chain, air, and water), radionuclide quantities and properties, and meteorological conditions. Historically, radioactive releases from SNL/NM have resulted in doses to the public that are several orders of magnitude below the EPA's standard of 10 mrem/yr. Radiation protection standards specific to DOE facilities are provided in Chapter 8.

5.4.1 NESHAP Dose Assessment

Emission Sources

To assess compliance, all NESHAP facilities at SNL/NM must submit annual facility emission data to the NESHAP Team Leader. The emissions from four "primary" sources (ACRR, Z Facility, NGF, and the RMWMF) are modeled using EPA's CAA Assessment Package-1988 (CAP88) (EPA 2013) to estimate the annual dose to each of the identified public receptors. Primary sources are those that determine their emissions by direct measurements or by calculations based on measured operational parameters.

The NESHAP regulation requires DOE to continuously monitor any radionuclide air emission source that has the potential to produce a dose of 0.1 mrem/yr to the MEI; however, there are no facilities at SNL/NM that exceed this criterion. As a BMP, some SNL/NM facilities perform continuous stack monitoring. Other facilities base their emission estimates on periodic confirmatory measurements or engineering calculations. In 2012, the highest emissions were from tritium. Historically, tritium and argon-41 have been the most significant contributor to the effective dose equivalent (EDE) of the MEI. Figure 5-6 shows the historical annual reported release (in Ci) of tritium and argon-41. The atmosphere contains 72 percent nitrogen, 21 percent oxygen, 0.93 percent argon, 0.03 percent carbon dioxide, and minor concentrations of neon, methane, hydrogen, helium, and krypton. Some of these constituents are susceptible to isotope transformations during high energy processes, which result in air activation products such as argon-41.

Demographic Data

Demographic data includes the resident population, the number of beef and dairy cattle, and the utilized food crop area fraction for a 50-mile (mi) radius study area. The densities for resident population, cattle, and food crops are calculated as the quotient of the most recent county data and the county land area (e.g., cows per acre). In 2012, the NESHAP calculation for resident population was based

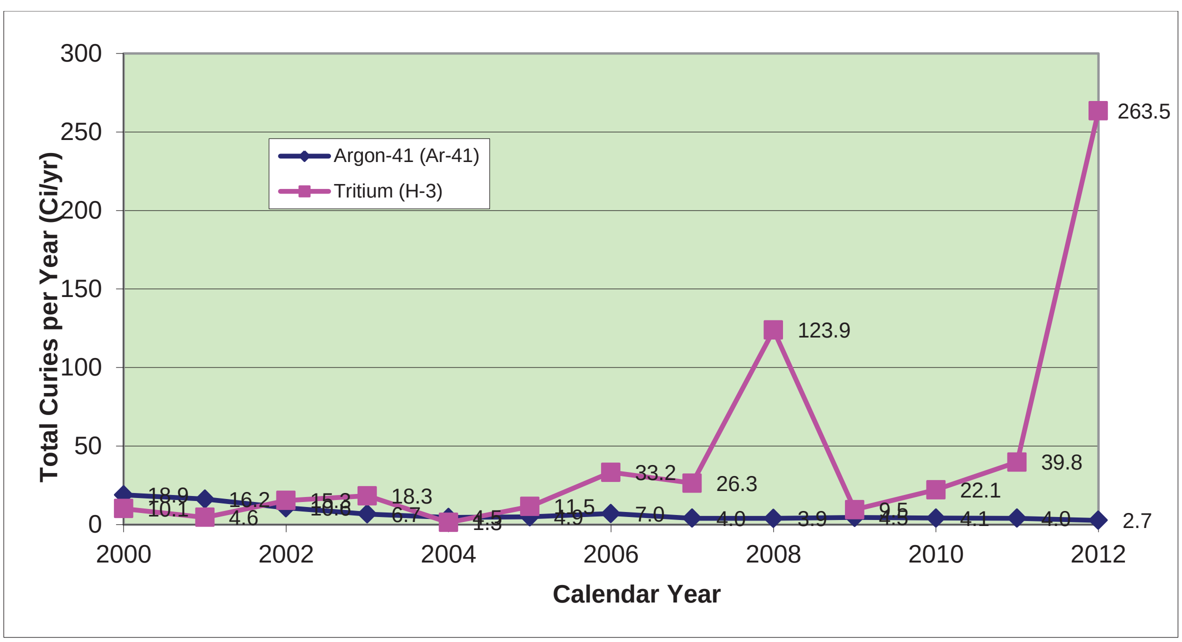

FIGURE 5-6. Summary of Atmospheric Releases of Argon-41 and Tritium from SNL/NM Facilities from 2000 to 2012
(Emissions vary from year to year based on the operations conducted at the various facilities.)

on the State's 2000 to 2001 estimated urban and county population data and U.S. Census Bureau data (DOC 2013). The beef and dairy cattle numbers and food crop area fraction were calculated using 2007 agricultural statistics. The statistics were supplied by the New Mexico Department of Agriculture (NMDOA) (NMDOA 2013). The following values were used in the 2012 CAP88 calculation:

- 0.93 Dairy cattle/square kilometers (km^2)
- 0.58 Beef cattle/km^2
- 0.00062 Acres of food crops/square meters (m^2)
- 882,187 Population (within 50-mi radius)

On-site and Off-site Public Receptors

Receptor locations in the vicinity of SNL/NM, shown in Table 5-8 and Table 5-9, have been identified as potential locations of maximum exposure to a member of the public. Off-site receptor locations extend to the Hard Rock Casino (formerly the Isleta Casino), the Four Hills subdivision north of KAFB, the Manzanita Mountains (with east mountain residents), and areas near the Albuquerque International Sunport west of KAFB. On-site receptors include U.S. Air Force facilities, offices, and housing areas, as well as other non-DOE and non-U.S. Department of Defense facilities on KAFB.

TABLE 5-8. Annual Source-Specific Effective Dose Equivalent (EDE) from Primary Sources to Off-Site Receptors During Calendar Year 2012

FACILITY	ACRR	NGF	RMWMF	Z FACILITY	
	Emission (mrem/yr)	Emission (mrem/yr)	Emission (mrem/yr)	Emission (mrem/yr)	TOTAL (mrem/yr)
City of Albuquerque EHD Bio-Disease	1.00E-04	7.90E-04	2.20E-03	6.40E-08	3.09E-03
Dog Off Leash Parking Area	9.10E-05	7.90E-04	2.20E-03	6.50E-08	3.08E-03
East Resident	9.10E-06	7.30E-04	1.90E-03	5.70E-08	2.64E-03
Eubank Gate Area (Bldg 8895)	5.60E-05	1.10E-03	2.00E-03	7.40E-08	3.16E-03
Four Hills Resident	5.30E-05	7.80E-04	2.00E-03	6.20E-08	2.83E-03
Hard Rock Hotel and Casino	2.80E-05	7.50E-04	2.00E-03	5.80E-08	2.78E-03
La Luz Childcare	5.00E-05	9.20E-04	2.00E-03	6.80E-08	2.97E-03
Manzano Mesa Apartments	4.50E-05	8.70E-04	2.00E-03	6.60E-08	2.92E-03
Manzano Multicultural Generational Community Center	4.10E-05	8.20E-04	2.00E-03	6.40E-08	2.86E-03
The National Museum of Nuclear Science & History	4.10E-05	8.60E-04	2.00E-03	6.40E-08	2.90E-03
NM School for the Blind & Visually Impaired	4.60E-05	8.80E-04	2.00E-03	6.60E-08	2.93E-03
Sunflower Meadows Park	8.70E-06	7.30E-04	1.90E-03	5.70E-08	2.64E-03
USGS	2.50E-05	7.40E-04	2.00E-03	5.70E-08	2.77E-03
VA Hospital	4.50E-05	8.10E-04	2.00E-03	6.70E-08	2.86E-03
Willow Wood	4.80E-05	8.70E-04	2.00E-03	6.60E-08	2.92E-03
TOTAL	**6.87E-04**	**1.24E-02**	**3.02E-02**	**9.55E-07**	**4.33E-02**

NOTES: ACRR = Annular Core Research Reactor
EHD = Environmental Health Department
mrem/yr = millirem per year
NGF = Neutron Generator Facility
NM = New Mexico
RMWMF = Radioactive Mixed Waste Management Facility
USGS = U.S. Geological Survey
VA = Veterans Administration

TABLE 5-9. Annual Source-Specific Effective Dose Equivalent (EDE) to On-Site Receptors During Calendar Year 2012

FACILITY	ACRR	NGF	RMWMF	Z FACILITY	TOTAL (mrem/yr)
	Emission (mrem/yr)	Emission (mrem/yr)	Emission (mrem/yr)	Emission (mrem/yr)	
Air National Guard Communications Flight	5.30E-05	9.60E-05	5.90E-05	1.10E-08	2.08E-04
Armed Forces Reserve Center	9.60E-05	1.20E-04	7.70E-05	8.80E-08	2.93E-04
Chestnut Site	1.30E-04	1.30E-05	8.60E-04	2.20E-09	1.00E-03
Child Development Center at Maxwell Housing Center	5.50E-05	3.90E-05	4.60E-05	5.20E-09	1.40E-04
Golf Course Club House	2.20E-04	4.20E-05	1.10E-04	1.20E-08	3.72E-04
Golf Course Maintenance Area	1.60E-04	5.80E-05	1.00E-04	1.40E-08	3.18E-04
Homeland Security Bldg (1008)	6.90E-05	4.10E-04	6.50E-05	3.00E-08	5.44E-04
Honeywell Systems\Support Site	6.80E-05	4.70E-04	6.20E-05	3.30E-08	6.00E-04
Lovelace Respiratory Research Institute	3.80E-05	1.00E-05	1.10E-04	1.60E-09	1.58E-04
KAFB Fire Station	5.50E-05	2.40E-04	5.40E-05	1.80E-08	3.49E-04
KAFB Landfill	9.50E-05	1.10E-04	7.90E-05	3.00E-08	2.84E-04
Kirtland Elementary	5.40E-05	4.00E-05	4.60E-05	4.80E-09	1.40E-04
Kirtland Family Housing	4.50E-05	1.90E-04	4.90E-05	1.10E-08	2.84E-04
Kirtland Storage Facility	3.60E-04	3.60E-05	1.50E-04	1.10E-08	5.46E-04
Manzano Offices (Fire Station)	1.10E-04	2.40E-05	1.20E-04	2.80E-09	2.54E-04
Maxwell Housing (SE Corner)	5.80E-05	4.20E-05	4.80E-05	5.60E-09	1.48E-04
Pershing Park Housing	4.40E-05	1.50E-04	4.80E-05	1.20E-08	2.42E-04
Richard W. Davis Advanced Laser Facility (formally Airport Bldg)	1.10E-04	1.30E-04	7.10E-05	1.50E-08	3.11E-04
Sandia Area Federal Credit Union	6.20E-05	3.00E-04	5.80E-05	2.50E-08	4.20E-04
Sandia Elementary School	4.40E-05	1.60E-04	4.90E-05	1.20E-08	2.53E-04
TA-IV Cafeteria	9.20E-05	1.30E-04	7.80E-05	1.80E-07	3.00E-04
Tijeras Learning Center	8.80E-05	2.60E-05	1.00E-04	3.10E-09	2.14E-04
Vehicle Maintenance Flight	5.50E-05	1.00E-04	6.10E-05	1.20E-08	2.16E-04
Wherry Elementary	4.90E-05	1.10E-04	5.50E-05	1.20E-08	2.14E-04
TOTAL	**2.21E-03**	**3.05E-03**	**2.56E-03**	**5.51E-07**	**7.81E-03**

NOTES: ACRR = Annular Core Research Reactor
Bldg = building
KAFB = Kirtland Air Force Base
mrem/yr = millirem per year
NGF = Neutron Generator Facility
RMWMF = Radioactive Mixed Waste Management Facility
SE = southeast
TA = Technical Area

Meteorology

Data from three meteorological towers (CW1, A36 and A21) in the proximity of NESHAP emission sources were used in 2012. Data from each tower consisted of approximately 35,000 hourly observations of wind direction, wind speed, and stability class (inferred from wind and solar insulation data). The data are compiled into a normalized distribution from which all wind and stability frequency-of-occurrence data were derived.

5.4.2 Dose Assessment Results

CAP88 utilizes a Gaussian plume equation that estimates air dispersion in both horizontal and vertical directions. Individual EDEs to off-site and on-site receptors are presented in Tables 5-8 and 5-9, respectively. Dose assessment results are summarized in Table 5-10.

TABLE 5-10. Calculated Dose Assessment Results for On-Site and Off-Site Receptors and for Collective Populations During Calendar Year 2012

Dose to Receptor	Location	2011 Calculated Dose	NESHAP Standard
Individual Dose			
On-site Receptor EDE to the MEI	Chestnut Site	1.00E-03 mrem/yr (1.00E-05 mSv/yr)	10 mrem/yr (0.1 mSv/yr)
Off-site Receptor EDE to the MEI	Eubank Gate Area	3.16E-03 mrem/yr (3.16E-05 mSv/yr)	10 mrem/yr (0.1 mSv/yr)
Collective Dose			
Collective Regional Population	Residents within an 80-km (50-mi) radius	2.47E-01 person-rem/yr[1] (2.47E-03 person-mSv/yr)	No Standard Available
Collective KAFB Population	KAFB Housing	1.11E-03 person-rem/yr[2] (1.11E-05 person-mSv/yr)	No Standard Available

NOTES: [1] Based on a population of 882,187 people estimated to be living within an 80-km (50-mi) radius.
[2] Based on a population of 4,399 people estimated to be living in permanent on-base housing.
EDE = effective dose equivalent
KAFB = Kirtland Air Force Base
km = kilometer
MEI = maximally exposed individual
mi = mile
mrem/yr = millirem per year
mSv/yr = millisievert per year
NESHAP = National Emissions Standards for Hazardous Air Pollutants
person-mSv/yr = person-millisievert per year
person-Sv/yr = person-sievert per year

The total dose at each receptor location is determined by summing the individual doses resulting from each source. The dose to the MEI member of the public is then compared to the EPA limit of 10 mrem/yr.

Radiological National Emission Standards Hazardous Air Pollutants (NESHAP) Compliance Subpart H of NESHAP regulates radionuclide air emissions from DOE/NNSA facilities, with the exception of naturally occurring radon. The Radiological NESHAP Program evaluates facilities that have the potential to release emissions to the environment yearly. In 2012, the primary radionuclides released from SNL/NM facilities were tritium and argon-41. In 2012, the on-site MEI was located on KAFB. The on-site MEI dose of 1.00E-03 mrem/yr at the Chestnut Site resulted primarily from tritium releases at the RMWMF. The off-site MEI was located at the Eubank Gate Area. The off-site MEI dose of 3.16E-03 mrem/yr at the Eubank Gate Area resulted also primarily from tritium releases at the RMWMF. Both doses are well below the 10 mrem/yr EPA standard. By comparison, the average person in the Albuquerque area receives 311 mrem/yr from natural background radiation (NCRP 2009).

Collective Dose

The collective population dose resulting from all SNL/NM radiological emissions was calculated for both KAFB and the regional area (Table 5-10). Collective dose calculations are not required by NESHAP regulations; however, it provides a useful numerical comparison of the public dose from year to year. Collective dose is calculated by multiplying a representative individual dose within a population, by the total population. Sandia calculates the collective population dose for both the KAFB housing areas and the general Albuquerque area population within a 50-mi radius.

Regional

The Albuquerque regional collective population dose in 2012 was 2.47E-01 person-roentgen equivalent, man per year (person-rem/yr). This is comparable with the average over the past five years of regional collective population dose data. For the purpose of calculating the collective dose, all releases are assumed to occur from a location centered in TA-V. The population dose was calculated by multiplying 882,187 residents by doses per sector.

KAFB

A collective population dose for KAFB residents was calculated based on three main housing areas (Maxwell, Pershing Park, and Kirtland Family). The total population dose for KAFB was obtained by summing the three areas based upon a total residential population of 4,399. The CY 2012 calculation resulted in an estimated population dose of 1.11E-03 person-rem/yr.

5.5 Air Compliance Requirements & Compliance Strategies

Air quality standards are implemented by regulations promulgated by local and federal governments in accordance with the CAA. The Albuquerque Bernalillo County Air Quality Control Board, the State of New Mexico, and the EPA determine applicable air quality standards for non-radiological pollutants. Radionuclide air emissions are currently regulated by the EPA under NESHAP, as discussed in Section 5.4.1. A complete list of air quality regulations applicable to SNL/NM is provided in Chapter 8.

5.5.1 SNL/NM Air Emission Sources

As discussed in Section 5.2.1, criteria pollutants include sulfur dioxide, nitrogen oxide, carbon monoxide, ozone, PM, and lead. For these criteria and other pollutants, the EPA:

- Sets ambient air quality standards – including those for motor vehicle emissions,
- Requires state implementation plans for protection and improvement of air quality,
- Institutes air quality programs to prevent the nation’s air from deteriorating, and
- Establishes hazardous air pollutant (HAP) control programs.

EPA standards for criteria pollutants are given in 40 CFR 50, NAAQS and implemented in (20.11.8 NMAC). NMAAQS with criteria pollutant standards for ambient air is met through on-going applicability determinations on potential criteria pollutant emission sources that require the following: acquisition of the necessary permits and registrations for applicable sources from the appropriate regulatory agencies; fuel throughput tracking, monitoring, and reporting; ambient air surveillance; and periodic direct emission sampling. As discussed previously, ambient air measurements taken in the vicinity of SNL/NM facilities have been well below maximum threshold limit values (TLV) and standards for criteria pollutants.

The significant sources of criteria pollutants at SNL/NM are defined as sources that require a permit or registration from a regulatory agency.

A majority of the permits held for SNL/NM are multi-source (including a combination of criteria pollutant emission sources). The DOE/NNSA/SFO and the AQC program has started to work with the COA to assure that we have only one permit or registration for combustion sources per building.

This is to better align with the current regulations and requirements. During CY 2012, several new boiler registrations were issued as part of this effort. The alignment has been completed and redundant multi-source permits and registrations have been corrected. Significant sources at SNL/NM are listed, below.

Boilers

During CY 2012, SNL/NM personnel maintained 30 permits and registrations for applicable boilers site wide. Table 5-11 illustrates the annual fuel usage and associated emissions for CY 2012. The boilers associated with the permits and registrations are shown in Table 5-12.

TABLE 5-11. Boiler Usage and Emission Data During Calendar Year 2012

Permit Number	Fuel Usage (scf)	Emissions (tpy)				
		NO_x	CO	PM_{10}	SO_2	VOC
#374-M2	7,434,812	0.1859	0.3123	0.0283	0.0067	0.0204
R#547-RV1	6,937,898	0.3469	0.2914	0.0264	0.0021	0.0191
#925-M2	8,692,140	0.4346	0.3651	0.0330	0.0078	0.0239
R#1406-M1	2,324,877	0.0581	0.0976	0.0088	0.0007	0.0064
#1725-M1	8,385,975	0.4193	0.3522	0.0319	0.0025	0.0231
#1820-M1	62,383,100	1.5596	2.6201	0.2371	0.0561	0.1716
R#1823	10,001,000	0.5001	0.4200	0.0380	0.0030	0.0275
R#1888-RV1	20,199,656	1.0100	0.8484	0.0768	0.0061	0.0555
R#1902-RV1	2,586,000	0.1293	0.1086	0.0098	0.0008	0.0071
R#2109	3,701,019	0.0925	0.1554	0.0141	0.0033	0.0102
R#2110	5,872,115	0.1468	0.2466	0.0223	0.0053	0.0161
R#2111	2,720,000	0.0680	0.1142	0.0103	0.0024	0.0075
R#2112	3,208,036	0.0802	0.1347	0.0122	0.0029	0.0088
R#2113	2,513,226	0.0628	0.1056	0.0096	0.0023	0.0069
R#2114	2,076,731	0.0519	0.0872	0.0079	0.0019	0.0057
R#2115	2,271,165	0.0568	0.0954	0.0086	0.0020	0.0062
R#2116	7,452,183	0.1863	0.3130	0.0283	0.0067	0.0205
R#2117	1,948,413	0.0487	0.0818	0.0074	0.0018	0.0054
R#2118	2,413,641	0.0603	0.1014	0.0092	0.0022	0.0066
R#2119	1,653,887	0.0413	0.0695	0.0063	0.0015	0.0045
R#2120	7,555,829	0.1889	0.3173	0.0287	0.0068	0.0208
R#2121	6,726,026	0.1682	0.2825	0.0256	0.0061	0.0185
R#2122	2,726,800	0.0682	0.1145	0.0104	0.0025	0.0075
R#2169	718,505	0.0359	0.0302	0.0027	0.0002	0.0020
R#2170	1,389,410	0.0695	0.0584	0.0053	0.0004	0.0038
R#2171	1,355,493	0.0678	0.0569	0.0052	0.0004	0.0037
R#2172-RV1	1,058,408	0.0529	0.0445	0.0040	0.0003	0.0029
R#2173	N/D[1]	1.0606	0.8909	0.0806	0.0064	0.0583
R#2174-RV1	4,288,421	0.2144	0.1801	0.0163	0.0013	0.0118
R#2175	2,513,595	0.1257	0.1056	0.0096	0.0008	0.0069

NOTES: CO = carbon monoxide
NO_x = nitrogen oxide
PM_{10} = Particulate Matter (diameter equal to or less than 10 microns)
N/D = non detect
scf = standard cubic feet
SO_2 = sulfur dioxide
tpy = tons per year
VOC = Volatile Organic Compound
[1] = There is currently not an individual fuel meter on this building, it is a total for several buildings. The emissions associated are the allowable emissions within the registration.

TABLE 5-12. Boilers Associated with Permits and Registrations During Calendar Year 2012

Permit Number	Description	Size	Fuel Type
#374-M2	Neutron Generator Production Facility (NGPF) Boilers used to heat the facility.	Six (6) 2 MMBtu/hr	Natural Gas
R#547	Explosives Components Facility (ECF) Boilers used to heat the facility.	Two (2) 4.3437 MMBtu/hr	Natural Gas
#925-M2	Processing and Environmental Technology Laboratory (PETL) Boilers used to heat the facility.	Ten (10) 1.4 MMBtu/hr	Natural Gas
R#1406-M1	Advanced Manufacturing Prototype Facility (AMPF) Boilers used to heat the facility.	Two (2) 1.8 MMBtu/hr	Natural Gas
#1725-M1	Center for Integrated Nanotechnologies (CINT) Boilers used to heat the facility.	Two (2) 6 MMBtu/hr	Natural Gas
#1820-M1	Microsystems and Engineering Sciences Applications (MESA) Complex Boilers used to heat the facility.	Two (2) 20.412 MMBtu/hr	Natural Gas
		One (1) 10.206 MMBtu/hr	
R#1823	Weapons Integration Facility (WIF) Boilers used to heat the facility.	Two (2) 8.17 MMBtu/hr	Natural Gas
		One (1) 3.68 MMBtu/hr	
R#1888-RV1	Building 878 boilers used to heat the facility.	Thirteen (13) 2 MMBtu/hr	Natural Gas
R#1902-RV1	Building 865 boilers used to heat the facility.	Two (2) 0.28 MMBtu/hr	Natural Gas
		Two (2) 1.3 MMBtu/hr	
R#2109	Building 802 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2110	Building 804 boilers used to heat the facility.	Four (4) 2 MMBtu/hr	Natural Gas
R#2111	Building 810 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2112	Building 823 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2113	Building 840 boilers used to heat the facility.	Four (4) 2 MMBtu/hr	Natural Gas
R#2114	Building 857 boilers used to heat the facility.	Two (2) 1.3 MMBtu/hr	Natural Gas
		Two (2) 1.1001 MMBtu/hr	

See notes at end of table.

TABLE 5-12. Boilers Associated with Permits and Registrations During Calendar Year 2012 (Concluded)

Permit	Description	Size	Fuel Type
R#2115	Building 860 boilers used to heat the facility.	Two (2) 1.3 MMBtu/hr	Natural Gas
R#2116	Building 880 boilers used to heat the facility.	Four (4) 2 MMBtu/hr	Natural Gas
		Two (2) 0.28 MMBtu/hr	
R#2117	Building 890 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2118	Building 887 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2119	Building 891 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2120	Building 892 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2121	Building 894 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
		Two (2) 1.001 MMBtu/hr	
		Two (2) 1.3 MMBtu/hr	
R#2122	Building 897 boilers used to heat the facility.	Three (3) 2 MMBtu/hr	Natural Gas
R#2169	Building 960 boilers used to heat the facility.	Two (2) 1.5 MMBtu/hr	Natural Gas
R#2170	Building 895 boilers used to heat the facility.	Three (3) 2.0 MMBtu/hr	Natural Gas
R#2171	Building 800 boilers used to heat the facility.	Two (2) 1.44 MMBtu/hr	Natural Gas
R#2172-RV1	Building 6585 boilers used to heat the facility.	Two (2) 5.0 MMBtu/hr	Natural Gas
R#2173	Building 6597 boilers used to heat the facility.	One (1) 2.47 MMBtu/hr	Natural Gas
R#2174-RV1	Building 6580 boilers used to heat the facility.	Four (4) 2.0 MMBtu/hr	Natural Gas
R#2175	Building 981 boilers used to heat the facility.	Two (2) 1.8 MMBtu/hr	Natural Gas

NOTES: Registration #936-M1 was combined into Permit #925-M2 since they were both associated with the same Building.
MMBtu/hr = Million British Thermal Units per hour

Emergency Generators

During CY 2012, SNL/NM personnel maintained 11 permits and registrations for applicable generators site wide. Table 5-13 illustrates the annual hours of operation and associated emissions for CY 2012. The emergency generators associated with the permits and registrations are shown in Table 5-14.

Chemical Usage

Registration #1901-RV1 was issued on October 24, 2011 by the COA, which includes all HAP chemical usage for general laboratory usage for research and development purposes. With the issuance of Registration #1901-RV1, all other permits and registrations that contained HAP chemical requirements have been modified to no longer have these requirements associated with them. During CY 2012, SNL/NM purchased a total of 12 tons of HAP chemicals. This number is far below the Registration #1901-RV1 and major HAP chemical source status of 25 tons per year (tpy).

TABLE 5-13. Generator Hours and Emission Data During Calendar Year 2012

Permit Number	Hours	Emissions (tpy)				
		NO_x	CO	PM_{10}	SO_2	VOC
#374-M2	9	0.0800	0.0172	0.0056	0.0053	0.0064
#402[a]	14.2	0.1280	0.0340	0.0023	0.0162	0.0036
	13.4					
	13.2					
	13.1					
#415-M2	2.9	0.0086	0.0019	0.0006	0.0006	0.0007
#924-RV1	7	0.0753	0.0172	0.0022	0.0254	0.0022
#925-M2	8	0.0860	0.0197	0.0025	0.0290	0.0025
#1725	12	0.0979	0.0224	0.0029	0.0330	0.0029
#1820-M1[b]	9	0.1492	0.0396	0.0145	0.0135	0.0168
	10	0.2102	0.0558	0.0204	0.0191	0.0237
#1828	10.3	0.0927	0.0212	0.0027	0.0312	0.0027
#1900[c]	3.9	0.0049	0.0042	0.0002	0.0016	N/A
#1930[c]	2.6	0.0040	0.0011	0.0001	0.0003	N/A
#2097[c]	30	0.0332	0.0288	0.0001	0.0103	N/A

NOTES: [a] The emission limits stated in the permit are combined emissions, therefore they are calculated annually as a summed emission for all four units.
[b] Permit #1678-M1 has been combined with Permit #1830 so all emission units are under one Permit (#1820-MI) for the Facility. The equipment has not been changed.
[c] City of Albuquerque has started issuing generator permits with combined NO_x and VOC emissions. Permit #1900 is the first permit to have this combination for Sandia.
CO = carbon monoxide
N/A = not applicable
NO_x = nitrogen oxide
PM_{10} = Particulate Matter (diameter equal to or less than 10 microns)
SO_2 = sulfur dioxide
tpy = tons per year
VOC = Volatile Organic Compound

TABLE 5-14. Emergency Generators Associated with the Permits and Registrations During Calendar Year 2012

Permit	Description	Size	Fuel Type
#374-M2	NGF Emergency Generator provides emergency power during unplanned power outages.	One (1) 469 hp	Diesel
#402	Emergency Generator Plant provides back-up power to various buildings in TA-I of SNL/NM.	Four (4) 805 hp	Diesel
#415-M2	RMWMF Emergency Generator provides emergency power during unplanned power outage.	One (1) 192 hp	Diesel
#924-RV1	TA-I East L Avenue Emergency Generator provides emergency power during unplanned power outages	One (1) 896 hp	Diesel
#925-M2	PETL Emergency Generator provides emergency power during unplanned power outages.	One (1) 896 hp	Diesel
#1725-M1	CINT Emergency Generator provides emergency power during unplanned power outages.	One (1) 680 hp	Diesel
#1820-M1[a]	MESA Complex Emergency Generators provide emergency power during unplanned power outages.	One (1) 999 hp	Diesel
		One (1) 1609 hp	
#1828	Southeast TA-I Back-up Generator provides backup power during unplanned power outages.	One (1) 750 hp	Diesel
#1900	SDF backup generator provides backup power during unplanned power outages.	One (1) 380 hp	Diesel
#1930	Building 962 backup generator provides backup power to the operations housed in Building 962.	One (1) 99 hp	Diesel
#2097	Building 833 generator will provide power for research & development missions.	One (1) 335 hp	Diesel

NOTES: CINT = Center for Integrated Nanotechnologies
hp = horsepower
MESA = Microsystems and Engineering Sciences Application
NGF = Neutron Generator Facility
PETL = Processing Environmental Technologies Laboratory
RMWMF = Radioactive Mixed Waste Management Facility
SDF = Strategic Defense Facility
SNL/NM = Sandia National Laboratories, New Mexico
TA = Technical Area

Miscellaneous New Source Review (NSR) Permits

The document disintegrator is an industrial-size, classified document shredder. There is one pollutant of concern with this permit, which is particulate emissions. The document disintegrator operated 339 hours in CY 2012 which calculated an estimated 0.9 tons of total suspended particulate. The process input rate of material was 62.5 percent below the permitted limit.

The Thermal Test Complex is an enclosed research and development fire test complex and an important element in the revitalization of SNL/NM test capabilities needed for test article qualification, development, surveillance, investigation, and modeling. The facility burned no fuel during CY 2012, however conducted some toluene fuel testing resulting in the following potential emissions in tpy:

Pollutant	Emissions (tpy)
Carbon Monoxide	0.002
Nitrogen Dioxide	0.0001
Sulfur Dioxide	0
PM_{10}	0.003
Hazardous Air Pollutant	0
Volatile Organic Compound	0.004

All emissions are well below permitted limits for the facility.

Open Burn Permits

Open burn permits are required for:

- Disposal of Explosives by Burning (avoids the hazards of transport and handling),
- Aboveground Detonation of Explosives (over 20 pounds [lb]),
- Burning Liquid Fuel (2,000 gallons or more, or solid fuel of 5,000 lb in a single event, research and development activity), and
- Igniting Rocket Motors (with greater than 4,000 lb of fuel).

A list of 2012 permits can be found in Chapter 8, Table 8-1.

Fugitive Dust

As required by 20.11.20 NMAC, *Fugitive Dust Control*, DOE obtains fugitive dust permits for each of Sandia's applicable projects that will disturb greater than ¾-acre of soil. For a list of 2012 permits refer to Chapter 8, Table 8-1 of this report.

Vehicles

The majority of government vehicles at SNL/NM are owned and managed by the General Services Administration (GSA). All GSA vehicles must comply with the same emission standards set for all personal and non-personal vehicles that are issued KAFB vehicle passes. As required by 20.11.100 NMAC, *Motor Vehicle Inspection Decentralized*, Sandia submits an annual vehicle inventory update and inspection plan to the COA for the applicable Sandia-owned vehicles.

5.5.2 Title V

The CAA Amendment of 1990 contained provisions under Title V requiring all existing major air emission sources to obtain an operating permit. A major source is defined as the combined emissions from any facility with the potential to emit:

- 100 tpy or greater of any criteria pollutant, 100,000 carbon dioxide equivalent greenhouse gas (GHG) emissions,
- 10 tpy of any single HAP, and
- 25 tpy of any combination of HAPs.

Background

The DOE/NNSA/SFO submitted Operating Permit application 515 (DOE 2002) on March 1, 1996, since potential emissions for SNL/NM were greater than 100 tpy of criteria pollutants. The COA has yet to issue the final permit. An updated application is currently being negotiated with the COA.

Greenhouse Gas Emissions

On May 13, 2010, the EPA issued a final rule that establishes a common sense approach to addressing greenhouse gas emissions from stationary sources under the CAA permitting programs. This final rule sets thresholds for GHG emissions that define when permits under the NSR Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities.

The CAA permitting program emissions thresholds for criteria pollutants such as lead, sulfur dioxide, and nitrogen oxide, are 100 and 250 tpy. While these thresholds are appropriate for criteria pollutants, they are not feasible for GHGs because GHGs are emitted in much higher volumes. EPA will phase in the CAA permitting requirements for GHGs in two initial steps. Operations at SNL/NM will become applicable in the second step, with deadline dates between July 1, 2011 and June 30, 2013. Operating permit requirements will, for the first time, apply to sources based on their GHG emissions even if they would not apply based on emissions of any other pollutant. Facilities that emit at least 100,000 tpy carbon dioxide equivalent will be subject to Title V permitting requirements.

SNL/NM personnel will have to update the current Title V Operating Permit application to include the GHG carbon dioxide equivalent emissions. During CY 2012, there was a calculated total of 152,317 tpy carbon dioxide equivalent (including fugitive GHG emissions) that would apply to the Title V permit. A meeting was held with the City of Albuquerque to discuss the path forward with the update to the Title V Permit application. The application will be updated with submission planned for CY 2013.

Permit Fee Structure

The COA regulations require source owners to pay air emission fees, which are implemented under 20.11.2 NMAC, *Fees*. The sources included in the fee determination for SNL/NM include the COA NSR permitted and registered sources, as summarized in Chapter 8, Table 8-1. Total fees are based on the permitted emission limits that are requested in the NSR permit/registration applications, which are incorporated into the issued NSR permit/registration. In 2012, a fee of $14,913 was paid to the COA based on the current permitted emissions fees.

Stratospheric Ozone Protection

Title VI of the CAA Amendments of 1990 required EPA to establish regulations to phase out the production and consumption of ozone depleting substances (ODSs). ODSs are defined as chlorofluorocarbons, hydrochlorofluorocarbons, and other halogenated chemicals that have been found to contribute to the depletion of the stratospheric ozone layer. EPA has established regulations in 40 CFR Part 82 that require the following: recycling of ODSs during servicing of equipment; establishment of requirements for recycling and recovery equipment, technicians, and reclaimers; repair of substantial leaks in refrigeration equipment containing greater than 50 lbs of refrigerant; and establishment of safe disposal standards.

At SNL/NM, ODSs are mainly used for comfort cooling for buildings, air conditioning units in vehicles, and water cooling units in drinking fountains. Halon is contained in some fire suppression systems and some fire extinguishers.

5.5.3 Compliance Strategies

DOE/NNSA/SFO and Sandia have met the conditions of its permits and registrations.

Chapter 6

Water Quality

Sandia National Laboratories, New Mexico (SNL/NM) conducts effluent monitoring through wastewater, surface water, storm water monitoring and surveillance programs. Sandia Corporation (Sandia) complies with water quality regulations established by local, state, and federal agencies. U.S. Environmental Protection Agency (EPA) standards are implemented at the state and local level by the New Mexico Environment Department (NMED) and the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). Currently, EPA Region VI implements storm water regulations under the National Pollutant Discharge Elimination System (NPDES). Sandia also adheres to the water quality guidelines contained in U.S. Department of Energy (DOE) Order 458.1, *Radiation Protection of the Public and the Environment* (DOE 2013).

6.1 Wastewater Discharge Program

Wastewater that is discharged to the public sewer system from SNL/NM facilities is divided into two categories: sanitary discharges and industrial discharges. Sanitary discharges include wastewater from restrooms and showers, food service establishments, and other domestic-type activities. Industrial discharges are produced from general laboratory research operations, including electroplating, metal finishing, microelectronic development, and photographic processes.

Sandia closely monitors its liquid effluent discharges to meet regulatory compliance. Sandia further reduces its toxic discharges by implementing Toxic Organic Management Plans, general good housekeeping, and engineering practices. Pollution Prevention (P2) measures are implemented to reduce, substitute, or eliminate toxic chemicals, where feasible, as discussed in Chapter 3, Section 3.5.5 of this report.

6.1.1 SNL/NM and the ABCWUA

ABCWUA Publicly-Owned Treatment Works (POTW)

SNL/NM's sewer system connects to the ABCWUA's sanitary sewer system through six permitted outfalls (Figure 6-1). It should be noted that SNL/NM Station WW007 (Permit 2069G) for activities conducted at the Microelectronics Development Laboratory (MDL) is upstream of the final discharge location, Station WW001 (Permit 2069A). Wastewater effluent discharged from any of the six outfalls must meet the ABCWUA's Sewer Use and Wastewater Control Ordinance (SUWCO) requirements. Information on the ABCWUA SUWCO requirements can be found at the American Legal Publishing Corporation's website:

www.amlegal.com/albuquerque_nm/

During Calendar Year (CY) 2012, there was one reportable event and a Notice of Violation was issued by the ABCWUA on October 31, 2012. The event was discovered and reported by SNL/NM personnel. The reportable event is summarized below:

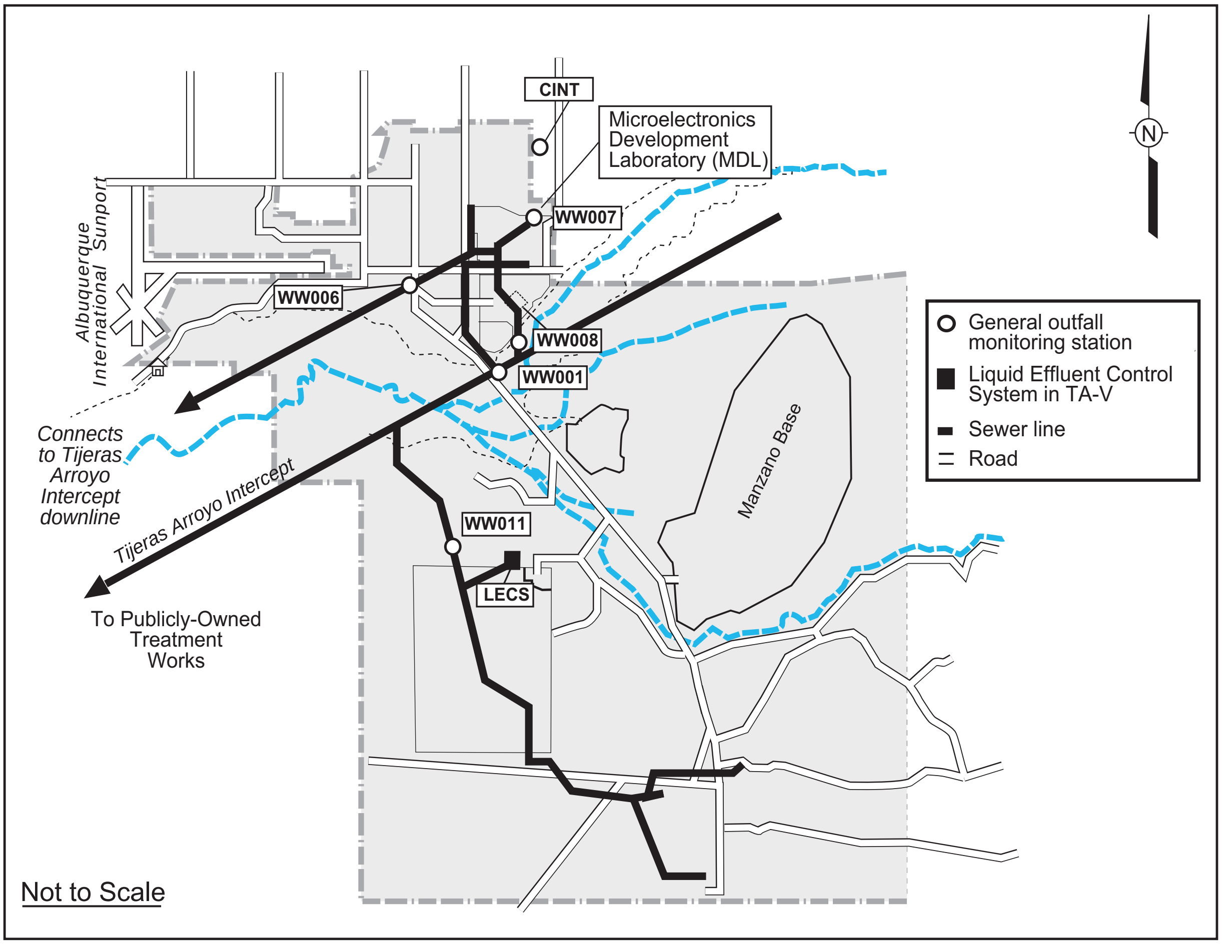

FIGURE 6-1. Wastewater Monitoring Station Locations

On Friday, October 26, 2012 at Building 905, laboratory 1105 a battery overcharging experiment was started at approximately 8 am, and ran normally for about two hours. At this point, the battery vented and ignited as expected in the testing bay which is designed for these types of experiments. At around 10 am power was lost to the scrubber and the water remaining in the system was discharged with a low potential of hydrogen (pH).

Around noon, a pH alarm was triggered at the downstream wastewater monitoring station 11 (Permit 2069I) where a pH less than 5.0 was recorded for 1 hour and 55 minutes (from 11:55 am to 1:50 pm, with the lowest pH of 4.5). Power was restored around 2 pm and the scrubber was powered on, the pH at the monitoring station rose above 5.0 around the same time returning the facility to compliance. At approximately 3 pm notification was made to the ABCWUA that the pH at Station 11 had been below 5 for approximately 2 hours.

An independent causal analysis team was formed to evaluate and determine the root cause of this event. The root cause was determined to be inadequate work planning and control. Prior to conducting the test, the organization did not adequately examine the expected effluent from the planned test to determine whether it was within the Laboratory Operating Envelope. Subsequent calculations showed the low pH effluent was a predictable outcome of this test. It appears that an assumption was made, based on extensive testing experience, that this test was comparable to those previously conducted.

Corrective Actions:

- Develop and utilize predictive modeling of pH profiles prior to the onset of battery testing as part of the work planning process to ensure that the expected outcome of the test is understood and is within the operating envelope of the space.
- Related documentation (Primary Hazard Screening [PHS], Hazard Analysis [HA], National Environmental Policy Act [NEPA] checklist, Waste Water Discharge Permit, Work Authorization Forms) will be evaluated and updated as appropriate to more completely reflect the scope of work performed in this space.
- Conduct operational tests to clarify characteristics of the scrubber system and allow preparation of a detailed operating procedure.
- Principles of Engineered Safety will be applied (i.e. evaluation of pH neutralization system and/or other system configuration modifications) and implemented as appropriate.

Wastewater Compliance Awards

The ABCWUA's reporting requirements are defined under its SUWCO. The SUWCO specifies the discharge quality and requirements that the ABCWUA will accept at its POTW. Sandia received six "Gold Pre-Treatment Awards" from the ABCWUA for the 2011 to 2012 reporting year (November 2011 through November 2012). A "Gold Pre-treatment Award" is given based on a facility's 100 percent compliance with reporting requirements and discharge limits set in its permits, or exceptional source reduction and P2.

6.1.2 Permitting and Reporting

The ABCWUA Water Utility Department, Water Reclamation Division, implements the EPA's water quality standards under the authority of the SUWCO. Sandia submits semi-annual wastewater reports to the ABCWUA. The primary regulatory drivers for the Wastewater Program and important program documents and reports are listed in Chapter 8.

Discharge Control Program

The Water Quality Group at SNL/NM maintains a Discharge Control Program to track wastewater discharges resulting from ongoing chemical, manufacturing, and industrial processes conducted at SNL/NM facilities. Facility processes are reviewed for contaminants, concentrations, and discharge frequencies to determine if the effluent will meet regulatory criteria. Once approved, a facility is issued an internal SNL/NM permit, which is reviewed annually. Generally, processes are well characterized and any constituents that are detected over the limits at a wastewater monitoring station can usually be tracked back to the source facility. Corrective actions to mitigate further releases are implemented, as necessary. One-time releases are approved on a case-by-case basis. Buildings that only produce domestic sewage, such as from lavatories (restrooms and showers), sinks, and fountains are not required to obtain an internal permit. Typical wastewater discharge requests include discharges made by the Groundwater Protection Program to dispose of well purge water from groundwater monitoring wells. Purge water is sampled prior to discharge to the sanitary sewer system. Other typical types of wastewater discharges are water from flush eyewash stations and the cleaning of laboratory glass wear."

6.1.3 Wastewater Monitoring Stations

SNL/NM has six on-site monitoring stations permitted by the ABCWUA (Figure 6-1). Wastewater permits are listed in Chapter 8, Table 8-1 of this report. All of the wastewater from SNL/NM's six permitted monitoring stations with the exception of Station WW007 (Permit 2069G) and the Center for Integrated Nanotechnologies (CINT) (Permit 2238A) contain a mixture of sanitary and industrial wastewater, which discharges into the ABCWUA sanitary sewer system through the Tijeras Arroyo Intercept.

The EPA has established categorical pre-treatment standards for specified classes of industrial discharges. Station WW007 (Permit 2069G) monitors the wastewater discharged from the Acid Waste Neutralization (AWN) system within the MDL in Technical Area (TA) I. Laboratory discharges from the MDL and buildings which comprise the Microsystems and Engineering Sciences Applications complex may also be configured to discharge to this AWN system. The CINT facility also utilizes an AWN system for pre-treatment of its process wastewater. SNL/NM discharges approximately 800,000 to 1,000,000 gallons of wastewater per day to the public sewer system.

Wastewater Monitoring

All outfall monitoring stations are equipped with flow meters which control automatic sampling units and pH sensors that continuously monitor wastewater 24-hours-a-day, 365-days-a-year. An auto-dialer notifies SNL/NM personnel when pH regulatory limits have been exceeded. SNL/NM personnel are required to notify DOE/National Nuclear Security Administration (NNSA)/Sandia Field Office (SFO) personnel of the exceeded limit. In addition, DOE/NNSA/SFO personnel are required to report the exceeded limit to the ABCWUA within 24 hours. Wastewater discharge permits and station characteristics are listed in Table 6-1.

Discharge monitoring Stations WW001 (Permit 2069A), WW006 (Permit 2069F), WW008 (Permit 2069I), and WW011 (Permit 2069K) are manhole-type installations with permanently installed continuous flow measuring and pH recording instrumentation. Wastewater monitoring Station WW007 (Permit 2069G) and the CINT (Permit 2238A) are located within buildings and are also equipped with installed continuous flow measuring and pH recording instrumentation.

Sandia splits wastewater samples taken from SNL/NM permitted outfalls with the ABCWUA to determine compliance with permit requirements. NMED is notified when sampling is scheduled to occur and is offered the opportunity to obtain samples for analysis. All samples are obtained as 24-hour flow proportional or time-weighted composites. Sandia sends all collected samples to an EPA-approved laboratory for analysis. Sampling results are compared with results obtained by the ABCWUA. Currently, the procedure is to sample randomly from a list of potential pollutants. The ABCWUA determines which parameters it plans to analyze. Monitoring parameters are listed below.

TABLE 6-1. SNL/NM Wastewater Discharge Permits and Station Characteristics

Permit	Waste Stream Process
General Outfall	
2069A (WW001)	All waste streams
2069F (WW006)	All waste streams
2069I (WW008)	All waste streams
2069K (WW011)	All waste streams and radiological screening of TA-V process water at the LECS
Categorical	
2069G (WW007)	Laboratory industrial processes acid waste from MDL activities
2238A (CINT)	Laboratory industrial processes acid waste from CINT activities

NOTES: "All waste streams" include both domestic and industrial discharges.
CINT = Center for Integrated Nano-Technologies
LECS = Liquid Effluent Control System
MDL = Microelectronics Development Laboratory
SNL/NM = Sandia National Laboratories, New Mexico
TA-V = Technical Area V

Wastewater Analyte Parameters

- Metals - aluminum, arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, and zinc.
- Radiological - gamma spectroscopy, gross alpha, gross beta, and tritium.
- General Chemistry - chemical oxygen demand, cyanide, formaldehyde, oil and grease, phenolic compounds, semi-volatile organic compounds, soluble fluoride, and volatile organic compounds.

Septic Systems

Sandia maintains three active septic tank systems and one holding tank in remote areas on Kirtland Air Force Base (KAFB), which are used only for domestic sanitary sewage collection. Since these tanks receive only domestic sewage and no industrial discharges, they do not require sampling prior to pumping and discharge to the public sewer. All septic holding tank records are sent to the State of New Mexico.

6.1.4 TA-V Radiological Screening

SNL/NM personnel maintains research and engineering reactors in TA-V. These reactors and support facilities have the potential to produce radioactive process wastewater that includes liquids from floor drains, lab sinks and other drains located in buildings that use, process or store radioactive materials. To ensure that all wastewater from these facilities meets regulatory standards, liquid effluent is separated into two process streams: reactor and non-reactor wastewater. Non-reactor wastewater is water from restrooms and non-radioactive laboratory activities. Reactor process wastewater is water from areas that use, process, or store radioactive materials and is channeled to holding tanks where it can be screened for radiological contaminants within the Liquid Effluent Control System (LECS). The LECS was developed as a control system to maintain the integrity of the ABCWUA's sanitary sewer system by collecting, analyzing, and handling SNL/NM reactor process wastewater from TA-V reactor activities. Water samples are analyzed for tritium, gross alpha, gross beta, and gamma spectroscopy to ensure radiological levels meet regulatory standards before the water is released to the public sewer system. If radioactivity levels are detected above regulatory limits, the water will not be released to the sanitary sewer system and an alternative disposal path will be found or the radionuclides will be allowed to decay in place over a matter of days or weeks if the contamination is due to short-lived medical radioisotopes. Once the activity is at or below regulatory levels, the water can be safely discharged to the public sewer system. The LECS consists of three 5,000-gal holding tanks with liquid level and radioactive alarm systems, a control room, and an ion exchange/filtration unit (treatment processor). The LECS is an engineered facility operating within an established safety envelope. Discharges to the sanitary sewer from the LECS and other SNL/NM activities did not exceed standards for radionuclides at any of SNL/NM's wastewater monitoring stations in 2012.

6.1.5 Summary of Monitoring Results

During 2012, Sandia split wastewater samples with both the ABCWUA and the NMED. Laboratory analytical results for these split wastewater samples, based on the parameters shown in Section 6.1.3, confirmed that Sandia was in compliance with all NMED and ABCWUA regulations for Permits 2069A, 2069F, 2069I, 2069K and 2238A. As previously stated in Section 6.1.1, one exceedance occurred in 2012. The event was discovered when a continuous wastewater monitor was activated for a low pH value in Permitted Flow Basin 2069I. Compliance sampling of SNL/NM facilities was conducted at the ABCWUA-permitted flow basin outfalls during the months of February, April, August, and October during 2012 to ensure that Sandia was in compliance with ABCWUA's discharge requirements. The ABCWUA Industrial Waste Engineer also conducted inspections of individual laboratory operations within the permitted flow basins during the months of January, May, and June of 2012. All water discharged from the LECS in 2012 also met federal regulatory standards and DOE orders for radiological levels in wastewater. All analytical results from sampling conducted in 2012 met ABCWUA discharge requirements and can be found in Appendix A of this report.

6.1.6 Sanitary Sewer System Releases in 2012

Reportable occurrences and environmental releases in 2012 are discussed in Chapter 6, Sections 6.1.1 of this report. There was one reportable release (ABCWUA Permit 2069I) in 2012.

6.2 Surface Discharge Program

All water and water-based compounds that discharge to the ground surface are evaluated for compliance with New Mexico Water Quality Control Commission (NMWQCC) regulations as implemented by the NMED Groundwater Bureau. These regulations are designed to protect the groundwater and surface water of the state for potential use as a domestic potable water source. The primary regulations and important program documents are listed in Chapter 8.

6.2.1 Surface Discharge Approval and Permitting

Surface discharges are releases of water and water-based compounds made to roads, open areas, or impoundments. Surface discharges are only made with the approval of the Internal Surface Discharge Program. Proposed discharges are evaluated for potential contaminants and concentration levels to determine if the discharge complies with strict water quality guidelines for surface releases. Uncontaminated water discharges must also be approved, since large volumes of water discharged in areas of prior contamination (such as Environmental Restoration [ER] sites) could increase infiltration rates and move contaminants deeper into the soil column. If any discharges do not meet surface water quality standards, alternative methods of disposal are found.

2012 Surface Discharge Activities

Surface discharge requests are generally made when access to a sanitary sewer line is not available, such as in remote locations on KAFB where no sewer lines exist. Typical surface discharges are requested as a result of fire training activities, the need to flush eyewash stations, and the cleaning of building exteriors. In 2012, 25 individual surface discharge requests were made; Sandia met all State of New Mexico standards, with the exception of the unauthorized discharge at Building 9939, which was approved for discharge to the sanitary sewer but was inappropriately discharged to the surface.

6.2.2 Surface Discharge Releases in 2012

The Surface Discharge Program must be contacted in the event of an accidental release or spill to the ground surface. In 2012, three releases met the reporting requirements established by NMED. These releases are discussed in Chapter 2, Section 2.2.2, and are summarized below. These releases were all reported to NMED because they were outside of permitted allowable discharges under SNL/NM's storm water Multi-Sector General Permit (MSGP).

1. On March 5, 2012, the Sandia Incident Commander and Hazardous Materials Team responded to a reported oil release at Building 6526 at SNL/NM located in TA-III. The source of the release was from a 4,000 gallon oil storage tank used to store hydraulic fluid for the centrifuge test facility. A chilled water leak in an equipment room caused the oil sump pump system to overfill. Approximately 1,600 gallons of Texaco Regal R&O hydraulic oil was captured in the tank's secondary containment and approximately 70 gallons of hydraulic oil flowed through a doorway to the ground surface. The spill was reported to NMED on March 6, 2012. Closure is pending final confirmatory soil sample results.

   Decontamination of the containment basin began on March 21, 2012. Approximately 20 cubic yards of soil was removed from the site. The oil storage tank, tank building and foundation were scheduled to be replaced as part of a planned renovation to the centrifuge facility. Additional soil removal and sampling was conducted during the demolition phase of the project to complete the clean-up.

2. On July 12, 2012, a potable water main leak occurred at SNL/NM in TA-I inside the basement excavation of Building 704, from a break in the water line that was not on the construction drawings. Before the construction crew was able to isolate and close the potable water line, an estimated volume of 217,000 gallons was discharged into the excavation. Although at this time there was no release to the environment, the NMED was called on July 12, 2012, to seek permission, under an emergency situation, to drain the water to prevent it from infiltrating neighboring building basements and/or causing the banks of the excavation to collapse, which caused damage to onsite construction equipment and utilities.

   Once NMED approval was obtained, straw wattles were placed across the roadway in a broad and shallow "U"-shaped orientation and the pump hoses discharged a sufficient distance upstream to reduce the velocity of the water as it encounters the wattles and to clear the water before it entered the storm drain. Three pumps were placed into operation, discharging through (approximately) 2.5-inch hoses. The water was drawn from near the surface of the pond and sediment discharge was minimal. The water ran clear from the discharge hoses with very minor sedimentation of fine particles, visible in the pooled areas upstream of the wattles. Pooled water was contained within the "U" shape and did not bypass the wattles. The water was pumped from the excavation site until the water level in the excavation approached the soil bottom. The broken water line was repaired before work continued.

3. On December 11, 2012, information was obtained that a surface discharge of wastewater occurred in Coyote Test Field at SNL/NM. The discovery of this release began with a review of the SNL Internal Surface and Sanitary Sewer Discharge Program approvals at Building 9938. It was found that not all materials were listed on the internal discharge approval to the sanitary sewer system and that the discharge was occurring to the surface.

   The wastewater was from the production, isolation, and purification processes used to produce a variety of high explosive materials or oxidizers. The extent of the discharge area is unknown but is limited based on the volume of wastewater placed to the ground surface. Based solely on limited field observations, it is likely that soil is the only media potentially affected by the wastewater discharges.

   The initial response was to call the NMED "Notification of Spills and Unauthorized Discharges" phone number to make a verbal 24-hour report of the release on December 12, 2012. The NMED Hazardous Waste Bureau was also notified. The corrective action will be coordinated with the NMED Hazardous Waste Bureau under the Section V of the Compliance Order on Consent between Sandia and the NMED (NMED 2004).

6.2.3 Pulsed Power Evaporation Lagoons

The Surface Discharge Program at SNL/NM reports water quality results from routine samples taken from two surface discharge lagoons in TA-IV. Both lagoons are permitted through NMED in Discharge Plan-530 (DP-530). The two surface discharge lagoons are primarily used to contain and evaporate water that collects in the secondary containments around seven outdoor oil storage tanks used to store dielectric oil. The secondary containments are designed to hold the entire content of the tanks in the event of an accidental release. Significant volumes of precipitation can collect in the containments during storm events. The water is visually inspected for oil contamination and any oil present is skimmed off prior to discharge to the TA-IV lagoons.

The original DP-530 was issued to SNL/NM for discharges from the pulsed power facilities located in TA-IV to Lagoons #1 and #2 on March 8, 1988. The DP-530 was submitted pursuant to New Mexico Administrative Code (NMAC) 20.6.2.3106 of NMWQCC regulations, and was approved pursuant to 20.6.2.3109 NMAC. A permit renewal application for DP-530 was submitted to NMED and was approved on September 12, 2007 and was to expire on September 12, 2012. Permit renewal for DP-530 was submitted within the required 180-days prior to its expiration date of September 12, 2012. NMED informed SNL that because the renewal application was submitted in time SNL is still permitted under the existing permit. The monitoring and reporting requirements are listed in Table 6-2.

Samples were collected from Lagoon #1 and Lagoon #2 on September 19, 2012. Sample fractions were collected for the parameters specified in, DP-530, under specific conditions identified in the September 12, 2007, DP-530 discharge permit renewal issued by NMED. All samples were transported with sample custody documentation to the analytical laboratory. Although there were no discharges to Lagoon #2 in CY 2012, sampling occurred to ensure no residual or outside contamination had occurred. Laboratory analysis results indicated that all detected constitutes met ABCWUA discharge requirements. During CY 2012, monthly inspections were performed on both lagoons and were documented in checklists filed in Sandia's Customer Funded Records Center and with DOE/NNSA/SFO.

Also, during calendar year CY 2012, Lagoon #1 was drained to the sanitary sewer system after sampling and analysis results indicated the water met discharge standards of the ABCWUA. After draining and cleaning, the condition of the Lagoon #1 liner was inspected. The inspection of the Lagoon #1 liner did not identify any signs of cracking or damage. Also during CY 2012, the water in Lagoon #2 evaporated naturally and the lagoon was cleaned and inspected. The inspection of Lagoon #2 did not identify any signs of cracking or damage to the liner.

6.3 Storm Water Program

6.3.1 Storm Drain System

Storm water runoff flowing over the ground surface has the potential to pick up and transport contaminants. The Storm Water Program works in coordination with the Materials Sustainability and Pollution Prevention Program, the Surface Discharge Program, Facilities Engineering, and ER Operations to implement measures and best management practices to prevent or reduce potential contaminants from being transported in storm water runoff. Potential contaminants may derive from:

- Oils and solvents from machine shops and manufacturing areas,
- Vehicle residues from streets and parking lots,
- Hazardous chemicals and metals from waste handling facilities,

TABLE 6-2. NMWQCC Monitoring and Reporting Requirements

Action	Frequency	Reporting
Inspection of Lagoons	Monthly	Documented in checklists
Drain, clean and inspect lagoon and liner	Annually	Annually
Water-level readings	Monthly	Annually
Inspect sump stations and clean as needed	Quarterly	Annually
Major cations, anions, and TDS	Biennially	Biennially
Purgeable organics using EPA Method 8240	Biennially	Biennially
Extractable organics using EPA Method 8270	Biennially	Biennially

NOTES: EPA = U.S. Environmental Protection Agency
NMWQCC = New Mexico Water Quality Control Commission
TDS = total dissolved solids

- Residual radioactive and hazardous constituents from Solid Waste Management Units,
- Building material contaminants from construction activities, and
- Pesticides and fertilizers from landscaped areas.

Sandia controls the potential contaminants that may be picked up by storm water runoff by routing all industrial waste water to the sanitary sewer and storing most chemicals indoors. Sandia also limits storm water contact with chemical storage containers and carefully controls runoff in areas where wastes, chemicals, and oils are stored or handled. Secondary containments for all outdoor oil storage tanks and chemical containers prevent potential pollutants from being transported in storm water runoff. Some facilities, such as the Hazardous Waste Management Facility and the Radioactive and Mixed Waste Management Facility are designed to divert all runoff from the facility to a lined catchment basin. Water that accumulates in these basins evaporates. If evaporation is not adequate due to meteorological conditions, the accumulated water is evaluated and pumped to the storm drain system for disposal. Per the Resource Conservation and Recovery Act Part B permit, discharge of the water is allowed if there have been no spills or releases or no visible sheen or excessive debris. If discharged to the sanitary sewer, approval must be obtained from the ABCWUA through DOE/NNSA/SFO.

NPDES Regulations

NPDES regulations, under the Clean Water Act (CWA), require any point source discharges to be permitted. Any runoff that flows into the Tijeras Arroyo through a channel, arroyo, conduit, or pipe is considered a discharge point. Overland surface flow or "sheet" flow that drains into Tijeras Arroyo is not considered a point source discharge.

The State of New Mexico has defined "Surface Waters of the State" to mean all surface waters situated wholly or partly within or bordering upon the State, including lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds. Surface waters of the state also means all tributaries of such waters, including adjacent wetlands, any manmade bodies of water that were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state, and any "waters of the United States" as defined under the CWA that are not included in the preceding description. In order to assist New Mexico in protecting its water resources, the EPA can apply NPDES regulations to discharges to New Mexico's surface waters, even if those waters are not "Waters of the U.S." under the CWA."

As shown in Figure 6-2, Tijeras Arroyo enters KAFB from the northeast, flows just south of TA-I, TA-II, and TA-IV, exits at KAFB's west boundary, and continues about eight miles to its discharge point at the Rio Grande River. The arroyo has created a significant topographic feature across KAFB where erosion of unconsolidated basin sediments has resulted in a channel over one half mile wide in some areas.

Watersheds at SNL/NM

NPDES permits are required if storm water runoff discharges to "Waters of the U.S." or "Surface Waters of the State." Sandia facilities in TA-I, TA-II, and TA-IV have storm drains, culverts, and channels that divert storm water runoff to discharge points on the north side of Tijeras Arroyo, which is classified as "Waters of the U.S." Sandia also conducts various activities in remote mountain and canyon areas in the Arroyo del Coyote watershed, which empties into Tijeras Arroyo northwest of the KAFB Golf Course. Activities in all of these areas are evaluated for possible NPDES permitting.

Drainages south of the Arroyo del Coyote watershed are generally short and undeveloped. Runoff in this area infiltrates quickly into highly permeable soils. Discharges from these areas do not reach any designated "Waters of the U.S."; but they do discharge to "Surface Waters of the State;" therefore, activities are evaluated for possible NPDES permits for facilities in these areas. TA-III, TA-V, and several remote sites are located in this area.

NPDES Permits

MSGP - The EPA provides regulatory oversight for SNL/NM's Storm Water Program. Operators must submit a Notice of Intent (NOI), implement control measures, sample storm water runoff for comparison to national benchmark values, and develop site-specific Storm Water Pollution Prevention Plans (SWP3s). An NOI was submitted to the EPA for coverage under the new 2008 MSGP before the January 5, 2009 deadline and in November 2009 EPA issued a new permit.
In 2009, the existing SWP3 was updated to comply with the new 2008 MSGP requirements. Key facilities affected by NPDES regulations are listed in Table 6-3. Chapter 8 lists all applicable regulations and program documents.

General Construction Permit (GCP) - A construction permit requires protection of storm water runoff during and after construction. All areas of the site that are susceptible to erosion must be stabilized upon completion of the project. A new GCP was issued on February 16, 2012 for a five-year term.

During 2012, ten storm water construction permits were active. Construction permits are listed in Chapter 8, Table 8-1.

Municipal Separate Storm Sewer System (MS4) - Under the Clean Water Act revisions of 1987, the U.S. Congress established a permitting program under the National Pollutant Discharge Elimination System (NPDES) for storm water discharges to "waters of the United States". An MS4 owned by municipalities, tribes, and state and federal agencies, primarily in urbanized areas as defined by the latest US Census, is subject to the permitting requirement.

In June 2011, Sandia, which operates an MS4, was notified by EPA that SNL/NM would be included in the urbanized area and would participate in a water shed pilot storm water permit for the middle Rio Grande Valley. The new permit is expected to issued by EPA in August, 2013.

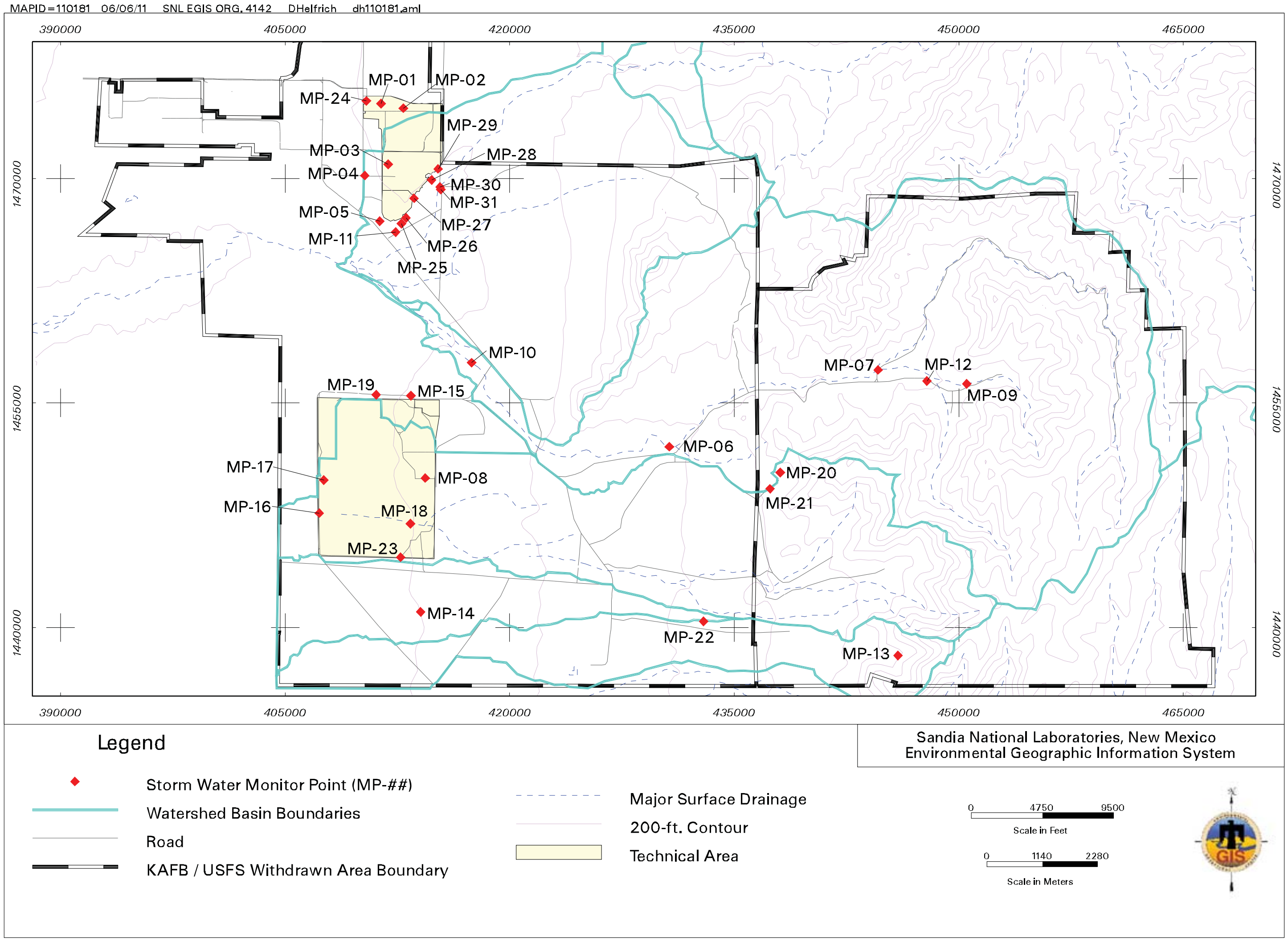

FIGURE 6-2. Storm Water Monitoring Point Locations at SNL/NM

6.3.2 MSGP Storm Water Monitoring Stations

Figure 6-2 illustrates the storm water monitoring point locations. Using the locations of the MSGP sites along with the watershed boundaries and flow patterns the storm water monitoring points were located at points that would best be suited to collect a representative sample of storm water runoff. The locations identified were then checked in the field where slight adjustments were made. This understanding between the hydrologic connection between the watershed outfalls, drainage patterns and locations of MSGP sites allowed for the selection of the monitoring points where representative samples could be collected.

6.3.3 MSGP Routine Inspections

All routine inspection results are attached to the SWP3. Routine inspections include the following:

- Monitoring station inspections are conducted monthly to ensure that samplers and other equipment are functioning properly.
- Material storage area inspections are conducted quarterly. All waste handling areas, vehicle and equipment cleaning areas, and loading and unloading areas are inspected for uncovered and unprotected potential contaminant sources and spills. These inspections increase personnel awareness and responsibility for storm water P2.
- Wet weather inspections (visual monitoring) are conducted quarterly during a storm event, if possible, but generally during the rainy season from April through September. Samples are collected and visually inspected for foaminess, clarity, and the presence of oil. The pH of the discharge is also measured and recorded. These inspections also provide an opportunity to check for broken levees and floating debris.
- Dry weather inspections are conducted quarterly when storm drains and ditches are dry, primarily to detect illicit discharges. In general, only storm water is allowed in the storm drain system; however, with approval from the Surface Discharge Program, water that meets NPDES permit conditions can be discharged to storm drains. An example of NPDES permit-approved discharges would be water used during fire training exercises or fire hydrant testing. Dry weather inspections also provide an opportunity to inspect ditches for excess vegetation, accumulated sediment, and debris. Storm channels are cleaned out annually, or as necessary.

Annual inspections of all permitted facilities and the entire storm water system are conducted. After the inspections have been completed, a report is generated indicating the extent of the inspections and certifying that is in compliance with the NPDES permit. Any inconsistency between the SWP3 and conditions at the facilities is noted in the report. If changes to the SWP3 are required as a result of these inspections, revisions are initiated. If potential pollution problems are uncovered, they are noted in the report along with a schedule for addressing those problem areas.

Sampling Protocols

Quarterly benchmark monitoring is the only analytical monitoring is required at SNL/NM under the 2008 MSGP. Annual effluent limitation monitoring; State monitoring; and impaired monitoring are not currently required.

TABLE 6-3. SNL/NM Facilities Subject to Storm Water Permitting
(These facilities are in areas where storm water can potentially drain to Tijeras Arroyo)

Description of SIC Code*	Potential Pollutants and Impacts	Applicable SNL/NM Facilities**	MSGP Sector
NPDES Multi-Sector Storm Water Permit			
Scrap and Waste Recycling	- Various solid objects with potential residual surface contamination	- Reapplication and Storage Yard - Solid Waste Transfer Station	N
Hazardous Waste Treatment, Storage, or Disposal Facilities	- Regulated hazardous chemical and radioactive waste	- HWMF - Manzano Storage Complex - RMWMF - CWL - TTF - AHCF - CAMU - SWMUs (including those in Lurance and Madera Canyons)	K
Electronic and Electrical Equipment Manufacturing	- Raw chemical storage such as acid and sodium hydroxide - Electroplating processes	- 858 Complex - AMPL - CINT - NGF	AC
Sand and Gravel Mining	- Crushed concrete and asphalt	- Technical Area III Borrow Pit	J-1
Landfills	- Non- Hazardous Waste	- Classified Waste Landfill	L
Short-Term Construction Permits			
Construction Permits - 2012	- Building material pollutants - Disturbed soil	- Mixed Waste Landfill Cover - TA-III Borrow Site*** - Heating Systems Modernization - 9940 Complex - Liquid Natural Gas - Thunder Range - TA II Escarpment - National Solar Thermal Test - TCR Phase II - 12th Street Roadway - P Avenue Improvements	

NOTES: *The EPA requires a National Pollution Discharge Elimination System (NPDES) Storm Water Permit for all industrial facilities that have processes defined in the Standard Industrial Classification (SIC) codes listed in Appendix A of 40 CFR 122.

**Applicable facilities are monitored under the expanded Storm Water Program, which was in effect in October 2001. The expanded program is documented in the revised Storm Water Pollution Prevention Plan (SWP3) (SNL 2010c).

***The Notice of Termination for the TA-III Borrow Site was submitted to EPA since it was decided to remain long-term borrow site and the activity was then included under the Multi Sector Storm water permit.

AHCF = Auxiliary Hot Cell Facility
AMPL = Advanced Manufacturing Process Laboratory
CAMU = Corrective Action Management Unit
CFR = Code of Federal Regulations
CINT = Center for Integrated Nano Technology
CWL = Classified Waste Landfill
EPA = U.S. Environmental Protection Agency
HWMF = Hazardous Waste Management Facility
MSGP = Multi-Sector General Permit
NGF = Neutron Generation Facility
NPDES = National Pollutant Discharge Elimination System
RMWMF = Radioactive & Mixed Waste Management Facility
SIC = Standard Industrial Classification
SNL/NM = Sandia National Laboratories, New Mexico
SWMU = Solid Waste Management Unit
TA = Technical Area
TCR = Test Capabilities Revitalization
TTF = Thermal Treatment Facility

An alternative to quarterly benchmark monitoring is allowed under the MSGP due to irregular storm water runoff associated with the semi-arid climate in New Mexico and is shown below:

- Period 1: June,
- Period 2: July,
- Period 3: August and,
- Period 4: September.

Table 6-4 shows the parameters to be sampled for each industry sector except Sector AC, which does not have monitoring under the 2008 MSGP.

After collection of four samples, if the average of the four monitoring values for any parameter does not exceed the benchmark then the sampling requirements for that parameter have been fulfilled for the permit term. If the average of the four values exceeds the benchmark then selection, installation, and implementation of the control measures must be reviewed to determine if modification(s) are necessary.

If it is determined that the average concentration exceeds benchmark value(s) is due solely to the presence of that pollutant in the natural background, corrective action or additional monitoring is not required provided that:

- The average concentration of the benchmark monitoring results is less than or equal to the concentration of the pollutant in the natural background,
- The supporting rational and any data, literature studies that describe the levels of natural background pollutants in the storm water discharge is documented and maintained with the SWP3, and
- EPA is notified on the final quarterly benchmark monitoring report that the benchmark exceedances are attributable solely to natural background pollutant levels.

After a rainfall of sufficient intensity and duration (as defined in the regulation), storm water runoff flowing through each monitoring station is collected as a grab sample by the automatic sampler. The discharge is collected within the first 30 minutes of the runoff event to allow for the sampling of any residues picked up in the soil upstream of the station. All samples are sent to off-site laboratories and analyzed according to protocols established by the EPA.

6.3.4 MSGP 2012 Activities

2012 Sampling Results

Quarterly visual sampling and analytical sampling was conducted in 2012. All monitoring data collected must be submitted to EPA no later than 30 days after receiving the complete laboratory results for all monitored outfalls for the reporting period (Section 6.3.3). The monitoring data as submitted to the EPA along with the environmental surveillance sampling results can be found in Appendix D of this report.

Laboratory results received in September 2012 from rainfall runoff collected at Storm Water Monitoring Point (SWMP)-11 exceeded benchmark values for total cadmium, total silver, and ammonia therefore controls were reevaluated and will be modified to minimize on-site erosion and subsequent sediment

TABLE 6.4. MSGP Storm Water Monitoring Requirements During Calendar Year 2012

Pollutant	MSGP Sector/Section	Benchmark Value (mg/L)
Total Recoverable Arsenic	K	0.15
Total Recoverable Cadmium	K	0.0029
Total Cyanide	K	0.022
Total Recoverable Lead	N, K, AA	0.122
Total Recoverable Mercury	K	0.0014
Total Recoverable Magnesium	K	0.064
Total Recoverable Selenium	K	0.005
Total Recoverable Silver	K	0.0065
Total Recoverable Aluminum	AA, N	0.75
Total Recoverable Copper	N	0.0189
Total Recoverable Iron	AA, N	1.0
Total Recoverable Zinc	AA, N	0.16
Chemical Oxygen Demand	K, N	120
Ammonia	K	2.14
Nitrate plus Nitrite Nitrogen	AA, J	0.68
Total Suspended Solids	L, N, J	100

NOTES: mg/L = milligram per liter
MSGP = Multi-Sector General Permit

transport in the drainage area to SWMP-11. These controls will be evaluated by continuing sampling of the storm water runoff at SWMP-11 and comparing these results to the benchmark values.

Total suspended solids (TSS) exceeded the benchmark value at SWMP-05. A review of the selection, design, installation, and implementation of control measures and improvements in stormwater controls in the flow basin to outfall SWMP-05 were also made in 2012. Sampling for TSS at SWMP-05 will continue and results compared to the benchmark values to monitor the improvements and to determine if additional improvements are needed.

Visual observations of storm water were performed when there was adequate runoff to collect a sample. The majority of the visual observations of storm water quality were done in the summer months and these assessments did not produce any indications of storm water pollution.

In March 2012 Sandia revised the MSGP SWP3 to include Sector J of the 2008 MSGP, Sand and Gravel Operations, to cover the TA-III Borrow Area which is used to stockpile soil and gravel for construction operations.

6.4 Oil Storage & Spill Control

The oil storage capacity at SNL/NM is 1.8 million gal in 46 aboveground storage tanks (ASTs) and three underground storage tanks (USTs). This does not include oil-containing equipment and transformers. Additional oil storage capacity in 55-gal drums occurs throughout the site on an as needed basis. All oil storage sites with regulated containers must be equipped with secondary spill containment. Secondary containment structures include concrete-lined basins, retaining walls, containment reservoirs, earthen berms, sloped pads, trenches, and containment pallets.

A Spill Prevention Control and Countermeasures (SPCC) Plan is required under the CWA. SNL/NM's SPCC Plan was revised in 2011 to incorporate changes to 40 Code of Federal Regulations (CFR) 112 and 20.5 NMAC. The focus of these 40 CFR 112 regulations is to protect specifically defined waterways, or "navigable waters of the United States" from potential oil contamination. "Navigable waters" is a broad term that includes rivers, lakes, oceans, and water channels (tributaries), such as streambeds and arroyos that connect to a river. This applies to the Tijeras Arroyo, which discharges to the Rio Grande. 20.5 NMAC regulations are to reduce, mitigate and eliminate the threats to the environment posed by petroleum products released from storage tanks.

SNL/NM's SPCC Plan describes oil storage facilities and the mitigation controls in place to prevent inadvertent discharges of oil. Facilities at SNL/NM subject to the regulations include:

- Oil storage tanks (USTs and ASTs),
- Bulk storage areas (multiple containers), and
- Temporary or portable tanks.

Table 8-1 lists the permit numbers for those tanks that are registered with NMED. SNL/NM's State of New Mexico Owner ID Number is 14109.

UST

Three USTs are currently operating at SNL/NM. Two 20,000-gal fiberglass USTs at SNL/NM and one 10,000-gal UST are registered with NMED.

AST

Forty-six ASTs are currently operating at SNL/NM. In 2002, the State of New Mexico passed oil storage regulations that required the registration of all oil storage tanks with a storage capacity greater than 1,320 gal, but less than 55,000 gal. Four ASTs at SNL/NM are registered with NMED.

Chapter 7

Quality Assurance

7.1 Corporate Level Quality Assurance

The Integrated Laboratory Management System (ILMS) is the framework by which Sandia Corporation (Sandia) manages all work done at the Laboratories. It reflects the major functions performed by the Laboratories as well as the management structure and the management information used to actually plan, execute, and monitor our work (Figure 7-1). ILMS is the means by which Sandia ensures long-term customer confidence by improving management performance and effectiveness, achieving efficiencies to enhance mission work, and satisfying National Nuclear Security Administration and the U.S. Department of Energy's (DOE) contractor assurance requirements.

Sandia deploys responsibility and accountability for implementing and putting into action the Quality Assurance (QA) Program elements specified in International Organization for Standardization (ISO) 9001-2000 (ISO 2008), the Contractor Requirements Document of DOE Order 414.1D, *Quality Assurance* (DOE 2011a), and regulation 10 Code of Federal Regulations 830, Subpart A, *Quality Assurance*, via policy statements, processes, and procedures; and executing the actions specified in those processes and procedures.

Sandia management is responsible for ensuring the quality of its products and for assessing its operations, programs, projects, and business systems; identifying deficiencies and effecting continuous improvements.

FIGURE 7-1. Sandia's Integrated Laboratories Management System (ILMS)
(The Corporate Work Process is illustrated in the five points

7.1.1 Environment, Safety & Health Policy Statement Requirement

Sandia is committed to protecting the environment and to preserving the health and safety of workers and the community. Sandia considers the protection and preservation of the environment and the safety and health of its employees, contractors, visitors, and the public to be critical to its success.

It is the policy of Sandia to protect Members of the Workforce and the public, prevent incidents, integrate environmental stewardship and sustainability throughout the life cycle of its activities, and to conserve natural resources and protect the environment.

DOE's Integrated Safety Management System (ISMS) is a key element of Sandia's ILMS. ISMS provides the framework for managing Environment, Safety & Health (ES&H) activities and functions while integrating them into all Sandia operations.

7.1.2 Integrated Safety Management System

Sandia's corporate ES&H program mandates compliance with all applicable laws, regulations, and DOE directives that are included in the Prime Contract between DOE and Sandia. As appropriate, internal corporate policy and permit requirements are included. Sandia is committed to performing work safely and ensuring protection of the Members of the Workforce, the public, and the environment.

***ES&H performance at Sandia
is based upon the
Five Safety Management Core Functions
and the
Seven Guiding Principles of ISMS.***

Sandia is committed to environmental protection for current and future generations. This commitment includes identifying and mitigating potential risks to the environment, and incorporating environmental management as an integrated element of all work. This evaluation is a key component of the Environmental Management System (Section 3.1).

Five Core Safety Management Functions of ISMS

There are five core safety management functions which provide the necessary work control structures, planning and execution at the activity level to ensure the safety of the Members of the Workforce, the public, and the environment:

1. ***Define the Scope of Work*** – Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.

2. ***Analyze the Hazards*** – Hazards and environmental impacts associated with the work are identified, analyzed, categorized, and communicated.

3. ***Develop and Implement Hazard Controls*** – Applicable standards and requirements are identified and agreed upon. Controls to prevent/mitigate hazards and environmental impacts are identified, the safety envelope is established, and controls are implemented.

4. ***Perform Work Within Controls*** – Readiness is confirmed and work is performed safely, and in an environmentally responsible manner.

5. ***Provide Feedback and Continuous Improvement***–Information and feedback on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, and line and independent oversight is conducted.

Figure 7-2 illustrates the five core safety management functions of ISMS.

Seven Guiding Principles of ISMS

Sandia shall, in the performance of work, ensure implementation of the following Seven Guiding Principles of ISMS:

1. ***Line Management is Responsible for Safety*** – Line management is responsible for the protection of employees, the public, and the environment. Line management includes those contractor and subcontractor employees managing or supervising employees performing work.

2. ***Clear Roles and Responsibilities are Defined*** – Clear and unambiguous lines of authority and responsibility for ensuring ES&H are established, documented, communicated, and maintained at all organizational levels.

3. ***Worker Competence Is Commensurate with Responsibilities*** – Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.

4. ***Priorities are Balanced*** – Resources are effectively allocated to address ES&H, programmatic, and operational considerations. Protecting employees, the public, and the environment is a priority whenever activities are planned and performed.

5. ***Safety Standards and Requirements are Identified*** – Before work is performed, the associated hazards are evaluated and an agreed-upon set of ES&H standards and requirements are established which, if properly implemented, provide adequate assurance that employees, the public, and the environment are protected from adverse consequences.

FIGURE 7-2. ISMS Star

6. ***Hazard Controls are Tailored to Work Being Performed*** – Administrative and engineering controls to prevent and mitigate hazards are tailored to the work being performed and associated hazards. Emphasis should be on designing the work and/or controls to reduce or eliminate the hazards and prevent accidents and unplanned releases and exposures.

7. ***Operations Authorization Exists*** – The conditions and requirements to be satisfied for operations to be initiated and conducted are established and agreed-upon by DOE and the contractor.

7.2 Environmental Program Quality Assurance

Environmental samples are collected by personnel in various programs and analyzed for radiological and non-radiological contaminants. Some sampling is specifically mandated by regulations to meet compliance, while other sampling activities are carried out in accordance with DOE Orders.

Environmental Sampling

Environmental sampling is conducted in accordance with program-specific sampling and analysis plans (SAP) or work plans, which contain applicable QA elements. These documents meet appropriate federal, state, and local regulatory guidelines for conducting sampling and analysis activities.

Program-Specific SAPs

Each program involved in environmental monitoring and sampling develops and follows a relevant SAP. Project SAPs include critical elements, such as procedures for sample collection, sample preservation and handling, sample control, references to analytical methods and analyte lists, laboratory quality control (QC) and procedures, required limits of detection, known potential matrix interferences, field QC, health and safety, schedules and frequency of sampling, data review, data acceptability, and reporting.

Sample Management Office (SMO)

Environmental samples are packaged, shipped, and tracked to off-site (contracted) laboratories by the SMO. The SMO is responsible for QA and QC once the samples are relinquished to the SMO by field team members.

Some samples are processed and analyzed for radiological constituents by the SNL/NM Radiation Protection Sample Diagnostics (RPSD) laboratory in accordance with RPSD procedures.

The SMO's roles and responsibilities include providing guidance and sample management support for field activities. However, each distinct program is responsible for its overall adherence and compliance regarding any sampling and analysis activity performed.

Selection of a Contract Laboratory

All off-site contract laboratories are selected based on performance objectives, licenses and accreditations, and appraisals (pre-award assessments) as described in the *Quality Assurance Project Plan (QAPP) for the SMO* (SNL 2010a). All laboratories must employ U.S. Environmental Protection Agency (EPA) test procedures wherever possible; when these are not available, other suitable and validated test procedures are applied. Laboratory instruments must be calibrated in accordance with established procedures, methods, and the SMO Statement of Work (SOW). All calibrations and detection limits must be verified before sample analysis and data reporting. Once a laboratory has passed initial appraisal and has been awarded a contract, the SMO is responsible for continuously monitoring laboratory performance to ensure that the laboratories are audited annually and meet their contractual requirements.

Contract laboratories are required to participate in applicable DOE and EPA programs for blind audit check sampling to monitor the overall accuracy of analyses routinely performed on SNL/NM samples.

Project QC Samples

Project-specified QC samples are submitted to contract laboratories in order to meet project data quality objectives and SAP requirements. Various field QC samples are collected to assess the quality and final usability of the data. Errors, some of which are unavoidable, that can be introduced into the sampling process include potential sample contamination in the field or during the transportation of samples. Additionally, sample results can be affected by the variability present at each sample location.

Laboratory Sample QC

With each SNL/NM sample batch, laboratory QC samples are concurrently prepared at defined frequencies and analyzed in accordance with established methods. Analytical accuracy, precision, contamination, and matrix effects associated with each analytical measurement are determined.

QC sample results are compared either to statistically established control criteria or prescribed acceptance control limits. Analytical results generated concurrently with QC sample results within established limits are considered acceptable. If QC analytical results exceed control limits, the results are qualified and corrective action is initiated if warranted. Reanalysis is then performed for samples in the analytical batch as specified in the SOW and laboratory procedures. QC sample summaries are included in analytical reports prepared by contract laboratories for SNL/NM.

Gamma Dosimetry QC

Thermoluminescent dosimeters used to measure gamma radiation are owned, issued, and processed by the Radiation Protection Dosimetry Program (RPDP) at Sandia National Laboratories, New Mexico (SNL/NM). The technical basis for the environmental dosimeter monitoring program is provided in Description and Procedures of the Environmental Radiation Dosimetry Program (SAND87-1916, 1987). Dosimeters are issued and processed quarterly following established protocols and quality assurance/quality control requirements specified in the RPDP operating procedures and the RPDP Quality Plan (SNL 2010c). Automated dosimeter processing equipment is used to process environmental dosimeters. Data reduction and dose calculations are performed by the RPDP external dosimetry technical staff.

7.3 2012 Sample Management Office Activities

In 2012, the SMO processed a total of 5,623 samples in support of Sandia projects, including:

- Environmental Monitoring (air and water),
- Terrestrial Surveillance,
- Long-Term Stewardship,
- Waste characterization,
- Decontamination and Demolition,
- Environmental Restoration, and
- Disassembly Sanitization Operation.

Of these, 4,498 were for environmental monitoring and surveillance projects. A total of 1,125 samples were submitted as field and analytical QC samples to assist with data validation and decision making.

SMO contract laboratories perform work in compliance with the Sandia SOW for analytical laboratories (Puissant 2011).

Inter-Laboratory Comparisons

SMO contract laboratories are required to participate in the DOE Mixed Analyte Performance Evaluation Program (MAPEP). They also participate in commercial vendor programs designed to meet the requirements given in the proficiency testing section (Chapter II) of the National Environmental Laboratory Accreditation Conference (NELAC) Standard. SMO contract laboratories have a history of achieving a 90 percent or greater success rate during these comparisons. Acceptable results are based either on established control limits (as stated in the applicable methods) or statistically applied acceptance windows as determined by the performance evaluation provider. Windows are typically two or three standard deviations around the true value.

Laboratory QA

In 2012, the SMO continued independent, on-site assessments (audits) and validation at the NELAC approved laboratories used by Sandia. Specific checks for documentation completeness, proper equipment calibration, proper laboratory practices, and batch QC data are made. These assessments focus on data defensibility and regulatory compliance.

During 2012, Sandia employed the following contract laboratories to perform analysis of SNL/NM samples:

- *General Engineering Laboratories (GEL)* in Charleston, South Carolina,
- *Test America Inc.* in St. Louis, Missouri; Costa Mesa, California; Austin, Texas,
- *Southwest Research Institute (SWRI)* in San Antonio, Texas,
- *Babcock & Wilcox Technical Services Group, Inc. (BWX) Technologies (formerly BWXT Services*) in Lynchburg, Virginia,
- *Hall Environmental Analysis Laboratory* in Albuquerque, New Mexico,
- *State of New Mexico Department of Health* in Albuquerque, New Mexico, and
- *Cape Fear Analytical* in Wilmington, North Carolina.

QA Audits

The DOE Consolidated Audit Program (DOECAP) conducted audits in 2012 at the primary SMO contract laboratories using DOECAP Quality Systems Analytical Services requirements. The audit reports, responses from the labs, and closure letters are all posted and tracked through the DOECAP website. The SMO works closely with the contract laboratories to expeditiously resolve audit findings. Decisions regarding sample distribution to contract laboratories are based on audit information, including outstanding corrective actions.

An Interim Priority I finding was issued in April 2012 for consecutive failures on the MAPEP Proficiency Testing samples for gross alpha determination on air filters. The laboratory corrective actions to date were reviewed and found to be satisfactory. All corrective actions were expeditiously resolved.

Data Validation and Records Management

Sample collection, Analysis Request and Chain-of-Custody (ARCOC) documentation and measurement data were reviewed and validated for each sample collected. Analytical data reported by the laboratories were reviewed to assess laboratory and field precision, accuracy, completeness, representativeness, and comparability with respect to method compliance and the DQOs of the particular program.

The following sources reviewed and validated data at a minimum of three levels:

1. The analytical laboratory, where data was validated according to the laboratory's QA plan, Standard Operating Procedures, and client-specific requirements,
2. A qualified member of Sandia's SMO staff, who reviews the analytical reports and corresponding sample collection and ARCOC documentation for completeness and laboratory contract compliance, and
3. A Sandia project leader, who is responsible for program objectives, regulatory compliance, and project-specific data quality requirements. The project leader makes the final decision regarding the usability and reporting of the data.

Additionally, all groundwater monitoring data, site wide confirmatory data, and a specified percentage of other program data are validated to detailed method-specified requirements.

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Chapter 8

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10 CFR 830 *Nuclear Safety Management*

10 CFR 851 *Worker Safety and Health Program*

40 CFR 50 *National Primary and Secondary Ambient Air Quality Standards*

40 CFR 60 *Standards of Performance for New Stationary Sources*

40 CFR 61 & 63 *National Emission Standards for Hazardous Air Pollutants* (NESHAP) Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities"

40 CFR 82 *Protection of Stratospheric Ozone*

40 CFR 112 *Oil Pollution Prevention*

40 CFR 122 *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System (NPDES)*

40 CFR 265 *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*

40 CFR 268 *Land Disposal Restrictions*

40 CFR 280 *Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*

40 CFR 302 *Designation, Reportable Quantities, and Notification (CERCLA Implementing Regulation)*

40 CFR 355 *Emergency Planning and Notification*

40 CFR 370 *Hazardous Chemical Reporting: Community Right-To-Know*

40 CFR 372 *Toxic Chemical Release Reporting: Community Right-to-Know (EPCRA Implementing Regulation)*

FEDERAL ACTS AND STATUTES

- American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S.C. §1996)
- Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. §470aa)
- Atomic Energy Act (AEA) of 1954 (42 U.S.C. §2011 et seq.) (Amended by the Price-Anderson Act)
- Clean Air Act (CAA) of 1990 (42 U.S.C. §7401)
- Clean Water Act (CWA) of 1977 (the Federal Water Pollution Control Act) (33 U.S.C. §1251)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
- (42 U.S.C. §9601) Amended by the Superfund Amendments and Reauthorization Act (SARA)
- Emergency Planning and Community Right to Know Act (EPCRA) of 1986 (42 U.S.C. §11001
- et seq.) (Also known as SARA Title III.)
- Endangered Species Act (ESA) (16 U.S.C. §1531 et seq.)
- Federal Facility Compliance Act (FFCA) of 1992 (42 U.S.C. §6961)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. §136)
- Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. §703 et seq.)
- National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §4321)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. §470 et seq.)
- Pollution Prevention Act of 1990 (42 U.S.C. §13101 et seq.)
- Price-Anderson Amendments Act (PAAA) (42 U.S.C. §2282 et seq.) (see Atomic Energy Act)
- Resource Conservation and Recovery Act (RCRA) of 1976 (42 U.S.C. §6901 et seq.)
- Safe Drinking Water Act (SDWA) (42 U.S.C §300f)
- Superfund Amendments and Reauthorization Act (SARA) of 1986 (see CERCLA)
- Toxic Substances Control Act (TSCA) of 1976 (15 U.S.C. §2601 et seq.)

Note: U.S.C. = United States Code

APPLICABLE LOCAL AND STATE LAWS AND REGULATIONS FOR ENVIRONMENTAL PROGRAMS

Water Quality

20.6.2 NMAC, *Ground and Surface Water Protection*
20.6.4 NMAC, *Standards for Interstate and Intrastate Surface Waters*
20.7.10 NMAC, *Drinking Water*
Albuquerque/Bernalillo County Water Utility Authority, *Sewer Use and Wastewater Control Ordinance*

Air Quality

20.11.2 NMAC, *Fees*
20.11.8 NMAC, *New Mexico Ambient Air Quality Standards*
20.11.20 NMAC, *Fugitive Dust Control*
20.11.21 NMAC, *Open Burning*
20.11.100 NMAC, *Motor Vehicle Inspection*

Miscellaneous

NMSA 76-4-1 et seq. *New Mexico Pesticide Control Act*
21.17.50 NMAC, *Pesticides*

Oil Storage and Spill Containment

Oil Storage Programs
20.5 NMAC, *Petroleum Storage Tanks*

Waste Management

Hazardous Waste Management Program
New Mexico Hazardous Waste Act (NMSA 1978, §74-4-1 et seq.)
20.4.1 NMAC, *Hazardous Waste Management*

Solid Waste Program
New Mexico Solid Waste Act (NMSA 1978, §74-9-1 et seq.)
20.9 NMAC, *Solid Waste Management*

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TABLE 8-1. Summary of Environmental Permits and Registrations in Effect During Calendar Year 2012

Permit Type and/or Facility Name	Location	Permit Number	Issue Date	Expiration Date	Regulatory Agency
SEWER WASTEWATER					
General	WW001 Station Manhole, south of TA-IV at Tijeras Arroyo	2069 A	7/17/2008	2/28/2013	ABCWUA
General	WW006 Station Manhole, at Pennsylvania Avenue	2069 F	6/17/2010	3/31/2014	ABCWUA
Microelectronics Development Laboratory (MDL)	WW007 Station Manhole, TA-I	2069 G	5/5/2010	2/28/2015	ABCWUA
General	WW008 Station Manhole, south of TA-II at Tijeras Arroyo	2069 I	6/15/2010	8/31/2014	ABCWUA
General	WW011 Station Manhole, north of TA-III (includes TAs-III and V, and Coyote Test Field sewer lines)	2069 K	5/25/2010	10/31/2014	ABCWUA
Center for Integrated Nanotechnologies (CINT)	CINT	2238A	5/25/2011	4/30/2016	ABCWUA
SURFACE DISCHARGE					
Pulsed Power Development Facilities (Discharge Plan)	TA-IV, Lagoons I and II	DP-530	9/21/2007	9/21/2012 Renewal application submitted and deemed complete. Current permit remains in effect until permit is renewed by NMED.	NMED
UNDERGROUND STORAGE TANKS (UST)					
UST (10,000 gallons)	TA-I	2742	6/15/2012	6/1/2013	NMED
UST (20,000 gallons)	TA-I	1368	6/1/2011	6/01/2012	NMED
UST (20,000 gallons)	TA-I	1369	6/1/2011	6/01/2012	NMED
ABOVE GROUND STORAGE TANKS (AST)					
AST / 2,000	TA-I	2743	6/1/2011	6/01/2012	NMED
AST / 4,500	TA-IV	2746	12/11/2012	6/01/2013	NMED
AST / 5,000	TA-III	2744	6/1/2011	6/01/2012	NMED
AST / 5,500	CTF	2745	6/1/2011	6/01/2012	NMED

See notes at end of table.

TABLE 8-1. Summary of Environmental Permits and Registrations in Effect During Calendar Year 2012 (Continued)

Permit Type and/or Facility Name	Location	Permit Number	Issue Date	Expiration Date	Regulatory Agency
STORM WATER					
NPDES INDUSTRIAL PERMITS					
National Pollution Discharge Elimination System (NPDES) "Multi-sector General" Permit	Storm water discharges from Industrial Activities at SNL/NM on KAFB	SNL/NM – NMR05GQ63 DOE/SFO – NMR05GP29	10/2009 11/2009	9/2013 9/2013	EPA
National Pollution Discharge Elimination System (NPDES) "Multi-sector General" Permit	Storm water discharges from Industrial Activities at the FAA/AANC/NDI Validation Center	SNL/NM – NMR05GL17 DOE/SFO – NMR05GH54	6/2009 6/2009	6/2014 6/2014	EPA
NPDES CONSTRUCTION PERM					
Mixed Waste Landfill Cover	TA-III	SNL/NM - NMR15EZ15 DOE/SFO - NMR15EZ62	05/18/2006	Active until terminated	EPA
Technical Area III Concrete Recycle/Borrow	TA-III	SNL/NM - NMR15F015 DOE/SFO - NMR15F012	5/31/2006	Active until terminated	EPA
Liquid Natural Gas	TA-III	SNL/NM - NMR10G703	10/31/2008	Active until terminated	EPA
Thunder Range	Range 2, 5, 6 Site 91 Breaching Site Site 9965	SNL/NM - NMR15G365 DOE/SFO - NMR15G366	6/03/2008	Active until terminated	EPA
TA II Escarpment	TA-II	SNL/NM -NMR10G475	08/12/2008	Active until terminated	EPA
9940 Complex	Coyote	SNL/NM - NMR10GO81 DOE/SFO - NMR15G366	9/1/2009	Active until terminated	EPA
National Solar Thermal Test	Coyote	SNL/NM - NMR10H626	12/7/2010	Active until terminated	EPA
Test Capabilities Revitalization (TCR) Phase II	TA-III	SNL/NM - NMR10GV578	4/1/2010	Active until terminated	EPA
12th Street Roadway	TA-I	SNL/NM - NMR10H419 DOE/SFO - NMR10H422	9/14/2010	Active until terminated	EPA
P Avenue Improvements	TA-II	SNL/NM – NMR12A152 DOE/SFO – NMR12A827	5/30/2012	Active until terminated	EPA

See notes at end of table.

TABLE 8-1. Summary of Environmental Permits and Registrations in Effect During Calendar Year 2012 (Continued)

Permit Type and/or Facility Name	Location	Permit Number	Issue Date	Expiration Date	Regulatory Agency
ECOLOGICAL					
NM Department of Game and Fish Authorization for Taking Protected Wildlife for Scientific/Educational Purposes	Site-Wide Ecological Monitoring	2931	3/18/2012	12/31/2013	NM Department of Game and Fish
NM Department of Game and Fish Nuisance Permit	Site-Wide Ecological Monitoring Activity	N/A	4/2/2012	3/31/2013	NM Department of Game and Fish
Federal Fish and Wildlife Permit – Special Purpose, Relocate	Site-Wide Ecological Monitoring Activity	MB02872A-0	2/11/2010	12/31/2012	U.S. Fish and Wildlife Service
Federal Fish and Wildlife Permit – Special Purpose, Salvage	Site-Wide Ecological Monitoring Activity	MB02907A-0	2/12/2010	3/31/2013	U.S. Fish and Wildlife Service
RCRA					
Hazardous Waste Facility Permit Modules I - III	Hazardous Waste Management Facility (HWMF)	NM5890110518-1	8/6/1992	08/06/2002, remains in effect until permit is renewed	NMED
Module IV. Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA	Solid Waste Management Units and Areas of Concern	NM5890110518	8/26/1993	9/20/2002, remains in effect until permit is renewed	NMED
Hazardous Waste Treatment Facility Permit Modules I - III	Thermal Treatment Facility (TTF)	NM5890110518-2	12/4/1994	12/4/2004, remains in effect until permit is renewed	NMED
Class III Permit Modification for the Management of Hazardous Remediation Waste in the Corrective Action Management Unit (CAMU), Tech Area III	CAMU	NM5890110518	9/25/1997	9/20/2002, remains in effect until permit is renewed	NMED
RCRA Part A Permit Application for Hazardous Waste Management Units	Radioactive and Mixed Waste Management Facility (RMWMF); 5 Manzano Bunkers; Auxiliary Hot Cell Facility	NM5890110518	First submitted 8/1990; Rev. 5/4/2012	No expiration date	NMED
RCRA Post-Closure Care Permit for the Chemical Waste Landfill	CWL	NM5890110518	6/2/2011	6/2/2021	NMED

See notes at end of table.

TABLE 8-1. Summary of Environmental Permits and Registrations in Effect During Calendar Year 2012 (Continued)

Permit Type and/or Facility Name	Location	Permit Number	Issue Date	Expiration Date	Regulatory Agency
OPEN BURN PERMITS*					
Propellant Applications – Terminal Ballistics Facility	Bldg. 6750	12-0005	1/1.12	12/31/12	COA
Explosive Applications – Terminal Ballistics Facility	Bldg. 6750	12-0004	1/1/12	12/31/12	COA
Thermite Applications – Terminal Ballistics Facility	Bldg. 6750	12-0006	1/1/12	12/31/12	COA
Thunder Range-Explosives Testing	Thunder Range	12-0007	1/1/12	12/31/12	COA
Thermal Treatment Facility	TTF*	12-0008	1/1/12	12/31/12	COA
Wood Crib	Burn Site	12-0011	1/1/12	12/31/12	COA
Explosives Testing	Bldg. 9920 Test Site	12-0001	1/1/12	12/31/12	COA
Carbon Fiber Epoxy Burn Tests	Burn Site / TTC	12-0003	1/1/12	12/31/12	COA
DETS-Explosives Testing	DETS	12-0009	1/1/12	12/31/12	COA
Igloo	Burn Site	12-0010	1/1/12	12/31/12	COA
IED & HME Explosives Testing & Training	Bldg. 9930 Test Site	12-0002	1/1/12	12/31/12	COA
Thunder Range-Explosives Testing	Thunder Range	12-0019	6/1/12	12/31/12	COA
AIR (Permits & Registrations)					
Document Disintegrator	TA-III	Permit #144-M1	9/28/2006	N/A	COA
Neutron Generator Facility (NGF)	TA-I	Permit #374-M2	12/6/2010	N/A	COA
Standby diesel generators at Bldg 862	TA-I	Permit #402	5/07/1996	N/A	COA
RMWMF	TA-III	Permit #415-M2-RV1	9/23/2011	N/A	COA
Title V Operating Permit	Site-Wide	515 (pending)	Submitted 3/1/1996	N/A	COA
Emergency Generator at Building 702	TA-I	Permit #924-RV1	2/8/2012	N/A	COA
Processing and Environmental Technology Laboratory (PETL) Emergency Generator	TA-I	Permit #925-M2	4/11/2012	N/A	COA
Advanced Manufacturing Prototype Facility (AMPF)	TA-I	Registration #1406-M1-RV1	10/4/2011	N/A	COA
Thermal Test Complex	TA-III	Permit #1712-RV1	10/6/2011	N/A	COA
Center for Integrated Nanotechnology (CINT)	Sandia Science & Technology Park	Permit #1725-M1	10/11/2004	N/A	COA
MESA Facility Boilers and Generators	TA-I	Permit #1820-M1	3/8/2011	N/A	COA
Building 899A Boiler Registration	TA-I	Registration #1823-RV1	9/30/2011	N/A	COA
South East Tech Area I Generator	TA-I	Permit #1828	9/28/2006	N/A	COA

See notes at end of table.

TABLE 8-1. Summary of Environmental Permits and Registrations in Effect During Calendar Year 2012 (Continued)

Permit Type and/or Facility Name	Location	Permit Number	Issue Date	Expiration Date	Regulatory Agency
AIR (Permits & Registrations) (concluded)					
Building 878 Boiler Registration	TA-I	Registration #1888-RV1	5/11/2011	N/A	COA
Strategic Defense Facility, Building 963	TA-IV	Permit#1900	1/11/2008	N/A	COA
Sitewide HAP Chemical Registration	Site Wide Permit	Registration #1901-RV1	10/24/2011	N/A	COA
Building 865 Boiler Registration	TA-I	Registration #1902-RV1	11/30/2010	N/A	COA
Building 962 Generator	TA-IV	Permit #1930	4/8/2009	N/A	COA
Building 833 Generator	TA-I	Permit #2097	9/1/2010	N/A	COA
Building 802 Boiler Registration	TA-I	Registration #2109	10/28/2010	N/A	COA
Building 804 Boiler Registration	TA-I	Registration #2110	11/8/2010	N/A	COA
Building 810 Boiler Registration	TA-I	Registration #2111	11/8/2010	N/A	COA
Building 823 Boiler Registration	TA-I	Registration #2112	11/8/2010	N/A	COA
Building 840 Boiler Registration	TA-I	Registration #2113	11/8/2010	N/A	COA
Building 857 Boiler Registration	TA-I	Registration #2114	11/8/2010	N/A	COA
Building 860 Boiler Registration	TA-I	Registration #2115	11/8/2010	N/A	COA
Building 880 Boiler Registration	TA-I	Registration #2116	11/30/2010	N/A	COA
Building 890 Boiler Registration	TA-I	Registration #2117	11/29/2010	N/A	COA
Building 887 Boiler Registration	TA-I	Registration #2118	11/29/2010	N/A	COA
Building 891 Boiler Registration	TA-I	Registration #2119	11/29/2010	N/A	COA
Building 892 Boiler Registration	TA-I	Registration #2120	11/30/2010	N/A	COA
Building 894 Boiler Registration	TA-I	Registration #2121	11/30/2010	N/A	COA
Building 897 Boiler Registration	TA-I	Registration #2122	11/30/2010	N/A	COA
Building 960 Boiler Registration	TA-IV	Registration #2169	9/27/2011	N/A	COA
Building 895 Boiler Registration	TA-I	Registration #2170	9/27/2011	N/A	COA
Building 800 Boiler Registration	TA-I	Registration #2171	9/27/2011	N/A	COA
Building 981 Boiler Registration	TA-IV	Registration #2175	9/22/2011	N/A	COA

See notes at end of table.

TABLE 8-1. Summary of Environmental Permits and Registrations in Effect During Calendar Year 2012 (Concluded)

Permit Type and/or Facility Name	Location	Permit Number	Issue Date	Expiration Date	Regulatory Agency
FUGITIVE DUST CONTROL AND DEMOLITION PERMIT FILE (Permits & Registrations)**					
Borrow Site – Cell 1 Programmatic	TA-III	P08-0005	12/10/2007	12/10/2012	COA
Moving Vehicle Test Track Programmatic	TA-III	P08-0004	12/11/2007	12/11/2012	COA
Thunder Range – Range 6 programmatic	Remote	P08-0061	8/7/2008	8/7/2013	COA
Thunder Range – Range 1 Programmatic	Remote	P08-0062	8/7/2008	8/7/2013	COA
Thunder Range – Range 5 Programmatic	Remote	P08-0063	8/7/2008	8/7/2013	COA
Thunder Range – Range 7 Programmatic	Remote	P09-0021	12/22/2009	12/22/2014	COA
Thunder Range – Range 4 Programmatic	Remote	P09-0022	12/22/2009	12/22/2014	COA
DETS Complex/Building 9940 (Modification/Expansion)	Remote	P09-0014	7/8/2009	7/8/2014	COA
DETS – East	Remote	P09-0016	7/9/2009	7/9/2014	COA
DETS – West	Remote	P09-0015	7/9/2009	7/9/2014	COA
Mixed Waste Landfill Cover	TA-III	10-683-4161	4/28/2009	4/28/2014	COA
Borrow Pit Cell 3	TA-III	10-683-4160	4/28/2009	4/28/2014	COA
ARRA Projects at the National Solar Thermal Test Facility	Remote	10-564-4405	10/20/2010	10/20/2015	COA
Building 894 Cooling Tower	TA-I	10-819-4546	11/1/2011	11/1/2012	COA

NOTES: *Open Burn Permits are issued by the City of Albuquerque for no more than a year at any one time.
**Permits are obtained by general contractors directly from City of Albuquerque
AANC = Airworthiness Assurance NDI Validation Center
ABCWUA = Albuquerque Bernalillo County Water Utility Authority
ARRA = American Recovery and Reinvestment Act
COA = City of Albuquerque
CTF = Coyote Test Field
CWL = Chemical Waste Landfill
DETS = Dynamic Explosives Test Site
DOE = Department of Energy
EPA = U.S. Environmental Protection Agency
FAA = Federal Aviation Administration
HAP = hazardous air pollutant
HME = Homemade Explosive
IED = Improvised Explosive Device
KAFB = Kirtland Air Force Base
MESA = Microsystems and Engineering Sciences Applications
N/A = not applicable
NDI = Non-destructive Inspection
NM = New Mexico
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act
SFO = Sandia Field Office
SNL/NM = Sandia National Laboratories, New Mexico
TA= technical area
TTC= Thermal Test Complex
TTF = Thermal Treatment Facility

TABLE 8-2. Federal and State Air Regulations Reviewed Annually for Applicability to SNL/NM

CAA Title	CAA Section	Federal Regulation	Local Regulation	Subject
I	176(c)	40 CFR 51 40 CFR 93	20.11.04 NMAC 20.11.03 NMAC	Conformity of Federal Actions (State and Federal Plans) General and Transportation
	110	40 CFR 53 40 CFR 58	N/A	Ambient Air Quality Surveillance
	109	40 CFR 50	20.11.08 NMAC	National Primary and Secondary Ambient Air Quality Standards (NAAQS)
	114	40 CFR 98		Mandatory Greenhouse Gas Reporting
	165-166	40 CFR 52	20.11.02 NMAC	Permit Fees
		40 CFR 52	20.11.05 NMAC	Visible Air Contaminants
		40 CFR 52	20.11.06 NMAC	Emergency Action Plan
		40 CFR 52	20.11.07 NMAC	Variance Procedure
		40 CFR 52	20.11.20 NMAC	Fugitive Dust Control
		40 CFR 52	20.11.21 NMAC	Open Burning
		40 CFR 51-52	20.11.40 NMAC	Source Registration
		40 CFR 51-52	20.11.41 NMAC	Authority-to-Construct
		40 CFR 51.100	20.11.43 NMAC	Stack Height Requirements
		40 CFR 51	20.11.44 NMAC	Emissions Trading
	171-193	40 CFR 51-52	20.11.60 NMAC	Permitting in Nonattainment Areas
	160-169	40 CFR 52	20.11.61 NMAC	Prevention of Significant Deterioration
	165-166	40 CFR 60 40 CFR 63	20.11.65 NMAC	Volatile Organic Compounds (VOC)
		40 CFR 60	20.11.66 NMAC	Process Equipment
		40 CFR 60	20.11.22 NMAC	Wood Burning
		40 CFR 60	20.11.63 NMAC	New Source Performance Standards (NSPS)
		40 CFR 60	20.11.67 NMAC	Equipment, Emissions and Limitations (stationary combustion sources)
		40 CFR 60	20.11.68 NMAC	Incinerators
		40 CFR 60	20.11.69 NMAC	Pathological Waste Destructors
		40 CFR 61 40 CFR 63	20.11.64 NMAC	National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart H – Radionuclides Subpart M – Asbestos Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines Subpart CCCCCC – Gasoline Dispensing Facilities
II	202-211	40 CFR 80	20.11.101 NMAC	Motor Vehicle Inspection: Centralized
			20.11.102 NMAC	Oxygenated Fuels
			20.11.103 NMAC	Motor Vehicle Visible Emissions
	213-219	40 CFR 85-86	20.11.100 NMAC	Motor Vehicle Inspection: Decentralized
III	319	40 CFR 53	20.2.3 NMAC 20.2.5 NMAC	Air Quality Monitoring
IV	401-416	40 CFR 72-78	20.11.62 NMAC	Acid Rain
V	501-507	40 CFR 70-71	20.11.42 NMAC	Operating Permits
VI	601-618	40 CFR 82	20.11.23 NMAC	Stratospheric Ozone Protection
VII	113-114	40 CFR 64	20.11.90 NMAC	Administration, Enforcement, Inspection

NOTES: CAA = Clean Air Act
CFR = Code of Federal Regulations
N/A = not applicable
NMAC = New Mexico Administrative Code
SNL/NM = Sandia National Laboratories, New Mexico

TABLE 8-3. Summary of Compliance History with Regard to Mixed Waste (MW) at SNL/NM

Date	Milestone	Comment
Nov 1984	1984 Hazardous and Solid Waste) Amendments (HSWA) to Resource Conservation and Recovery Act (RCRA)	Extended storage became an issue after HSWA established land disposal restrictions (LDR) and a prohibition on storage of wastes for more than one year.
Aug 1990	RCRA Part A Interim Status Permit Application	Submitted RCRA Part A Interim Status permit application to New Mexico Environment Department (NMED) for MW storage. Later revisions to the interim status application added proposed MW treatment processes.
Oct 1992	Federal Facilities Compliance Act (FFCA) Passed	The FFCA allows storage of MW that does not meet the applicable treatment standard beyond the one-year RCRA time limit. Requires U.S. Department of Energy (DOE) to submit a site treatment plan for MW.
Dec 1992	Notice of Noncompliance (NON) Issued	U.S. Environmental Protection Agency (EPA) issued a NON for storage of RCRA-regulated MW over the one-year maximum period.
Oct 1993	Conceptual Site Treatment Plan (STP) Submitted	DOE submitted *Conceptual Site Treatment Plan for Mixed Waste* to NMED; other drafts followed.
Mar 1995	Final STP Submitted	DOE submitted final *Site Treatment Plan for Mixed Waste* to NMED.
Jun 1995	Historical Disposal Requests Validation (HDRV) Project Initiated	The HDRV Project was initiated to characterize and sort legacy MW. Project continued into 1997, when it was replaced with new sorting procedures.
Oct 1995	Federal Facility Compliance Order (FFCO) Signed	The FFCO, an agreement between NMED, DOE, and Sandia Corporation (Sandia), details specific actions required with regard to MW management, including the requirement to develop a STP, to be updated annually.
Mar 1996	STP Milestones Met	Updated STP to reflect Fiscal Year (FY) 1995 activities.
Sep 1996	First MW Shipment FFCO Amendment No. 1	First MW shipment made, MW sent to Perma-Fix/Diversified Scientific Services, Inc. for treatment. FFCO amended.
Dec 1996	Revisions to Proposed Treatment Methods	DOE and Sandia re-submitted Part A and B permit application, to reflect revisions to proposed on-site treatment methods.
May 1997	FFCO Amendment No. 2	FFCO amended.
Dec 1997	On-site MW Treatment	Onsite treatment of MW began at the SNL/NM Radioactive and Mixed Waste Management Facility in compliance with regulatory requirements.
1997	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 1996 activities and changes to proposed treatment technologies. NMED approved Revision 1 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.

See notes at end of table.

TABLE 8-3. Summary of Compliance History with Regard to Mixed Waste (MW) at SNL/NM (Continued)

Date	Milestone	Comment
1998	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 1997 activities and changes to proposed treatment technologies. NMED approved Revision 2 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
1999	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 1998 activities and changes to proposed treatment technologies. NMED approved Revision 3 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
2000	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 1999 activities and changes to proposed treatment technologies. NMED approved Revision 4 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
2001	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2000 activities and changes to proposed treatment technologies. NMED approved Revision 5 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
May 2001	FFCO Amendment No. 3	FFCO amended.
2002	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2001 activities and changes to proposed treatment technologies. NMED approved Revision 6 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
Feb 2002	Revisions to Permit Application	DOE and Sandia submitted updated Part A and B permit application to NMED to reflect revisions to on-site waste management operations. Permit application for mixed waste management units is combined with permit renewal request for hazardous waste management units at SNL/NM.
2003	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2002 activities and changes to proposed treatment technologies. NMED approved Revision 7 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.

See notes at end of table.

TABLE 8-3. Summary of Compliance History with Regard to Mixed Waste (MW) at SNL/NM (Continued)

Date	Milestone	Comment
Apr 2003; Nov 2003	Revisions to Permit Application	DOE and Sandia revised Part A and Part B permit application in response to NMED comments.
2004	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2003 activities and changes to proposed treatment technologies. NMED approved Revision 8 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
Apr 2004	FFCO Amendment No. 4	FFCO amended.
Nov 2004	Revisions to Permit Application	DOE and Sandia revised Part A and Part B permit application in response to NMED comments.
2005	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2004 activities and changes to proposed treatment technologies. NMED approved Revision 9 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
Jun 2005; Oct 2005	Revisions to Permit Application	DOE and Sandia revised Part A and Part B permit application to reflect changes in waste management operations.
May 2006	Revisions to Permit Application	DOE and Sandia revised Part B permit application to reflect changes in waste management operations.
2006	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2005 activities and changes to proposed treatment technologies. NMED approved Revision 10 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
Mar 2007	Revisions to Permit Application	DOE and Sandia revised Part A and Part B permit application to reflect changes in waste management operations.
Aug 2007	Draft Permit Issued	NMED issued draft permit to DOE and Sandia, and made it available for public comment.
2007	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2006 activities and changes to proposed treatment technologies. NMED approved Revision 11 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
Jan 2008	Comments on Draft Permit Submitted	DOE and Sandia submitted extensive comments on draft permit to NMED and requested resolution of comments.

See notes at end of table.

TABLE 8-3. Summary of Compliance History with Regard to Mixed Waste (MW) at SNL/NM (Concluded)

Date	Milestone	Comment
2008	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2007 activities and changes to proposed treatment technologies. NMED approved Revision 12 to STP, revising waste volumes and treatment/disposal technologies, and establishing new deadlines.
2009	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2008 activities and changes to proposed treatment technologies.
2010	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Updated STP to reflect FY 2009 activities and changes to proposed treatment technologies.
Dec 2010	FFCO Amendment No. 5	FFCO amended to extend certain compliance deadlines.
2011	STP Milestones Met	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements, meeting all treatment and disposal milestones. Completed disposition of all mixed wastes subject to the STP, in compliance with applicable deadlines. Updated STP to reflect FY 2010 activities.
May 2012	Revisions to Permit Application	DOE and Sandia revised Part A and Part B permit application to reflect changes in waste management operations.
Sep 2012	Draft Permit Issued	NMED issued draft permit to DOE and Sandia, and made it available for public comment.
Nov 2012	Comments on Draft Permit Submitted	DOE and Sandia submitted comments on draft permit to NMED and requested resolution of comments.
2012	No STP milestones	Treated wastes on site and shipped mixed wastes to off-site treatment and disposal facilities in compliance with regulatory requirements.

NOTES: SNL/NM = Sandia National Laboratories/New Mexico

TABLE 8-4. Quantity of Mixed Waste Subject to the Federal Facility Compliance Order (End of FY 2012)

Waste Category	Volume (m^3)	Description	Status and Plans
TG 1	0	Inorganic Debris with Explosive Component	No waste currently in inventory
TG 2	0	Inorganic Debris with a Water Reactive Component	No waste currently in inventory
TG 3	0	Reactive Metals	No waste currently in inventory
TG 4	0	Elemental Lead	No waste currently in inventory.
TG 5	0	Aqueous Liquids (Corrosive)	No waste currently in inventory.
TG 6	0	Elemental Mercury	No waste currently in inventory.
TG 7	0	Organic Liquids I	No waste currently in inventory.
TG 8	0	Organic Debris with Organic Contaminants	
TG 9	0	Inorganic Debris with TCLP Metals	No waste currently in inventory
TG 10	0	Heterogeneous Debris	No waste currently in inventory
TG 11	0	Organic Liquids II	No waste currently in inventory.
TG 12	0	Organic Debris with TCLP Metals	No waste currently in inventory.
TG 13	0	Oxidizers	No waste currently in inventory.
TG 14	0	Aqueous Liquids with Organic Contaminants	No waste currently in inventory.
TG 15	0	Soils <50 percent Debris & Particulates with TCLP Metals	No waste currently in inventory.
TG 16	0	Cyanide Waste	No waste currently in inventory.
TG 17	0	Liquid/Solid with Organic and/or Metal Contaminants	No waste currently in inventory.
TG 18	0	Particulates with Organic Contaminants	No waste currently in inventory.
TG 19	0	Liquids with Metals	No waste currently in inventory.
TG 20	0	Propellant with TCLP Metals	No waste currently in inventory.
TG 21	0	Sealed Sources with TCLP Metals	No waste currently in inventory.
TG 22	0	Reserved	Not Applicable
TG 23	0	Thermal Batteries	No waste currently in inventory.
TG 24	0	Spark Gap Tubes with TCLP Metals	No waste currently in inventory.
TG 25	0	Classified Items with TCLP Metals	No waste currently in inventory
TG 26	0	Debris Items with Reactive Compounds & TCLP Metals	No waste currently in inventory.
TG 27	0	High Mercury Solids & Liquids	No waste currently in inventory.
TRU/MW	0.000011	TRU/MW	

NOTES: FY = Fiscal Year
m^3 = cubic meters
TCLP = toxicity characteristic leaching procedure
TRU/MW = transuranic/mixed waste

RADIOLOGICAL DOSE

Radiation Protection

The U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) has established radiation protection standards for the public to control and limit radiation doses resulting from activities at DOE facilities. Sandia National Laboratories, New Mexico (SNL/NM) is the DOE facility specific to this discussion. Public areas are defined as any location that is accessible to non-DOE facility employees (e.g., excluding Sandia Corporation [Sandia] employees and contractors), such as Kirtland Air Force Base (KAFB) personnel and the surrounding community. Radiation protection standards are provided in DOE Order 458.1, Radiation Protection of the Public and the Environment (DOE 2013). Environmental monitoring requirements for DOE operations are given in DOE Order 436.1, Departmental Sustainability (DOE 2011). In addition to these quantitative standards, the overriding DOE policy is that exposures to the public shall be maintained "as low as reasonably achievable" (ALARA).

DOE Order 458.1, *Radiation Protection of the Public and the Environment*, limits the total annual effective dose equivalent (EDE) of all potential exposure pathways to the public (including air, water, and the food chain) to 100 millirem per year (mrem/yr). The Order lists the Derived Concentration Standards (DCS) for radionuclides in water and air that could be continuously consumed or inhaled (365 days/year). This is a conservative approach that assumes that a member of the public resides at the location continuously. Table 8-5 lists the DCSs pertinent to activities at SNL/NM and to this report.

- *Water Pathways* - DOE drinking water guidelines are based on an annual EDE not to exceed 4 mrem/yr. Guideline values for drinking water are calculated at four percent of ingested water using DCS values for specific nuclides.

- *Air Pathways* - DOE facilities are required to comply with U.S. Environmental Protection Agency (EPA) standards for radiation protection as given in National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart H, specific to radionuclides emitted from DOE facilities (with the exception of radon). This rule mandates that air emissions from DOE facilities shall not cause any individual of the public to receive an EDE of greater than 10 mrem/yr from air pathways. Table 8-6 summarizes the public radiation protection standards that are applicable to DOE facilities.

WATER QUALITY MONITORING PARAMETERS

Resource Conservation and Recovery Act (RCRA)

Table 8-7 lists the 40 Code of Federal Regulations (CFR) 265, Subpart F, parameters required for groundwater monitoring analysis, implemented under RCRA. Table 8-8 gives the EPA interim primary drinking water standards (40 CFR 265, Appendix III) for the groundwater monitoring parameters. Table 8-9 gives EPA secondary drinking water standards. Table 8-10 gives New Mexico Water Quality Control Commission (NMWQCC) Standards for groundwater.

TABLE 8-5. Derived Concentration Standards (DCS) for Selected Radionuclides*

	Ingested Water		Inhaled Air	
Radionuclide	**DCG (µCi/ml)**	**f_1 Value****	**DCG (µCi/ml)**	**Solubility Class**
Tritium (water)	1.9×10^{-3}	1	2.1×10^{-7}	S
Cesium-137	3×10^{-6}	1	8.8×10^{-10}	F
Uranium, total (U_{tot})	7.5×10^{-7}	4×10^{-2}	1.3×10^{-12}	M

NOTES: *From Table 5, Derived Concentration Technical Standards, DOE-STD-1196-2011 (DOE 2011).
**f_1 value is the gastrointestinal absorption factor. Listed DCS's for U_{tot} are based on U_{238} listing in DOE-STD-1196-2011 (DOE 2011).
µCi/ml = microcuries per milliliter
DCG = Derived Concentration Guides
DOE = U.S. Department of Energy
S = Slow
M = Medium
F = Fast

TABLE 8-6. General Dose Limits to the Public from DOE Facilities

Pathway	Equivalent (EDE) Limit	Comments
All Pathways*	100 mrem/yr 1 mSv/yr	The EDE for any member of the public from all routine DOE operations (normal planned activities including remedial actions). Radiation dose occurring from natural background and medical exposures are not included in the total allowed dose from all pathways.
Air Pathway**	10 mrem/yr 0.10 mSv/yr	Sandia calculates doses resulting from all potential air depositions and direct inhalation (e.g., emissions, ground shine, food crops).

NOTES: *DOE Order 458.1, *Radiation Protection of the Public and the Environment* (DOE 2013)
**40 CFR 61, Subpart H for radionuclides, National Emission Standards for Hazardous Air Pollutants (NESHAP)
CFR = Code of Federal Regulations
DOE = U.S. Department of Energy
EDE = effective dose equivalent
mrem/yr = millirem per year
mSv/yr = millisievert per year

TABLE 8-7. Groundwater Monitoring Parameters Required by 40 CFR 265, Subpart F*

Parameters used as Indicators of Groundwater Contamination	Parameters Establishing Groundwater Quality	Parameters Characterizing the Suitability of the Groundwater as a Drinking Water Supply, as specified in Appendix III†
pH	Chloride	Arsenic
Specific Conductance	Iron	Barium
Total Organic Carbon (TOC))	Manganese	Cadmium
Total Organic Halogen (TOX)	Phenols	Chromium
	Sodium	Fluoride
	Sulfate	Lead
		Mercury
		Nitrate (as N)
		Selenium
		Silver
		Endrin
		Lindane
		Methoxychlor
		Toxaphene
		2,4-D
		2,4,5-TP Silvex
		Radium
		Gross Alpha
		Gross Beta
		Turbidity
		Coliform Bacteria

NOTES: *Resource Conservation and Recovery Act (RCRA)
†40 CFR 265, Appendix III.
CFR = Code of Federal Regulations
pH = potential hydrogen (acidity)

TABLE 8-8. EPA Primary Drinking Water Supply Standards

Inorganic Chemicals	MCL	Units
Antimony	0.006	mg/L
Arsenic	0.010	mg/L
Asbestos	7	MFL
Barium	2.0	mg/L
Beryllium	0.004	mg/L
Cadmium	0.005	mg/L
Chromium	0.1	mg/L
Copper	1.3*	mg/L
Cyanide (free cyanide)	0.2	mg/L
Fluoride	4.0	mg/L
Lead	0.015	mg/L
Mercury (inorganic)	0.002	mg/L
Nitrate (measured as N)	10	mg/L
Nitrite (measured as N)	1	mg/L
Selenium	0.05	mg/L
Thallium	0.002	mg/L
Organic Chemicals	**MCL**	**Units**
Alachlor	0.002	mg/L
Atrazine	0.003	mg/L
Benzene	0.005	mg/L
Benzo(a)pyrene	0.0002	mg/L
Carbofuran	0.04	mg/L
Carbon tetrachloride	0.005	mg/L
Chlordane	0.002	mg/L
Chlorobenzene	0.1	mg/L
2,4-D	0.07	mg/L
Dalapon	0.2	mg/L
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	mg/L
o-Dichlorobenzene	0.6	mg/L
p-Dichlorobenzene	0.075	mg/L
1,2-Dichloroethane	0.005	mg/L
1,1-Dichloroethylene	0.007	mg/L
cis-1,2-Dichloroethylene	0.07	mg/L
trans-1,2-Dichloroethylene	0.1	mg/L
Dichloromethane	0.005	mg/L
1,2-Dichloropropane	0.005	mg/L
Di(2-ethylhexyl)adipate	0.4	mg/L
Di(2ethylhexyl)phthalate	0.006	mg/L
Dinoseb	0.007	mg/L
Dioxin (2,3,7,8-TCDD)	0.00000003	mg/L

See notes at end of table.

TABLE 8-8. EPA Primary Drinking Water Supply Standards (Concluded)

Organic Chemicals (continued)	MCL	Units
Diquat	0.02	mg/L
Endothall	0.1	mg/L
Endrin	0.002	mg/L
Ethylbenzene	0.7	mg/L
Ethylene Dibromide	0.00005	mg/L
Glyphosate	0.7	mg/L
Heptachlor	0.0004	mg/L
Heptachlor epoxide	0.0002	mg/L
Hexachlorobenzene	0.001	mg/L
Hexachlorocyclopentadiene	0.05	mg/L
Lindane	0.0002	mg/L
Methoxychlor	0.04	mg/L
Oxamyl (Vydate)	0.2	mg/L
Polychlorinated biphenyls (PCBs)	0.0005	mg/L
Pentachlorophenol	0.001	mg/L
Picloram	0.5	mg/L
Simazine	0.004	mg/L
Styrene	0.1	mg/L
Tetrachloroethylene	0.005	mg/L
Toluene	1	mg/L
Total Trihalomethanes (TTHMs)	0.08	mg/L
Toxaphene	0.003	mg/L
2,4,5-TP (Silvex)	0.05	mg/L
1,2,4-Trichlorobenzene	0.07	mg/L
1,1,1-Trichloroethane	0.2	mg/L
1,1,2-Trichloroethane	0.005	mg/L
Trichloroethylene	0.005	mg/L
Vinyl chloride	0.002	mg/L
Xylenes (total)	10	mg/L
Radionuclides	**MCL**	**Units**
Beta particles and photon emitters	4	mrem/yr
Gross alpha particle activity	15	pCi/L
Radium 226 and Radium 228 (combined)	5	pCi/L
Uranium	0.030	mg/L

NOTES: *action level concentrations which trigger systems into taking treatment steps if 10 percent of tap water samples exceed the value
EPA = U.S. Environmental Protection Agency
MCL = Maximum Contaminant Level
mg/L = milligram per liter
mrem/yr = millirem per year
pCi/L = picocurie per liter

TABLE 8-9. EPA Secondary Drinking Water Supply Standards

Contaminant	Level
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 color units
Copper	1.0 mg/L
Corrosivity	Non-corrosive
Fluoride	2.0 mg/L
Foaming agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.1 mg/L
Sulfate	250 mg/L
Total dissolved solids (TDS)	500 mg/L
Zinc	5 mg/L

NOTES: EPA = U.S. Environmental Protection Agency
mg/L = milligram per liter
pH = potential hydrogen (acidity)

TABLE 8-10. New Mexico Water Quality Control Commission (NMWQCC) Standards for Groundwater of 10,000 mg/L total dissolved solid (TDS) Concentration or Less

Contaminant	NMWQCC Standard	Units
A. Human Health Standards		
Arsenic	0.1	mg/L
Barium	1.0	mg/L
Cadmium	0.01	mg/L
Chromium	0.05	mg/L
Cyanide	0.2	mg/L
Fluoride	1.6	mg/L
Lead	0.05	mg/L
Total Mercury	0.002	mg/L
Nitrate (as N)	10.0	mg/L
Selenium	0.05	mg/L
Silver	0.05	mg/L
Uranium	0.03	mg/L
Radioactivity: Radium-226 & Radium 228	30.0	pCi/L
Benzene	0.01	mg/L
Polychlorinated biphenyls (PCB's)	0.001	mg/L
Toluene	0.75	mg/L
Carbon Tetrachloride	0.01	mg/L
1,2-dichloroethane (EDC)	0.01	mg/L
1,1-dichloroethylene (1,1-DCE)	0.005	mg/L
1,1,2,2-tetrachloroethylene (PCE)	0.02	mg/L
1,1,2- trichloroethylene (TCE)	0.1	mg/L
Ethylbenzene	0.75	mg/L
Total Xylenes	0.62	mg/L
Methylene Chloride	0.1	mg/L
Chloroform	0.1	mg/L
1,1 –dichloroethane	0.025	mg/L
Ethylene dibromide (EDB)	0.0001	mg/L
1,1,1 –trichloroethane	0.06	mg/L
1,1,2 –trichloroethane	0.01	mg/L
1,2,2,2 –tetrachloroethane	0.01	mg/L
Vinyl Chloride	0.001	mg/L
PAHs: total naphtalene + monomethylnapthalenes	0.03	mg/L
Benzo(a)pyrene	0.0007	mg/L

See notes at end of table.

TABLE 8-10. New Mexico Water Quality Control Commission (NMWQCC) Standards for Groundwater of 10,000 mg/L total dissolved solid (TDS) Concentration or Less (Concluded)

Contaminant	NMWQCC Standard	Units
B. Other Standards for Domestic Water Supply		
Chloride	250.0	mg/L
Copper	1.0	mg/L
Iron	1.0	mg/L
Manganese	0.2	mg/L
Phenols	0.005	mg/L
Sulfate	600.0	mg/L
Total Dissolved Solids	1,000.0	mg/L
Zinc	10.0	mg/L
pH	Between 6 and 9	
C. Standards for Irrigation Use – Groundwater shall meet the standards of Subsections A, B, and C unless otherwise provided		
Aluminum	5.0	mg/L
Boron	0.75	mg/L
Cobalt	0.05	mg/L
Molybdenum	1.0	mg/L
Nickel	0.2	mg/L

NOTES: mg/L = milligram per liter
pCi/L = picocurie per liter
pH = potential hydrogen (acidity)

Chapter 9

Glossary

A

Abatement – Reducing the degree or intensity of, or eliminating, pollution.

Alluvial – Relating to and/or sand deposited by flowing water.

Ambient air – Any unconfined portion of the atmosphere: open air, surrounding air.

Analyte – A substance or chemical constituent that is undergoing analysis.

Antimony – A metallic element having four allotropic forms, the most common of which is a hard, extremely brittle, lustrous, silver-white, crystalline material. It is used in a wide variety of alloys, especially with lead in battery plates, and in the manufacture of flame-proofing compounds, paint, semiconductor devices, and ceramic products.

Appraisal – A documented activity performed according to written procedures and specified criteria to evaluate the compliance and conformance of an organization with programs, standards, and other requirements contained in orders, laws, and regulations, or other requirements invoked by SNL.

Aquifer – An underground geological formation, or group of formations, containing water. A source of groundwater for wells and springs.

Arroyo – A deep gully cut by an intermittent stream; a dry gulch.

Asbestos – A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. Uses for asbestos-containing material include, but are not limited to, electrical and heat insulation, paint filler, reinforcing agents in rubber and plastics (e.g., tile mastic), and cement reinforcement.

Audit – 1. An examination of records or financial accounts to check their accuracy. 2. An adjustment or correction of accounts. 3. An examined and verified account.

B

Background radiation – Relatively constant low-level radiation from environmental sources such as building materials, cosmic rays, and ingested radionuclides in the body.

Basin – 1. A low-lying area, wholly or largely surrounded by higher land, that varies from a small, nearly enclosed valley to an extensive, mountain-rimmed depression. 2. An entire area drained by a given stream and its tributaries. 3. An area in which the rock strata are inclined downward from all sides toward the center. 4. An area in which sediments accumulate.

Best Management Practice (BMP) – The preferred methods and practices for managing operations.

Biological niche – A role played by a species in the environment.

Biota – The animal and plant life of a given region.

C

Catchment basin – The geographical area draining into a river or reservoir.

Cesium-137 – A radioactive isotope of cesium used in radiation therapy and found in atmospheric fallout.

Coniferous forest – A type of forest characterized by cone-bearing, needle-leaved trees.

Containment – An enclosed space or facility to contain and prevent the escape of hazardous material.

Containment cell – An engineered structure designed to contain and prevent the migration of hazardous waste.

Contamination – Introduction into water, air, and soil of microorganisms, chemicals, toxic substances, wastes, or wastewater in a concentration that makes the medium unfit for its next intended use. Also applies to surfaces of objects, buildings, and various household and agricultural use products.

Corporate Work Process (CWP) – A five-element process for managing and performing work that applies to all activities, facilities, organizations, and employees.

Corrective action – 1. EPA can require treatment, storage and disposal (TSDF) facilities handling hazardous waste to undertake corrective actions to clean up spills resulting from failure to follow hazardous waste management procedures or other mistakes. The process includes cleanup procedures designed to guide TSDFs toward in spills. 2. An action identified to correct a finding that, when completed, fixes the problem or prevents recurrence.

D

Data Quality Objectives (DQO) – Following a strategic, systematic process for planning scientific data collection efforts.

Decontamination – Removal of harmful substances such as noxious chemicals, harmful bacteria or other organisms, or radioactive material from exposed individuals, rooms and furnishings in buildings, or the exterior environment.

Demolition – The act or process of wrecking or destroying, especially destruction by explosives.

Discharge – Any liquid or solid that flows or is placed on or onto any land or into any water. This includes precipitation discharges to the storm drains, accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of any material or substance on or into any land or water.

Discharge limits – The maximum concentration of a specified pollutant allowed to be discharged in a volume of water or wastewater.

Discharge point – The site or location of a release, flow or runoff of any waste governed by regulation.

Diurnal – 1. Relating to or occurring in a 24-hour period; daily. 2. Occurring or active during the daytime rather than at night: diurnal animals.

Dosimeter – A device used to measure the dose of ionizing radiation received by an individual.

E

Ecology – The relationship of living things to one another and their environment, or the study of such relationships.

Effective Dose Equivalent (EDE) – The weighted average of dose equivalents in certain organs or tissues of the body; this can be used to estimate the health-effects risk of the exposed individual.

Effluent – Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Electronic Product Environmental Assessment Tool (EPEAT) - Is a set of criteria in eight different electronic to determine the environmental attributes of a particular electronic office product. At this point, EPEAT is only targeting computer desktops/towers, notebook computers (laptops) and monitors.

Electroplating – To coat or cover with a thin layer of metal by electrodeposition.

Environment – The sum of all external conditions affecting the life, development and survival of an organism.

Environment, Safety and Health (ES&H) – A program designed to protect and preserve the environment and to ensure the safety and health of its employees, contractors, visitors, and the public.

Environmental Assessment (EA) – An environmental analysis prepared pursuant to the National Environmental Policy Act (NEPA) to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Impact Statement (EIS) – A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

Environmental Management – A program designed to maintain compliance with EPA, state, local and DOE requirements.

Environmental Management System (EMS) – A continuing cycle of planning, evaluating, implementing, and improving processes and actions undertaken to achieve environmental goals.

Environmental Monitoring – The collection and analysis of samples or direct measurements of environmental media such as air, water, and soil.

Environmental Restoration (ER) – A project chartered with the assessment and, if necessary, the remediation of inactive waste sites.

Environmental surveillance – A program including surveys of soil and vegetation, water sampling and analysis, in an attempt to identify and quantify long-term effects of pollutants resulting from SNL operations.

ER site – Any location listed on the environmental restoration ER site list that has been identified as an area that is (or may be) contaminated-either on or beneath the land surface-as a result of SNL operations. Contaminants may be chemicals, radioactive material, or both.

Exceedance – Violation of the pollutant levels permitted by environmental protection standards.

Explosive waste – Any explosive substance, article, or explosive-contaminated item that cannot be used for its intended purpose and does not have a legitimate investigative or research use.

F

Fault – A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are displaced relative to one another and parallel to the plane of fracture.

Fauna – 1. Animals, especially the animals of a particular region or period, considered as a group. 2. A catalog of the animals of a specific region or period.

Flora – 1. Plants. 2. The plant life characterizing a specific geographic region or environment.

G

Gamma Radiation – very high-energy/high-frequency electromagnetic radiation that is emitted by the nuclei of radioactive substances during decay, or by the interactions of high-energy electrons with matter. They are similar to, but have a shorter wavelength, than X-rays.

Geology – The scientific study of the origin, history, and structure of the earth.

Groundwater – The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

H

Hazardous substance – 1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or is otherwise released into the environment.

Hazardous waste site – Any facility or location at which hazardous waste operations take place.

Herbicides – A chemical pesticide designed to control or destroy plants, weeds, or grasses.

High-Level Radioactive Waste (HLW) – Waste generated in core fuel of a nuclear reactor, found at nuclear reactors or by nuclear fuel reprocessing; is a serious threat to anyone who comes near the waste without shielding.

I

Illicit discharges – The absolute prohibitions against the release of certain substances.

Implementation Plan (IP) – The plan developed by the Operational Readiness Review (ORR) or Readiness Assessment (RA) team that describes the specifics of approach, schedule, methodology, team members and their qualifications, and reporting requirements of the ORR or RA. The Implementation Plan (IP) is used by the team leader to execute the ORR or RA.

Industrial discharges – The absolute prohibitions against the release of certain substances.

Inertial-confinement fusion – A method of controlled fusion in which the rapid implosion of a fuel pellet, produced by laser, electron, or ion beams, raises the temperature and density of the pellet core to levels at which nuclear fusion can take place before the pellet flies apart.

Inhalation hazard – Risk from materials or chemicals that present a hazard if respired (inhaled) into the lungs.

Insecticides – A pesticide compound specifically used to kill or prevent the growth of insects.

Integrated Laboratories Management System (ILMS) – Framework for all management requirements for Sandia. It represents the complete set of policy, business rules, practices, and information that establishes Sandia's business expectations and intent.

Integrated Safety Management System (ISMS) Systematically integrates safety into management and work practices at all levels so that missions are accomplished while protecting the worker, the public, and the environment.

L

Lagoons – 1. A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater; also used for storage of wastewater. 2. Shallow body of water, often separated from the sea by coral reefs or sandbars.

Landfill – 1. Sanitary landfills are disposal sites for non-hazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day. 2. Secure chemical landfills are disposal sites for hazardous waste, selected and designed to minimize the chance of release of hazardous substances into the environment.

Leachate – Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.

Line management – The process of managing workers through individual Integrated Job Structure assignments (i.e., work titles) and contractor positions that support SNL's mission core processes and enabling processes.

Low-Level Waste (LLW) – Wastes less hazardous than most of those associated with a nuclear reactor; generated by hospitals, research laboratories, and certain industries. The Department of Energy, Nuclear Regulatory Commission, and EPA share responsibilities for managing them.

Low Temperature Thermal Desorption (LTTD) – A process of removing organic compounds from soil by heating it and causing the organics to volatilize and/or decompose. The volatilized compounds may be further degraded by after burning or catalysis.

M

Materials Sustainability and Pollution Prevention (MSP2) - The use and reuse of materials in the most productive and sustainable manner across their entire life cycle. Sustainable materials management purchases sustainable products, emphasizes using less, reduces waste and toxicity, recovers more of the materials that are used, slows climate change and assures sufficient resources to meet society's needs today and in the future.

Maximally Exposed Individual (MEI) – The location of a member of the public which receives or has the potential to receive the maximum radiological dose from air emissions of a National Emissions Standards for Hazardous Air Pollutants (NESHAP) radionuclide source. The dose estimates are based on realistic, yet conservative input parameters.

Migratory birds – All birds listed within the Migratory Bird Treaty Act, 50 CFR 10.13, or which are a mutation or hybrid of any such species, including any part, nest, or egg.

Mixed Analyte Performance Evaluation Program (MAPEP) – The MAPEP is used by the DOE as a quality assurance tool for environmental analytical services across the DOE Complex. It includes radiological, stable inorganic, and organic constituents (i.e., mixed analytes) in the same single-blind sample for analytical performance evaluation. The samples use various matrices including soils, water, vegetation, and air filters. MAPEP samples are not a mixed waste.

Mixed waste – Radioactive waste that contains both source material, special nuclear material, or by-product material subject to the Atomic Energy Act of 1954, as amended; and a hazardous component subject to the Resource Conservation and Recovery Act (RCRA), as amended.

N

National Emissions Standards for Hazardous Air Pollutants (NESHAP) – Emissions standards set by EPA for an air pollutant not covered by NAAQS that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. Primary standards are designed to protect human health, secondary standards to protect public welfare (e.g. building facades, visibility, crops, and domestic animals).

National Environmental Policy Act (NEPA) – The basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy.

National Pollutant Discharge Elimination System (NPDES) – A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

Natural resources – Resources (actual and potential) supplied by nature.

Nitrate – A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and domestic animals. A plant nutrient and inorganic fertilizer, nitrate is found in septic systems, animal feed lots, agricultural fertilizers, manure, industrial waste waters, sanitary landfills, and garbage dumps.

Nitrite – 1. An intermediate in the process of nitrification. 2. Nitrous oxide salts used in food preservation.

Nitrogen Dioxide – A poisonous brown gas, NO_2, often found in smog and automobile exhaust fumes and synthesized for use as a nitrating agent, a catalyst, and an oxidizing agent.

Non-radiological contaminants – A source of contamination that has no radiological components.

Nuclear energy – The energy released by a nuclear reaction.

Nuclear particle acceleration – Imparting large kinetic energy to electrically charged sub-atomic nuclear particles (e.g., protons, deuterons, electrons) by applying electrical potential differences for the purpose of physics experiments.

O

Outfalls – The place where effluent is discharged into receiving waters.

Ozone – A colorless gas (O3) soluble in alkalis and cold water; a strong oxidizing agent; can be produced by electric discharge in oxygen or by the action of ultraviolet radiation on oxygen in the stratosphere (where it acts as a screen for ultraviolet radiation).

P

Perched groundwater – Groundwater that is unconfined and separated from an underlying main body of groundwater by an unsaturated zone (also known as perched water).

Perennial spring – A spring that flows continuously, as opposed to an intermittent spring or periodic spring.

Physiography – The study of the natural features of the earth's surface, especially in its current aspects, including land formation, climate, currents, and distribution of flora and fauna (also called physical geography).

PM_{10} – Particulate matter (diameter equal to or less than 10 microns).

$PM_{2.5}$ – Respirable particulate matter (diameter equal to or less than 2.5 microns)

Point source – A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g. a pipe, ditch, ship, ore pit, factory smokestack.

Point source discharges – Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged.

Pollutant – Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Pollution Prevention (P2) – The use of materials, processes, and practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous substances, and waste into land, water, and air. For DOE, this includes recycling.

Polychlorinated biphenyl – "PCB" and "PCBs" are chemical terms limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances that contains such substance. Because of their persistence, toxicity, and ecological damage via water pollution, their manufacture was discontinued in the U.S. in 1976.

Potable Water – Water free from impurities present in quantities sufficient to cause disease or harmful physiological effects.

Pulsed power – Technology is used to generate and apply energetic beams and high-power energy pulses.

Q

Quality Assurance (QA) – A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

Quality Control (QC) – Used in determining analytical accuracy, precision, and contamination when samples are collected , and to assess the quality and usability of the data.

R

Radioactive waste – Any waste that emits energy as rays, waves, streams or energetic particles. Radioactive materials are often mixed with hazardous waste, from nuclear reactors, research institutions, or hospitals.

Radiological Contaminants – Radioactive material deposited in any place where it is not desired, particularly where its presence may be harmful.

Radionuclide – Radioactive particle, man-made (anthropogenic) or natural, with a distinct atomic weight number. Can have a long life as soil or water pollutant.

Radon – A colorless naturally occurring, radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks.

Reportable quantity (RQ) – Quantity of material or product compound or contaminant which when released to the environment is reportable to a regulatory agency.

Rodenticides – A chemical or agent used to destroy rats or other rodent pests, or to prevent them from damaging food, crops, etc.

S

Sample Management Office (SMO) – An SNL office that manages environmental analytical laboratory contracts and assists with the processing and tracking of samples undergoing chemical and radiochemical analyses performed at these laboratories.

Sampling and Analysis Plan (SAP) – A plan containing various criteria required for conducting sampling activities.

Sanitary discharges – The portion of liquid effluent exclusive of industrial wastewater and storm water. The liquid discharges from rest rooms and food preparation activities.

Secondary containment – Any structure or device that has been installed to prevent leaks, spills, or other discharges of stored chemicals, waste, oil, or fuel from storage, transfer, or end-use equipment from being released to the environment. Examples of secondary containment include pans, basins, sumps, dikes, berms, or curbs.

Semi-volatile organic compounds (SVOC) – Organic compounds that volatilize slowly at standard temperature (20 degrees C and 1 atm pressure).

Site-Wide Environmental Impact Statement (SWEIS) – A detailed public document, for which a federal agency is responsible, that provides analysis of the expected impacts on the human environment of a proposed action and alternatives to the proposed action.

Solid waste – Any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities.

Statement Of Work (SOW) – A comprehensive description of the goods, services, or combination of goods and services for which SNL contracts.

Storm water – Water runoff from rainfall or snowmelt, including that discharged to the sanitary sewer system.

Sulfur Dioxide (SO_2) – A colorless, extremely irritating gas or liquid, SO_2, used in many industrial processes, especially the manufacture of sulfuric acid.

Surface discharge – Spilling, leaking, pumping, pouring, emitting, emptying, or dumping into water or in a location and manner where there is a reasonable probability that the discharged substance will reach surface or subsurface water.

T

Thermoluminescent Dosimeter (TLD) – A device that monitors both the whole body and skin radiation dose to which a person has been exposed during the course of work. These same devices can also be used to measure environmental exposure rates.

Threatened and endangered species – A species present in such small numbers that it is at risk of extinction.

Time-weighted composites – A sample consisting of several portions of the user's discharge collected during a 24-hour period in which each portion of the sample is collected with a specific time frame that is irrespective of flow.

Topography – The physical features of a surface area including relative elevations and the position of natural and man-made (anthropogenic) features.

Total Non-Methane Hydrocarbon (TNMHC) – The sum of all hydrocarbon air pollutants except methane; significant precursors to ozone formation.

Toxic chemicals – Any chemical listed in EPA rules as "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986."

Transuranic waste (TRU) – Radioactive waste containing alpha-emitting radionuclides having an atomic number greater than 92, and a half-life greater than 20 years, in concentrations greater than 100 nCi/g.

Tritium – A radioactive hydrogen isotope with atomic mass 3 and half-life 12.5 years, prepared artificially for use as a tracer and as a constituent of hydrogen bombs.

U

Unconsolidated basin sediment – 1. A sediment that is loosely arranged or unstratified, or whose particles are not cemented together, occurring either at the surface or at depth. 2. Soil material that is in a loosely aggregated form.

Underground Storage Tank (UST) – A single tank or a combination of tanks, including underground pipes connected thereto, which are used to contain an accumulation of regulated substances, such as petroleum products, mineral oil, and chemicals, and the volume of which, including the volume of underground pipes connected thereto, is 10% or more beneath the surface of the ground.

Up-gradient – In the direction of higher water levels.

Upstream – In, at, or toward the source of a stream.

Uranium – A heavy silvery-white metallic element, radioactive and toxic, easily oxidized, and having 14 known isotopes of which U 238 is the most abundant in nature. The element occurs in several minerals, including uraninite and carnotite, from which it is extracted and processed for use in research, nuclear fuels, and nuclear weapons.

USFS (U.S. Forest Service) Withdrawn Area – A portion of Kirtland Air Force Base consisting of land within the Cibola National Forest, which has been withdrawn from public access for use by the US Air Force and the US Department of Energy.

V

Vadose zone – The zone between land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

Vanadium – A bright white, soft, ductile metallic element found in several minerals, notably vanadinite and carnotite, having good structural strength and used in rust-resistant high-speed tools, as a carbon stabilizer in some steels, as a titanium-steel bonding agent, and as a catalyst.

Volatile Organic Compound (VOC) – Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

W

Waste characterization – Identification of chemical and microbiological constituents of a waste material.

Waste management – The processes involved in dealing with the waste of humans and organisms, including minimization, handling, processing, storage, recycling, transport, and final disposal.

Wastewater – The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Water Pollution - The presence in water of enough harmful or objectionable material to damage the water's quality.

Water table – The level of groundwater.

Watershed – The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point.

Wetland – An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

Wind rose – A graphical presentation of wind speed and direction frequency distribution.

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Mark Kelly, P.E. (1**)
Industrial Waste Engineer
Albuquerque Bernalillo County Water Utility Authority
Environmental Compliance Division
Industrial Pretreatment
4201 Second Street, SW
Albuquerque, NM 87105

Brent A. Pulsipher (1**)
Pacific Northwest National Laboratory
902 Battelle Blvd.
P.O. Box 999 / MS K5-12
Richland, WA 99352

Theresa Davis (1**)
Argonne National Laboratory
9700 South Cass Avenue
Building 200, Room B-11
Argonne, Illinois 60439

William Moats (1***)
Hazardous Waste Bureau/
Permits Management Program
5500 San Antonio NE
Albuquerque, NM 87109

New Mexico Environment Department (1***)
Hazardous Waste Bureau
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Health Department
1 Civic Plaza NW
Albuquerque, NM 87102

Jim Piatt, Director (1**)
Isleta Environment Department
P.O. Box 1270
Isleta, NM 87022

Hon. Robert Benavides (1**)
Governor
Pueblo of Isleta
P.O. Box 1270
Isleta Pueblo, NM 87022

Linda Weiss (1*)
USGS-WRD-NM District
5338 Montgomery NE
Suite 400/300
Albuquerque, NM 87109-1311

Rick Shean (1*)
Water Quality Hydrologist
Albuquerque Bernalillo County Water Utility Authority
Water Resources Section
P.O. Box 568
Albuquerque, NM 87103

New Mexico Environment Department (1***)
Attn: Susan Lucas Kamar
DOE Oversight Bureau
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P.O. Box 5400
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Jessica Milne (1**)
Lockheed-Martin Corporation
Mail Drop: CCT 246
6801 Rockledge Drive
Bethesda, MD 20817

Eva Hickey (1**)
Battelle Pacific Northwest Laboratories
P.O. Box 999, MS K-3-66
Richland, WA 99352

UNM – Valencia Campus (1**)
280 La Entrada
Los Lunas, NM 87031

UNM – Los Alamos Branch Campus (1**)
4000 University Drive
Los Alamos, NM 87544

Anderson School of Management (1**)
1 University of New Mexico, MSC05 3090
Albuquerque, NM 87131-0001

Victoria R. Martinez (1*)
Environmental Restoration Program
377 SPTG/CEANR
2050 Wyoming Blvd. SE
Suite 124
Kirtland AFB, NM 87117

Peggy Johnson (1*)
New Mexico Bureau of Mines and Mineral Resources
801 Leroy Place
Socorro, NM 87801

William Walker (1*)
U.S. Department of the Interior
Bureau of Indian Affairs, Southwest Region
Albuquerque Area Office
1001 Indian School Road, NW
Albuquerque, NM 87104-2303

Steve Rohrer (1**)
Lovelace Respiratory Research Institute
2425 Ridgecrest Drive SE
Albuquerque, NM 87108-5127

Margaret Lindeman (2**)
Lockheed-Martin Corporation
6801 Rockledge Drive
Mail Drop 246
Bethesda, MD 20817

Roger Dirkes (1**)
Battelle Pacific Northwest Laboratories
P.O. Box 999
Richland, WA 99352

CNM – Montoya Campus (1**)
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Albuquerque, NM 87106-4096

CNM – South Valley Campus (1**)
5816 Isleta Boulevard SW
Albuquerque, NM 87105

Danny Zamora (1*)
CABQ Environmental Health Department
One Civic Plaza NW
Room 3023
Albuquerque, NM 87102

Penny H. Holeman (1*)
Director, ES&H
Lovelace Respiratory Research Institute
2425 Ridgecrest Dr. SE
Albuquerque, NM 87108

College of Santa Fe (1**)
1600 St. Michaels Drive
Santa Fe, NM 87505

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Other Individuals and Organizations (concluded):

Christopher Segura (1*)
Environmental Management Division
377 SPTG/CEVC
Suite 112
2050 Wyoming Blvd.
Kirtland AFB, NM 87117-5270

Robert Garcia (1*)
Bernalillo County Environmental Health Dept.
111 Union Square SE
Suite 300
Albuquerque, NM 8 7102

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APPENDIX A

2012 WASTEWATER MONITORING RESULTS

TABLE A-1. Permitted Sanitary Outfalls of Inorganic Analyses, February 2012 through April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
CINT	2238A	28-Feb-2012	091735-009	Cyanide, total		0.0015	U	mg/L	0.45
CINT	2238A	28-Feb-2012	091735-010	Cyanide, total		0.0015	U	mg/L	0.45
CINT	2238A	28-Feb-2012	091735-011	Cyanide, total		0.0015	U	mg/L	0.45
CINT	2238A	28-Feb-2012	091735-012	Cyanide, total		0.0015	U	mg/L	0.45
CINT	2238A	28-Feb-2012	091738-009	Cyanide, total		0.0015	U	mg/L	0.45
CINT	2238A	29-Feb-2012	091736-001	Aluminum		0.068	U	mg/L	900
CINT	2238A	29-Feb-2012	091740-001	Aluminum		0.068	U	mg/L	900
CINT	2238A	29-Feb-2012	091736-001	Arsenic	0.00582	0.005	J	mg/L	0.051
CINT	2238A	29-Feb-2012	091740-001	Arsenic		0.005	U	mg/L	0.051
CINT	2238A	29-Feb-2012	091736-001	Boron	0.0588	0.015		mg/L	
CINT	2238A	29-Feb-2012	091740-001	Boron	0.0634	0.015		mg/L	
CINT	2238A	29-Feb-2012	091736-001	Cadmium		0.001	U	mg/L	0.05
CINT	2238A	29-Feb-2012	091740-001	Cadmium		0.001	U	mg/L	0.05
CINT	2238A	29-Feb-2012	091736-001	Chromium	0.00412	0.001	J	mg/L	4.1
CINT	2238A	29-Feb-2012	091740-001	Chromium	0.00452	0.001	J	mg/L	4.1
CINT	2238A	29-Feb-2012	091736-001	Copper	0.00413	0.003	J	mg/L	5.3
CINT	2238A	29-Feb-2012	091740-001	Copper	0.00408	0.003	J	mg/L	5.3
CINT	2238A	29-Feb-2012	091736-002	Fluoride	0.978	0.033		mg/L	36
CINT	2238A	29-Feb-2012	091740-002	Fluoride	0.955	0.033		mg/L	36
CINT	2238A	29-Feb-2012	091736-001	Lead		0.0033	U	mg/L	1
CINT	2238A	29-Feb-2012	091740-001	Lead		0.0033	U	mg/L	1
CINT	2238A	29-Feb-2012	091740-021	Mercury		0.000066	U	mg/L	
CINT	2238A	29-Feb-2012	091736-001	Molybdenum	0.0489	0.002		mg/L	2
CINT	2238A	29-Feb-2012	091740-001	Molybdenum	0.0528	0.002		mg/L	2
CINT	2238A	29-Feb-2012	091736-001	Nickel		0.0015	U	mg/L	2
CINT	2238A	29-Feb-2012	091740-001	Nickel		0.0015	U	mg/L	2
CINT	2238A	29-Feb-2012	091736-001	Selenium		0.006	U	mg/L	0.46
CINT	2238A	29-Feb-2012	091740-001	Selenium		0.006	U	mg/L	0.46
CINT	2238A	29-Feb-2012	091736-001	Silver		0.001	U	mg/L	5
CINT	2238A	29-Feb-2012	091740-001	Silver		0.001	U	mg/L	5
CINT	2238A	29-Feb-2012	091736-001	Zinc	0.00377	0.0033	J	mg/L	2.2
CINT	2238A	29-Feb-2012	091740-001	Zinc	0.00366	0.0033	J	mg/L	2.2
CINT	2238A	1-Mar-2012	091737-001	Aluminum		0.068	U	mg/L	900
CINT	2238A	1-Mar-2012	091737-001	Arsenic		0.005	U	mg/L	0.051
CINT	2238A	1-Mar-2012	091737-001	Boron	0.052	0.015		mg/L	
CINT	2238A	1-Mar-2012	091737-001	Cadmium		0.001	U	mg/L	0.05
CINT	2238A	1-Mar-2012	091737-001	Chromium	0.004	0.001	J	mg/L	4.1

TABLE A-1. Permitted Sanitary Outfalls of Inorganic Analyses, February 2012 through April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
CINT	2238A	1-Mar-2012	091737-001	Copper	0.0105	0.003		mg/L	5.3
CINT	2238A	1-Mar-2012	091737-002	Fluoride	0.889	0.033		mg/L	36
CINT	2238A	1-Mar-2012	091737-001	Lead		0.0033	U	mg/L	1
CINT	2238A	1-Mar-2012	091737-001	Molybdenum	0.0438	0.002		mg/L	2
CINT	2238A	1-Mar-2012	091737-001	Nickel		0.0015	U	mg/L	2
CINT	2238A	1-Mar-2012	091737-001	Selenium	0.00715	0.006	J	mg/L	0.46
CINT	2238A	1-Mar-2012	091737-001	Silver		0.001	U	mg/L	5
CINT	2238A	1-Mar-2012	091737-001	Zinc	0.00581	0.0033	J	mg/L	2.2
CINT	2238A	24-Apr-2012	091749-007	Ammonia	0.13	0.017		mg/L	
CINT	2238A	25-Apr-2012	091755-007	Ammonia	0.0678	0.017		mg/L	
WW001	2069A	24-Apr-2012	091743-001	Aluminum	0.2	0.068	J	mg/L	900
WW001	2069A	24-Apr-2012	091743-007	Ammonia	13.2	0.425		mg/L	
WW001	2069A	24-Apr-2012	091743-001	Arsenic		0.005	U	mg/L	0.051
WW001	2069A	24-Apr-2012	091743-001	Boron	0.0755	0.015		mg/L	
WW001	2069A	24-Apr-2012	091743-001	Cadmium		0.001	U	mg/L	0.05
WW001	2069A	24-Apr-2012	091743-001	Chromium	0.00356	0.001	J	mg/L	4.1
WW001	2069A	24-Apr-2012	091743-001	Copper	0.0338	0.003		mg/L	5.3
WW001	2069A	24-Apr-2012	091743-002	Fluoride	2.24	0.033		mg/L	36
WW001	2069A	24-Apr-2012	091743-001	Lead	0.0123	0.0033		mg/L	1
WW001	2069A	24-Apr-2012	091743-001	Molybdenum	0.0914	0.002		mg/L	2
WW001	2069A	24-Apr-2012	091743-001	Nickel		0.0015	U	mg/L	2
WW001	2069A	24-Apr-2012	091743-001	Selenium		0.006	U	mg/L	0.46
WW001	2069A	24-Apr-2012	091743-001	Silver		0.001	U	mg/L	5
WW001	2069A	24-Apr-2012	091743-001	Zinc	0.0585	0.0033		mg/L	2.2
WW001	2069A	25-Apr-2012	091750-001	Aluminum	0.127	0.068	J	mg/L	900
WW001	2069A	25-Apr-2012	091750-007	Ammonia	10.8	0.17		mg/L	
WW001	2069A	25-Apr-2012	091750-001	Arsenic	0.00795	0.005	J	mg/L	0.051
WW001	2069A	25-Apr-2012	091750-001	Boron	0.16	0.015		mg/L	
WW001	2069A	25-Apr-2012	091750-001	Cadmium		0.001	U	mg/L	0.05
WW001	2069A	25-Apr-2012	091750-001	Chromium	0.00451	0.001	J	mg/L	4.1
WW001	2069A	25-Apr-2012	091750-001	Copper	0.0318	0.003		mg/L	5.3
WW001	2069A	25-Apr-2012	091750-002	Fluoride	3.03	0.033		mg/L	36
WW001	2069A	25-Apr-2012	091750-001	Lead	0.00937	0.0033	J	mg/L	1
WW001	2069A	25-Apr-2012	091750-001	Molybdenum	0.114	0.002		mg/L	2
WW001	2069A	25-Apr-2012	091750-001	Nickel		0.0015	U	mg/L	2
WW001	2069A	25-Apr-2012	091750-001	Selenium		0.006	U	mg/L	0.46
WW001	2069A	25-Apr-2012	091750-001	Silver		0.001	U	mg/L	5

TABLE A-1. Permitted Sanitary Outfalls of Inorganic Analyses, February 2012 through April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW001	2069A	25-Apr-2012	091750-001	Zinc	0.0728	0.0033		mg/L	2.2
WW006	2069F	23-Apr-2012	091746-009	Cyanide, total	0.00427	0.00167	J	mg/L	0.45
WW006	2069F	23-Apr-2012	091746-010	Cyanide, total	0.00339	0.00167	J	mg/L	0.45
WW006	2069F	23-Apr-2012	091746-011	Cyanide, total	0.00294	0.00167	J	mg/L	0.45
WW006	2069F	23-Apr-2012	091746-012	Cyanide, total	0.00239	0.00167	J	mg/L	0.45
WW006	2069F	24-Apr-2012	091744-001	Aluminum	0.337	0.068		mg/L	900
WW006	2069F	24-Apr-2012	091744-007	Ammonia	43.9	0.85		mg/L	
WW006	2069F	24-Apr-2012	091744-001	Arsenic	0.00573	0.005	J	mg/L	0.051
WW006	2069F	24-Apr-2012	091744-001	Boron	0.238	0.015		mg/L	
WW006	2069F	24-Apr-2012	091744-001	Cadmium		0.001	U	mg/L	0.05
WW006	2069F	24-Apr-2012	091744-001	Chromium	0.00262	0.001	J	mg/L	4.1
WW006	2069F	24-Apr-2012	091744-001	Copper	0.0398	0.003		mg/L	5.3
WW006	2069F	24-Apr-2012	091744-002	Fluoride	0.831	0.033		mg/L	36
WW006	2069F	24-Apr-2012	091744-001	Lead		0.0033	U	mg/L	1
WW006	2069F	24-Apr-2012	091744-001	Molybdenum	0.122	0.002		mg/L	2
WW006	2069F	24-Apr-2012	091744-001	Nickel		0.0015	U	mg/L	2
WW006	2069F	24-Apr-2012	091744-001	Selenium		0.006	U	mg/L	0.46
WW006	2069F	24-Apr-2012	091744-001	Silver	0.00225	0.001	J	mg/L	5
WW006	2069F	24-Apr-2012	091744-001	Zinc	0.0898	0.0033		mg/L	2.2
WW006	2069F	25-Apr-2012	091751-001	Aluminum	0.269	0.068		mg/L	900
WW006	2069F	25-Apr-2012	091751-007	Ammonia	42.6	0.85		mg/L	
WW006	2069F	25-Apr-2012	091751-001	Arsenic	0.00603	0.005	J	mg/L	0.051
WW006	2069F	25-Apr-2012	091751-001	Boron	0.127	0.015		mg/L	
WW006	2069F	25-Apr-2012	091751-001	Cadmium		0.001	U	mg/L	0.05
WW006	2069F	25-Apr-2012	091751-001	Chromium	0.00382	0.001	J	mg/L	4.1
WW006	2069F	25-Apr-2012	091751-001	Copper	0.0262	0.003		mg/L	5.3
WW006	2069F	25-Apr-2012	091751-002	Fluoride	1.06	0.033		mg/L	36
WW006	2069F	25-Apr-2012	091751-001	Lead		0.0033	U	mg/L	1
WW006	2069F	25-Apr-2012	091751-001	Molybdenum	0.19	0.002		mg/L	2
WW006	2069F	25-Apr-2012	091751-001	Nickel		0.0015	U	mg/L	2
WW006	2069F	25-Apr-2012	091751-001	Selenium		0.006	U	mg/L	0.46
WW006	2069F	25-Apr-2012	091751-001	Silver		0.001	U	mg/L	5
WW006	2069F	25-Apr-2012	091751-001	Zinc	0.0998	0.0033		mg/L	2.2
WW007	2069G	23-Apr-2012	091757-009	Cyanide, total		0.00167	U	mg/L	0.45
WW007	2069G	23-Apr-2012	091757-010	Cyanide, total		0.00167	U	mg/L	0.45
WW007	2069G	23-Apr-2012	091757-011	Cyanide, total	0.00288	0.00167	J	mg/L	0.45
WW007	2069G	23-Apr-2012	091757-012	Cyanide, total		0.00167	U	mg/L	0.45

TABLE A-1. Permitted Sanitary Outfalls of Inorganic Analyses, February 2012 through April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW007	2069G	24-Apr-2012	091745-001	Aluminum		0.068	U	mg/L	900
WW007	2069G	24-Apr-2012	091745-007	Ammonia	1.1	0.017		mg/L	
WW007	2069G	24-Apr-2012	091745-001	Arsenic		0.005	U	mg/L	0.051
WW007	2069G	24-Apr-2012	091745-001	Boron	0.0233	0.015	J	mg/L	
WW007	2069G	24-Apr-2012	091745-001	Cadmium		0.001	U	mg/L	0.05
WW007	2069G	24-Apr-2012	091745-001	Chromium		0.001	U	mg/L	4.1
WW007	2069G	24-Apr-2012	091745-001	Copper		0.003	U	mg/L	5.3
WW007	2069G	24-Apr-2012	091745-002	Fluoride	1.48	0.033		mg/L	36
WW007	2069G	24-Apr-2012	091745-001	Lead		0.0033	U	mg/L	1
WW007	2069G	24-Apr-2012	091745-001	Molybdenum	0.0184	0.002		mg/L	2
WW007	2069G	24-Apr-2012	091745-001	Nickel		0.0015	U	mg/L	2
WW007	2069G	24-Apr-2012	091745-001	Selenium		0.006	U	mg/L	0.46
WW007	2069G	24-Apr-2012	091745-001	Silver		0.001	U	mg/L	5
WW007	2069G	24-Apr-2012	091745-001	Zinc		0.0033	U	mg/L	2.2
WW007	2069G	25-Apr-2012	091752-001	Aluminum		0.068	U	mg/L	900
WW007	2069G	25-Apr-2012	091752-007	Ammonia	1.51	0.017		mg/L	
WW007	2069G	25-Apr-2012	091752-001	Arsenic		0.005	U	mg/L	0.051
WW007	2069G	25-Apr-2012	091752-001	Boron	0.0318	0.015	J	mg/L	
WW007	2069G	25-Apr-2012	091752-001	Cadmium		0.001	U	mg/L	0.05
WW007	2069G	25-Apr-2012	091752-001	Chromium	0.00221	0.001	J	mg/L	4.1
WW007	2069G	25-Apr-2012	091752-001	Copper		0.003	U	mg/L	5.3
WW007	2069G	25-Apr-2012	091752-002	Fluoride	1.55	0.033		mg/L	36
WW007	2069G	25-Apr-2012	091752-001	Lead		0.0033	U	mg/L	1
WW007	2069G	25-Apr-2012	091752-001	Molybdenum	0.0226	0.002		mg/L	2
WW007	2069G	25-Apr-2012	091752-001	Nickel		0.0015	U	mg/L	2
WW007	2069G	25-Apr-2012	091752-001	Selenium		0.006	U	mg/L	0.46
WW007	2069G	25-Apr-2012	091752-001	Silver		0.001	U	mg/L	5
WW007	2069G	25-Apr-2012	091752-001	Zinc	0.00473	0.0033	J	mg/L	2.2
WW008	2069I	23-Apr-2012	091758-009	Cyanide, total	0.00614	0.00167		mg/L	0.45
WW008	2069I	23-Apr-2012	091758-010	Cyanide, total	0.00292	0.00167	J	mg/L	0.45
WW008	2069I	23-Apr-2012	091758-011	Cyanide, total	0.00225	0.00167	J	mg/L	0.45
WW008	2069I	23-Apr-2012	091758-012	Cyanide, total		0.00167	U	mg/L	0.45
WW008	2069I	24-Apr-2012	091746-001	Aluminum	0.27	0.068		mg/L	900
WW008	2069I	24-Apr-2012	091746-007	Ammonia	47.7	0.85		mg/L	
WW008	2069I	24-Apr-2012	091746-001	Arsenic		0.005	U	mg/L	0.051
WW008	2069I	24-Apr-2012	091746-001	Boron	0.329	0.015		mg/L	
WW008	2069I	24-Apr-2012	091746-001	Cadmium		0.001	U	mg/L	0.05

TABLE A-1. Permitted Sanitary Outfalls of Inorganic Analyses, February 2012 through April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW008	2069I	24-Apr-2012	091746-001	Chromium	0.00558	0.001		mg/L	4.1
WW008	2069I	24-Apr-2012	091746-001	Copper	0.0824	0.003		mg/L	5.3
WW008	2069I	24-Apr-2012	091746-002	Fluoride	0.993	0.033		mg/L	36
WW008	2069I	24-Apr-2012	091746-001	Lead		0.0033	U	mg/L	1
WW008	2069I	24-Apr-2012	091746-001	Molybdenum	0.114	0.002		mg/L	2
WW008	2069I	24-Apr-2012	091746-001	Nickel	0.0108	0.0015		mg/L	2
WW008	2069I	24-Apr-2012	091746-001	Selenium		0.006	U	mg/L	0.46
WW008	2069I	24-Apr-2012	091746-001	Silver		0.001	U	mg/L	5
WW008	2069I	24-Apr-2012	091746-001	Zinc	0.157	0.0033		mg/L	2.2
WW008	2069I	25-Apr-2012	091753-001	Aluminum	0.191	0.068	J	mg/L	900
WW008	2069I	25-Apr-2012	091753-007	Ammonia	63.5	0.85		mg/L	
WW008	2069I	25-Apr-2012	091753-001	Arsenic	0.00709	0.005	J	mg/L	0.051
WW008	2069I	25-Apr-2012	091753-001	Boron	0.237	0.015		mg/L	
WW008	2069I	25-Apr-2012	091753-001	Cadmium		0.001	U	mg/L	0.05
WW008	2069I	25-Apr-2012	091753-001	Chromium	0.00378	0.001	J	mg/L	4.1
WW008	2069I	25-Apr-2012	091753-001	Copper	0.0862	0.003		mg/L	5.3
WW008	2069I	25-Apr-2012	091753-002	Fluoride	0.998	0.033		mg/L	36
WW008	2069I	25-Apr-2012	091753-001	Lead		0.0033	U	mg/L	1
WW008	2069I	25-Apr-2012	091753-001	Molybdenum	0.106	0.002		mg/L	2
WW008	2069I	25-Apr-2012	091753-001	Nickel	0.00481	0.0015	J	mg/L	2
WW008	2069I	25-Apr-2012	091753-001	Selenium		0.006	U	mg/L	0.46
WW008	2069I	25-Apr-2012	091753-001	Silver		0.001	U	mg/L	5
WW008	2069I	25-Apr-2012	091753-001	Zinc	0.105	0.0033		mg/L	2.2
WW011	2069K	24-Apr-2012	091747-001	Aluminum	0.318	0.068		mg/L	900
WW011	2069K	24-Apr-2012	091747-007	Ammonia	25.1	0.85		mg/L	
WW011	2069K	24-Apr-2012	091747-001	Arsenic	0.0062	0.005	J	mg/L	0.051
WW011	2069K	24-Apr-2012	091747-001	Boron	0.0945	0.015		mg/L	
WW011	2069K	24-Apr-2012	091747-001	Cadmium		0.001	U	mg/L	0.05
WW011	2069K	24-Apr-2012	091747-001	Chromium	0.00883	0.001		mg/L	4.1
WW011	2069K	24-Apr-2012	091747-001	Copper	0.0518	0.003		mg/L	5.3
WW011	2069K	24-Apr-2012	091747-002	Fluoride	0.898	0.033		mg/L	36
WW011	2069K	24-Apr-2012	091747-001	Lead		0.0033	U	mg/L	1
WW011	2069K	24-Apr-2012	091747-001	Molybdenum	0.193	0.002		mg/L	2
WW011	2069K	24-Apr-2012	091747-001	Nickel	0.00222	0.0015	J	mg/L	2
WW011	2069K	24-Apr-2012	091747-001	Selenium		0.006	U	mg/L	0.46
WW011	2069K	24-Apr-2012	091747-001	Silver		0.001	U	mg/L	5
WW011	2069K	24-Apr-2012	091747-001	Zinc	0.166	0.0033		mg/L	2.2

TABLE A-1. Permitted Sanitary Outfalls of Inorganic Analyses, February 2012 through April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW011	2069K	25-Apr-2012	091754-001	Aluminum	0.164	0.068	J	mg/L	900
WW011	2069K	25-Apr-2012	091754-007	Ammonia	18.4	0.85		mg/L	
WW011	2069K	25-Apr-2012	091754-001	Arsenic		0.005	U	mg/L	0.051
WW011	2069K	25-Apr-2012	091754-001	Boron	0.0924	0.015		mg/L	
WW011	2069K	25-Apr-2012	091754-001	Cadmium		0.001	U	mg/L	0.05
WW011	2069K	25-Apr-2012	091754-001	Chromium	0.00753	0.001		mg/L	4.1
WW011	2069K	25-Apr-2012	091754-001	Copper	0.0301	0.003		mg/L	5.3
WW011	2069K	25-Apr-2012	091754-002	Fluoride	0.873	0.033		mg/L	36
WW011	2069K	25-Apr-2012	091754-001	Lead		0.0033	U	mg/L	1
WW011	2069K	25-Apr-2012	091754-001	Molybdenum	0.167	0.002		mg/L	2
WW011	2069K	25-Apr-2012	091754-001	Nickel		0.0015	U	mg/L	2
WW011	2069K	25-Apr-2012	091754-001	Selenium		0.006	U	mg/L	0.46
WW011	2069K	25-Apr-2012	091754-001	Silver		0.001	U	mg/L	5
WW011	2069K	25-Apr-2012	091754-001	Zinc	0.154	0.0033		mg/L	2.2

NOTES:

ABCWUA = Albuquerque Bernalillo County Water Utility Authority
MDL = Method detection limit
mg/L = milligrams per liter
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective practical quantitation limit (PQL)
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration

TABLE A-2. Summary of Sanitary Outfalls of Radiological Analyses, April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Sewer Release Limits* (Monthly Avg)
CINT	2238A	24-Apr-2012	091749-004	Actinium-228	-4.61	12.6	U	13.5	pCi/L	300000
CINT	2238A	24-Apr-2012	091749-003	Alpha, gross	-2.02	2.88	U	5.94	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Americium-241	-9.52	11.9	U	18.6	pCi/L	200
CINT	2238A	24-Apr-2012	091749-004	Beryllium-7	-9.23	15.6	U	24.7	pCi/L	
CINT	2238A	24-Apr-2012	091749-003	Beta, gross	2.15	2.98	U	5.01	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Bismuth-212	17.8	24.7	U	42.5	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Bismuth-214	6.86	8.69	U	7.38	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Cesium-137	-0.0468	1.7	U	3	pCi/L	10000
CINT	2238A	24-Apr-2012	091749-004	Cobalt-60	0.543	1.99	U	3.58	pCi/L	30000
CINT	2238A	24-Apr-2012	091749-004	Lead-212	1.32	5.24	U	5.97	pCi/L	20000
CINT	2238A	24-Apr-2012	091749-004	Lead-214	3.9	6.95	U	6.99	pCi/L	1000000
CINT	2238A	24-Apr-2012	091749-004	Neptunium-237	2.87	3.57	U	5.91	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Potassium-40	-12.7	31.8	U	45.2	pCi/L	40000
CINT	2238A	24-Apr-2012	091749-004	Radium-223	-35.2	1440	U	52.5	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Radium-224	27.7	35.9	U	53.4	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Radium-226	-47.6	81.4	U	85.2	pCi/L	600
CINT	2238A	24-Apr-2012	091749-004	Radium-228	-4.61	12.6	U	13.5	pCi/L	600
CINT	2238A	24-Apr-2012	091749-004	Sodium-22	-0.989	1.84	U	3.07	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Thorium-227	-5.65	231	U	21	pCi/L	
CINT	2238A	24-Apr-2012	091749-004	Thorium-231	25.9	26.7	U	41.3	pCi/L	300
CINT	2238A	24-Apr-2012	091749-004	Thorium-234	-40.9	144	U	197	pCi/L	50000
CINT	2238A	24-Apr-2012	091749-005	Tritium	78.7	90	U	149	pCi/L	10000000
CINT	2238A	24-Apr-2012	091749-004	Uranium-235	10.4	19.1	U	18.2	pCi/L	3000
CINT	2238A	24-Apr-2012	091749-004	Uranium-238	-40.9	144	U	197	pCi/L	3000
WW001	2069A	24-Apr-2012	091743-004	Actinium-228	12.3	10.3	U	16.1	pCi/L	300000
WW001	2069A	24-Apr-2012	091743-003	Alpha, gross	2.05	1.47	U	2.16	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Americium-241	3.06	4.08	U	5.69	pCi/L	200
WW001	2069A	24-Apr-2012	091743-004	Beryllium-7	-2.78	19.2	U	33.3	pCi/L	
WW001	2069A	24-Apr-2012	091743-003	Beta, gross	11.3	2.93		3.39	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Bismuth-212	21.3	32.1	U	54.3	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Bismuth-214	4.37	7.9	U	7.64	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Cesium-137	-5.79	5.77	U	6.04	pCi/L	10000
WW001	2069A	24-Apr-2012	091743-004	Cobalt-60	0.53	2.21	U	3.94	pCi/L	30000
WW001	2069A	24-Apr-2012	091743-004	Lead-212	7.17	7.22	U	7.17	pCi/L	20000
WW001	2069A	24-Apr-2012	091743-004	Lead-214	10.7	6.8	U	10.7	pCi/L	1000000
WW001	2069A	24-Apr-2012	091743-004	Neptunium-237	0.38	4.06	U	6.86	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Potassium-40	-2	47.5	U	52.9	pCi/L	40000
WW001	2069A	24-Apr-2012	091743-004	Radium-223	18	739	U	70.8	pCi/L	

TABLE A-2. Summary of Sanitary Outfalls of Radiological Analyses, April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Sewer Release Limits* (Monthly Avg)
WW001	2069A	24-Apr-2012	091743-004	Radium-224	83.7	57.8	U	83.7	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Radium-226	-28.5	71.6	U	80.6	pCi/L	600
WW001	2069A	24-Apr-2012	091743-004	Radium-228	12.3	10.3	U	16.1	pCi/L	600
WW001	2069A	24-Apr-2012	091743-004	Sodium-22	-1.37	2.37	U	3.89	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Thorium-227	6.94	286	U	27.1	pCi/L	
WW001	2069A	24-Apr-2012	091743-004	Thorium-231	23.3	20.8	U	31.1	pCi/L	300
WW001	2069A	24-Apr-2012	091743-004	Thorium-234	54.8	92.9	U	74.1	pCi/L	50000
WW001	2069A	24-Apr-2012	091743-005	Tritium	105	93	U	151	pCi/L	10000000
WW001	2069A	24-Apr-2012	091743-004	Uranium-235	2.92	11.9	U	20.4	pCi/L	3000
WW001	2069A	24-Apr-2012	091743-004	Uranium-238	54.8	92.9	U	74.1	pCi/L	3000
WW006	2069F	24-Apr-2012	091744-004	Actinium-228	-1.82	13	U	12.7	pCi/L	300000
WW006	2069F	24-Apr-2012	091744-003	Alpha, gross	1.99	2.09	U	3.41	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Americium-241	-2.33	11.4	U	16.5	pCi/L	200
WW006	2069F	24-Apr-2012	091744-004	Beryllium-7	0.0576	15.4	U	26.9	pCi/L	
WW006	2069F	24-Apr-2012	091744-003	Beta, gross	23.1	4.9		4.29	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Bismuth-212	28.7	28.5	U	45.1	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Bismuth-214	2.48	6.96	U	7.36	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Cesium-137	0.576	1.95	U	3.35	pCi/L	10000
WW006	2069F	24-Apr-2012	091744-004	Cobalt-60	4.39	3.27	U	4.4	pCi/L	30000
WW006	2069F	24-Apr-2012	091744-004	Lead-212	4.24	8.08	U	6.8	pCi/L	20000
WW006	2069F	24-Apr-2012	091744-004	Lead-214	-2.36	7.13	U	7.6	pCi/L	1000000
WW006	2069F	24-Apr-2012	091744-004	Neptunium-237	1.13	3.87	U	6.46	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Potassium-40	19.1	44	U	27.9	pCi/L	40000
WW006	2069F	24-Apr-2012	091744-004	Radium-223	35.7	1470	U	66.3	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Radium-224	70.5	52	U	70.5	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Radium-226	56.1	89.6	U	62.5	pCi/L	600
WW006	2069F	24-Apr-2012	091744-004	Radium-228	-1.82	13	U	12.7	pCi/L	600
WW006	2069F	24-Apr-2012	091744-004	Sodium-22	0.958	1.77	U	3.12	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Thorium-227	-0.439	23.5	U	25.3	pCi/L	
WW006	2069F	24-Apr-2012	091744-004	Thorium-231	-1.29	39.4	U	45.1	pCi/L	300
WW006	2069F	24-Apr-2012	091744-004	Thorium-234	53.3	149	U	140	pCi/L	50000
WW006	2069F	24-Apr-2012	091744-005	Tritium	41.3	87.3	U	148	pCi/L	10000000
WW006	2069F	24-Apr-2012	091744-004	Uranium-235	11.2	18.5	U	21.1	pCi/L	3000
WW006	2069F	24-Apr-2012	091744-004	Uranium-238	53.3	149	U	140	pCi/L	3000
WW008	2069I	24-Apr-2012	091746-004	Actinium-228	-14.8	17	U	15.4	pCi/L	300000
WW008	2069I	24-Apr-2012	091746-003	Alpha, gross	0.594	1.72	U	3.1	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Americium-241	7.63	14.6	U	22.2	pCi/L	200
WW008	2069I	24-Apr-2012	091746-004	Beryllium-7	4.79	22.9	U	39.8	pCi/L	

TABLE A-2. Summary of Sanitary Outfalls of Radiological Analyses, April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Sewer Release Limits* (Monthly Avg)
WW008	2069I	24-Apr-2012	091746-003	Beta, gross	34.1	6.15		3.01	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Bismuth-212	27.8	32.2	U	52.4	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Bismuth-214	0.926	8.49	U	7.09	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Cesium-137	2.53	2.47	U	3.93	pCi/L	10000
WW008	2069I	24-Apr-2012	091746-004	Cobalt-60	0.267	2.1	U	3.71	pCi/L	30000
WW008	2069I	24-Apr-2012	091746-004	Lead-212	0.723	6.46	U	6.55	pCi/L	20000
WW008	2069I	24-Apr-2012	091746-004	Lead-214	6.59	6.6	U	8.03	pCi/L	1000000
WW008	2069I	24-Apr-2012	091746-004	Neptunium-237	-0.834	3.89	U	6.76	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Potassium-40	24.5	50.1	U	34.9	pCi/L	40000
WW008	2069I	24-Apr-2012	091746-004	Radium-223	-3.26	380	U	66.8	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Radium-224	18.4	42.9	U	62.5	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Radium-226	10.9	99.6	U	64.2	pCi/L	600
WW008	2069I	24-Apr-2012	091746-004	Radium-228	-14.8	17	U	15.4	pCi/L	600
WW008	2069I	24-Apr-2012	091746-004	Sodium-22	-0.743	2.15	U	3.65	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Thorium-227	7.06	818	U	26.7	pCi/L	
WW008	2069I	24-Apr-2012	091746-004	Thorium-231	-31.3	50.9	U	55.1	pCi/L	300
WW008	2069I	24-Apr-2012	091746-004	Thorium-234	50.2	192	U	178	pCi/L	50000
WW008	2069I	24-Apr-2012	091746-005	Tritium	103	89.3	U	145	pCi/L	10000000
WW008	2069I	24-Apr-2012	091746-004	Uranium-235	-12	22.2	U	22.4	pCi/L	3000
WW008	2069I	24-Apr-2012	091746-004	Uranium-238	50.2	192	U	178	pCi/L	3000
WW011	2069K	24-Apr-2012	091747-004	Actinium-228	22.3	13.6	U	22.3	pCi/L	300000
WW011	2069K	24-Apr-2012	091747-003	Alpha, gross	1.3	1.67	U	2.81	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Americium-241	-2.11	16.6	U	24.2	pCi/L	200
WW011	2069K	24-Apr-2012	091747-004	Beryllium-7	-0.407	15.7	U	26.9	pCi/L	
WW011	2069K	24-Apr-2012	091747-003	Beta, gross	26.9	5.67		4.47	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Bismuth-212	24.6	27.5	U	45.9	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Bismuth-214	7.38	8.08	U	7.49	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Cesium-137	-0.242	1.82	U	3.2	pCi/L	10000
WW011	2069K	24-Apr-2012	091747-004	Cobalt-60	-0.179	1.93	U	3.41	pCi/L	30000
WW011	2069K	24-Apr-2012	091747-004	Lead-212	1.6	5.97	U	6.05	pCi/L	20000
WW011	2069K	24-Apr-2012	091747-004	Lead-214	2	8.4	U	7.66	pCi/L	1000000
WW011	2069K	24-Apr-2012	091747-004	Neptunium-237	-2	3.73	U	6.22	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Potassium-40	12.8	41.1	U	37	pCi/L	40000
WW011	2069K	24-Apr-2012	091747-004	Radium-223	-6.32	264	U	61.5	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Radium-224	96.3	59.9	U	96.3	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Radium-226	-53.4	85.3	U	78.7	pCi/L	600
WW011	2069K	24-Apr-2012	091747-004	Radium-228	22.3	13.6	U	22.3	pCi/L	600
WW011	2069K	24-Apr-2012	091747-004	Sodium-22	1.55	2.01	U	3.55	pCi/L	

TABLE A-2. Summary of Sanitary Outfalls of Radiological Analyses, April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Sewer Release Limits* (Monthly Avg)
WW011	2069K	24-Apr-2012	091747-004	Thorium-227	1.79	75.2	U	25.1	pCi/L	
WW011	2069K	24-Apr-2012	091747-004	Thorium-231	16.6	46.5	U	47.9	pCi/L	300
WW011	2069K	24-Apr-2012	091747-004	Thorium-234	256	238	U	256	pCi/L	50000
WW011	2069K	24-Apr-2012	091747-005	Tritium	17.7	82	U	141	pCi/L	10000000
WW011	2069K	24-Apr-2012	091747-004	Uranium-235	1.56	21.8	U	20.4	pCi/L	3000
WW011	2069K	24-Apr-2012	091747-004	Uranium-238	256	238	U	256	pCi/L	3000

NOTES:

MDA = minimum detectable amount.

pCi/L = picocuries per liter

U = The result is less than the MDA.

*** = The monthly average concentration values for release of sanitary sewage were derived by taking the most restrictive restrictive occupational stochastic oral ingestion annual limits on intake (ALI) for a reference man.**

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	29-Feb-2012	091740-008	Acenaphthene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Acenaphthylene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Anthracene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Benzo(a)anthracene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Benzo(a)pyrene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Benzo(b)fluoranthene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Benzo(ghi)perylene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Benzo(k)fluoranthene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Bromophenyl phenyl ether, 4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Butylbenzyl phthalate		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Carbazole		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chloro-3-methylphenol, 4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chlorobenzenamine, 4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chloroethoxy)methane, bis(2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chloroethyl)ether, bis(2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chloroisopropyl) ether, bis(2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chloronaphthalene, 2-		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chlorophenol, 2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chlorophenyl phenyl ether, 4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Chrysene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Cresol, m,p-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Cresol, o-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Di-n-butyl phthalate		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Di-n-octyl phthalate		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dibenz[a,h]anthracene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dibenzofuran		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dichlorobenzene, 1,2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dichlorobenzene, 1,3-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dichlorobenzene, 1,4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dichlorobenzidine, 3,3'-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dichlorophenol, 2,4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Diethylphthalate		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dimethylphenol, 2,4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dimethylphthalate		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dinitro-o-cresol		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dinitrophenol, 2,4-		10	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	29-Feb-2012	091740-008	Dinitrotoluene, 2,4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Dinitrotoluene, 2,6-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Diphenyl amine		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Ethylhexyl)phthalate, bis(2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Fluoranthene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Fluorene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Hexachlorobenzene		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Hexachlorobutadiene		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Hexachlorocyclopentadiene		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Hexachloroethane		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Indeno(1,2,3-c,d)pyrene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Isophorone		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Methylnaphthalene, 2-		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Naphthalene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitro-benzene		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitroaniline, 2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitroaniline, 3-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitroaniline, 4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitrophenol, 2-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitrophenol, 4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Nitrosodipropylamine, n-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Pentachlorophenol		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Phenanthrene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Phenol		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Pyrene		0.6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Trichlorobenzene, 1,2,4-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Trichlorophenol, 2,4,5-		6	U	ug/L
CINT	2238A	29-Feb-2012	091740-008	Trichlorophenol, 2,4,6-		6	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Acenaphthene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Acenaphthylene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Anthracene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Benzo(a)anthracene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Benzo(a)pyrene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Benzo(b)fluoranthene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Benzo(ghi)perylene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Benzo(k)fluoranthene		0.3	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	25-Apr-2012	091755-008	Bromophenyl phenyl ether, 4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Butylbenzyl phthalate		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Carbazole		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chloro-3-methylphenol, 4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chlorobenzenamine, 4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chloroethoxy)methane, bis(2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chloroethyl)ether, bis(2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chloroisopropyl) ether, bis(2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chloronaphthalene, 2-		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chlorophenol, 2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chlorophenyl phenyl ether, 4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Chrysene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Cresol, m,p-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Cresol, o-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Di-n-butyl phthalate		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Di-n-octyl phthalate		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dibenz[a,h]anthracene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dibenzofuran		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dichlorobenzene, 1,2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dichlorobenzene, 1,3-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dichlorobenzene, 1,4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dichlorobenzidine, 3,3'-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dichlorophenol, 2,4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Diethylphthalate		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dimethylphenol, 2,4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dimethylphthalate		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dinitro-o-cresol		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dinitrophenol, 2,4-		5	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dinitrotoluene, 2,4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Dinitrotoluene, 2,6-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Diphenyl amine		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Ethylhexyl)phthalate, bis(2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Fluoranthene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Fluorene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Hexachlorobenzene		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Hexachlorobutadiene		3	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	25-Apr-2012	091755-008	Hexachlorocyclopentadiene		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Hexachloroethane		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Indeno(1,2,3-c,d)pyrene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Isophorone		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Methylnaphthalene, 2-		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Naphthalene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitro-benzene		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitroaniline, 2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitroaniline, 3-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitroaniline, 4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitrophenol, 2-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitrophenol, 4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Nitrosodipropylamine, n-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Pentachlorophenol		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Phenanthrene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Phenol		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Pyrene		0.3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Trichlorobenzene, 1,2,4-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Trichlorophenol, 2,4,5-		3	U	ug/L
CINT	2238A	25-Apr-2012	091755-008	Trichlorophenol, 2,4,6-		3	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Acenaphthene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Acenaphthylene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Anthracene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Benzo(a)anthracene	0.99	0.286		ug/L
WW001	2069A	25-Apr-2012	091750-008	Benzo(a)pyrene	0.533	0.286	J	ug/L
WW001	2069A	25-Apr-2012	091750-008	Benzo(b)fluoranthene	0.59	0.286	J	ug/L
WW001	2069A	25-Apr-2012	091750-008	Benzo(ghi)perylene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Benzo(k)fluoranthene	0.61	0.286	J	ug/L
WW001	2069A	25-Apr-2012	091750-008	Bromophenyl phenyl ether, 4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Butylbenzyl phthalate		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Carbazole		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chloro-3-methylphenol, 4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chlorobenzenamine, 4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chloroethoxy)methane, bis(2-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chloroethyl)ether, bis(2-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chloroisopropyl) ether, bis(2-		2.86	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	25-Apr-2012	091750-008	Chloronaphthalene, 2-		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chlorophenol, 2-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chlorophenyl phenyl ether, 4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Chrysene	1.16	0.286		ug/L
WW001	2069A	25-Apr-2012	091750-008	Cresol, m,p-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Cresol, o-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Di-n-butyl phthalate		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Di-n-octyl phthalate		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dibenz[a,h]anthracene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dibenzofuran		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dichlorobenzene, 1,2-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dichlorobenzene, 1,3-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dichlorobenzene, 1,4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dichlorobenzidine, 3,3'-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dichlorophenol, 2,4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Diethylphthalate		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dimethylphenol, 2,4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dimethylphthalate		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dinitro-o-cresol		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dinitrophenol, 2,4-		4.76	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dinitrotoluene, 2,4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Dinitrotoluene, 2,6-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Diphenyl amine		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Ethylhexyl)phthalate, bis(2-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Fluoranthene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Fluorene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Hexachlorobenzene		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Hexachlorobutadiene		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Hexachlorocyclopentadiene		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Hexachloroethane		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Indeno(1,2,3-c,d)pyrene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Isophorone		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Methylnaphthalene, 2-		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Naphthalene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Nitro-benzene		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Nitroaniline, 2-		2.86	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	25-Apr-2012	091750-008	Nitroaniline, 3-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Nitroaniline, 4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Nitrophenol, 2-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Nitrophenol, 4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Nitrosodipropylamine, n-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Pentachlorophenol		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Phenanthrene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Phenol		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Pyrene		0.286	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Trichlorobenzene, 1,2,4-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Trichlorophenol, 2,4,5-		2.86	U	ug/L
WW001	2069A	25-Apr-2012	091750-008	Trichlorophenol, 2,4,6-		2.86	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Acenaphthene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Acenaphthylene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Anthracene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Benzo(a)anthracene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Benzo(a)pyrene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Benzo(b)fluoranthene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Benzo(ghi)perylene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Benzo(k)fluoranthene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Bromophenyl phenyl ether, 4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Butylbenzyl phthalate		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Carbazole		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chloro-3-methylphenol, 4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chlorobenzenamine, 4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chloroethoxy)methane, bis(2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chloroethyl)ether, bis(2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chloroisopropyl) ether, bis(2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chloronaphthalene, 2-		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chlorophenol, 2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chlorophenyl phenyl ether, 4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Chrysene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Cresol, m,p-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Cresol, o-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Di-n-butyl phthalate		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Di-n-octyl phthalate		3.23	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	24-Apr-2012	092270-008	Dibenz[a,h]anthracene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dibenzofuran		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dichlorobenzene, 1,2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dichlorobenzene, 1,3-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dichlorobenzene, 1,4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dichlorobenzidine, 3,3'-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dichlorophenol, 2,4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Diethylphthalate		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dimethylphenol, 2,4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dimethylphthalate		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dinitro-o-cresol		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dinitrophenol, 2,4-		5.38	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dinitrotoluene, 2,4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Dinitrotoluene, 2,6-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Diphenyl amine		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Ethylhexyl)phthalate, bis(2-	9.9	3.23	J	ug/L
WW006	2069F	24-Apr-2012	092270-008	Fluoranthene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Fluorene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Hexachlorobenzene		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Hexachlorobutadiene		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Hexachlorocyclopentadiene		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Hexachloroethane		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Indeno(1,2,3-c,d)pyrene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Isophorone		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Methylnaphthalene, 2-		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Naphthalene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitro-benzene		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitroaniline, 2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitroaniline, 3-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitroaniline, 4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitrophenol, 2-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitrophenol, 4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Nitrosodipropylamine, n-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Pentachlorophenol		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Phenanthrene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Phenol		3.23	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	24-Apr-2012	092270-008	Pyrene		0.323	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Trichlorobenzene, 1,2,4-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Trichlorophenol, 2,4,5-		3.23	U	ug/L
WW006	2069F	24-Apr-2012	092270-008	Trichlorophenol, 2,4,6-		3.23	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Acenaphthene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Acenaphthylene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Anthracene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Benzo(a)anthracene	0.543	0.286	J	ug/L
WW006	2069F	25-Apr-2012	091751-008	Benzo(a)pyrene	0.41	0.286	J	ug/L
WW006	2069F	25-Apr-2012	091751-008	Benzo(b)fluoranthene	0.476	0.286	J	ug/L
WW006	2069F	25-Apr-2012	091751-008	Benzo(ghi)perylene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Benzo(k)fluoranthene	0.448	0.286	J	ug/L
WW006	2069F	25-Apr-2012	091751-008	Bromophenyl phenyl ether, 4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Butylbenzyl phthalate		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Carbazole		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chloro-3-methylphenol, 4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chlorobenzenamine, 4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chloroethoxy)methane, bis(2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chloroethyl)ether, bis(2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chloroisopropyl) ether, bis(2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chloronaphthalene, 2-		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chlorophenol, 2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chlorophenyl phenyl ether, 4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Chrysene	0.619	0.286	J	ug/L
WW006	2069F	25-Apr-2012	091751-008	Cresol, m,p-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Cresol, o-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Di-n-butyl phthalate		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Di-n-octyl phthalate		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dibenz[a,h]anthracene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dibenzofuran		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dichlorobenzene, 1,2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dichlorobenzene, 1,3-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dichlorobenzene, 1,4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dichlorobenzidine, 3,3'-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dichlorophenol, 2,4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Diethylphthalate		2.86	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	25-Apr-2012	091751-008	Dimethylphenol, 2,4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dimethylphthalate		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dinitro-o-cresol		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dinitrophenol, 2,4-		4.76	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dinitrotoluene, 2,4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Dinitrotoluene, 2,6-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Diphenyl amine		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Ethylhexyl)phthalate, bis(2-	7.35	2.86	J	ug/L
WW006	2069F	25-Apr-2012	091751-008	Fluoranthene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Fluorene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Hexachlorobenzene		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Hexachlorobutadiene		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Hexachlorocyclopentadiene		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Hexachloroethane		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Indeno(1,2,3-c,d)pyrene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Isophorone		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Methylnaphthalene, 2-		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Naphthalene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitro-benzene		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitroaniline, 2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitroaniline, 3-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitroaniline, 4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitrophenol, 2-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitrophenol, 4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Nitrosodipropylamine, n-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Pentachlorophenol		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Phenanthrene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Phenol		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Pyrene		0.286	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Trichlorobenzene, 1,2,4-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Trichlorophenol, 2,4,5-		2.86	U	ug/L
WW006	2069F	25-Apr-2012	091751-008	Trichlorophenol, 2,4,6-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Acenaphthene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Acenaphthylene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Anthracene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Benzo(a)anthracene		0.286	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	25-Apr-2012	091752-008	Benzo(a)pyrene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Benzo(b)fluoranthene	0.295	0.286	J	ug/L
WW007	2069G	25-Apr-2012	091752-008	Benzo(ghi)perylene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Benzo(k)fluoranthene	0.352	0.286	J	ug/L
WW007	2069G	25-Apr-2012	091752-008	Bromophenyl phenyl ether, 4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Butylbenzyl phthalate		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Carbazole		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chloro-3-methylphenol, 4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chlorobenzenamine, 4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chloroethoxy)methane, bis(2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chloroethyl)ether, bis(2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chloroisopropyl) ether, bis(2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chloronaphthalene, 2-		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chlorophenol, 2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chlorophenyl phenyl ether, 4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Chrysene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Cresol, m,p-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Cresol, o-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Di-n-butyl phthalate		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Di-n-octyl phthalate		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dibenz[a,h]anthracene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dibenzofuran		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dichlorobenzene, 1,2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dichlorobenzene, 1,3-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dichlorobenzene, 1,4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dichlorobenzidine, 3,3'-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dichlorophenol, 2,4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Diethylphthalate		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dimethylphenol, 2,4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dimethylphthalate		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dinitro-o-cresol		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dinitrophenol, 2,4-		4.76	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dinitrotoluene, 2,4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Dinitrotoluene, 2,6-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Diphenyl amine		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Ethylhexyl)phthalate, bis(2-		2.86	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	25-Apr-2012	091752-008	Fluoranthene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Fluorene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Hexachlorobenzene		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Hexachlorobutadiene		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Hexachlorocyclopentadiene		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Hexachloroethane		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Indeno(1,2,3-c,d)pyrene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Isophorone		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Methylnaphthalene, 2-		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Naphthalene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitro-benzene		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitroaniline, 2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitroaniline, 3-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitroaniline, 4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitrophenol, 2-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitrophenol, 4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Nitrosodipropylamine, n-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Pentachlorophenol		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Phenanthrene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Phenol		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Pyrene		0.286	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Trichlorobenzene, 1,2,4-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Trichlorophenol, 2,4,5-		2.86	U	ug/L
WW007	2069G	25-Apr-2012	091752-008	Trichlorophenol, 2,4,6-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Acenaphthene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Acenaphthylene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Anthracene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Benzo(a)anthracene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Benzo(a)pyrene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Benzo(b)fluoranthene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Benzo(ghi)perylene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Benzo(k)fluoranthene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Bromophenyl phenyl ether, 4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Butylbenzyl phthalate		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Carbazole		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chloro-3-methylphenol, 4-		2.86	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	25-Apr-2012	091753-008	Chlorobenzenamine, 4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chloroethoxy)methane, bis(2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chloroethyl)ether, bis(2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chloroisopropyl) ether, bis(2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chloronaphthalene, 2-		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chlorophenol, 2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chlorophenyl phenyl ether, 4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Chrysene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Cresol, m,p-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Cresol, o-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Di-n-butyl phthalate		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Di-n-octyl phthalate		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dibenz[a,h]anthracene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dibenzofuran		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dichlorobenzene, 1,2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dichlorobenzene, 1,3-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dichlorobenzene, 1,4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dichlorobenzidine, 3,3'-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dichlorophenol, 2,4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Diethylphthalate		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dimethylphenol, 2,4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dimethylphthalate		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dinitro-o-cresol		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dinitrophenol, 2,4-		4.76	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dinitrotoluene, 2,4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Dinitrotoluene, 2,6-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Diphenyl amine		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Ethylhexyl)phthalate, bis(2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Fluoranthene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Fluorene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Hexachlorobenzene		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Hexachlorobutadiene		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Hexachlorocyclopentadiene		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Hexachloroethane		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Indeno(1,2,3-c,d)pyrene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Isophorone		2.86	U	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	25-Apr-2012	091753-008	Methylnaphthalene, 2-		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Naphthalene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitro-benzene		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitroaniline, 2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitroaniline, 3-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitroaniline, 4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitrophenol, 2-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitrophenol, 4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Nitrosodipropylamine, n-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Pentachlorophenol		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Phenanthrene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Phenol		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Pyrene		0.286	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Trichlorobenzene, 1,2,4-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Trichlorophenol, 2,4,5-		2.86	U	ug/L
WW008	2069I	25-Apr-2012	091753-008	Trichlorophenol, 2,4,6-		2.86	U	ug/L
WW011	2069K	25-Apr-2012	091754-008	Acenaphthene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Acenaphthylene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Anthracene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Benzo(a)anthracene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Benzo(a)pyrene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Benzo(b)fluoranthene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Benzo(ghi)perylene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Benzo(k)fluoranthene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Bromophenyl phenyl ether, 4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Butylbenzyl phthalate		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Carbazole		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chloro-3-methylphenol, 4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chlorobenzenamine, 4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chloroethoxy)methane, bis(2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chloroethyl)ether, bis(2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chloroisopropyl) ether, bis(2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chloronaphthalene, 2-		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chlorophenol, 2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chlorophenyl phenyl ether, 4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Chrysene		0.3	Uh	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW011	2069K	25-Apr-2012	091754-008	Cresol, m,p-	11.3	3	h	ug/L
WW011	2069K	25-Apr-2012	091754-008	Cresol, o-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Di-n-butyl phthalate		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Di-n-octyl phthalate		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dibenz[a,h]anthracene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dibenzofuran		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dichlorobenzene, 1,2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dichlorobenzene, 1,3-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dichlorobenzene, 1,4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dichlorobenzidine, 3,3'-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dichlorophenol, 2,4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Diethylphthalate		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dimethylphenol, 2,4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dimethylphthalate		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dinitro-o-cresol		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dinitrophenol, 2,4-		5	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dinitrotoluene, 2,4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Dinitrotoluene, 2,6-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Diphenyl amine		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Ethylhexyl)phthalate, bis(2-	44.6	3	h	ug/L
WW011	2069K	25-Apr-2012	091754-008	Fluoranthene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Fluorene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Hexachlorobenzene		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Hexachlorobutadiene		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Hexachlorocyclopentadiene		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Hexachloroethane		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Indeno(1,2,3-c,d)pyrene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Isophorone		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Methylnaphthalene, 2-		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Naphthalene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Nitro-benzene		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Nitroaniline, 2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Nitroaniline, 3-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Nitroaniline, 4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Nitrophenol, 2-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Nitrophenol, 4-		3	Uh	ug/L

TABLE A-3. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW011	2069K	25-Apr-2012	091754-008	Nitrosodipropylamine, n-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Pentachlorophenol		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Phenanthrene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Phenol		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Pyrene		0.3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Trichlorobenzene, 1,2,4-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Trichlorophenol, 2,4,5-		3	Uh	ug/L
WW011	2069K	25-Apr-2012	091754-008	Trichlorophenol, 2,4,6-		3	Uh	ug/L

NOTES:

MDL = Minimum detection limit.

h = Sample preparation holding time exceeded.

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective practical quantitation limit (PQL).

ug/L = micrograms per liter.

U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	28-Feb-2012	091738-006	Benzene		0.3	U	ug/L
CINT	2238A	28-Feb-2012	091738-006	Ethyl benzene		0.25	U	ug/L
CINT	2238A	28-Feb-2012	091738-006	Toluene		0.25	U	ug/L
CINT	2238A	28-Feb-2012	091738-006	Xylene		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Acetone	500	3.5		ug/L
CINT	2238A	29-Feb-2012	091740-006	Benzene		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Bromodichloromethane	2.08	0.25		ug/L
CINT	2238A	29-Feb-2012	091740-006	Bromoform		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Bromomethane		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Butanone, 2-		1.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Carbon disulfide		1.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Carbon tetrachloride		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Chlorobenzene		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Chloroethane		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Chloroform	1.47	0.25		ug/L
CINT	2238A	29-Feb-2012	091740-006	Chloromethane		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dibromochloromethane	1.79	0.3		ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloroethane, 1,1-		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloroethane, 1,2-		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloroethene, 1,1-		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloropropane, 1,2-		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloropropene, cis-1,3-		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Dichloropropene, trans-1,3-		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Ethyl benzene		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Hexanone, 2-		1.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Methylene chloride		3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Pentanone, 4-methyl-, 2-		1.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Styrene		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Tetrachloroethane, 1,1,2,2-		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Tetrachloroethene		0.3	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Toluene		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Trichloroethane, 1,1,1-		0.325	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	29-Feb-2012	091740-006	Trichloroethane, 1,1,2-		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Trichloroethene		0.25	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Vinyl acetate		1.5	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Vinyl chloride		0.5	U	ug/L
CINT	2238A	29-Feb-2012	091740-006	Xylene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Acetone	113	3		ug/L
CINT	2238A	24-Apr-2012	091749-006	Benzene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Bromodichloromethane	1.37	0.3		ug/L
CINT	2238A	24-Apr-2012	091749-006	Bromoform	1.9	0.3		ug/L
CINT	2238A	24-Apr-2012	091749-006	Bromomethane		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Butanone, 2-		2	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Carbon disulfide		1.5	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Carbon tetrachloride		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Chlorobenzene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Chloroethane		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Chloroform	1.61	0.3		ug/L
CINT	2238A	24-Apr-2012	091749-006	Chloromethane		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dibromochloromethane	1.47	0.3		ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloroethane, 1,1-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloroethane, 1,2-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloroethene, 1,1-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloropropane, 1,2-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Ethyl benzene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Hexanone, 2-		2.2	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Methylene chloride		3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Styrene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Tetrachloroethene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Toluene		0.3	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	24-Apr-2012	091749-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Trichloroethene		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Vinyl acetate		1.5	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Vinyl chloride		0.3	U	ug/L
CINT	2238A	24-Apr-2012	091749-006	Xylene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Acetone	16.2	3		ug/L
WW001	2069A	24-Apr-2012	091743-006	Benzene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Bromodichloromethane		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Bromoform	1.14	0.3		ug/L
WW001	2069A	24-Apr-2012	091743-006	Bromomethane		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Butanone, 2-		2	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Carbon disulfide		1.5	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Carbon tetrachloride		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Chlorobenzene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Chloroethane		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Chloroform		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Chloromethane		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dibromochloromethane	0.33	0.3	J	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Ethyl benzene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Hexanone, 2-		2.2	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Methylene chloride		3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Styrene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Tetrachloroethene		0.3	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	24-Apr-2012	091743-006	Toluene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Trichloroethene		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Vinyl acetate		1.5	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Vinyl chloride		0.3	U	ug/L
WW001	2069A	24-Apr-2012	091743-006	Xylene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Acetone	35.6	3		ug/L
WW006	2069F	24-Apr-2012	092270-006	Acetone	43.1	3		ug/L
WW006	2069F	24-Apr-2012	091744-006	Benzene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Benzene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Bromodichloromethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Bromodichloromethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Bromoform	0.37	0.3	J	ug/L
WW006	2069F	24-Apr-2012	092270-006	Bromoform		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Bromomethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Bromomethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Butanone, 2-		2	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Butanone, 2-	2.43	2	J	ug/L
WW006	2069F	24-Apr-2012	091744-006	Carbon disulfide		1.5	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Carbon disulfide		1.5	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Carbon tetrachloride		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Carbon tetrachloride		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Chlorobenzene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Chlorobenzene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Chloroethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Chloroethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Chloroform		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Chloroform		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Chloromethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Chloromethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dibromochloromethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dibromochloromethane		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloroethane, 1,1-		0.3	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	24-Apr-2012	092270-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Ethyl benzene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Ethyl benzene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Hexanone, 2-		2.2	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Hexanone, 2-		2.2	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Methylene chloride		3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Methylene chloride		3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Styrene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Styrene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Tetrachloroethene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Tetrachloroethene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Toluene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Toluene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Trichloroethane, 1,1,2-		0.3	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	24-Apr-2012	092270-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Trichloroethene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Trichloroethene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Vinyl acetate		1.5	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Vinyl acetate		1.5	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Vinyl chloride		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Vinyl chloride		0.3	U	ug/L
WW006	2069F	24-Apr-2012	091744-006	Xylene		0.3	U	ug/L
WW006	2069F	24-Apr-2012	092270-006	Xylene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Acetone	7.1	3	J	ug/L
WW007	2069G	24-Apr-2012	091745-006	Benzene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Bromodichloromethane		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Bromoform		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Bromomethane		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Butanone, 2-		2	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Carbon disulfide		1.5	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Carbon tetrachloride		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Chlorobenzene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Chloroethane		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Chloroform		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Chloromethane		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dibromochloromethane		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloroethene, cis-1,2-	0.4	0.3	J	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Ethyl benzene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Hexanone, 2-		2.2	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Methylene chloride		3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	24-Apr-2012	091745-006	Styrene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Tetrachloroethene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Toluene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Trichloroethene		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Vinyl acetate		1.5	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Vinyl chloride		0.3	U	ug/L
WW007	2069G	24-Apr-2012	091745-006	Xylene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Acetone	20.2	3		ug/L
WW008	2069I	24-Apr-2012	091746-006	Benzene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Bromodichloromethane		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Bromoform	7.47	0.3		ug/L
WW008	2069I	24-Apr-2012	091746-006	Bromomethane		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Butanone, 2-	3.33	2	J	ug/L
WW008	2069I	24-Apr-2012	091746-006	Carbon disulfide		1.5	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Carbon tetrachloride		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Chlorobenzene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Chloroethane		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Chloroform		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Chloromethane		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dibromochloromethane		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Ethyl benzene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Hexanone, 2-		2.2	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Methylene chloride		3	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	24-Apr-2012	091746-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Styrene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Tetrachloroethene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Toluene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Trichloroethene		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Vinyl acetate		1.5	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Vinyl chloride		0.3	U	ug/L
WW008	2069I	24-Apr-2012	091746-006	Xylene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Acetone	10.8	3		ug/L
WW011	2069K	24-Apr-2012	091747-006	Benzene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Bromodichloromethane		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Bromoform	0.4	0.3	J	ug/L
WW011	2069K	24-Apr-2012	091747-006	Bromomethane		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Butanone, 2-	2.17	2	J	ug/L
WW011	2069K	24-Apr-2012	091747-006	Carbon disulfide		1.5	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Carbon tetrachloride		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Chlorobenzene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Chloroethane		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Chloroform	0.48	0.3	J	ug/L
WW011	2069K	24-Apr-2012	091747-006	Chloromethane		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dibromochloromethane		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Ethyl benzene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Hexanone, 2-		2.2	U	ug/L

TABLE A-4. Summary of Sanitary Outfalls of Volatile Organic Compounds, February 2012 and April 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW011	2069K	24-Apr-2012	091747-006	Methylene chloride		3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Styrene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Tetrachloroethene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Toluene	1.65	0.3		ug/L
WW011	2069K	24-Apr-2012	091747-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Trichloroethene		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Vinyl acetate		1.5	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Vinyl chloride		0.3	U	ug/L
WW011	2069K	24-Apr-2012	091747-006	Xylene		0.3	U	ug/L

NOTES:

MDL = Method detection limit.

J = Estimated value, the analyte concentration fell above the effective MDL limit and below the effective practical quantitation limit (PQL).

ug/L = micrograms per liter.

U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2069A	WW001	Aluminum	0.068	mg/L	900
2069A	WW001	Aluminum	0.101	mg/L	900
2069A	WW001	Aluminum	0.127	mg/L	900
2069A	WW001	Aluminum	0.2	mg/L	900
		Aluminum Average	*0.124*		
		Aluminum StdDev	*0.056*		
		Aluminum Min	*0.068*		
		Aluminum Max	*0.200*		
2069A	WW001	Ammonia	10.8	mg/L	
2069A	WW001	Ammonia	13.2	mg/L	
2069A	WW001	Ammonia	18.1	mg/L	
2069A	WW001	Ammonia	23.2	mg/L	
		Ammonia Average	*16.325*		
		Ammonia StdDev	*5.499*		
		Ammonia Min	*10.800*		
		Ammonia Max	*23.200*		
2069A	WW001	Arsenic	0.005	mg/L	0.051
2069A	WW001	Arsenic	0.00762	mg/L	0.051
2069A	WW001	Arsenic	0.00792	mg/L	0.051
2069A	WW001	Arsenic	0.00795	mg/L	0.051
		Arsenic Average	*0.007*		
		Arsenic StdDev	*0.001*		
		Arsenic Min	*0.005*		
		Arsenic Max	*0.008*		
2069A	WW001	Boron	0.0755	mg/L	
2069A	WW001	Boron	0.0985	mg/L	
2069A	WW001	Boron	0.126	mg/L	
2069A	WW001	Boron	0.16	mg/L	
		Boron Average	*0.115*		
		Boron StdDev	*0.036*		
		Boron Min	*0.076*		
		Boron Max	*0.160*		
2069A	WW001	Cadmium	0.001	mg/L	0.05
2069A	WW001	Cadmium	0.001	mg/L	0.05
2069A	WW001	Cadmium	0.001	mg/L	0.05
2069A	WW001	Cadmium	0.001	mg/L	0.05
		Cadmium Average	*0.001*		
		Cadmium StdDev	*0.000*		
		Cadmium Min	*0.001*		
		Cadmium Max	*0.001*		
2069A	WW001	Chromium	0.00356	mg/L	4.1
2069A	WW001	Chromium	0.00451	mg/L	4.1
2069A	WW001	Chromium	0.00464	mg/L	4.1
2069A	WW001	Chromium	0.00501	mg/L	4.1
		Chromium Average	*0.004*		
		Chromium StdDev	*0.001*		
		Chromium Min	*0.004*		
		Chromium Max	*0.005*		

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2069A	WW001	Copper	0.0314	mg/L	5.3
2069A	WW001	Copper	0.0318	mg/L	5.3
2069A	WW001	Copper	0.0338	mg/L	5.3
2069A	WW001	Copper	0.0475	mg/L	5.3
		Copper Average	*0.036*		
		Copper StdDev	*0.008*		
		Copper Min	*0.031*		
		Copper Max	*0.048*		
2069A	WW001	Fluoride	2.24	mg/L	36
2069A	WW001	Fluoride	3.03	mg/L	36
2069A	WW001	Fluoride	3.52	mg/L	36
2069A	WW001	Fluoride	3.58	mg/L	36
		Fluoride Average	*3.093*		
		Fluoride StdDev	*0.619*		
		Fluoride Min	*2.240*		
		Fluoride Max	*3.580*		
2069A	WW001	Lead	0.0033	mg/L	1
2069A	WW001	Lead	0.0033	mg/L	1
2069A	WW001	Lead	0.00937	mg/L	1
2069A	WW001	Lead	0.0123	mg/L	1
		Lead Average	*0.007*		
		Lead StdDev	*0.005*		
		Lead Min	*0.003*		
		Lead Max	*0.012*		
2069A	WW001	Molybdenum	0.0914	mg/L	2
2069A	WW001	Molybdenum	0.114	mg/L	2
2069A	WW001	Molybdenum	0.125	mg/L	2
2069A	WW001	Molybdenum	0.126	mg/L	2
		Molybdenum Average	*0.114*		
		Molybdenum StdDev	*0.016*		
		Molybdenum Min	*0.091*		
		Molybdenum Max	*0.126*		
2069A	WW001	Nickel	0.0015	mg/L	2
2069A	WW001	Nickel	0.0015	mg/L	2
2069A	WW001	Nickel	0.0015	mg/L	2
2069A	WW001	Nickel	0.00151	mg/L	2
		Nickel Average	*0.002*		
		Nickel StdDev	*0.000*		
		Nickel Min	*0.002*		
		Nickel Max	*0.002*		
2069A	WW001	Selenium	0.006	mg/L	0.46
2069A	WW001	Selenium	0.006	mg/L	0.46
2069A	WW001	Selenium	0.006	mg/L	0.46
2069A	WW001	Selenium	0.006	mg/L	0.46
		Selenium Average	*0.006*		
		Selenium StdDev	*0.000*		
		Selenium Min	*0.006*		
		Selenium Max	*0.006*		

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2069A	WW001	Silver	0.001	mg/L	5
2069A	WW001	Silver	0.001	mg/L	5
2069A	WW001	Silver	0.00483	mg/L	5
2069A	WW001	Silver	0.00598	mg/L	5
		Silver Average	*0.003*		
		Silver StdDev	*0.003*		
		Silver Min	*0.001*		
		Silver Max	*0.006*		
2069A	WW001	Zinc	0.0585	mg/L	2.2
2069A	WW001	Zinc	0.0653	mg/L	2.2
2069A	WW001	Zinc	0.0728	mg/L	2.2
2069A	WW001	Zinc	0.089	mg/L	2.2
		Zinc Average	*0.071*		
		Zinc StdDev	*0.013*		
		Zinc Min	*0.059*		
		Zinc Max	*0.089*		
2069F	WW006	Aluminum	0.267	mg/L	900
2069F	WW006	Aluminum	0.269	mg/L	900
2069F	WW006	Aluminum	0.273	mg/L	900
2069F	WW006	Aluminum	0.337	mg/L	900
		Aluminum Average	*0.287*		
		Aluminum StdDev	*0.034*		
		Aluminum Min	*0.267*		
		Aluminum Max	*0.337*		
2069F	WW006	Ammonia	42.6	mg/L	
2069F	WW006	Ammonia	43.9	mg/L	
2069F	WW006	Ammonia	44.8	mg/L	
2069F	WW006	Ammonia	58	mg/L	
		Ammonia Average	*47.325*		
		Ammonia StdDev	*7.174*		
		Ammonia Min	*42.600*		
		Ammonia Max	*58.000*		
2069F	WW006	Arsenic	0.005	mg/L	0.051
2069F	WW006	Arsenic	0.00573	mg/L	0.051
2069F	WW006	Arsenic	0.00603	mg/L	0.051
2069F	WW006	Arsenic	0.00654	mg/L	0.051
		Arsenic Average	*0.006*		
		Arsenic StdDev	*0.001*		
		Arsenic Min	*0.005*		
		Arsenic Max	*0.007*		
2069F	WW006	Boron	0.127	mg/L	
2069F	WW006	Boron	0.164	mg/L	
2069F	WW006	Boron	0.181	mg/L	
2069F	WW006	Boron	0.238	mg/L	
		Boron Average	*0.178*		
		Boron StdDev	*0.046*		
		Boron Min	*0.127*		
		Boron Max	*0.238*		

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2069F	WW006	Cadmium	0.001	mg/L	0.05
2069F	WW006	Cadmium	0.001	mg/L	0.05
2069F	WW006	Cadmium	0.001	mg/L	0.05
2069F	WW006	Cadmium	0.001	mg/L	0.05
		Cadmium Average	*0.001*		
		Cadmium StdDev	*0.000*		
		Cadmium Min	*0.001*		
		Cadmium Max	*0.001*		
2069F	WW006	Chromium	0.00262	mg/L	4.1
2069F	WW006	Chromium	0.00382	mg/L	4.1
2069F	WW006	Chromium	0.00399	mg/L	4.1
2069F	WW006	Chromium	0.00455	mg/L	4.1
		Chromium Average	*0.004*		
		Chromium StdDev	*0.001*		
		Chromium Min	*0.003*		
		Chromium Max	*0.005*		
2069F	WW006	Copper	0.0262	mg/L	5.3
2069F	WW006	Copper	0.03	mg/L	5.3
2069F	WW006	Copper	0.0398	mg/L	5.3
2069F	WW006	Copper	0.0533	mg/L	5.3
		Copper Average	*0.037*		
		Copper StdDev	*0.012*		
		Copper Min	*0.026*		
		Copper Max	*0.053*		
2069F	WW006	Cyanide, total	0.00167	mg/L	0.45
2069F	WW006	Cyanide, total	0.00175	mg/L	0.45
2069F	WW006	Cyanide, total	0.00215	mg/L	0.45
2069F	WW006	Cyanide, total	0.00239	mg/L	0.45
2069F	WW006	Cyanide, total	0.00272	mg/L	0.45
2069F	WW006	Cyanide, total	0.00294	mg/L	0.45
2069F	WW006	Cyanide, total	0.00339	mg/L	0.45
2069F	WW006	Cyanide, total	0.00427	mg/L	0.45
		Cyanide, total Average	*0.003*		
		Cyanide, total StdDev	*0.001*		
		Cyanide, total Min	*0.002*		
		Cyanide, total Max	*0.004*		
2069F	WW006	Fluoride	0.786	mg/L	36
2069F	WW006	Fluoride	0.831	mg/L	36
2069F	WW006	Fluoride	0.858	mg/L	36
2069F	WW006	Fluoride	1.06	mg/L	36
		Fluoride Average	*0.884*		
		Fluoride StdDev	*0.121*		
		Fluoride Min	*0.786*		
		Fluoride Max	*1.060*		
2069F	WW006	Lead	0.0033	mg/L	1
2069F	WW006	Lead	0.0033	mg/L	1
2069F	WW006	Lead	0.0033	mg/L	1
2069F	WW006	Lead	0.0033	mg/L	1

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Lead Average	*0.003*		
		Lead StdDev	*0.000*		
		Lead Min	*0.003*		
		Lead Max	*0.003*		
2069F	WW006	Molybdenum	0.094	mg/L	2
2069F	WW006	Molybdenum	0.122	mg/L	2
2069F	WW006	Molybdenum	0.183	mg/L	2
2069F	WW006	Molybdenum	0.19	mg/L	2
		Molybdenum Average	*0.147*		
		Molybdenum StdDev	*0.047*		
		Molybdenum Min	*0.094*		
		Molybdenum Max	*0.190*		
2069F	WW006	Nickel	0.0015	mg/L	2
2069F	WW006	Nickel	0.0015	mg/L	2
2069F	WW006	Nickel	0.00168	mg/L	2
2069F	WW006	Nickel	0.00239	mg/L	2
		Nickel Average	*0.002*		
		Nickel StdDev	*0.000*		
		Nickel Min	*0.002*		
		Nickel Max	*0.002*		
2069F	WW006	Selenium	0.006	mg/L	0.46
2069F	WW006	Selenium	0.006	mg/L	0.46
2069F	WW006	Selenium	0.006	mg/L	0.46
2069F	WW006	Selenium	**0.006**	mg/L	0.46
		Selenium Average	*0.006*		
		Selenium StdDev	*0*		
		Selenium Min	*0.006*		
		Selenium Max	*0.006*		
2069F	WW006	Silver	**0.001**	mg/L	5
2069F	WW006	Silver	**0.002**	mg/L	5
2069F	WW006	Silver	0.00742	mg/L	5
2069F	WW006	Silver	0.00837	mg/L	5
		Silver Average	*0.005*		
		Silver StdDev	*0.004*		
		Silver Min	*0.001*		
		Silver Max	*0.008*		
2069F	WW006	Zinc	**0.090**	mg/L	2.2
2069F	WW006	Zinc	0.0998	mg/L	2.2
2069F	WW006	Zinc	0.133	mg/L	2.2
2069F	WW006	Zinc	0.361	mg/L	2.2
		Zinc Average	*0.171*		
		Zinc StdDev	*0.128*		
		Zinc Min	*0.090*		
		Zinc Max	*0.361*		
2069F	WW006 #2	Cyanide, total	0.00262	mg/L	0.45
2069F	WW006 #2	Cyanide, total	0.00304	mg/L	0.45
2069F	WW006 #2	Cyanide, total	0.00351	mg/L	0.45
2069F	WW006 #2	Cyanide, total	0.004	mg/L	0.45

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Cyanide, total Average	*0.003*		
		Cyanide, total StdDev	*0.001*		
		Cyanide, total Min	*0.003*		
		Cyanide, total Max	*0.004*		
2069G	WW007	Aluminum	0.068	mg/L	900
2069G	WW007	Aluminum	0.068	mg/L	900
2069G	WW007	Aluminum	0.068	mg/L	900
2069G	WW007	Aluminum	0.068	mg/L	900
		Aluminum Average	*0.068*		
		Aluminum StdDev	*0.000*		
		Aluminum Min	*0.068*		
		Aluminum Max	*0.068*		
2069G	WW007	Ammonia	1.1	mg/L	
2069G	WW007	Ammonia	1.2	mg/L	
2069G	WW007	Ammonia	1.51	mg/L	
2069G	WW007	Ammonia	2.99	mg/L	
		Ammonia Average	*1.700*		
		Ammonia StdDev	*0.878*		
		Ammonia Min	*1.100*		
		Ammonia Max	*2.990*		
2069G	WW007	Arsenic	0.005	mg/L	0.051
2069G	WW007	Arsenic	0.005	mg/L	0.051
2069G	WW007	Arsenic	0.005	mg/L	0.051
2069G	WW007	Arsenic	0.005	mg/L	0.051
		Arsenic Average	*0.005*		
		Arsenic StdDev	*0.000*		
		Arsenic Min	*0.005*		
		Arsenic Max	*0.005*		
2069G	WW007	Boron	0.0215	mg/L	
2069G	WW007	Boron	0.0225	mg/L	
2069G	WW007	Boron	0.0233	mg/L	
2069G	WW007	Boron	0.0318	mg/L	
		Boron Average	*0.025*		
		Boron StdDev	*0.005*		
		Boron Min	*0.022*		
		Boron Max	*0.032*		
2069G	WW007	Cadmium	0.001	mg/L	0.05
2069G	WW007	Cadmium	0.001	mg/L	0.05
2069G	WW007	Cadmium	0.001	mg/L	0.05
2069G	WW007	Cadmium	0.001	mg/L	0.05
		Cadmium Average	*0.001*		
		Cadmium StdDev	*0.000*		
		Cadmium Min	*0.001*		
		Cadmium Max	*0.001*		
2069G	WW007	Chromium	0.001	mg/L	4.1
2069G	WW007	Chromium	0.00194	mg/L	4.1
2069G	WW007	Chromium	0.00221	mg/L	4.1
2069G	WW007	Chromium	0.00231	mg/L	4.1

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Chromium Average	*0.002*		
		Chromium StdDev	*0.001*		
		Chromium Min	*0.001*		
		Chromium Max	*0.002*		
2069G	WW007	Copper	0.003	mg/L	5.3
2069G	WW007	Copper	0.003	mg/L	5.3
2069G	WW007	Copper	0.00426	mg/L	5.3
2069G	WW007	Copper	0.00494	mg/L	5.3
		Copper Average	*0.004*		
		Copper StdDev	*0.001*		
		Copper Min	*0.003*		
		Copper Max	*0.005*		
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00167	mg/L	0.45
2069G	WW007	Cyanide, total	0.00288	mg/L	0.45
		Cyanide, total Average	*0.002*		
		Cyanide, total StdDev	*0.000*		
		Cyanide, total Min	*0.002*		
		Cyanide, total Max	*0.003*		
2069G	WW007	Fluoride	1.48	mg/L	36
2069G	WW007	Fluoride	1.55	mg/L	36
2069G	WW007	Fluoride	4.36	mg/L	36
2069G	WW007	Fluoride	8.39	mg/L	36
		Fluoride Average	*3.945*		
		Fluoride StdDev	*3.253*		
		Fluoride Min	*1.480*		
		Fluoride Max	*8.390*		
2069G	WW007	Lead	0.0033	mg/L	1
2069G	WW007	Lead	0.0033	mg/L	1
2069G	WW007	Lead	0.0033	mg/L	1
2069G	WW007	Lead	0.0033	mg/L	1
		Lead Average	*0.003*		
		Lead StdDev	*0.000*		
		Lead Min	*0.003*		
		Lead Max	*0.003*		
2069G	WW007	Molybdenum	0.0184	mg/L	2
2069G	WW007	Molybdenum	0.0187	mg/L	2
2069G	WW007	Molybdenum	0.0197	mg/L	2
2069G	WW007	Molybdenum	0.0226	mg/L	2
		Molybdenum Average	*0.020*		
		Molybdenum StdDev	*0.002*		
		Molybdenum Min	*0.018*		
		Molybdenum Max	*0.023*		

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2069G	WW007	Nickel	0.0015	mg/L	2
2069G	WW007	Nickel	0.0015	mg/L	2
2069G	WW007	Nickel	0.0015	mg/L	2
2069G	WW007	Nickel	0.0015	mg/L	2
		Nickel Average	*0.002*		
		Nickel StdDev	*0.000*		
		Nickel Min	*0.002*		
		Nickel Max	*0.002*		
2069G	WW007	Selenium	0.006	mg/L	0.46
2069G	WW007	Selenium	0.006	mg/L	0.46
2069G	WW007	Selenium	0.006	mg/L	0.46
2069G	WW007	Selenium	0.006	mg/L	0.46
		Selenium Average	*0.006*		
		Selenium StdDev	*0.000*		
		Selenium Min	*0.006*		
		Selenium Max	*0.006*		
2069G	WW007	Silver	0.001	mg/L	5
2069G	WW007	Silver	0.001	mg/L	5
2069G	WW007	Silver	0.00269	mg/L	5
2069G	WW007	Silver	0.00311	mg/L	5
		Silver Average	*0.002*		
		Silver StdDev	*0.001*		
		Silver Min	*0.001*		
		Silver Max	*0.003*		
2069G	WW007	Zinc	0.0033	mg/L	2.2
2069G	WW007	Zinc	0.0033	mg/L	2.2
2069G	WW007	Zinc	0.0033	mg/L	2.2
2069G	WW007	Zinc	0.00473	mg/L	2.2
		Zinc Average	*0.004*		
		Zinc StdDev	*0.001*		
		Zinc Min	*0.003*		
		Zinc Max	*0.005*		
2069I	WW008	Aluminum	0.068	mg/L	900
2069I	WW008	Aluminum	0.068	mg/L	900
2069I	WW008	Aluminum	0.191	mg/L	900
2069I	WW008	Aluminum	0.27	mg/L	900
		Aluminum Average	*0.149*		
		Aluminum StdDev	*0.099*		
		Aluminum Min	*0.068*		
		Aluminum Max	*0.270*		
2069I	WW008	Ammonia	47.7	mg/L	
2069I	WW008	Ammonia	54	mg/L	
2069I	WW008	Ammonia	63.5	mg/L	
2069I	WW008	Ammonia	67.5	mg/L	
		Ammonia Average	*58.175*		
		Ammonia StdDev	*8.990*		
		Ammonia Min	*47.700*		
		Ammonia Max	*67.500*		

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2069I	WW008	Arsenic	0.005	mg/L	0.051
2069I	WW008	Arsenic	0.005	mg/L	0.051
2069I	WW008	Arsenic	0.00709	mg/L	0.051
2069I	WW008	Arsenic	0.00764	mg/L	0.051
		Arsenic Average	*0.006*		
		Arsenic StdDev	*0.001*		
		Arsenic Min	*0.005*		
		Arsenic Max	*0.008*		
2069I	WW008	Boron	0.123	mg/L	
2069I	WW008	Boron	0.134	mg/L	
2069I	WW008	Boron	0.237	mg/L	
2069I	WW008	Boron	0.329	mg/L	
		Boron Average	*0.206*		
		Boron StdDev	*0.097*		
		Boron Min	*0.123*		
		Boron Max	*0.329*		
2069I	WW008	Cadmium	0.001	mg/L	0.05
2069I	WW008	Cadmium	0.001	mg/L	0.05
2069I	WW008	Cadmium	0.001	mg/L	0.05
2069I	WW008	Cadmium	0.001	mg/L	0.05
		Cadmium Average	*0.001*		
		Cadmium StdDev	*0.000*		
		Cadmium Min	*0.001*		
		Cadmium Max	*0.001*		
2069I	WW008	Chromium	0.00242	mg/L	4.1
2069I	WW008	Chromium	0.00264	mg/L	4.1
2069I	WW008	Chromium	0.00378	mg/L	4.1
2069I	WW008	Chromium	0.00558	mg/L	4.1
		Chromium Average	*0.004*		
		Chromium StdDev	*0.001*		
		Chromium Min	*0.002*		
		Chromium Max	*0.006*		
2069I	WW008	Copper	0.0436	mg/L	5.3
2069I	WW008	Copper	0.0438	mg/L	5.3
2069I	WW008	Copper	0.0824	mg/L	5.3
2069I	WW008	Copper	0.0862	mg/L	5.3
		Copper Average	*0.064*		
		Copper StdDev	*0.023*		
		Copper Min	*0.044*		
		Copper Max	*0.086*		
2069I	WW008	Cyanide, total	0.00167	mg/L	0.45
2069I	WW008	Cyanide, total	0.00171	mg/L	0.45
2069I	WW008	Cyanide, total	0.00186	mg/L	0.45
2069I	WW008	Cyanide, total	0.00225	mg/L	0.45
2069I	WW008	Cyanide, total	0.00292	mg/L	0.45
2069I	WW008	Cyanide, total	0.00477	mg/L	0.45
2069I	WW008	Cyanide, total	0.00614	mg/L	0.45
2069I	WW008	Cyanide, total	0.00778	mg/L	0.45

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Cyanide, total Average	*0.004*		
		Cyanide, total StdDev	*0.002*		
		Cyanide, total Min	*0.002*		
		Cyanide, total Max	*0.008*		
2069I	WW008	Fluoride	0.712	mg/L	36
2069I	WW008	Fluoride	0.718	mg/L	36
2069I	WW008	Fluoride	0.993	mg/L	36
2069I	WW008	Fluoride	0.998	mg/L	36
		Fluoride Average	*0.855*		
		Fluoride StdDev	*0.162*		
		Fluoride Min	*0.712*		
		Fluoride Max	*0.998*		
2069I	WW008	Lead	0.0033	mg/L	1
2069I	WW008	Lead	0.0033	mg/L	1
2069I	WW008	Lead	0.0033	mg/L	1
2069I	WW008	Lead	0.0033	mg/L	1
		Lead Average	*0.003*		
		Lead StdDev	*0.000*		
		Lead Min	*0.003*		
		Lead Max	*0.003*		
2069I	WW008	Molybdenum	0.0224	mg/L	2
2069I	WW008	Molybdenum	0.0226	mg/L	2
2069I	WW008	Molybdenum	0.106	mg/L	2
2069I	WW008	Molybdenum	0.114	mg/L	2
		Molybdenum Average	*0.066*		
		Molybdenum StdDev	*0.051*		
		Molybdenum Min	*0.022*		
		Molybdenum Max	*0.114*		
2069I	WW008	Nickel	0.00481	mg/L	2
2069I	WW008	Nickel	0.00532	mg/L	2
2069I	WW008	Nickel	0.00596	mg/L	2
2069I	WW008	Nickel	0.0108	mg/L	2
		Nickel Average	*0.007*		
		Nickel StdDev	*0.003*		
		Nickel Min	*0.005*		
		Nickel Max	*0.011*		
2069I	WW008	Selenium	0.006	mg/L	0.46
2069I	WW008	Selenium	0.006	mg/L	0.46
2069I	WW008	Selenium	0.006	mg/L	0.46
2069I	WW008	Selenium	0.006	mg/L	0.46
		Selenium Average	*0.006*		
		Selenium StdDev	*0.000*		
		Selenium Min	*0.006*		
		Selenium Max	*0.006*		
2069I	WW008	Silver	0.001	mg/L	5
2069I	WW008	Silver	0.001	mg/L	5
2069I	WW008	Silver	0.00383	mg/L	5
2069I	WW008	Silver	0.00454	mg/L	5

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Silver Average	*0.003*		
		Silver StdDev	*0.002*		
		Silver Min	*0.001*		
		Silver Max	*0.005*		
2069I	WW008	Zinc	0.105	mg/L	2.2
2069I	WW008	Zinc	0.106	mg/L	2.2
2069I	WW008	Zinc	0.14	mg/L	2.2
2069I	WW008	Zinc	0.157	mg/L	2.2
		Zinc Average	*0.127*		
		Zinc StdDev	*0.026*		
		Zinc Min	*0.105*		
		Zinc Max	*0.157*		
2069K	WW011	Aluminum	0.116	mg/L	900
2069K	WW011	Aluminum	0.144	mg/L	900
2069K	WW011	Aluminum	0.164	mg/L	900
2069K	WW011	Aluminum	0.318	mg/L	900
		Aluminum Average	*0.186*		
		Aluminum StdDev	*0.091*		
		Aluminum Min	*0.116*		
		Aluminum Max	*0.318*		
2069K	WW011	Ammonia	18.4	mg/L	
2069K	WW011	Ammonia	21.7	mg/L	
2069K	WW011	Ammonia	25.1	mg/L	
2069K	WW011	Ammonia	31.2	mg/L	
		Ammonia Average	*24.100*		
		Ammonia StdDev	*5.467*		
		Ammonia Min	*18.400*		
		Ammonia Max	*31.200*		
2069K	WW011	Arsenic	0.005	mg/L	0.051
2069K	WW011	Arsenic	0.0062	mg/L	0.051
2069K	WW011	Arsenic	0.00649	mg/L	0.051
2069K	WW011	Arsenic	0.00938	mg/L	0.051
		Arsenic Average	*0.007*		
		Arsenic StdDev	*0.002*		
		Arsenic Min	*0.005*		
		Arsenic Max	*0.009*		
2069K	WW011	Boron	0.0884	mg/L	
2069K	WW011	Boron	0.0924	mg/L	
2069K	WW011	Boron	0.0945	mg/L	
2069K	WW011	Boron	0.164	mg/L	
		Boron Average	*0.110*		
		Boron StdDev	*0.036*		
		Boron Min	*0.088*		
		Boron Max	*0.164*		
2069K	WW011	Cadmium	0.001	mg/L	0.05
2069K	WW011	Cadmium	0.001	mg/L	0.05
2069K	WW011	Cadmium	0.001	mg/L	0.05
2069K	WW011	Cadmium	0.001	mg/L	0.05

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Cadmium Average	*0.001*		
		Cadmium StdDev	*0.000*		
		Cadmium Min	*0.001*		
		Cadmium Max	*0.001*		
2069K	WW011	Chromium	0.00574	mg/L	4.1
2069K	WW011	Chromium	0.00753	mg/L	4.1
2069K	WW011	Chromium	0.00883	mg/L	4.1
2069K	WW011	Chromium	0.0222	mg/L	4.1
		Chromium Average	*0.011*		
		Chromium StdDev	*0.008*		
		Chromium Min	*0.006*		
		Chromium Max	*0.022*		
2069K	WW011	Copper	0.0301	mg/L	5.3
2069K	WW011	Copper	0.0512	mg/L	5.3
2069K	WW011	Copper	0.0518	mg/L	5.3
2069K	WW011	Copper	0.0724	mg/L	5.3
		Copper Average	*0.051*		
		Copper StdDev	*0.017*		
		Copper Min	*0.030*		
		Copper Max	*0.072*		
2069K	WW011	Fluoride	0.724	mg/L	36
2069K	WW011	Fluoride	0.792	mg/L	36
2069K	WW011	Fluoride	0.873	mg/L	36
2069K	WW011	Fluoride	0.898	mg/L	36
		Fluoride Average	*0.822*		
		Fluoride StdDev	*0.079*		
		Fluoride Min	*0.724*		
		Fluoride Max	*0.898*		
2069K	WW011	Lead	0.0033	mg/L	1
2069K	WW011	Lead	0.0033	mg/L	1
2069K	WW011	Lead	0.0033	mg/L	1
2069K	WW011	Lead	0.00377	mg/L	1
		Lead Average	*0.003*		
		Lead StdDev	*0.000*		
		Lead Min	*0.003*		
		Lead Max	*0.004*		
2069K	WW011	Molybdenum	0.0663	mg/L	2
2069K	WW011	Molybdenum	0.0915	mg/L	2
2069K	WW011	Molybdenum	0.167	mg/L	2
2069K	WW011	Molybdenum	0.193	mg/L	2
		Molybdenum Average	*0.129*		
		Molybdenum StdDev	*0.060*		
		Molybdenum Min	*0.066*		
		Molybdenum Max	*0.193*		
2069K	WW011	Nickel	0.0015	mg/L	2
2069K	WW011	Nickel	0.00222	mg/L	2
2069K	WW011	Nickel	0.0032	mg/L	2
2069K	WW011	Nickel	0.00676	mg/L	2

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
		Nickel Average	*0.003*		
		Nickel StdDev	*0.002*		
		Nickel Min	*0.002*		
		Nickel Max	*0.007*		
2069K	WW011	Selenium	0.006	mg/L	0.46
2069K	WW011	Selenium	0.006	mg/L	0.46
2069K	WW011	Selenium	0.006	mg/L	0.46
2069K	WW011	Selenium	0.006	mg/L	0.46
		Selenium Average	*0.006*		
		Selenium StdDev	*0.000*		
		Selenium Min	*0.006*		
		Selenium Max	*0.006*		
2069K	WW011	Silver	0.001	mg/L	5
2069K	WW011	Silver	0.001	mg/L	5
2069K	WW011	Silver	0.00713	mg/L	5
2069K	WW011	Silver	0.00755	mg/L	5
		Silver Average	*0.004*		
		Silver StdDev	*0.004*		
		Silver Min	*0.001*		
		Silver Max	*0.008*		
2069K	WW011	Zinc	0.11	mg/L	2.2
2069K	WW011	Zinc	0.124	mg/L	2.2
2069K	WW011	Zinc	0.154	mg/L	2.2
2069K	WW011	Zinc	0.166	mg/L	2.2
		Zinc Average	*0.139*		
		Zinc StdDev	*0.026*		
		Zinc Min	*0.110*		
		Zinc Max	*0.166*		
2238A	CINT	Aluminum	0.068	mg/L	900
2238A	CINT	Aluminum	0.068	mg/L	900
2238A	CINT	Aluminum	0.068	mg/L	900
2238A	CINT	Aluminum	0.068	mg/L	900
2238A	CINT	Aluminum	0.068	mg/L	900
		Aluminum Average	*0.068*		
		Aluminum StdDev	*0.000*		
		Aluminum Min	*0.068*		
		Aluminum Max	*0.068*		
2238A	CINT	Ammonia	0.0678	mg/L	
2238A	CINT	Ammonia	0.0774	mg/L	
2238A	CINT	Ammonia	0.13	mg/L	
2238A	CINT	Ammonia	0.196	mg/L	
		Ammonia Average	*0.118*		
		Ammonia StdDev	*0.059*		
		Ammonia Min	*0.068*		
		Ammonia Max	*0.196*		
2238A	CINT	Arsenic	0.005	mg/L	0.051
2238A	CINT	Arsenic	0.005	mg/L	0.051
2238A	CINT	Arsenic	0.005	mg/L	0.051

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2238A	CINT	Arsenic	0.00582	mg/L	0.051
2238A	CINT	Arsenic	0.00818	mg/L	0.051
		Arsenic Average	*0.006*		
		Arsenic StdDev	*0.001*		
		Arsenic Min	*0.005*		
		Arsenic Max	*0.008*		
2238A	CINT	Boron	0.052	mg/L	
2238A	CINT	Boron	0.0552	mg/L	
2238A	CINT	Boron	0.0588	mg/L	
2238A	CINT	Boron	0.0634	mg/L	
2238A	CINT	Boron	0.0646	mg/L	
		Boron Average	*0.059*		
		Boron StdDev	*0.005*		
		Boron Min	*0.052*		
		Boron Max	*0.065*		
2238A	CINT	Cadmium	0.001	mg/L	0.05
2238A	CINT	Cadmium	0.001	mg/L	0.05
2238A	CINT	Cadmium	0.001	mg/L	0.05
2238A	CINT	Cadmium	0.001	mg/L	0.05
2238A	CINT	Cadmium	0.001	mg/L	0.05
		Cadmium Average	*0.001*		
		Cadmium StdDev	*0.000*		
		Cadmium Min	*0.001*		
		Cadmium Max	*0.001*		
2238A	CINT	Chromium	0.00175	mg/L	4.1
2238A	CINT	Chromium	0.00216	mg/L	4.1
2238A	CINT	Chromium	0.004	mg/L	4.1
2238A	CINT	Chromium	0.00412	mg/L	4.1
2238A	CINT	Chromium	0.00452	mg/L	4.1
		Chromium Average	*0.003*		
		Chromium StdDev	*0.001*		
		Chromium Min	*0.002*		
		Chromium Max	*0.005*		
2238A	CINT	Copper	0.00408	mg/L	5.3
2238A	CINT	Copper	0.00413	mg/L	5.3
2238A	CINT	Copper	0.0057	mg/L	5.3
2238A	CINT	Copper	0.0105	mg/L	5.3
2238A	CINT	Copper	0.0233	mg/L	5.3
		Copper Average	*0.010*		
		Copper StdDev	*0.008*		
		Copper Min	*0.004*		
		Copper Max	*0.023*		
2238A	CINT	Cyanide, total	0.0015	mg/L	0.45
2238A	CINT	Cyanide, total	0.0015	mg/L	0.45
2238A	CINT	Cyanide, total	0.0015	mg/L	0.45
2238A	CINT	Cyanide, total	0.0015	mg/L	0.45
2238A	CINT	Cyanide, total	0.0015	mg/L	0.45
2238A	CINT	Cyanide, total	0.00167	mg/L	0.45

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2238A	CINT	Cyanide, total	0.00167	mg/L	0.45
2238A	CINT	Cyanide, total	0.00167	mg/L	0.45
2238A	CINT	Cyanide, total	0.00167	mg/L	0.45
		Cyanide, total Average	*0.002*		
		Cyanide, total StdDev	*0.000*		
		Cyanide, total Min	*0.002*		
		Cyanide, total Max	*0.002*		
2238A	CINT	Fluoride	0.579	mg/L	36
2238A	CINT	Fluoride	0.889	mg/L	36
2238A	CINT	Fluoride	0.955	mg/L	36
2238A	CINT	Fluoride	0.978	mg/L	36
2238A	CINT	Fluoride	2.76	mg/L	36
		Fluoride Average	*1.232*		
		Fluoride StdDev	*0.869*		
		Fluoride Min	*0.579*		
		Fluoride Max	*2.760*		
2238A	CINT	Lead	0.0033	mg/L	1
2238A	CINT	Lead	0.0033	mg/L	1
2238A	CINT	Lead	0.0033	mg/L	1
2238A	CINT	Lead	0.0033	mg/L	1
2238A	CINT	Lead	0.0106	mg/L	1
		Lead Average	*0.005*		
		Lead StdDev	*0.003*		
		Lead Min	*0.003*		
		Lead Max	*0.011*		
2238A	CINT	Mercury	0.000066	mg/L	
		Mercury Average	*0.000*		
		Mercury StdDev	*#DIV/0!*		
		Mercury Min	*0.000*		
		Mercury Max	*0.000*		
2238A	CINT	Molybdenum	0.028	mg/L	2
2238A	CINT	Molybdenum	0.0323	mg/L	2
2238A	CINT	Molybdenum	0.0438	mg/L	2
2238A	CINT	Molybdenum	0.0489	mg/L	2
2238A	CINT	Molybdenum	0.0528	mg/L	2
		Molybdenum Average	*0.041*		
		Molybdenum StdDev	*0.011*		
		Molybdenum Min	*0.028*		
		Molybdenum Max	*0.053*		
2238A	CINT	Nickel	0.0015	mg/L	2
2238A	CINT	Nickel	0.0015	mg/L	2
2238A	CINT	Nickel	0.0015	mg/L	2
2238A	CINT	Nickel	0.0015	mg/L	2
2238A	CINT	Nickel	0.0015	mg/L	2
		Nickel Average	*0.002*		
		Nickel StdDev	*0.000*		
		Nickel Min	*0.002*		
		Nickel Max	*0.002*		

TABLE A-5. Permitted Sanitary Outfalls of Non-radiological (Inorganic) Analyses, CY 2012

Permit Number	Station	Analyte	Result	Units	Regulatory Limit (ABCWUA)
2238A	CINT	Selenium	0.006	mg/L	0.46
2238A	CINT	Selenium	0.006	mg/L	0.46
2238A	CINT	Selenium	0.006	mg/L	0.46
2238A	CINT	Selenium	0.00715	mg/L	0.46
2238A	CINT	Selenium	0.00853	mg/L	0.46
		Selenium Average	*0.007*		
		Selenium StdDev	*0.001*		
		Selenium Min	*0.006*		
		Selenium Max	*0.009*		
2238A	CINT	Silver	0.001	mg/L	5
2238A	CINT	Silver	0.001	mg/L	5
2238A	CINT	Silver	0.001	mg/L	5
2238A	CINT	Silver	0.001	mg/L	5
2238A	CINT	Silver	0.001	mg/L	5
		Silver Average	*0.001*		
		Silver StdDev	*0.000*		
		Silver Min	*0.001*		
		Silver Max	*0.001*		
2238A	CINT	Zinc	0.00366	mg/L	2.2
2238A	CINT	Zinc	0.00377	mg/L	2.2
2238A	CINT	Zinc	0.00457	mg/L	2.2
2238A	CINT	Zinc	0.00581	mg/L	2.2
2238A	CINT	Zinc	0.00972	mg/L	2.2
		Zinc Average	*0.006*		
		Zinc StdDev	*0.003*		
		Zinc Min	*0.004*		
		Zinc Max	*0.010*		

NOTES:

ABCWUA = Albuquerque Bernalillo County Water Utility Authority
mg/L = milligrams per liter
Min = Minimum
Max = Maximum
StdDev = Standard Deviation

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2069A	WW001	Actinium-228	5.67	pCi/L	300000
2069A	WW001	Actinium-228	12.3	pCi/L	300000
		Actinium-228 Average	*8.985*		
		Actinium-228 StdDev	*4.688*		
		Actinium-228 Min	*5.670*		
		Actinium-228 Max	*12.3*		
2069A	WW001	Alpha, gross	2.05	pCi/L	
2069A	WW001	Alpha, gross	4.21	pCi/L	
		Alpha, gross Average	*3.130*		
		Alpha, gross StdDev	*1.527*		
		Alpha, gross Min	*2.050*		
		Alpha, gross Max	*4.21*		
2069A	WW001	Americium-241	1.12	pCi/L	200
2069A	WW001	Americium-241	3.06	pCi/L	200
		Americium-241 Average	*2.090*		
		Americium-241 StdDev	*1.372*		
		Americium-241 Min	*1.120*		
		Americium-241 Max	*3.06*		
2069A	WW001	Beryllium-7	-2.78	pCi/L	
2069A	WW001	Beryllium-7	6.02	pCi/L	
		Beryllium-7 Average	*1.620*		
		Beryllium-7 StdDev	*6.223*		
		Beryllium-7 Min	*-2.780*		
		Beryllium-7 Max	*6.02*		
2069A	WW001	Beta, gross	11.3	pCi/L	
2069A	WW001	Beta, gross	17.1	pCi/L	
		Beta, gross Average	*14.200*		
		Beta, gross StdDev	*4.101*		
		Beta, gross Min	*11.300*		
		Beta, gross Max	*17.1*		
2069A	WW001	Bismuth-212	7.21	pCi/L	
2069A	WW001	Bismuth-212	21.3	pCi/L	

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Bismuth-212 Average	*14.255*		
		Bismuth-212 StdDev	*9.963*		
		Bismuth-212 Min	*7.210*		
		Bismuth-212 Max	*21.3*		
2069A	WW001	Bismuth-214	4.37	pCi/L	
2069A	WW001	Bismuth-214	12.3	pCi/L	
		Bismuth-214 Average	*8.335*		
		Bismuth-214 StdDev	*5.607*		
		Bismuth-214 Min	*4.370*		
		Bismuth-214 Max	*12.3*		
2069A	WW001	Cesium-137	-5.79	pCi/L	10000
2069A	WW001	Cesium-137	-0.484	pCi/L	10000
		Cesium-137 Average	*-3.137*		
		Cesium-137 StdDev	*3.752*		
		Cesium-137 Min	*-5.790*		
		Cesium-137 Max	*-0.484*		
2069A	WW001	Cobalt-60	-0.566	pCi/L	30000
2069A	WW001	Cobalt-60	0.53	pCi/L	30000
		Cobalt-60 Average	*-0.018*		
		Cobalt-60 StdDev	*0.775*		
		Cobalt-60 Min	*-0.566*		
		Cobalt-60 Max	*0.53*		
2069A	WW001	Lead-212	-1.18	pCi/L	20000
2069A	WW001	Lead-212	7.17	pCi/L	20000
		Lead-212 Average	*2.995*		
		Lead-212 StdDev	*5.904*		
		Lead-212 Min	*-1.180*		
		Lead-212 Max	*7.17*		
2069A	WW001	Lead-214	1.03	pCi/L	1000000
2069A	WW001	Lead-214	10.7	pCi/L	1000000
		Lead-214 Average	*5.865*		
		Lead-214 StdDev	*6.838*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Lead-214 Min	*1.030*		
		Lead-214 Max	*10.7*		
2069A	WW001	Neptunium-237	0.38	pCi/L	
2069A	WW001	Neptunium-237	1.18	pCi/L	
		Neptunium-237 Average	*0.780*		
		Neptunium-237 StdDev	*0.566*		
		Neptunium-237 Min	*0.380*		
		Neptunium-237 Max	*1.18*		
2069A	WW001	Potassium-40	-33.6	pCi/L	40000
2069A	WW001	Potassium-40	-2	pCi/L	40000
		Potassium-40 Average	*-17.800*		
		Potassium-40 StdDev	*22.345*		
		Potassium-40 Min	*-33.600*		
		Potassium-40 Max	*-2*		
2069A	WW001	Radium-223	-5.17	pCi/L	
2069A	WW001	Radium-223	18	pCi/L	
		Radium-223 Average	*6.415*		
		Radium-223 StdDev	*16.384*		
		Radium-223 Min	*-5.170*		
		Radium-223 Max	*18*		
2069A	WW001	Radium-224	-151	pCi/L	
2069A	WW001	Radium-224	83.7	pCi/L	
		Radium-224 Average	*-33.650*		
		Radium-224 StdDev	*165.958*		
		Radium-224 Min	*-151.000*		
		Radium-224 Max	*83.7*		
2069A	WW001	Radium-226	-28.5	pCi/L	600
2069A	WW001	Radium-226	49.9	pCi/L	600
		Radium-226 Average	*10.700*		
		Radium-226 StdDev	*55.437*		
		Radium-226 Min	*-28.500*		
		Radium-226 Max	*49.9*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2069A	WW001	Radium-228	5.67	pCi/L	600
2069A	WW001	Radium-228	12.3	pCi/L	600
		Radium-228 Average	*8.985*		
		Radium-228 StdDev	*4.688*		
		Radium-228 Min	*5.670*		
		Radium-228 Max	*12.3*		
2069A	WW001	Sodium-22	-1.37	pCi/L	
2069A	WW001	Sodium-22	-0.592	pCi/L	
		Sodium-22 Average	*-0.981*		
		Sodium-22 StdDev	*0.550*		
		Sodium-22 Min	*-1.370*		
		Sodium-22 Max	*-0.592*		
2069A	WW001	Thorium-227	-17	pCi/L	
2069A	WW001	Thorium-227	6.94	pCi/L	
		Thorium-227 Average	*-5.030*		
		Thorium-227 StdDev	*16.928*		
		Thorium-227 Min	*-17.000*		
		Thorium-227 Max	*6.94*		
2069A	WW001	Thorium-231	0.909	pCi/L	300
2069A	WW001	Thorium-231	23.3	pCi/L	300
		Thorium-231 Average	*12.105*		
		Thorium-231 StdDev	*15.833*		
		Thorium-231 Min	*0.909*		
		Thorium-231 Max	*23.3*		
2069A	WW001	Thorium-234	-4.11	pCi/L	50000
2069A	WW001	Thorium-234	54.8	pCi/L	50000
		Thorium-234 Average	*25.345*		
		Thorium-234 StdDev	*41.656*		
		Thorium-234 Min	*-4.110*		
		Thorium-234 Max	*54.8*		
2069A	WW001	Tritium	5.78	pCi/L	10000000
2069A	WW001	Tritium	105	pCi/L	10000000

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Tritium Average	*55.390*		
		Tritium StdDev	*70.159*		
		Tritium Min	*5.780*		
		Tritium Max	*105*		
2069A	WW001	Uranium-235	1.51	pCi/L	3000
2069A	WW001	Uranium-235	2.92	pCi/L	3000
		Uranium-235 Average	*2.215*		
		Uranium-235 StdDev	*0.997*		
		Uranium-235 Min	*1.510*		
		Uranium-235 Max	*2.92*		
2069A	WW001	Uranium-238	-4.11	pCi/L	3000
2069A	WW001	Uranium-238	54.8	pCi/L	3000
		Uranium-238 Average	*25.345*		
		Uranium-238 StdDev	*41.656*		
		Uranium-238 Min	*-4.110*		
		Uranium-238 Max	*54.8*		
2069F	WW006	Actinium-228	-8.63	pCi/L	300000
2069F	WW006	Actinium-228	-1.82	pCi/L	300000
		Actinium-228 Average	*-5.225*		
		Actinium-228 StdDev	*4.815*		
		Actinium-228 Min	*-8.630*		
		Actinium-228 Max	*-1.82*		
2069F	WW006	Alpha, gross	1.99	pCi/L	
2069F	WW006	Alpha, gross	4.06	pCi/L	
		Alpha, gross Average	*3.025*		
		Alpha, gross StdDev	*1.464*		
		Alpha, gross Min	*1.990*		
		Alpha, gross Max	*4.06*		
2069F	WW006	Americium-241	-3.08	pCi/L	200
2069F	WW006	Americium-241	-2.33	pCi/L	200
		Americium-241 Average	*-2.705*		
		Americium-241 StdDev	*0.530*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Americium-241 Min	*-3.080*		
		Americium-241 Max	*-2.33*		
2069F	WW006	Beryllium-7	0.0576	pCi/L	
2069F	WW006	Beryllium-7	3.84	pCi/L	
		Beryllium-7 Average	*1.949*		
		Beryllium-7 StdDev	*2.675*		
		Beryllium-7 Min	*0.058*		
		Beryllium-7 Max	*3.84*		
2069F	WW006	Beta, gross	22.6	pCi/L	
2069F	WW006	Beta, gross	23.1	pCi/L	
		Beta, gross Average	*22.850*		
		Beta, gross StdDev	*0.354*		
		Beta, gross Min	*22.600*		
		Beta, gross Max	*23.1*		
2069F	WW006	Bismuth-212	5.21	pCi/L	
2069F	WW006	Bismuth-212	28.7	pCi/L	
		Bismuth-212 Average	*16.955*		
		Bismuth-212 StdDev	*16.610*		
		Bismuth-212 Min	*5.210*		
		Bismuth-212 Max	*28.7*		
2069F	WW006	Bismuth-214	2.48	pCi/L	
2069F	WW006	Bismuth-214	3.8	pCi/L	
		Bismuth-214 Average	*3.140*		
		Bismuth-214 StdDev	*0.933*		
		Bismuth-214 Min	*2.480*		
		Bismuth-214 Max	*3.8*		
2069F	WW006	Cesium-137	0.0499	pCi/L	10000
2069F	WW006	Cesium-137	0.576	pCi/L	10000
		Cesium-137 Average	*0.313*		
		Cesium-137 StdDev	*0.372*		
		Cesium-137 Min	*0.050*		
		Cesium-137 Max	*0.576*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2069F	WW006	Cobalt-60	-0.34	pCi/L	30000
2069F	WW006	Cobalt-60	4.39	pCi/L	30000
		Cobalt-60 Average	*2.025*		
		Cobalt-60 StdDev	*3.345*		
		Cobalt-60 Min	*-0.340*		
		Cobalt-60 Max	*4.39*		
2069F	WW006	Lead-212	4.24	pCi/L	20000
2069F	WW006	Lead-212	8.99	pCi/L	20000
		Lead-212 Average	*6.615*		
		Lead-212 StdDev	*3.359*		
		Lead-212 Min	*4.240*		
		Lead-212 Max	*8.99*		
2069F	WW006	Lead-214	-2.36	pCi/L	1000000
2069F	WW006	Lead-214	1.19	pCi/L	1000000
		Lead-214 Average	*-0.585*		
		Lead-214 StdDev	*2.510*		
		Lead-214 Min	*-2.360*		
		Lead-214 Max	*1.19*		
2069F	WW006	Neptunium-237	-0.693	pCi/L	
2069F	WW006	Neptunium-237	1.13	pCi/L	
		Neptunium-237 Average	*0.219*		
		Neptunium-237 StdDev	*1.289*		
		Neptunium-237 Min	*-0.693*		
		Neptunium-237 Max	*1.13*		
2069F	WW006	Potassium-40	13.4	pCi/L	40000
2069F	WW006	Potassium-40	19.1	pCi/L	40000
		Potassium-40 Average	*16.250*		
		Potassium-40 StdDev	*4.031*		
		Potassium-40 Min	*13.400*		
		Potassium-40 Max	*19.1*		
2069F	WW006	Radium-223	-21.2	pCi/L	
2069F	WW006	Radium-223	35.7	pCi/L	

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Radium-223 Average	*7.250*		
		Radium-223 StdDev	*40.234*		
		Radium-223 Min	*-21.200*		
		Radium-223 Max	*35.7*		
2069F	WW006	Radium-224	32.7	pCi/L	
2069F	WW006	Radium-224	70.5	pCi/L	
		Radium-224 Average	*51.600*		
		Radium-224 StdDev	*26.729*		
		Radium-224 Min	*32.700*		
		Radium-224 Max	*70.5*		
2069F	WW006	Radium-226	-38.9	pCi/L	600
2069F	WW006	Radium-226	56.1	pCi/L	600
		Radium-226 Average	*8.600*		
		Radium-226 StdDev	*67.175*		
		Radium-226 Min	*-38.900*		
		Radium-226 Max	*56.1*		
2069F	WW006	Radium-228	-8.63	pCi/L	600
2069F	WW006	Radium-228	-1.82	pCi/L	600
		Radium-228 Average	*-5.225*		
		Radium-228 StdDev	*4.815*		
		Radium-228 Min	*-8.630*		
		Radium-228 Max	*-1.82*		
2069F	WW006	Sodium-22	-0.805	pCi/L	
2069F	WW006	Sodium-22	0.958	pCi/L	
		Sodium-22 Average	*0.077*		
		Sodium-22 StdDev	*1.247*		
		Sodium-22 Min	*-0.805*		
		Sodium-22 Max	*0.958*		
2069F	WW006	Thorium-227	-11.8	pCi/L	
2069F	WW006	Thorium-227	-0.439	pCi/L	
		Thorium-227 Average	*-6.120*		
		Thorium-227 StdDev	*8.033*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Thorium-227 Min	*-11.800*		
		Thorium-227 Max	*-0.439*		
2069F	WW006	Thorium-231	-28.9	pCi/L	300
2069F	WW006	Thorium-231	-1.29	pCi/L	300
		Thorium-231 Average	*-15.095*		
		Thorium-231 StdDev	*19.523*		
		Thorium-231 Min	*-28.900*		
		Thorium-231 Max	*-1.29*		
2069F	WW006	Thorium-234	-178	pCi/L	50000
2069F	WW006	Thorium-234	53.3	pCi/L	50000
		Thorium-234 Average	*-62.350*		
		Thorium-234 StdDev	*163.554*		
		Thorium-234 Min	*-178.000*		
		Thorium-234 Max	*53.3*		
2069F	WW006	Tritium	-74.8	pCi/L	10000000
2069F	WW006	Tritium	41.3	pCi/L	10000000
		Tritium Average	*-16.750*		
		Tritium StdDev	*82.095*		
		Tritium Min	*-74.800*		
		Tritium Max	*41.3*		
2069F	WW006	Uranium-235	7.54	pCi/L	3000
2069F	WW006	Uranium-235	11.2	pCi/L	3000
		Uranium-235 Average	*9.370*		
		Uranium-235 StdDev	*2.588*		
		Uranium-235 Min	*7.540*		
		Uranium-235 Max	*11.2*		
2069F	WW006	Uranium-238	-178	pCi/L	3000
2069F	WW006	Uranium-238	53.3	pCi/L	3000
		Uranium-238 Average	*-62.350*		
		Uranium-238 StdDev	*163.554*		
		Uranium-238 Min	*-178.000*		
		Uranium-238 Max	*53.3*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2069I	WW008	Actinium-228	-14.8	pCi/L	300000
2069I	WW008	Actinium-228	5.76	pCi/L	300000
		Actinium-228 Average	*-4.520*		
		Actinium-228 StdDev	*14.538*		
		Actinium-228 Min	*-14.800*		
		Actinium-228 Max	*5.76*		
2069I	WW008	Alpha, gross	0.594	pCi/L	
2069I	WW008	Alpha, gross	1.57	pCi/L	
		Alpha, gross Average	*1.082*		
		Alpha, gross StdDev	*0.690*		
		Alpha, gross Min	*0.594*		
		Alpha, gross Max	*1.57*		
2069I	WW008	Americium-241	2.69	pCi/L	200
2069I	WW008	Americium-241	7.63	pCi/L	200
		Americium-241 Average	*5.160*		
		Americium-241 StdDev	*3.493*		
		Americium-241 Min	*2.690*		
		Americium-241 Max	*7.63*		
2069I	WW008	Beryllium-7	1.13	pCi/L	
2069I	WW008	Beryllium-7	4.79	pCi/L	
		Beryllium-7 Average	*2.960*		
		Beryllium-7 StdDev	*2.588*		
		Beryllium-7 Min	*1.130*		
		Beryllium-7 Max	*4.79*		
2069I	WW008	Beta, gross	20.4	pCi/L	
2069I	WW008	Beta, gross	34.1	pCi/L	
		Beta, gross Average	*27.250*		
		Beta, gross StdDev	*9.687*		
		Beta, gross Min	*20.400*		
		Beta, gross Max	*34.1*		
2069I	WW008	Bismuth-212	27.8	pCi/L	
2069I	WW008	Bismuth-212	30.1	pCi/L	

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Bismuth-212 Average	*28.950*		
		Bismuth-212 StdDev	*1.626*		
		Bismuth-212 Min	*27.800*		
		Bismuth-212 Max	*30.1*		
2069I	WW008	Bismuth-214	0.926	pCi/L	
2069I	WW008	Bismuth-214	10.9	pCi/L	
		Bismuth-214 Average	*5.913*		
		Bismuth-214 StdDev	*7.053*		
		Bismuth-214 Min	*0.926*		
		Bismuth-214 Max	*10.9*		
2069I	WW008	Cesium-137	-1.57	pCi/L	10000
2069I	WW008	Cesium-137	2.53	pCi/L	10000
		Cesium-137 Average	*0.480*		
		Cesium-137 StdDev	*2.899*		
		Cesium-137 Min	*-1.570*		
		Cesium-137 Max	*2.53*		
2069I	WW008	Cobalt-60	0.267	pCi/L	30000
2069I	WW008	Cobalt-60	0.907	pCi/L	30000
		Cobalt-60 Average	*0.587*		
		Cobalt-60 StdDev	*0.453*		
		Cobalt-60 Min	*0.267*		
		Cobalt-60 Max	*0.907*		
2069I	WW008	Lead-212	0.723	pCi/L	20000
2069I	WW008	Lead-212	5.67	pCi/L	20000
		Lead-212 Average	*3.197*		
		Lead-212 StdDev	*3.498*		
		Lead-212 Min	*0.723*		
		Lead-212 Max	*5.67*		
2069I	WW008	Lead-214	-5.3	pCi/L	1000000
2069I	WW008	Lead-214	6.59	pCi/L	1000000
		Lead-214 Average	*0.645*		
		Lead-214 StdDev	*8.407*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Lead-214 Min	*-5.300*		
		Lead-214 Max	*6.59*		
2069I	WW008	Neptunium-237	-0.834	pCi/L	
2069I	WW008	Neptunium-237	2.85	pCi/L	
		Neptunium-237 Average	*1.008*		
		Neptunium-237 StdDev	*2.605*		
		Neptunium-237 Min	*-0.834*		
		Neptunium-237 Max	*2.85*		
2069I	WW008	Potassium-40	24.5	pCi/L	40000
2069I	WW008	Potassium-40	61.3	pCi/L	40000
		Potassium-40 Average	*42.900*		
		Potassium-40 StdDev	*26.022*		
		Potassium-40 Min	*24.500*		
		Potassium-40 Max	*61.3*		
2069I	WW008	Radium-223	-8.77	pCi/L	
2069I	WW008	Radium-223	-3.26	pCi/L	
		Radium-223 Average	*-6.015*		
		Radium-223 StdDev	*3.896*		
		Radium-223 Min	*-8.770*		
		Radium-223 Max	*-3.26*		
2069I	WW008	Radium-224	10.4	pCi/L	
2069I	WW008	Radium-224	18.4	pCi/L	
		Radium-224 Average	*14.400*		
		Radium-224 StdDev	*5.657*		
		Radium-224 Min	*10.400*		
		Radium-224 Max	*18.4*		
2069I	WW008	Radium-226	10.9	pCi/L	600
2069I	WW008	Radium-226	29.7	pCi/L	600
		Radium-226 Average	*20.300*		
		Radium-226 StdDev	*13.294*		
		Radium-226 Min	*10.900*		
		Radium-226 Max	*29.7*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2069I	WW008	Radium-228	-14.8	pCi/L	600
2069I	WW008	Radium-228	5.76	pCi/L	600
		Radium-228 Average	*-4.520*		
		Radium-228 StdDev	*14.538*		
		Radium-228 Min	*-14.800*		
		Radium-228 Max	*5.76*		
2069I	WW008	Sodium-22	-0.743	pCi/L	
2069I	WW008	Sodium-22	0.592	pCi/L	
		Sodium-22 Average	*-0.076*		
		Sodium-22 StdDev	*0.944*		
		Sodium-22 Min	*-0.743*		
		Sodium-22 Max	*0.592*		
2069I	WW008	Thorium-227	-9.98	pCi/L	
2069I	WW008	Thorium-227	7.06	pCi/L	
		Thorium-227 Average	*-1.460*		
		Thorium-227 StdDev	*12.049*		
		Thorium-227 Min	*-9.980*		
		Thorium-227 Max	*7.06*		
2069I	WW008	Thorium-231	-31.3	pCi/L	300
2069I	WW008	Thorium-231	10.1	pCi/L	300
		Thorium-231 Average	*-10.600*		
		Thorium-231 StdDev	*29.274*		
		Thorium-231 Min	*-31.300*		
		Thorium-231 Max	*10.1*		
2069I	WW008	Thorium-234	-95.4	pCi/L	50000
2069I	WW008	Thorium-234	50.2	pCi/L	50000
		Thorium-234 Average	*-22.600*		
		Thorium-234 StdDev	*102.955*		
		Thorium-234 Min	*-95.400*		
		Thorium-234 Max	*50.2*		
2069I	WW008	Tritium	-29.3	pCi/L	10000000
2069I	WW008	Tritium	103	pCi/L	10000000

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Tritium Average	*36.850*		
		Tritium StdDev	*93.550*		
		Tritium Min	*-29.300*		
		Tritium Max	*103*		
2069I	WW008	Uranium-235	-12	pCi/L	3000
2069I	WW008	Uranium-235	-4.69	pCi/L	3000
		Uranium-235 Average	*-8.345*		
		Uranium-235 StdDev	*5.169*		
		Uranium-235 Min	*-12.000*		
		Uranium-235 Max	*-4.69*		
2069I	WW008	Uranium-238	-95.4	pCi/L	3000
2069I	WW008	Uranium-238	50.2	pCi/L	3000
		Uranium-238 Average	*-22.600*		
		Uranium-238 StdDev	*102.955*		
		Uranium-238 Min	*-95.400*		
		Uranium-238 Max	*50.2*		
2069K	WW011	Actinium-228	10.5	pCi/L	300000
2069K	WW011	Actinium-228	22.3	pCi/L	300000
		Actinium-228 Average	*16.400*		
		Actinium-228 StdDev	*8.344*		
		Actinium-228 Min	*10.500*		
		Actinium-228 Max	*22.3*		
2069K	WW011	Alpha, gross	1.3	pCi/L	
2069K	WW011	Alpha, gross	3.44	pCi/L	
		Alpha, gross Average	*2.370*		
		Alpha, gross StdDev	*1.513*		
		Alpha, gross Min	*1.300*		
		Alpha, gross Max	*3.44*		
2069K	WW011	Americium-241	-2.11	pCi/L	200
2069K	WW011	Americium-241	1.42	pCi/L	200
		Americium-241 Average	*-0.345*		
		Americium-241 StdDev	*2.496*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Americium-241 Min	*-2.110*		
		Americium-241 Max	*1.42*		
2069K	WW011	Beryllium-7	-0.407	pCi/L	
2069K	WW011	Beryllium-7	4.52	pCi/L	
		Beryllium-7 Average	*2.057*		
		Beryllium-7 StdDev	*3.484*		
		Beryllium-7 Min	*-0.407*		
		Beryllium-7 Max	*4.52*		
2069K	WW011	Beta, gross	26.9	pCi/L	
2069K	WW011	Beta, gross	33.3	pCi/L	
		Beta, gross Average	*30.100*		
		Beta, gross StdDev	*4.525*		
		Beta, gross Min	*26.900*		
		Beta, gross Max	*33.3*		
2069K	WW011	Bismuth-212	13.9	pCi/L	
2069K	WW011	Bismuth-212	24.6	pCi/L	
		Bismuth-212 Average	*19.250*		
		Bismuth-212 StdDev	*7.566*		
		Bismuth-212 Min	*13.900*		
		Bismuth-212 Max	*24.6*		
2069K	WW011	Bismuth-214	1.29	pCi/L	
2069K	WW011	Bismuth-214	7.38	pCi/L	
		Bismuth-214 Average	*4.335*		
		Bismuth-214 StdDev	*4.306*		
		Bismuth-214 Min	*1.290*		
		Bismuth-214 Max	*7.38*		
2069K	WW011	Cesium-137	-0.242	pCi/L	10000
2069K	WW011	Cesium-137	1.93	pCi/L	10000
		Cesium-137 Average	*0.844*		
		Cesium-137 StdDev	*1.536*		
		Cesium-137 Min	*-0.242*		
		Cesium-137 Max	*1.93*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2069K	WW011	Cobalt-60	-0.179	pCi/L	30000
2069K	WW011	Cobalt-60	1.08	pCi/L	30000
		Cobalt-60 Average	*0.451*		
		Cobalt-60 StdDev	*0.890*		
		Cobalt-60 Min	*-0.179*		
		Cobalt-60 Max	*1.08*		
2069K	WW011	Lead-212	1.6	pCi/L	20000
2069K	WW011	Lead-212	8.22	pCi/L	20000
		Lead-212 Average	*4.910*		
		Lead-212 StdDev	*4.681*		
		Lead-212 Min	*1.600*		
		Lead-212 Max	*8.22*		
2069K	WW011	Lead-214	-0.0465	pCi/L	1000000
2069K	WW011	Lead-214	2	pCi/L	1000000
		Lead-214 Average	*0.977*		
		Lead-214 StdDev	*1.447*		
		Lead-214 Min	*-0.047*		
		Lead-214 Max	*2*		
2069K	WW011	Neptunium-237	-2	pCi/L	
2069K	WW011	Neptunium-237	0.126	pCi/L	
		Neptunium-237 Average	*-0.937*		
		Neptunium-237 StdDev	*1.503*		
		Neptunium-237 Min	*-2.000*		
		Neptunium-237 Max	*0.126*		
2069K	WW011	Potassium-40	12.8	pCi/L	40000
2069K	WW011	Potassium-40	22.4	pCi/L	40000
		Potassium-40 Average	*17.600*		
		Potassium-40 StdDev	*6.788*		
		Potassium-40 Min	*12.800*		
		Potassium-40 Max	*22.4*		
2069K	WW011	Radium-223	-31.3	pCi/L	
2069K	WW011	Radium-223	-6.32	pCi/L	

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Radium-223 Average	*-18.810*		
		Radium-223 StdDev	*17.664*		
		Radium-223 Min	*-31.300*		
		Radium-223 Max	*-6.32*		
2069K	WW011	Radium-224	77.6	pCi/L	
2069K	WW011	Radium-224	96.3	pCi/L	
		Radium-224 Average	*86.950*		
		Radium-224 StdDev	*13.223*		
		Radium-224 Min	*77.600*		
		Radium-224 Max	*96.3*		
2069K	WW011	Radium-226	-53.4	pCi/L	600
2069K	WW011	Radium-226	-19.2	pCi/L	600
		Radium-226 Average	*-36.300*		
		Radium-226 StdDev	*24.183*		
		Radium-226 Min	*-53.400*		
		Radium-226 Max	*-19.2*		
2069K	WW011	Radium-228	10.5	pCi/L	600
2069K	WW011	Radium-228	22.3	pCi/L	600
		Radium-228 Average	*16.400*		
		Radium-228 StdDev	*8.344*		
		Radium-228 Min	*10.500*		
		Radium-228 Max	*22.3*		
2069K	WW011	Sodium-22	0.696	pCi/L	
2069K	WW011	Sodium-22	1.55	pCi/L	
		Sodium-22 Average	*1.123*		
		Sodium-22 StdDev	*0.604*		
		Sodium-22 Min	*0.696*		
		Sodium-22 Max	*1.55*		
2069K	WW011	Thorium-227	0.511	pCi/L	
2069K	WW011	Thorium-227	1.79	pCi/L	
		Thorium-227 Average	*1.151*		
		Thorium-227 StdDev	*0.904*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Thorium-227 Min	*0.511*		
		Thorium-227 Max	*1.79*		
2069K	WW011	Thorium-231	3.5	pCi/L	300
2069K	WW011	Thorium-231	16.6	pCi/L	300
		Thorium-231 Average	*10.050*		
		Thorium-231 StdDev	*9.263*		
		Thorium-231 Min	*3.500*		
		Thorium-231 Max	*16.6*		
2069K	WW011	Thorium-234	120	pCi/L	50000
2069K	WW011	Thorium-234	256	pCi/L	50000
		Thorium-234 Average	*188.000*		
		Thorium-234 StdDev	*96.167*		
		Thorium-234 Min	*120.000*		
		Thorium-234 Max	*256*		
2069K	WW011	Tritium	-57	pCi/L	10000000
2069K	WW011	Tritium	17.7	pCi/L	10000000
		Tritium Average	*-19.650*		
		Tritium StdDev	*52.821*		
		Tritium Min	*-57.000*		
		Tritium Max	*17.7*		
2069K	WW011	Uranium-235	-7.28	pCi/L	3000
2069K	WW011	Uranium-235	1.56	pCi/L	3000
		Uranium-235 Average	*-2.860*		
		Uranium-235 StdDev	*6.251*		
		Uranium-235 Min	*-7.280*		
		Uranium-235 Max	*1.56*		
2069K	WW011	Uranium-238	120	pCi/L	3000
2069K	WW011	Uranium-238	256	pCi/L	3000
		Uranium-238 Average	*188.000*		
		Uranium-238 StdDev	*96.167*		
		Uranium-238 Min	*120.000*		
		Uranium-238 Max	*256*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2238A	CINT	Actinium-228	-4.61	pCi/L	300000
2238A	CINT	Actinium-228	11.7	pCi/L	300000
		Actinium-228 Average	*3.545*		
		Actinium-228 StdDev	*11.533*		
		Actinium-228 Min	*-4.610*		
		Actinium-228 Max	*11.7*		
2238A	CINT	Alpha, gross	-2.02	pCi/L	
2238A	CINT	Alpha, gross	1.78	pCi/L	
		Alpha, gross Average	*-0.120*		
		Alpha, gross StdDev	*2.687*		
		Alpha, gross Min	*-2.020*		
		Alpha, gross Max	*1.78*		
2238A	CINT	Americium-241	-9.52	pCi/L	200
2238A	CINT	Americium-241	-5.84	pCi/L	200
		Americium-241 Average	*-7.680*		
		Americium-241 StdDev	*2.602*		
		Americium-241 Min	*-9.520*		
		Americium-241 Max	*-5.84*		
2238A	CINT	Beryllium-7	-9.23	pCi/L	
2238A	CINT	Beryllium-7	-5.49	pCi/L	
		Beryllium-7 Average	*-7.360*		
		Beryllium-7 StdDev	*2.645*		
		Beryllium-7 Min	*-9.230*		
		Beryllium-7 Max	*-5.49*		
2238A	CINT	Beta, gross	2.15	pCi/L	
2238A	CINT	Beta, gross	8.31	pCi/L	
		Beta, gross Average	*5.230*		
		Beta, gross StdDev	*4.356*		
		Beta, gross Min	*2.150*		
		Beta, gross Max	*8.31*		
2238A	CINT	Bismuth-212	17.8	pCi/L	
2238A	CINT	Bismuth-212	32.8	pCi/L	

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Bismuth-212 Average	*25.300*		
		Bismuth-212 StdDev	*10.607*		
		Bismuth-212 Min	*17.800*		
		Bismuth-212 Max	*32.8*		
2238A	CINT	Bismuth-214	6.86	pCi/L	
2238A	CINT	Bismuth-214	8.42	pCi/L	
		Bismuth-214 Average	*7.640*		
		Bismuth-214 StdDev	*1.103*		
		Bismuth-214 Min	*6.860*		
		Bismuth-214 Max	*8.42*		
2238A	CINT	Cesium-137	-0.0468	pCi/L	10000
2238A	CINT	Cesium-137	1.79	pCi/L	10000
		Cesium-137 Average	*0.872*		
		Cesium-137 StdDev	*1.299*		
		Cesium-137 Min	*-0.047*		
		Cesium-137 Max	*1.79*		
2238A	CINT	Cobalt-60	-0.642	pCi/L	30000
2238A	CINT	Cobalt-60	0.543	pCi/L	30000
		Cobalt-60 Average	*-0.050*		
		Cobalt-60 StdDev	*0.838*		
		Cobalt-60 Min	*-0.642*		
		Cobalt-60 Max	*0.543*		
2238A	CINT	Lead-212	1.32	pCi/L	20000
2238A	CINT	Lead-212	7.08	pCi/L	20000
		Lead-212 Average	*4.200*		
		Lead-212 StdDev	*4.073*		
		Lead-212 Min	*1.320*		
		Lead-212 Max	*7.08*		
2238A	CINT	Lead-214	3.9	pCi/L	1000000
2238A	CINT	Lead-214	6.29	pCi/L	1000000
		Lead-214 Average	*5.095*		
		Lead-214 StdDev	*1.690*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Lead-214 Min	*3.900*		
		Lead-214 Max	*6.29*		
2238A	CINT	Neptunium-237	2.87	pCi/L	
2238A	CINT	Neptunium-237	3.04	pCi/L	
		Neptunium-237 Average	*2.955*		
		Neptunium-237 StdDev	*0.120*		
		Neptunium-237 Min	*2.870*		
		Neptunium-237 Max	*3.04*		
2238A	CINT	Potassium-40	-17.6	pCi/L	40000
2238A	CINT	Potassium-40	-12.7	pCi/L	40000
		Potassium-40 Average	*-15.150*		
		Potassium-40 StdDev	*3.465*		
		Potassium-40 Min	*-17.600*		
		Potassium-40 Max	*-12.7*		
2238A	CINT	Radium-223	-35.2	pCi/L	
2238A	CINT	Radium-223	-0.369	pCi/L	
		Radium-223 Average	*-17.785*		
		Radium-223 StdDev	*24.629*		
		Radium-223 Min	*-35.200*		
		Radium-223 Max	*-0.369*		
2238A	CINT	Radium-224	27.7	pCi/L	
2238A	CINT	Radium-224	68.2	pCi/L	
		Radium-224 Average	*47.950*		
		Radium-224 StdDev	*28.638*		
		Radium-224 Min	*27.700*		
		Radium-224 Max	*68.2*		
2238A	CINT	Radium-226	-47.6	pCi/L	600
2238A	CINT	Radium-226	30.4	pCi/L	600
		Radium-226 Average	*-8.600*		
		Radium-226 StdDev	*55.154*		
		Radium-226 Min	*-47.600*		
		Radium-226 Max	*30.4*		

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
2238A	CINT	Radium-228	-4.61	pCi/L	600
2238A	CINT	Radium-228	11.7	pCi/L	600
		Radium-228 Average	*3.545*		
		Radium-228 StdDev	*11.533*		
		Radium-228 Min	*-4.610*		
		Radium-228 Max	*11.7*		
2238A	CINT	Sodium-22	-0.989	pCi/L	
2238A	CINT	Sodium-22	-0.35	pCi/L	
		Sodium-22 Average	*-0.670*		
		Sodium-22 StdDev	*0.452*		
		Sodium-22 Min	*-0.989*		
		Sodium-22 Max	*-0.35*		
2238A	CINT	Thorium-227	-5.65	pCi/L	
2238A	CINT	Thorium-227	1.06	pCi/L	
		Thorium-227 Average	*-2.295*		
		Thorium-227 StdDev	*4.745*		
		Thorium-227 Min	*-5.650*		
		Thorium-227 Max	*1.06*		
2238A	CINT	Thorium-231	-3.18	pCi/L	300
2238A	CINT	Thorium-231	25.9	pCi/L	300
		Thorium-231 Average	*11.360*		
		Thorium-231 StdDev	*20.563*		
		Thorium-231 Min	*-3.180*		
		Thorium-231 Max	*25.9*		
2238A	CINT	Thorium-234	-40.9	pCi/L	50000
2238A	CINT	Thorium-234	-9.8	pCi/L	50000
		Thorium-234 Average	*-25.350*		
		Thorium-234 StdDev	*21.991*		
		Thorium-234 Min	*-40.900*		
		Thorium-234 Max	*-9.8*		
2238A	CINT	Tritium	-17.5	pCi/L	10000000
2238A	CINT	Tritium	78.7	pCi/L	10000000

TABLE A-6. Permitted Sanitary Outfalls of Radiological Analyses, CY 2012

Permit Number	Station	Analyte	Activity	Units	Regulatory Sewer Release Limits*
		Tritium Average	*30.600*		
		Tritium StdDev	*68.024*		
		Tritium Min	*-17.500*		
		Tritium Max	*78.7*		
2238A	CINT	Uranium-235	2.98	pCi/L	3000
2238A	CINT	Uranium-235	10.4	pCi/L	3000
		Uranium-235 Average	*6.690*		
		Uranium-235 StdDev	*5.247*		
		Uranium-235 Min	*2.980*		
		Uranium-235 Max	*10.4*		
2238A	CINT	Uranium-238	-40.9	pCi/L	3000
2238A	CINT	Uranium-238	-9.8	pCi/L	3000
		Uranium-238 Average	*-25.350*		
		Uranium-238 StdDev	*21.991*		
		Uranium-238 Min	*-40.900*		
		Uranium-238 Max	*-9.8*		
		Grand Average	**6.5796175**		
		Grand StdDev	40.61450209		
		Grand Min	-178		
		Grand Max	256		

NOTES:

Min = Minimum
Max = Maximum
pCi/L = picocuries per liter
StdDev = Standard Deviation
*** = The monthly average concentration values for release of sanitary sewage were derived by taking the most restrictive occupational stochastic oral ingestion annual limits on intake (ALI) for a reference man.**

TABLE A-7. Permitted Sanitary Outfalls of Inorganic Analyses, August 2012 and October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
CINT	2238A	27-Aug-2012	092879-009	Cyanide, total		0.00167	U	mg/L	0.45
CINT	2238A	27-Aug-2012	092879-010	Cyanide, total		0.00167	U	mg/L	0.45
CINT	2238A	27-Aug-2012	092879-011	Cyanide, total		0.00167	U	mg/L	0.45
CINT	2238A	27-Aug-2012	092879-012	Cyanide, total		0.00167	U	mg/L	0.45
CINT	2238A	28-Aug-2012	092880-001	Aluminum		0.068	U	mg/L	900
CINT	2238A	28-Aug-2012	092880-001	Arsenic		0.005	U	mg/L	0.051
CINT	2238A	28-Aug-2012	092880-001	Boron	0.0552	0.015		mg/L	
CINT	2238A	28-Aug-2012	092880-001	Cadmium		0.001	U	mg/L	0.05
CINT	2238A	28-Aug-2012	092880-001	Chromium	0.00216	0.001	J	mg/L	4.1
CINT	2238A	28-Aug-2012	092880-001	Copper	0.0057	0.003	J	mg/L	5.3
CINT	2238A	28-Aug-2012	092880-002	Fluoride	0.579	0.033		mg/L	36
CINT	2238A	28-Aug-2012	092880-001	Lead		0.0033	U	mg/L	1
CINT	2238A	28-Aug-2012	092880-001	Molybdenum	0.0323	0.002		mg/L	2
CINT	2238A	28-Aug-2012	092880-001	Nickel		0.0015	U	mg/L	2
CINT	2238A	28-Aug-2012	092880-001	Selenium	0.00853	0.006	J	mg/L	0.46
CINT	2238A	28-Aug-2012	092880-001	Silver		0.001	U	mg/L	5
CINT	2238A	28-Aug-2012	092880-001	Zinc	0.00457	0.0033	JB	mg/L	2.2
CINT	2238A	29-Aug-2012	092881-001	Aluminum		0.068	U	mg/L	900
CINT	2238A	29-Aug-2012	092881-001	Arsenic	0.00818	0.005	J	mg/L	0.051
CINT	2238A	29-Aug-2012	092881-001	Boron	0.0646	0.015		mg/L	
CINT	2238A	29-Aug-2012	092881-001	Cadmium		0.001	U	mg/L	0.05
CINT	2238A	29-Aug-2012	092881-001	Chromium	0.00175	0.001	J	mg/L	4.1
CINT	2238A	29-Aug-2012	092881-001	Copper	0.0233	0.003		mg/L	5.3
CINT	2238A	29-Aug-2012	092881-002	Fluoride	2.76	0.033		mg/L	36
CINT	2238A	29-Aug-2012	092881-001	Lead	0.0106	0.0033		mg/L	1
CINT	2238A	29-Aug-2012	092881-001	Molybdenum	0.028	0.002		mg/L	2
CINT	2238A	29-Aug-2012	092881-001	Nickel		0.0015	U	mg/L	2
CINT	2238A	29-Aug-2012	092881-001	Selenium		0.006	U	mg/L	0.46
CINT	2238A	29-Aug-2012	092881-001	Silver		0.001	U	mg/L	5
CINT	2238A	29-Aug-2012	092881-001	Zinc	0.00972	0.0033	JB	mg/L	2.2
CINT	2238A	23-Oct-2012	092887-007	Ammonia	0.196	0.017		mg/L	
CINT	2238A	24-Oct-2012	092894-007	Ammonia	0.0774	0.017		mg/L	
WW001	2069A	23-Oct-2012	092882-001	Aluminum	0.101	0.068	J	mg/L	900
WW001	2069A	23-Oct-2012	092882-007	Ammonia	23.2	0.34		mg/L	
WW001	2069A	23-Oct-2012	092882-001	Arsenic	0.00792	0.005	J	mg/L	0.051

TABLE A-7. Permitted Sanitary Outfalls of Inorganic Analyses, August 2012 and October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW001	2069A	23-Oct-2012	092882-001	Boron	0.126	0.015		mg/L	
WW001	2069A	23-Oct-2012	092882-001	Cadmium		0.001	U	mg/L	0.05
WW001	2069A	23-Oct-2012	092882-001	Chromium	0.00501	0.001		mg/L	4.1
WW001	2069A	23-Oct-2012	092882-001	Copper	0.0475	0.003		mg/L	5.3
WW001	2069A	23-Oct-2012	092882-002	Fluoride	3.52	0.033		mg/L	36
WW001	2069A	23-Oct-2012	092882-001	Lead		0.0033	U	mg/L	1
WW001	2069A	23-Oct-2012	092882-001	Molybdenum	0.125	0.002		mg/L	2
WW001	2069A	23-Oct-2012	092882-001	Nickel	0.00151	0.0015	J	mg/L	2
WW001	2069A	23-Oct-2012	092882-001	Selenium		0.006	U	mg/L	0.46
WW001	2069A	23-Oct-2012	092882-001	Silver	0.00598	0.001		mg/L	5
WW001	2069A	23-Oct-2012	092882-001	Zinc	0.089	0.0033		mg/L	2.2
WW001	2069A	24-Oct-2012	092889-001	Aluminum		0.068	U	mg/L	900
WW001	2069A	24-Oct-2012	092889-007	Ammonia	18.1	0.85		mg/L	
WW001	2069A	24-Oct-2012	092889-001	Arsenic	0.00762	0.005	J	mg/L	0.051
WW001	2069A	24-Oct-2012	092889-001	Boron	0.0985	0.015		mg/L	
WW001	2069A	24-Oct-2012	092889-001	Cadmium		0.001	U	mg/L	0.05
WW001	2069A	24-Oct-2012	092889-001	Chromium	0.00464	0.001	J	mg/L	4.1
WW001	2069A	24-Oct-2012	092889-001	Copper	0.0314	0.003		mg/L	5.3
WW001	2069A	24-Oct-2012	092889-002	Fluoride	3.58	0.033		mg/L	36
WW001	2069A	24-Oct-2012	092889-001	Lead		0.0033	U	mg/L	1
WW001	2069A	24-Oct-2012	092889-001	Molybdenum	0.126	0.002		mg/L	2
WW001	2069A	24-Oct-2012	092889-001	Nickel		0.0015	U	mg/L	2
WW001	2069A	24-Oct-2012	092889-001	Selenium		0.006	U	mg/L	0.46
WW001	2069A	24-Oct-2012	092889-001	Silver	0.00483	0.001	J	mg/L	5
WW001	2069A	24-Oct-2012	092889-001	Zinc	0.0653	0.0033		mg/L	2.2
WW006	2069F	22-Oct-2012	092895-009	Cyanide, total	0.00272	0.00167	J	mg/L	0.45
WW006	2069F	22-Oct-2012	092895-010	Cyanide, total	0.00175	0.00167	J	mg/L	0.45
WW006	2069F	22-Oct-2012	092895-011	Cyanide, total	0.00215	0.00167	J	mg/L	0.45
WW006	2069F	22-Oct-2012	092895-012	Cyanide, total		0.00167	U	mg/L	0.45
WW006	2069F	23-Oct-2012	092883-001	Aluminum	0.267	0.068		mg/L	900
WW006	2069F	23-Oct-2012	092883-007	Ammonia	44.8	0.85		mg/L	
WW006	2069F	23-Oct-2012	092883-001	Arsenic	0.00654	0.005	J	mg/L	0.051
WW006	2069F	23-Oct-2012	092883-001	Boron	0.181	0.015		mg/L	
WW006	2069F	23-Oct-2012	092883-001	Cadmium		0.001	U	mg/L	0.05
WW006	2069F	23-Oct-2012	092883-001	Chromium	0.00399	0.001	J	mg/L	4.1

TABLE A-7. Permitted Sanitary Outfalls of Inorganic Analyses, August 2012 and October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW006	2069F	23-Oct-2012	092883-001	Copper	0.03	0.003		mg/L	5.3
WW006	2069F	23-Oct-2012	092883-002	Fluoride	0.858	0.033		mg/L	36
WW006	2069F	23-Oct-2012	092883-001	Lead		0.0033	U	mg/L	1
WW006	2069F	23-Oct-2012	092883-001	Molybdenum	0.183	0.002		mg/L	2
WW006	2069F	23-Oct-2012	092883-001	Nickel	0.00168	0.0015	J	mg/L	2
WW006	2069F	23-Oct-2012	092883-001	Selenium		0.006	U	mg/L	0.46
WW006	2069F	23-Oct-2012	092883-001	Silver	0.00742	0.001		mg/L	5
WW006	2069F	23-Oct-2012	092883-001	Zinc	0.133	0.0033		mg/L	2.2
WW006	2069F	24-Oct-2012	092890-001	Aluminum	0.273	0.068		mg/L	900
WW006	2069F	24-Oct-2012	092890-007	Ammonia	58	0.85		mg/L	
WW006	2069F	24-Oct-2012	092890-001	Arsenic		0.005	U	mg/L	0.051
WW006	2069F	24-Oct-2012	092890-001	Boron	0.164	0.015		mg/L	
WW006	2069F	24-Oct-2012	092890-001	Cadmium		0.001	U	mg/L	0.05
WW006	2069F	24-Oct-2012	092890-001	Chromium	0.00455	0.001	J	mg/L	4.1
WW006	2069F	24-Oct-2012	092890-001	Copper	0.0533	0.003		mg/L	5.3
WW006	2069F	24-Oct-2012	092890-002	Fluoride	0.786	0.033		mg/L	36
WW006	2069F	24-Oct-2012	092890-001	Lead		0.0033	U	mg/L	1
WW006	2069F	24-Oct-2012	092890-001	Molybdenum	0.094	0.002		mg/L	2
WW006	2069F	24-Oct-2012	092890-001	Nickel	0.00239	0.0015	J	mg/L	2
WW006	2069F	24-Oct-2012	092890-001	Selenium		0.006	U	mg/L	0.46
WW006	2069F	24-Oct-2012	092890-001	Silver	0.00837	0.001		mg/L	5
WW006	2069F	24-Oct-2012	092890-001	Zinc	0.361	0.0033		mg/L	2.2
WW006 #2	2069F	23-Oct-2012	092898-009	Cyanide, total	0.00351	0.00167	J	mg/L	0.45
WW006 #2	2069F	23-Oct-2012	092898-010	Cyanide, total	0.004	0.00167	J	mg/L	0.45
WW006 #2	2069F	23-Oct-2012	092898-011	Cyanide, total	0.00304	0.00167	J	mg/L	0.45
WW006 #2	2069F	23-Oct-2012	092898-012	Cyanide, total	0.00262	0.00167	J	mg/L	0.45
WW007	2069G	22-Oct-2012	092896-009	Cyanide, total		0.00167	U	mg/L	0.45
WW007	2069G	22-Oct-2012	092896-010	Cyanide, total		0.00167	U	mg/L	0.45
WW007	2069G	22-Oct-2012	092896-011	Cyanide, total		0.00167	U	mg/L	0.45
WW007	2069G	22-Oct-2012	092896-012	Cyanide, total		0.00167	U	mg/L	0.45
WW007	2069G	23-Oct-2012	092884-001	Aluminum		0.068	U	mg/L	900
WW007	2069G	23-Oct-2012	092884-007	Ammonia	2.99	0.085		mg/L	
WW007	2069G	23-Oct-2012	092884-001	Arsenic		0.005	U	mg/L	0.051
WW007	2069G	23-Oct-2012	092884-001	Boron	0.0225	0.015	J	mg/L	
WW007	2069G	23-Oct-2012	092884-001	Cadmium		0.001	U	mg/L	0.05

TABLE A-7. Permitted Sanitary Outfalls of Inorganic Analyses, August 2012 and October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW007	2069G	23-Oct-2012	092884-001	Chromium	0.00194	0.001	J	mg/L	4.1
WW007	2069G	23-Oct-2012	092884-001	Copper	0.00426	0.003	J	mg/L	5.3
WW007	2069G	23-Oct-2012	092884-002	Fluoride	8.39	0.033		mg/L	36
WW007	2069G	23-Oct-2012	092884-001	Lead		0.0033	U	mg/L	1
WW007	2069G	23-Oct-2012	092884-001	Molybdenum	0.0197	0.002		mg/L	2
WW007	2069G	23-Oct-2012	092884-001	Nickel		0.0015	U	mg/L	2
WW007	2069G	23-Oct-2012	092884-001	Selenium		0.006	U	mg/L	0.46
WW007	2069G	23-Oct-2012	092884-001	Silver	0.00311	0.001	J	mg/L	5
WW007	2069G	23-Oct-2012	092884-001	Zinc		0.0033	U	mg/L	2.2
WW007	2069G	24-Oct-2012	092891-001	Aluminum		0.068	U	mg/L	900
WW007	2069G	24-Oct-2012	092891-007	Ammonia	1.2	0.017		mg/L	
WW007	2069G	24-Oct-2012	092891-001	Arsenic		0.005	U	mg/L	0.051
WW007	2069G	24-Oct-2012	092891-001	Boron	0.0215	0.015	J	mg/L	
WW007	2069G	24-Oct-2012	092891-001	Cadmium		0.001	U	mg/L	0.05
WW007	2069G	24-Oct-2012	092891-001	Chromium	0.00231	0.001	J	mg/L	4.1
WW007	2069G	24-Oct-2012	092891-001	Copper	0.00494	0.003	J	mg/L	5.3
WW007	2069G	24-Oct-2012	092891-002	Fluoride	4.36	0.033		mg/L	36
WW007	2069G	24-Oct-2012	092891-001	Lead		0.0033	U	mg/L	1
WW007	2069G	24-Oct-2012	092891-001	Molybdenum	0.0187	0.002		mg/L	2
WW007	2069G	24-Oct-2012	092891-001	Nickel		0.0015	U	mg/L	2
WW007	2069G	24-Oct-2012	092891-001	Selenium		0.006	U	mg/L	0.46
WW007	2069G	24-Oct-2012	092891-001	Silver	0.00269	0.001	J	mg/L	5
WW007	2069G	24-Oct-2012	092891-001	Zinc		0.0033	U	mg/L	2.2
WW008	2069I	22-Oct-2012	092897-009	Cyanide, total	0.00186	0.00167	J	mg/L	0.45
WW008	2069I	22-Oct-2012	092897-010	Cyanide, total	0.00477	0.00167	J	mg/L	0.45
WW008	2069I	22-Oct-2012	092897-011	Cyanide, total	0.00778	0.00167		mg/L	0.45
WW008	2069I	22-Oct-2012	092897-012	Cyanide, total	0.00171	0.00167	J	mg/L	0.45
WW008	2069I	23-Oct-2012	092885-001	Aluminum		0.068	U	mg/L	900
WW008	2069I	23-Oct-2012	092885-007	Ammonia	54	0.85		mg/L	
WW008	2069I	23-Oct-2012	092885-001	Arsenic	0.00764	0.005	J	mg/L	0.051
WW008	2069I	23-Oct-2012	092885-001	Boron	0.134	0.015		mg/L	
WW008	2069I	23-Oct-2012	092885-001	Cadmium		0.001	U	mg/L	0.05
WW008	2069I	23-Oct-2012	092885-001	Chromium	0.00242	0.001	J	mg/L	4.1
WW008	2069I	23-Oct-2012	092885-001	Copper	0.0436	0.003		mg/L	5.3
WW008	2069I	23-Oct-2012	092885-002	Fluoride	0.718	0.033		mg/L	36

TABLE A-7. Permitted Sanitary Outfalls of Inorganic Analyses, August 2012 and October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW008	2069I	23-Oct-2012	092885-001	Lead		0.0033	U	mg/L	1
WW008	2069I	23-Oct-2012	092885-001	Molybdenum	0.0226	0.002		mg/L	2
WW008	2069I	23-Oct-2012	092885-001	Nickel	0.00596	0.0015		mg/L	2
WW008	2069I	23-Oct-2012	092885-001	Selenium		0.006	U	mg/L	0.46
WW008	2069I	23-Oct-2012	092885-001	Silver	0.00454	0.001	J	mg/L	5
WW008	2069I	23-Oct-2012	092885-001	Zinc	0.14	0.0033		mg/L	2.2
WW008	2069I	24-Oct-2012	092892-001	Aluminum		0.068	U	mg/L	900
WW008	2069I	24-Oct-2012	092892-007	Ammonia	67.5	0.85		mg/L	
WW008	2069I	24-Oct-2012	092892-001	Arsenic		0.005	U	mg/L	0.051
WW008	2069I	24-Oct-2012	092892-001	Boron	0.123	0.015		mg/L	
WW008	2069I	24-Oct-2012	092892-001	Cadmium		0.001	U	mg/L	0.05
WW008	2069I	24-Oct-2012	092892-001	Chromium	0.00264	0.001	J	mg/L	4.1
WW008	2069I	24-Oct-2012	092892-001	Copper	0.0438	0.003		mg/L	5.3
WW008	2069I	24-Oct-2012	092892-002	Fluoride	0.712	0.033		mg/L	36
WW008	2069I	24-Oct-2012	092892-001	Lead		0.0033	U	mg/L	1
WW008	2069I	24-Oct-2012	092892-001	Molybdenum	0.0224	0.002		mg/L	2
WW008	2069I	24-Oct-2012	092892-001	Nickel	0.00532	0.0015		mg/L	2
WW008	2069I	24-Oct-2012	092892-001	Selenium		0.006	U	mg/L	0.46
WW008	2069I	24-Oct-2012	092892-001	Silver	0.00383	0.001	J	mg/L	5
WW008	2069I	24-Oct-2012	092892-001	Zinc	0.106	0.0033		mg/L	2.2
WW011	2069K	23-Oct-2012	092886-001	Aluminum	0.144	0.068	J	mg/L	900
WW011	2069K	23-Oct-2012	092886-007	Ammonia	31.2	0.85		mg/L	
WW011	2069K	23-Oct-2012	092886-001	Arsenic	0.00649	0.005	J	mg/L	0.051
WW011	2069K	23-Oct-2012	092886-001	Boron	0.0884	0.015		mg/L	
WW011	2069K	23-Oct-2012	092886-001	Cadmium		0.001	U	mg/L	0.05
WW011	2069K	23-Oct-2012	092886-001	Chromium	0.00574	0.001		mg/L	4.1
WW011	2069K	23-Oct-2012	092886-001	Copper	0.0724	0.003		mg/L	5.3
WW011	2069K	23-Oct-2012	092886-002	Fluoride	0.792	0.033		mg/L	36
WW011	2069K	23-Oct-2012	092886-001	Lead		0.0033	U	mg/L	1
WW011	2069K	23-Oct-2012	092886-001	Molybdenum	0.0663	0.002		mg/L	2
WW011	2069K	23-Oct-2012	092886-001	Nickel	0.00676	0.0015		mg/L	2
WW011	2069K	23-Oct-2012	092886-001	Selenium		0.006	U	mg/L	0.46
WW011	2069K	23-Oct-2012	092886-001	Silver	0.00755	0.001		mg/L	5
WW011	2069K	23-Oct-2012	092886-001	Zinc	0.124	0.0033		mg/L	2.2
WW011	2069K	24-Oct-2012	092893-001	Aluminum	0.116	0.068	J	mg/L	900

TABLE A-7. Permitted Sanitary Outfalls of Inorganic Analyses, August 2012 and October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units	Regulatory Limit (ABCWUA)
WW011	2069K	24-Oct-2012	092893-007	Ammonia	21.7	0.85		mg/L	
WW011	2069K	24-Oct-2012	092893-001	Arsenic	0.00938	0.005	J	mg/L	0.051
WW011	2069K	24-Oct-2012	092893-001	Boron	0.164	0.015		mg/L	
WW011	2069K	24-Oct-2012	092893-001	Cadmium		0.001	U	mg/L	0.05
WW011	2069K	24-Oct-2012	092893-001	Chromium	0.0222	0.001		mg/L	4.1
WW011	2069K	24-Oct-2012	092893-001	Copper	0.0512	0.003		mg/L	5.3
WW011	2069K	24-Oct-2012	092893-002	Fluoride	0.724	0.033		mg/L	36
WW011	2069K	24-Oct-2012	092893-001	Lead	0.00377	0.0033	J	mg/L	1
WW011	2069K	24-Oct-2012	092893-001	Molybdenum	0.0915	0.002		mg/L	2
WW011	2069K	24-Oct-2012	092893-001	Nickel	0.0032	0.0015	J	mg/L	2
WW011	2069K	24-Oct-2012	092893-001	Selenium		0.006	U	mg/L	0.46
WW011	2069K	24-Oct-2012	092893-001	Silver	0.00713	0.001		mg/L	5
WW011	2069K	24-Oct-2012	092893-001	Zinc	0.11	0.0033		mg/L	2.2

NOTES:

ABCWUA = Albuquerque Bernalillo County Water Utility Authority
B = The analyte was found in the blank above the effective MDL.
MDL = Method detection limit.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective practical quantitation limit (PQL).
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE A-8. Summary of Sanitary Outfalls of Radiological Analyses, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Regulatory Sewer Release Limits*
CINT	2238A	23-Oct-2012	092887-004	Actinium-228	11.7	14.8	U	13.8	pCi/L	300000
CINT	2238A	23-Oct-2012	092887-003	Alpha, gross	1.78	4.81	U	8.47	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Americium-241	-5.84	6.26	U	9.33	pCi/L	200
CINT	2238A	23-Oct-2012	092887-004	Beryllium-7	-5.49	14.9	U	25.6	pCi/L	
CINT	2238A	23-Oct-2012	092887-003	Beta, gross	8.31	6.9	U	11.3	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Bismuth-212	32.8	30.7	U	48.4	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Bismuth-214	8.42	8.23	X	6.75	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Cesium-137	1.79	2.09	U	3.47	pCi/L	10000
CINT	2238A	23-Oct-2012	092887-004	Cobalt-60	-0.642	1.92	U	3.27	pCi/L	30000
CINT	2238A	23-Oct-2012	092887-004	Lead-212	7.08	6.3		5.13	pCi/L	20000
CINT	2238A	23-Oct-2012	092887-004	Lead-214	6.29	8.28	U	6.94	pCi/L	1000000
CINT	2238A	23-Oct-2012	092887-004	Neptunium-237	3.04	3.67	U	5.95	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Potassium-40	-17.6	44.9	U	45.7	pCi/L	40000
CINT	2238A	23-Oct-2012	092887-004	Radium-223	-0.369	35.4	U	57.9	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Radium-224	68.2	48.3	U	68.2	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Radium-226	30.4	59.5	U	70	pCi/L	600
CINT	2238A	23-Oct-2012	092887-004	Radium-228	11.7	14.8	U	13.8	pCi/L	600
CINT	2238A	23-Oct-2012	092887-004	Sodium-22	-0.35	1.83	U	3.18	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Thorium-227	1.06	30.4	U	23.4	pCi/L	
CINT	2238A	23-Oct-2012	092887-004	Thorium-231	-3.18	19.8	U	32.9	pCi/L	300
CINT	2238A	23-Oct-2012	092887-004	Thorium-234	-9.8	89.1	U	96.7	pCi/L	50000
CINT	2238A	23-Oct-2012	092887-005	Tritium	-17.5	95.1	U	181	pCi/L	10000000
CINT	2238A	23-Oct-2012	092887-004	Uranium-235	2.98	15.9	U	17.8	pCi/L	3000
CINT	2238A	23-Oct-2012	092887-004	Uranium-238	-9.8	89.1	U	96.7	pCi/L	3000
WW001	2069A	23-Oct-2012	092882-004	Actinium-228	5.67	14.2	U	16.7	pCi/L	300000
WW001	2069A	23-Oct-2012	092882-003	Alpha, gross	4.21	2.93	U	4.45	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Americium-241	1.12	3.31	U	4.97	pCi/L	200
WW001	2069A	23-Oct-2012	092882-004	Beryllium-7	6.02	16.5	U	29	pCi/L	
WW001	2069A	23-Oct-2012	092882-003	Beta, gross	17.1	3.89		3.89	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Bismuth-212	7.21	30.1	U	54.3	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Bismuth-214	12.3	10.4		6.64	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Cesium-137	-0.484	2.36	U	3.96	pCi/L	10000
WW001	2069A	23-Oct-2012	092882-004	Cobalt-60	-0.566	2.47	U	4.39	pCi/L	30000
WW001	2069A	23-Oct-2012	092882-004	Lead-212	-1.18	6.86	U	6.6	pCi/L	20000

TABLE A-8. Summary of Sanitary Outfalls of Radiological Analyses, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Regulatory Sewer Release Limits*
WW001	2069A	23-Oct-2012	092882-004	Lead-214	1.03	7.69	U	6.83	pCi/L	1000000
WW001	2069A	23-Oct-2012	092882-004	Neptunium-237	1.18	3.25	U	5.81	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Potassium-40	-33.6	39.7	U	46.7	pCi/L	40000
WW001	2069A	23-Oct-2012	092882-004	Radium-223	-5.17	137	U	58.8	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Radium-224	-151	79	U	56.1	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Radium-226	49.9	81	U	52.3	pCi/L	600
WW001	2069A	23-Oct-2012	092882-004	Radium-228	5.67	14.2	U	16.7	pCi/L	600
WW001	2069A	23-Oct-2012	092882-004	Sodium-22	-0.592	2.2	U	3.75	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Thorium-227	-17	438	U	21.3	pCi/L	
WW001	2069A	23-Oct-2012	092882-004	Thorium-231	0.909	22.7	U	25.8	pCi/L	300
WW001	2069A	23-Oct-2012	092882-004	Thorium-234	-4.11	51.9	U	64.9	pCi/L	50000
WW001	2069A	23-Oct-2012	092882-005	Tritium	5.78	96.7	U	179	pCi/L	10000000
WW001	2069A	23-Oct-2012	092882-004	Uranium-235	1.51	16.4	U	15.2	pCi/L	3000
WW001	2069A	23-Oct-2012	092882-004	Uranium-238	-4.11	51.9	U	64.9	pCi/L	3000
WW006	2069F	23-Oct-2012	092883-004	Actinium-228	-8.63	11.8	U	12.5	pCi/L	300000
WW006	2069F	23-Oct-2012	092883-003	Alpha, gross	4.06	2.09		2.84	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Americium-241	-3.08	11.1	U	17.4	pCi/L	200
WW006	2069F	23-Oct-2012	092883-004	Beryllium-7	3.84	13.3	U	23.2	pCi/L	
WW006	2069F	23-Oct-2012	092883-003	Beta, gross	22.6	4.59		3.72	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Bismuth-212	5.21	22.5	U	40.5	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Bismuth-214	3.8	7.7	U	7.5	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Cesium-137	0.0499	1.72	U	2.93	pCi/L	10000
WW006	2069F	23-Oct-2012	092883-004	Cobalt-60	-0.34	1.76	U	3.15	pCi/L	30000
WW006	2069F	23-Oct-2012	092883-004	Lead-212	8.99	7.14	U	8.99	pCi/L	20000
WW006	2069F	23-Oct-2012	092883-004	Lead-214	1.19	7.59	U	7.01	pCi/L	1000000
WW006	2069F	23-Oct-2012	092883-004	Neptunium-237	-0.693	3.03	U	5.28	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Potassium-40	13.4	43.4	U	32.1	pCi/L	40000
WW006	2069F	23-Oct-2012	092883-004	Radium-223	-21.2	546	U	49.3	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Radium-224	32.7	36.6	U	51.3	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Radium-226	-38.9	73.4	U	81.9	pCi/L	600
WW006	2069F	23-Oct-2012	092883-004	Radium-228	-8.63	11.8	U	12.5	pCi/L	600
WW006	2069F	23-Oct-2012	092883-004	Sodium-22	-0.805	1.75	U	2.87	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Thorium-227	-11.8	304	U	19.2	pCi/L	
WW006	2069F	23-Oct-2012	092883-004	Thorium-231	-28.9	40.3	U	40.6	pCi/L	300

TABLE A-8. Summary of Sanitary Outfalls of Radiological Analyses, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Regulatory Sewer Release Limits*
WW006	2069F	23-Oct-2012	092883-004	Thorium-234	-178	169	U	184	pCi/L	50000
WW006	2069F	23-Oct-2012	092883-005	Tritium	-74.8	86.6	U	178	pCi/L	10000000
WW006	2069F	23-Oct-2012	092883-004	Uranium-235	7.54	17.9	U	18	pCi/L	3000
WW006	2069F	23-Oct-2012	092883-004	Uranium-238	-178	169	U	184	pCi/L	3000
WW008	2069I	23-Oct-2012	092885-004	Actinium-228	5.76	14.3	U	13.4	pCi/L	300000
WW008	2069I	23-Oct-2012	092885-003	Alpha, gross	1.57	1.38	U	2.1	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Americium-241	2.69	7.54	U	11.9	pCi/L	200
WW008	2069I	23-Oct-2012	092885-004	Beryllium-7	1.13	13.7	U	23.6	pCi/L	
WW008	2069I	23-Oct-2012	092885-003	Beta, gross	20.4	3.93		2.7	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Bismuth-212	30.1	26.8	U	42.8	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Bismuth-214	10.9	5.62		5.81	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Cesium-137	-1.57	3.33	U	3.62	pCi/L	10000
WW008	2069I	23-Oct-2012	092885-004	Cobalt-60	0.907	1.82	U	3.29	pCi/L	30000
WW008	2069I	23-Oct-2012	092885-004	Lead-212	5.67	5.83	X	4.72	pCi/L	20000
WW008	2069I	23-Oct-2012	092885-004	Lead-214	-5.3	6.34	U	6.55	pCi/L	1000000
WW008	2069I	23-Oct-2012	092885-004	Neptunium-237	2.85	3.39	U	5.61	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Potassium-40	61.3	24.2		30.2	pCi/L	40000
WW008	2069I	23-Oct-2012	092885-004	Radium-223	-8.77	229	U	52.9	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Radium-224	10.4	32.4	U	50.7	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Radium-226	29.7	77.9	U	53.2	pCi/L	600
WW008	2069I	23-Oct-2012	092885-004	Radium-228	5.76	14.3	U	13.4	pCi/L	600
WW008	2069I	23-Oct-2012	092885-004	Sodium-22	0.592	1.61	U	2.95	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Thorium-227	-9.98	258	U	20.7	pCi/L	
WW008	2069I	23-Oct-2012	092885-004	Thorium-231	10.1	19.8	U	33.6	pCi/L	300
WW008	2069I	23-Oct-2012	092885-004	Thorium-234	-95.4	125	U	125	pCi/L	50000
WW008	2069I	23-Oct-2012	092885-005	Tritium	-29.3	94.1	U	181	pCi/L	10000000
WW008	2069I	23-Oct-2012	092885-004	Uranium-235	-4.69	14.8	U	17.1	pCi/L	3000
WW008	2069I	23-Oct-2012	092885-004	Uranium-238	-95.4	125	U	125	pCi/L	3000
WW011	2069K	23-Oct-2012	092886-004	Actinium-228	10.5	8.15	U	12	pCi/L	300000
WW011	2069K	23-Oct-2012	092886-003	Alpha, gross	3.44	2.45	U	3.7	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Americium-241	1.42	9.82	U	15.3	pCi/L	200
WW011	2069K	23-Oct-2012	092886-004	Beryllium-7	4.52	13.9	U	23.6	pCi/L	
WW011	2069K	23-Oct-2012	092886-003	Beta, gross	33.3	6.28		3.97	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Bismuth-212	13.9	22.2	U	38.2	pCi/L	

TABLE A-8. Summary of Sanitary Outfalls of Radiological Analyses, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Activity	Two Sigma Error	Lab Data Qualifier	MDA	Units	Regulatory Sewer Release Limits*
WW011	2069K	23-Oct-2012	092886-004	Bismuth-214	1.29	8.29	U	7.18	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Cesium-137	1.93	3.19	U	2.6	pCi/L	10000
WW011	2069K	23-Oct-2012	092886-004	Cobalt-60	1.08	1.81	U	3.22	pCi/L	30000
WW011	2069K	23-Oct-2012	092886-004	Lead-212	8.22	6.94		4.38	pCi/L	20000
WW011	2069K	23-Oct-2012	092886-004	Lead-214	-0.0465	6.37	U	6.51	pCi/L	1000000
WW011	2069K	23-Oct-2012	092886-004	Neptunium-237	0.126	3.13	U	5.41	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Potassium-40	22.4	42.7	U	31	pCi/L	40000
WW011	2069K	23-Oct-2012	092886-004	Radium-223	-31.3	813	U	51	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Radium-224	77.6	48.3	U	77.6	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Radium-226	-19.2	61.6	U	70.4	pCi/L	600
WW011	2069K	23-Oct-2012	092886-004	Radium-228	10.5	8.15	U	12	pCi/L	600
WW011	2069K	23-Oct-2012	092886-004	Sodium-22	0.696	1.71	U	3.08	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Thorium-227	0.511	17.8	U	20.7	pCi/L	
WW011	2069K	23-Oct-2012	092886-004	Thorium-231	3.5	21.1	U	36.1	pCi/L	300
WW011	2069K	23-Oct-2012	092886-004	Thorium-234	120	150	U	152	pCi/L	50000
WW011	2069K	23-Oct-2012	092886-005	Tritium	-57	87.9	U	176	pCi/L	10000000
WW011	2069K	23-Oct-2012	092886-004	Uranium-235	-7.28	17	U	17	pCi/L	3000
WW011	2069K	23-Oct-2012	092886-004	Uranium-238	120	150	U	152	pCi/L	3000

NOTES:

MDA = minimum detectable activity.
pCi/L = picocuries per liter
U = The result is less than the MDA.
X = Presumptive evidence analyte is not present.
*** = The monthly average concentration values for release of sanitary sewage were derived by taking the most restrictive restrictive occupational stochastic oral ingestion annual limits on intake (ALI) for a reference man.**

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	23-Oct-2012	092887-006	Acetone	39.4	3		ug/L
CINT	2238A	23-Oct-2012	092887-006	Benzene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Bromochloromethane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Bromodichloromethane	1.36	0.3		ug/L
CINT	2238A	23-Oct-2012	092887-006	Bromoform	2.33	0.3		ug/L
CINT	2238A	23-Oct-2012	092887-006	Bromomethane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Butanone, 2-	2.07	2	J	ug/L
CINT	2238A	23-Oct-2012	092887-006	Carbon disulfide		1.5	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Carbon tetrachloride		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Chlorobenzene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Chloroethane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Chloroform	1.26	0.3		ug/L
CINT	2238A	23-Oct-2012	092887-006	Chloromethane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Cyclohexane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dibromo-3-chloropropane, 1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dibromochloromethane	1.87	0.3		ug/L
CINT	2238A	23-Oct-2012	092887-006	Dibromoethane, 1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichlorobenzene, 1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichlorobenzene, 1,3-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichlorobenzene, 1,4-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichlorodifluoromethane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloroethane, 1,1-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloroethane, 1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloroethene, 1,1-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloropropane, 1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Dioxane, 1,4-		15	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Ethyl benzene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Hexanone, 2-		2.2	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Isopropylbenzene		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	23-Oct-2012	092887-006	Methyl Acetate		1.5	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Methylcyclohexane		3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Methylene chloride		3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Styrene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Tert-butyl methyl ether		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Tetrachloroethene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Toluene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichloro-1,2,2-trifluoroethane, 1,1,2-		1.5	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichlorobenzene, 1,2,3-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichlorobenzene, 1,2,4-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichloroethene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Trichlorofluoromethane		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Vinyl chloride		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Xylene		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Xylene, m-, p-		0.3	U	ug/L
CINT	2238A	23-Oct-2012	092887-006	Xylene, o-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Acetone	18.1	3		ug/L
WW001	2069A	23-Oct-2012	092882-006	Benzene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Bromochloromethane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Bromodichloromethane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Bromoform	1.17	0.3		ug/L
WW001	2069A	23-Oct-2012	092882-006	Bromomethane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Butanone, 2-		2	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Carbon disulfide		1.5	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Carbon tetrachloride		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Chlorobenzene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Chloroethane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Chloroform		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Chloromethane		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	23-Oct-2012	092882-006	Cyclohexane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dibromo-3-chloropropane, 1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dibromochloromethane	0.57	0.3	J	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dibromoethane, 1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichlorobenzene, 1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichlorobenzene, 1,3-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichlorobenzene, 1,4-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichlorodifluoromethane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Dioxane, 1,4-		15	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Ethyl benzene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Hexanone, 2-		2.2	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Isopropylbenzene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Methyl Acetate		1.5	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Methylcyclohexane		3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Methylene chloride		3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Styrene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Tert-butyl methyl ether		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Tetrachloroethene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Toluene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Trichloro-1,2,2-trifluoroethane, 1,1,2-		1.5	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Trichlorobenzene, 1,2,3-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Trichlorobenzene, 1,2,4-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Trichloroethane, 1,1,1-		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	23-Oct-2012	092882-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Trichloroethene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Trichlorofluoromethane		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Vinyl chloride		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Xylene		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Xylene, m-, p-		0.3	U	ug/L
WW001	2069A	23-Oct-2012	092882-006	Xylene, o-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Acetone	35	3		ug/L
WW006	2069F	23-Oct-2012	092883-006	Benzene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Bromochloromethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Bromodichloromethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Bromoform	5.63	0.3		ug/L
WW006	2069F	23-Oct-2012	092883-006	Bromomethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Butanone, 2-		2	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Carbon disulfide		1.5	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Carbon tetrachloride		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Chlorobenzene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Chloroethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Chloroform		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Chloromethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Cyclohexane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dibromo-3-chloropropane, 1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dibromochloromethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dibromoethane, 1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichlorobenzene, 1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichlorobenzene, 1,3-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichlorobenzene, 1,4-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichlorodifluoromethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloroethene, trans-1,2-		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	23-Oct-2012	092883-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Dioxane, 1,4-		15	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Ethyl benzene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Hexanone, 2-		2.2	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Isopropylbenzene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Methyl Acetate		1.5	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Methylcyclohexane		3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Methylene chloride		3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Styrene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Tert-butyl methyl ether		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Tetrachloroethene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Toluene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichloro-1,2,2-trifluoroethane, 1,1,2-		1.5	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichlorobenzene, 1,2,3-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichlorobenzene, 1,2,4-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichloroethene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Trichlorofluoromethane		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Vinyl chloride		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Xylene		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Xylene, m-, p-		0.3	U	ug/L
WW006	2069F	23-Oct-2012	092883-006	Xylene, o-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Acetone	16.7	3		ug/L
WW007	2069G	23-Oct-2012	092884-006	Benzene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Bromochloromethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Bromodichloromethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Bromoform		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Bromomethane		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	23-Oct-2012	092884-006	Butanone, 2-		2	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Carbon disulfide		1.5	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Carbon tetrachloride		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Chlorobenzene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Chloroethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Chloroform		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Chloromethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Cyclohexane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dibromo-3-chloropropane, 1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dibromochloromethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dibromoethane, 1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichlorobenzene, 1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichlorobenzene, 1,3-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichlorobenzene, 1,4-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichlorodifluoromethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Dioxane, 1,4-		15	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Ethyl benzene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Hexanone, 2-		2.2	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Isopropylbenzene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Methyl Acetate		1.5	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Methylcyclohexane		3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Methylene chloride		3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Styrene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Tert-butyl methyl ether		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	23-Oct-2012	092884-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Tetrachloroethene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Toluene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichloro-1,2,2-trifluoroethane, 1,1,2-		1.5	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichlorobenzene, 1,2,3-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichlorobenzene, 1,2,4-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichloroethene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Trichlorofluoromethane		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Vinyl chloride		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Xylene		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Xylene, m-, p-		0.3	U	ug/L
WW007	2069G	23-Oct-2012	092884-006	Xylene, o-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Acetone	22.9	3		ug/L
WW008	2069I	23-Oct-2012	092885-006	Benzene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Bromochloromethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Bromodichloromethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Bromoform		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Bromomethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Butanone, 2-		2	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Carbon disulfide		1.5	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Carbon tetrachloride		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Chlorobenzene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Chloroethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Chloroform		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Chloromethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Cyclohexane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dibromo-3-chloropropane, 1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dibromochloromethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dibromoethane, 1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichlorobenzene, 1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichlorobenzene, 1,3-		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	23-Oct-2012	092885-006	Dichlorobenzene, 1,4-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichlorodifluoromethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Dioxane, 1,4-		15	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Ethyl benzene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Hexanone, 2-		2.2	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Isopropylbenzene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Methyl Acetate		1.5	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Methylcyclohexane		3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Methylene chloride		3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Styrene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Tert-butyl methyl ether		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Tetrachloroethene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Toluene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichloro-1,2,2-trifluoroethane, 1,1,2-		1.5	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichlorobenzene, 1,2,3-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichlorobenzene, 1,2,4-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichloroethene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Trichlorofluoromethane		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Vinyl chloride		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Xylene		0.3	U	ug/L
WW008	2069I	23-Oct-2012	092885-006	Xylene, m-, p-		0.3	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	23-Oct-2012	092885-006	Xylene, o-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Acetone	161	3		ug/L
WW011	2069K	23-Oct-2012	092886-006	Benzene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Bromochloromethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Bromodichloromethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Bromoform		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Bromomethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Butanone, 2-	2.18	2	J	ug/L
WW011	2069K	23-Oct-2012	092886-006	Carbon disulfide		1.5	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Carbon tetrachloride		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Chlorobenzene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Chloroethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Chloroform	0.39	0.3	J	ug/L
WW011	2069K	23-Oct-2012	092886-006	Chloromethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Cyclohexane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dibromo-3-chloropropane, 1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dibromochloromethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dibromoethane, 1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichlorobenzene, 1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichlorobenzene, 1,3-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichlorobenzene, 1,4-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichlorodifluoromethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloroethane, 1,1-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloroethane, 1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloroethene, 1,1-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloroethene, cis-1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloroethene, trans-1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloropropane, 1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloropropene, cis-1,3-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dichloropropene, trans-1,3-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Dioxane, 1,4-		15	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Ethyl benzene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Hexanone, 2-		2.2	U	ug/L

TABLE A-9. Summary of Sanitary Outfalls of Volatile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW011	2069K	23-Oct-2012	092886-006	Isopropylbenzene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Methyl Acetate		1.5	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Methylcyclohexane		3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Methylene chloride		3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Pentanone, 4-methyl-, 2-		1.5	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Styrene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Tert-butyl methyl ether		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Tetrachloroethane, 1,1,2,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Tetrachloroethene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Toluene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichloro-1,2,2-trifluoroethane, 1,1,2-		1.5	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichlorobenzene, 1,2,3-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichlorobenzene, 1,2,4-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichloroethane, 1,1,1-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichloroethane, 1,1,2-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichloroethene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Trichlorofluoromethane		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Vinyl chloride		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Xylene		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Xylene, m-, p-		0.3	U	ug/L
WW011	2069K	23-Oct-2012	092886-006	Xylene, o-		0.3	U	ug/L

NOTES:

MDL = Method detection limit.

J = Estimated value, the analyte concentration fell above the effective MDL limit and below the effective practical quantitation limit (PQL).

ug/L = micrograms per liter.

U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	24-Oct-2012	092894-008	1,1'-Biphenyl		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Acenaphthene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Acenaphthylene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Acetophenone		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Anthracene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Atrazine		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Benzaldehyde		5	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Benzo(a)anthracene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Benzo(a)pyrene		0.44	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Benzo(b)fluoranthene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Benzo(ghi)perylene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Benzo(k)fluoranthene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Bromophenyl phenyl ether, 4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Butylbenzyl phthalate		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Caprolactam		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Carbazole		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chloro-3-methylphenol, 4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chlorobenzenamine, 4-		3.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chloroethoxy)methane, bis(2-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chloroethyl)ether, bis(2-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chloronaphthalene, 2-		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chlorophenol, 2-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chlorophenyl phenyl ether, 4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Chrysene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Cresol, m,p-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Cresol, o-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Di-n-butyl phthalate		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Di-n-octyl phthalate		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dibenz[a,h]anthracene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dibenzofuran		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dichlorobenzidine, 3,3'-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dichlorodiisopropyl ether, 2,2'-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dichlorophenol, 2,4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Diethylphthalate		3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
CINT	2238A	24-Oct-2012	092894-008	Dimethylphenol, 2,4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dimethylphthalate		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dinitro-o-cresol		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dinitrophenol, 2,4-		5	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dinitrotoluene, 2,4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Dinitrotoluene, 2,6-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Diphenyl amine		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Ethylhexyl)phthalate, bis(2-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Fluoranthene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Fluorene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Hexachlorobenzene		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Hexachlorobutadiene		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Hexachlorocyclopentadiene		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Hexachloroethane		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Indeno(1,2,3-c,d)pyrene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Isophorone		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Methylnaphthalene, 2-		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Naphthalene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitro-benzene		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitroaniline, 2-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitroaniline, 3-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitroaniline, 4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitrophenol, 2-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitrophenol, 4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Nitrosodipropylamine, n-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Pentachlorophenol		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Phenanthrene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Phenol		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Pyrene		0.3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Trichlorobenzene, 1,2,4-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Trichlorophenol, 2,4,5-		3	U	ug/L
CINT	2238A	24-Oct-2012	092894-008	Trichlorophenol, 2,4,6-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	1,1'-Biphenyl		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Acenaphthene		0.3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	24-Oct-2012	092889-008	Acenaphthylene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Acetophenone		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Anthracene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Atrazine		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Benzaldehyde		5	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Benzo(a)anthracene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Benzo(a)pyrene		0.44	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Benzo(b)fluoranthene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Benzo(ghi)perylene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Benzo(k)fluoranthene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Bromophenyl phenyl ether, 4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Butylbenzyl phthalate		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Caprolactam		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Carbazole		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chloro-3-methylphenol, 4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chlorobenzenamine, 4-		3.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chloroethoxy)methane, bis(2-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chloroethyl)ether, bis(2-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chloronaphthalene, 2-		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chlorophenol, 2-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chlorophenyl phenyl ether, 4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Chrysene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Cresol, m,p-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Cresol, o-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Di-n-butyl phthalate		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Di-n-octyl phthalate		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dibenz[a,h]anthracene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dibenzofuran		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dichlorobenzidine, 3,3'-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dichlorodiisopropyl ether, 2,2'-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dichlorophenol, 2,4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Diethylphthalate		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dimethylphenol, 2,4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dimethylphthalate		3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW001	2069A	24-Oct-2012	092889-008	Dinitro-o-cresol		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dinitrophenol, 2,4-		5	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dinitrotoluene, 2,4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Dinitrotoluene, 2,6-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Diphenyl amine		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Ethylhexyl)phthalate, bis(2-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Fluoranthene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Fluorene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Hexachlorobenzene		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Hexachlorobutadiene		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Hexachlorocyclopentadiene		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Hexachloroethane		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Indeno(1,2,3-c,d)pyrene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Isophorone		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Methylnaphthalene, 2-		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Naphthalene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitro-benzene		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitroaniline, 2-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitroaniline, 3-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitroaniline, 4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitrophenol, 2-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitrophenol, 4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Nitrosodipropylamine, n-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Pentachlorophenol		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Phenanthrene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Phenol		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Pyrene		0.3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Trichlorobenzene, 1,2,4-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Trichlorophenol, 2,4,5-		3	U	ug/L
WW001	2069A	24-Oct-2012	092889-008	Trichlorophenol, 2,4,6-		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	1,1'-Biphenyl		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Acenaphthene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Acenaphthylene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Acetophenone		30	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	24-Oct-2012	092890-008	Anthracene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Atrazine		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Benzaldehyde		50	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Benzo(a)anthracene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Benzo(a)pyrene		4.4	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Benzo(b)fluoranthene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Benzo(ghi)perylene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Benzo(k)fluoranthene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Bromophenyl phenyl ether, 4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Butylbenzyl phthalate		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Caprolactam		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Carbazole		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chloro-3-methylphenol, 4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chlorobenzenamine, 4-		33	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chloroethoxy)methane, bis(2-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chloroethyl)ether, bis(2-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chloronaphthalene, 2-		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chlorophenol, 2-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chlorophenyl phenyl ether, 4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Chrysene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Cresol, m,p-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Cresol, o-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Di-n-butyl phthalate		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Di-n-octyl phthalate		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dibenz[a,h]anthracene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dibenzofuran		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dichlorobenzidine, 3,3'-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dichlorodiisopropyl ether, 2,2'-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dichlorophenol, 2,4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Diethylphthalate		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dimethylphenol, 2,4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dimethylphthalate		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dinitro-o-cresol		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dinitrophenol, 2,4-		50	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW006	2069F	24-Oct-2012	092890-008	Dinitrotoluene, 2,4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Dinitrotoluene, 2,6-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Diphenyl amine		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Ethylhexyl)phthalate, bis(2-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Fluoranthene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Fluorene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Hexachlorobenzene		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Hexachlorobutadiene		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Hexachlorocyclopentadiene		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Hexachloroethane		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Indeno(1,2,3-c,d)pyrene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Isophorone		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Methylnaphthalene, 2-		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Naphthalene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitro-benzene		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitroaniline, 2-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitroaniline, 3-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitroaniline, 4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitrophenol, 2-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitrophenol, 4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Nitrosodipropylamine, n-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Pentachlorophenol		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Phenanthrene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Phenol		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Pyrene		3	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Trichlorobenzene, 1,2,4-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Trichlorophenol, 2,4,5-		30	U	ug/L
WW006	2069F	24-Oct-2012	092890-008	Trichlorophenol, 2,4,6-		30	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	1,1'-Biphenyl		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Acenaphthene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Acenaphthylene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Acetophenone		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Anthracene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Atrazine		2.86	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	24-Oct-2012	092891-008	Benzaldehyde		4.76	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Benzo(a)anthracene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Benzo(a)pyrene		0.419	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Benzo(b)fluoranthene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Benzo(ghi)perylene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Benzo(k)fluoranthene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Bromophenyl phenyl ether, 4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Butylbenzyl phthalate		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Caprolactam		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Carbazole		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chloro-3-methylphenol, 4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chlorobenzenamine, 4-		3.14	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chloroethoxy)methane, bis(2-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chloroethyl)ether, bis(2-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chloronaphthalene, 2-		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chlorophenol, 2-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chlorophenyl phenyl ether, 4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Chrysene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Cresol, m,p-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Cresol, o-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Di-n-butyl phthalate		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Di-n-octyl phthalate		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dibenz[a,h]anthracene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dibenzofuran		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dichlorobenzidine, 3,3'-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dichlorodiisopropyl ether, 2,2'-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dichlorophenol, 2,4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Diethylphthalate		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dimethylphenol, 2,4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dimethylphthalate		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dinitro-o-cresol		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dinitrophenol, 2,4-		4.76	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dinitrotoluene, 2,4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Dinitrotoluene, 2,6-		2.86	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW007	2069G	24-Oct-2012	092891-008	Diphenyl amine		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Ethylhexyl)phthalate, bis(2-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Fluoranthene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Fluorene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Hexachlorobenzene		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Hexachlorobutadiene		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Hexachlorocyclopentadiene		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Hexachloroethane		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Indeno(1,2,3-c,d)pyrene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Isophorone		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Methylnaphthalene, 2-		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Naphthalene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitro-benzene		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitroaniline, 2-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitroaniline, 3-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitroaniline, 4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitrophenol, 2-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitrophenol, 4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Nitrosodipropylamine, n-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Pentachlorophenol		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Phenanthrene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Phenol		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Pyrene		0.286	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Trichlorobenzene, 1,2,4-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Trichlorophenol, 2,4,5-		2.86	U	ug/L
WW007	2069G	24-Oct-2012	092891-008	Trichlorophenol, 2,4,6-		2.86	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	1,1'-Biphenyl		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Acenaphthene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Acenaphthylene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Acetophenone		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Anthracene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Atrazine		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Benzaldehyde		5	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Benzo(a)anthracene		0.3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	24-Oct-2012	092892-008	Benzo(a)pyrene		0.44	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Benzo(b)fluoranthene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Benzo(ghi)perylene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Benzo(k)fluoranthene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Bromophenyl phenyl ether, 4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Butylbenzyl phthalate		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Caprolactam		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Carbazole		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chloro-3-methylphenol, 4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chlorobenzenamine, 4-		3.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chloroethoxy)methane, bis(2-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chloroethyl)ether, bis(2-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chloronaphthalene, 2-		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chlorophenol, 2-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chlorophenyl phenyl ether, 4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Chrysene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Cresol, m,p-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Cresol, o-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Di-n-butyl phthalate		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Di-n-octyl phthalate		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dibenz[a,h]anthracene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dibenzofuran		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dichlorobenzidine, 3,3'-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dichlorodiisopropyl ether, 2,2'-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dichlorophenol, 2,4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Diethylphthalate		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dimethylphenol, 2,4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dimethylphthalate		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dinitro-o-cresol		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dinitrophenol, 2,4-		5	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dinitrotoluene, 2,4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Dinitrotoluene, 2,6-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Diphenyl amine		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Ethylhexyl)phthalate, bis(2-		3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW008	2069I	24-Oct-2012	092892-008	Fluoranthene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Fluorene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Hexachlorobenzene		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Hexachlorobutadiene		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Hexachlorocyclopentadiene		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Hexachloroethane		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Indeno(1,2,3-c,d)pyrene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Isophorone		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Methylnaphthalene, 2-		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Naphthalene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitro-benzene		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitroaniline, 2-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitroaniline, 3-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitroaniline, 4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitrophenol, 2-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitrophenol, 4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Nitrosodipropylamine, n-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Pentachlorophenol		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Phenanthrene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Phenol		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Pyrene		0.3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Trichlorobenzene, 1,2,4-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Trichlorophenol, 2,4,5-		3	U	ug/L
WW008	2069I	24-Oct-2012	092892-008	Trichlorophenol, 2,4,6-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	1,1'-Biphenyl		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Acenaphthene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Acenaphthylene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Acetophenone		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Anthracene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Atrazine		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Benzaldehyde		5	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Benzo(a)anthracene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Benzo(a)pyrene		0.44	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Benzo(b)fluoranthene		0.3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW011	2069K	24-Oct-2012	092893-008	Benzo(ghi)perylene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Benzo(k)fluoranthene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Bromophenyl phenyl ether, 4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Butylbenzyl phthalate		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Caprolactam		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Carbazole		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chloro-3-methylphenol, 4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chlorobenzenamine, 4-		3.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chloroethoxy)methane, bis(2-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chloroethyl)ether, bis(2-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chloronaphthalene, 2-		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chlorophenol, 2-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chlorophenyl phenyl ether, 4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Chrysene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Cresol, m,p-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Cresol, o-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Di-n-butyl phthalate		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Di-n-octyl phthalate		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dibenz[a,h]anthracene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dibenzofuran		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dichlorobenzidine, 3,3'-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dichlorodiisopropyl ether, 2,2'-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dichlorophenol, 2,4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Diethylphthalate		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dimethylphenol, 2,4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dimethylphthalate		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dinitro-o-cresol		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dinitrophenol, 2,4-		5	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dinitrotoluene, 2,4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Dinitrotoluene, 2,6-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Diphenyl amine		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Ethylhexyl)phthalate, bis(2-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Fluoranthene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Fluorene		0.3	U	ug/L

TABLE A-10. Summary of Sanitary Outfalls of Semi-Volitile Organic Compounds, October 2012

Station	Permit Number	Date Collected	Sample ID	Analyte	Result	MDL	Lab Data Qualifier	Units
WW011	2069K	24-Oct-2012	092893-008	Hexachlorobenzene		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Hexachlorobutadiene		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Hexachlorocyclopentadiene		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Hexachloroethane		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Indeno(1,2,3-c,d)pyrene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Isophorone		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Methylnaphthalene, 2-		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Naphthalene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitro-benzene		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitroaniline, 2-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitroaniline, 3-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitroaniline, 4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitrophenol, 2-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitrophenol, 4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Nitrosodipropylamine, n-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Pentachlorophenol		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Phenanthrene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Phenol		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Pyrene		0.3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Trichlorobenzene, 1,2,4-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Trichlorophenol, 2,4,5-		3	U	ug/L
WW011	2069K	24-Oct-2012	092893-008	Trichlorophenol, 2,4,6-		3	U	ug/L

NOTES:

MDA = Method detection limit.

ug/L = micrograms per liter.

U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

APPENDIX B

2012 ANNUAL GROUNDWATER MONITORING REPORT

SANDIA REPORT
Unlimited Release
SAND2013-4700P
Printed June 2013

Calendar Year 2012

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.

Annual Groundwater Monitoring Report

Calendar Year 2012

SANDIA REPORT
Unlimited Release
SAND2013-4700P
Printed June 2013

Long-Term Stewardship Consolidated Groundwater Monitoring Program

Sandia National Laboratories, New Mexico

June 2013

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

Long-Term Stewardship (4142)
Sandia National Laboratories, New Mexico
Albuquerque, New Mexico 87185-0729

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Contributing Authors

Copland, John
Jackson, Tim
Lum, Clinton
Mitchell, Michael
Skelly, Michael

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 Protection Program (GWPP) 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 GWPP locations and at the following SNL/NM sites through December 31, 2012: Burn Site Groundwater study area; Chemical Waste Landfill; Mixed Waste Landfill; Solid Waste Management Units 8/58, 49, 68, 116, 149, and 154; Technical Area V study area; and the Tijeras Arroyo Groundwater study area. 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, *Environmental, Safety, and Health Reporting*.

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Chapter Tables

Chapter Tables (continued)

Chapter Tables (continued)

Chapter Tables (concluded)

Chapter Figures

Chapter Figures (concluded)

Abbreviations and Acronyms

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
CAC	Corrective Action Complete
CCBA	Coyote Canyon Blast Area
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
CMI	Corrective Measures Implementation
CMIP	Corrective Measures Implementation Plan
CMS	Corrective Measures Study
COA	City of Albuquerque
COC	constituent of concern
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
DO	dissolved oxygen
DOE	U.S. Department of Energy
DRO	diesel range organics
DSS	Drain and Septic System
EB	equipment blank
EDMS	Environmental Data Management System
EMS	Environmental Management System
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ET	evapotranspirative
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
GRO	gasoline range organics
GWPP	Groundwater Protection Program
HE	high explosive
HPT	High Performing Team
HSWA	Hazardous and Solid Waste Amendments
IMWP	Interim Measures Work Plan
IRP	Installation Restoration Program (U.S. Air Force)
JP-4	jet propellant, fuel grade 4
KAFB	Kirtland Air Force Base
LCS	laboratory control sample
LE	Landfill Excavation

Abbreviations and Acronyms (continued)

LRRI	Lovelace Respiratory Research Institute
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
MWL	Mixed Waste Landfill
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NNSA	National Nuclear Security Administration
NOD	Notice of Disapproval
NPN	nitrate plus nitrite
OB	Oversight Bureau
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
PCE	tetrachloroethene
PGWS	perched groundwater system
PQL	practical quantitation limit
PVC	polyvinyl chloride
QC	quality control
QED™	QED Environmental Systems MicroPurge® low-flow sampling method
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-trinitro-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
SDWA	Safe Drinking Water Act
SFO	Sandia Field Office
SMO	Sample Management Office
SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TAG	Tijeras Arroyo Groundwater (Investigation)
TAL	Target Analyte List
TA-V study area	Technical Area-V Groundwater Investigation Study Area
TB	trip blank
TCE	trichloroethene (equivalent to trichlorethylene)

Abbreviations and Acronyms (concluded)

tetryl	methyl 2,4,6-trinitrophenylnitramine
the Order	Compliance Order on Consent
TOC	total organic carbon
TOX	total organic halogens
TPH	total petroleum hydrocarbons
UCS	Underground Conduit System
USAF	U.S. Air Force
USGS	U.S. Geological Survey
VA	Veterans Administration
VCM	voluntary corrective measure
VE	Vapor Extraction
VOC	volatile organic compound

Units

µg/L	microgram(s) per liter
ac-ft	acre feet
ft	foot (feet)
ft^3/yr	cubic feet per year
ft/ft	feet per foot
ft/min	feet per minute
ft/yr	feet per year
gal.	gallon(s)
in/yr	inches per year
Ma	Mega Annum
mg/L	milligram(s) per liter
NTU	nephelometric turbidity units
pCi/g	picocuries per gram
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
EOD	Explosive Ordnance Disposal
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

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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 Protection Program (GWPP) 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) 2012. This report has been prepared to meet the environmental reporting requirements for the CY 2012 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: GWPP site-wide surveillance (Chapter 2.0); Chemical Waste Landfill (CWL) (Chapter 3.0); Mixed Waste Landfill (MWL) (Chapter 4.0); Technical Area (TA)-V (Chapter 5.0); Tijeras Arroyo Groundwater (TAG) (Chapter 6.0); Burn Site Groundwater (BSG) (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 (ABCWUA) 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, which have uplifted along normal faults. 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 GWPP 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
- TA-V

- TAG
- BSG
- 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; the TA-V, TAG, BSG study areas; 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 CWL PCCP Attachment 2, Groundwater Sampling and Analysis Plan.

Groundwater Quality Monitoring Activities and Results

During CY 2012, groundwater samples were collected from monitoring wells for the 12 investigations (GWPP 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 GWPP monitoring wells were also compared with NMED maximum allowable concentrations (MACs) promulgated for groundwater by the State of New Mexico Water Quality Control Commission (NMWQCC). 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/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 Protection Program

Chapter 2.0 documents the results of the CY 2012 groundwater surveillance monitoring activities conducted as part of the SNL/NM GWPP. Water levels were measured at 97 monitoring wells. Water level measurements were obtained either monthly or quarterly depending on the response characteristics of the groundwater system at each well location to pumping or other stresses. The surveillance activities include the annual collection and analysis of groundwater samples from 12 monitoring wells and 1 surface water sample from a spring. Annual sampling of groundwater was conducted during April/May 2012. Samples collected from all locations were analyzed for Safe Drinking Water Act list volatile organic compounds (VOCs), total organic halogens, total phenols, total alkalinity, nitrate plus nitrite (NPN), total cyanide, major anions, Target Analyte List (TAL) metals plus uranium, mercury, radionuclides by gamma spectroscopy, gross alpha/beta activity, radium-226, and radium-228. Additional samples were collected at selected monitoring wells for analysis of high explosive (HE) compounds and isotopic uranium.

No analytical parameters exceed established MCLs or MACs, except for beryllium and fluoride. The concentrations of these analytes that exceed MCLs or MACs in groundwater samples are similar to the results reported for previous years.

Fluoride was detected above the NMWQCC groundwater protection MAC of 1.6 milligrams per liter (mg/L) at four sampling locations (Coyote Springs, SFR-2S, SFR-4T, and TRE-1). The concentrations range from 1.61 to 2.76 mg/L. The EPA MCL for fluoride is 4.0 mg/L.

Beryllium was detected in the surface water sample from Coyote Springs at a concentration of 0.0065 mg/L. The MCL for beryllium is 0.004 mg/L. Beryllium has been consistently detected in the surface water samples from the springs and is considered to be of natural origin.

Groundwater elevation measurements were obtained throughout CY 2012 at 97 locations on a monthly or quarterly basis. Groundwater elevation measurements obtained from representative monitoring wells 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 ABCWUA wells located north of the base.

Groundwater elevations were also obtained from wells completed in the perched groundwater system (PGWS) to construct a groundwater elevation contour map. The contours indicate groundwater flow in the PGWS is toward the southeast. Water levels are declining in the northwest and increasing slightly in the east presumably due to the drainage of the system to the east and perhaps some additional recharge from the Tijeras Arroyo.

Chemical Waste Landfill

Chapter 3.0 discusses the CWL semiannual groundwater monitoring activities performed during January and July 2012. Groundwater samples were collected from four monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11) and analyzed for trichloroethene (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 associated EPA MCLs in any of the CWL groundwater samples. The analytical results are comparable to historical values.

Mixed Waste Landfill

Chapter 4.0 discusses the MWL annual groundwater sampling activities conducted in February 2012. Groundwater samples were collected from seven monitoring wells (MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, and MWL-MW9) and analyzed for VOCs, TAL metals plus uranium, anions (i.e., bromide, chloride, fluoride, and sulfate), total alkalinity, NPN, radionuclides by gamma spectroscopy, gross alpha/beta activity, and tritium as specified in the Order. No analytes were detected at concentrations exceeding the associated EPA MCLs in any of the MWL groundwater samples. The analytical results are comparable to historical values.

Technical Area V Groundwater Study Area

Chapter 5.0 discusses the TA-V groundwater monitoring activities conducted during CY 2012. Both TCE and nitrate have been identified as constituents of concern (COCs) in groundwater at the TA-V Groundwater Investigation Study Area (TA-V study area) based on detections above the EPA MCL in samples collected from monitoring wells. Currently 16 wells in the TA-V study area are monitored for water quality and water levels. Table XI-1 of the Order specifies that the sampling frequency for groundwater monitoring at TA-V is quarterly. Unique features of the TA-V study area include low concentrations of TCE and nitrate in a deep alluvial aquifer.

The conceptual site model of contaminant transport at TA-V includes release from the source term, migration through the vadose zone, and movement in groundwater. The potential sources of TCE and/or nitrate in the TA-V study area include wastewater disposal systems and seepage pits. Based on the historical use and disposal of chlorinated solvents, the extent of TCE in groundwater is probably associated with multiple aqueous releases of solvents and subsequent vapor-phase transport through the vadose zone. The slow rate of groundwater flow (4 to 20 feet per year) is responsible for the present distribution of TCE in the aquifer.

Only NPN and TCE were detected above the MCLs in groundwater samples from TA-V study area wells. NPN concentrations exceed the MCL of 10 mg/L in samples from monitoring wells LWDS-MW1 and TAV-MW10, with a maximum concentration of 13.6 mg/L in the sample collected from monitoring well LWDS-MW1 in June 2012.

During CY 2012, TCE exceeded the MCL of 5 micrograms per liter (μg/L) 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 20.7 μg/L found in the sample from monitoring well LWDS-MW1 collected in March 2012.

The analytical results for this reporting period are consistent with historical concentrations. The current conceptual site model for the TA-V study area does not require modification based on the sampling results for CY 2012.

The following activities took place for the TA-V study area during CY 2012:

- Monthly or quarterly water level measurements were obtained for all TA-V study area wells.
- Semiannual and quarterly groundwater sampling events were conducted at 16 wells in February/March, May/June, July/August, and October/November 2012.
- Quarterly soil-vapor sampling events were conducted at monitoring wells TAV-SV01, TAV-SV02, and TAV-SV03 in February, May, August, and November 2012.

Tijeras Arroyo Groundwater Study Area

Chapter 6.0 addresses groundwater monitoring activities conducted during CY 2012 at the TAG study area. Currently, 21 wells in the TAG study area are monitored for water quality, and 30 wells are monitored for water levels. Two groundwater systems are present in the TAG study area: the PGWS at approximately 220 to 330 ft bgs and the regional aquifer groundwater system at approximately 440 to 570 ft bgs. Groundwater monitoring wells are completed within either the PGWS or regional aquifer. Unique features of the TAG study area include low concentrations of TCE at scattered locations in the PGWS and low concentrations of nitrate at scattered locations in the PGWS and regional aquifer.

For CY 2012, wells were sampled in March, June, August/September, and November/December. The samples were analyzed for VOCs, NPN, anions, TAL metals (plus uranium), gross alpha/beta activity, tritium, and radionuclides by gamma spectroscopy. Depending on their locations and historical concentrations of COCs, wells were sampled quarterly, semiannually, or annually during this reporting period.

Both TCE and nitrate have been identified as COCs in groundwater at the TAG study area based on historical groundwater monitoring results. Only NPN and TCE were detected above MCLs in samples from TAG study area wells. In CY 2012, NPN concentrations exceeded the MCL of 10 mg/L in samples from monitoring wells TA2-SW1-320, TA2-W-19, TJA-2, TJA-4, and TJA-7, with a maximum concentration of 32.1 mg/L in the sample from monitoring well TJA-4 collected during the September 2012 sampling event. NPN concentrations in monitoring wells TA2-SW1-320, TJA-4, and TJA-7 have generally exceeded the MCL for the life of the wells, whereas NPN concentrations occasionally have exceeded the MCL in samples from monitoring wells TJA-2 and TA2-W-19.

During CY 2012, TCE exceeded the MCL of 5 μg/L in the groundwater sample from one PGWS well, WYO-4. The maximum concentration of TCE detected during this reporting period is 9.42 μg/L in the sample from monitoring well WYO-4 collected during the March 2012 sampling event. TCE concentrations in samples from monitoring well WYO-4 slightly exceed the MCL, and trends are level to slightly increasing over time.

The analytical results for this reporting period are consistent with historical concentrations. The current conceptual site model for the TAG study area does not require modification based on the sampling results for CY 2012.

The following activities took place for the TAG study area during CY 2012:

- Monthly, quarterly, or annual water level measurements were obtained from TAG monitoring wells.

- Quarterly groundwater sampling events were conducted at seven monitoring wells (TA2-SW1-320, TA2-W-19, TA2-W-26, TJA-2, TJA-4, TJA-7, and WYO-4) in March, June, August/September, and November/December 2012.

- Semiannual groundwater sampling was conducted at four monitoring wells (TA2-W-01, TA2-W-27, TJA-3, and TJA-6) in March and August/September 2012.

- Annual groundwater sampling was conducted at 10 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, and WYO-3) in August/September 2012.

Burn Site Groundwater Study Area

Chapter 7.0 discusses the groundwater monitoring activities conducted during CY 2012 at the BSG study area, which is located around 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 Burn Site Well (a nonpotable production well used for fire suppression). The study area consists of 10 monitoring wells, and samples were collected and analyzed for VOCs, semivolatile organic compounds (SVOCs), HE compounds, total petroleum hydrocarbons (TPH)-diesel range organics, TPH-gasoline range organics, anions, alkalinity, NPN, TAL metals (plus uranium), gross alpha/beta activity, tritium, and radionuclides by gamma spectroscopy. As required by the NMED, semiannual sampling for perchlorate was conducted at monitoring well CYN-MW6.

Only NPN was detected above the MCL in samples from BSG study area wells. NPN results exceed the MCL of 10 mg/L in samples from monitoring wells CYN-MW6, CYN-MW9, CYN-MW11, and CYN-MW12, with a maximum concentration of 33.1 mg/L in the sample from monitoring well CYN-MW9 collected during the April 2012 sampling event.

Perchlorate was detected slightly above the screening level/method detection limit (MDL) of 4 μg/L only in samples collected from monitoring well CYN-MW6. Perchlorate concentrations range from 5.77 J to 7.32 J μg/L, where "J" represents an estimated concentration. Currently, no MCL is established for perchlorate.

The analytical results for this reporting period are consistent with historical concentrations. The current conceptual site model does not require modification based on the sampling results for CY 2012.

The following activities took place for the BSG study area during CY 2012:

- Quarterly groundwater sampling events were conducted at four monitoring wells (CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) in January 2012.

- Semiannual groundwater sampling was conducted at eight monitoring wells (CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) in April 2012.

- Semiannual groundwater sampling was conducted at eight monitoring wells (CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) in October 2012.

- Semiannual perchlorate screening groundwater sampling and reporting were performed for monitoring well CYN-MW6.

- Monitoring wells CYN-MW1D, CYN-MW2S, and 12AUP-01 were decommissioned in November 2012.

- Monitoring well CYN-MW13 was installed to replace CYN-MW1D in December 2012.

Solid Waste Management Units 8/58

Chapter 8.0 discusses the groundwater monitoring activities conducted during CY 2012 at SWMUs 8/58, which are located in the Arroyo del Coyote watershed that captures runoff from the western flank of the Manzanita Mountains. Monitoring wells CCBA-MW1 and CCBA-MW2 were installed in August 2011, and these wells have been sampled quarterly since then. The groundwater samples from each well 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, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

No parameters were detected above established MCLs, except for fluoride. Fluoride exceeds the established MCL of 4.0 mg/L in monitoring well CCBA-MW1 sample at a concentration ranging from 4.93 to 5.32 mg/L.

The following activities took place for SWMUs 8/58 during CY 2012:

- A report describing the well installation field activities was approved by the NMED in April 2012.

- Quarterly groundwater sampling was conducted at monitoring wells CCBA-MW1 and CCBA-MW2 in January, April, July, and October 2012.

Solid Waste Management Unit 49
Chapter 9.0 discusses the SWMU 49 annual groundwater monitoring activities performed during CY 2012. SWMU 49 is located in Lurance Canyon and consists of a surface discharge area associated with a former trailer used as a darkroom and the area around a drainpipe outfall from Building 9820. The DOE/Sandia received a letter from the NMED on April 14, 2010, that lists SWMU 49 under the heading of "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls" and further states that SWMU 49 requires long-term monitoring of groundwater on an annual basis as a site control. Annual sampling was completed in 2012, and samples were analyzed for general chemistry, VOCs, HE compounds, perchlorate, metals, cyanide, NPN, gross alpha/beta activity, and radionuclides by gamma spectroscopy. No analytes were detected above their respective MCLs.

The following activities took place for SWMU 49 during CY 2012:

- Annual groundwater sampling was conducted at monitoring well CYN-MW5 in January 2012.
- Periodic groundwater elevation data were obtained from monitoring well CYN-MW5.

Solid Waste Management Unit 68
Chapter 10.0 discusses the quarterly groundwater monitoring activities performed during CY 2012 at SWMU 68, which is located in Coyote Test Field. Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were installed in August 2011, and these wells have been sampled quarterly since then. The groundwater samples from each well 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, hexavalent chromium, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium. No parameters were detected above established MCLs.

The following activities took place for SWMU 68 during CY 2012:

- A report describing the well installation field activities was approved by the NMED in April 2012.
- Quarterly groundwater sampling was conducted at monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 in January, April, July, and October 2012.

Solid Waste Management Unit 116
Chapter 11.0 discusses the SWMU 116 annual groundwater monitoring activities performed during CY 2012. SWMU 116 is located on the western margin of the Manzanita Mountain foothills and includes the immediate area surrounding the five seepage pits and septic tank located south of Building 9990. The DOE/Sandia received a letter from the NMED on April 14, 2010, that lists SWMU 116 under the heading of "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls" and further states that SWMU 116 requires long-term monitoring of groundwater on an annual basis as a site control. Annual sampling was completed in 2012, and samples were analyzed for general chemistry, VOCs, HE compounds, perchlorate, TAL metals plus uranium, cyanide, and NPN. No analytes were detected above their respective MCLs.

The following activities took place for SWMU 116 during CY 2012:

- Annual groundwater sampling was conducted at monitoring well CTF-MW1 in February 2012.
- Periodic groundwater elevation data were obtained from monitoring well CTF-MW1.

Solid Waste Management Unit 149

Chapter 12.0 discusses the quarterly groundwater monitoring activities performed during CY 2012 at SWMU 149, which is located in the Coyote Test Field. Monitoring well CTF-MW3 was sampled quarterly and the samples were analyzed for VOCs, TAL metals (including selenium), general chemistry parameters, perchlorate, and NPN. No analytical results for the monitoring well CTF-MW3 groundwater samples exceed the corresponding MCLs.

The following activities took place for monitoring well CTF-MW3 near SWMU 149 during CY 2012:

- Quarterly groundwater sampling was conducted at monitoring well CTF-MW3 in March, June, September, and December 2012.
- Quarterly reporting of analytical results for monitoring well CTF-MW3 was conducted.

Solid Waste Management Unit 154

Chapter 13.0 discusses the quarterly groundwater monitoring activities performed during CY 2012 at SWMU 154, which is located in Coyote Test Field. Monitoring well CTF-MW2 was sampled quarterly and the samples were analyzed for VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

For all four quarters, arsenic was detected above the established MCL of 0.010 mg/L. Arsenic concentrations ranged from 0.0276 to 0.0559 mg/L, with the maximum concentration reported for the filtered sample collected in March 2012. No other analytical results for the monitoring well CTF-MW2 groundwater samples exceed the corresponding MCLs.

The following activities took place for monitoring well CTF-MW2 near SWMU 154 during CY 2012:

- Quarterly groundwater sampling was conducted at monitoring well CTF-MW2 in March, June, September, and December 2012.
- Quarterly reporting of analytical results for groundwater samples from monitoring well CTF-MW2 was conducted.

Future Groundwater Monitoring Events

The groundwater monitoring events conducted on a site-wide basis as part of the SNL/NM GWPP and at site-specific LTS/ER Operations sites will continue on a quarterly, semiannual, annual, and biennial basis during CY 2013, as specified by regulatory guidance. The results for these monitoring events will be presented in the Annual Groundwater Monitoring Report for CY 2013.

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 Groundwater Protection Program (GWPP) and site-specific groundwater monitoring at Long-Term Stewardship (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) 2012. Separate chapters focus on the investigation activities at each of the following monitoring networks maintained at SNL/NM: GWPP site-wide surveillance (Chapter 2.0); Chemical Waste Landfill (CWL) (Chapter 3.0); Mixed Waste Landfill (MWL) (Chapter 4.0); Technical Area (TA)-V (Chapter 5.0); Tijeras Arroyo Groundwater (TAG) (Chapter 6.0); Burn Site Groundwater (BSG) (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 a mean elevation of 5,384 feet (ft) above mean sea level (amsl) and a maximum elevation of 7,986 ft amsl. 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).

SNL/NM 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.

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 9.47 inches (National Oceanic and Atmospheric Administration National Weather Service station); half of this precipitation occurs from June through August in the form of brief but intense thunderstorms. Because of the low humidity and generally warm temperatures, the evaporation potential is high.

1.1.2 Geologic Setting

SNL/NM is located near the east-central edge of the Albuquerque Basin on KAFB. 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). 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.

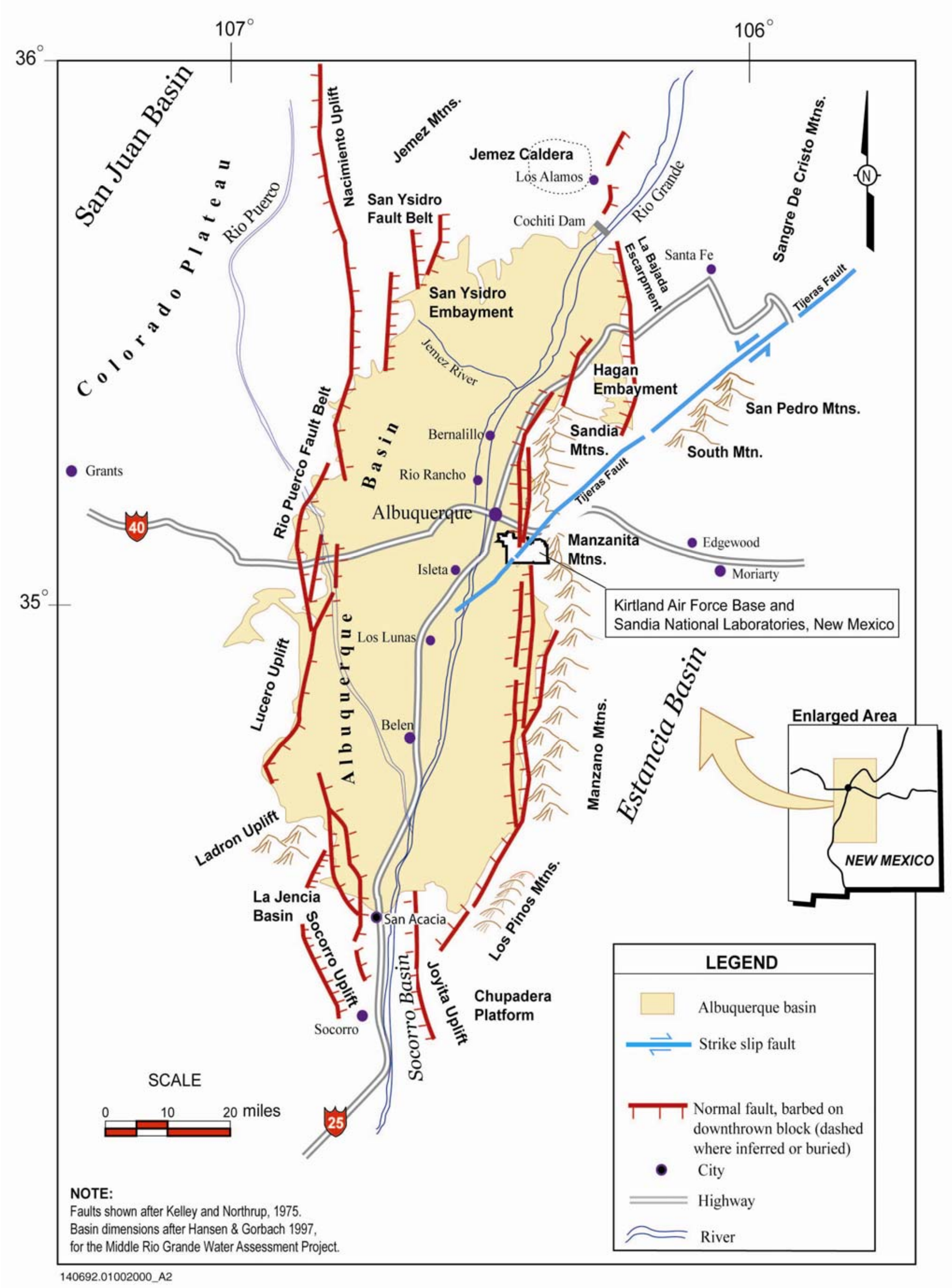

Figure 1-1. Albuquerque Basin, North-Central New Mexico

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.

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 Springs 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 Springs fault extends northward from Socorro County and terminates on KAFB in the vicinity of the Tijeras fault. The Sandia and the Hubbell Springs 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. Strike-slip motion along the Tijeras fault is thought to be expressed by southwesterly movement of the northern block (left lateral). The Sandia, Hubbell Springs, 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.

1.1.3 Hydrogeology

Figure 1-3 shows the 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 (bgs). A perched groundwater system (PGWS) also lies above the regional aquifer in the vicinity of TA-I, TA-II, and TA-IV in the TAG Area of Concern (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,

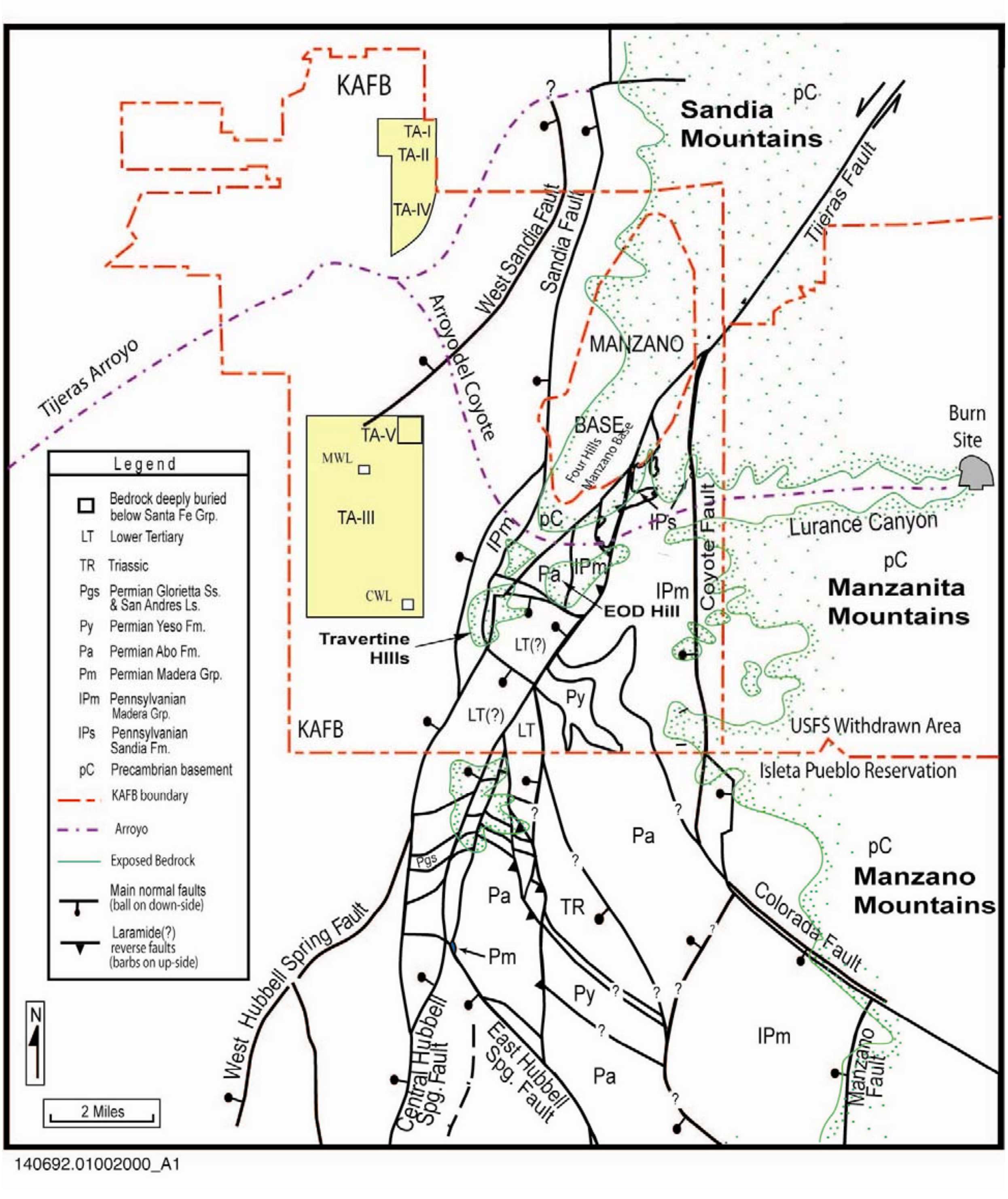

Figure 1-2. Generalized Geology in the Vicinity of SNL/NM and KAFB (Van Hart 2003)

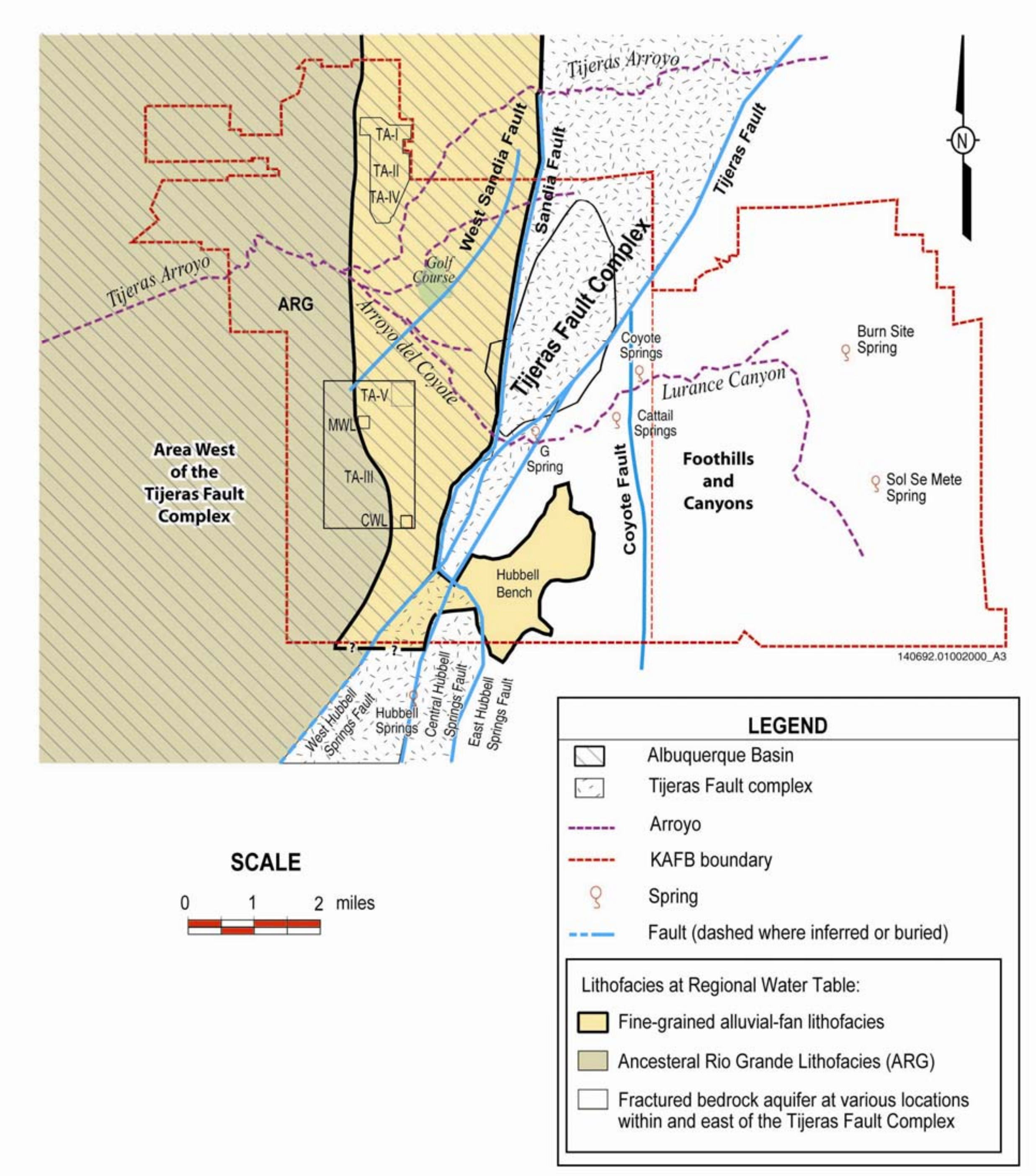

Figure 1-3. Hydrogeologically Distinct Areas Primarily Controlled by Faults (Modified from SNL 1995)

west of TA-II, and east 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, and infiltration from an 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 bgs. 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 (ft/ft), in crossing the Tijeras fault complex from east to west. The change in the groundwater elevation is 350 ft over 15,840 ft. 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 ft/ft. 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 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 (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 Springs (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 estimated to be up to 2.2 million cubic feet per year (ft^3/yr) (50 acre ft [ac-ft]/year [yr]) (SNL 1998). The best estimate for the groundwater recharge associated with Arroyo del Coyote is 0.4 million ft^3/yr (9.2 ac-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.

1.2 Groundwater Monitoring

Extensive groundwater monitoring is conducted at KAFB. The U.S. Air Force (USAF) Installation Restoration Program has a large monitoring well network associated with several closed landfills and a closed sewage lagoon. 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-owned facilities and sites permitted by the USAF for DOE 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 extensive 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 2012 sampling events conducted at the GWPP and LTS/ER Operations monitoring networks maintained at SNL/NM.

Table 1-1. Sample Collection Events for Groundwater Quality Monitoring at SNL/NM from January through December 2012

Sampling Event	GWPP	CWL	MWL	TA-V	TAG	BSG	SWMUs 8/58	SWMU 49	SWMU 68	SWMU 116	SWMU 149	SWMU 154
January 12		√				√	√	√	√			
February 12			√	√						√		
March 12			√	√	√						√	√
April 12	√					√	√		√			
May 12	√			√								
June 12				√	√						√	√
July 12		√		√			√		√			
August 12				√	√							
September 12					√						√	√
October 12				√		√	√		√			
November 12				√	√							
December 12					√						√	√

NOTES:
BSG = Burn Site Groundwater.
CWL = Chemical Waste Landfill.
GWPP = Groundwater Protection Program.
MWL = Mixed Waste Landfill.
SNL/NM = Sandia National Laboratories, New Mexico.
SWMU = Solid Waste Management Unit.
TA-V = Technical Area V.
TAG = Tijeras Area Groundwater.

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 2012 are listed in Table 1-3.

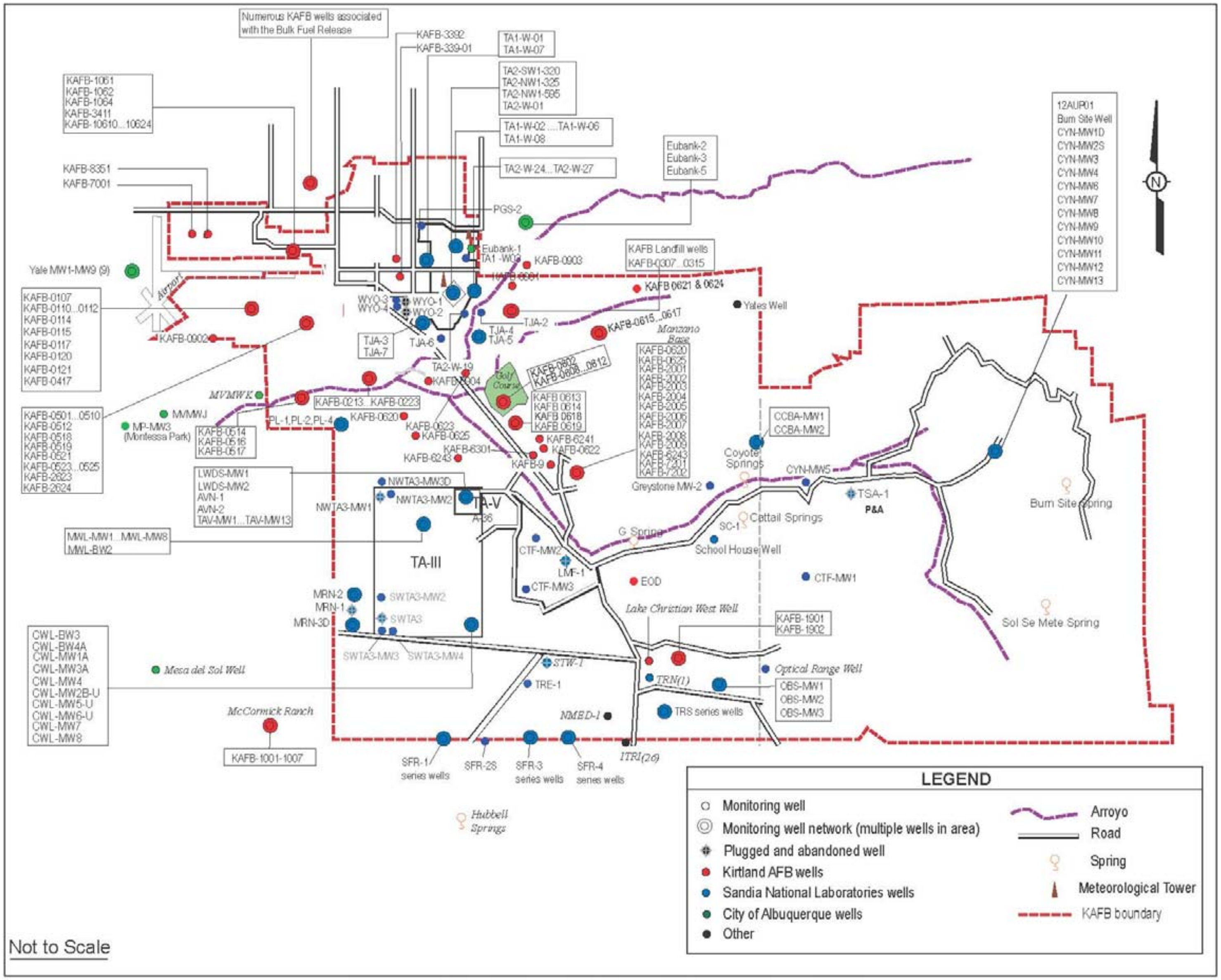

Figure 1-4. Wells and Springs within SNL/NM and KAFB

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2012

	SNL/NM Groundwater Monitoring
Number of Active Wells Monitored	78
Number of Analyses Performed	18,220
Percent of Nondetected Results	78 %

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	181	0	5.71	8.27	7.31	0.4216	NE
Specific Conductivity in μmhos/cm	181	0	368	4156	775	574.4	NE
Temperature in °C	181	0	12.79	25.80	19.03	2.370	NE
Turbidity in NTU	181	0	0.13	32.9	1.53	3.251	NE
Detected Organic Compounds in μg/L							
Bromodichloromethane	3	200	0.500	0.630	0.5667	0.0651	NE
Chloroform	9	199	0.300	0.850	0.5544	0.2216	NE
Dibromochloromethane	3	200	0.410	1.12	0.643	0.414	NE
Dichloroethane, 1,1-	14	189	0.410	1.07	0.6671	0.2809	NE
Dichloroethene, 1,1-	1	207	0.920	0.920	0.920	N/A	7.0
Dichloroethene, cis-1,2-	42	161	0.300	4.12	1.437	1.194	70
Diesel Range Organics	6	19	68.1	83.9	75.07	5.91	NE
RDX	5	46	0.147	0.295	0.1980	0.0573	NE
Tetrachloroethene	9	199	0.310	1.54	0.834	0.406	5.0
Toluene	62	141	0.260	2.47	0.6635	0.4438	1,000
Trichloroethene	75	139	0.390	20.7	5.743	5.627	5.0

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2012 *(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	42	105	0.0158	0.9220	0.00887	0.1413	NE
Antimony	2	145	0.00110	0.00114	0.00112	0.000028	0.006
Arsenic	29	118	0.00178	0.05590	0.01851	0.02275	0.010
Barium	147	0	0.00273	0.2230	0.06266	0.04034	2.0
Beryllium	20	127	0.000209	0.00650	0.001795	0.001624	0.004
Cadmium	11	136	0.000133	0.000415	0.000254	0.000093	0.005
Calcium	230	0	34.7	396	93.71	76.73	NE
Chromium	30	128	0.00208	0.0262	0.00633	0.00778	0.100
Cobalt	114	33	0.0001	0.0102	0.001104	0.002760	NE
Copper	68	79	0.00036	0.0794	0.00257	0.00956	NE
Iron	191	8	0.0509	2.82	0.3527	0.5555	NE
Lead	2	145	0.000605	0.00106	0.000832	0.000322	NE
Magnesium	230	0	3.44	88.7	21.87	16.44	NE
Manganese	80	119	0.001	3.16	0.402	0.994	NE
Nickel	137	21	0.00083	0.195	0.00674	0.02380	NE
Potassium	230	0	1.28	56.6	5.717	9.769	NE
Selenium	98	49	0.00153	0.0366	0.007297	0.008454	0.050
Silver	3	144	0.000660	0.00186	0.001183	0.000615	NE
Sodium	230	0	14.2	1130	81.70	136.96	NE
Thallium	18	129	0.000472	0.00138	0.000994	0.000324	0.002
Uranium	135	2	0.000647	0.0284	0.007286	0.006584	0.030
Vanadium	113	34	0.00102	0.0113	0.004779	0.002454	NE
Zinc	64	83	0.0035	1.71	0.0696	0.2247	NE

Table 1-2. Summary of SNL/NM Groundwater Monitoring Results for Calendar Year 2012 *(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 as N	205	6	0.278	33.1	7.125	7.096	10
Bromide	107	3	0.0963	3.34	0.6276	0.5581	NE
Chloride	166	0	8.90	499	61.60	84.71	NE
Fluoride	110	0	0.0670	5.32	1.394	1.126	4.0
Sulfate	166	0	14.3	1960	110.1	226.9	NE
Total Cyanide	2	45	0.00441	0.00463	0.00452	0.000156	0.200
Total Organic Halogens	9	7	0.00338	0.0132	0.00707	0.00324	NE
Perchlorate	3	41	5.77	7.32	6.80	0.8920	NE
Total Organic Carbon #1	39	27	0.339	1.96	0.7406	0.3173	NE
Total Organic Carbon #2	46	20	0.360	2.35	0.8837	0.3771	NE
Total Organic Carbon #3	44	22	0.360	2.11	0.7644	0.3271	NE
Total Organic Carbon #4	44	22	0.330	2.35	0.7917	0.3663	NE
Total Organic Carbon Average	44	22	0.344	2.19	0.7872	0.3433	NE
Alkalinity as $CaCO_3$	156	0	71.8	1600	247.1	262.0	NE
Detected Radiochemistry Activities in pCi/L (unless noted otherwise)							
Alpha, gross (corrected)	101	8	-6.55	25.9	2.461	4.160	15.0[a]
Beta, gross	95	14	1.25	74.0	8.95	14.41	4 mrem/yr
Potassium-40	9	84	38.80	92.0	58.26	15.66	NE
Radium-226	6	10	0.262	0.867	0.4605	0.2193	5.0[b]
Radium-228	8	8	0.484	1.17	0.7819	0.2809	5.0[b]
Uranium-233/234	51	0	0.35	61.3	18.58	16.57	NE
Uranium-235/236	42	9	0.0764	1.07	0.2964	0.227	NE
Uranium-238	51	0	0.085	9.37	3.387	2.396	NE

NOTES:

[a]The 15.0 pCi/L MCL is for corrected gross alpha activity.
[b]The 5.0 pCi/L MCL is for combined Ra-226 and Ra-228.

°C = Degree(s) Celsius.
µg/L = Microgram(s) per liter.
µmhos/cm = Micromhos per centimeter.
4 mrem/yr = Any combination of beta- and/or gamma-emitting radionuclides (as dose rate).
$CaCO_3$ = Calcium as carbon carbonate.
corrected = Gross alpha results reported as corrected values (uranium activities subtracted out).
MCL = Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Drinking Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards (EPA May 2009).
mg/L = Milligram(s) per liter.
mrem/yr = Millirem per year.
N = Nitrogen.
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).
Ra = Radium.
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 2012

Analyte	Well	Exceedance	Date
Arsenic MCL = 0.010 mg/L	CTF-MW2	0.0498 mg/L	March 2012
		0.0498 mg/L[a]	
		0.0433 mg/L	June 2012
		0.0276 mg/L[a]	
		0.0535 mg/L	September 2012
		0.0494 mg/L[a]	
		0.0516 mg/L	December 2012
		0.0536 mg/L[a]	
	CTF-MW2 (Duplicate)	0.0559 mg/L	March 2012
		0.0521 mg/L[a]	
Beryllium MCL = 0.004 mg/L	Coyote Springs	0.0065 mg/L	May 2012
Fluoride MCL = 4 mg/L	CCBA-MW1	4.94 mg/L	January 2012
		4.93 mg/L	April 2012
		5.03 mg/L	July 2012
		5.32 mg/L	October 2012
	CCBA-MW1 (Duplicate)	4.94 mg/L	January 2012
		5.00 mg/L	July 2012
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	CYN-MW6	21.3 mg/L	April 2012
		18.6 mg/L	October 2012
	CYN-MW6 (Duplicate)	21.2 mg/L	April 2012
	CYN-MW9	33.0 mg/L	January 2012
		33.1 mg/L	April 2012
		31.8 mg/L	October 2012
	CYN-MW9 (Duplicate)	31.1 mg/L	October 2012
	CYN-MW11	10.3 mg/L	January 2012
	CYN-MW11 (Duplicate)	10.1 mg/L	January 2012
	CYN-MW12	12.9 mg/L	January 2012
		13.2 mg/L	April 2012
		13.4 mg/L	October 2012
	CYN-MW12 (Duplicate)	13.2 mg/L	April 2012
	LWDS-MW1	11.2 mg/L	March 2012
		13.6 mg/L	June 2012
		11.4 mg/L	August 2012
		12.0 mg/L	November 2012
	TA2-SW1-320	20.0 mg/L	March 2012
		21.0 mg/L	June 2012
		20.9 mg/L	September 2012
		20.9 mg/L	November 2012
	TA2-SW1-320 (Duplicate)	20.7 mg/L	June 2012
	TA2-W-19	10.1 mg/L	June 2012
		10.6 mg/L	November 2012
	TA2-W-19 (Duplicate)	13.7 mg/L	June 2012
	TJA-2	10.6 mg/L	June 2012
		10.3 mg/L	September 2012
		11.0 mg/L	November 2012

Table 1-3. Summary of Exceedances for SNL/NM Groundwater Monitoring Wells Sampled During Calendar Year 2012 *(Concluded)*

Analyte	Well	Exceedance	Date
Nitrate plus Nitrite (as Nitrogen) MCL = 10.0 mg/L	TJA-4	28.0 mg/L	March 2012
		31.4 mg/L	June 2012
		32.1 mg/L	September 2012
		28.8 mg/L	December 2012
	TJA-7	22.7 mg/L	March 2012
		25.7 mg/L	June 2012
		26.2 mg/L	September 2012
		23.5 mg/L	December 2012
	TAV-MW10	11.3 mg/L	February 2012
		11.8 mg/L	June 2012
		12.3 mg/L	August 2012
		11.8 mg/L	November 2012
	TAV-MW10 (Duplicate)	12.0 mg/L	November 2012
Trichloroethene MCL = 5.0 µg/L	LWDS-MW1	20.7 µg/L	March 2012
		19.1 µg/L	June 2012
		16.9 µg/L	August 2012
		18.1 µg/L	November 2012
	TAV-MW6	13.7 µg/L	February 2012
		16.9 µg/L	June 2012
		14.1 µg/L	August 2012
		16.1 µg/L	November 2012
	TAV-MW10	14.2 µg/L	February 2012
		18.2 µg/L	June 2012
		17.2 µg/L	August 2012
		16.2 µg/L	November 2012
	TAV-MW10 (Duplicate)	15.8 µg/L	November 2012
	TAV-MW12	6.68 µg/L	February 2012
		6.82 µg/L	May 2012
		5.86 µg/L	August 2012
		6.85 µg/L	November 2012
	TAV-MW12 (Duplicate)	6.81 µg/L	November 2012
	TAV-MW14	7.40 µg/L	February 2012
		7.30 µg/L	June 2012
		5.92 µg/L	August 2012
		6.90 µg/L	November 2012
	TAV-MW14 (Duplicate)	7.52 µg/L	February 2012
	WYO-4	9.42 µg/L	March 2012
		8.57 µg/L	June 2012
		7.81 µg/L	September 2012
		9.03 µg/L	December 2012
	WYO-4 (Duplicate)	9.26 µg/L	December 2012
Gross Alpha 15 pCi/L	CTF-MW2	25.96[b] pCi/L	December 2012
	CYN-MW4	18.17 pCi/L	April 2012

NOTES:

[a]Analytical result for filtered groundwater sample. All other analytical results are for unfiltered groundwater samples.
[b]Reported gross alpha activity from initial analysis. A re-analysis was performed and result is reported below the MCL.

µg/L = Microgram(s) per liter.
MCL = Maximum contaminant level.
mg/L = Milligram(s) per liter.
pCi/L = Picocuries per liter.
SNL/NM = Sandia National Laboratories, New Mexico.

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

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, TA-V, TAG, BSG, 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 Protection Program Monitoring

The SNL/NM LTS Program's GWPP 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 GWPP and LTS/ER Operations are directed based on three different sets of regulations and requirements. Groundwater surveillance conducted at the GWPP network is directed by DOE Order 436.1, *Departmental Sustainability* (DOE 2011a) and DOE Order 231.1B, *Environment, Safety, and Health Reporting* (DOE 2011b). 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 Order became effective in 2004 and specified that corrective actions for releases of hazardous waste or hazardous constituents were to be conducted under the 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 Order is no longer effective.

The MWL, TA-V, TAG, and BSG are undergoing corrective action in accordance with the Order between the NMED, Sandia, and the DOE (NMED April 2004). Each of the TA-V, TAG, and BSG sites must comply with requirements set forth in the Order for site characterization and the development of a Corrective Measures Evaluation (CME) for each site. The NMED is the regulatory agency responsible for enforcing the requirements identified in the Order for each of the three CMEs (SNL 2004a, 2004b, and 2004c). The Order also extends NMED regulatory jurisdiction to the placement and installation of new groundwater monitoring wells and the decommissioning of existing wells at SNL/NM.

In addition, SWMUs 8/58, 49, 68, 116, 149, and 154 are undergoing corrective action in accordance with the Order and addressed in a letter received from the NMED by the DOE 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 long-term monitoring of groundwater on a quarterly or annual basis.

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. As required by the PCCP, the *CWL Annual Post-Closure Care Report for Calendar Year 2011* was submitted to the NMED in March 2012 (SNL March 2012). The CWL Annual Post-Closure Care Report for CY 2012 will be submitted to NMED in March 2013.

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 the 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 2012, 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 February 2011). 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 low-flow 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™ Model 6920 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. 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 Records 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) or rinsate sample was collected to verify the equipment decontamination process. For wells equipped with dedicated nitrogen gas-powered bladder pumps (QED Environmental Systems, Inc. [QED™] MicroPurge® low-flow sampling method); 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 QED™ MicroPurge® 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 May 2010). 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, Issue 04* (SNL May 2010) and Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL May 2011).

1.3.1.6 Waste Management

Purge and decontamination water 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) as nonregulated waste, based on historical sampling results and process knowledge of the monitoring well location. Results for associated environmental samples provide supplemental data for approval to discharge water to the sanitary sewer. All data were compared with ABCWUA discharge limits (COA 2005).

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 (GEL) 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,b,c,d,e]
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
SVOCs	SW846-8270C
Metals	SW846-6010/6020/7470
Total Cyanide	SW846-9012
Total Organic Carbon	SW846-9060
Total Organic Halogens	SW846-9020
TPH Diesel Range Organics	SW846-8015A/B
TPH Gasoline Range Organics	SW846-8015B
Total Phenol	SW846-9066
VOCs	SW846-8260B

NOTES:

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

[b]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.

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

[d]EPA 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.

[e]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 = 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,b]
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]EPA 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
[b]U.S. Department of Energy, 1990, *EML Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300, Environmental Measurements Laboratory.
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* (SNL May 2011). 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 has been submitted to the SNL/NM Records Center.

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

QC Sample Type	Description
Field QC	
Equipment blanks[a]	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 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 relative percent difference (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:
[a]Equipment blanks are collected for selected wells only.
LCS = Laboratory control sample.
QC = Quality control.
VOC = Volatile organic compound.

1.3.4 Field Quality Control Samples

Field QC samples included duplicate environmental, EB, 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 (RPD) 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 or rinsate sample was 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 also prepared by the laboratory during sample preparation and analysis. These are used to assist with data validation and data defensibility. They include method blanks, laboratory control samples, matrix spike, matrix spike duplicates, sample replicates, and surrogate spike samples. Batch laboratory QC samples were analyzed concurrently with all groundwater samples to determine accuracy, precision, possible contamination, and matrix effects. All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL May 2011). Laboratory data qualifiers are provided with the analytical results in the tables attached to Chapters 2.0 through 13.0.

1.4 References

Clesceri et al. 1998 — Clesceri, L.S., A.E. Greenburg, and A.D. 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.

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DOE 2011b U.S. Department of Energy (DOE), 2011. *Environment, Safety, and Health Reporting,* DOE Order 231.1B, U.S. Department of Energy, Washington, D.C., June 27.

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2.0 Long-Term Stewardship Groundwater Protection Program

2.1 Introduction

This chapter documents the results for the Calendar Year (CY) 2012 groundwater surveillance monitoring activities conducted as part of the Sandia National Laboratories, New Mexico (SNL/NM) Long-Term Stewardship Program's Groundwater Protection Program (GWPP). The surveillance activities include the annual collection and analysis of groundwater samples from 12 monitoring wells and 1 surface water sample from a spring. As part of the activities, SNL/NM personnel also measured groundwater elevations at 96 monitoring wells owned by the U.S. Department of Energy (DOE) and maintained/monitored by Sandia Corporation (Sandia), and 1 well (Eubank 1) owned by the City of Albuquerque (COA). Groundwater elevation measurements were obtained either monthly or quarterly 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 GWPP 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 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 groundwater data for SNL/NM 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 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 GWPP 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 GWPP 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 in *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE 2005). The GWPP project 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 GWPP is provided in the *SNL/NM Groundwater Protection Program Plan* (SNL 2009).

2.2 Regulatory Criteria

Sandia is in compliance with the requirement to have a site-wide Environmental Management System (EMS) in accordance with the DOE Order 436.1 (DOE 2011). The following actions ensure the implementation of a successful GWPP 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 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 GWPP activities is documented for future site management.
- The quality of baseline groundwater and vadose zone conditions at the site 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 the groundwater protection goals.

In April 2004, the Compliance Order on Consent (the Order) (NMED April 2004) became effective between the DOE, Sandia, and the New Mexico Environment Department (NMED). Among other sampling requirements primarily affecting ER sites for a variety of potential contaminants, the 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/Sandia are required to evaluate the nature and extent of perchlorate contamination and report the results in a Resource Conservation and Recovery Act Corrective Measures Evaluation. Sampling and analysis at the noncompliant well will continue on a quarterly basis until at least four consecutive nondetections are obtained.

The NMED DOE Oversight Bureau (OB) splits groundwater samples collected by the GWPP. 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 National Nuclear Security Administration (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 2009)
NMWQCC[a] Standards for Groundwater (20 6.2.3103A NMAC Human Health Standards) (NMED 2001)	MAC	NMWQCC
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 direct human health risks.

[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 the 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 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 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 April 25 to May 15, 2012. Samples were collected from 12 wells and 1 spring. Groundwater surveillance samples were collected from the following monitoring wells: Greystone-MW2, MRN-2, MRN-3D, NWTA3-MW3D, PL-2, PL-4, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1. A water sample was collected from Coyote Springs. Well 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 (SDWA) list volatile organic compounds (VOCs)
- Total organic halogens (TOX)
- Total phenols
- Total alkalinity
- Nitrate plus nitrite (NPN)
- Total cyanide
- High explosives (HE), selected 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

Analysis for HE compounds was conducted on 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 located in the Coyote Canyon Test Field. All samples were filtered in the field using in-line filters of 0.45-micron pore size, except those for VOC, HE, and mercury fractions. Duplicate environmental samples from monitoring wells SFR-4T SWTA3-MW2, and TRE-1were submitted for all analyses.

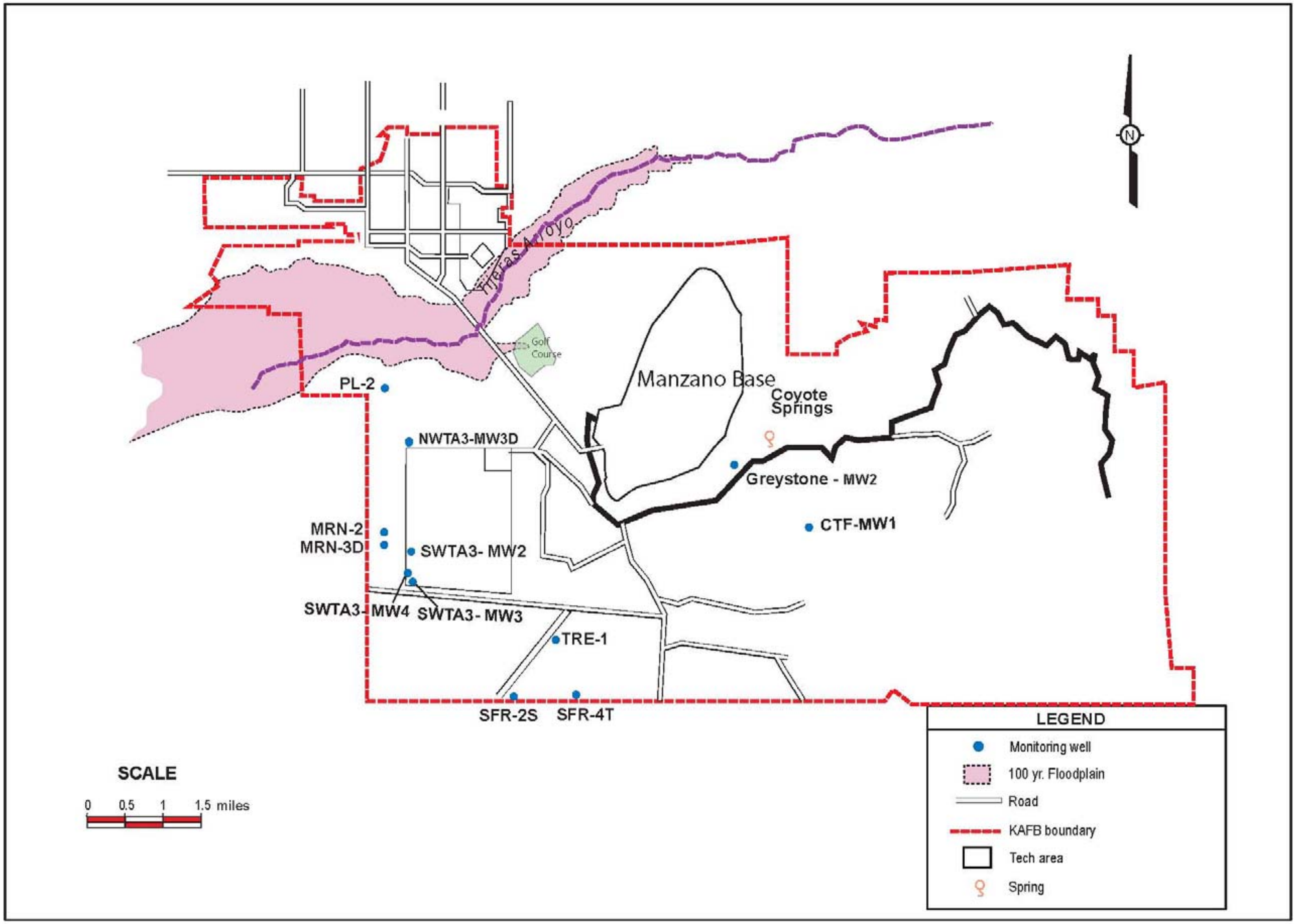

Figure 2-1. Groundwater Protection Program Water Quality Monitoring Network

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 GWPP gathers groundwater information from a large network of 218 wells within and in the vicinity of Kirtland Air Force Base (KAFB). In addition to wells owned by the DOE, data are solicited from the U.S. Air Force (USAF) Installation Restoration Program (IRP), Albuquerque Bernalillo County Water Utility Authority (ABCWUA), the Lovelace Respiratory Research Institute (LRRI), and U.S. Geological Service (USGS) (Figure 1-4 and Plate 1). Groundwater elevations in wells were measured quarterly or monthly during CY 2012, 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 recharge is difficult to measure directly. Precipitation can be used as an indirect measure of recharge potential. Available precipitation also impacts the demand on groundwater withdrawal. Water quantities pumped by the KAFB and ABCWUA 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. 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 GWPP during CY 2012.

2.4 Field Methods and Measurements

The monitoring procedures conducted for GWPP groundwater monitoring are described in detail in Section 1.3. The water level information obtained in 2012 was used to develop the potentiometric surface map presented in Plate 1 and the hydrographs presented on Figures 2C-6 through 2C-11 (Attachment 2C).

2.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using U.S. Environmental Protection Agency (EPA)-specified protocols 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 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 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 April and May 2012. No VOCs or HE compounds were detected at concentrations above established MCLs or MACs in any groundwater sample. Chloroform was the only VOC detected above the laboratory MDLs but below reporting limits or PQLs. Consequently the concentration values reported by the laboratory are qualified with “J” as estimated concentrations. Both chloroform detections were further qualified as “not detected” during the data validation process. Table 2A-2 (Attachment 2A) lists the laboratory MDLs for VOC and HE compounds associated with the applied analytical methods.

Table 2A-3 (Attachment 2A) summarizes NPN results. NPN was detected in all the well samples above associated MDLs, and ranged from 0.309 to 5.26 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 1.61 to 2.76 mg/L. The elevated fluoride concentrations routinely observed in Coyote Springs is in an area of shallow groundwater and elevated bedrock containing fluoride-bearing minerals. Fluoride in groundwater is suspected to be naturally occurring. The time trend plots for Coyote Springs and for wells in which fluoride concentrations exceed the MCL are presented on Figures 2B-1 through 2B-4 (Attachment 2B).

Detections of TOX were reported in samples from six monitoring wells (Greystone-MW2, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, and TRE-1) and Coyote Springs at concentrations ranging from 0.00338 to 0.0132 mg/L.

Total phenol was not detected in any of the samples from Coyote Springs or the monitoring wells. Total cyanide was detected in the sample from monitoring well SFR-2S at a “J” level concentration.

Mercury was analyzed in unfiltered samples and 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 GWPP 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 sample. Beryllium was detected above the MCL of 0.004 mg/L in the sample from Coyote Springs at a concentration of 0.0065 mg/L. The time trend plot for beryllium concentrations for Coyote Springs is shown on Figure 2B-5 (Attachment 2B). The beryllium result for Coyote Springs is consistent with prior years of monitoring data as is demonstrated in the trend plot (Figure 2B-5).

Gross beta, radium-226, and radium-228 results did not exceed established MCLs or MACs. Isotopic uranium was collected at Coyote Springs and monitoring wells Greystone-MW2, SFR-2S, SFR-4T, and TRE-1 since groundwater contacts bedrock, which contains material high in naturally occurring uranium.

Radioisotopic results are summarized in Table 2A-7 (Attachment 2A), and include analyses for alpha- and beta-emitting radioisotopes (gross alpha/beta activity), radium-226, radium-228, and gamma spectroscopy results for short-list gamma radiation-emitting radioisotopes (americium-241, cesium-137, cobalt-60, and potassium-40). All activity results for these short-list gamma radiation-emitting isotopes are less than the associated MDA values, except for potassium-40. Potassium-40 was reported above the MDA in monitoring well MRN-3D at an activity of 59.4 plus or minus 32.0 picocuries per liter (pCi/L). Potassium-40 in monitoring wells Greystone-MW2 and SWTA3-MW3 was qualified as unusable during data validation since the laboratory did not meet minimum peak identification criteria. Potassium-40 is a naturally occurring isotope that is unaffected by site operations and is therefore of no concern. Isotopic uranium (uranium-233/234, urnaium-235/236, and uranium-238) analysis was 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. The MCL value of 15 pCi/L for gross alpha activity does not include the contribution of the uranium or radon activity. The analytical procedure removes the radon from the sample; hence, the laboratory-reported gross alpha activity result must be corrected by removing only the uranium activity in the sample.

For wells where isotopic uranium activity was measured, the activity value was subtracted directly to correct the gross alpha activity results. For other wells, the uranium concentration obtained from the TAL metal analysis was converted to uranium activity using a conversion factor of 670 picocuries per milligram (EPA 2001). The corrected gross alpha activity results are all below the MCL of 15 pCi/L, with a maximum value of 7.94 pCi/L. Gross beta activity, radium-226, and radium-228 results do not exceed established MCLs.

Table 2A-8 (Attachment 2A) summarizes field water quality measurements collected prior to sampling. Field water quality measurements include turbidity, potential of hydrogen (pH), temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO).

2.6.2 Groundwater Elevation Measurements

During CY 2012, SNL/NM GWPP personnel measured groundwater elevations in 97 wells. The groundwater elevations were measured with an electric well sounder. Data were also provided by the USAF IRP, COA, LRRI, and USGS for other wells on and near KAFB. The groundwater elevation data are maintained in the EDMS. Groundwater elevation data for CY 2012 for SNL/NM wells are provided in Table 1. The total number of wells represented in the database, listed by the respective organization, is provided in Table 2-2.

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

Total Wells	Measuring Agency	Well Owner	Location
98	SNL/NM GWPP	DOE/NNSA	Site-wide surveillance network wells, CWL, MWL, TA-V, TAG Investigation, and Burn Site Groundwater Area
49	USAF IRP	KAFB	IRP Long-term Monitoring Program
4	COA	COA	Eubank Landfill north of KAFB and Yale Avenue Landfill west of KAFB
1	SNL/NM GWPP	COA	Eubank 1, West of Eubank Landfill
1	USGS	NMOSE	Mesa del Sol-2 well
1	USGS	COA	Montessa Park-5 well
4	LRRI	DOE/NNSA	Southern boundary of KAFB

NOTES:
COA = City of Albuquerque.
CWL = Chemical Waste Landfill.
DOE = U.S. Department of Energy.
GWPP = Groundwater Protection Program.
IRP = Installation Restoration Program.
KAFB = Kirtland Air Force Base.
LRRI = Lovelace Respiratory Research Institute.
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.
USAF = U.S. Air Force.
USGS = U.S. Geological Survey.

2.6.2.1 Groundwater Recharge and Withdrawal

Factors influencing groundwater elevation changes include potential recharge from precipitation and groundwater withdrawal by production wells.

Annual Precipitation

The regional climate for the Albuquerque Basin area is semiarid. Long-term average precipitation ranges from 9.0 inches per year (in/yr) (30-year norm) 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. For CY 2012, the wettest months were April, July, and August. Precipitation data relevant to KAFB hydrogeology are available from four rain-gauge locations. Three meteorological towers are used to measure on-site precipitation at KAFB: the A21 tower located in Technical Area (TA)-II; the A36 tower located in TA-III; and the SC1 tower located near Schoolhouse Well in the foothills of the Manzanita Mountains (Figure 1-4). The fourth data source is the National Weather Service station at the Albuquerque International Sunport located at the northwest corner of KAFB.

Annual precipitation during CY 2012 at the four locations is shown in Table 2-3. Data for CY 2011 is 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 5.46 inches of precipitation measured at the Albuquerque International Sunport during CY 2012 is 0.74 inches more than the corresponding period for the previous year; but it is 4.01 inches below the 30-year norm of 9.47 inches. Monthly distribution of precipitation during CY 2012 at the four locations is shown on Figure 2C-1 (Attachment 2C). Figure 2C-2 shows the annual distribution of precipitation at these four locations for the period from January 2002 to December 2012.

Table 2-3. Precipitation Data for Kirtland Air Force Base, Calendar Years 2011 and 2012

Site	A21	A36	SC1	Airport
CY 2011	5.45	6.88	8.43	4.72
CY 2012	3.98	4.51	6.51	5.46

NOTES:
Data are in inches of rainfall.
Airport = Albuquerque International Sunport.
CY = Calendar Year.

Groundwater Withdrawal

The KAFB production wells are screened over a depth from about 500 to 2,000 feet (ft) below ground surface (bgs) and extract groundwater from the upper and middle unit of the Santa Fe Group. During CY 2012, KAFB pumped groundwater primarily from seven water supply wells.

KAFB supplies all the water for SNL/NM and other DOE facilities located on KAFB. Figure 2C-3 (Attachment 2C) shows the CY 2012 monthly production for KAFB water supply wells. The highest level of production was in July at 119,597,000 gallons (gal.); the lowest occurred in December at 31,090,000 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 2C-4 shows the CY 2012 monthly production for each KAFB water supply well. Figure 2C-5 shows the trend of total annual groundwater production at KAFB for all wells, starting with 2001. Table 2-4 provides a comparison of water pumped during CY 2012 to the previous year.

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

Units	CY 2011	CY 2012
Million gallons	912	874
Acre feet	2,800	2,683

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 IRP, COA, LRRI, and the State of New Mexico were used to construct the base-wide CY 2012 potentiometric surface map of the regional aquifer as shown on Plate 1. A total of 111 monitoring wells with water levels for February, October, and November 2012 were used for interpreting the groundwater-elevation data and constructing the contours (Table 1). Even though the various well owners measure water levels on differing schedules, the use of three 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 and ABCWUA Ridgecrest production well fields are located near the northern boundary of KAFB. The flat gradient in the middle of the trough is characteristic 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 elevation along the eastern mountain front of the Albuquerque Basin, and the presence of various faults (Plate 1).

Perched Groundwater System Potentiometric Surface Map

During the installation of monitoring wells for groundwater characterization at TA-II in 1993, a shallow water-bearing zone was encountered at a depth of 300 ft bgs. This was 200 ft above the regional aquifer. The installation of additional wells completed in this PGWS defined the lateral extent of the system, which is approximately 3.5 square miles. The western edge of the PGWS trends along the former KAFB sewage lagoons. The northern edge coincides with the northern boundary of TA-I. To the east, the PGWS has been confirmed in the USAF IRP monitoring wells east of the KAFB Landfill. The southern edge appears to be south of the 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 GWPP monitoring wells (Figures 2C-6 through 2C-11). The groundwater elevation data for these wells are considered to be representative of groundwater across KAFB. Historical data from quarterly and monthly groundwater elevation measurements through CY 2012 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 2C-6)**—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 2C-7)**—Declining trend up until early 2011; since then groundwater elevations have stabilized.

- **NWTA3-MW3D, PL-2, and PL-4 (Figure 2C-8)**—Declining trend up until late 2010/early 2011; since then groundwater elevations have stabilized and show a slight to moderate increasing trend in monitoring wells PL-2 and PL-4.

- **SFR-2S and TRE-1 (Figure 2C-9)**—Slight to moderate declining trend since 2004.

- **SFR-4T (Figure 2C-10)**—Cyclical pattern with yearly fluctuations of 20 to 30 ft since 2001, but less pronounced cyclical pattern in 2011 and 2012.

- **SWTA3-MW2, SWTA3-MW3, and SWTA3-MW4 (Figure 2C-11)**—Moderate declining trend up until late 2011; since then groundwater elevations continue to decline but appear to be leveling off.

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 from monitoring wells SFR-4T, SWTA3-MW2, and TRE-1 and analyzed for all parameters to estimate the overall reproducibility of the sampling and analytical process. 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 20 for organics and less than 35 for inorganic analyses) for all calculated parameters, except TOX in monitoring well TRE-1. The RPD was calculated at 58, but is considered an estimate value, since TOX was detected below the PQL in monitoring well TRE-1 samples.

EB samples were collected prior to well purging and sampling at monitoring wells SFR-4T, SWTA3-MW2, and TRE-1 and submitted for all analyses.

Bromodichloromethane, chloride, chloroform, copper, dibromochloromethane, potassium, sodium, gross beta, radium-226, and radium-228 were detected in EB samples. No corrective action was required for bromodichloromethane, chloride, chloroform, dibromochloromethane, potassium, sodium, gross beta, radium-226, or radium-228 since these parameters were not detected in associated environmental samples or were detected at concentrations greater than five times the blank result. Copper was detected at concentrations less than five times the associated environmental sample results and associated environmental sample results were qualified as not detected during data validation for monitoring well SFR-4T, SWTA3-MW2, and TRE-1 samples.

The TB samples were submitted whenever samples were collected for VOC analysis to assess whether contamination of the samples had occurred during shipment and storage. A total of 16 trip blanks were submitted with the CY 2012 samples. No VOCs were detected above associated laboratory MDLs.

Three FB samples were collected for VOCs to assess whether contamination of the samples resulted from ambient conditions during sample collection. FB samples were prepared by pouring deionized water into sample containers at the monitoring well PL-2, MRN-3D, and SWTA3-MW3 sampling points to simulate the transfer of environmental samples from the sampling system to the sample container. The VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary, since 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 was determined as acceptable and reported QC measures to be adequate.

2.8 Variances and Nonconformances

No variances or nonconformance issues from requirements specified in the GWPP Mini-SAP (SNL 2012) were identified during the CY 2012 sampling activities.

2.9 Summary and Conclusions

The annual groundwater surveillance monitoring sampling event was conducted between April 25 to May 15, 2012. Groundwater samples were collected from 12 monitoring wells and 1 spring. The analytical results for the groundwater samples are similar to the results reported for previous years. No VOCs or HE compounds were detected at concentrations above established MCLs or MACs in any groundwater sample. Chloroform was the only VOC detected above the laboratory MDLs but below reporting limits or PQLs. Consequently the concentration values reported by the laboratory are qualified with "J" as estimated concentrations. Both chloroform detections were further qualified as "not detected" during the data validation process.

NPN was detected in all the well samples above associated MDLs, and ranged from 0.309 to 5.26 mg/L. All NPN results are below the MCL/MAC of 10 mg/L.

Fluoride was detected above the NMWQCC groundwater protection standard of 1.6 mg/L (NMED 2001) in samples from Coyote Springs and monitoring wells SFR-2S, SFR-4T, and TRE-1 at concentrations ranging from 1.61 to 2.76 mg/L. The EPA SDWA-regulated 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 0.0065 mg/L.

Groundwater elevations were obtained during CY 2012 at 97 SNL/NM monitoring wells on a monthly or quarterly basis. Groundwater elevations from SNL/NM wells and wells owned by other agencies were used to construct a base-wide potentiometric surface map of the regional aquifer. 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 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.

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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 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.

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 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 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 2012 Sandia National Laboratories, New Mexico (SNL/NM), 2012. *Groundwater Protection Program Mini-SAP for FY12 Annual Groundwater Surveillance*, Sandia National Laboratories, Albuquerque, New Mexico, March.

SNL 2009 Sandia National Laboratories, New Mexico (SNL/NM), 2009. *SNL/NM Groundwater Protection Program Plan*, Sandia National Laboratories, Albuquerque, New Mexico, September.

Attachment 2A
Groundwater Protection Program
Analytical Results Tables

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Attachment 2A Tables

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

Calendar Year 2012

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL/MAC[d] (µg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TRE-1 02-May-12	Chloroform	0.660	0.300	1.00	NE	100	J	1.0U	092315-001	SW846-8260
TRE-1 (Duplicate) 02-May-12	Chloroform	0.700	0.300	1.00	NE	100	J	1.0U	092316-001	SW846-8260

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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	0.0825	SW846-8321A
4-Isopropyltoluene	0.300	SW846-8260	1,3-Dinitrobenzene	0.0825	SW846-8321A
Benzene	0.300	SW846-8260	2,4,6-Trinitrotoluene	0.0825	SW846-8321A
Bromobenzene	0.300	SW846-8260	2,4-Dinitrotoluene	0.0825	SW846-8321A
Bromochloromethane	0.300	SW846-8260	2,6-Dinitrotoluene	0.0825	SW846-8321A
Bromodichloromethane	0.300	SW846-8260	2-Amino-4,6-dinitrotoluene	0.0825	SW846-8321A
Bromoform	0.300	SW846-8260	2-Nitrotoluene	0.0845	SW846-8321A
Carbon tetrachloride	0.300	SW846-8260	3-Nitrotoluene	0.0825	SW846-8321A
Chlorobenzene	0.300	SW846-8260	4-Amino-2,6-dinitrotoluene	0.0825	SW846-8321A
Chloroethane	0.300	SW846-8260	4-Nitrotoluene	0.155	SW846-8321A
Chloroform	0.300	SW846-8260	HMX	0.0825	SW846-8321A
Chloromethane	0.300	SW846-8260	Nitro-benzene	0.0825	SW846-8321A
Dibromochloromethane	0.300	SW846-8260	Pentaerythritol tetranitrate	0.103	SW846-8321A
Dibromomethane	0.300	SW846-8260	RDX	0.0825	SW846-8321A
Dichlorodifluoromethane	0.300	SW846-8260	Tetryl	0.0825	SW846-8321A

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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 15-May-12	Nitrate plus nitrite as N	0.461	0.085	0.250	10.0			092335-018	EPA 353.2
Greystone-MW2 25-Apr-12	Nitrate plus nitrite as N	4.80	0.425	1.25	10.0			092299-018	EPA 353.2
MRN-2 04-May-12	Nitrate plus nitrite as N	4.37	0.085	0.250	10.0			092321-018	EPA 353.2
MRN-3D 03-May-12	Nitrate plus nitrite as N	2.41	0.170	0.500	10.0			092318-018	EPA 353.2
NWTA3-MW3D 10-May-12	Nitrate plus nitrite as N	1.15	0.085	0.250	10.0			092333-018	EPA 353.2
PL-2 27-Apr-12	Nitrate plus nitrite as N	2.80	0.170	0.500	10.0			092306-018	EPA 353.2
PL-4 11-May-12	Nitrate plus nitrite as N	5.26	0.170	0.500	10.0			092309-018	EPA 353.2
SFR-2S 01-May-12	Nitrate plus nitrite as N	0.930	0.850	2.50	10.0	J		092311-018	EPA 353.2
SFR-4T 26-Apr-12	Nitrate plus nitrite as N	0.309	0.170	0.500	10.0	J		092303-018	EPA 353.2
SFR-4T (Duplicate) 26-Apr-12	Nitrate plus nitrite as N	0.309	0.170	0.500	10.0	J		092304-018	EPA 353.2
SWTA3-MW2 08-May-12	Nitrate plus nitrite as N	0.760	0.085	0.250	10.0			092328-018	EPA 353.2
SWTA3-MW2 (Duplicate) 08-May-12	Nitrate plus nitrite as N	0.785	0.085	0.250	10.0			092329-018	EPA 353.2
SWTA3-MW3 07-May-12	Nitrate plus nitrite as N	0.525	0.085	0.250	10.0			092323-018	EPA 353.2
SWTA3-MW4 09-May-12	Nitrate plus nitrite as N	1.12	0.085	0.250	10.0			092331-018	EPA 353.2
TRE-1 02-May-12	Nitrate plus nitrite as N	2.44	0.170	0.500	10.0			092315-018	EPA 353.2
TRE-1 (Duplicate) 02-May-12	Nitrate plus nitrite as N	2.36	0.170	0.500	10.0			092316-018	EPA 353.2

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL/MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Spring	Total Organic Halogens	0.0132	0.00333	0.010	NE	NE			092335-003	SW846 9020
15-May-12	Bromide	ND	0.067	0.200	NE	NE	U		092335-016	SW846 9056
	Chloride	499	3.35	10.0	NE	NE			092335-016	SW846 9056
	Fluoride	**1.66**	0.033	0.100	4.0	1.60			092335-016	SW846 9056
	Sulfate	130	6.65	20.0	NE	NE			092335-016	SW846 9056
	Alkalinity as CaCO3	1090	0.725	1.00	NE	NE			092335-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U		092335-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092335-027	SW846 9012
Greystone-MW2	Total Organic Halogens	0.00341	0.00333	0.010	NE	NE	J		092299-003	SW846 9020
25-Apr-12	Bromide	0.600	0.067	0.200	NE	NE			092299-016	SW846 9056
	Chloride	116	0.670	2.00	NE	NE			092299-016	SW846 9056
	Fluoride	0.870	0.033	0.100	4.0	1.60			092299-016	SW846 9056
	Sulfate	49.8	1.33	4.00	NE	NE			092299-016	SW846 9056
	Alkalinity as CaCO3	448	0.725	1.00	NE	NE			092299-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092299-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092299-027	SW846 9012
MRN-2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092321-003	SW846 9020
04-May-12	Bromide	0.192	0.067	0.200	NE	NE	J		092321-016	SW846 9056
	Chloride	14.2	0.067	0.200	NE	NE			092321-016	SW846 9056
	Fluoride	0.573	0.033	0.100	4.0	1.60			092321-016	SW846 9056
	Sulfate	48.7	0.665	2.00	NE	NE			092321-016	SW846 9056
	Alkalinity as CaCO3	149	0.725	1.00	NE	NE			092321-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092321-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092321-027	SW846 9012
MRN-3D	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092318-003	SW846 9020
03-May-12	Bromide	0.244	0.067	0.200	NE	NE			092318-016	SW846 9056
	Chloride	14.7	0.067	0.200	NE	NE			092318-016	SW846 9056
	Fluoride	0.437	0.033	0.100	4.0	1.60			092318-016	SW846 9056
	Sulfate	65.1	1.33	4.00	NE	NE			092318-016	SW846 9056
	Alkalinity as CaCO3	158	0.725	1.00	NE	NE			092318-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092318-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092318-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092333-003	SW846 9020
10-May-12	Bromide	0.184	0.067	0.200	NE	NE	J		092333-016	SW846 9056
	Chloride	11.0	0.067	0.200	NE	NE			092333-016	SW846 9056
	Fluoride	0.715	0.033	0.100	4.0	1.60			092333-016	SW846 9056
	Sulfate	48.5	0.665	2.00	NE	NE			092333-016	SW846 9056
	Alkalinity as CaCO3	138	0.725	1.00	NE	NE			092333-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092333-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092333-027	SW846 9012
PL-2	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092306-003	SW846 9020
27-Apr-12	Bromide	0.227	0.067	0.200	NE	NE			092306-016	SW846 9056
	Chloride	15.1	0.067	0.200	NE	NE			092306-016	SW846 9056
	Fluoride	0.542	0.033	0.100	4.0	1.60			092306-016	SW846 9056
	Sulfate	65.5	1.33	4.00	NE	NE			092306-016	SW846 9056
	Alkalinity as CaCO3	150	0.725	1.00	NE	NE			092306-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092306-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092306-027	SW846 9012
PL-4	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092309-003	SW846 9020
11-May-12	Bromide	0.195	0.067	0.200	NE	NE	J		092309-016	SW846 9056
	Chloride	17.5	0.067	0.200	NE	NE			092309-016	SW846 9056
	Fluoride	0.390	0.033	0.100	4.0	1.60			092309-016	SW846 9056
	Sulfate	65.2	0.665	2.00	NE	NE			092309-016	SW846 9056
	Alkalinity as CaCO3	169	0.725	1.00	NE	NE			092309-022	SM2320B
	Total Phenol	ND	0.00167	0.005	NE	NE	U		092309-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092309-027	SW846 9012
SFR-2S	Total Organic Halogens	0.00722	0.00333	0.010	NE	NE	J		092311-003	SW846 9020
01-May-12	Bromide	0.690	0.067	0.200	NE	NE			092311-016	SW846 9056
	Chloride	123	0.670	2.00	NE	NE			092311-016	SW846 9056
	Fluoride	**1.62**	0.033	0.100	4.0	1.60			092311-016	SW846 9056
	Sulfate	65.8	1.33	4.00	NE	NE			092311-016	SW846 9056
	Alkalinity as CaCO3	389	0.725	1.00	NE	NE			092311-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092311-026	SW846 9066
	Total Cyanide	0.00463	0.00167	0.005	0.200	0.200	J	J-	092311-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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 26-Apr-12	Total Organic Halogens	0.00918	0.00333	0.010	NE	NE	J		092303-003	SW846 9020
	Bromide	1.58	0.067	0.200	NE	NE			092303-016	SW846 9056
	Chloride	191	6.70	20.0	NE	NE			092303-016	SW846 9056
	Fluoride	**2.76**	0.033	0.100	4.0	1.60			092303-016	SW846 9056
	Sulfate	1940	13.3	40.0	NE	NE			092303-016	SW846 9056
	Alkalinity as CaCO3	106	0.725	1.00	NE	NE			092303-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092303-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092303-027	SW846 9012
SFR-4T (Duplicate) 26-Apr-12	Total Organic Halogens	0.00696	0.00333	0.010	NE	NE	J		092304-003	SW846 9020
	Bromide	1.58	0.067	0.200	NE	NE			092304-016	SW846 9056
	Chloride	192	6.70	20.0	NE	NE			092304-016	SW846 9056
	Fluoride	**2.76**	0.033	0.100	4.0	1.60			092304-016	SW846 9056
	Sulfate	1960	13.3	40.0	NE	NE			092304-016	SW846 9056
	Alkalinity as CaCO3	106	0.725	1.00	NE	NE			092304-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092304-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092304-027	SW846 9012
SWTA3-MW2 08-May-12	Total Organic Halogens	0.00338	0.00333	0.010	NE	NE	J		092328-003	SW846 9020
	Bromide	0.175	0.067	0.200	NE	NE	J		092328-016	SW846 9056
	Chloride	15.1	0.067	0.200	NE	NE			092328-016	SW846 9056
	Fluoride	0.950	0.033	0.100	4.0	1.60			092328-016	SW846 9056
	Sulfate	53.9	0.665	2.00	NE	NE			092328-016	SW846 9056
	Alkalinity as CaCO3	165	0.725	1.00	NE	NE			092328-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092328-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092328-027	SW846 9012
SWTA3-MW2 (Duplicate) 08-May-12	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092329-003	SW846 9020
	Bromide	0.165	0.067	0.200	NE	NE	J		092329-016	SW846 9056
	Chloride	15.1	0.067	0.200	NE	NE			092329-016	SW846 9056
	Fluoride	0.946	0.033	0.100	4.0	1.60			092329-016	SW846 9056
	Sulfate	54.0	0.665	2.00	NE	NE			092329-016	SW846 9056
	Alkalinity as CaCO3	161	0.725	1.00	NE	NE			092329-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092329-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092329-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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	0.00494	0.00333	0.010	NE	NE	J		092323-003	SW846 9020
07-May-12	Bromide	0.193	0.067	0.200	NE	NE	J		092323-016	SW846 9056
	Chloride	14.3	0.067	0.200	NE	NE			092323-016	SW846 9056
	Fluoride	1.25	0.033	0.100	4.0	1.60			092323-016	SW846 9056
	Sulfate	61.0	0.665	2.00	NE	NE			092323-016	SW846 9056
	Alkalinity as CaCO3	160	0.725	1.00	NE	NE			092323-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092323-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092323-027	SW846 9012
SWTA3-MW4	Total Organic Halogens	ND	0.00333	0.010	NE	NE	U		092331-003	SW846 9020
09-May-12	Bromide	0.168	0.067	0.200	NE	NE	J		092331-016	SW846 9056
	Chloride	17.2	0.067	0.200	NE	NE			092331-016	SW846 9056
	Fluoride	1.58	0.033	0.100	4.0	1.60			092331-016	SW846 9056
	Sulfate	48.9	0.665	2.00	NE	NE			092331-016	SW846 9056
	Alkalinity as CaCO3	173	0.725	1.00	NE	NE			092331-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092331-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092331-027	SW846 9012
TRE-1	Total Organic Halogens	0.00988	0.00333	0.010	NE	NE	J		092315-003	SW846 9020
02-May-12	Bromide	0.814	0.067	0.200	NE	NE			092315-016	SW846 9056
	Chloride	128	0.670	2.00	NE	NE			092315-016	SW846 9056
	Fluoride	1.57	0.033	0.100	4.0	1.60			092315-016	SW846 9056
	Sulfate	94.0	1.33	4.00	NE	NE			092315-016	SW846 9056
	Alkalinity as CaCO3	490	0.725	1.00	NE	NE			092315-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092315-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092315-027	SW846 9012
TRE-1 (Duplicate)	Total Organic Halogens	0.00546	0.00333	0.010	NE	NE	J		092316-003	SW846 9020
02-May-12	Bromide	0.788	0.067	0.200	NE	NE			092316-016	SW846 9056
	Chloride	131	0.670	2.00	NE	NE			092316-016	SW846 9056
	Fluoride	**1.61**	0.033	0.100	4.0	1.60			092316-016	SW846 9056
	Sulfate	94.7	1.33	4.00	NE	NE			092316-016	SW846 9056
	Alkalinity as CaCO3	482	0.725	1.00	NE	NE			092316-022	SM2320B
	Total Phenol	ND	0.0167	0.05	NE	NE	U		092316-026	SW846 9066
	Total Cyanide	ND	0.00167	0.005	0.200	0.200	U	UJ	092316-027	SW846 9012

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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 15-May-12	ND	0.000067	0.0002	0.002	U	UJ	092335-010	SW846 7470A
Greystone-MW2 25-Apr-12	ND	0.000067	0.0002	0.002	U	UJ	092299-010	SW846 7470A
MRN-2 04-May-12	ND	0.000067	0.0002	0.002	U	UJ	092321-010	SW846 7470A
MRN-3D 03-May-12	ND	0.000067	0.0002	0.002	U	UJ	092318-010	SW846 7470A
NWTA3-MW3D 10-May-12	ND	0.000067	0.0002	0.002	U	UJ	092333-010	SW846 7470A
PL-2 27-Apr-12	ND	0.000067	0.0002	0.002	U	UJ	092306-010	SW846 7470A
PL-4 11-May-12	ND	0.000067	0.0002	0.002	U	UJ	092309-010	SW846 7470A
SFR-2S 01-May-12	ND	0.000067	0.0002	0.002	U	UJ	092311-010	SW846 7470A
SFR-4T 26-Apr-12	ND	0.000067	0.0002	0.002	U	UJ	092303-010	SW846 7470A
SFR-4T (Duplicate) 26-Apr-12	ND	0.000067	0.0002	0.002	U	UJ	092304-010	SW846 7470A
SWTA3-MW2 08-May-12	ND	0.000067	0.0002	0.002	U	UJ	092328-010	SW846 7470A
SWTA3-MW2 (Duplicate) 08-May-12	ND	0.000067	0.0002	0.002	U	UJ	092329-010	SW846 7470A
SWTA3-MW3 07-May-12	ND	0.000067	0.0002	0.002	U	UJ	092323-010	SW846 7470A
SWTA3-MW4 09-May-12	ND	0.000067	0.0002	0.002	U	UJ	092331-010	SW846 7470A
TRE-1 02-May-12	ND	0.000067	0.0002	0.002	U	UJ	092315-010	SW846 7470A
TRE-1 (Duplicate) 02-May-12	ND	0.000067	0.0002	0.002	U	UJ	092316-010	SW846 7470A

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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	0.178	0.015	0.050	NE	NE			092335-009	SW846 6020
15-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092335-009	SW846 6020
	Arsenic	0.00413	0.0017	0.005	0.010	0.100	J		092335-009	SW846 6020
	Barium	0.0401	0.0006	0.002	2.00	1.00			092335-009	SW846 6020
	Beryllium	**0.0065**	0.0002	0.0005	0.004	NE			092335-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092335-009	SW846 6020
	Calcium	288	0.600	2.00	NE	NE			092335-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092335-009	SW846 6020
	Cobalt	0.0102	0.0001	0.001	NE	NE			092335-009	SW846 6020
	Copper	0.00209	0.00035	0.001	NE	NE			092335-009	SW846 6020
	Iron	0.606	0.033	0.100	NE	NE			092335-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092335-009	SW846 6020
	Magnesium	61.6	0.100	0.300	NE	NE			092335-009	SW846 6020
	Manganese	1.44	0.005	0.025	NE	NE			092335-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092335-009	SW846 7470
	Nickel	0.030	0.0005	0.002	NE	NE			092335-009	SW846 6020
	Potassium	30.6	0.080	0.300	NE	NE			092335-009	SW846 6020
	Selenium	0.00548	0.0015	0.005	0.050	0.050			092335-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092335-009	SW846 6020
	Sodium	402	0.800	2.50	NE	NE		J	092335-009	SW846 6020
	Thallium	0.00138	0.00045	0.002	0.002	NE	J		092335-009	SW846 6020
	Uranium	0.00706	0.000067	0.0002	0.03	0.03	B		092335-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	NE	U		092335-009	SW846 6010
	Zinc	0.0469	0.0035	0.010	NE	NE			092335-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092299-009	SW846 6020
25-Apr-12	Antimony	ND	0.001	0.003	0.006	NE	U		092299-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092299-009	SW846 6020
	Barium	0.139	0.0006	0.002	2.00	1.00			092299-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092299-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092299-009	SW846 6020
	Calcium	141	0.300	1.00	NE	NE	B		092299-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092299-009	SW846 6020
	Cobalt	0.000409	0.0001	0.001	NE	NE	J		092299-009	SW846 6020
	Copper	0.000848	0.00035	0.001	NE	NE	J		092299-009	SW846 6020
	Iron	0.402	0.033	0.100	NE	NE			092299-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092299-009	SW846 6020
	Magnesium	26.3	0.010	0.030	NE	NE		J	092299-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092299-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092299-009	SW846 7470
	Nickel	0.00239	0.0005	0.002	NE	NE			092299-009	SW846 6020
	Potassium	4.65	0.080	0.300	NE	NE			092299-009	SW846 6020
	Selenium	0.00162	0.0015	0.005	0.050	0.050	J		092299-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092299-009	SW846 6020
	Sodium	93.1	0.400	1.25	NE	NE			092299-009	SW846 6020
	Thallium	0.000669	0.00045	0.002	0.002	NE	J		092299-009	SW846 6020
	Uranium	0.00729	0.000067	0.0002	0.03	0.03			092299-009	SW846 6020
	Vanadium	0.00316	0.001	0.005	NE	NE	J		092299-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092299-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092321-009	SW846 6020
04-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092321-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092321-009	SW846 6020
	Barium	0.0554	0.0006	0.002	2.00	1.00			092321-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092321-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092321-009	SW846 6020
	Calcium	46.3	0.060	0.200	NE	NE	B		092321-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092321-009	SW846 6020
	Cobalt	0.000113	0.0001	0.001	NE	NE	J		092321-009	SW846 6020
	Copper	0.000917	0.00035	0.001	NE	NE	B, J	0.0029U	092321-009	SW846 6020
	Iron	0.178	0.033	0.100	NE	NE			092321-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092321-009	SW846 6020
	Magnesium	13.6	0.010	0.030	NE	NE		J	092321-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092321-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092321-009	SW846 7470
	Nickel	0.000989	0.0005	0.002	NE	NE	J		092321-009	SW846 6020
	Potassium	3.17	0.080	0.300	NE	NE			092321-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092321-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092321-009	SW846 6020
	Sodium	21.4	0.080	0.250	NE	NE			092321-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092321-009	SW846 6020
	Uranium	0.00319	0.000067	0.0002	0.03	0.03			092321-009	SW846 6020
	Vanadium	0.00741	0.001	0.005	NE	NE			092321-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092321-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092318-009	SW846 6020
03-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092318-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092318-009	SW846 6020
	Barium	0.119	0.0006	0.002	2.00	1.00			092318-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092318-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U	UJ	092318-009	SW846 6020
	Calcium	59.7	0.300	1.00	NE	NE			092318-009	SW846 6020
	Chromium	0.00485	0.002	0.010	0.100	0.050	B, J	0.0186U	092318-009	SW846 6020
	Cobalt	0.000115	0.0001	0.001	NE	NE	J		092318-009	SW846 6020
	Copper	0.000935	0.00035	0.001	NE	NE	J	J+	092318-009	SW846 6020
	Iron	0.245	0.033	0.100	NE	NE			092318-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092318-009	SW846 6020
	Magnesium	12.8	0.010	0.030	NE	NE			092318-009	SW846 6020
	Manganese	0.0212	0.001	0.005	NE	NE			092318-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092318-009	SW846 7470
	Nickel	0.00138	0.0005	0.002	NE	NE	J	J-	092318-009	SW846 6020
	Potassium	4.08	0.080	0.300	NE	NE			092318-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092318-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092318-009	SW846 6020
	Sodium	27.1	0.080	0.250	NE	NE			092318-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092318-009	SW846 6020
	Uranium	0.00352	0.000067	0.0002	0.03	0.03			092318-009	SW846 6020
	Vanadium	0.00567	0.001	0.005	NE	NE			092318-009	SW846 6010
	Zinc	0.0828	0.0035	0.010	NE	NE			092318-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092333-009	SW846 6020
10-May-12	Antimony	0.00119	0.001	0.003	0.006	NE	B, J	0.0053U	092333-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092333-009	SW846 6020
	Barium	0.0874	0.0006	0.002	2.00	1.00			092333-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092333-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092333-009	SW846 6020
	Calcium	36.6	0.060	0.200	NE	NE	B		092333-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092333-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		092333-009	SW846 6020
	Copper	0.000774	0.00035	0.001	NE	NE	B, J	0.0029U	092333-009	SW846 6020
	Iron	0.170	0.033	0.100	NE	NE			092333-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092333-009	SW846 6020
	Magnesium	7.72	0.010	0.030	NE	NE		J	092333-009	SW846 6020
	Manganese	0.00132	0.001	0.005	NE	NE	J		092333-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092333-009	SW846 7470
	Nickel	0.000931	0.0005	0.002	NE	NE	J		092333-009	SW846 6020
	Potassium	3.77	0.080	0.300	NE	NE			092333-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092333-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092333-009	SW846 6020
	Sodium	34.8	0.080	0.250	NE	NE			092333-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092333-009	SW846 6020
	Uranium	0.0036	0.000067	0.0002	0.03	0.03			092333-009	SW846 6020
	Vanadium	0.00781	0.001	0.005	NE	NE			092333-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092333-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092306-009	SW846 6020
27-Apr-12	Antimony	ND	0.001	0.003	0.006	NE	U		092306-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092306-009	SW846 6020
	Barium	0.0767	0.0006	0.002	2.00	1.00			092306-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092306-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U	UJ	092306-009	SW846 6020
	Calcium	63.0	0.300	1.00	NE	NE			092306-009	SW846 6020
	Chromium	0.00487	0.002	0.010	0.100	0.050	B, J	0.0186U	092306-009	SW846 6020
	Cobalt	0.000125	0.0001	0.001	NE	NE	J		092306-009	SW846 6020
	Copper	0.00171	0.00035	0.001	NE	NE		J+	092306-009	SW846 6020
	Iron	0.257	0.033	0.100	NE	NE			092306-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092306-009	SW846 6020
	Magnesium	9.26	0.010	0.030	NE	NE			092306-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092306-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092306-009	SW846 7470
	Nickel	0.0038	0.0005	0.002	NE	NE		J-	092306-009	SW846 6020
	Potassium	3.48	0.080	0.300	NE	NE			092306-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092306-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092306-009	SW846 6020
	Sodium	29.5	0.080	0.250	NE	NE			092306-009	SW846 6020
	Thallium	0.00056	0.00045	0.002	0.002	NE	J		092306-009	SW846 6020
	Uranium	0.00381	0.000067	0.0002	0.03	0.03			092306-009	SW846 6020
	Vanadium	0.00611	0.001	0.005	NE	NE			092306-009	SW846 6010
	Zinc	0.0113	0.0035	0.010	NE	NE			092306-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092309-009	SW846 6020
11-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092309-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092309-009	SW846 6020
	Barium	0.0689	0.0006	0.002	2.00	1.00			092309-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092309-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092309-009	SW846 6020
	Calcium	71.0	0.300	1.00	NE	NE			092309-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092309-009	SW846 6020
	Cobalt	0.000162	0.0001	0.001	NE	NE	J		092309-009	SW846 6020
	Copper	0.000792	0.00035	0.001	NE	NE	J		092309-009	SW846 6020
	Iron	0.140	0.033	0.100	NE	NE			092309-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092309-009	SW846 6020
	Magnesium	11.6	0.010	0.030	NE	NE			092309-009	SW846 6020
	Manganese	0.0797	0.001	0.005	NE	NE			092309-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092309-009	SW846 7470
	Nickel	0.0021	0.0005	0.002	NE	NE			092309-009	SW846 6020
	Potassium	4.99	0.080	0.300	NE	NE			092309-009	SW846 6020
	Selenium	0.00265	0.0015	0.005	0.050	0.050	J		092309-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092309-009	SW846 6020
	Sodium	21.8	0.080	0.250	NE	NE		J	092309-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092309-009	SW846 6020
	Uranium	0.0036	0.000067	0.0002	0.03	0.03	B		092309-009	SW846 6020
	Vanadium	0.00282	0.001	0.005	NE	NE	J		092309-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092309-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092311-009	SW846 6020
01-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092311-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092311-009	SW846 6020
	Barium	0.0586	0.0006	0.002	2.00	1.00			092311-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092311-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U	UJ	092311-009	SW846 6020
	Calcium	145	0.600	2.00	NE	NE			092311-009	SW846 6020
	Chromium	0.0043	0.002	0.010	0.100	0.050	B, J	0.0186U	092311-009	SW846 6020
	Cobalt	0.000559	0.0001	0.001	NE	NE	J		092311-009	SW846 6020
	Copper	0.00156	0.00035	0.001	NE	NE		J+	092311-009	SW846 6020
	Iron	0.551	0.033	0.100	NE	NE			092311-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092311-009	SW846 6020
	Magnesium	37.1	0.010	0.030	NE	NE			092311-009	SW846 6020
	Manganese	0.00527	0.001	0.005	NE	NE			092311-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092311-009	SW846 7470
	Nickel	0.038	0.0005	0.002	NE	NE			092311-009	SW846 6020
	Potassium	7.39	0.080	0.300	NE	NE			092311-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092311-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092311-009	SW846 6020
	Sodium	88.0	0.800	2.50	NE	NE			092311-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092311-009	SW846 6020
	Uranium	0.0172	0.000067	0.0002	0.03	0.03			092311-009	SW846 6020
	Vanadium	0.00298	0.001	0.005	NE	NE	J		092311-009	SW846 6010
	Zinc	0.00353	0.0035	0.010	NE	NE	J		092311-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092303-009	SW846 6020
26-Apr-12	Antimony	ND	0.001	0.003	0.006	NE	U		092303-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092303-009	SW846 6020
	Barium	0.00943	0.0006	0.002	2.00	1.00			092303-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092303-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092303-009	SW846 6020
	Calcium	60.4	0.300	1.00	NE	NE	B		092303-009	SW846 6020
	Chromium	0.0021	0.002	0.010	0.100	0.050	B, J	0.010U	092303-009	SW846 6020
	Cobalt	0.000198	0.0001	0.001	NE	NE	J		092303-009	SW846 6020
	Copper	0.00793	0.00035	0.001	NE	NE			092303-009	SW846 6020
	Iron	0.324	0.033	0.100	NE	NE			092303-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092303-009	SW846 6020
	Magnesium	3.47	0.010	0.030	NE	NE		J	092303-009	SW846 6020
	Manganese	0.0106	0.001	0.005	NE	NE			092303-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092303-009	SW846 7470
	Nickel	0.00545	0.0005	0.002	NE	NE			092303-009	SW846 6020
	Potassium	2.33	0.080	0.300	NE	NE			092303-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092303-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092303-009	SW846 6020
	Sodium	1130	4.00	12.5	NE	NE			092303-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092303-009	SW846 6020
	Uranium	0.000246	0.000067	0.0002	0.03	0.03		0.00052U	092303-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	NE	U		092303-009	SW846 6010
	Zinc	0.0229	0.0035	0.010	NE	NE			092303-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	NE	U		092304-009	SW846 6020
26-Apr-12	Antimony	ND	0.001	0.003	0.006	NE	U		092304-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092304-009	SW846 6020
	Barium	0.0098	0.0006	0.002	2.00	1.00			092304-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092304-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092304-009	SW846 6020
	Calcium	61.5	0.300	1.00	NE	NE	B		092304-009	SW846 6020
	Chromium	0.00257	0.002	0.010	0.100	0.050	B, J	0.010U	092304-009	SW846 6020
	Cobalt	0.000215	0.0001	0.001	NE	NE	J		092304-009	SW846 6020
	Copper	0.00858	0.00035	0.001	NE	NE			092304-009	SW846 6020
	Iron	0.334	0.033	0.100	NE	NE			092304-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092304-009	SW846 6020
	Magnesium	3.44	0.010	0.030	NE	NE		J	092304-009	SW846 6020
	Manganese	0.0103	0.001	0.005	NE	NE			092304-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092304-009	SW846 7470
	Nickel	0.00564	0.0005	0.002	NE	NE			092304-009	SW846 6020
	Potassium	2.33	0.080	0.300	NE	NE			092304-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092304-009	SW846 6020
	Silver	0.00066	0.0002	0.001	NE	0.050	J		092304-009	SW846 6020
	Sodium	1070	4.00	12.5	NE	NE			092304-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092304-009	SW846 6020
	Uranium	0.00026	0.000067	0.0002	0.03	0.03		0.00052U	092304-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	NE	U		092304-009	SW846 6010
	Zinc	0.023	0.0035	0.010	NE	NE			092304-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092328-009	SW846 6020
08-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092328-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092328-009	SW846 6020
	Barium	0.070	0.0006	0.002	2.00	1.00			092328-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092328-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092328-009	SW846 6020
	Calcium	41.8	0.060	0.200	NE	NE	B		092328-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092328-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		092328-009	SW846 6020
	Copper	0.000734	0.00035	0.001	NE	NE	B, J	0.0029U	092328-009	SW846 6020
	Iron	0.169	0.033	0.100	NE	NE		0.19U	092328-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092328-009	SW846 6020
	Magnesium	12.5	0.010	0.030	NE	NE		J	092328-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092328-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092328-009	SW846 7470
	Nickel	0.00087	0.0005	0.002	NE	NE	J		092328-009	SW846 6020
	Potassium	3.95	0.080	0.300	NE	NE			092328-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092328-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092328-009	SW846 6020
	Sodium	33.5	0.080	0.250	NE	NE			092328-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092328-009	SW846 6020
	Uranium	0.00325	0.000067	0.0002	0.03	0.03			092328-009	SW846 6020
	Vanadium	0.00642	0.001	0.005	NE	NE			092328-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092328-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL/MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW2 (Duplicate)	Aluminum	ND	0.015	0.050	NE	NE	U		092329-009	SW846 6020
08-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092329-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092329-009	SW846 6020
	Barium	0.0715	0.0006	0.002	2.00	1.00			092329-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092329-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092329-009	SW846 6020
	Calcium	42.0	0.060	0.200	NE	NE	B		092329-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092329-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		092329-009	SW846 6020
	Copper	0.00248	0.00035	0.001	NE	NE	B	0.0029U	092329-009	SW846 6020
	Iron	0.181	0.033	0.100	NE	NE		0.19U	092329-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092329-009	SW846 6020
	Magnesium	12.8	0.010	0.030	NE	NE		J	092329-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092329-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092329-009	SW846 7470
	Nickel	0.000944	0.0005	0.002	NE	NE	J		092329-009	SW846 6020
	Potassium	4.66	0.080	0.300	NE	NE			092329-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092329-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092329-009	SW846 6020
	Sodium	34.2	0.080	0.250	NE	NE			092329-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092329-009	SW846 6020
	Uranium	0.00335	0.000067	0.0002	0.03	0.03			092329-009	SW846 6020
	Vanadium	0.00647	0.001	0.005	NE	NE			092329-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092329-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092323-009	SW846 6020
07-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092323-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092323-009	SW846 6020
	Barium	0.0576	0.0006	0.002	2.00	1.00			092323-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092323-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092323-009	SW846 6020
	Calcium	35.5	0.060	0.200	NE	NE	B		092323-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092323-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		092323-009	SW846 6020
	Copper	0.000808	0.00035	0.001	NE	NE	B, J	0.0029U	092323-009	SW846 6020
	Iron	0.155	0.033	0.100	NE	NE			092323-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092323-009	SW846 6020
	Magnesium	10.3	0.010	0.030	NE	NE		J	092323-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092323-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092323-009	SW846 7470
	Nickel	0.000946	0.0005	0.002	NE	NE	J		092323-009	SW846 6020
	Potassium	4.48	0.080	0.300	NE	NE			092323-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092323-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092323-009	SW846 6020
	Sodium	45.7	0.080	0.250	NE	NE			092323-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092323-009	SW846 6020
	Uranium	0.00251	0.000067	0.0002	0.03	0.03			092323-009	SW846 6020
	Vanadium	0.00818	0.001	0.005	NE	NE			092323-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092323-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092331-009	SW846 6020
09-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092331-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092331-009	SW846 6020
	Barium	0.0508	0.0006	0.002	2.00	1.00			092331-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092331-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		092331-009	SW846 6020
	Calcium	34.7	0.060	0.200	NE	NE	B		092331-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	0.050	U		092331-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		092331-009	SW846 6020
	Copper	0.000728	0.00035	0.001	NE	NE	B, J	0.0029U	092331-009	SW846 6020
	Iron	0.154	0.033	0.100	NE	NE			092331-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092331-009	SW846 6020
	Magnesium	9.44	0.010	0.030	NE	NE		J	092331-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092331-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092331-009	SW846 7470
	Nickel	0.000831	0.0005	0.002	NE	NE	J		092331-009	SW846 6020
	Potassium	4.92	0.080	0.300	NE	NE			092331-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092331-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092331-009	SW846 6020
	Sodium	50.9	0.400	1.25	NE	NE			092331-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092331-009	SW846 6020
	Uranium	0.00238	0.000067	0.0002	0.03	0.03			092331-009	SW846 6020
	Vanadium	0.00865	0.001	0.005	NE	NE			092331-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092331-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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		092315-009	SW846 6020
02-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092315-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092315-009	SW846 6020
	Barium	0.0419	0.0006	0.002	2.00	1.00			092315-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	NE	U		092315-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U	UJ	092315-009	SW846 6020
	Calcium	185	0.600	2.00	NE	NE			092315-009	SW846 6020
	Chromium	0.00435	0.002	0.010	0.100	0.050	B, J	0.0186U	092315-009	SW846 6020
	Cobalt	0.000331	0.0001	0.001	NE	NE	J		092315-009	SW846 6020
	Copper	0.00162	0.00035	0.001	NE	NE		0.006UJ	092315-009	SW846 6020
	Iron	0.708	0.033	0.100	NE	NE			092315-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092315-009	SW846 6020
	Magnesium	34.4	0.010	0.030	NE	NE			092315-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092315-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092315-009	SW846 7470
	Nickel	0.0036	0.0005	0.002	NE	NE		J-	092315-009	SW846 6020
	Potassium	7.03	0.080	0.300	NE	NE			092315-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092315-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092315-009	SW846 6020
	Sodium	121	0.800	2.50	NE	NE			092315-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092315-009	SW846 6020
	Uranium	0.0179	0.000067	0.0002	0.03	0.03			092315-009	SW846 6020
	Vanadium	0.00282	0.001	0.005	NE	NE	J		092315-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092315-009	SW846 6020

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	NE	U		092316-009	SW846 6020
02-May-12	Antimony	ND	0.001	0.003	0.006	NE	U		092316-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	0.100	U		092316-009	SW846 6020
	Barium	0.0424	0.0006	0.002	2.00	1.00			092316-009	SW846 6020
	Beryllium	0.000209	0.0002	0.0005	0.004	NE	J		092316-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U	UJ	092316-009	SW846 6020
	Calcium	185	0.600	2.00	NE	NE			092316-009	SW846 6020
	Chromium	0.00464	0.002	0.010	0.100	0.050	B, J	0.0186U	092316-009	SW846 6020
	Cobalt	0.000335	0.0001	0.001	NE	NE	J		092316-009	SW846 6020
	Copper	0.00159	0.00035	0.001	NE	NE		0.006UJ	092316-009	SW846 6020
	Iron	0.727	0.033	0.100	NE	NE			092316-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		092316-009	SW846 6020
	Magnesium	35.4	0.010	0.030	NE	NE			092316-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		092316-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	092316-009	SW846 7470
	Nickel	0.00359	0.0005	0.002	NE	NE		J-	092316-009	SW846 6020
	Potassium	6.62	0.080	0.300	NE	NE			092316-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	0.050	U		092316-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		092316-009	SW846 6020
	Sodium	109	0.800	2.50	NE	NE			092316-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	NE	U		092316-009	SW846 6020
	Uranium	0.0176	0.000067	0.0002	0.03	0.03			092316-009	SW846 6020
	Vanadium	0.00285	0.001	0.005	NE	NE	J		092316-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	NE	U		092316-009	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, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2012

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	-8.29 ± 12.1	16.6	8.13	NE	NE	U	BD	092335-033	EPA 901.1
15-May-12	Cesium-137	-0.0927 ± 2.17	3.70	1.79	NE	NE	U	BD	092335-033	EPA 901.1
	Cobalt-60	0.767 ± 2.12	3.84	1.82	NE	NE	U	BD	092335-033	EPA 901.1
	Potassium-40	13.8 ± 41.2	31.0	14.6	NE	NE	U	BD	092335-033	EPA 901.1
	Gross Alpha	-0.410	NA	NA	15 pCi/L	NE	NA	None	092335-034	EPA 900.0
	Gross Beta	29.9 ± 8.52	10.5	5.10	4 mrem/yr	NE		J	092335-034	EPA 900.0
	Uranium-233/234	10.7 ± 1.57	0.119	0.0507	NE	NE		J+	092335-035	HASL-300
	Uranium-235/236	0.0727 ± 0.0485	0.0844	0.0313	NE	NE	U	BD	092335-035	HASL-300
	Uranium-238	2.21 ± 0.386	0.0594	0.0209	NE	NE		J+	092335-035	HASL-300
	Radium-226	0.443 ± 0.324	0.421	0.172	5 pCi/L	30 pCi/L		J	092335-038	EPA 903.1
	Radium-228	0.962 ± 0.419	0.459	0.208	5 pCi/L	30 pCi/L		J	092335-039	EPA 904.0
Greystone-MW2	Americium-241	3.90 ± 3.90	5.42	2.65	NE	NE	U	BD	092299-033	EPA 901.1
25-Apr-12	Cesium-137	-0.455 ± 2.36	3.97	1.90	NE	NE	U	BD	092299-033	EPA 901.1
	Cobalt-60	-0.0103 ± 2.31	4.19	1.96	NE	NE	U	BD	092299-033	EPA 901.1
	Potassium-40	105 ± 64.9	35.9	16.6	NE	NE	X	R	092299-033	EPA 901.1
	Gross Alpha	2.68	NA	NA	15 pCi/L	NE	NA	None	092299-034	EPA 900.0
	Gross Beta	6.40 ± 2.41	3.37	1.63	4 mrem/yr	NE		J	092299-034	EPA 900.0
	Uranium-233/234	9.83 ± 1.28	0.080	0.034	NE	NE			092299-035	HASL-300
	Uranium-235/236	0.228 ± 0.0774	0.0567	0.021	NE	NE			092299-035	HASL-300
	Uranium-238	2.26 ± 0.341	0.0399	0.014	NE	NE			092299-035	HASL-300
	Radium-226	0.867 ± 0.449	0.483	0.197	5 pCi/L	30 pCi/L		J	092299-038	EPA 903.1
	Radium-228	0.522 ± 0.333	0.446	0.193	5 pCi/L	30 pCi/L		J	092299-039	EPA 904.0
MRN-2	Americium-241	-0.533 ± 12.3	19.1	9.33	NE	NE	U	BD	092321-033	EPA 901.1
04-May-12	Cesium-137	0.544 ± 1.89	3.29	1.58	NE	NE	U	BD	092321-033	EPA 901.1
	Cobalt-60	0.657 ± 1.92	3.51	1.66	NE	NE	U	BD	092321-033	EPA 901.1
	Potassium-40	7.95 ± 45.4	48.6	23.3	NE	NE	U	BD	092321-033	EPA 901.1
	Gross Alpha	4.44	NA	NA	15 pCi/L	NE	NA	None	092321-034	EPA 900.0
	Gross Beta	6.72 ± 1.57	1.61	0.782	4 mrem/yr	NE			092321-034	EPA 900.0
	Radium-226	0.131 ± 0.161	0.252	0.0865	5 pCi/L	30 pCi/L	U	BD	092321-038	EPA 903.1
	Radium-228	0.0822 ± 0.257	0.459	0.207	5 pCi/L	30 pCi/L	U	BD	092321-039	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, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2012

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	Americium-241	0.794 ± 4.05	5.88	2.89	NE	NE	U	BD	092318-033	EPA 901.1
03-May-12	Cesium-137	18.9 ± 4.08	19.0	2.00	NE	NE		BD	092318-033	EPA 901.1
	Cobalt-60	1.09 ± 2.25	4.01	1.90	NE	NE	U	BD	092318-033	EPA 901.1
	Potassium-40	59.4 ± 32.0	38.3	18.1	NE	NE		J	092318-033	EPA 901.1
	Gross Alpha	3.46	NA	NA	15 pCi/L	NE	NA	None	092318-034	EPA 900.0
	Gross Beta	5.81 ± 1.47	1.66	0.806	4 mrem/yr	NE			092318-034	EPA 900.0
	Radium-226	0.0553 ± 0.141	0.265	0.105	5 pCi/L	30 pCi/L	U	BD	092318-038	EPA 903.1
	Radium-228	0.373 ± 0.321	0.496	0.224	5 pCi/L	30 pCi/L	U	BD	092318-039	EPA 904.0
NWTA3-MW3D	Americium-241	3.28 ± 12.8	19.8	9.64	NE	NE	U	BD	092333-033	EPA 901.1
10-May-12	Cesium-137	-0.491 ± 1.70	2.93	1.40	NE	NE	U	BD	092333-033	EPA 901.1
	Cobalt-60	-0.418 ± 1.84	3.23	1.52	NE	NE	U	BD	092333-033	EPA 901.1
	Potassium-40	5.99 ± 48.5	31.8	14.9	NE	NE	U	BD	092333-033	EPA 901.1
	Gross Alpha	1.76	NA	NA	15 pCi/L	NE	NA	None	092333-034	EPA 900.0
	Gross Beta	2.67 ± 1.05	1.52	0.741	4 mrem/yr	NE		J	092333-034	EPA 900.0
	Radium-226	0.377 ± 0.327	0.435	0.177	5 pCi/L	30 pCi/L	U	BD	092333-038	EPA 903.1
	Radium-228	-0.186 ± 0.216	0.466	0.205	5 pCi/L	30 pCi/L	U	BD	092333-039	EPA 904.0
PL-2	Americium-241	-13.2 ± 12.5	17.9	8.75	NE	NE	U	BD	092306-033	EPA 901.1
27-Apr-12	Cesium-137	0.633 ± 2.05	3.61	1.73	NE	NE	U	BD	092306-033	EPA 901.1
	Cobalt-60	-1.43 ± 2.31	3.72	1.75	NE	NE	U	BD	092306-033	EPA 901.1
	Potassium-40	10.9 ± 36.9	46.4	22.0	NE	NE	U	BD	092306-033	EPA 901.1
	Gross Alpha	2.15	NA	NA	15 pCi/L	NE	NA	None	092306-034	EPA 900.0
	Gross Beta	4.45 ± 1.44	1.94	0.948	4 mrem/yr	NE		J	092306-034	EPA 900.0
	Radium-226	0.262 ± 0.183	0.209	0.0718	5 pCi/L	30 pCi/L		J	092306-038	EPA 903.1
	Radium-228	1.17 ± 0.465	0.472	0.215	5 pCi/L	30 pCi/L		J	092306-039	EPA 904.0
PL-4	Americium-241	-0.326 ± 11.1	16.5	8.05	NE	NE	U	BD	092309-033	EPA 901.1
11-May-12	Cesium-137	0.564 ± 2.24	3.84	1.86	NE	NE	U	BD	092309-033	EPA 901.1
	Cobalt-60	-0.348 ± 1.87	3.32	1.57	NE	NE	U	BD	092309-033	EPA 901.1
	Potassium-40	-10.4 ± 35.3	42.5	20.3	NE	NE	U	BD	092309-033	EPA 901.1
	Gross Alpha	-0.06	NA	NA	15 pCi/L	NE	NA	None	092309-034	EPA 900.0
	Gross Beta	10.2 ± 2.05	1.63	0.795	4 mrem/yr	NE			092309-034	EPA 900.0
	Radium-226	0.514 ± 0.299	0.207	0.0629	5 pCi/L	30 pCi/L		J	092309-038	EPA 903.1
	Radium-228	0.0407 ± 0.229	0.442	0.186	5 pCi/L	30 pCi/L	U	BD	092309-039	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, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/MAC[d]		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SFR-2S	Americium-241	-12.3 ± 11.6	16.3	8.00	NE	NE	U	BD	092311-033	EPA 901.1
01-May-12	Cesium-137	-0.012 ± 2.14	3.66	1.77	NE	NE	U	BD	092311-033	EPA 901.1
	Cobalt-60	-8.8 ± 5.51	3.26	1.53	NE	NE	U	BD	092311-033	EPA 901.1
	Potassium-40	21.2 ± 45.1	30.0	14.0	NE	NE	U	BD	092311-033	EPA 901.1
	Gross Alpha	-3.43	NA	NA	15 pCi/L	NE	NA	None	092311-034	EPA 900.0
	Gross Beta	12.8 ± 3.06	3.06	1.48	4 mrem/yr	NE			092311-034	EPA 900.0
	Uranium-233/234	19.5 ± 2.45	0.0539	0.0229	NE	NE			092311-035	HASL-300
	Uranium-235/236	0.355 ± 0.0843	0.0382	0.014	NE	NE			092311-035	HASL-300
	Uranium-238	5.07 ± 0.672	0.0269	0.00945	NE	NE			092311-035	HASL-300
	Radium-226	0.381 ± 0.306	0.385	0.157	5 pCi/L	30 pCi/L	U	BD	092311-038	EPA 903.1
	Radium-228	0.817 ± 0.390	0.462	0.208	5 pCi/L	30 pCi/L		J	092311-039	EPA 904.0
SFR-4T	Americium-241	3.77 ± 6.50	9.49	4.64	NE	NE	U	BD	092303-033	EPA 901.1
26-Apr-12	Cesium-137	1.30 ± 1.70	2.90	1.40	NE	NE	U	BD	092303-033	EPA 901.1
	Cobalt-60	4.05 ± 2.70	4.05	1.71	NE	NE	U	BD	092303-033	EPA 901.1
	Potassium-40	22.6 ± 30.5	30.1	14.2	NE	NE	U	BD	092303-033	EPA 901.1
	Gross Alpha	3.98	NA	NA	15 pCi/L	NE	NA	None	092303-034	EPA 900.0
	Gross Beta	5.55 ± 5.44	8.92	4.29	4 mrem/yr	NE	U	BD	092303-034	EPA 900.0
	Uranium-233/234	0.437 ± 0.108	0.0777	0.0331	NE	NE			092303-035	HASL-300
	Uranium-235/236	-0.00527 ± 0.0231	0.0551	0.0204	NE	NE	U	BD	092303-035	HASL-300
	Uranium-238	0.0853 ± 0.0407	0.0388	0.0136	NE	NE		J	092303-035	HASL-300
	Radium-226	0.00 ± 0.231	0.475	0.193	5 pCi/L	30 pCi/L	U	BD	092303-038	EPA 903.1
	Radium-228	0.613 ± 0.354	0.456	0.199	5 pCi/L	30 pCi/L		J	092303-039	EPA 904.0
SFR-4T (Duplicate)	Americium-241	1.76 ± 7.58	11.3	5.51	NE	NE	U	BD	092304-033	EPA 901.1
26-Apr-12	Cesium-137	-0.0603 ± 1.63	2.85	1.36	NE	NE	U	BD	092304-033	EPA 901.1
	Cobalt-60	-0.746 ± 1.77	3.01	1.41	NE	NE	U	BD	092304-033	EPA 901.1
	Potassium-40	-6.39 ± 42.7	42.1	20.1	NE	NE	U	BD	092304-033	EPA 901.1
	Gross Alpha	0.15	NA	NA	15 pCi/L	NE	NA	None	092304-034	EPA 900.0
	Gross Beta	-0.341 ± 4.37	7.59	3.66	4 mrem/yr	NE	U	BD	092304-034	EPA 900.0
	Uranium-233/234	0.353 ± 0.088	0.0684	0.0291	NE	NE			092304-035	HASL-300
	Uranium-235/236	-0.00464 ± 0.0158	0.0485	0.018	NE	NE	U	BD	092304-035	HASL-300
	Uranium-238	0.0976 ± 0.0447	0.0341	0.012	NE	NE		J	092304-035	HASL-300
	Radium-226	0.410 ± 0.339	0.474	0.193	5 pCi/L	30 pCi/L	U	BD	092304-038	EPA 903.1
	Radium-228	0.547 ± 0.345	0.460	0.200	5 pCi/L	30 pCi/L		J	092304-039	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, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/MAC[d]		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW2	Americium-241	-8.13 ± 11.1	17.1	8.39	NE	NE	U	BD	092328-033	EPA 901.1
08-May-12	Cesium-137	2.94 ± 2.61	4.01	1.94	NE	NE	U	BD	092328-033	EPA 901.1
	Cobalt-60	-0.326 ± 1.89	3.36	1.59	NE	NE	U	BD	092328-033	EPA 901.1
	Potassium-40	-44.3 ± 39.6	43.6	20.9	NE	NE	U	BD	092328-033	EPA 901.1
	Gross Alpha	2.65	NA	NA	15 pCi/L	NE	NA	None	092328-034	EPA 900.0
	Gross Beta	6.53 ± 1.64	1.77	0.866	4 mrem/yr	NE		NJ+	092328-034	EPA 900.0
	Radium-226	0.266 ± 0.246	0.327	0.124	5 pCi/L	30 pCi/L	U	BD	092328-038	EPA 903.1
	Radium-228	0.0661 ± 0.261	0.475	0.212	5 pCi/L	30 pCi/L	U	BD	092328-039	EPA 904.0
SWTA3-MW2 (Duplicate)	Americium-241	0.479 ± 6.49	9.60	4.69	NE	NE	U	BD	092329-033	EPA 901.1
08-May-12	Cesium-137	0.770 ± 1.60	2.82	1.36	NE	NE	U	BD	092329-033	EPA 901.1
	Cobalt-60	0.568 ± 1.60	2.92	1.37	NE	NE	U	BD	092329-033	EPA 901.1
	Potassium-40	0.385 ± 30.1	36.8	17.6	NE	NE	U	BD	092329-033	EPA 901.1
	Gross Alpha	1.03	NA	NA	15 pCi/L	NE	NA	None	092329-034	EPA 900.0
	Gross Beta	5.00 ± 1.40	1.75	0.857	4 mrem/yr	NE		NJ+	092329-034	EPA 900.0
	Radium-226	0.188 ± 0.259	0.434	0.177	5 pCi/L	30 pCi/L	U	BD	092329-038	EPA 903.1
	Radium-228	0.484 ± 0.329	0.459	0.201	5 pCi/L	30 pCi/L		J	092329-039	EPA 904.0
SWTA3-MW3	Americium-241	2.37 ± 3.13	4.94	2.41	NE	NE	U	BD	092323-033	EPA 901.1
07-May-12	Cesium-137	2.86 ± 2.69	4.24	2.04	NE	NE	U	BD	092323-033	EPA 901.1
	Cobalt-60	0.477 ± 2.35	4.30	2.02	NE	NE	U	BD	092323-033	EPA 901.1
	Potassium-40	43.3 ± 34.0	40.8	19.1	NE	NE	X	R	092323-033	EPA 901.1
	Gross Alpha	1.94	NA	NA	15 pCi/L	NE	NA	None	092323-034	EPA 900.0
	Gross Beta	4.74 ± 1.32	1.61	0.785	4 mrem/yr	NE		J	092323-034	EPA 900.0
	Radium-226	0.376 ± 0.275	0.360	0.140	5 pCi/L	30 pCi/L		J	092323-038	EPA 903.1
	Radium-228	0.218 ± 0.270	0.447	0.194	5 pCi/L	30 pCi/L	U	BD	092323-039	EPA 904.0
SWTA3-MW4	Americium-241	0.952 ± 6.63	10.2	4.99	NE	NE	U	BD	092331-033	EPA 901.1
09-May-12	Cesium-137	1.71 ± 1.74	2.91	1.40	NE	NE	U	BD	092331-033	EPA 901.1
	Cobalt-60	0.386 ± 1.63	2.88	1.36	NE	NE	U	BD	092331-033	EPA 901.1
	Potassium-40	-15.8 ± 33.3	37.7	18.0	NE	NE	U	BD	092331-033	EPA 901.1
	Gross Alpha	0.94	NA	NA	15 pCi/L	NE	NA	None	092331-034	EPA 900.0
	Gross Beta	4.89 ± 1.31	1.56	0.758	4 mrem/yr	NE			092331-034	EPA 900.0
	Radium-226	0.301 ± 0.204	0.247	0.0934	5 pCi/L	30 pCi/L		J	092331-038	EPA 903.1
	Radium-228	0.297 ± 0.297	0.470	0.207	5 pCi/L	30 pCi/L	U	BD	092331-039	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, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2012

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]
TRE-1	Americium-241	2.96 ± 12.8	20.0	9.79	NE	NE	U	BD	092315-033	EPA 901.1
02-May-12	Cesium-137	1.53 ± 2.12	3.57	1.72	NE	NE	U	BD	092315-033	EPA 901.1
	Cobalt-60	-1.02 ± 1.87	3.16	1.49	NE	NE	U	BD	092315-033	EPA 901.1
	Potassium-40	63.7 ± 40.1	63.8	23.5	NE	NE		BD	092315-033	EPA 901.1
	Gross Alpha	0.01	NA	NA	15 pCi/L	NE	NA	None	092315-034	EPA 900.0
	Gross Beta	15.8 ± 3.45	2.39	1.14	4 mrem/yr	NE			092315-034	EPA 900.0
	Uranium-233/234	23.6 ± 3.06	0.0676	0.0288	NE	NE			092315-035	HASL-300
	Uranium-235/236	0.289 ± 0.0842	0.0479	0.0178	NE	NE			092315-035	HASL-300
	Uranium-238	5.90 ± 0.805	0.0338	0.0119	NE	NE			092315-035	HASL-300
	Radium-226	0.230 ± 0.243	0.372	0.152	5 pCi/L	30 pCi/L	U	BD	092315-038	EPA 903.1
	Radium-228	0.327 ± 0.291	0.455	0.210	5 pCi/L	30 pCi/L	U	BD	092315-039	EPA 904.0
TRE-1 (Duplicate)	Americium-241	15.1 ± 10.3	15.1	5.89	NE	NE		BD	092316-033	EPA 901.1
02-May-12	Cesium-137	-0.529 ± 1.65	2.81	1.34	NE	NE	U	BD	092316-033	EPA 901.1
	Cobalt-60	-1.62 ± 1.99	3.08	1.44	NE	NE	U	BD	092316-033	EPA 901.1
	Potassium-40	6.41 ± 43.9	27.6	12.8	NE	NE	U	BD	092316-033	EPA 901.1
	Gross Alpha	7.94	NA	NA	15 pCi/L	NE	NA	None	092316-034	EPA 900.0
	Gross Beta	14.5 ± 3.60	3.64	1.76	4 mrem/yr	NE			092316-034	EPA 900.0
	Uranium-233/234	22.8 ± 2.95	0.0663	0.0282	NE	NE			092316-035	HASL-300
	Uranium-235/236	0.441 ± 0.104	0.047	0.0174	NE	NE			092316-035	HASL-300
	Uranium-238	5.72 ± 0.779	0.0331	0.0116	NE	NE			092316-035	HASL-300
	Radium-226	0.197 ± 0.193	0.290	0.118	5 pCi/L	30 pCi/L	U	BD	092316-038	EPA 903.1
	Radium-228	1.14 ± 0.476	0.442	0.190	5 pCi/L	30 pCi/L		J	092316-039	EPA 904.0

Refer to footnotes on page 2A-35.

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

Calendar Year 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
Coyote Spring	15-May-12	14.40	2863	207.0	5.96	2.28	30.7	3.13
Greystone-MW2	25-Apr-12	18.31	1133	108.2	7.31	0.26	75.3	7.03
MRN-2	04-May-12	20.67	422	86.3	7.97	0.72	76.5	6.85
MRN-3D	03-May-12	20.44	459	-19.2	7.85	1.27	52.3	4.70
NWTA3-MW3D	10-May-12	19.90	368	-10.6	8.12	0.80	50.0	4.50
PL-2	27-Apr-12	18.47	445	53.7	8.04	0.31	70.7	6.60
PL-4	11-May-12	19.76	477	16.8	7.72	1.01	60.4	5.47
SFR-2S	01-May-12	18.18	1096	64.4	7.19	20.0	80.7	7.60
SFR-4T	26-Apr-12	19.18	4156	-146.0	8.27	1.19	10.0	0.96
SWTA3-MW2	08-May-12	18.85	430	71.7	8.03	0.80	48.4	4.48
SWTA3-MW3	07-May-12	20.33	436	-7.1	8.04	1.40	50.6	4.54
SWTA3-MW4	09-May-12	19.51	447	88.2	8.09	1.03	52.0	4.75
TRE-1	02-May-12	18.56	1317	107.0	7.03	0.27	74.1	6.89

Refer to footnotes on page 2A-35.

Footnotes for Groundwater Protection Program Groundwater Surveillance Task Tables

CaCO3 = calcium carbonate.
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID = Idenitifier.
N = nitrate.
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine.
Tetryl = methyl-2,4,6-trinitrophenylnitramine.

[a]Result and/or Activity

- Values in bold exceed the established MCL and/or MAC.
- ND = not detected (at method detection limit).
- 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 Code of Federal Regulations [CFR] Parts 9, 141, and 142, Table 2A- 1-4).
- µg/L = micrograms per liter.
- mg/L = milligrams per liter.
- pCi/L = picocuries per liter.

[b]MDL or MDA

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.

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.

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

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.

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.

[d]MCL/MAC

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards (EPA May 2009).
- Maximum Allowable Concentration in groundwater for the contaminants specified in 20 NMAC 6.2, Sec 3103A, Human Health Standards, August 2012.
- NE = not established.
- The following are the MCLs for gross alpha particles and beta particles in community water systems: pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table 2A- 1-4). 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).
- 5 pCi/L = MCL for combined radium-226 and radium-228.
- 30 pCi/L = MAC for combined radium-226 and radium-228.

[e]Laboratory Qualifier

B = The analyte was detected in the blank above the effective method detection limit (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.
X = Data rejected due to peak not meeting identification criteria.

Footnotes for Groundwater Protection Program Groundwater Surveillance Task 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.
NJ+	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive 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.
R	=	The data are unusable, and resampling or reanalysis are necessary for verification.

[g] **Analytical Method**

- EPA, 1986 (and updates), *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed.
- EPA, 1984, *Methods for Chemical Analysis of Water and Wastes*, EPA 600-4-79-020.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, Cincinnati, Ohio.
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300.

[h] **Field Water Quality Measurements**

- Field measurements collected prior to sampling.

°C	= degrees Celsius.
% Sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 2B
Groundwater Protection Program
Plots

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Attachment 2B Plots

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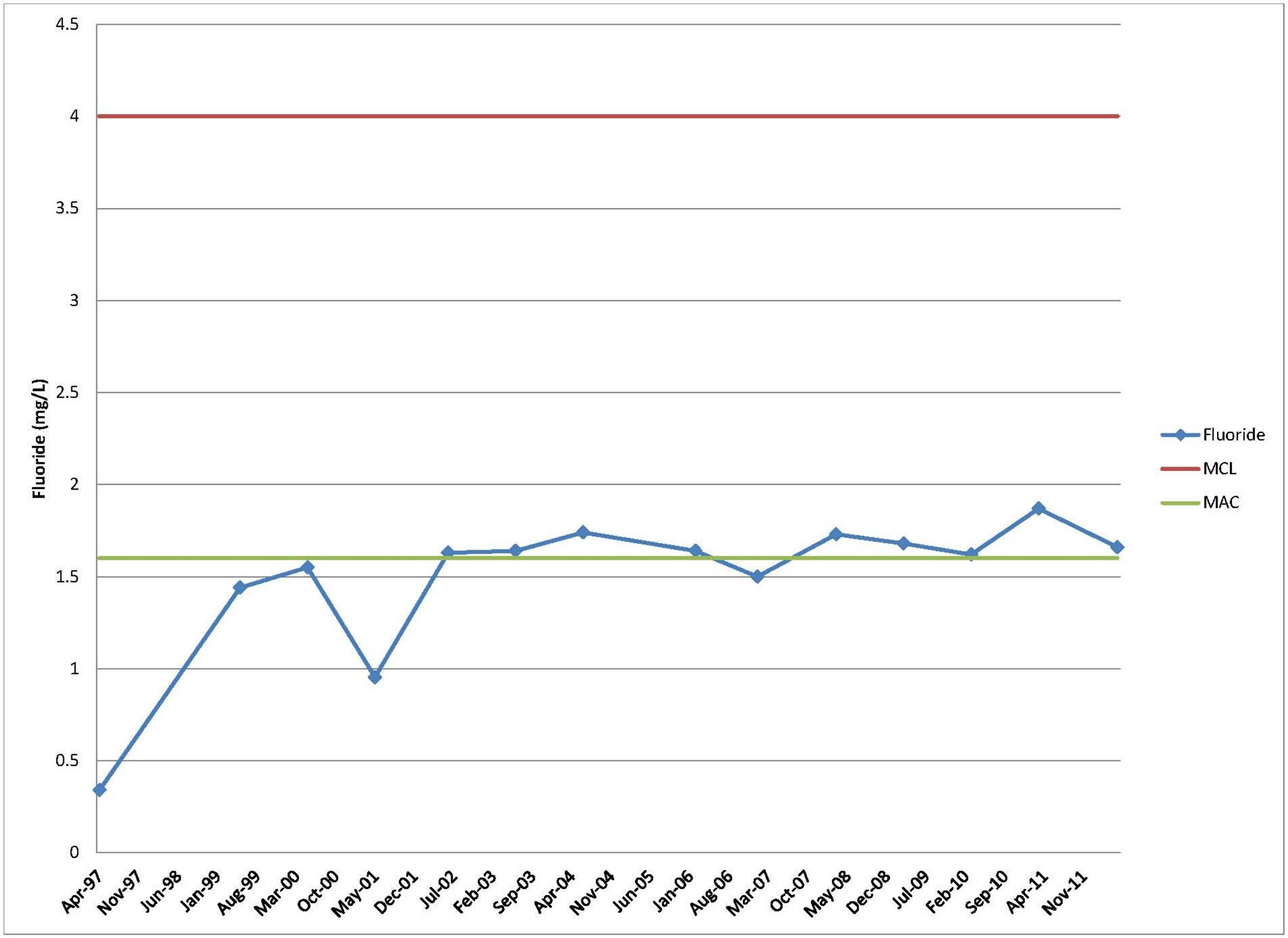

Figure 2B-1. Fluoride Concentrations, Coyote Spring

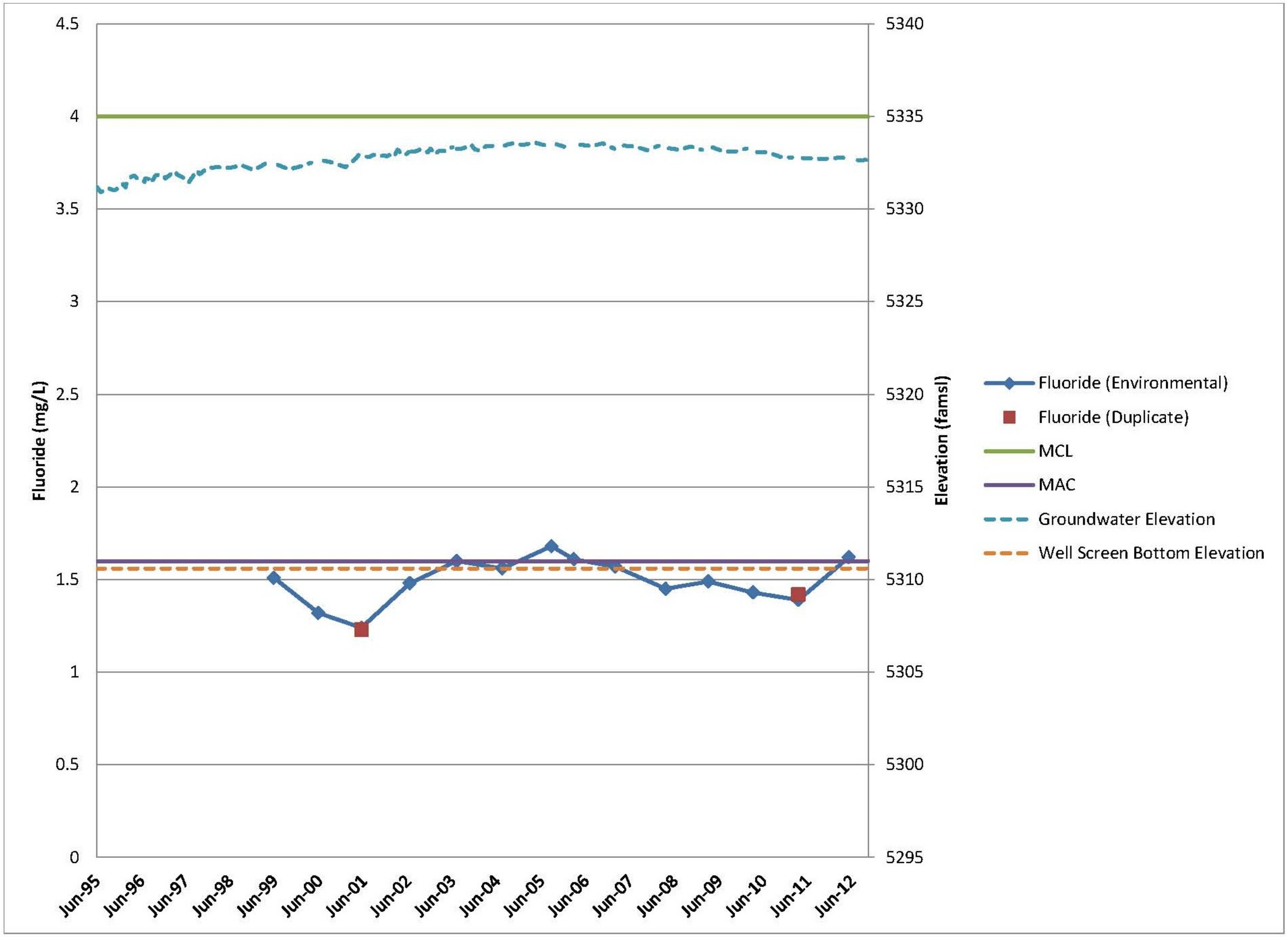

Figure 2B-2. Fluoride Concentrations, SFR-2S

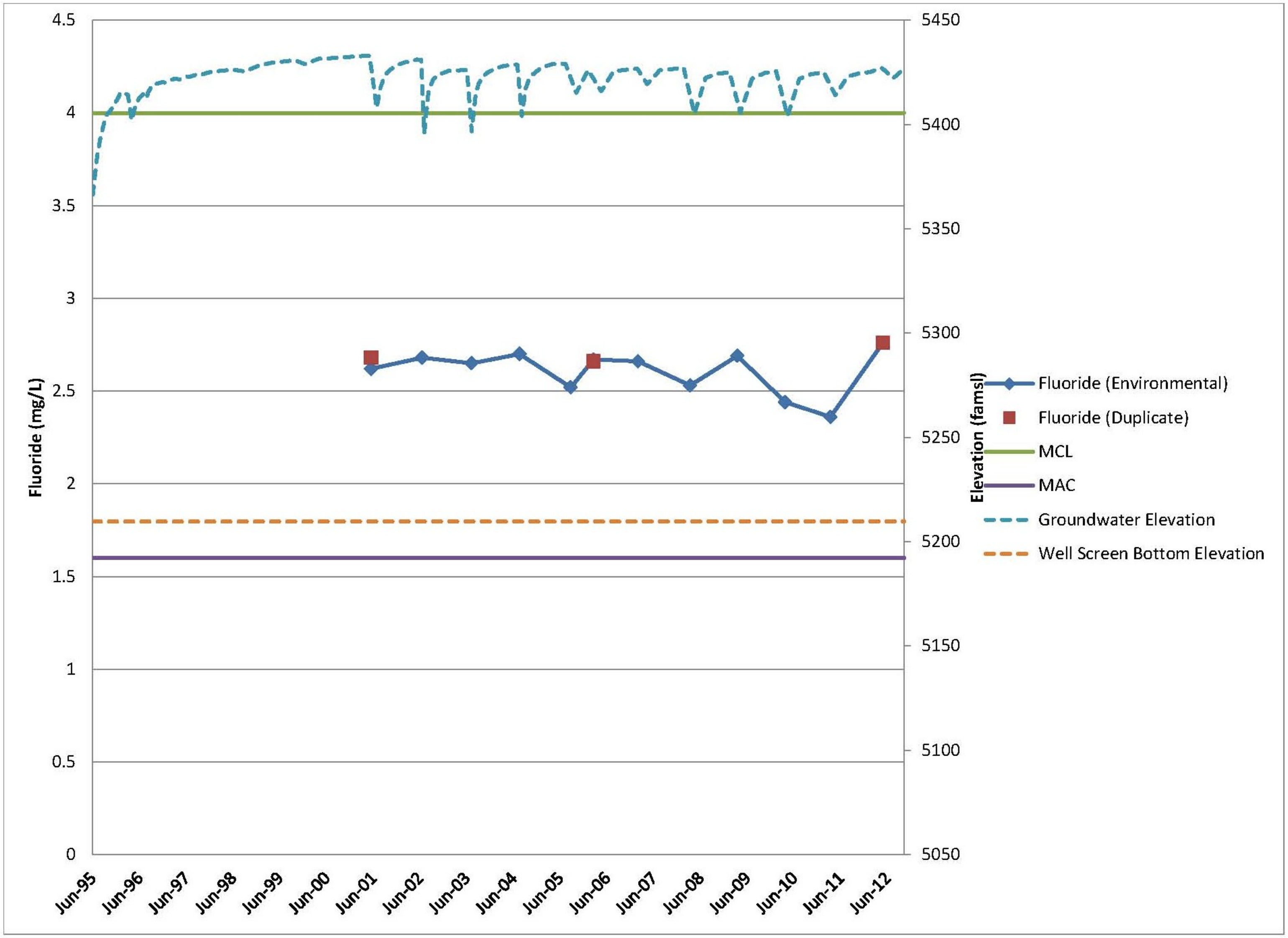

Figure 2B-3. Fluoride Concentrations, SFR-4T

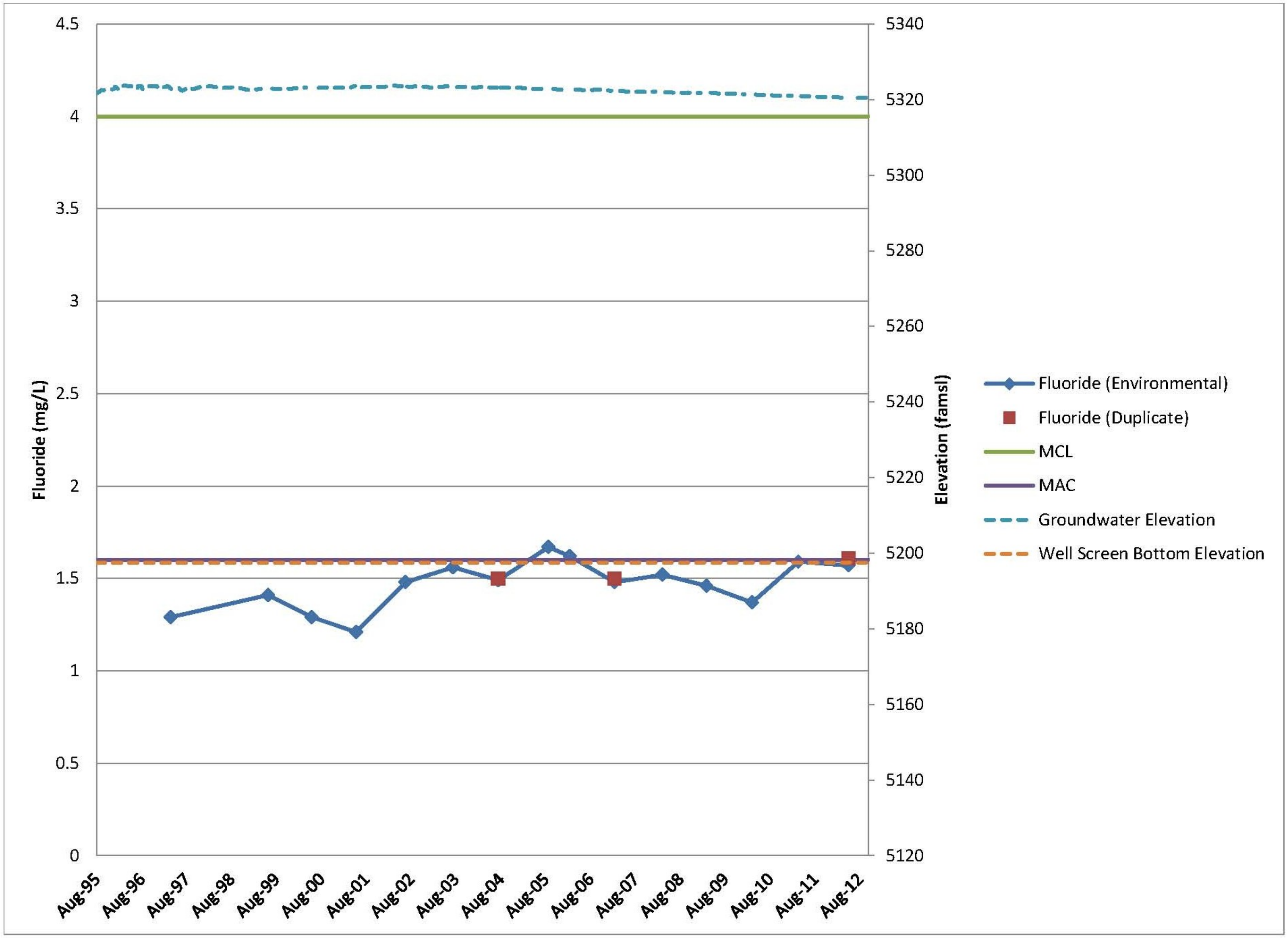

Figure 2B-4. Fluoride Concentrations, TRE-1

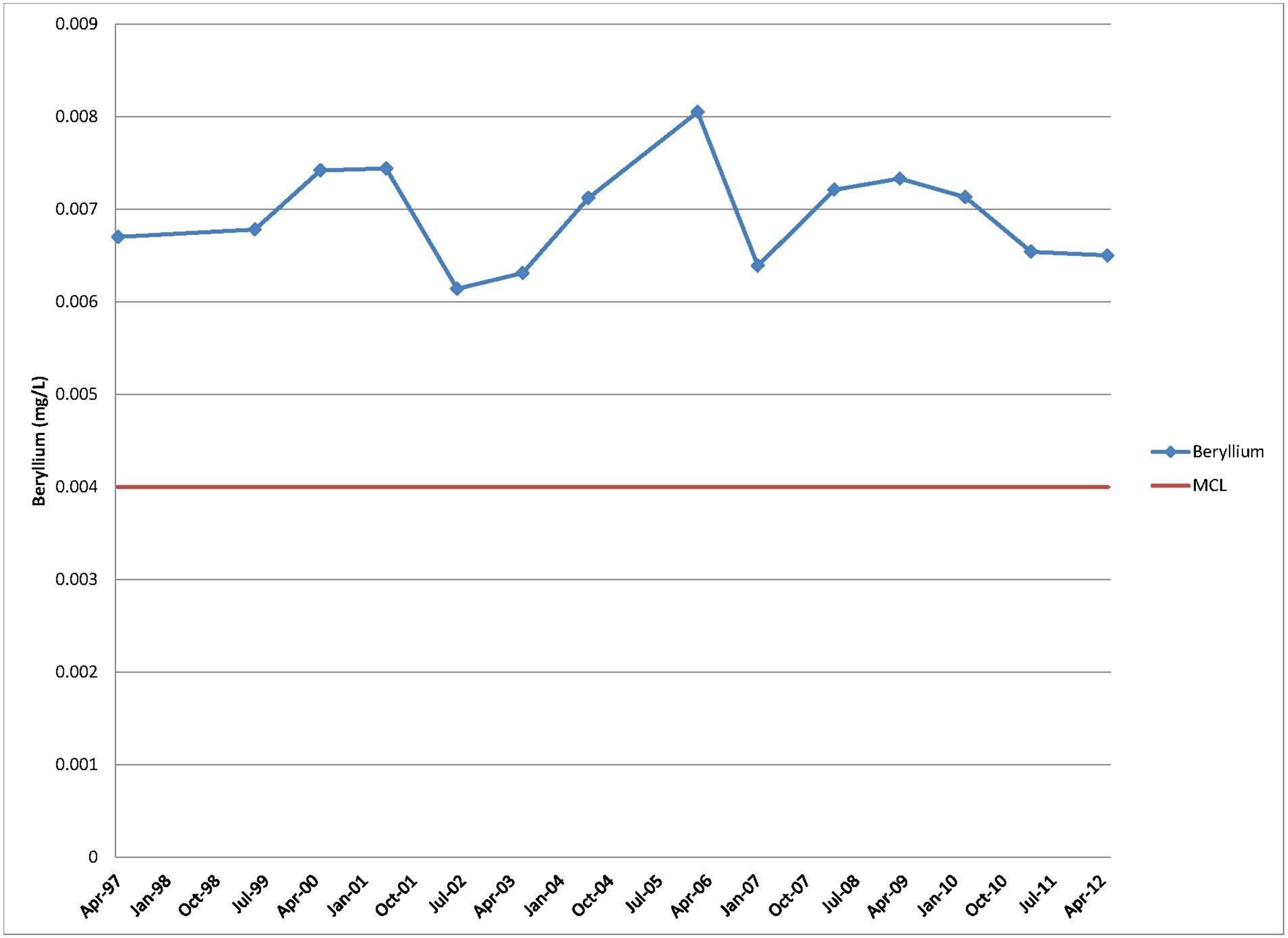

Figure 2B-5. Beryllium Concentrations, Coyote Spring

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Attachment 2C
Groundwater Protection Program
Charts and Hydrographs

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Attachment 2C Charts and Hydrographs

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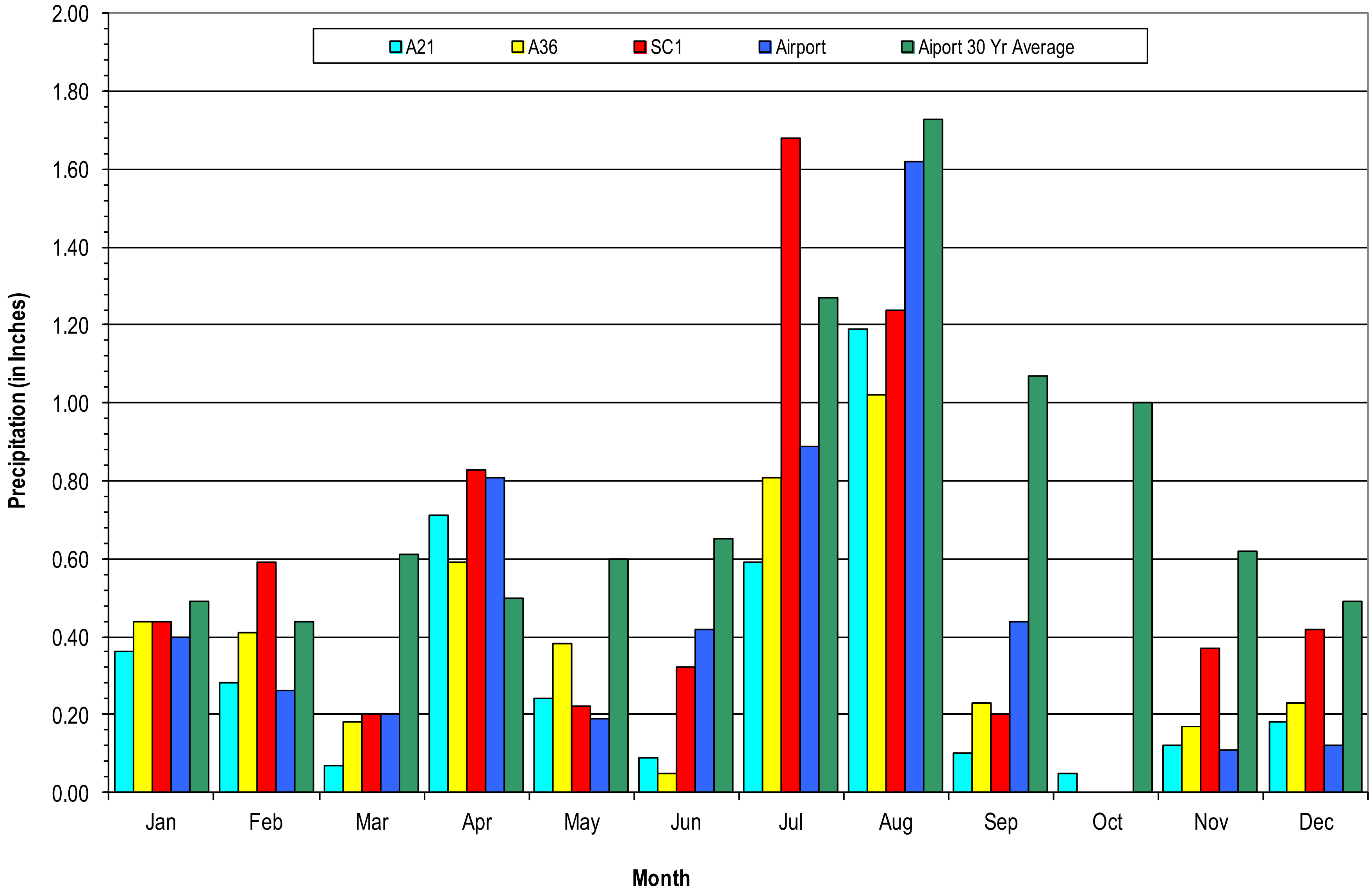

Figure 2C-1. Precipitation Data for SNL/NM, CY2012

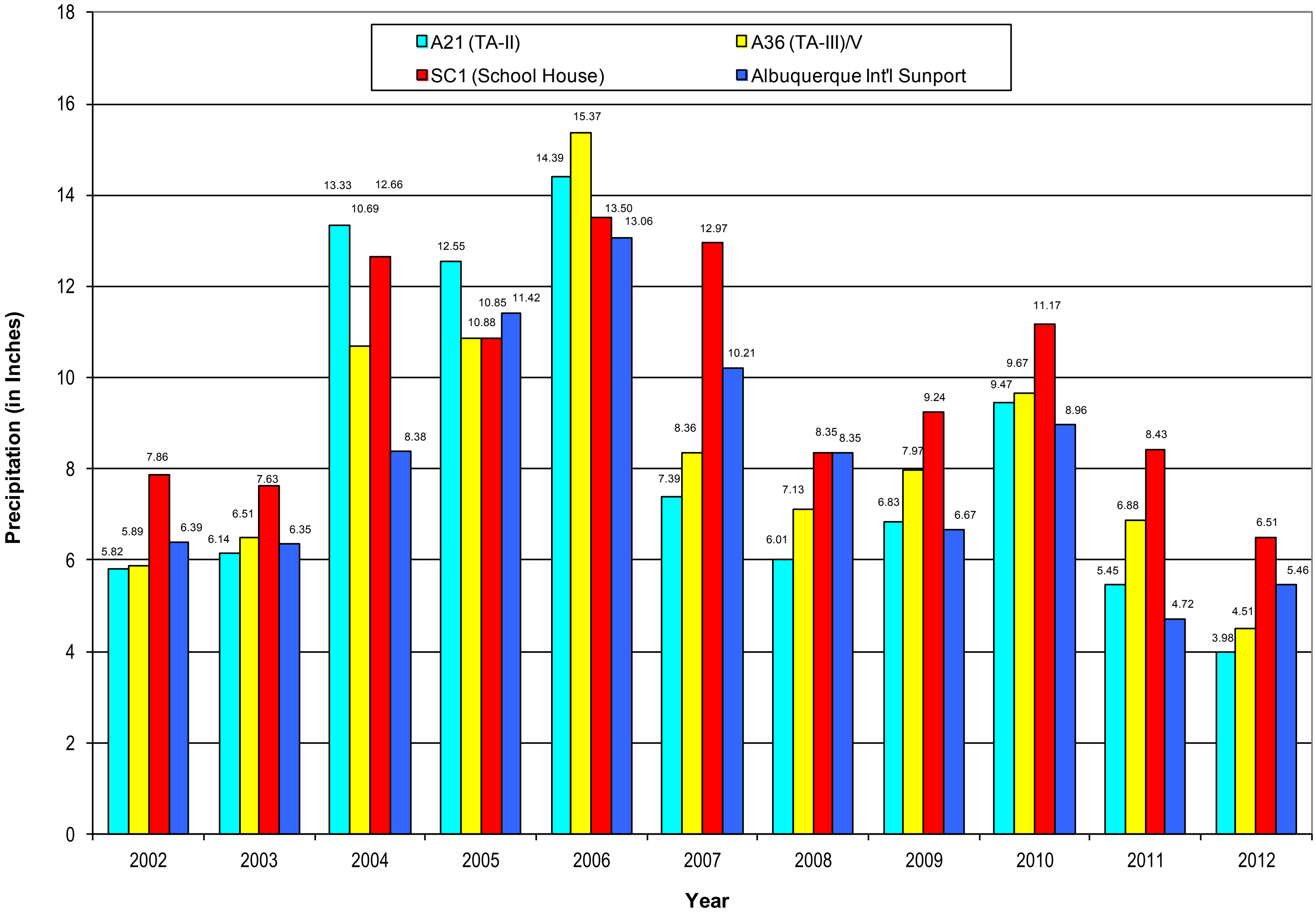

Figure 2C-2. Annual Precipitation Data for SNL/NM, January 2002 to December 2012

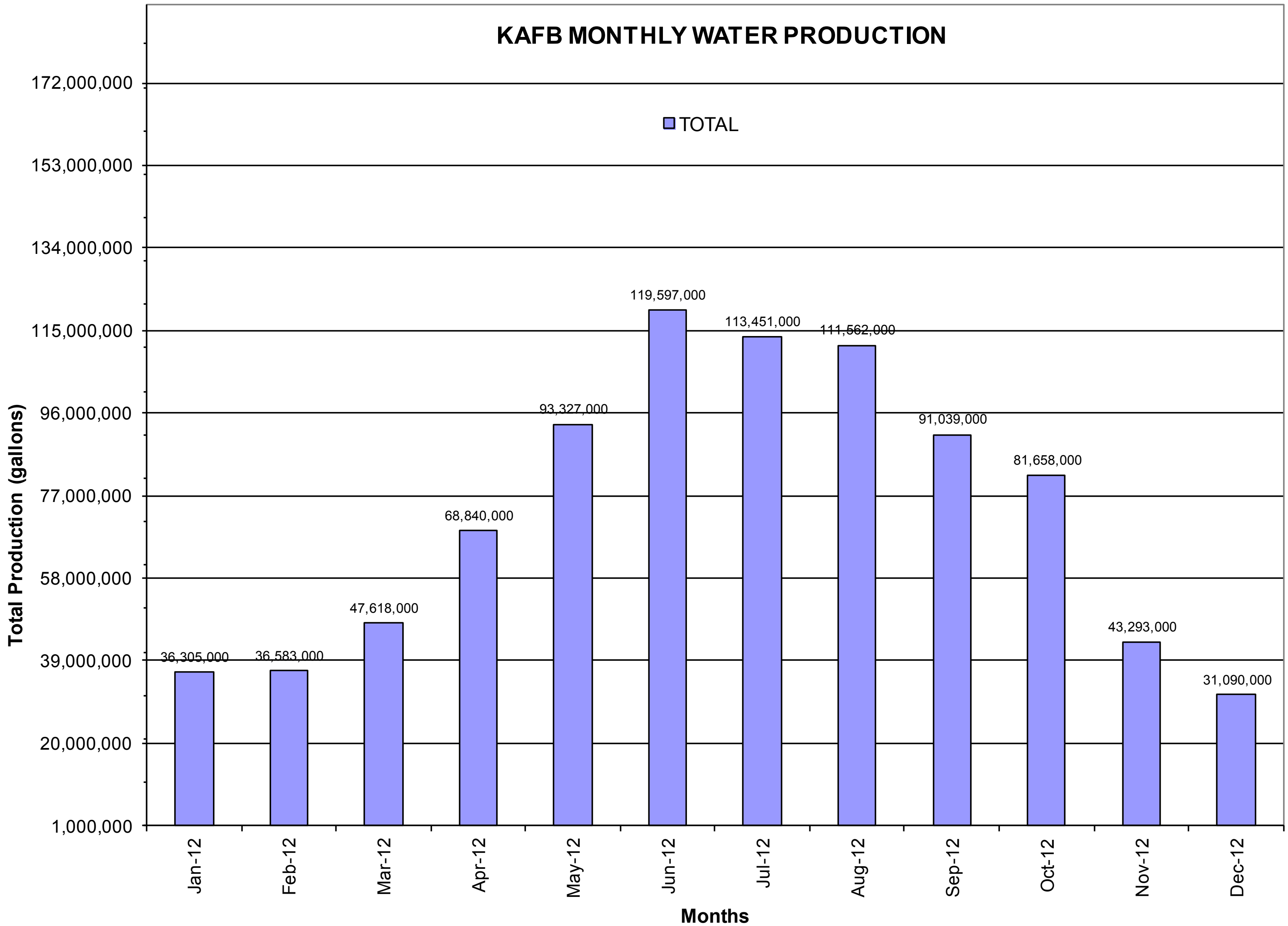

Figure 2C-3. Monthly Groundwater Pumped by KAFB Water Supply Wells, CY2012

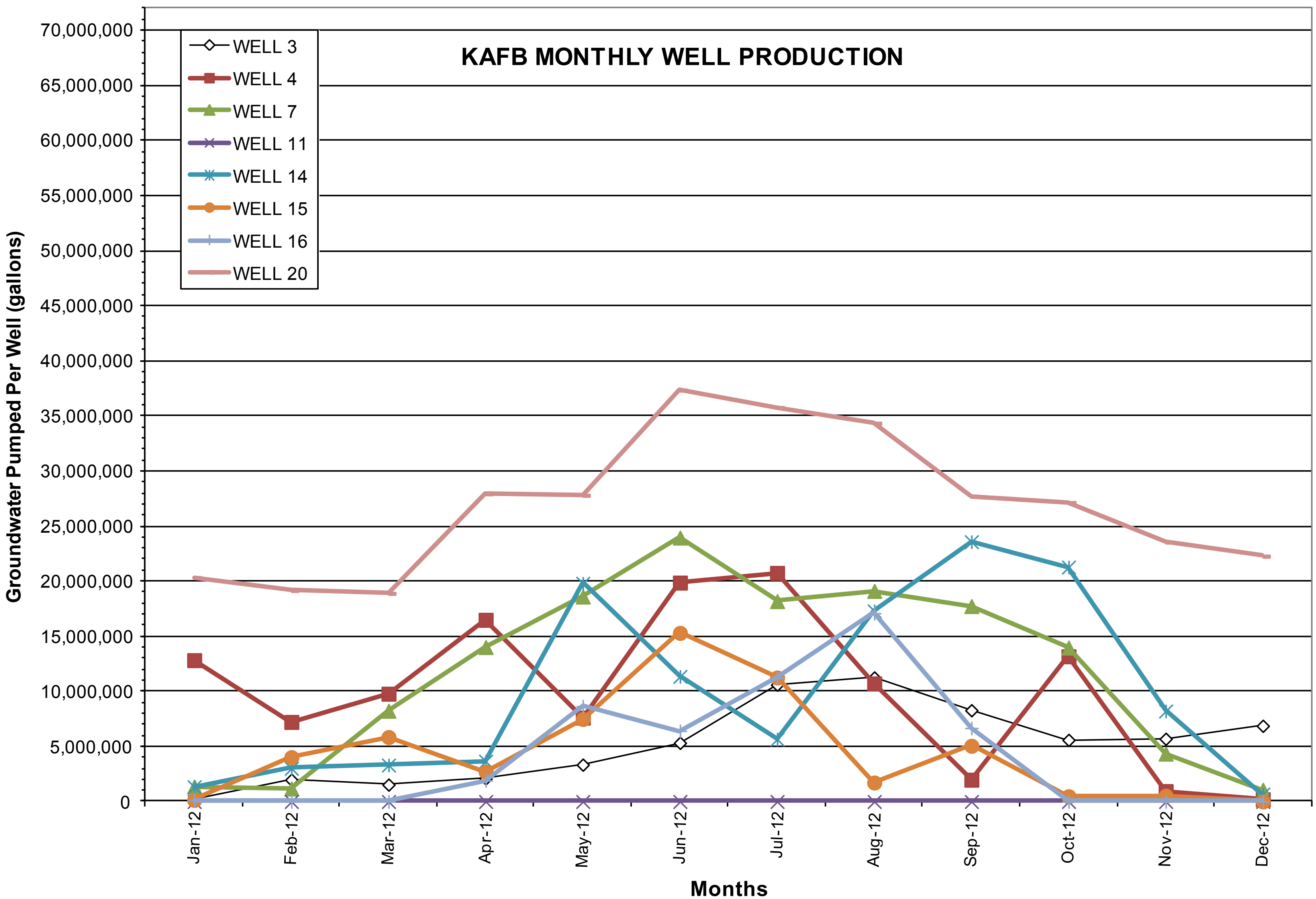

Figure 2C-4. Groundwater Pumped by KAFB Water Supply Wells, CY2012

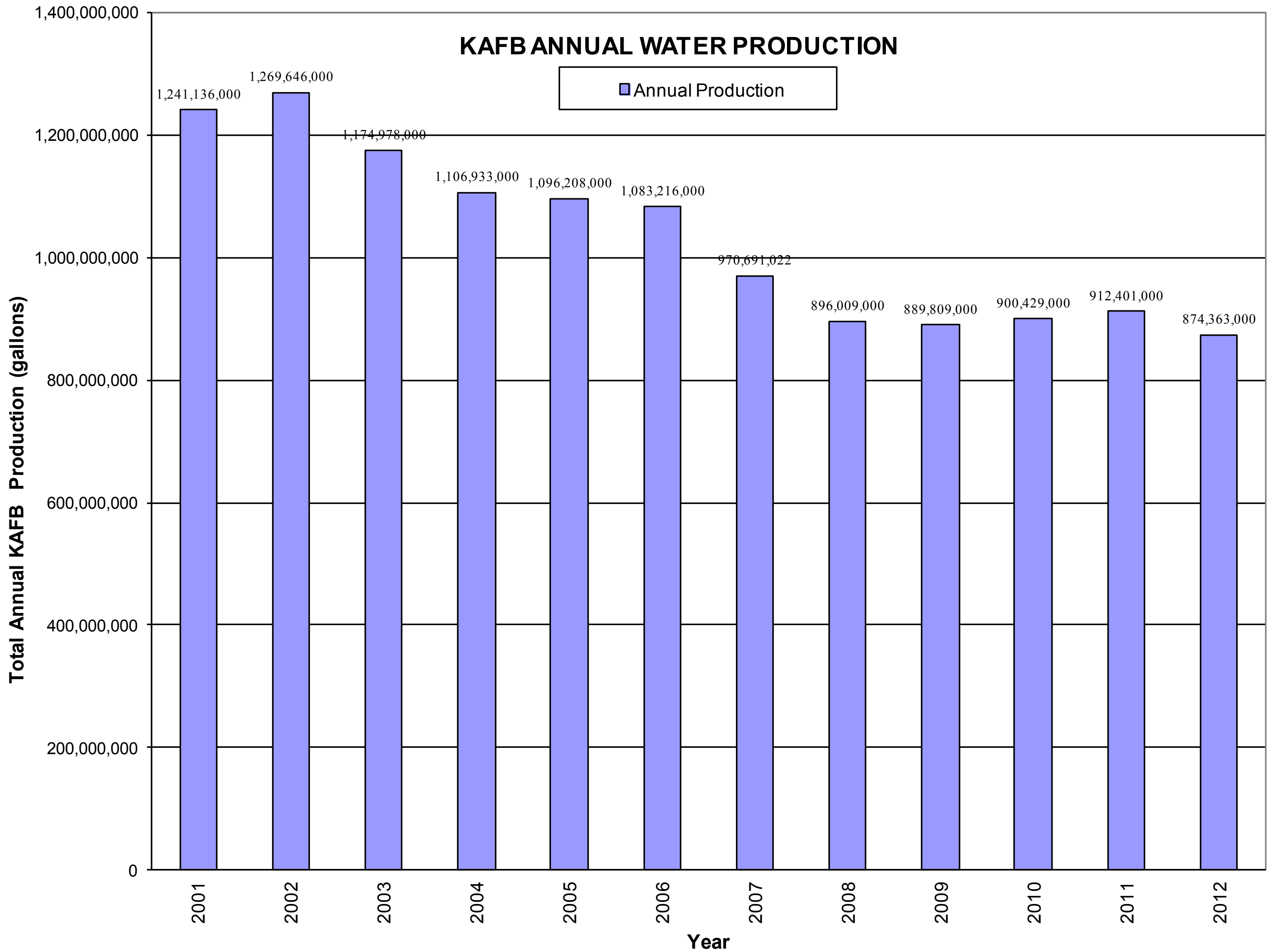

Figure 2C-5. Annual Groundwater Pumped by KAFB Water Supply Wells, 2001 to 2012

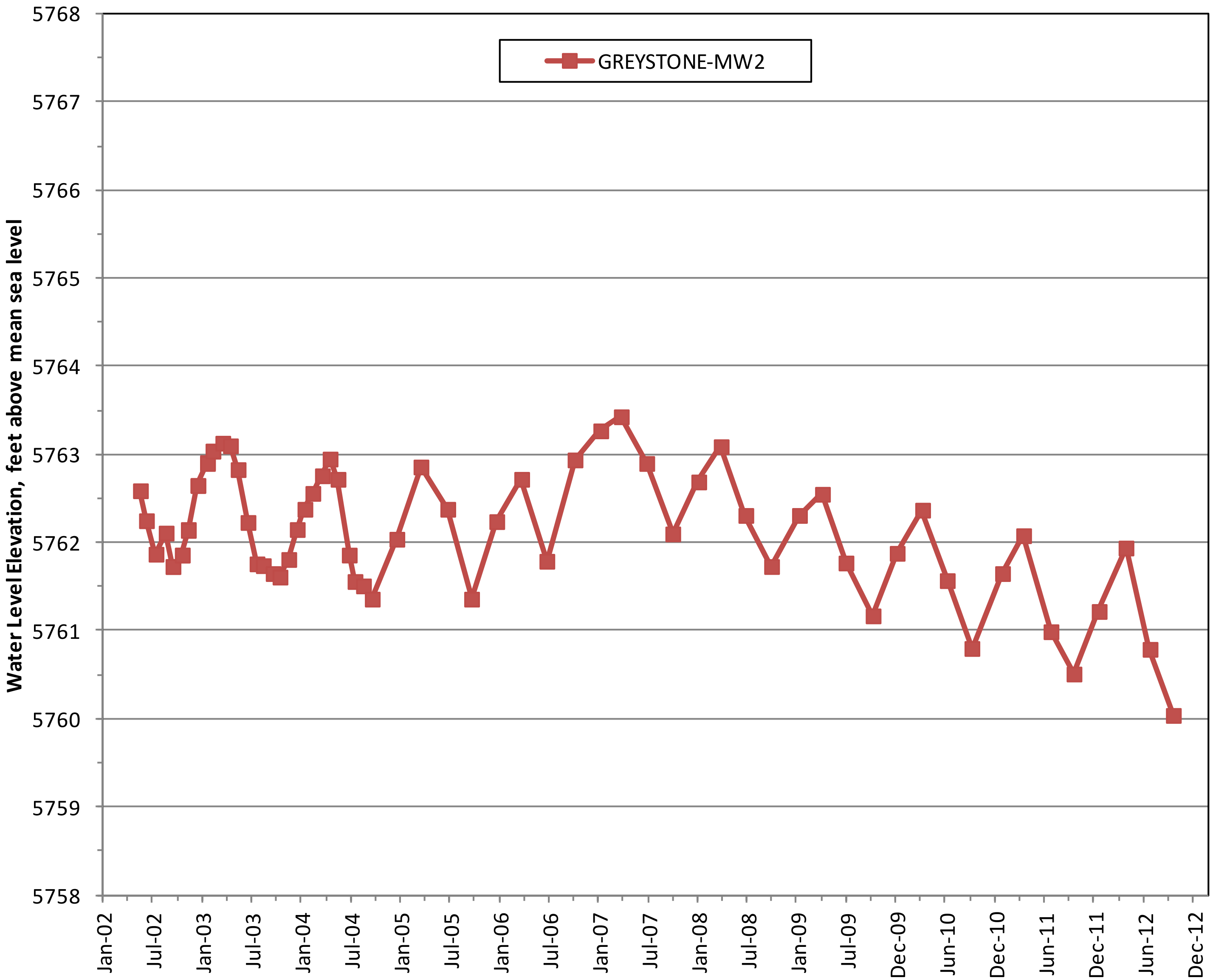

Figure 2C-6. GWPP Study Area Wells (1 of 6)

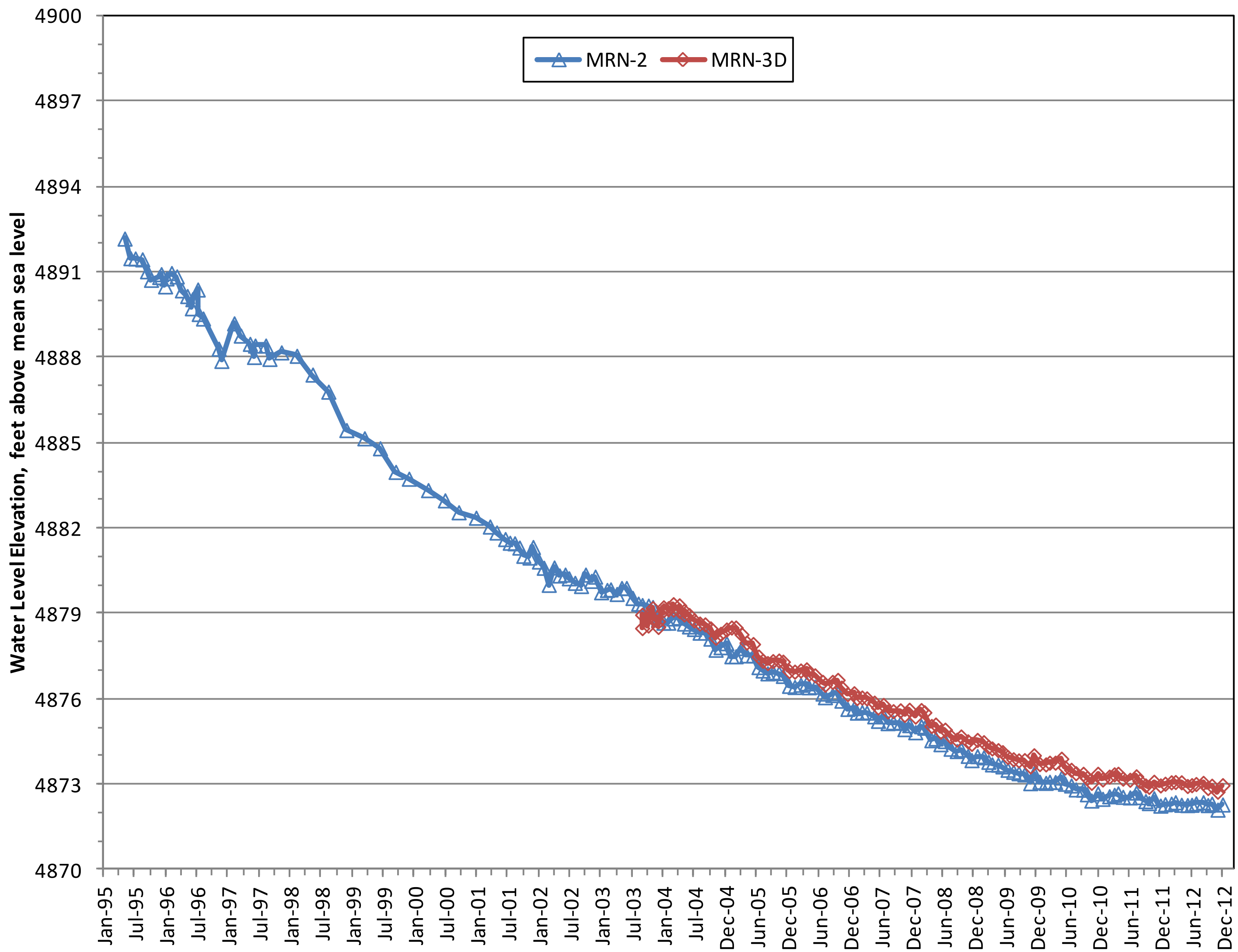

Figure 2C-7. GWPP Study Area Wells (2 of 6)

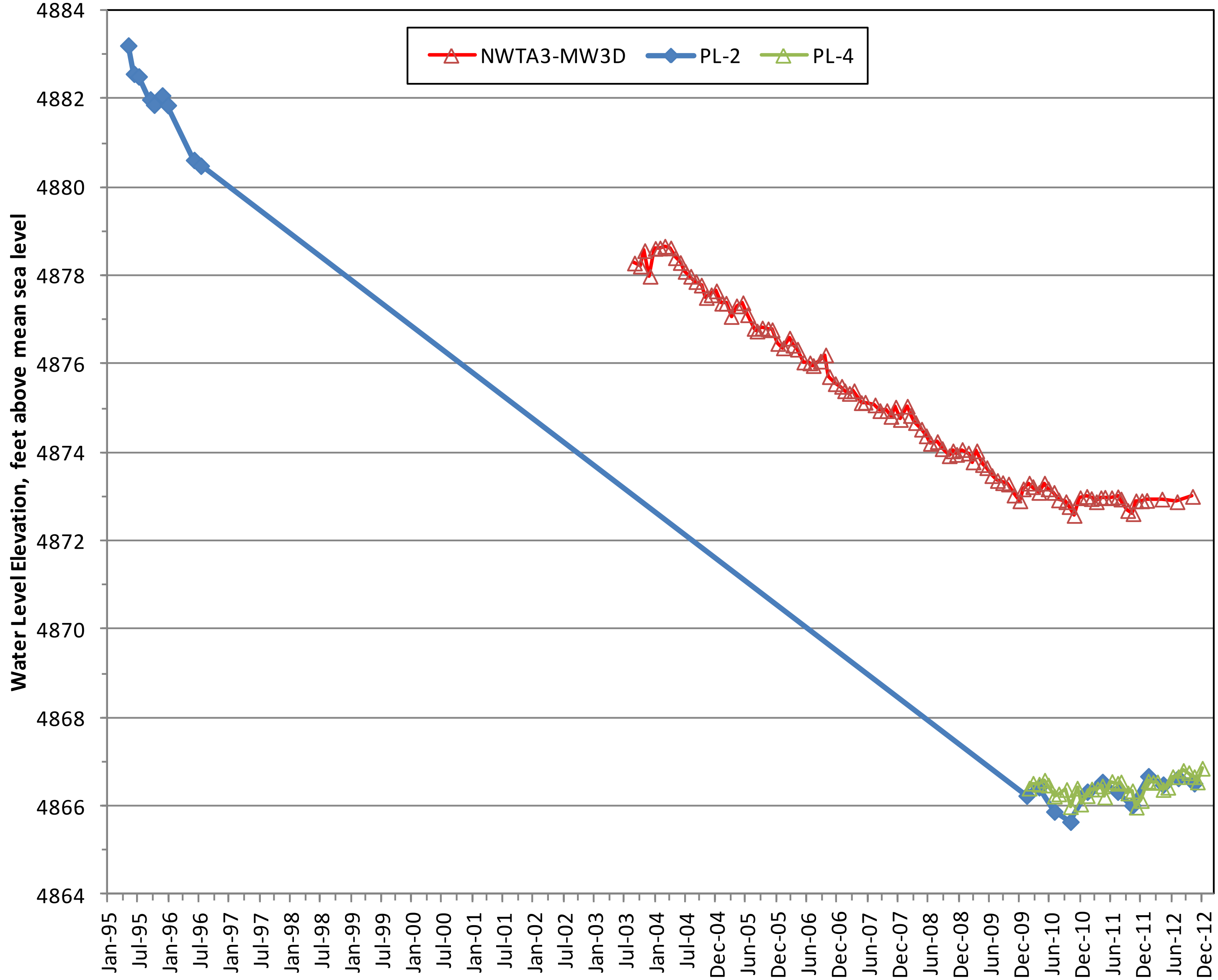

Figure 2C-8. GWPP Study Area Wells (3 of 6)

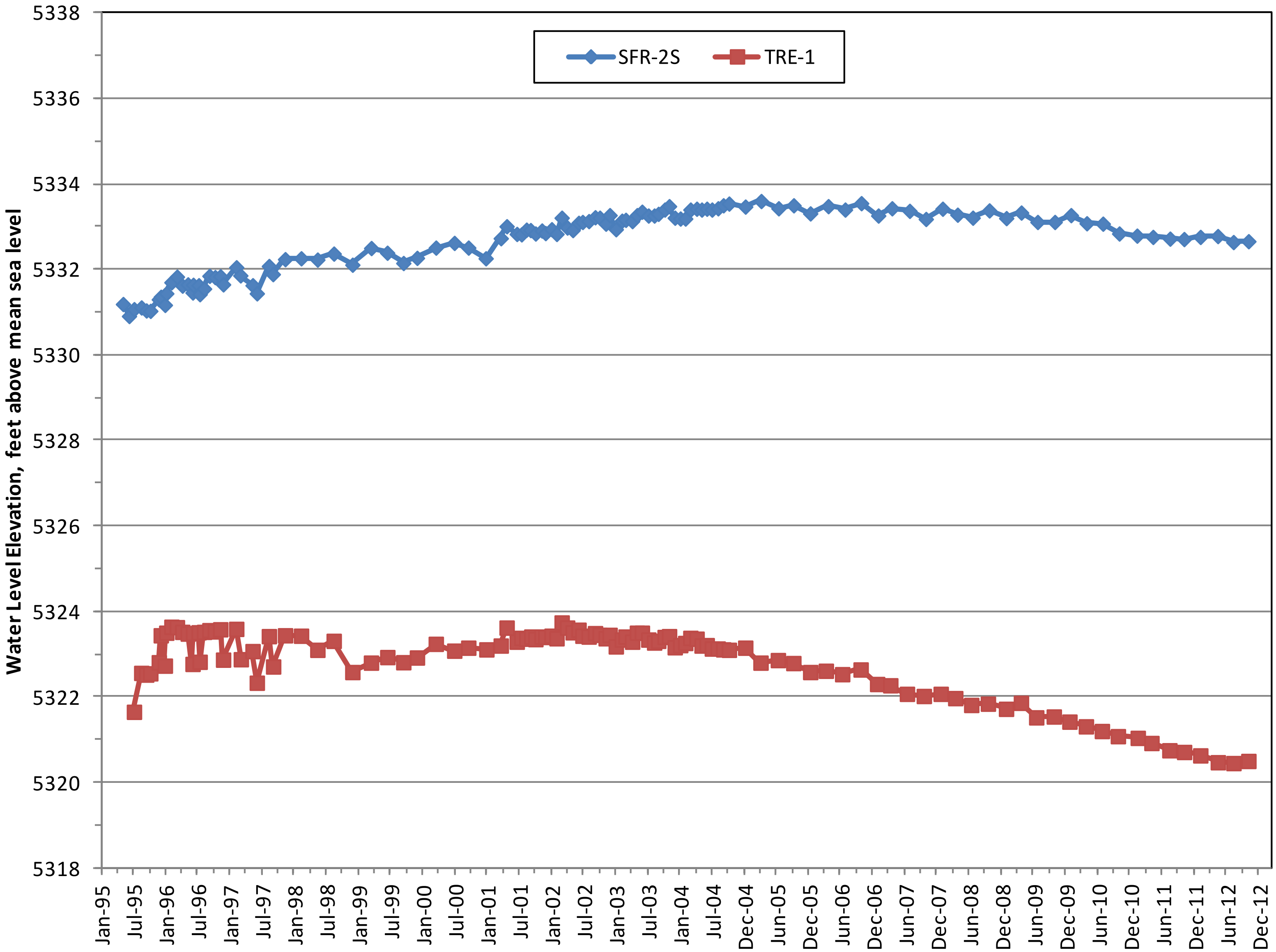

Figure 2C-9. GWPP Study Area Wells (4 of 6)

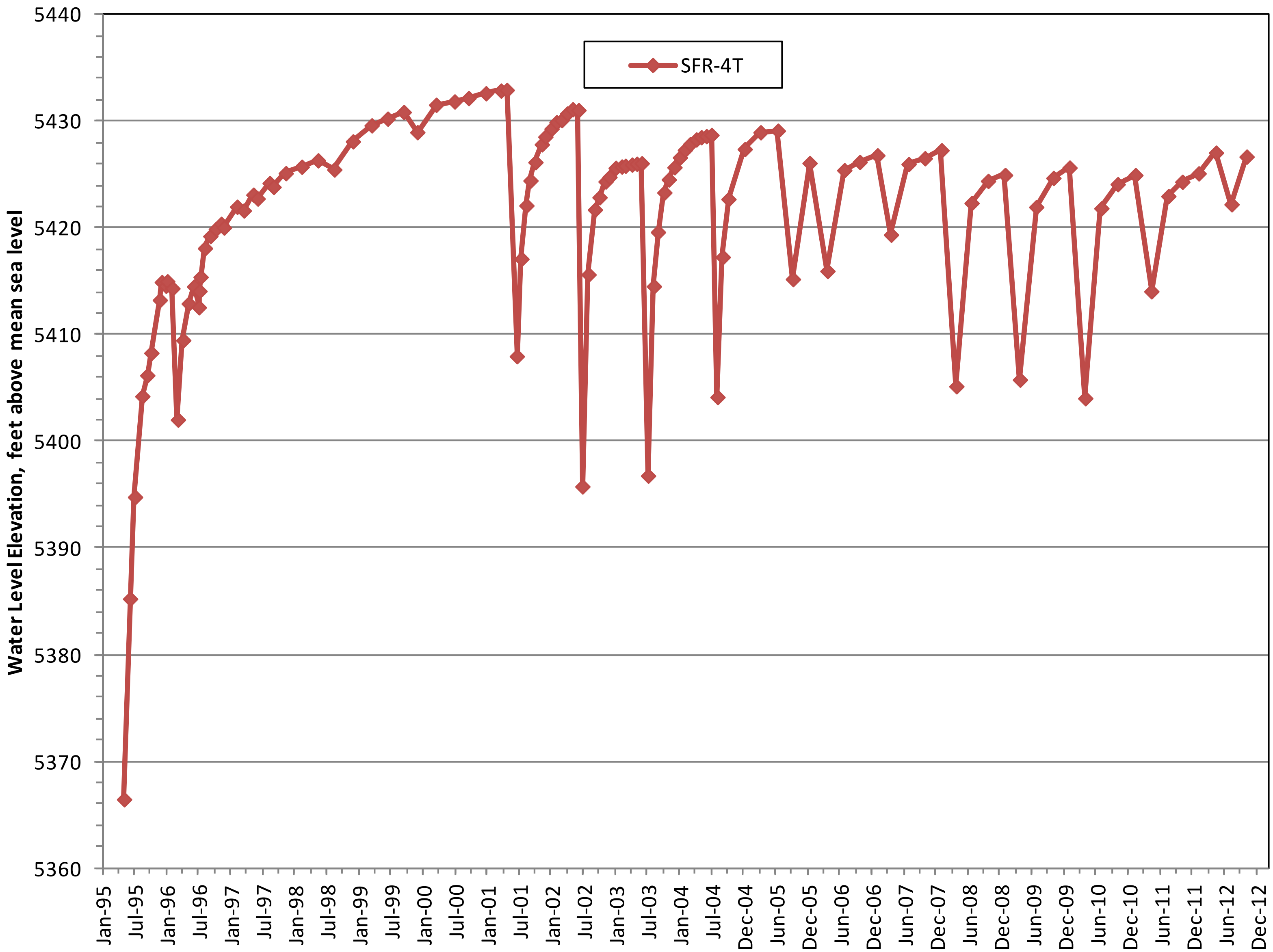

Figure 2C-10. GWPP Study Area Wells (5 of 6)

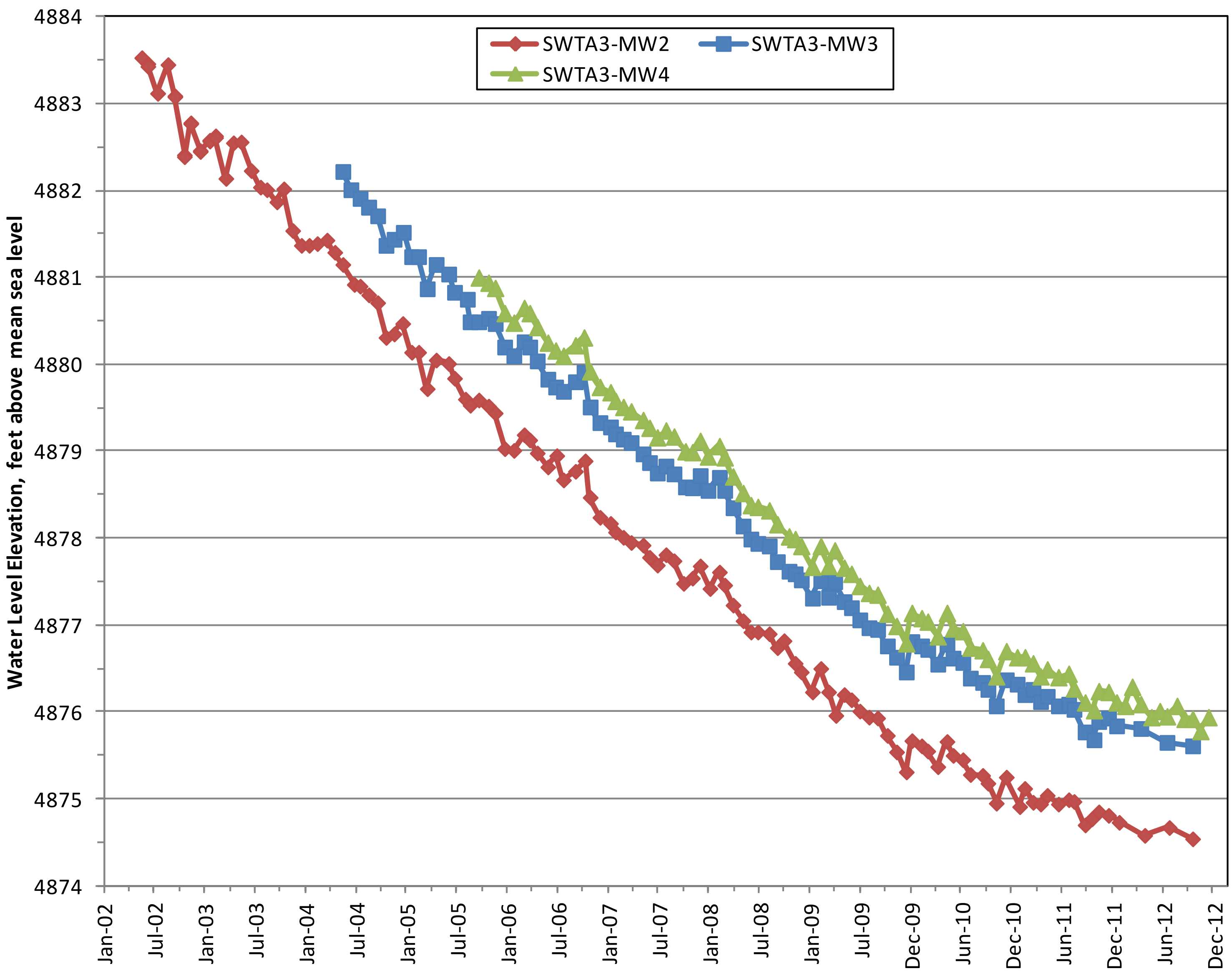

Figure 2C-11. GWPP Study Area Wells (6 of 6)

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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 Care Permit Application* (Final Closure Plan; SNL December 1992). The SNL/NM Environmental Restoration Project implemented two voluntary corrective measures (VCMs), the Vapor Extraction (VE) and Landfill Excavation (LE) VCMs. As part of the VE 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 LE VCM, the CWL was excavated from September 1998 through February 2002. More than 52,000 cubic yards of contaminated soil and debris were removed from this former disposal area (SNL April 2003).

In April 2004, the U.S. Department of Energy (DOE) and Sandia Corporation (Sandia) requested approval to install an at-grade vegetative soil cover as an interim measure (Wagner April 2004) while New Mexico Environment Department (NMED) comments on the April 2003 CWL Corrective Measure 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 (ET) cover began in March 2005 and was completed in September 2005.

On May 21, 2007, the NMED issued the CWL CMS Report (SNL December 2004), Draft Post-Closure Care Permit (PCCP) (NMED May 2007), and a Closure Plan amendment for a 60-day public comment period that was completed on August 20, 2007. The DOE and Sandia submitted comments to the NMED (Wagner July 2007) and requested a public hearing. Several citizens also provided comments and requested a public hearing. Informal negotiations were initiated by the NMED in August 2008 with all parties requesting a public hearing. On October 15, 2009, the NMED Secretary signed the *Final Order In the Matter of Application for a Post-Closure Care Hazardous Waste Permit for the Chemical Waste Landfill, Sandia National Laboratories, EPA ID No. NM5890110518* (Final Order), issuing the CWL PCCP (NMED October 2009a). On October 16, 2009, the NMED issued the *Notice of Approval, Final Remedy and Closure Plan Amendment, Chemical Waste Landfill, Sandia National Laboratories, EPA ID No. NM5890115018, NMED-HWB-05-016* (NMED October 2009b). The NMED-approved CWL Closure Plan amendment addressed changes to both Chapter 12 (closure process) and Appendix G (Groundwater Sampling and Analysis Plan). Appendix G changes were established during the 2008 through 2009 informal negotiations and included the replacement of four groundwater monitoring wells and a reduction in the number of wells required for semiannual sampling.

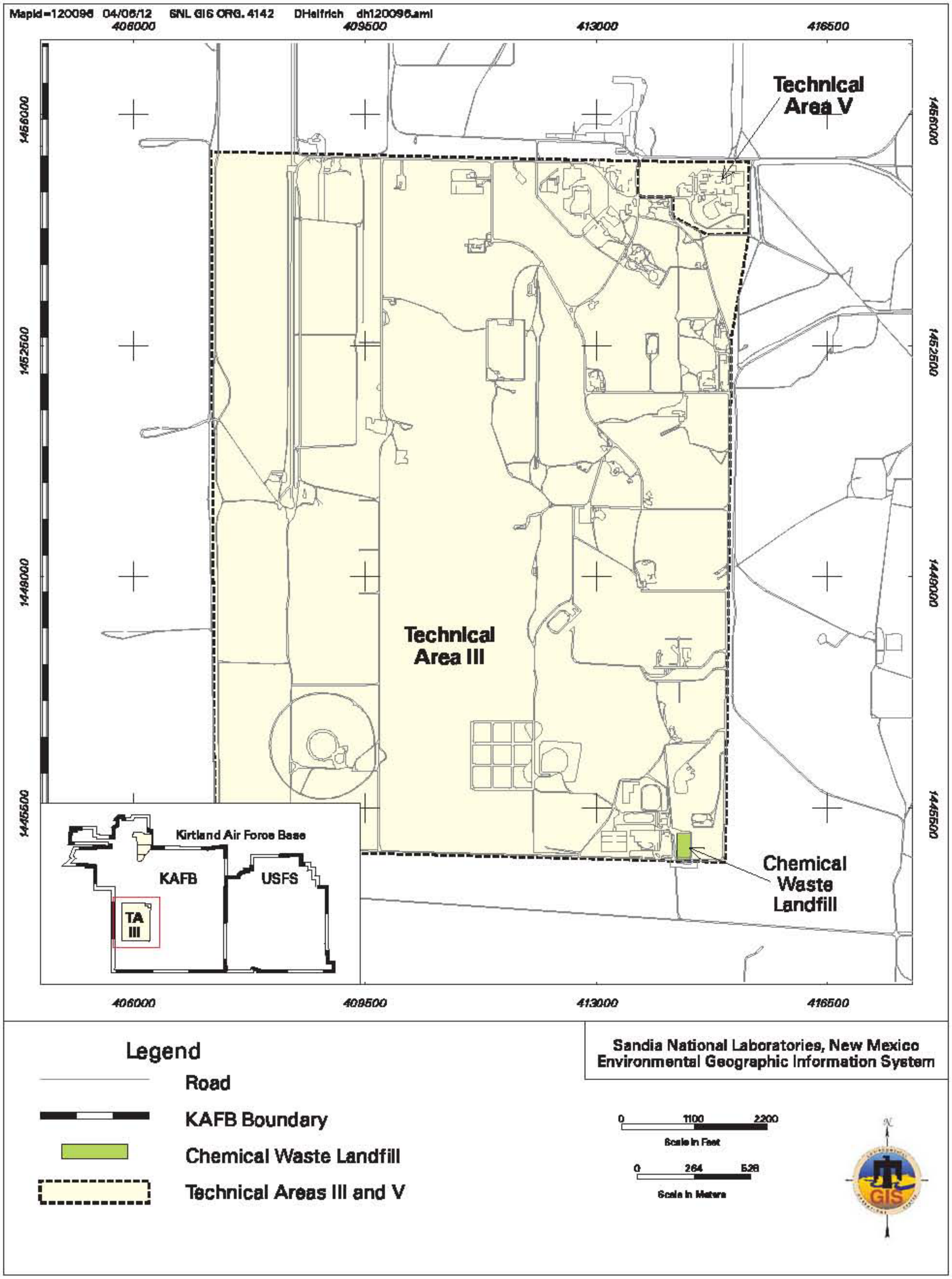

Figure 3-1. Location of the Chemical Waste Landfill within Technical Area III

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. As documented in the Closure Plan Amendment (NMED October 2009b), after the new monitoring wells were installed they became the exclusive groundwater monitoring network for the CWL. 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). The Well Installation and Decommissioning Report was submitted 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 at the CWL after June 2011 are performed by the LTS 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. As required by the PCCP, the CWL Annual Post-Closure Care Report for Calendar Year (CY) 2011 was submitted to the NMED in March 2012 (SNL March 2012). The CWL Annual Post-Closure Care Report for CY 2012 will be submitted to NMED in March 2013.

3.1.1 Monitoring History

In 1985, groundwater monitoring began 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. In 1988, four additional monitoring wells were installed. In 1990, an additional downgradient well was installed. In 1994, seven more monitoring wells were installed. In response to a Notice of Violation from the NMED with regard to the inadequate design and construction of the 1985 wells, four of these wells were plugged and abandoned in 1997. To complete the ongoing chromium assessment, the NMED requested the installation of two additional deep monitoring wells to be monitored for eight quarters. These two wells (CWL-MW7 and CWL-MW8) were installed in March and April 2003 with NMED direction regarding location, construction, and well screen placement in the regional aquifer. The results for the eight sampling events and completion of the chromium investigation were documented in the August 2005 *Chemical Waste Landfill Quarterly Closure Progress Report* (SNL August 2005). Monitoring well CWL-MW2A was plugged and abandoned in June 2004 due to well integrity issues (SNL July 2004). As discussed in the previous section, from April through August 2010 new monitoring wells CWL-MW9, CWL-MW10, CWL-MW11, and CWL-BW5 were installed, and monitoring wells CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, CWL-MW6U, and CWL-BW4A were decommissioned based on modification to the Closure Plan. Two of the decommissioned wells, CWL-MW5U/L and CWL-MW6U/L, were nested well pairs consisting of two wells installed in the same borehole.

Until 1990, all groundwater sampling at the CWL was conducted on a quarterly basis in accordance with 40 CFR 265.92(c)(1). In 1990, the NMED granted a reduction in the sampling frequency from quarterly to semiannually for groundwater contamination indicator parameters and annually for groundwater quality parameters, as allowed by 40 CFR 265.92(d)(2), as no contaminants had been detected above U.S. Environmental Protection Agency (EPA) drinking water standards in samples from any well. During the following sampling quarter in March 1990, TCE was detected above the drinking water standard of 5 µg/L in the sample from monitoring well CWL-MW2A. Additionally, two indicator parameters (specific conductance [SC] and potential of hydrogen [pH]) also exceeded state guidelines. Two months later, resampling for VOCs confirmed the presence of TCE. The NMED reinstated the quarterly sampling requirement and, thereafter, all indicator parameters were sampled in accordance with 40 CFR 265.93(c)(2).

In 1995, Appendix G of the Final Closure Plan (SNL December 1992) was revised and updated as part of a Closure Plan Amendment Request submitted to the NMED on June 30, 1995. In May 2000, the NMED approved the following changes to Appendix G of the CWL Closure Plan (Bearzi May 2000):

- Biennial frequency (every other year) for agreed upon Appendix IX constituents including VOCs, semivolatile organic compounds, chlorinated herbicides, polychlorinated biphenyls, total cyanide, sulfides, dissolved chromium, and total metals plus iron.

- Semiannual frequency (twice a year) for Appendix IX VOCs and metals.

As part of its review of the CMS Report, the NMED presented general groundwater characterization requirements in December 2003 (Kieling December 2003). In March 2004, these requirements were further discussed, and it was agreed that seven sampling events using the conventional sampling method for all CWL monitoring wells with a diameter large enough to accommodate the conventional method equipment would be sufficient for the revised CMS Report. The original NMED comments and the negotiated agreements regarding the required number of events are documented in the revised CWL CMS Report (SNL December 2004).

3.1.2 Monitoring Network

After the installation and development of monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11 in 2010, they became the CWL compliance groundwater monitoring network. These four wells are shown on Figure 3-2 and listed in Table 3-1.

3.1.3 Summary of Activities

The CY 2012 semiannual groundwater monitoring activities for the CWL were performed during January and July 2012 in accordance with the CWL PCCP (NMED October 2009a) and involved the collection of groundwater samples from the four compliance wells. 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 2012.

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 2012* that will be submitted to the NMED in March 2013.

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).

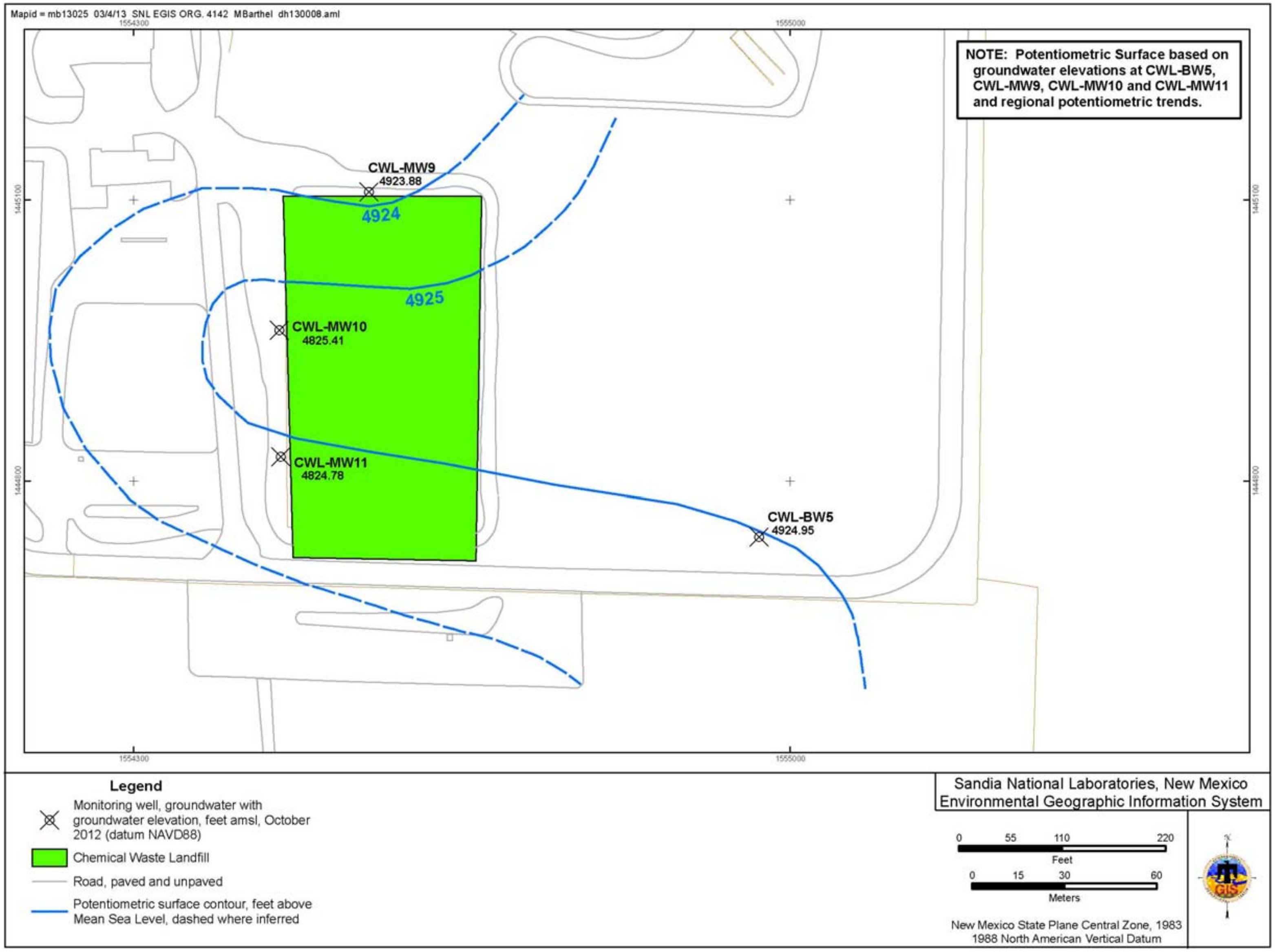

Figure 3-2. Chemical Waste Landfill Monitoring Well Locations and Potentiometric Surface Map, October 2012

Table 3-1. CWL Post-Closure Care Permit Monitoring Well Network and Calendar Year 2012 Compliance Activities

Well ID	WQ	WL	Comment
PCCP Monitoring Well Network, July–August 2011 Sampling Event			
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 the WQ sampling and WL measurements that were conducted from January to December 2012.

BW = Background Well.
CWL = Chemical Waste Landfill.
ID = Identification.
MW = Monitoring Well.
PCCP = Post-Closure Care Permit.
WL = Water level.
WQ = Water quality.

In accordance with the CWL PCCP (NMED October 2009a), groundwater monitoring is required on a semi-annual basis. One of the two semi-annual events must include analyses for the enhanced list of constituents comprised of 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene, 1,1-dichloroethene, chloroform, and trichlorofluoromethane in addition to TCE, chromium, and nickel. The other semi-annual event must include TCE, chromium, and nickel.

3.1.5 Conceptual Site Model

As documented in the NMED-approved CWL PCCP (NMED October 2009a), the constituents of concern in groundwater are TCE, chromium, and nickel. For understanding the hydrogeologic regime at the CWL, 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 feet (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 2011 and October 2012 at the CWL wells ranged from 0.33 ft (CWL-MW11) to 0.72 ft (CWL-MW10) (Figure 3B-1). 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 ET cover that was installed in 2005. Groundwater recharge of the regional aquifer primarily occurs by the infiltration of precipitation in the Manzanita Mountains located approximately 5 miles to the east.

The CWL potentiometric surface map for October 2012 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 localized deflection in the potentiometric surface immediately beneath the CWL (Figure 3-2) probably reflects site-specific geologic controls (i.e., vertical and lateral changes in hydraulic conductivity associated with the anisotropic alluvial-fan sediments).

Based on the potentiometric surface map, the horizontal gradient at the CWL ranged from approximately 0.006 to 0.011 feet per foot in October 2012. Using this gradient range and representative hydraulic conductivity and porosity data cited in the *CWL Groundwater Assessment Report* (SNL October 1995), an estimate of groundwater velocity was calculated. The groundwater velocity at the CWL is estimated to range from approximately 5.8×10^{-4} to 1.1×10^{-3} ft per day (2.0×10^{-7} to 3.0×10^{-7} centimeters per second). This is equivalent to approximately 0.22 to 0.31 ft/yr. This considerably low range of groundwater velocity is consistent with previous CWL estimates for horizontal groundwater flow. 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 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 2012 is summarized in Section 3.1.3. Table 3-2 lists the parameters and CWL monitoring wells sampled.

Table 3-2. Analytical Parameters for the CWL Monitoring Wells, Calendar Year 2012

Parameters	CY 2012 Semiannual Event	CWL Monitoring Wells
TCE, Chromium, and Nickel	January	CWL-BW5, CWL-MW5 dup, CWL-MW9, CWL-MW10, and CWL-MW11
TCE; Chromium; Nickel; 1,1,2-Trichloro-1,2,2-trifluoroethane; Tetrachloroethene; 1,1-Dichloroethene; Chloroform; and Trichlorofluoromethane	July	CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW10 dup, CWL-MW11, and CWL-MW11 dup

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

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 2009). The analytical results are summarized in Attachment 3A, Tables 3A-1 and 3A-2.

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 are presented in Table 3A-3 (Attachment 3A) and groundwater elevation measurements at the CWL monitoring wells from CY 2010 through CY 2012 are presented in Attachment 3B, Figure 3B-1.

The minimum purging volume requirement was satisfied at three of the four monitoring wells. 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. The modified Bennett™ groundwater sampling system was operated to achieve the lowest possible flow rate. The flow rate was continually adjusted throughout each purge event. The average flow rate during the purging of monitoring well CWL-MW10 was estimated at 0.13 gallons per minute (gpm) (equivalent of 0.49 liters per minute), and the estimated flow rate during the final stages of the purging process achieved flow rates as low as 0.06 gpm (equivalent to 0.23 liters per minute).

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 (PQL) 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, PQLs, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Customer Funded Records Center (CFRC). 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.

All the CY 2012 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.

3.6.1 VOCs

The analytical results for TCE (January and July) and the enhanced list of VOCs (January only) are summarized in Attachment 3A, Table 3A-1. TCE was the only VOC detected above the laboratory MDL;

it was detected in all samples from monitoring well CWL-MW10. TCE was detected in the environmental samples at concentrations of 4.68 and 3.62 μg/L. TCE was also detected at a concentration of 3.62 μg/L in the July duplicate sample from monitoring well CWL-MW10. All 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 only detected above the laboratory MDL of 0.002 milligrams per liter (mg/L) in the July environmental and duplicate samples from monitoring well CWL-MW11 at estimated concentrations of 0.00246 and 0.00258 mg/L, respectively. Nickel was detected in each sample at concentrations ranging from 0.00177 mg/L in monitoring well CWL-BW5 environmental sample to 0.00435 mg/L in the monitoring well CWL-MW9 environmental sample. Chromium was not detected above the MCL of 0.10 mg/L; 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, SC, 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 May 2011). 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 two duplicate samples were collected in July from monitoring wells CWL-MW10 and CWL-MW11, and the results were compared to the results for the corresponding environmental sample. Relative percent difference (RPD) values were calculated for the detected parameters. The CY 2012 duplicate sample results show good correlation with RPD values of less than 1 for TCE (CWL-MW10) and 5 to 21 for nickel and chromium. The agreement between duplicate environmental and environmental sample results are within the acceptable range for RPD values of less than 20 for organic compounds and less than 35 for metals (NMED October 2009a).

3.7.1.2 Field Blank Samples

One FB sample was collected in January and analyzed for TCE and the enhanced list of VOCs. Two FB samples were collected in July and analyzed for TCE only. There were no detections in the three FB samples.

3.7.1.3 Trip Blank Samples

Five TBs were submitted with the January samples for TCE and the enhanced list of VOCs, and five TBs were submitted with July samples for TCE analysis. VOCs were not detected in these samples.

3.7.1.4 Equipment Blank Samples

One EB sample was collected in January and analyzed for TCE, the enhanced list of VOCs, chromium, and nickel. Two EB samples were collected in July and analyzed for TCE, chromium, and nickel. The only detection in the three EB samples was chloroform in the January EB sample; no corrective action was necessary since this compound was not detected in any of the environmental samples.

3.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples (LCS), were analyzed concurrently with the groundwater samples. Additionally, batch matrix spike, matrix spike duplicate, and surrogate spike samples were analyzed. All laboratory data were reviewed and qualified in accordance with AOP 00-03, Revision 3, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL May 2011). Internal laboratory QC samples, including method blanks and duplicate LCSs, were analyzed concurrently with all groundwater samples.

Nickel results from monitoring wells CWL-BW5, CWL-MW9, and CWL-MW11 in the January 2012 samples were qualified as estimated values during data validation since nickel was detected in the associated interference check sample. Nickel in the July monitoring well CWL-MW11 environmental duplicate sample was qualified as not detected during data validation since nickel was reported at a concentration less than five times the detected value in the associated laboratory method blank sample. 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 CFRC.

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 2012 sampling activities at the CWL.

3.9 Summary and Conclusions

During CY 2012, 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 2012 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 2012

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		091638-001	SW846-8260B
18-Jan-12	2,2-trifluoroethane, 1,1,2-Trichloro-1	ND	1.00	5.00	NE	U		091638-001	SW846-8260B
	Chloroform	ND	0.250	1.00	NE	U		091638-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		091638-001	SW846-8260B
	Trichloroethene	ND	0.250	1.00	5.00	U		091638-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		091638-001	SW846-8260B
CWL-BW5 (Duplicate)	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		091639-001	SW846-8260B
18-Jan-12	2,2-trifluoroethane, 1,1,2-Trichloro-1	ND	1.00	5.00	NE	U		091639-001	SW846-8260B
	Chloroform	ND	0.250	1.00	NE	U		091639-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		091639-001	SW846-8260B
	Trichloroethene	ND	0.250	1.00	5.00	U		091639-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		091639-001	SW846-8260B
CWL-MW9	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		091632-001	SW846-8260B
17-Jan-12	2,2-trifluoroethane, 1,1,2-Trichloro-1	ND	1.00	5.00	NE	U		091632-001	SW846-8260B
	Chloroform	ND	0.250	1.00	NE	U		091632-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		091632-001	SW846-8260B
	Trichloroethene	ND	0.250	1.00	5.00	U		091632-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		091632-001	SW846-8260B
CWL-MW10	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		091647-001	SW846-8260B
23-Jan-12	2,2-trifluoroethane, 1,1,2-Trichloro-1	ND	1.00	5.00	NE	U		091647-001	SW846-8260B
	Chloroform	ND	0.250	1.00	NE	U		091647-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		091647-001	SW846-8260B
	Trichloroethene	4.68	0.250	1.00	5.00			091647-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		091647-001	SW846-8260B
CWL-MW11	1,1-Dichloroethene	ND	0.300	1.00	7.00	U		091643-001	SW846-8260B
19-Jan-12	2,2-trifluoroethane, 1,1,2-Trichloro-1	ND	1.00	5.00	NE	U		091643-001	SW846-8260B
	Chloroform	ND	0.250	1.00	NE	U		091643-001	SW846-8260B
	Tetrachloroethene	ND	0.300	1.00	5.00	U		091643-001	SW846-8260B
	Trichloroethene	ND	0.250	1.00	5.00	U		091643-001	SW846-8260B
	Trichlorofluoromethane	ND	0.300	1.00	NE	U		091643-001	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 2012

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 05-Jul-12	Trichloroethene	ND	0.300	1.00	5.00	U		092579-001	SW846-8260B
CWL-MW9 06-Jul-12	Trichloroethene	ND	0.300	1.00	5.00	U		092584-001	SW846-8260B
CWL-MW10 11-Jul-12	Trichloroethene	3.62	0.300	1.00	5.00			092598-001	SW846-8260B
CWL-MW10 (Duplicate) 11-Jul-12	Trichloroethene	3.62	0.300	1.00	5.00			092599-001	SW846-8260B
CWL-MW11 09-Jul-12	Trichloroethene	ND	0.300	1.00	5.00	U		092591-001	SW846-8260B
CWL-MW11 (Duplicate) 09-Jul-12	Trichloroethene	ND	0.300	1.00	5.00	U		092592-001	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 2012

Well ID	Analyte	Result[a] (mg/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		091638-015	SW846-6020
18-Jan-12	Nickel	0.00177	0.0005	0.002	NE	J	J+	091638-015	SW846-6020
CWL-BW5 (Duplicate)	Chromium	ND	0.002	0.010	0.100	U		091639-015	SW846-6020
18-Jan-12	Nickel	0.00218	0.0005	0.002	NE		J+	091639-015	SW846-6020
CWL-MW9	Chromium	ND	0.002	0.010	0.100	U		091632-015	SW846-6020
17-Jan-12	Nickel	0.00306	0.0005	0.002	NE		J+	091632-015	SW846-6020
CWL-MW10	Chromium	ND	0.002	0.010	0.100	U		091647-015	SW846-6020
23-Jan-12	Nickel	0.00246	0.0005	0.002	NE			091647-015	SW846-6020
CWL-MW11	Chromium	ND	0.002	0.010	0.100	U		091643-015	SW846-6020
19-Jan-12	Nickel	0.00205	0.0005	0.002	NE		J+	091643-015	SW846-6020
CWL-BW5	Chromium	ND	0.002	0.010	0.100	U		092579-015	SW846-6020
05-Jul-12	Nickel	0.0041	0.0005	0.002	NE			092579-015	SW846-6020
CWL-MW9	Chromium	ND	0.002	0.010	0.100	U		092584-015	SW846-6020
06-Jul-12	Nickel	0.00435	0.0005	0.002	NE			092584-015	SW846-6020
CWL-MW10	Chromium	ND	0.002	0.010	0.100	U		092598-015	SW846-6020
11-Jul-12	Nickel	0.00307	0.0005	0.002	NE	B		092598-015	SW846-6020
CWL-MW10 (Duplicate)	Chromium	ND	0.002	0.010	0.100	U		092599-015	SW846-6020
11-Jul-12	Nickel	0.0029	0.0005	0.002	NE	B		092599-015	SW846-6020
CWL-MW11	Chromium	0.00246	0.002	0.010	0.100	J		092591-015	SW846-6020
09-Jul-12	Nickel	0.00255	0.0005	0.002	NE	B	0.00264U	092591-015	SW846-6020
CWL-MW11 (Duplicate)	Chromium	0.00258	0.002	0.010	0.100	J		092592-015	SW846-6020
09-Jul-12	Nickel	0.00273	0.0005	0.002	NE	B		092592-015	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 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CWL-BW5	18-Jan-12	17.95	1217	411.9	6.65	0.87	70.4	6.56
CWL-MW9	17-Jan-12	18.47	1075	308.6	6.73	0.56	18.0	1.68
CWL-MW10	23-Jan-12	14.72	967	383.9	7.14	3.21	46.0	4.66
CWL-MW11	19-Jan-12	19.61	1100	374.2	6.76	0.46	50.0	4.49
CWL-BW5	05-Jul-12	20.86	999	189.3	6.71	0.37	80.4	7.15
CWL-MW9	06-Jul-12	20.94	889	-1.2	6.77	0.42	21.5	1.90
CWL-MW10	11-Jul-12	22.76	807	141.0	7.03	2.04	50.6	4.33
CWL-MW11	09-Jul-12	25.80	931	156.2	6.84	0.65	67.5	5.18

Refer to footnotes on page 3A-9.

Footnotes for Chemical Waste Landfill Groundwater Monitoring Tables

[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

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

[c]PQL

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

[d]MCL

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Water Regulations (40 Code of Federal Regulations 141.11[b]), National Primary Drinking Water Standards (EPA May 2009).
- NE = not established.

[e]Laboratory Qualifier

B = Analyte is detected in associated laboratory method blank.
J = Amount detected is below the PQL.
U = Analyte is absent or below the method detection limit.

[f]Validation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

[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 collected prior to sampling.

°C = degrees Celsius.
% Sat = percent saturation.
µmho/cm = micromhos per centimeter.
mg/L = milligrams per liter.
mV = millivolts.
NTU = nephelometric turbidity units.
pH = potential of hydrogen (negative logarithm of the hydrogen ion concentration).

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Attachment 3B
Chemical Waste Landfill
Hydrographs

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Attachment 3B Hydrographs

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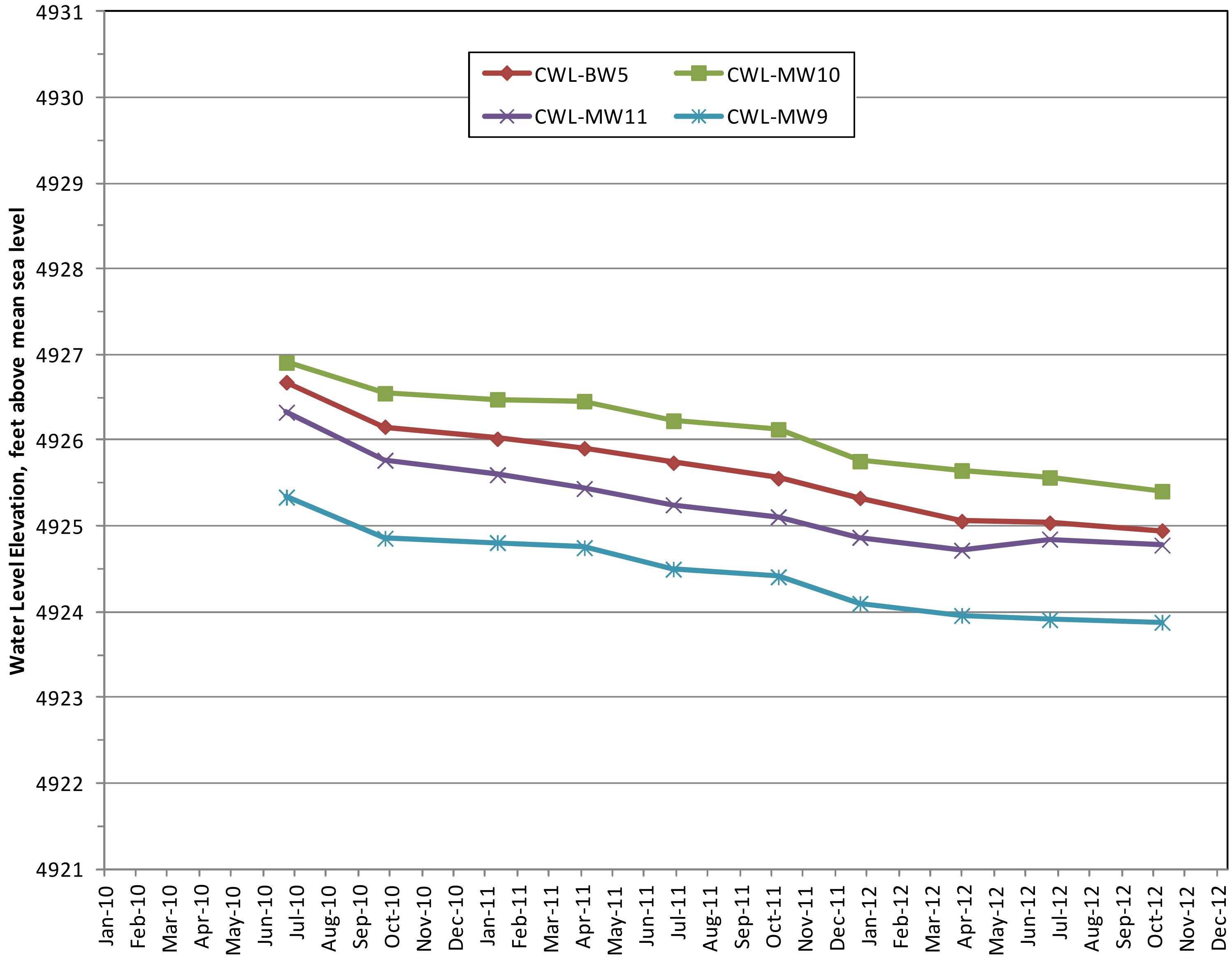

Figure 3B-1. CWL Study Area Wells

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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 to determine whether a release of RCRA contaminants had occurred at the MWL (SNL September 1990). The Phase 1 RFI indicated that tritium had been released to the environment. A Phase 2 RFI was conducted from 1992 to 1995 to determine the contaminant source, define the nature and extent of contamination, identify potential contaminant transport pathways, evaluate potential risks, and provide remedial action alternatives for the MWL (Peace et al. 2002).

The Phase 2 RFI confirmed tritium as the constituent of concern (COC) in soil at the MWL. Tritium occurs in surface and near-surface soil in and around the classified area. Tritium levels range from 1,100 picocuries per gram (pCi/g) in surface soil to 206 pCi/g in subsurface soil. The highest tritium levels have been found within 30 feet (ft) below ground surface (bgs) in soil adjacent to and directly below the classified area disposal pits. At depths greater than 30 ft bgs, tritium levels decrease rapidly. At approximately 100 ft bgs, the highest tritium level detected has been 0.074 pCi/g, and at 120 to 140 ft bgs, maximum tritium levels have been 0.029 pCi/g.

On October 11, 2001, the New Mexico Environment Department (NMED) directed the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) and Sandia Corporation (Sandia) to conduct a Corrective Measures Study (CMS) for the MWL (SNL December 2001a). The MWL CMS Report (SNL May 2003) was submitted to the NMED on May 21, 2003, for technical review and comment and recommended that an alternative vegetative soil cover (i.e., evapotranspirative [ET] cover) be deployed as the preferred corrective measure for the MWL. The NMED held a public comment period on the MWL CMS 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., ET cover) as the final remedy for the MWL. The selection was documented in the *Final Order, State of New Mexico Before the Secretary of the Environment in the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill* (Final Order; NMED May 2005), which also required a Corrective Measures Implementation (CMI) Plan (CMIP). The MWL CMIP (SNL November 2005) was submitted to the NMED in November 2005. The NMED conditionally approved the CMIP in December 2008 after resolution of two Notices of Disapproval (NODs) (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 CMIP was submitted to NMED in January 2010 (SNL January 2010). The CMI Report was approved by NMED on October 14, 2011 (Bearzi October 2011) after NMED held a public meeting on December 14, 2010, and resolution of an NOD issued in May 2011 (Bearzi May 2011). The MWL Long-term Monitoring and Maintenance Plan (LTMMP) (SNL March 2012) was submitted to the NMED within 180 days of CMI Report approval as required by the Final

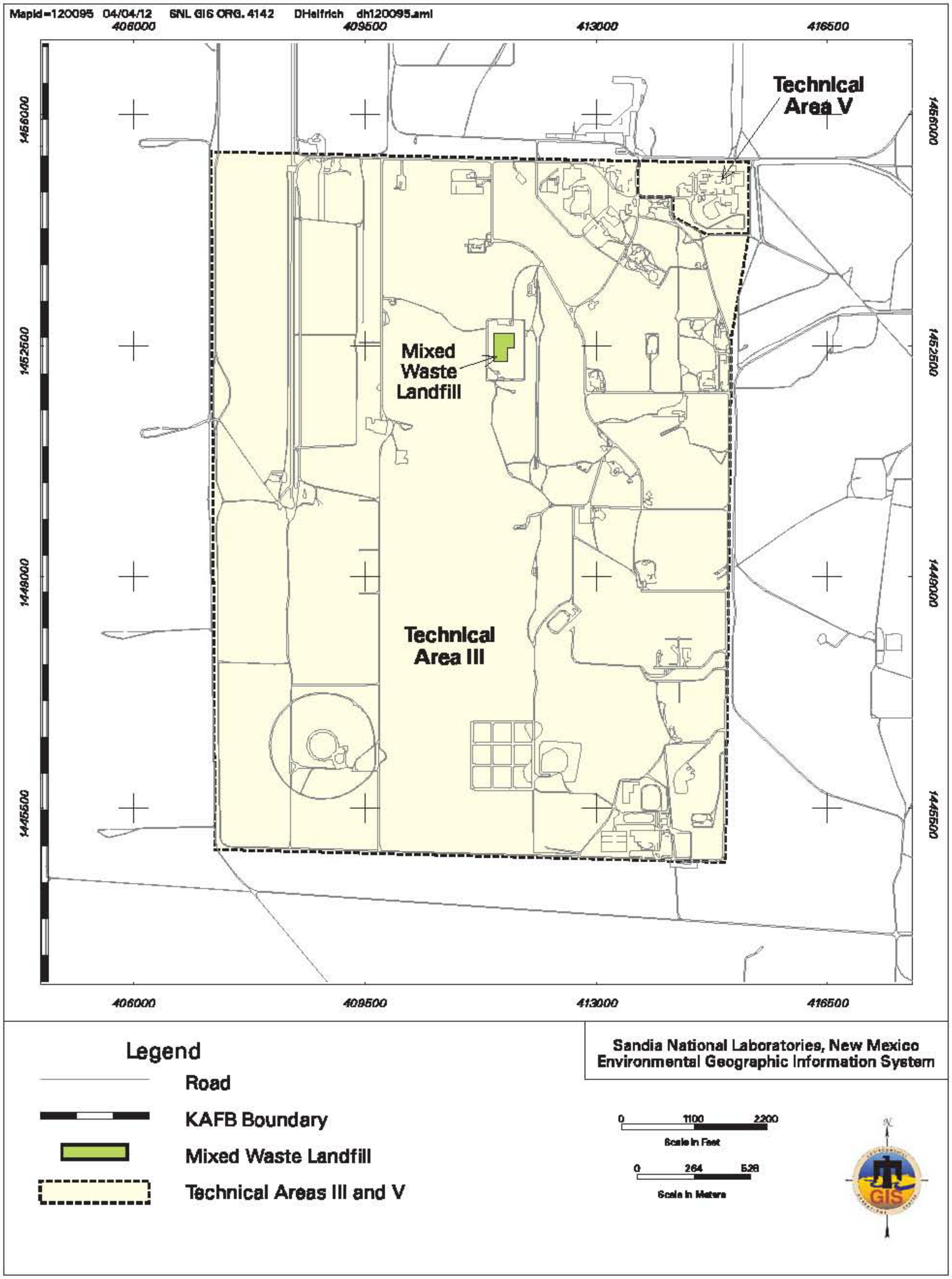

Figure 4-1. Location of the Mixed Waste Landfill within Technical Area III

Order. The original NMED 60-day public comment period for the MWL LTMMP began on September 14, 2011, and was extended twice; the comment period is scheduled to end February 11, 2013. NMED held a public meeting on the LTMMP on October 16, 2012.

4.1.1 Monitoring History

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 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. 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 placed below the top of the regional water table in the coarse-grained Ancestral Rio Grande (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 comprise the MWL groundwater monitoring network for the uppermost part of the regional aquifer and were approved by the NMED (Bearzi October 2008 and January 2009).

Monitoring wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9 were considered new wells and, as required by the Compliance Order on Consent (the Order) (NMED April 2004), were sampled a minimum of eight consecutive quarters for a defined suite of parameters in addition to sampling for perchlorate for at least four consecutive quarters. The four consecutive quarters of perchlorate sampling were completed in Calendar Year (CY) 2009 with no detections at or above the screening level of 4 micrograms per liter (µg/L); therefore, these wells have been removed from the perchlorate monitoring network. The required eight quarterly sampling events were completed in CY 2010. Monitoring wells MWL-MW4, MWL-MW5, and MWL-MW6 are preexisting wells and are sampled on an annual basis. All seven MWL wells are now sampled annually as required by the Order.

Figure 4-2 shows the current groundwater monitoring well network consisting of seven monitoring wells completed within the interfingering, fine-grained, alluvial-fan deposits (MWL-BW2, MWL-MW4 uppermost screened interval, MWL-MW7, MWL-MW8, and MWL-MW9) and coarse-grained ARG deposits (MWL-MW5 and MWL-MW6). The lower screened interval of monitoring well MWL-MW4 is completed within the coarse-grained ARG deposits, but is not part of the current monitoring network. The seven MWL wells are constructed of 5-inch diameter, Schedule 80 polyvinyl chloride (PVC) casing and have screens composed of slotted Schedule 80 PVC. References in this report 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.

In April 2010, the DOE/NNSA and Sandia received a letter from the NMED which required further investigation to determine the source of very low toluene concentrations in some groundwater samples collected from the MWL in 2008 through early 2010, including conducting a purging/sampling study of the groundwater along with any other studies necessary to determine the source (Bearzi April 2010). The DOE/NNSA and Sandia submitted the *Mixed Waste Landfill Toluene Investigation Report* in

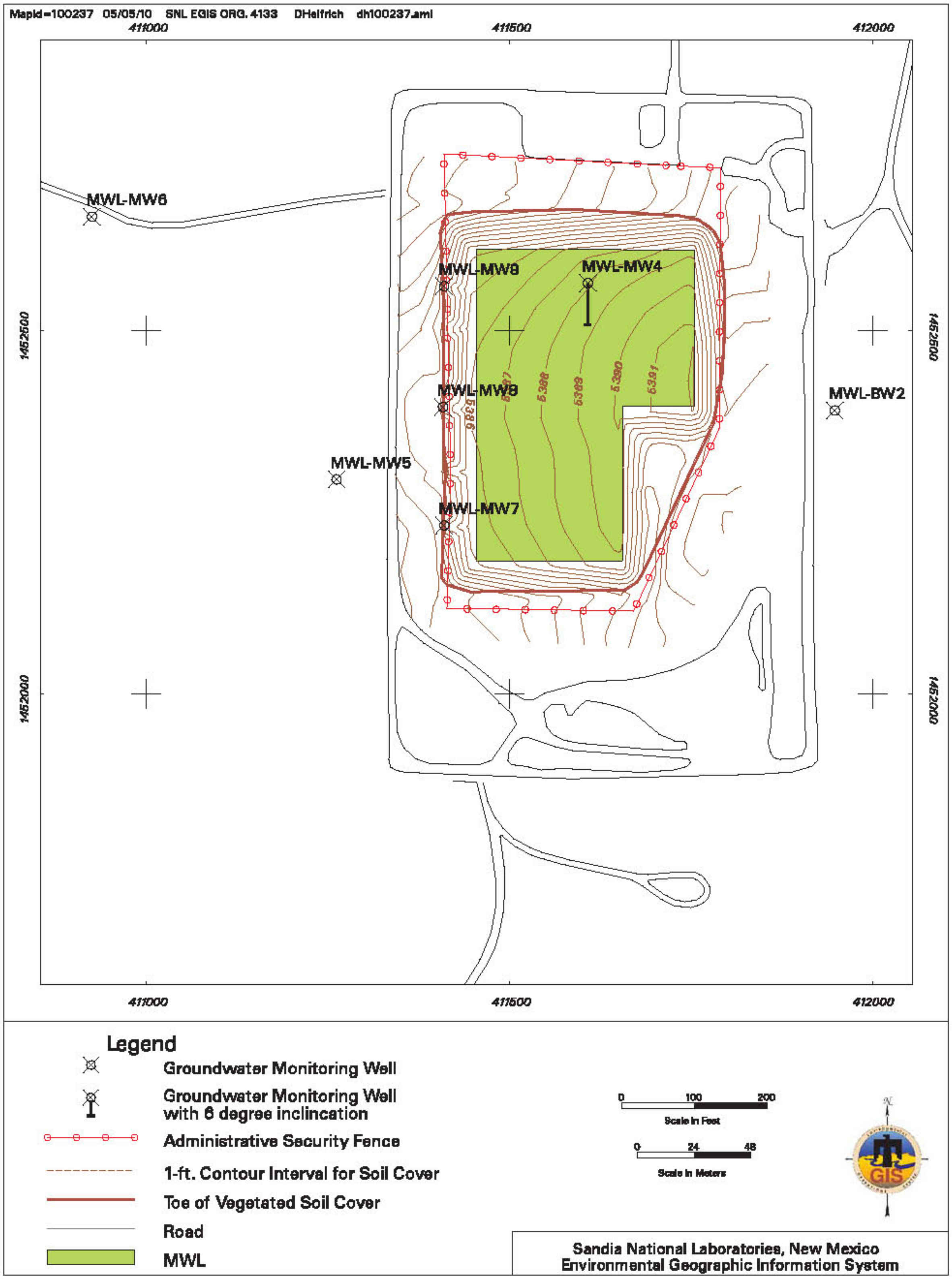

Figure 4-2. Location of Groundwater Monitoring Wells at the Mixed Waste Landfill

August 2010 and received an NOD with two comments from the NMED in September 2010 (Bearzi September 2010). The DOE/NNSA and Sandia NOD response (Wagner October 2010) that included a revised version of the report (SNL October 2010) was submitted to the NMED in October 2010 and was approved in January 2011 (Bearzi January 2011).

Groundwater at the MWL has been extensively characterized since 1990 for major ion chemistry, volatile organic compounds (VOCs), semivolatile organic compounds, nitrate, metals, radionuclides, and perchlorate. Twenty years of data indicate that groundwater has not been contaminated by the MWL (Goering et al. 2002; SNL December 2001b, 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, and June 2012).

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. A single annual sampling event was conducted at the MWL in CY 2012.

Table 4-1. MWL Annual Groundwater Sampling Event, Calendar Year 2012

Well ID	Installation Year	WQ	WL	Calendar Year 2012[a]
MWL-BW2	2008	✓	✓	Annual
MWL-MW4[b]	1993	✓	✓	Annual
MWL-MW5	2000	✓	✓	Annual
MWL-MW6	2000	✓	✓	Annual
MWL-MW7	2008	✓	✓	Annual
MWL-MW8	2008	✓	✓	Annual
MWL-MW9	2008	✓	✓	Annual

NOTES:
Check marks in the WQ and WL columns indicate WQ sampling and WL measurements.
[a]Annual groundwater monitoring of all wells was conducted in February, with resampling of monitoring well MWL-MW8 in March.
[b]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.
WL = Water level.
WQ = Water quality.

4.1.3 Summary of Activities

Annual groundwater sampling was conducted in February 2012 at the MWL as summarized in Table 4-1. Groundwater samples were collected from the seven monitoring wells (MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, and MWL-MW9) and analyzed for VOCs, Target Analyte List (TAL) metals plus uranium, anions (as bromide, chloride, fluoride, and sulfate), alkalinity, nitrate plus nitrite (NPN), gamma spectroscopy, gross alpha/beta activity, and tritium. Duplicate environmental samples were collected at monitoring wells MWL-MW5 and MWL-MW9. Monitoring well MWL-MW8 was resampled for VOCs only in March. Attachment 4A provides summary tables for the CY 2012 analytical results.

4.1.4 Summary of Future Activities

The revised MWL LTMMP (SNL March 2012) was submitted to NMED in March 2012. The LTMMP defines the long-term monitoring, maintenance, inspection, and repair requirements for the MWL, including semiannual groundwater monitoring. All LTMMP monitoring, inspection, and maintenance requirements will be implemented upon NMED approval (anticipated in late April 2013) and reported to NMED annually in a separate MWL report. Groundwater monitoring activities and results will also continue to be provided in this Annual Groundwater Monitoring Report.

4.1.5 Conceptual Site Model

Tritium was identified as the COC at the MWL based on the Phase 2 RFI. 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 incorporated in this section.

Groundwater at the MWL is contained within the regional aquifer, which consists of unconsolidated Santa Fe Group deposits (fine-grained alluvial-fan deposits and coarse-grained ARG deposits). The depth to water is approximately 500 ft bgs. 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 (ABCWUA) 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.

Due to the declining water level, the original groundwater monitoring well network (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3 installed in 1988 and 1989) was replaced, and four new wells were installed in 2008 (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9). The completion intervals of the four 2008 wells are deeper, with the well screens set across the uppermost part of the regional aquifer. The aquifer hydraulic conductivity, based on slug test results performed in the 2008 wells, range from 1.95×10^{-1} to 1.48×10^{-2} ft per day, with an average of 8.58×10^{-2} ft per day. The hydraulic conductivity for the 2008 wells is generally higher than that for the original MWL groundwater monitoring wells, indicating an increase in hydraulic conductivity with depth and proximity to the highly conductive ARG deposits.

Water levels were lower than expected in the 2008 monitoring wells relative to the water levels in the older wells. The lower groundwater elevations in monitoring wells MWL-MW7 through MWL-MW9 appear to be related to the following two major factors:

- Variations in hydraulic conductivity in the upper part of the regional aquifer (showing increasing hydraulic conductivities with depth)

- Ongoing large-scale pumping of groundwater by the KAFB and ABCWUA production wells, which has created a strong downward vertical gradient at the MWL

The completion intervals of the new wells are deeper and within a higher hydraulic conductivity layer than the shallower wells that were replaced (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3). Thus, the vertical gradient and drawdown of the regional aquifer have greater impact in the new wells, resulting in a lower groundwater elevation relative to the previous monitoring well network.

An updated 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). In summary, the geology of the upper portion of the regional aquifer, a stratified system, varies with depth from a low hydraulic conductivity layer (in which former monitoring wells MWL-MW2 and MWL-MW3 were screened) to a medium conductivity layer (in which the deeper screens of monitoring wells MWL-MW7, MWL-MW8, and MWL-MW9 reside) to a high conductivity layer corresponding to the ARG deposits (in which at least part of the screen intervals of monitoring wells MWL-MW4 [lower screen], MWL-MW5, and MWL-MW6 are located). The uppermost surface of the regional aquifer continues to decline as a result of historic and ongoing large-scale pumping of groundwater by the KAFB and ABCWUA production wells. The overall effect at the MWL is that groundwater flow has a strong vertically downward component in the lower and medium conductivity layers in response to this regional drawdown from pumping (i.e., a draining system).

Figure 4-3 shows the October 2012 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 feet 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.

For the period from July 2008 to October 2012, groundwater levels in the four wells installed in 2008 (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) declined less than 2 ft (Figures 4B-1 and 4B-2 of Attachment 4B). Monitoring wells MWL-MW7, MWL-MW8, and MWL-MW9 declined at rates ranging from 0.18 to 0.27 feet per year (ft/yr). Upgradient well MWL-BW2 showed a greater rate of decline at 1.3 ft/yr, but most of this decline occurred in 2008 and may be the result of an inaccurate initial groundwater elevation measurement (Figure 4B-2 of Attachment 4B). 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 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

Historically, the NMED Hazardous Waste Bureau has provided regulatory oversight of the MWL as Solid Waste Management Unit (SWMU) 76 under the Hazardous and Solid Waste Amendments module of the SNL/NM RCRA Permit. The NMED confirmed that the MWL is properly designated as a SWMU (Dinwiddie June 1998) and, as such, must comply with the corrective action program defined in Title 20, New Mexico Administrative Code (NMAC), Section 4.1.50, incorporating Title 40, Code of Federal Regulations (CFR), Section 264.101. The requirements for corrective action at the MWL, including those for groundwater monitoring, are established through the corrective measures process.

The NMED issued the Order in April 2004, which transferred the regulatory authority for corrective action at the MWL to the Order (NMED April 2004). This report has been formatted to address the content criteria set forth in the Order for Periodic Monitoring Reports.

Although radionuclides are being monitored and screened at the MWL, 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 Order (NMED April 2004).

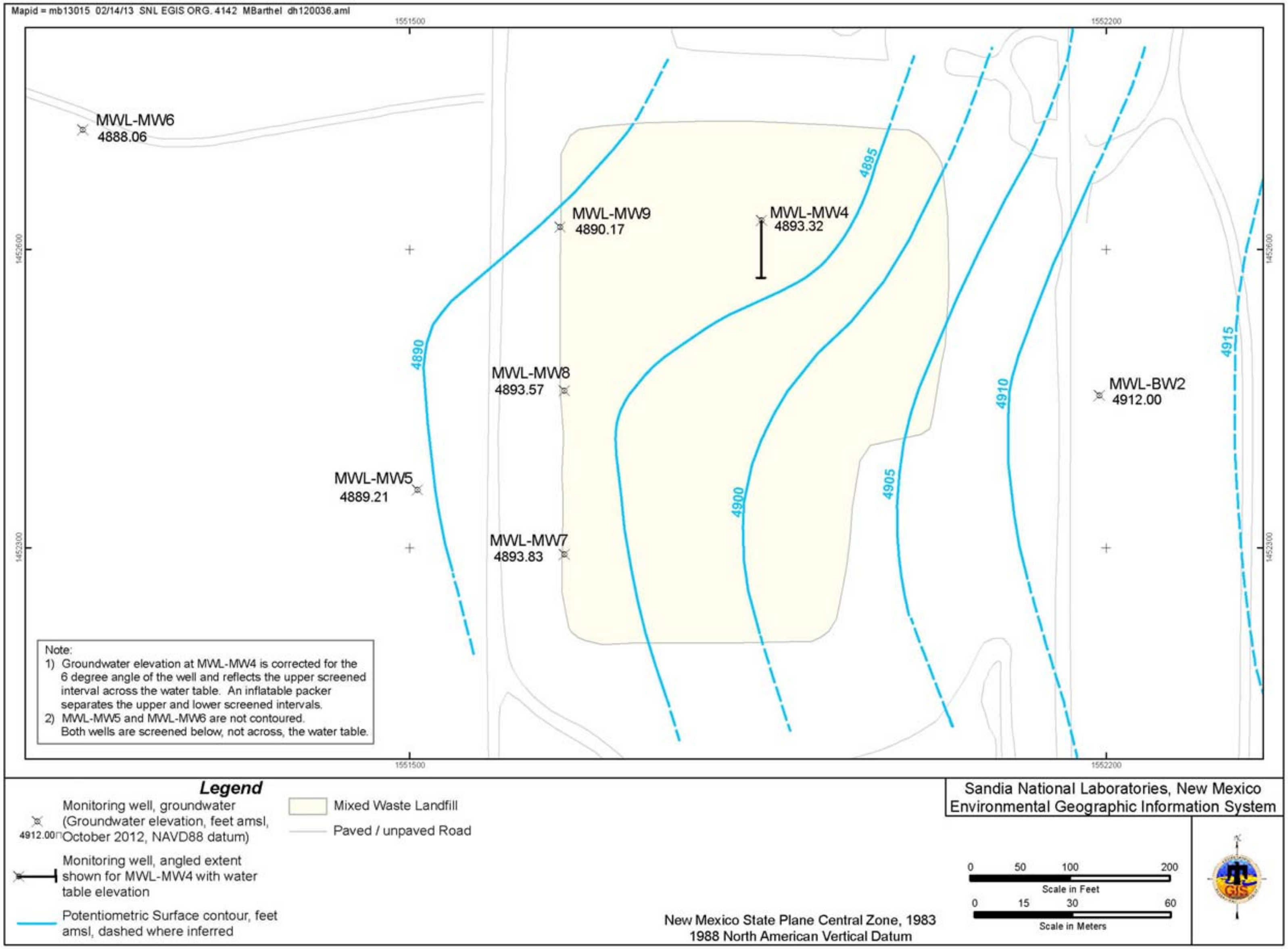

Figure 4-3. Localized Potentiometric Surface of the Basin Fill Aquifer at the Mixed Waste Landfill, October 2012

4.3 Scope of Activities

The CY 2012 annual 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 from February 2 to 15, 2012. Groundwater sampling activities were conducted in conformance with procedures outlined in the *Mixed Waste Landfill Groundwater Monitoring, Mini-Sampling and Analysis Plan for Fiscal Year 2012 Annual Sampling* (SNL January 2012).

Table 4-2. Analytical Parameters for the MWL Monitoring Wells, Calendar Year 2012

Analytical Parameter	Calendar Year 2012[a]
Volatile Organic Compounds	MWL-BW2 MWL-MW4 MWL-MW5 MWL-MW5 (dup) MWL-MW6 MWL-MW7 MWL-MW8 MWL-MW9 MWL-MW9 (dup)
TAL metals plus Uranium	
Nitrate plus Nitrite (as nitrogen)	
Major Anions (Bromide, Fluoride, Chloride, and Sulfate)	
Total Alkalinity as Bicarbonate and Calcium Carbonate	
Radionuclides: Gamma-Emitting Radionuclides Gross Alpha Activity Gross Beta Activity Tritium	

NOTES:

[a]Annual groundwater sampling was conducted in February, with resampling of MWL-MW8 for VOCs only in March.

BW = Background Well.
dup = Duplicate.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
TAL = Target Analyte List.

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 2009). The analytical results are summarized in Attachment 4A, Tables 4A-1 through 4A-7.

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. 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 (LCS), matrix spike, matrix spike duplicate, and surrogate spike analyses.

Water quality parameters were measured in the field for temperature, specific conductance (SC), oxidation-reduction potential (ORP), pH, and dissolved oxygen (DO) using an YSI™ Model 6920 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 Plan for Fiscal Year 2012 Annual Sampling* (SNL January 2012), which are consistent with the methods described in Section 1.3. Field water quality parameters are presented in Table 4A-8 (Attachment 4A) and current CY 2012 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 wells, except MWL-MW4. Monitoring well MWL-MW4 is installed with a dedicated Bennett™ sampling system. The purging volume requirement was achieved for four of the seven monitoring wells (MWL-BW2, MWL-MW5, MWL-MW6, and MWL-MW7). The minimum purge requirements were not met at monitoring wells MWL-MW4, MWL-MW8, and MWL-MW9. These three monitoring wells were purged to dryness, allowed to recover, and then sampled to collect the most representative groundwater sample possible given the low yield of these wells.

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 off-site laboratories 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 chemical, general chemistry, and radiological constituents are presented in Attachment 4A, Tables 4A-1 through 4A-7. Field water quality measurements are presented in Attachment 4A, Table 4A-8. Analytical results that are above the analytical laboratory method detection limit (MDL) but below the practical quantitation limit (PQL) are qualified as estimated values and designated with a “J” qualifier in Tables 4A-1 through 4A-7. 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 the CY 2012 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

Detected VOCs are presented in Attachment 4A, Table 4A-1. No VOCs were detected at concentrations above established MCLs in any groundwater sample. Tetrachloroethene (PCE) was detected below the MCL of 5.0 µg/L in monitoring well MWL-MW8 at an estimated concentration of 0.310 µg/L. SNL/NM personnel re-sampled monitoring well MWL-MW8 for VOCs in March 2012, since PCE has not been detected in historical monitoring well MWL-MW8 samples and no VOCs were detected in the resample. Toluene was detected below the MCL of 1,000 µg/L in the monitoring well MWL-MW9 duplicate environmental sample at a concentration of 1.31 µg/L, but was not detected in the associated environmental sample. Laboratory MDLs for all VOCs are presented in Attachment 4A, Table 4A-2.

4.6.2 General Chemistry Parameters

The general chemistry analytical results are presented in Attachment 4A, Tables 4A-3 and 4A-4. NPN was not detected above the nitrate MCL of 10 milligrams per liter (mg/L) in any groundwater sample. NPN was detected at concentrations ranging from 1.12 mg/L in the field duplicate sample from monitoring well MWL-MW5 to 2.08 mg/L in the field duplicate sample from monitoring well MWL-MW9. The NPN results are summarized in Table 4A-3. Table 4A-4 summarizes the alkalinity and major anions (bromide, chloride, fluoride, and sulfate) results. No parameters were detected above established MCLs.

4.6.3 Metals

Metal analysis includes two sets of analyses and results, filtered and unfiltered fractions. Groundwater samples obtained for total metal analyses are collected without filtering. Dissolved metal samples are collected after groundwater is passed through in-line filters of 0.45 micron pore size. The difference in concentrations between the total and dissolved fraction may be attributed to the original metallic ion content of the particles and any sorption of ions to the suspended particles.

Table 4A-5 (Attachment 4A) summarizes the metal results, including total uranium, for all unfiltered groundwater samples collected during the CY 2012 annual monitoring event at the MWL. Samples were analyzed for TAL metals according to EPA Methods 6010, 6020, and 7470 (EPA 1986). Table 4A-6 (Attachment 4A) summarizes the metal results, including total uranium, for the filtered samples collected during the CY 2012 annual groundwater monitoring event.

TAL metals plus uranium were analyzed for each MWL monitoring well sample, in both unfiltered and filtered fractions. No metal parameters were detected above established MCLs in any groundwater sample.

4.6.4 Radiological Parameters

Groundwater samples from the MWL monitoring wells were screened for gamma-emitting radionuclides, gross alpha/beta activity, and tritium (Table 4A-7, Attachment 4A) and the analytical results are compared with the established EPA MCLs (no MCL has been established for tritium).

Gross alpha activity is measured as a screening tool and in accordance with 40 CFR, Parts 9, 141, and 142, Table I-4 and does not include uranium, which is measured independently. Therefore, gross alpha activity measurements were corrected by subtracting the total uranium activity. Corrected gross alpha activity results are all below the MCL of 15 picocuries per liter (pCi/L) and range from 3.08 to 10.51 pCi/L. Gross beta results do not exceed established MCLs. Tritium and short-list gamma spectroscopy radionuclides activities were below the laboratory minimum detectable activity levels in all groundwater samples. All radiological parameter results are summarized in Table 4A-7 (Attachment 4A).

4.6.5 Water Quality Parameters

The field water quality parameters measured immediately before sampling are presented in Attachment 4A, Table 4A-8. These field parameters consist of temperature, SC, ORP, pH, turbidity, and DO.

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 May 2011). 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-MW5 and MWL-MW9, and the results were compared to the results for the corresponding environmental sample. Relative percent difference (RPD) values were calculated for the detected parameters.

CY 2012 duplicate environmental sample results show good correlation with RPD values less than 20 for organic compounds and less than 35 for metals for all calculated parameters, except the unfiltered cobalt results from monitoring well MWL-MW5 (RPD is 54). The cobalt results are considered estimated values because the reported concentrations are below the PQL.

4.7.1.2 Equipment Blank Samples

A total of three EB samples (also referred to as a rinsate blanks) were collected during the CY 2012 sampling event and submitted for all analyses. EB samples were collected prior to sampling monitoring wells MWL-MW5 and MWL-MW9 in February 2012, and prior to resampling monitoring well MWL-MW8 in March 2012.

Various constituents detected in EB samples included acetone, arsenic, bromodichloromethane, chloroform, and dibromochloromethane. No corrective action was required since these analytes were not detected in associated environmental samples.

4.7.1.3 Field Blank Samples

A total of eight FB samples were collected during the CY 2012 sampling and submitted for VOC analysis. Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected in FB samples. No corrective action was required since these compounds were not detected in associated environmental samples.

4.7.1.4 Trip Blank Samples

A total of 11 TB samples were submitted with the February and March 2012 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 LCSs, 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 May 2011).

Although some analytical results were qualified during the data validation, no significant data quality problems were noted for any CY 2012 MWL groundwater monitoring samples. Data validation reports are filed in the SNL/NM Customer Funded Records Center.

4.8 Variances and Nonconformances

All analytical and field methods were performed according to the requirements specified in the MWL groundwater monitoring Mini-Sampling and Analysis Plan (SAP) for FY 2011 (SNL January 2012). No variances and/or nonconformances from requirements in the MWL Mini-SAP were identified during CY 2012 sampling activities, and there were no variances from the plans.

4.9 Summary and Conclusions

During CY 2012 environmental groundwater samples were collected from seven MWL groundwater monitoring wells. Sample parameters included VOCs, unfiltered and filtered fractions for TAL metals plus uranium, anions (as bromide, chloride, fluoride, and sulfate), alkalinity, NPN, gamma spectroscopy, gross alpha/beta activity, and tritium analyses. Groundwater monitoring results were compared with established EPA MCLs for drinking water (EPA 2009). No parameters were detected above established MCLs in any groundwater sample.

Based on the field and laboratory QC sample and data validation results, the CY 2012 groundwater monitoring data meet data quality objectives and are in compliance with analytical methods and laboratory procedures (i.e., representative and technically defensible).

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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 2012

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 10-Feb-12	Tetrachloroethene	0.310	0.300	1.00	5.00	J		091722-001	SW846-8260B
MWL-MW9 (Duplicate) 06-Feb-12	Toluene	1.31	0.250	1.00	1000			091710-001	SW846-8260B

Refer to footnotes on page 4A-33.

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 2012

Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.325
1,1,2,2-Tetrachloroethane	0.250
1,1,2-Trichloroethane	0.250
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.250
1,2-Dichloropropane	0.250
2-Butanone	1.25
2-Hexanone	1.25
4-methyl-, 2-Pentanone	1.25
Acetone	3.50
Benzene	0.300
Bromodichloromethane	0.250
Bromoform	0.250
Bromomethane	0.300
Carbon disulfide	1.25
Carbon tetrachloride	0.300
Chlorobenzene	0.250
Chloroethane	0.300
Chloroform	0.250
Chloromethane	0.300
Dibromochloromethane	0.300
Ethyl benzene	0.250
Methylene chloride	3.00
Styrene	0.250
Tetrachloroethene	0.300
Toluene	0.250
Trichloroethene	0.250
Vinyl acetate	1.50
Vinyl chloride	0.500
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.250
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.250

Refer to footnotes on page 4A-33.

Table 4A-3
Summary of Nitrate plus Nitrite Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 07-Feb-12	Nitrate plus nitrite as N	1.89	0.100	0.500	10.0			091713-018	EPA 353.2
MWL-MW4 14-Feb-12	Nitrate plus nitrite as N	2.01	0.100	0.500	10.0			091725-018	EPA 353.2
MWL-MW5 08-Feb-12	Nitrate plus nitrite as N	1.14	0.100	0.500	10.0			091718-018	EPA 353.2
MWL-MW5 (Duplicate) 08-Feb-12	Nitrate plus nitrite as N	1.12	0.100	0.500	10.0			091719-018	EPA 353.2
MWL-MW6 02-Feb-12	Nitrate plus nitrite as N	1.52	0.100	0.500	10.0			091704-018	EPA 353.2
MWL-MW7 15-Feb-12	Nitrate plus nitrite as N	1.72	0.100	0.500	10.0			091728-018	EPA 353.2
MWL-MW8 10-Feb-12	Nitrate plus nitrite as N	1.20	0.100	0.500	10.0			091722-018	EPA 353.2
MWL-MW9 06-Feb-12	Nitrate plus nitrite as N	2.03	0.100	0.500	10.0			091709-018	EPA 353.2
MWL-MW9 (Duplicate) 06-Feb-12	Nitrate plus nitrite as N	2.08	0.100	0.500	10.0			091710-018	EPA 353.2

Refer to footnotes on page 4A-33.

Table 4A-4
Summary of Alkalinity and Anion Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Bicarbonate alkalinity	240	0.725	1.00	NE			091713-022	SM 2320B
07-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091713-022	SM 2320B
	Bromide	0.435	0.066	0.200	NE			091713-016	SW846 9056
	Chloride	67.8	0.330	1.00	NE			091713-016	SW846 9056
	Fluoride	0.775	0.033	0.100	4.0			091713-016	SW846 9056
	Sulfate	44.9	0.500	2.00	NE			091713-016	SW846 9056
MWL-MW4	Bicarbonate alkalinity	201	0.725	1.00	NE			091725-022	SM 2320B
14-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091725-022	SM 2320B
	Bromide	0.369	0.066	0.200	NE			091725-016	SW846 9056
	Chloride	55.4	0.330	1.00	NE			091725-016	SW846 9056
	Fluoride	0.870	0.033	0.100	4.0			091725-016	SW846 9056
	Sulfate	38.6	0.500	2.00	NE			091725-016	SW846 9056
MWL-MW5	Bicarbonate alkalinity	319	0.725	1.00	NE			091718-022	SM 2320B
08-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091718-022	SM 2320B
	Bromide	0.461	0.066	0.200	NE			091718-016	SW846 9056
	Chloride	83.1	0.660	2.00	NE			091718-016	SW846 9056
	Fluoride	0.843	0.033	0.100	4.0			091718-016	SW846 9056
	Sulfate	54.9	1.00	4.00	NE			091718-016	SW846 9056
MWL-MW5 (Duplicate)	Bicarbonate alkalinity	317	0.725	1.00	NE			091719-022	SM 2320B
08-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091719-022	SM 2320B
	Bromide	0.506	0.066	0.200	NE			091719-016	SW846 9056
	Chloride	84.5	0.660	2.00	NE			091719-016	SW846 9056
	Fluoride	0.873	0.033	0.100	4.0			091719-016	SW846 9056
	Sulfate	55.6	1.00	4.00	NE			091719-016	SW846 9056
MWL-MW6	Bicarbonate alkalinity	305	0.725	1.00	NE			091704-022	SM 2320B
02-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091704-022	SM 2320B
	Bromide	0.470	0.066	0.200	NE			091704-016	SW846 9056
	Chloride	80.8	0.660	2.00	NE		J	091704-016	SW846 9056
	Fluoride	0.692	0.033	0.100	4.0			091704-016	SW846 9056
	Sulfate	52.9	1.00	4.00	NE		J	091704-016	SW846 9056
MWL-MW7	Bicarbonate alkalinity	215	0.725	1.00	NE			091728-022	SM 2320B
15-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091728-022	SM 2320B
	Bromide	0.321	0.066	0.200	NE			091728-016	SW846 9056
	Chloride	42.0	0.330	1.00	NE			091728-016	SW846 9056
	Fluoride	1.02	0.033	0.100	4.0			091728-016	SW846 9056
	Sulfate	38.3	0.100	0.400	NE			091728-016	SW846 9056

Refer to footnotes on page 4A-33.

Table 4A-4 *(Concluded)*
Summary of Alkalinity and Anion Results,
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Bicarbonate alkalinity	220	0.725	1.00	NE			091722-022	SM 2320B
10-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091722-022	SM 2320B
	Bromide	0.340	0.066	0.200	NE			091722-016	SW846 9056
	Chloride	49.8	0.330	1.00	NE			091722-016	SW846 9056
	Fluoride	0.996	0.033	0.100	4.0			091722-016	SW846 9056
	Sulfate	37.4	0.100	0.400	NE			091722-016	SW846 9056
MWL-MW9	Bicarbonate alkalinity	219	0.725	1.00	NE			091709-022	SM 2320B
06-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091709-022	SM 2320B
	Bromide	0.329	0.066	0.200	NE			091709-016	SW846 9056
	Chloride	45.9	0.330	1.00	NE			091709-016	SW846 9056
	Fluoride	1.06	0.033	0.100	4.0			091709-016	SW846 9056
	Sulfate	37.8	0.100	0.400	NE			091709-016	SW846 9056
MWL-MW9 (Duplicate)	Bicarbonate alkalinity	228	0.725	1.00	NE			091710-022	SM 2320B
06-Feb-12	Carbonate alkalinity	ND	0.725	1.00	NE	U		091710-022	SM 2320B
	Bromide	0.307	0.066	0.200	NE			091710-016	SW846 9056
	Chloride	42.2	0.330	1.00	NE			091710-016	SW846 9056
	Fluoride	1.04	0.033	0.100	4.0			091710-016	SW846 9056
	Sulfate	37.7	0.100	0.400	NE			091710-016	SW846 9056

Refer to footnotes on page 4A-33.

Table 4A-5
Summary of Target Analyte List Metals plus Uranium Results,
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Aluminum	0.0581	0.015	0.050	NE	B	0.1175U	091713-009	SW846 6020
07-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091713-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091713-009	SW846 6020
	Barium	0.118	0.0006	0.002	2.00		J+	091713-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091713-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091713-009	SW846 6020
	Calcium	94.2	0.300	1.00	NE	B		091713-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091713-009	SW846 6020
	Cobalt	0.000249	0.0001	0.001	NE	J		091713-009	SW846 6020
	Copper	0.000505	0.00035	0.001	NE	B, J	0.00205U	091713-009	SW846 6020
	Iron	0.205	0.033	0.100	NE			091713-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091713-009	SW846 6020
	Magnesium	23.4	0.010	0.030	NE		J	091713-009	SW846 6020
	Manganese	0.0251	0.001	0.005	NE			091713-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091713-009	SW846 7470
	Nickel	0.00155	0.0005	0.002	NE	B, J	0.00366UJ	091713-009	SW846 6020
	Potassium	4.77	0.080	0.300	NE			091713-009	SW846 6020
	Selenium	0.00178	0.0015	0.005	0.050	J		091713-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091713-009	SW846 6020
	Sodium	69.9	0.400	1.25	NE			091713-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091713-009	SW846 6020
	Uranium	0.00689	0.000067	0.0002	0.030			091713-009	SW846 6020
	Vanadium	0.00473	0.001	0.005	NE	J		091713-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091713-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW4	Aluminum	ND	0.015	0.050	NE	U		091725-009	SW846 6020
14-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091725-009	SW846 6020
	Arsenic	0.00186	0.0017	0.005	0.010	J		091725-009	SW846 6020
	Barium	0.0855	0.0006	0.002	2.00			091725-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091725-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091725-009	SW846 6020
	Calcium	58.2	0.600	2.00	NE			091725-009	SW846 6020
	Chromium	0.00259	0.002	0.010	0.100	J		091725-009	SW846 6020
	Cobalt	0.000184	0.0001	0.001	NE	J		091725-009	SW846 6020
	Copper	0.00193	0.00035	0.001	NE			091725-009	SW846 6020
	Iron	0.204	0.033	0.100	NE			091725-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091725-009	SW846 6020
	Magnesium	19.7	0.010	0.030	NE			091725-009	SW846 6020
	Manganese	0.00576	0.001	0.005	NE			091725-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091725-009	SW846 7470
	Nickel	0.194	0.0005	0.002	NE			091725-009	SW846 6020
	Potassium	4.90	0.080	0.300	NE			091725-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091725-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091725-009	SW846 6020
	Sodium	48.0	0.080	0.250	NE			091725-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091725-009	SW846 6020
	Uranium	0.00458	0.000067	0.0002	0.030			091725-009	SW846 6020
	Vanadium	0.00731	0.001	0.005	NE			091725-009	SW846 6010
	Zinc	0.0348	0.0035	0.010	NE			091725-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW5	Aluminum	ND	0.015	0.050	NE	U		091718-009	SW846 6020
08-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091718-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091718-009	SW846 6020
	Barium	0.140	0.0006	0.002	2.00		J+	091718-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091718-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091718-009	SW846 6020
	Calcium	104	0.300	1.00	NE	B		091718-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091718-009	SW846 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		091718-009	SW846 6020
	Copper	0.0019	0.00035	0.001	NE	B	0.00205U	091718-009	SW846 6020
	Iron	0.165	0.033	0.100	NE			091718-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091718-009	SW846 6020
	Magnesium	35.1	0.050	0.150	NE		J	091718-009	SW846 6020
	Manganese	0.0104	0.001	0.005	NE			091718-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091718-009	SW846 7470
	Nickel	0.00499	0.0005	0.002	NE	B	0.00366UJ	091718-009	SW846 6020
	Potassium	6.50	0.080	0.300	NE			091718-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091718-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091718-009	SW846 6020
	Sodium	83.9	0.400	1.25	NE			091718-009	SW846 6020
	Thallium	0.000764	0.00045	0.002	0.002	J		091718-009	SW846 6020
	Uranium	0.00879	0.000067	0.0002	0.030			091718-009	SW846 6020
	Vanadium	0.00467	0.001	0.005	NE	J		091718-009	SW846 6010
	Zinc	0.0074	0.0035	0.010	NE	J		091718-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW5 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		091719-009	SW846 6020
08-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091719-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091719-009	SW846 6020
	Barium	0.136	0.0006	0.002	2.00		J+	091719-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091719-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091719-009	SW846 6020
	Calcium	112	0.300	1.00	NE	B		091719-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091719-009	SW846 6020
	Cobalt	0.000194	0.0001	0.001	NE	J		091719-009	SW846 6020
	Copper	0.000634	0.00035	0.001	NE	B, J	0.00205U	091719-009	SW846 6020
	Iron	0.147	0.033	0.100	NE		NJ-	091719-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091719-009	SW846 6020
	Magnesium	35.0	0.010	0.030	NE		J	091719-009	SW846 6020
	Manganese	0.00821	0.001	0.005	NE			091719-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091719-009	SW846 7470
	Nickel	0.00285	0.0005	0.002	NE	B	0.00366UJ	091719-009	SW846 6020
	Potassium	6.59	0.080	0.300	NE			091719-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091719-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091719-009	SW846 6020
	Sodium	77.8	0.400	1.25	NE			091719-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091719-009	SW846 6020
	Uranium	0.00932	0.000067	0.0002	0.030			091719-009	SW846 6020
	Vanadium	0.00518	0.001	0.005	NE			091719-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091719-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW6	Aluminum	ND	0.015	0.050	NE	U		091704-009	SW846 6020
02-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091704-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091704-009	SW846 6020
	Barium	0.0929	0.0006	0.002	2.00			091704-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091704-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091704-009	SW846 6020
	Calcium	74.9	0.300	1.00	NE	B	J	091704-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091704-009	SW846 6020
	Cobalt	0.000118	0.0001	0.001	NE	J		091704-009	SW846 6020
	Copper	0.000717	0.00035	0.001	NE	B, J	0.0019U	091704-009	SW846 6020
	Iron	0.141	0.033	0.100	NE			091704-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091704-009	SW846 6020
	Magnesium	26.3	0.010	0.030	NE			091704-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091704-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091704-009	SW846 7470
	Nickel	0.00123	0.0005	0.002	NE	J		091704-009	SW846 6020
	Potassium	4.80	0.080	0.300	NE			091704-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091704-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091704-009	SW846 6020
	Sodium	71.8	0.400	1.25	NE			091704-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091704-009	SW846 6020
	Uranium	0.00901	0.000067	0.0002	0.030			091704-009	SW846 6020
	Vanadium	0.00688	0.001	0.005	NE			091704-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091704-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW7	Aluminum	ND	0.015	0.050	NE	U		091728-009	SW846 6020
15-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091728-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091728-009	SW846 6020
	Barium	0.105	0.006	0.020	2.00			091728-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091728-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091728-009	SW846 6020
	Calcium	61.5	0.600	2.00	NE			091728-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091728-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091728-009	SW846 6020
	Copper	0.000397	0.00035	0.001	NE	J		091728-009	SW846 6020
	Iron	0.134	0.033	0.100	NE			091728-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091728-009	SW846 6020
	Magnesium	20.5	0.010	0.030	NE			091728-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091728-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091728-009	SW846 7470
	Nickel	0.000908	0.0005	0.002	NE	J		091728-009	SW846 6020
	Potassium	4.83	0.080	0.300	NE			091728-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091728-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091728-009	SW846 6020
	Sodium	48.9	0.080	0.250	NE			091728-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091728-009	SW846 6020
	Uranium	0.00777	0.000067	0.0002	0.030			091728-009	SW846 6020
	Vanadium	0.0069	0.001	0.005	NE			091728-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091728-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Aluminum	0.0348	0.015	0.050	NE	J		091722-009	SW846 6020
10-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091722-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091722-009	SW846 6020
	Barium	0.131	0.006	0.020	2.00			091722-009	SW846 6020
	Beryllium	0.000233	0.0002	0.0005	0.004	J		091722-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091722-009	SW846 6020
	Calcium	62.2	0.600	2.00	NE			091722-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091722-009	SW846 6020
	Cobalt	0.000103	0.0001	0.001	NE	J		091722-009	SW846 6020
	Copper	0.00071	0.00035	0.001	NE	J		091722-009	SW846 6020
	Iron	0.186	0.033	0.100	NE			091722-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091722-009	SW846 6020
	Magnesium	20.0	0.010	0.030	NE			091722-009	SW846 6020
	Manganese	0.0128	0.001	0.005	NE			091722-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091722-009	SW846 7470
	Nickel	0.00106	0.0005	0.002	NE	J		091722-009	SW846 6020
	Potassium	5.09	0.080	0.300	NE			091722-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091722-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091722-009	SW846 6020
	Sodium	47.1	0.080	0.250	NE			091722-009	SW846 6020
	Thallium	0.000505	0.00045	0.002	0.002	J		091722-009	SW846 6020
	Uranium	0.00706	0.000067	0.0002	0.030			091722-009	SW846 6020
	Vanadium	0.00187	0.001	0.005	NE	J		091722-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091722-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW9	Aluminum	ND	0.015	0.050	NE	U		091709-009	SW846 6020
06-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091709-009	SW846 6020
	Arsenic	0.00268	0.0017	0.005	0.010	J		091709-009	SW846 6020
	Barium	0.107	0.0006	0.002	2.00		J+	091709-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091709-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091709-009	SW846 6020
	Calcium	72.3	0.300	1.00	NE	B		091709-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091709-009	SW846 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		091709-009	SW846 6020
	Copper	0.00101	0.00035	0.001	NE	B	0.00205U	091709-009	SW846 6020
	Iron	0.104	0.033	0.100	NE		NJ-	091709-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091709-009	SW846 6020
	Magnesium	20.4	0.010	0.030	NE		J	091709-009	SW846 6020
	Manganese	0.00309	0.001	0.005	NE	J		091709-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091709-009	SW846 7470
	Nickel	0.0012	0.0005	0.002	NE	B, J	0.00366UJ	091709-009	SW846 6020
	Potassium	5.13	0.080	0.300	NE			091709-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091709-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091709-009	SW846 6020
	Sodium	60.5	0.400	1.25	NE			091709-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091709-009	SW846 6020
	Uranium	0.0087	0.000067	0.0002	0.030			091709-009	SW846 6020
	Vanadium	0.00789	0.001	0.005	NE			091709-009	SW846 6010
	Zinc	0.00399	0.0035	0.010	NE	J		091709-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-5 *(Concluded)*
Summary of Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW9 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		091710-009	SW846 6020
06-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091710-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091710-009	SW846 6020
	Barium	0.109	0.0006	0.002	2.00		J+	091710-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091710-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091710-009	SW846 6020
	Calcium	85.3	0.300	1.00	NE	B		091710-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091710-009	SW846 6020
	Cobalt	0.000118	0.0001	0.001	NE	J		091710-009	SW846 6020
	Copper	0.000815	0.00035	0.001	NE	B, J	0.00205U	091710-009	SW846 6020
	Iron	0.115	0.033	0.100	NE		NJ-	091710-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091710-009	SW846 6020
	Magnesium	21.1	0.010	0.030	NE		J	091710-009	SW846 6020
	Manganese	0.0037	0.001	0.005	NE	J		091710-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091710-009	SW846 7470
	Nickel	0.00141	0.0005	0.002	NE	B, J	0.00366UJ	091710-009	SW846 6020
	Potassium	5.77	0.080	0.300	NE			091710-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091710-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091710-009	SW846 6020
	Sodium	47.3	0.080	0.250	NE			091710-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091710-009	SW846 6020
	Uranium	0.00848	0.000067	0.0002	0.030			091710-009	SW846 6020
	Vanadium	0.00796	0.001	0.005	NE			091710-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091710-009	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Aluminum	ND	0.015	0.050	NE	U		091713-010	SW846 6020
07-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091713-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091713-010	SW846 6020
	Barium	0.121	0.0006	0.002	2.00		J+	091713-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091713-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091713-010	SW846 6020
	Calcium	95.0	0.300	1.00	NE	B		091713-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091713-010	SW846 6020
	Cobalt	0.000313	0.0001	0.001	NE	J		091713-010	SW846 6020
	Copper	0.000524	0.00035	0.001	NE	B, J	0.00205U	091713-010	SW846 6020
	Iron	0.123	0.033	0.100	NE		NJ-	091713-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091713-010	SW846 6020
	Magnesium	25.0	0.010	0.030	NE		J	091713-010	SW846 6020
	Manganese	0.0245	0.001	0.005	NE			091713-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091713-010	SW846 7470
	Nickel	0.00156	0.0005	0.002	NE	B, J	0.00366UJ	091713-010	SW846 6020
	Potassium	4.61	0.080	0.300	NE			091713-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091713-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091713-010	SW846 6020
	Sodium	67.0	0.400	1.25	NE			091713-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091713-010	SW846 6020
	Uranium	0.00741	0.000067	0.0002	0.030			091713-010	SW846 6020
	Vanadium	0.00444	0.001	0.005	NE	J		091713-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091713-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW4	Aluminum	ND	0.015	0.050	NE	U		091725-010	SW846 6020
14-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091725-010	SW846 6020
	Arsenic	0.00318	0.0017	0.005	0.010	J		091725-010	SW846 6020
	Barium	0.0859	0.0006	0.002	2.00			091725-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091725-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091725-010	SW846 6020
	Calcium	60.6	0.600	2.00	NE			091725-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091725-010	SW846 6020
	Cobalt	0.000321	0.0001	0.001	NE	J		091725-010	SW846 6020
	Copper	0.00113	0.00035	0.001	NE			091725-010	SW846 6020
	Iron	0.140	0.033	0.100	NE			091725-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091725-010	SW846 6020
	Magnesium	20.4	0.010	0.030	NE			091725-010	SW846 6020
	Manganese	0.00556	0.001	0.005	NE			091725-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091725-010	SW846 7470
	Nickel	0.195	0.0005	0.002	NE			091725-010	SW846 6020
	Potassium	5.14	0.080	0.300	NE			091725-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091725-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091725-010	SW846 6020
	Sodium	50.0	0.080	0.250	NE			091725-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091725-010	SW846 6020
	Uranium	0.00462	0.000067	0.0002	0.030			091725-010	SW846 6020
	Vanadium	0.0075	0.001	0.005	NE			091725-010	SW846 6010
	Zinc	0.0313	0.0035	0.010	NE			091725-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW5	Aluminum	ND	0.015	0.050	NE	U		091718-010	SW846 6020
08-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091718-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091718-010	SW846 6020
	Barium	0.139	0.0006	0.002	2.00		J+	091718-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091718-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091718-010	SW846 6020
	Calcium	132	0.300	1.00	NE	B		091718-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091718-010	SW846 6020
	Cobalt	0.000181	0.0001	0.001	NE	J		091718-010	SW846 6020
	Copper	0.000531	0.00035	0.001	NE	B, J	0.00205U	091718-010	SW846 6020
	Iron	0.175	0.033	0.100	NE			091718-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091718-010	SW846 6020
	Magnesium	31.5	0.010	0.030	NE		J	091718-010	SW846 6020
	Manganese	0.0027	0.001	0.005	NE	J		091718-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091718-010	SW846 7470
	Nickel	0.00203	0.0005	0.002	NE	B	0.00366UJ	091718-010	SW846 6020
	Potassium	6.29	0.080	0.300	NE			091718-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091718-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091718-010	SW846 6020
	Sodium	75.5	0.400	1.25	NE			091718-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091718-010	SW846 6020
	Uranium	0.00995	0.000067	0.0002	0.030			091718-010	SW846 6020
	Vanadium	0.00433	0.001	0.005	NE	J		091718-010	SW846 6010
	Zinc	0.00363	0.0035	0.010	NE	J		091718-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW5 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		091719-010	SW846 6020
08-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091719-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091719-010	SW846 6020
	Barium	0.143	0.0006	0.002	2.00		J+	091719-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091719-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091719-010	SW846 6020
	Calcium	116	0.300	1.00	NE	B		091719-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091719-010	SW846 6020
	Cobalt	0.000177	0.0001	0.001	NE	J		091719-010	SW846 6020
	Copper	0.000619	0.00035	0.001	NE	B, J	0.00205U	091719-010	SW846 6020
	Iron	0.180	0.033	0.100	NE			091719-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091719-010	SW846 6020
	Magnesium	33.9	0.010	0.030	NE		J	091719-010	SW846 6020
	Manganese	0.00296	0.001	0.005	NE	J		091719-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091719-010	SW846 7470
	Nickel	0.0021	0.0005	0.002	NE	B	0.00366UJ	091719-010	SW846 6020
	Potassium	6.59	0.080	0.300	NE			091719-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091719-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091719-010	SW846 6020
	Sodium	77.7	0.400	1.25	NE			091719-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091719-010	SW846 6020
	Uranium	0.0103	0.000067	0.0002	0.030			091719-010	SW846 6020
	Vanadium	0.0048	0.001	0.005	NE	J		091719-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091719-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW6	Aluminum	ND	0.015	0.050	NE	U		091704-010	SW846 6020
02-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091704-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091704-010	SW846 6020
	Barium	0.099	0.0006	0.002	2.00			091704-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091704-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091704-010	SW846 6020
	Calcium	76.4	0.300	1.00	NE	B	J	091704-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091704-010	SW846 6020
	Cobalt	0.000277	0.0001	0.001	NE	J		091704-010	SW846 6020
	Copper	0.00057	0.00035	0.001	NE	B, J	0.0019U	091704-010	SW846 6020
	Iron	0.133	0.033	0.100	NE			091704-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091704-010	SW846 6020
	Magnesium	24.7	0.010	0.030	NE			091704-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091704-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091704-010	SW846 7470
	Nickel	0.00116	0.0005	0.002	NE	J		091704-010	SW846 6020
	Potassium	4.91	0.080	0.300	NE			091704-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091704-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091704-010	SW846 6020
	Sodium	70.9	0.400	1.25	NE			091704-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091704-010	SW846 6020
	Uranium	0.00883	0.000067	0.0002	0.030			091704-010	SW846 6020
	Vanadium	0.00667	0.001	0.005	NE			091704-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091704-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW7	Aluminum	ND	0.015	0.050	NE	U		091728-010	SW846 6020
15-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091728-010	SW846 6020
	Arsenic	0.00185	0.0017	0.005	0.010	J		091728-010	SW846 6020
	Barium	0.0915	0.0006	0.002	2.00			091728-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091728-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091728-010	SW846 6020
	Calcium	58.5	0.600	2.00	NE			091728-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091728-010	SW846 6020
	Cobalt	0.000151	0.0001	0.001	NE	J		091728-010	SW846 6020
	Copper	0.00044	0.00035	0.001	NE	J		091728-010	SW846 6020
	Iron	0.130	0.033	0.100	NE			091728-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091728-010	SW846 6020
	Magnesium	20.1	0.010	0.030	NE			091728-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091728-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091728-010	SW846 7470
	Nickel	0.00112	0.0005	0.002	NE	J		091728-010	SW846 6020
	Potassium	4.81	0.080	0.300	NE			091728-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091728-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091728-010	SW846 6020
	Sodium	48.2	0.080	0.250	NE			091728-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091728-010	SW846 6020
	Uranium	0.00712	0.000067	0.0002	0.030			091728-010	SW846 6020
	Vanadium	0.00687	0.001	0.005	NE			091728-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091728-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Aluminum	ND	0.015	0.050	NE	U		091722-010	SW846 6020
10-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091722-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091722-010	SW846 6020
	Barium	0.130	0.006	0.020	2.00			091722-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091722-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091722-010	SW846 6020
	Calcium	62.9	0.600	2.00	NE			091722-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091722-010	SW846 6020
	Cobalt	0.00015	0.0001	0.001	NE	J		091722-010	SW846 6020
	Copper	0.000641	0.00035	0.001	NE	J		091722-010	SW846 6020
	Iron	0.134	0.033	0.100	NE			091722-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091722-010	SW846 6020
	Magnesium	21.2	0.010	0.030	NE			091722-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091722-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091722-010	SW846 7470
	Nickel	0.000993	0.0005	0.002	NE	J		091722-010	SW846 6020
	Potassium	5.23	0.080	0.300	NE			091722-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091722-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091722-010	SW846 6020
	Sodium	51.4	0.800	2.50	NE			091722-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091722-010	SW846 6020
	Uranium	0.00693	0.000067	0.0002	0.030			091722-010	SW846 6020
	Vanadium	0.00157	0.001	0.005	NE	J		091722-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091722-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Continued)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW9	Aluminum	ND	0.015	0.050	NE	U		091709-010	SW846 6020
06-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091709-010	SW846 6020
	Arsenic	0.00385	0.0017	0.005	0.010	J		091709-010	SW846 6020
	Barium	0.111	0.0006	0.002	2.00		J+	091709-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091709-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091709-010	SW846 6020
	Calcium	73.6	0.300	1.00	NE	B		091709-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091709-010	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		091709-010	SW846 6020
	Copper	0.00054	0.00035	0.001	NE	B, J	0.00205U	091709-010	SW846 6020
	Iron	0.0983	0.033	0.100	NE	J	NJ-	091709-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091709-010	SW846 6020
	Magnesium	20.5	0.010	0.030	NE		J	091709-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091709-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091709-010	SW846 7470
	Nickel	0.00131	0.0005	0.002	NE	B, J	0.00366UJ	091709-010	SW846 6020
	Potassium	5.72	0.080	0.300	NE			091709-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091709-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091709-010	SW846 6020
	Sodium	47.6	0.080	0.250	NE			091709-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091709-010	SW846 6020
	Uranium	0.00979	0.000067	0.0002	0.030			091709-010	SW846 6020
	Vanadium	0.00904	0.001	0.005	NE			091709-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091709-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-6 *(Concluded)*
Summary of Filtered Target Analyte List Metals plus Uranium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW9 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		091710-010	SW846 6020
06-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091710-010	SW846 6020
	Arsenic	0.00359	0.0017	0.005	0.010	J		091710-010	SW846 6020
	Barium	0.110	0.0006	0.002	2.00		J+	091710-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091710-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091710-010	SW846 6020
	Calcium	71.5	0.300	1.00	NE	B		091710-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	091710-010	SW846 6020
	Cobalt	0.000126	0.0001	0.001	NE	J		091710-010	SW846 6020
	Copper	0.000606	0.00035	0.001	NE	B, J	0.00205U	091710-010	SW846 6020
	Iron	0.0934	0.033	0.100	NE	J	NJ-	091710-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091710-010	SW846 6020
	Magnesium	21.1	0.010	0.030	NE		J	091710-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091710-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091710-010	SW846 7470
	Nickel	0.00128	0.0005	0.002	NE	B, J	0.00366UJ	091710-010	SW846 6020
	Potassium	5.71	0.080	0.300	NE			091710-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091710-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091710-010	SW846 6020
	Sodium	47.4	0.080	0.250	NE			091710-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091710-010	SW846 6020
	Uranium	0.00963	0.000067	0.0002	0.030			091710-010	SW846 6020
	Vanadium	0.00869	0.001	0.005	NE			091710-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091710-010	SW846 6020

Refer to footnotes on page 4A-33.

Table 4A-7
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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	-2.59 ± 6.42	10.4	5.10	NE	U	BD	091713-033	EPA 901.1
07-Feb-12	Cesium-137	-2.2 ± 2.12	3.04	1.47	NE	U	BD	091713-033	EPA 901.1
	Cobalt-60	2.32 ± 2.14	3.48	1.66	NE	U	BD	091713-033	EPA 901.1
	Potassium-40	33.4 ± 43.7	29.9	14.1	NE	X	R	091713-033	EPA 901.1
	Gross Alpha	4.82	NA	NA	15 pCi/L	NA	None	091713-034	EPA 900.0
	Gross Beta	4.21 ± 1.43	1.86	0.898	4 mrem/yr		J	091713-034	EPA 900.0
	Tritium	-3.18 ± 57.8	107	48.8	NE	U	BD	091713-036	EPA 906.0 M
MWL-MW4	Americium-241	8.77 ± 8.45	12.2	5.94	NE	U	BD	091725-033	EPA 901.1
14-Feb-12	Cesium-137	-0.612 ± 2.38	4.20	1.99	NE	U	BD	091725-033	EPA 901.1
	Cobalt-60	1.31 ± 2.31	4.34	2.01	NE	U	BD	091725-033	EPA 901.1
	Potassium-40	3.14 ± 45.3	39.1	17.9	NE	U	BD	091725-033	EPA 901.1
	Gross Alpha	1.35	NA	NA	15 pCi/L	NA	None	091725-034	EPA 900.0
	Gross Beta	6.80 ± 1.73	1.83	0.882	4 mrem/yr			091725-034	EPA 900.0
	Tritium	91.8 ± 71.1	110	50.3	NE	U	BD	091725-036	EPA 906.0 M
MWL-MW5	Americium-241	-2.96 ± 8.29	12.1	5.91	NE	U	BD	091718-033	EPA 901.1
08-Feb-12	Cesium-137	0.448 ± 1.71	2.95	1.41	NE	U	BD	091718-033	EPA 901.1
	Cobalt-60	0.222 ± 1.73	3.05	1.43	NE	U	BD	091718-033	EPA 901.1
	Potassium-40	3.07 ± 36.9	29.2	13.6	NE	U	BD	091718-033	EPA 901.1
	Gross Alpha	10.51	NA	NA	15 pCi/L	NA	None	091718-034	EPA 900.0
	Gross Beta	7.87 ± 2.57	3.36	1.63	4 mrem/yr		NJ+	091718-034	EPA 900.0
	Tritium	14.9 ± 62.0	111	50.7	NE	U	BD	091718-036	EPA 906.0 M
MWL-MW5 (Duplicate)	Americium-241	0.139 ± 11.6	17.8	8.75	NE	U	BD	091719-033	EPA 901.1
08-Feb-12	Cesium-137	-0.738 ± 1.92	3.20	1.54	NE	U	BD	091719-033	EPA 901.1
	Cobalt-60	1.91 ± 2.16	3.67	1.75	NE	U	BD	091719-033	EPA 901.1
	Potassium-40	-23.8 ± 40.5	43.9	21.1	NE	U	BD	091719-033	EPA 901.1
	Gross Alpha	6.26	NA	NA	15 pCi/L	NA	None	091719-034	EPA 900.0
	Gross Beta	6.24 ± 2.20	2.94	1.42	4 mrem/yr		NJ+	091719-034	EPA 900.0
	Tritium	50.0 ± 64.7	109	49.4	NE	U	BD	091719-036	EPA 906.0 M

Refer to footnotes on page 4A-33.

Table 4A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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-MW6	Americium-241	-2.49 ± 5.09	8.45	4.14	NE	U	BD	091704-033	EPA 901.1
02-Feb-12	Cesium-137	1.14 ± 1.70	2.96	1.43	NE	U	BD	091704-033	EPA 901.1
	Cobalt-60	1.58 ± 2.13	3.32	1.58	NE	U	BD	091704-033	EPA 901.1
	Potassium-40	-0.218 ± 32.6	42.2	20.3	NE	U	BD	091704-033	EPA 901.1
	Gross Alpha	9.66	NA	NA	15 pCi/L	NA	None	091704-034	EPA 900.0
	Gross Beta	7.04 ± 1.68	1.57	0.754	4 mrem/yr			091704-034	EPA 900.0
	Tritium	21.5 ± 62.7	111	50.7	NE	U	BD	091704-036	EPA 906.0 M
MWL-MW7	Americium-241	2.18 ± 4.07	6.27	3.03	NE	U	BD	091728-033	EPA 901.1
15-Feb-12	Cesium-137	1.42 ± 6.50	6.08	2.91	NE	U	BD	091728-033	EPA 901.1
	Cobalt-60	1.52 ± 3.11	5.78	2.68	NE	U	BD	091728-033	EPA 901.1
	Potassium-40	4.66 ± 52.5	71.7	33.7	NE	U	BD	091728-033	EPA 901.1
	Gross Alpha	4.99	NA	NA	15 pCi/L	NA	None	091728-034	EPA 900.0
	Gross Beta	2.89 ± 1.40	2.04	0.986	4 mrem/yr		J	091728-034	EPA 900.0
	Tritium	-16.4 ± 58.0	110	50.2	NE	U	BD	091728-036	EPA 906.0 M
MWL-MW8	Americium-241	2.52 ± 4.26	6.93	3.35	NE	U	BD	091722-033	EPA 901.1
10-Feb-12	Cesium-137	2.54 ± 3.29	5.68	2.68	NE	U	BD	091722-033	EPA 901.1
	Cobalt-60	0.453 ± 3.11	5.89	2.68	NE	U	BD	091722-033	EPA 901.1
	Potassium-40	-11.5 ± 44.7	73.2	34.0	NE	U	BD	091722-033	EPA 901.1
	Gross Alpha	3.80	NA	NA	15 pCi/L	NA	None	091722-034	EPA 900.0
	Gross Beta	6.62 ± 1.78	2.03	0.983	4 mrem/yr			091722-034	EPA 900.0
	Tritium	57.2 ± 66.3	110	50.1	NE	U	BD	091722-036	EPA 906.0 M
MWL-MW9	Americium-241	-0.545 ± 11.5	17.8	8.71	NE	U	BD	091709-033	EPA 901.1
06-Feb-12	Cesium-137	-1.45 ± 2.22	3.60	1.73	NE	U	BD	091709-033	EPA 901.1
	Cobalt-60	1.29 ± 2.32	4.13	1.95	NE	U	BD	091709-033	EPA 901.1
	Potassium-40	-55.2 ± 49.4	51.3	24.4	NE	U	BD	091709-033	EPA 901.1
	Gross Alpha	3.08	NA	NA	15 pCi/L	NA	None	091709-034	EPA 900.0
	Gross Beta	5.70 ± 1.88	2.46	1.20	4 mrem/yr		J	091709-034	EPA 900.0
	Tritium	-19.3 ± 56.7	108	49.3	NE	U	BD	091709-036	EPA 906.0 M

Refer to footnotes on page 4A-33.

Table 4A-7 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 (Duplicate)	Americium-241	3.32 ± 12.2	19.4	9.50	NE	U	BD	091710-033	EPA 901.1
06-Feb-12	Cesium-137	0.318 ± 2.11	3.69	1.78	NE	U	BD	019710-033	EPA 901.1
	Cobalt-60	1.70 ± 2.32	4.03	1.91	NE	U	BD	091710-033	EPA 901.1
	Potassium-40	-28.4 ± 46.5	53.1	25.5	NE	U	BD	091710-033	EPA 901.1
	Gross Alpha	3.20	NA	NA	15 pCi/L	NA	None	091710-034	EPA 900.0
	Gross Beta	6.27 ± 1.53	1.50	0.719	4 mrem/yr			091710-034	EPA 900.0
	Tritium	14.5 ± 60.4	108	49.3	NE	U	BD	091710-036	EPA 906.0 M

Refer to footnotes on page 4A-33.

Table 4A-8
Summary of Field Water Quality Measurements[h], Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
MWL-BW2	07-Feb-12	16.71	761	388.7	7.12	1.34	21.9	2.34
MWL-MW4	14-Feb-12	18.70	651	341.9	8.11	1.28	24.7	2.26
MWL-MW5	08-Feb-12	18.58	966	382.6	6.99	0.30	30.4	2.79
MWL-MW6	02-Feb-12	19.07	936	393.0	7.03	0.15	33.0	3.08
MWL-MW7	15-Feb-12	17.16	638	383.5	7.35	0.56	51.0	4.90
MWL-MW8	10-Feb-12	14.30	646	380.0	7.41	1.62	40.9	4.18
MWL-MW8 (Resample)	28-Mar-12	19.98	573	61.1	7.75	1.60	43.7	3.95
MWL-MW9	06-Feb-12	12.79	636	378.9	7.52	2.60	76.3	8.07

Refer to footnotes on page 4A-33.

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Footnotes for Mixed Waste Landfill Groundwater Monitoring Tables

[a]**Result**
- Values in bold exceed the established MCL.
- ND = not detected (at method detection limit).
- 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)
- µg/L = micrograms per liter.
- mg/L = milligrams per liter.
- pCi/L = picocuries per liter.

[b]**MDL or MDA**
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.

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.

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**
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.

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.

[d]**MCL**
- Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards (EPA July 2002).
- NE = not established.
- 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 4A- 1-4).
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

[e]**Laboratory Qualifier**

B	=	Analyte is detected in associated laboratory method blank.
J	=	Estimated value, the analyte concentration is below the practical quantitation limit (PQL).
NA	=	Not applicable.
U	=	Analyte is absent or below the method detection limit.
X	=	Data rejected due to high counting uncertainty.

[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.
NJ-	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected negative bias.
R	=	The data are unusable (compound may or may not be present). 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.

Footnotes for Mixed Waste Landfill Groundwater Monitoring Tables *(Concluded)*

[g]Analytical Method

- EPA, 1986 (and updates), *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed.
- EPA, 1984, *Methods for Chemical Analysis of Water and Wastes*, EPA 600-4-79-020.
- EPA, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.
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[h]Field Water Quality Measurements

- Field measurements collected prior to sampling.

°C	= degrees Celsius.
% Sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 4B
Mixed Waste Landfill
Hydrographs

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Attachment 4B Hydrographs

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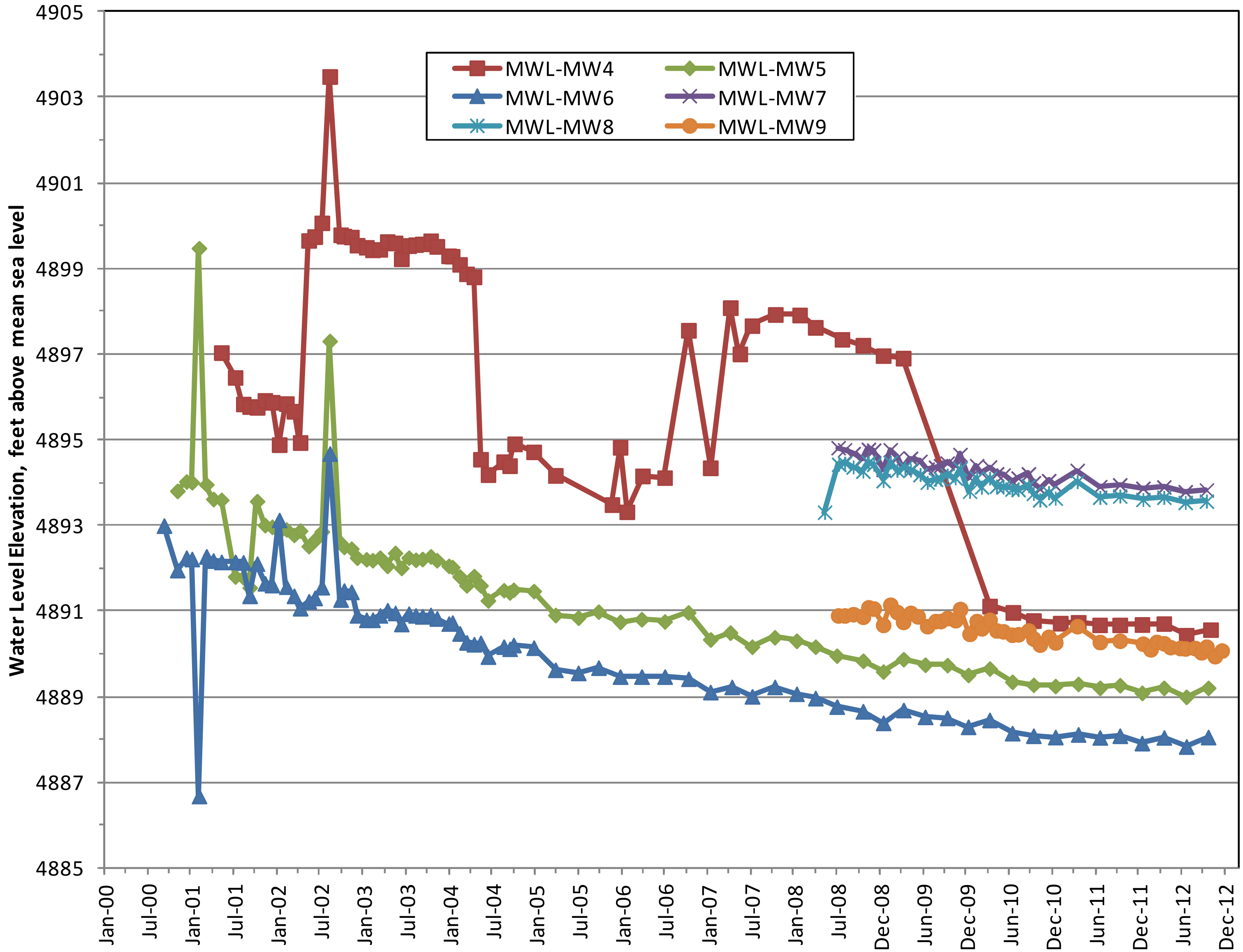

Figure 4B-1. MWL Study Area Wells (1 of 2)

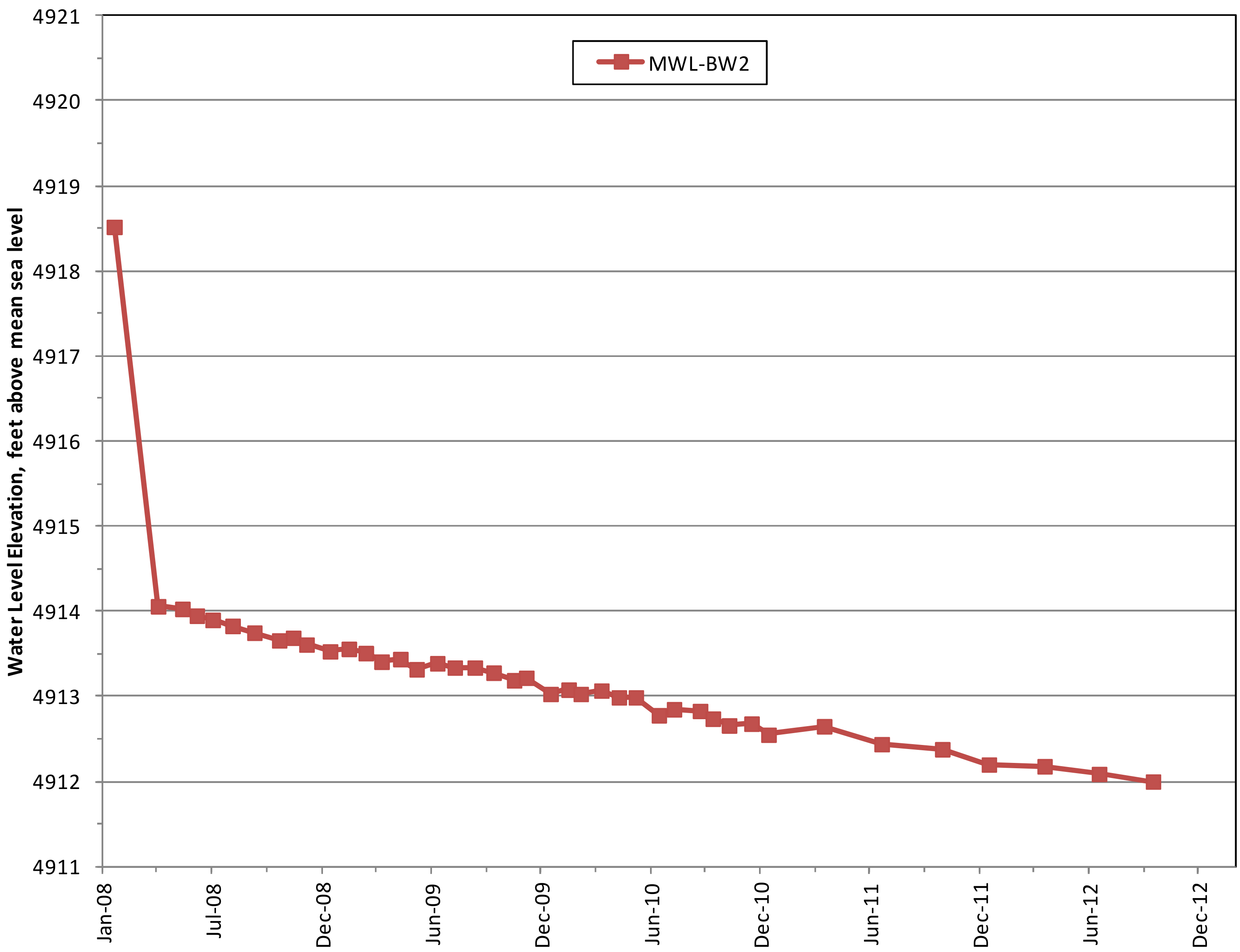

Figure 4B-2. MWL Study Area Wells (2 of 2)

5.0 Technical Area V Groundwater

5.1 Introduction

Trichloroethene (TCE) and nitrate have been identified as constituents of concern (COCs) in groundwater at the Technical Area (TA)-V Groundwater Investigation Study Area (TA-V study area) 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 the TA-V study area have been 26 micrograms per liter (µg/L) of TCE and 19 milligrams per liter (mg/L) of nitrate. 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 TA-V study area include low concentrations of TCE and nitrate in a deep alluvial aquifer.

5.1.1 Location

TA-V occupies approximately 35 acres in the northeastern corner of TA-III (Figure 5-1) at Sandia National Laboratories, New Mexico (SNL/NM). TA-V is located in the north-central portion of Kirtland Air Force Base (KAFB), south of the City of Albuquerque (Figure 5-1). The SNL/NM facility is a government-owned, contractor-operated, multi-program laboratory overseen by the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) through the Sandia Field Office in Albuquerque, New Mexico. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM under Contract DE-AC04-94AL85000.

TA-V is situated within the Albuquerque Basin, and the vadose zone at TA-V is approximately 500 feet (ft) in thickness and 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 municipal well fields located north of KAFB and from water supply wells located in the northern portion of KAFB.

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 containing contaminants derived from TA-V facilities was disposed of to drain fields, seepage pits, and unlined surface impoundments. SNL/NM Environmental Restoration (ER) Operations (formerly ER Project) personnel have conducted numerous groundwater investigations in the TA-V study area 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 TA-V study area 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 TA-V study area have been conducted by SNL/NM over the past 20 years (Table 5-1). Groundwater monitoring at TA-V began in October 1992. TCE was first detected in monitoring well LWDS-MW1 in October 1993 and was later detected in monitoring well TAV-MW1 in September 1995. Since then, low concentrations of TCE have been consistently detected during quarterly sampling events. Potential sources for TCE in groundwater include the Liquid Waste Disposal System (LWDS) drain field and surface impoundments and the TA-V seepage pits (Section 5.1.7).

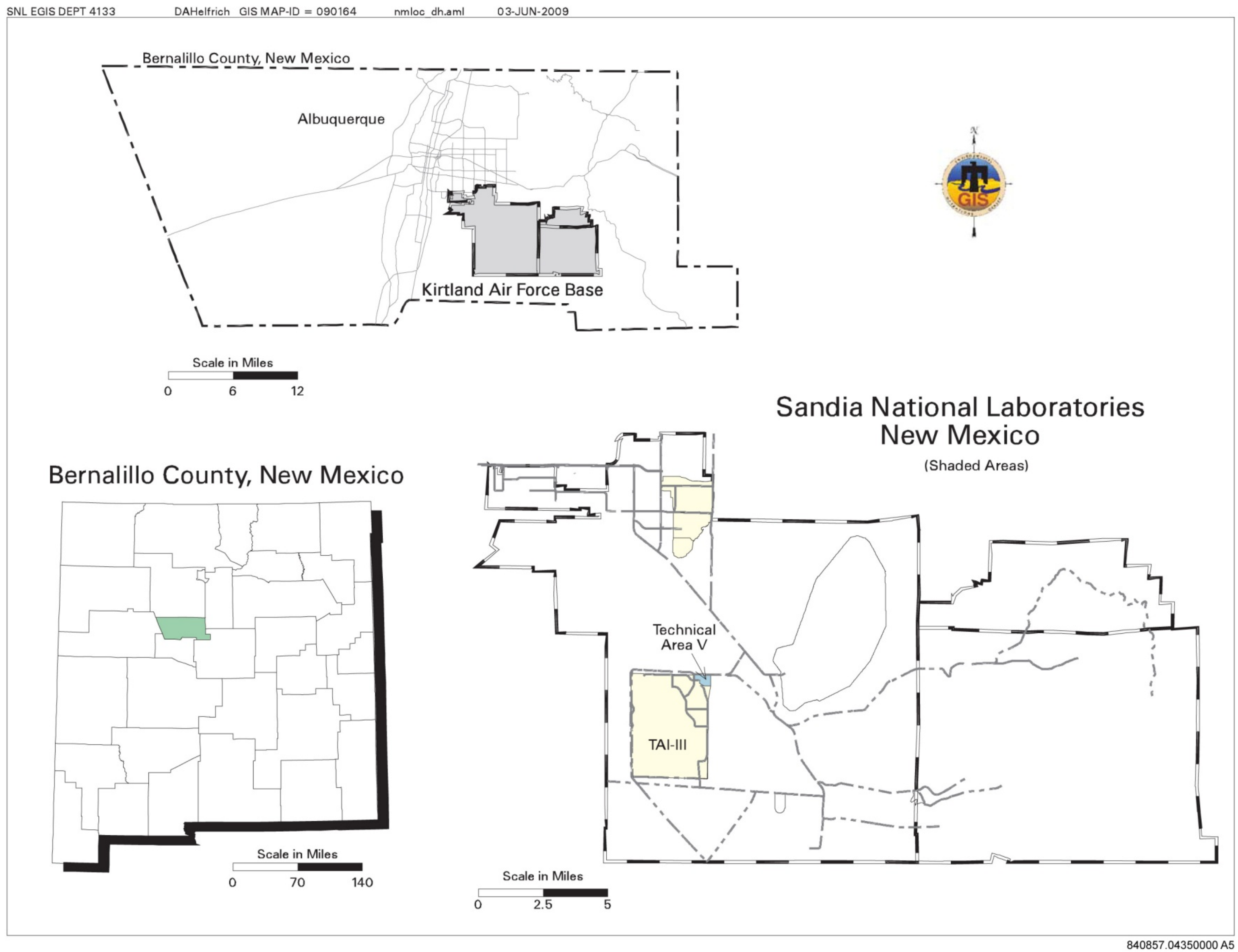

Figure 5-1. Location of the TA-V Study Area

Table 5-1. Historical Timeline of the TA-V Study Area

Month	Year	Event	Reference
May	1959	KAFB water supply well KAFB-10 is installed west of TA-V and north of TA-III. Water from the well was used as auxiliary water for fire protection.	NMOSE May 1959
April	1992	The LWDS RFI Work Plan is submitted. The investigation will examine SWMUs 4, 5, and 52.	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 method detection limit, 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 Calendar Year 1994 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1995
June	1995	Report submitted discussing water quality issues reported in the Calendar Year 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 Calendar Year 1995 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1996
March	1996	Submit a letter to the NMED with notification of a 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 as there was a potential for the ungrouted annulus for this production well to act as a conduit.	SNL April 1996
March	1997	Groundwater sampling analytical results for TA-V wells reported in the Calendar Year 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 Calendar Year 1997 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1998

Table 5-1. Historical Timeline of the TA-V Study Area *(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 Fiscal Year 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 Fiscal Year 1999 SNL/NM Annual Groundwater Monitoring Report	SNL March 2000
April	2001	Groundwater sampling analytical results for TA-V wells reported in the Fiscal Year 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 Fiscal Years 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 Fiscal Year 2001 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2002
March	2003	Groundwater sampling analytical results for TA-V wells reported in the Fiscal Year 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 Fiscal Year 2003 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2004
April	2004	The NMED issues the Compliance Order on Consent (the Order) to the DOE/Sandia, which identified TA-V as an area with groundwater contamination requiring a CME.	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 Order.	SNL April 2004a
May	2004	Submit the *Corrective Measures Evaluation Work Plan, Technical Area V Groundwate*r. This document was required by the 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

Table 5-1. Historical Timeline of the TA-V Study Area *(Continued)*

Month	Year	Event	Reference
December	2004	Submit responses to the NMED request 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 Fiscal Year 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 Fiscal Year 2005 SNL/NM Annual Groundwater Monitoring Report.	SNL November 2006
March	2007	Groundwater sampling analytical results for TA-V wells reported in the Fiscal Year 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 Fiscal Year 2007 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2008
July	2008	NMED issues an NOD on the July 2005 CME Report for TA-V Groundwater.	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 in the TA-V study area.	NMED April 2009
April	2009	Submit a response to the NOD on the July 2005 CME Report for TA-V Groundwater.	SNL April 2009
June	2009	Groundwater sampling analytical results for TA-V wells reported in the Calendar Year 2008 SNL/NM Annual Groundwater Monitoring Report.	SNL June 2009
August	2009	NMED issues a second NOD on the July 2005 CME Report for TA-V Groundwater.	NMED August 2009

Table 5-1. Historical Timeline of the TA-V Study Area *(Concluded)*

Month	Year	Event	Reference
November	2009	Submit a response to the second NOD on the July 2005 CME Report for TA-V Groundwater.	SNL November 2009
December	2009	NMED issues a third NOD on the July 2005 CME Report for TA-V Groundwater.	NMED December 2009
February	2010	Submit a response to the third NOD on the July 2005 CME Report for TA-V Groundwater.	SNL February 2010
May	2010	NMED issues a notice of conditional approval for the TA-V Groundwater Investigation Work Plan associated with July 2005 TA-V Groundwater CME Report.	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 Calendar Year 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 Calendar Year 2010 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2011
September	2012	Groundwater sampling analytical results for TA-V wells reported in the Calendar Year 2011 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2012a

NOTES:

CME = Corrective Measures Evaluation.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
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.
TCE = Trichloroethene.

In April 2004, the Compliance Order on Consent (the Order) became effective between the New Mexico Environment Department (NMED), DOE, and Sandia. The Order specifies TA-V as an area of groundwater contamination (NMED April 2004). Since the initial discoveries of TCE and nitrate at the TA-V study area, 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 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/NNSA and Sandia in April 2004. The Current Conceptual Model provides a comprehensive list of groundwater monitoring data sources used to support the summary of investigations. 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).

5.1.4 Current Monitoring Network

In Calendar Year (CY) 2012, 16 wells in the TA-V study area were being monitored for water quality and water levels (Figure 5-2; Table 5-2). Table XI-1 of the Order (NMED April 2004) specifies that the sampling frequency for groundwater monitoring at TA-V is quarterly.

5.1.5 Summary of Calendar Year 2012 Activities

The following activities took place for the TA-V study area during CY 2012:

- Obtained monthly or quarterly water level measurements for all TA-V study area wells.

- Conducted semiannual and quarterly groundwater sampling events at 16 wells (Table 5-2) in February/March, May/June, July/August, and October/November 2012 (SNL February 2012, April 2012, June 2012, and September 2012b).

- Prepared tables of analytical results (Attachment 5A), concentration versus time plots (Attachment 5B), and hydrographs (Attachment 5C) in support of this report.

- Conducted quarterly soil-vapor sampling events at three wells in February, May, August, and November 2012. The analytical results for these three sampling events are presented in the report entitled *Technical Area V Soil-Vapor Monitoring, Calendar Year 2012 Activities* (Attachment 5D), which includes analytical tables and concentration versus time plots.

5.1.6 Summary of Future Activities

The following activities are anticipated for the TA-V study area during CY 2013:

- Obtain periodic water level measurements for TA-V study area wells
- Conduct quarterly or semiannual groundwater sampling at 16 TA-V study area wells
- Conduct quarterly soil-vapor sampling at three TA-V study area wells

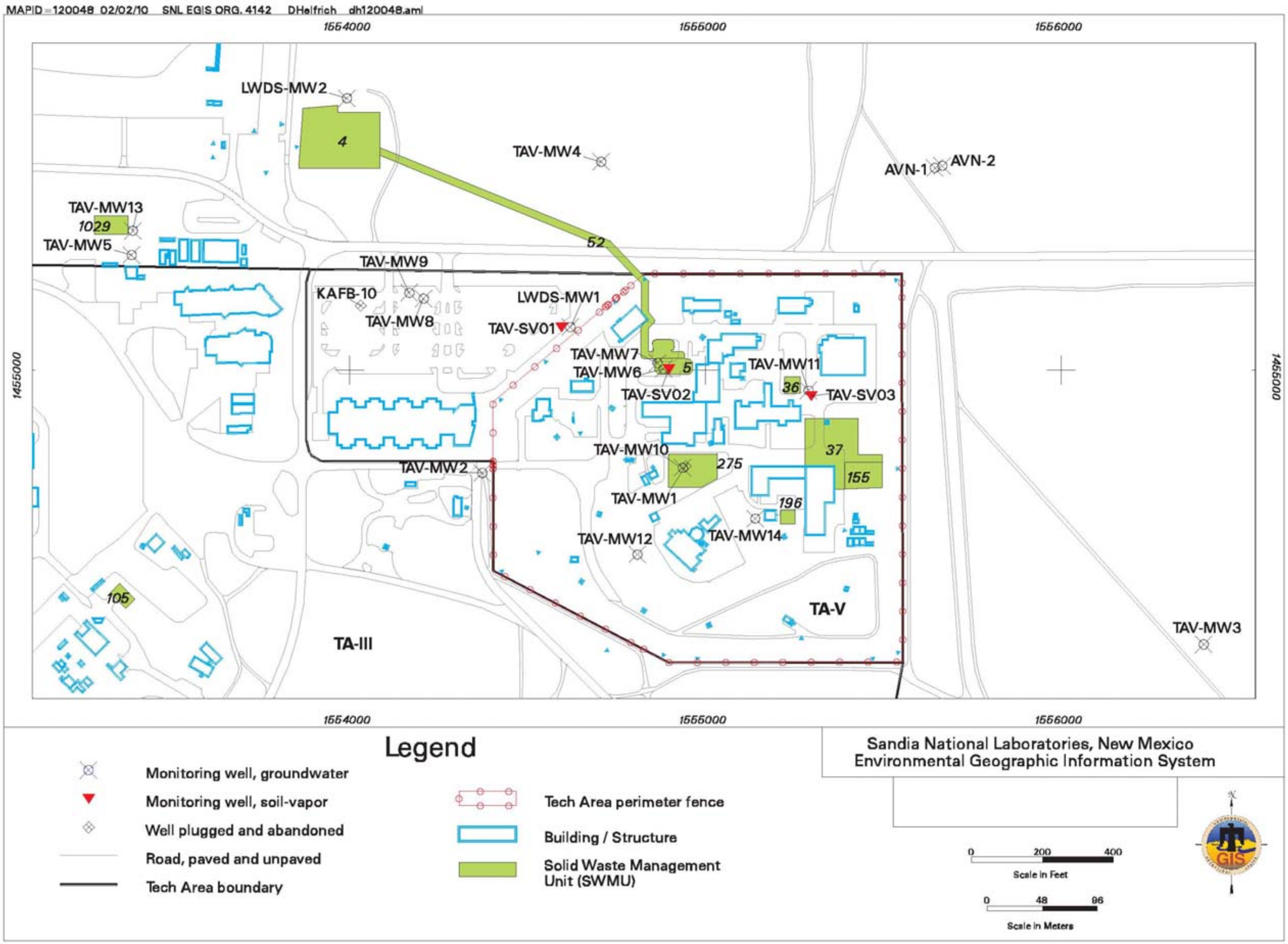

Figure 5-2. TA-V Monitoring Well Locations (16 Active Groundwater Monitoring Wells)

Table 5-2. Groundwater Monitoring Wells at the TA-V Study Area

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			Regional aquifer; water table completion (currently dry)
TAV-MW1	1995			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 WQ sampling and WL measurements were obtained during this reporting period.

AVN = Area V (North).
bgs = Below ground surface.
ft = Foot (feet).
LWDS = Liquid Waste Disposal System.
MW = Monitoring well.
TA-V = Technical Area V.
WL = Water level.
WQ = Water quality.

5.1.7 Current Conceptual Model

The conceptual site model of contaminant transport at TA-V includes release from the source term, migration through the vadose zone, and movement in groundwater.

TCE and other organic chemicals were presumably present in wastewater that was discharged to the LWDS drain field from 1962 to 1967 and to the TA-V seepage pits from the 1960s until the early 1980s, when disposal practices were modified to protect the environment. Wastewater was disposed of at the surface impoundments from 1967 to 1972. Wastewater continued to be discharged to the seepage pits from the early 1980s until 1992, but it contained no TCE.

Water containing dissolved concentrations of TCE and other organic chemicals moved rapidly through the alluvial-fan lithofacies into the aquifer. Upon cessation of disposal, vertical pathways to the aquifer drained rapidly. Continued flushing of the vadose zone beneath the seepage pits until 1992 likely removed significant sources of secondary contaminants.

Low concentrations of TCE present in the aquifer today are a result of these initial releases. The slow rate of horizontal groundwater flow (4 to 20 feet per year [ft/yr]) is responsible for the present distribution of TCE in the aquifer.

Nitrate concentrations in groundwater at TA-V, which are presumably derived from unknown upgradient sources, have exceeded MCLs in the two upgradient AVN wells (AVN-1 and AVN-2 [now dry]) that are currently being studied by KAFB. Concentrations have also exceeded MCLs in samples from wells located in TA-V (LWDS-MW1 and TAV-MW10), suggesting an additional local source of nitrate. However, septic waste was not discharged or disposed of to the three SWMUs (4, 5, and 275) at TA-V.

5.1.7.1 Regional Hydrogeologic Conditions

SNL/NM 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 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 today 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 all three subbasins, and most “pinch out” against the subsurface basement blocks that separate the subbasins. 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.

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 pumping centers 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.

Contaminant transport at TA-V is constrained by geologic features. The stratigraphic units of hydrologic significance consist of the alluvial-fan lithofacies and Ancestral Rio Grande (ARG) lithofacies. TA-V is largely underlain by a thick section of alluvial-fan deposits. These deposits consist of the alluvial-fan lithofacies of the Santa Fe Group overlain by younger post-Santa Fe Group alluvial-fan deposits. The deepest monitoring well in the study area (AVN-1) penetrated 650 ft of these deposits. The total thickness of deposits at TA-V is not known.

The alluvial-fan lithofacies is further 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 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 ARG deposits interfinger with alluvial-fan deposits west of TA-V. These deposits consist predominantly of uniformly coarse sand and gravel that were deposited with the integration of the Rio Grande drainage system.

5.1.7.2 Hydrologic Conditions at the TA-V Study Area

Direct precipitation may provide one possible source of local recharge. The average annual precipitation at TA-V is 8.7 inches (SNL April 2004a). 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 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 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. But 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 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 unsaturated and saturated 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. Rapid vertical flow through the discontinuous, layered, lenticular sediments in the vadose zone may be somewhat attenuated or diverted at horizons of contrasting hydraulic properties. Discharge of wastewater to the drain field was discontinued in 1967. Discharge to the surface impoundments and seepage pits was discontinued in 1972 and 1992, respectively.

No evidence of groundwater perching has been observed at TA-V. Based on moisture content measurements in vadose-zone sediment samples, drainage of residual water from the vadose zone to the aquifer was rapid after discharge ceased; minimal moisture from wastewater discharge at TA-V probably remains in the vadose zone.

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. The average horizontal hydraulic conductivity for these sediments is estimated to be about 1.24×10^{-4} ft per minute (SNL March 1999a). Vertical hydraulic conductivity is estimated to be one-tenth to one-hundredth the horizontal hydraulic conductivity.

5.1.7.3 Local Direction of Flow

Water levels measured in 16 monitoring wells were used to construct a map of the regional-aquifer potentiometric surface at TA-V (Figure 5-3). The potentiometric surface indicates that the regional groundwater flow beneath TA-V is generally to the northwest. Localized flow paths are to the west and southwest. The horizontal gradient ranges from approximately 0.0007 to 0.002 feet per foot. Calculated groundwater flow velocities based on aquifer testing range from 4 to 10 ft/yr (SNL March 1999a). Water-table contours for October 2012 suggest that a subtle groundwater mound is present at TA-V. This apparent groundwater mound is considered to be an artifact of regional water level declines within a heterogeneous aquifer and does not represent residual mounding from wastewater disposal that was discontinued in the early 1990s (SNL March 1999a).

Water-level data indicate that groundwater flow to the west of TA-V turns sharply to the north, moving toward Albuquerque Bernalillo County Water Utility Authority (ABCWUA) pumping centers located north of KAFB and 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 than the fine-grained sediments of the alluvial-fan lithofacies at TA-V and allow for more rapid flow.

Vertical flow gradients in the regional aquifer within the TA-V study area are strongly downward. Historically, water levels in the regional aquifer have been declining at a rate approaching 1.3 ft/yr (Attachment 5C, Figures 5C-1 through 5C-3).

5.1.7.4 Contaminant Sources

Contaminant migration in the subsurface at TA-V is controlled by local recharge to the Santa Fe Group aquifer and by the permeability of the sedimentary units in the vadose zone and aquifer. Possible sources of recharge include infiltration of wastewater disposed of at TA-V, precipitation, and ephemeral flows in nearby arroyos.

The majority of wastewater discharged at TA-V occurred at SWMUs 4, 5, and 275. Table 5-3 identifies the dates of disposal and estimated disposal volumes. After 1992, wastewater was diverted to the ABCWUA sanitary sewer system.

Sampling and analysis have been conducted in the vadose zone to characterize the presence of COCs. Locations of investigations are based on possible source terms (Table 5-3). Overall, the presence of COCs in the vadose zone is minimal. Movement of water and contaminant transport through the vadose zone occurred rapidly, and vadose zone drainage occurred soon after cessation of wastewater disposal.

Within the LWDS drain field, trace quantities of TCE, tetrachloroethene (PCE), and benzene were detected in shallow borehole soil-vapor samples collected during 1994 (SNL March 1999a). The possibility of vadose zone contamination was further investigated with the installation of monitoring wells TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9 in March and April 2001. The results for soil and soil-vapor samples show no significant volatile organic compounds (VOCs) residual soil contamination in the vadose zone. Also, no results have shown evidence of excessive moisture in the vadose zone sediments; therefore, no significant residual contaminated water is present in the vadose zone beneath the LWDS drain field (SNL October 2001).

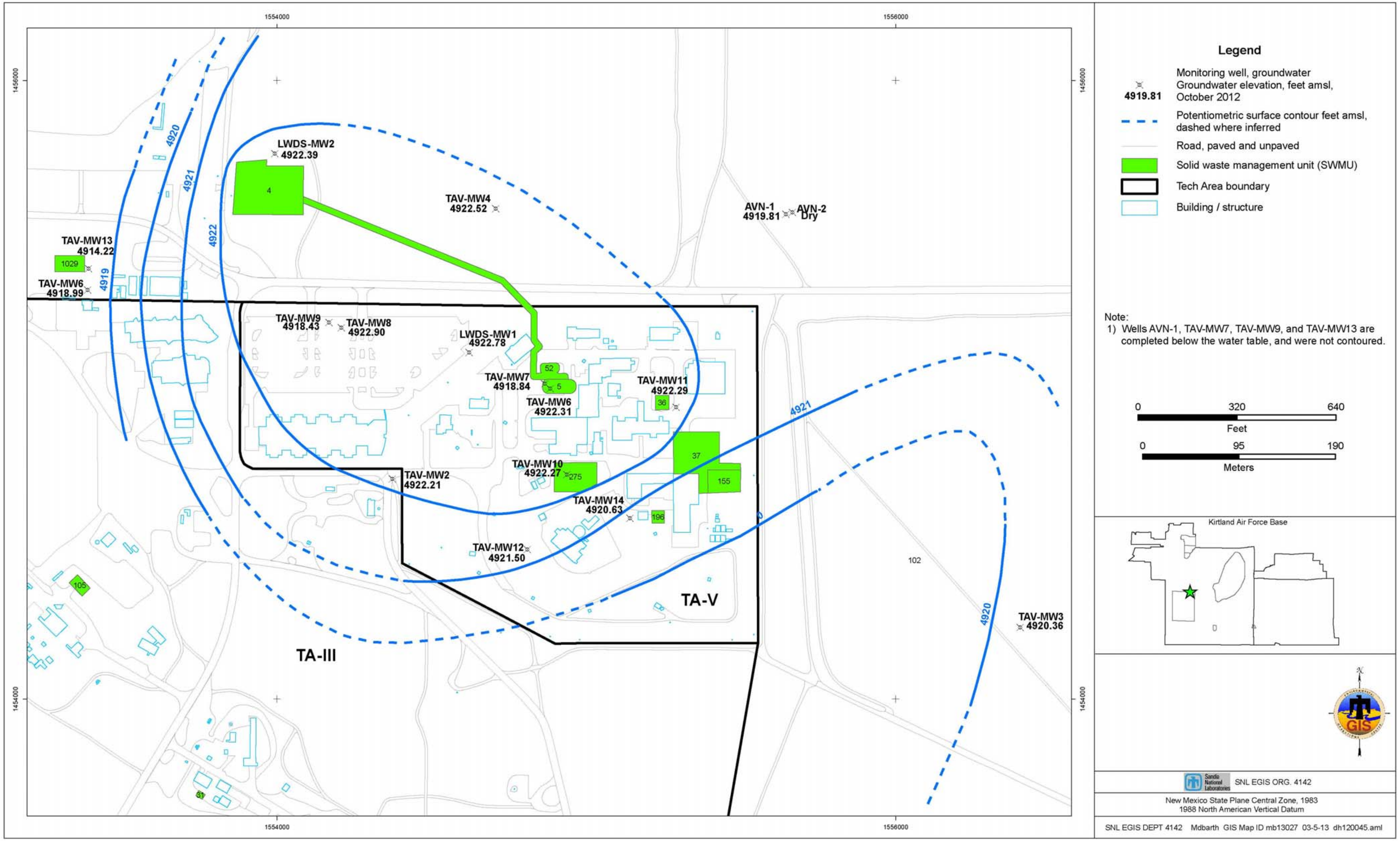

Figure 5-3. TA-V Study Area Potentiometric Surface Map (October 2012)

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

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

NOTES:
LWDS = Liquid Waste Disposal System.
SWMU = Solid Waste Management Unit.
TA-V = Technical Area V.

In the vicinity of the TA-V seepage pits, trace quantities of TCE, PCE, benzene, toluene, and total xylene were detected in shallow and deep vadose-zone borehole soil-vapor samples collected during passive, surficial characterization studies conducted during 1994 and 1995. Vapor-phase TCE was detected at 44 parts per billion (by volume) at a depth of 80 ft below ground surface in TAV-BH-01 (SNL March 1999a). Solvent disposals to the seepage pits were most likely reduced in the early 1980s, but wastewater disposal continued. This likely flushed into the aquifer any residual COCs that may have been present in the vapor and aqueous phase in the vadose zone.

Other surface contamination sites have been investigated at TA-V. Investigations have included surface and subsurface passive and active vapor-phase sampling for VOCs. Sampling results have shown that these other sites probably have not contributed to groundwater contamination. For example, only trace quantities of TCE, methylene chloride, trichloroethane, benzene, and toluene were detected in shallow soil samples collected at SWMU 196 (Building 6597 cistern).

Because TCE is volatile and the vapors are denser than ambient air, the physical properties of TCE are conducive to downward vapor-phase transport; therefore, vapor transport in the vadose zone is a possible mechanism for the presence of TCE in the regional aquifer. Some TCE will typically be retained in the vadose zone due to adsorption onto fine-grained materials and capillary forces.

Three physical processes, occurring in the vadose zone, affect the potential migration of TCE into the regional aquifer as follows:

- Vaporization from the water source
- Vapor phase through the vadose zone
- Adsorption onto fine-grained materials within the regional aquifer

Nitrate is present primarily in the aqueous phase in both the vadose zone and aquifer. It is typically nonsorptive and, for the most part, does not absorb onto matrix surfaces in the vadose zone or groundwater. Therefore, any locally derived nitrate most likely was transported through the vadose zone with the initial discharges of wastewater.

5.1.7.5 Contaminant Distribution and Transport in Groundwater

Distribution and transport of COCs and aquifer parameters are discussed in this section. TCE is present in low concentrations in the Santa Fe Group aquifer beneath TA-V. The highest TCE concentrations are not directly under the drain field source; rather, the highest concentrations have migrated in the localized direction of groundwater flow. The TCE distribution depicted on Figure 5-4 shows that the center of the TCE mass is located about 100 ft west of the SWMU 5 drain field and about 150 ft northwest of the SWMU 275 seepage pits.

Maximum historical TCE concentrations reported at TA-V were 23 to 26 µg/L for monitoring well LWDS-MW1 on November 13, 2000. TCE has consistently exceeded the MCL at monitoring well LWDS-MW1 since 1993, and concentrations at monitoring wells TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14 have exceeded the MCL during recent sampling events (Section 5.6). TCE has been found only in water-table completion wells and has not been detected 100 ft below the water table based on data collected from deep monitoring wells TAV-MW7, TAV-MW9, and TAV-MW13.

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, LWDS-MW1, TAV-MW5, and TAV-MW10, although the concentrations do not appear to be increasing over time. The highest reported concentrations for TA-V monitoring wells include the following:

- 13 mg/L for AVN-1 on May 14, 2001
- 16 mg/L for AVN-2 on October 27, 1999
- 13 mg/L for TAV-MW5 on August 18, 1999
- 13.7 mg/L for TAV-MW10 on October 20, 2010
- 19 mg/L for LWDS-MW1 on November 13, 2000, and February 16, 2001

Upgradient wells AVN-1 and AVN-2 were completed at different depths and show relatively consistent nitrate concentrations with depth and over time AVN-2 is currently dry.

The source of nitrate in water from TA-V wells is unknown. Some nitrate may have been disposed of to the subsurface in TA-V sanitary wastes; however, nitrate concentrations exceeding the MCL in the AVN wells suggests that the source of nitrate is regionally upgradient and to the northeast of TA-V. The background nitrate concentration is 4 mg/L.

5.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM ER Operations as well as implements and enforces federal regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER SWMUs and Areas of Concern 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).

All corrective action requirements pertaining to the TA-V study area are contained in the Order (NMED April 2004). Groundwater characterization for TA-V was initiated to satisfy the requirements of the SNL/NM Hazardous and Solid Waste Amendments (HSWA) Permit for characterization of SWMUs (NMED 1993). The groundwater monitoring activities for the TA-V study area are not associated with a single SWMU but are more regional in nature and have historically been voluntarily conducted by SNL/NM ER Operations.

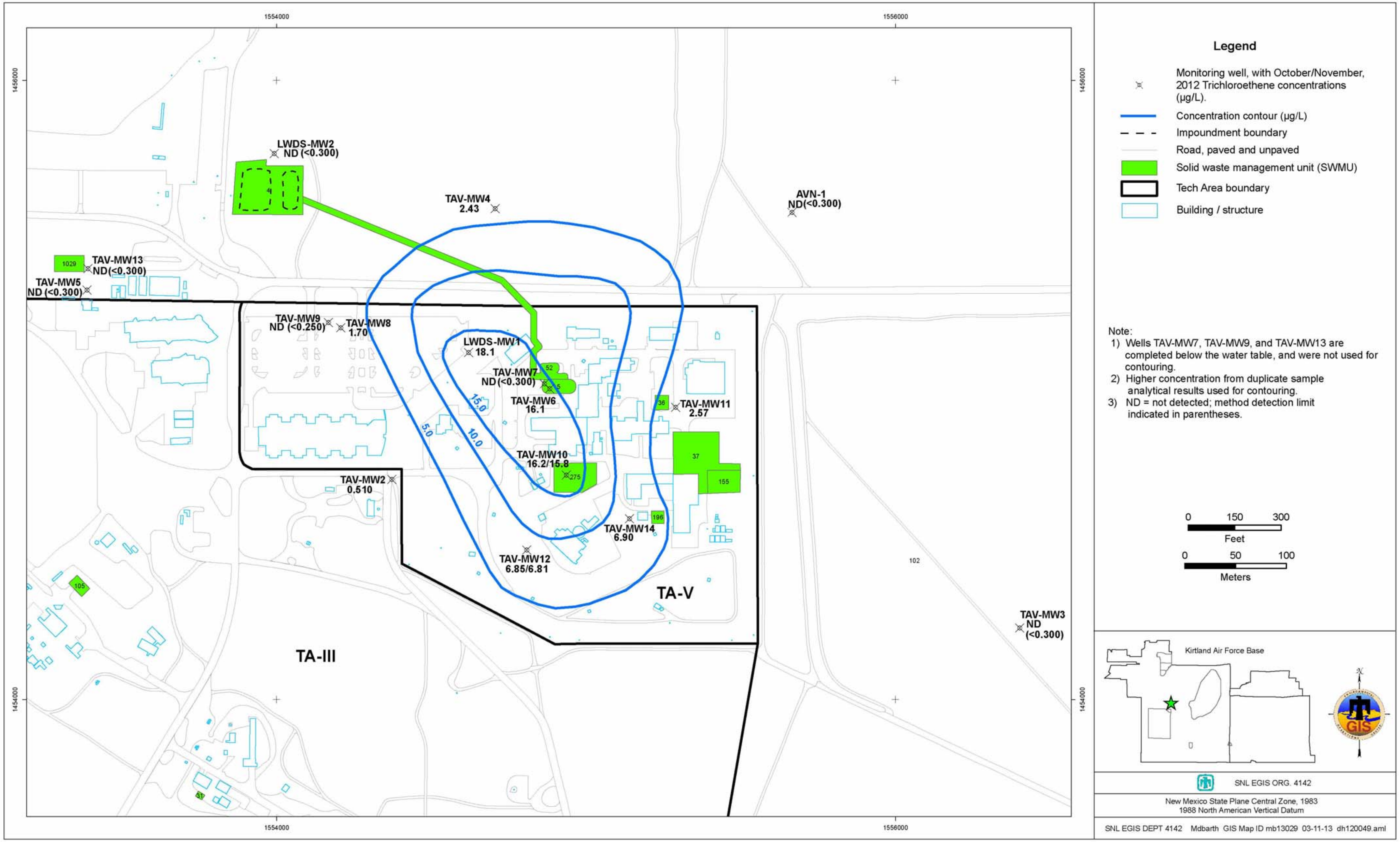

Figure 5-4. Distribution of TCE in Groundwater at SNL/NM TA-V, October/November 2012

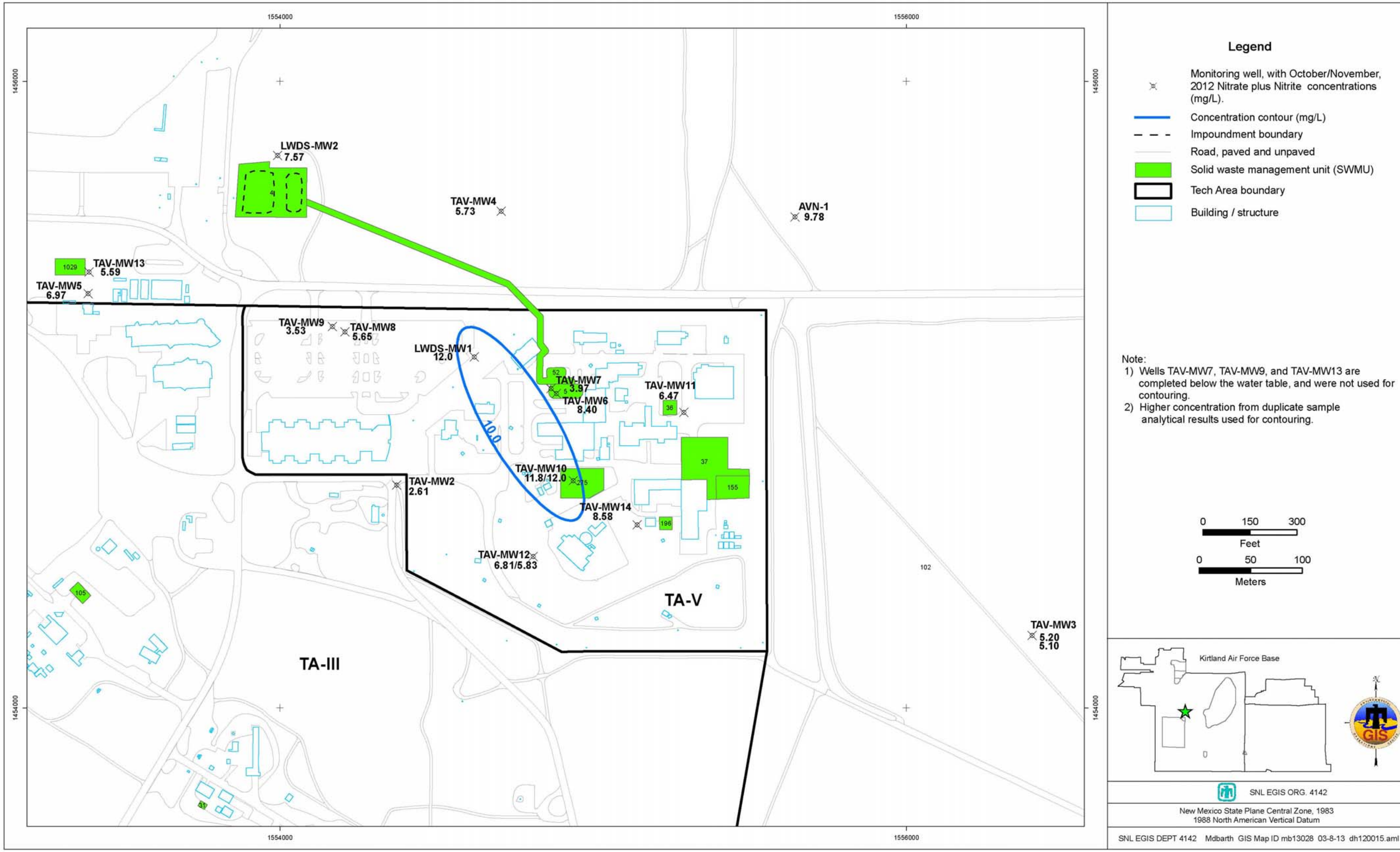

Figure 5-5. Distribution of Nitrate plus Nitrite Results in Groundwater at SNL/NM TA-V, October/November 2012

The 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 Order (NMED April 2004). The TA-V investigations must comply with requirements set forth in the Order for site characterization and development of a CME. The Order also contains schedules that define dates for the delivery of plans and reports related to TA-V.

Although the Order requires that the DOE/NNSA and Sandia evaluate the nature and extent of contamination in the TA-V study area in general terms, no specific reporting requirements are prescribed in the Order (NMED April 2004). DOE/NNSA and Sandia continue to present the TA-V 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 Order.

In this report TA-V groundwater monitoring data are presented for both hazardous and radioactive constituents; however, the analytical data for radionuclides (gamma spectroscopy, 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. Additional information on radionuclides and the scope of the Order is available in Section III.A of the Order (NMED April 2004).

5.3 Scope of Activities

The activities for the TA-V investigation for CY 2012, including plans and reports, are listed in Section 5.1.5. The field activities completed in the study area include groundwater level measurements, soil-vapor monitoring, and groundwater monitoring. The CY 2012 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.

Table 5-4. Groundwater Monitoring Well Network and Sampling Dates for the TA-V Study Area, Calendar Year 2012

Date of Sampling Event	Wells Sampled	SAP
February/March 2012	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 2012* (SNL February 2012)
May/June 2012	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 2012* (SNL April 2012)
July/August 2012	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 2012* (SNL June 2012)
October/November 2012	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 2013* (SNL September 2012b)

NOTES:

AVN = Area V (North).
LWDS = Liquid Waste Disposal System.
MW = monitoring well.
SAP = Sampling and Analysis Plan.
TA-V = Technical Area V.

Table 5-5. Parameters Sampled at TA-V Wells for Each Sampling Event, Calendar Year 2012

Parameter	February/March 2012	Parameter	May/June 2012
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-MW11 TAV-MW12 TAV-MW13 TAV-MW14 TAV-MW14 (dup)	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 TAV-MW2 TAV-MW3 TAV-MW4 TAV-MW5 TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW9 (dup) TAV-MW10 TAV-MW11 TAV-MW12 TAV-MW13 TAV-MW13 (dup) TAV-MW14
Parameter	**July/August 2012**	**Parameter**	**October/November 2012**
Alkalinity Anions Gamma Spec* Gross Alpha Gross Beta NPN Sulfides TAL Metals, plus Total Uranium Total Organic Carbon Tritium VOCs	AVN-1 LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW4 TAV-MW4 (dup) TAV-MW6 TAV-MW8 TAV-MW10 TAV-MW11 TAV-MW11 (dup) TAV-MW12 TAV-MW13 TAV-MW14	Alkalinity Calcium, total Chloride Iron, dissolved Magnesium, total Manganese, dissolved NPN Potassium, total Sodium, total Sulfate Total Organic Carbon VOCs	AVN-1 LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW3 (dup) TAV-MW4 TAV-MW5 TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10 TAV-MW10 (dup) TAV-MW11 TAV-MW12 TAV-MW12 (dup) TAV-MW13 TAV-MW14

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.
TA-V = Technical Area V.
VOC = Volatile organic compound.

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. 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. TB samples are used to determine whether VOCs contaminated the sample during preparation, transportation, or handling prior to receipt by the analytical laboratory.

5.4 Field Methods and Measurements

The monitoring procedures conducted for TA-V groundwater monitoring are described in detail in Section 1.3. The water level information obtained in 2012 was used to develop the potentiometric surface map presented on Figure 5-3 and the hydrographs presented on 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 TA-V study area that exceed regulatory standards. The analytical results and field measurements for all TA-V 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-7. 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 low concentrations in groundwater samples from TA-V study area monitoring wells include the following:

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

Four VOCs were detected during CY 2012. Three of these VOCs have promulgated MCLs. Only TCE exceeds its corresponding MCL, which is 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 20.7 µg/L in the sample from monitoring well LWDS-MW1 collected in March 2012. Figures 5B-1, 5B-2, 5B-3, 5B-4, and 5B-5 (Attachment 5B) show that, over the lifetime of the wells, the TCE concentrations are decreasing over time in monitoring well LWDS-MW1 and increasing over time in monitoring wells TAV-MW6, TAV-MW10, TAV-MW12, and TAV-MW14.

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 and TAV-MW10. The maximum concentration of NPN detected during this reporting period is 13.6 mg/L in the sample collected from monitoring well LWDS-MW1 in June 2012. Figure 5B-6 (Attachment 5B) shows that the NPN concentrations in monitoring well LWDS-MW1 typically have exceeded the MCL, with stable concentrations to slightly decreasing concentrations over time. Figure 5B-7 (Attachment 5B) shows that NPN concentrations in monitoring well TAV-MW10 have slightly exceeded the MCL with the trend increasing over time.

The analytical results for anions (bromide, chloride, fluoride, and sulfate) are presented in Table 5A-4 (Attachment 5A). Only fluoride has a promulgated MCL, and none of the results exceed the fluoride MCL.

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

Total metal results are presented in Table 5A-6, and filtered total metal results are presented in Table 5A-7; no metal results exceed established primary or secondary MCLs (Attachment 5A).

Tritium, gross alpha/beta activity, and gamma spectroscopy results are presented in Table 5A-8; all radionuclide results are below established MCLs (Attachment 5A).

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 (pH), turbidity, and dissolved oxygen. The parameter measurements obtained immediately before sample collection 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 sampling results for all wells and all sampling periods show good correlation (relative percent difference [RPD] values of less than 20) for all calculated parameters except for TOC in monitoring well TAV-MW9 sample during the May/June 2012 sampling event. The RPD for TOC was calculated at 85, but is considered an estimated value since calibration intercepts were outside acceptance criteria and the duplicate sample concentration is reported below the practical quantitation limit.

The results for the EB analyses are as follows:

- **February/March 2012 Sampling Event—**EB samples were collected prior to sampling monitoring wells TAV-MW8 and TAV-MW14 and submitted for all analyses. Bromodichloromethane, chloride, chloroform, and dibromochloromethane were detected in EB samples. No corrective action was required for all parameters, since these parameters were not detected in environmental samples or reported values in environmental samples are greater than five times the EB concentration.

- **May/June 2012 Sampling Event—**EB samples were collected prior to sampling monitoring wells AVN-1, TAV-MW9, and TAV-MW13 and submitted for all analyses. Bromodichloromethane, calcium, chloride, chloroform, dibromochloromethane, sodium, and TOC were detected in EB samples. No corrective action was required for bromodichloromethane, calcium, chloride, chloroform, dibromochloromethane, or sodium, since these parameters were not detected in environmental samples or reported values in environmental samples are greater than five times the EB concentration. TOC in monitoring well AVN-1 samples were qualified as not detected during data validation, since detected values were less than five times the EB concentrations.

- **July/August 2012 Sampling Event—**EB samples were collected prior to sampling monitoring wells TAV-MW4 and TAV-MW11 and submitted for all analyses. Bromodichloromethane, calcium, chloride, chloroform, dibromochloromethane, toluene, and TOC were detected in EB samples. No corrective action was required for bromodichloromethane, calcium, chloride, or dibromochloromethane since these parameters were not detected in environmental samples or reported values in environmental samples are greater than five times the EB concentration. Chloroform in monitoring well TAV-MW4 and toluene in monitoring well TAV-MW11 samples were qualified as not detected during data validation since these compounds were reported at concentrations less than 10 times the EB concentration. TOC in monitoring wells TAV-MW4 and TAV-MW11 samples were qualified as not detected during data validation, since detected values were less than five times the EB concentrations.

- **October/November 2012 Sampling Event—**EB samples were collected prior to sampling monitoring wells TAV-MW3, TAV-MW10, and TAV-MW12 and submitted for all analyses. Acetone, bromodichloromethane, bromoform, chloride, chloroform, dibromochloromethane, iron, sodium, sulfate, and TOC were detected in EB samples. No corrective action was required for acetone, bromodichloromethane, bromoform, chloride, chloroform, dibromochloromethane, sodium, or sulfate, since these parameters were not detected in environmental samples or reported values in environmental samples are greater than five times the equipment blank concentration. TOC in monitoring well TAV-MW3 and iron in monitoring well TAV-MW12 samples were qualified as not detected during data validation, since detected values were less than five times the EB concentrations.

The results for the FB analyses are as follows:

- **February/March 2012 Sampling Event—**FB samples were collected at monitoring wells AVN-1, TAV-MW10, and TAV-MW13. The compounds detected in FB samples included bromodichloromethane, chloroform, dibromochloromethane, and TCE. No correction action was required since these compounds were either not detected in associated environmental samples or were reported at concentrations less than 10 times the environmental result.

- **May/June 2012 Sampling Event—**FB samples were collected at monitoring wells TAV-MW8 and TAV-MW11. The compounds detected in FB samples included bromodichloromethane, chloroform, and dibromochloromethane. No correction action was required since these compounds were not detected in associated environmental samples.

- **July/August 2012 Sampling Event—**FB samples were collected at monitoring wells TAV-MW2, TAV-MW6, and TAV-MW13. The compounds detected in FB samples included bromodichloromethane, chloroform, and dibromochloromethane. No correction action was required since these compounds were not detected in associated environmental samples.

- **October/November 2012 Sampling Event—**FB samples were collected at monitoring wells TAV-MW2, TAV-MW6, and TAV-MW13. The compounds detected in FB samples included bromodichloromethane, chloroform, and dibromochloromethane. No correction action was required since these compounds were not detected in associated environmental samples.

No VOCs were detected above laboratory MDLs in any TB sample, except acetone. Acetone was detected in the monitoring well TAV-MW13 TB sample during the February/March sampling event and in the monitoring well LWDS-MW2 TB sample during the October/November sampling event. Acetone in the monitoring wells TAV-MW4 and TAV-MW13 environmental samples were qualified as not detected, during data validation, since the TB concentration was greater than the environmental sample.

Laboratory data qualifiers are provided with the analytical results in Tables 5A-1 through 5A-9 (Attachment 5A).

5.8 Variances and Nonconformances

No variances or nonconformances from requirements specified in the TA-V Mini-Sampling and Analysis Plans (SAPs) (SNL February 2012, SNL April 2012, SNL June 2012, and SNL September 2012b) were identified during CY 2012 sampling activities. However, the following project-specific issues associated with these sampling events were noted during all sampling events:

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

- **February/March 2012 Sampling Event—**A new water sampling truck including new stainless steel tubing, valves, and sampling manifold was used at six TA-V monitoring wells. Toluene was detected at low level concentrations in all environmental groundwater samples collected from the new truck. All QC requirements from the analytical laboratory were within acceptable range. The low level toluene detections may be attributed to material (i.e. piping sealant) within the new sampling equipment. SNL/NM personnel performed several equipment decontaminations prior to use, but additional decontaminations and collection of extra field QC samples are necessary to determine the actual source of toluene.

- **May/June 2012 Sampling Event—**The field team did not collect a third FB sample due to a paperwork oversight. No corrective action was necessary since detected VOCs in environmental samples are comparable to historical values and current trends. In addition, QC measures associated for other FB samples are adequate.

- **July/August 2012 Sampling Event—**The contract laboratory provided SNL/NM personnel with improperly preserved sample containers for sulfide analysis. Sulfide analysis was not performed. Sulfide is not a COC and historical results were reported as nondetections.

- **October/November 2012 Sampling Event—**The sample containers from the monitoring well TAV-MW4 environmental sample and the associated FB sample were mislabeled in the field. The sample identification numbers for these two samples were exchanged based upon professional judgment and analytical results. The field team discovered an algae-like substance in the Bennett™ System flow value during the purging activities at monitoring well TAV-MW10. The field team stopped the purge to remove the valve. After the valve was removed and replaced, the field team proceeded with purging and sampling activities. The analytical results from monitoring well TAV-MW10 are comparable to historical values.

5.9 Summary and Conclusions

The conceptual site model of contaminant transport at TA-V includes release from the two primary sources, migration through the vadose zone, and movement into and along with groundwater. TCE and other organic chemicals were present in wastewater that was discharged to the underground LWDS drain field during the period from 1962 to 1967, and to the 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 concentrations of TCE and other organic chemicals moved rapidly downward through the alluvial-fan lithofacies and into the regional aquifer. Upon cessation of wastewater disposal, vertical pathways through the vadose zone drained rapidly. Continued flushing of the vadose zone beneath the seepage pits that occurred until 1992 removed a significant portion of residual COCs present in the vadose zone. Rapid drainage and continued flushing removed significant secondary contaminant sources. Low concentrations of TCE present in the regional aquifer today represent these initial wastewater releases. The combined effect of low groundwater velocities, dispersion, and dilution are responsible for the current distribution of TCE in the regional aquifer.

Nitrate concentrations in groundwater at TA-V are primarily derived from unknown upgradient sources. During this reporting period, NPN results exceed the MCL of 10 mg/L in samples from monitoring wells LWDS-MW1, and TAV-MW10. The maximum concentration of NPN detected during this reporting period is 13.6 mg/L in the sample collected from monitoring well LWDS-MW1 in June 2012. 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 20.7 µg/L in the sample from monitoring well LWDS-MW1 collected in March 2012.

The analytical results for this reporting period are consistent with historical detections. The following conclusions are based on a comprehensive review of available information for current groundwater contamination conditions in the TA-V study area:

- The primary COCs for the TA-V study area are TCE and nitrate.
- Based on the historical use and disposal of chlorinated solvents, the extent of TCE in groundwater is associated with multiple TA-V wastewater releases containing VOCs and the subsequent vapor-phase transport of these VOCs through the vadose zone to the water table.
- The distribution of low concentrations of TCE in the regional aquifer is principally attributed to the combined effect of low groundwater velocities, dispersion, and dilution.
- The distribution of nitrate above the background level is laterally widespread in the study area, but the lateral extent of nitrate above the MCL is limited. The extent of the 10 mg/L concentration contour in 2012 is smaller than previous years due to the concentration of nitrate in monitoring well TAV-MW6 dropping below 10 mg/L.
- The primary sources of TCE and possibly nitrate in the TA-V study area consist of two wastewater disposal systems (SWMUs 5 and 275). An upgradient source of nitrate may be present.
- The current conceptual site model described in Section 5.1.7 does not require modification based on the analytical results for this reporting period.

Ongoing environmental studies of the TA-V study area include the following:

- Continue collecting groundwater samples at the 16 TA-V groundwater and 3 soil-vapor monitoring wells. At a minimum, the analytes for groundwater sampling will consist of VOCs and NPN.

- Continue obtaining periodic measurements of groundwater elevations in all TA-V monitoring wells.

- Continue reporting TA-V investigation 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 2012

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1 01-Mar-12	Toluene	0.380	0.250	1.00	1000	J		091774-001	SW846-8260B
LWDS-MW1 05-Mar-12	Toluene	1.05	0.250	1.00	1000			091791-001	SW846-8260B
	Trichloroethene	**20.7**	0.250	1.00	5.00			091791-001	SW846-8260B
	cis-1,2-Dichloroethene	4.12	0.300	1.00	70.0			091791-001	SW846-8260B
LWDS-MW2 21-Feb-12	Toluene	0.620	0.250	1.00	1000	J		091770-001	SW846-8260B
TAV-MW2 20-Feb-12	Trichloroethene	0.680	0.250	1.00	5.00	J		091763-001	SW846-8260B
TAV-MW4 23-Feb-12	Chloroform	0.630	0.250	1.00	NE	J		091779-001	SW846-8260B
	Toluene	0.860	0.250	1.00	1000	J		091779-001	SW846-8260B
	Trichloroethene	1.97	0.250	1.00	5.00			091779-001	SW846-8260B
TAV-MW6 28-Feb-12	Toluene	0.670	0.250	1.00	1000	J		091786-001	SW846-8260B
	Trichloroethene	**13.7**	0.250	1.00	5.00			091786-001	SW846-8260B
	cis-1,2-Dichloroethene	2.49	0.300	1.00	70.0			091786-001	SW846-8260B
TAV-MW8 21-Feb-12	Trichloroethene	1.92	0.250	1.00	5.00			091767-001	SW846-8260B
TAV-MW8 (Duplicate) 21-Feb-12	Trichloroethene	2.00	0.250	1.00	5.00			091768-001	SW846-8260B
TAV-MW10 29-Feb-12	Toluene	0.520	0.250	1.00	1000	J		091788-001	SW846-8260B
	Trichloroethene	**14.2**	0.250	1.00	5.00			091788-001	SW846-8260B
	cis-1,2-Dichloroethene	2.69	0.300	1.00	70.0			091788-001	SW846-8260B
TAV-MW11 22-Feb-12	Trichloroethene	2.71	0.250	1.00	5.00			091772-001	SW846-8260B
TAV-MW12 23-Feb-12	Trichloroethene	**6.68**	0.250	1.00	5.00			091777-001	SW846-8260B
TAV-MW13 20-Feb-12	Acetone	3.70	3.50	10.0	NE	J	10.0U	091760-001	SW846-8260B
	Toluene	1.13	0.250	1.00	1000			091760-001	SW846-8260B
TAV-MW14 27-Feb-12	Trichloroethene	**7.40**	0.250	1.00	5.00			091783-001	SW846-8260B
	cis-1,2-Dichloroethene	0.850	0.300	1.00	70.0	J		091783-001	SW846-8260B
TAV-MW14 (Duplicate) 27-Feb-12	Trichloroethene	**7.52**	0.250	1.00	5.00			091784-001	SW846-8260B
	cis-1,2-Dichloroethene	0.840	0.300	1.00	70.0	J		091784-001	SW846-8260B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

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 08-Jun-12	Toluene	2.10	0.300	1.00	1000			092445-001	SW846-8260B
	Trichloroethene	**19.1**	0.300	1.00	5.00			092445-001	SW846-8260B
	cis-1,2-Dichloroethene	3.54	0.300	1.00	70.0			092445-001	SW846-8260B
TAV-MW2 21-May-12	Trichloroethene	0.600	0.300	1.00	5.00	J		092381-001	SW846-8260B
TAV-MW4 01-Jun-12	Chloroform	0.700	0.300	1.00	NE	J		092447-001	SW846-8260B
	Toluene	1.09	0.300	1.00	1000			092447-001	SW846-8260B
	Trichloroethene	2.52	0.300	1.00	5.00			092447-001	SW846-8260B
TAV-MW6 05-Jun-12	Toluene	0.840	0.300	1.00	1000	J		092398-001	SW846-8260B
	Trichloroethene	**16.9**	0.300	1.00	5.00			092398-001	SW846-8260B
	cis-1,2-Dichloroethene	2.63	0.300	1.00	70.0			092398-001	SW846-8260B
TAV-MW8 22-May-12	Trichloroethene	1.84	0.300	1.00	5.00			092383-001	SW846-8260B
TAV-MW10 06-Jun-12	Toluene	0.810	0.300	1.00	1000	J		092451-001	SW846-8260B
	Trichloroethene	**18.2**	0.300	1.00	5.00			092451-001	SW846-8260B
	cis-1,2-Dichloroethene	2.90	0.300	1.00	70.0			092451-001	SW846-8260B
TAV-MW11 29-May-12	Trichloroethene	2.83	0.300	1.00	5.00			092388-001	SW846-8260B
	cis-1,2-Dichloroethene	0.350	0.300	1.00	70.0	J		092388-001	SW846-8260B
TAV-MW12 31-May-12	Toluene	1.02	0.300	1.00	1000			092396-001	SW846-8260B
	Trichloroethene	**6.82**	0.300	1.00	5.00			092396-001	SW846-8260B
	cis-1,2-Dichloroethene	0.300	0.300	1.00	70.0	J		092396-001	SW846-8260B
TAV-MW14 04-Jun-12	Toluene	1.44	0.300	1.00	1000			092449-001	SW846-8260B
	Trichloroethene	**7.30**	0.300	1.00	5.00			092449-001	SW846-8260B
	cis-1,2-Dichloroethene	0.900	0.300	1.00	70.0	J		092449-001	SW846-8260B
AVN-1 31-Jul-12	Toluene	0.420	0.300	1.00	1000	J		092654-001	SW846-8260B
LWDS-MW1 09-Aug-12	Toluene	1.07	0.300	1.00	1000			092670-001	SW846-8260B
	Trichloroethene	**16.9**	0.300	1.00	5.00			092670-001	SW846-8260B
	cis-1,2-Dichloroethene	3.82	0.300	1.00	70.0			092670-001	SW846-8260B
LWDS-MW2 30-Jul-12	Toluene	0.600	0.300	1.00	1000	J		092652-001	SW846-8260B
TAV-MW2 24-Jul-12	Toluene	0.650	0.300	1.00	1000	J		092642-001	SW846-8260B
	Trichloroethene	0.590	0.300	1.00	5.00	J		092642-001	SW846-8260B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4 02-Aug-12	Chloroform	0.710	0.300	1.00	NE	J	38.05U	092660-001	SW846-8260B
	Toluene	0.460	0.300	1.00	1000	J		092660-001	SW846-8260B
	Trichloroethene	2.43	0.300	1.00	5.00			092660-001	SW846-8260B
TAV-MW4 (Duplicate) 02-Aug-12	Chloroform	0.730	0.300	1.00	NE	J	38.05U	092661-001	SW846-8260B
	Toluene	0.470	0.300	1.00	1000	J		092661-001	SW846-8260B
	Trichloroethene	2.43	0.300	1.00	5.00			092661-001	SW846-8260B
TAV-MW6 06-Aug-12	Toluene	0.440	0.300	1.00	1000	J		092665-001	SW846-8260B
	Trichloroethene	**14.1**	0.300	1.00	5.00			092665-001	SW846-8260B
	cis-1,2-Dichloroethene	2.32	0.300	1.00	70.0			092665-001	SW846-8260B
TAV-MW8 25-Jul-12	Toluene	0.520	0.300	1.00	1000	J		092645-001	SW846-8260B
	Trichloroethene	1.90	0.300	1.00	5.00			092645-001	SW846-8260B
TAV-MW10 07-Aug-12	Toluene	0.490	0.300	1.00	1000	J		092668-001	SW846-8260B
	Trichloroethene	**17.2**	0.300	1.00	5.00			092668-001	SW846-8260B
	cis-1,2-Dichloroethene	3.35	0.300	1.00	70.0			092668-001	SW846-8260B
TAV-MW11 26-Jul-12	Toluene	0.520	0.300	1.00	1000	J	1.00U	092649-001	SW846-8260B
	Trichloroethene	2.63	0.300	1.00	5.00			092649-001	SW846-8260B
TAV-MW11 (Duplicate) 26-Jul-12	Toluene	0.590	0.300	1.00	1000	J	1.00U	092650-001	SW846-8260B
	Trichloroethene	2.66	0.300	1.00	5.00			092650-001	SW846-8260B
TAV-MW12 01-Aug-12	Toluene	0.550	0.300	1.00	1000	J		092656-001	SW846-8260B
	Trichloroethene	**5.86**	0.300	1.00	5.00			092656-001	SW846-8260B
TAV-MW13 23-Jul-12	Toluene	0.650	0.300	1.00	1000	J		092639-001	SW846-8260B
TAV-MW14 03-Aug-12	Toluene	0.450	0.300	1.00	1000	J		092663-001	SW846-8260B
	Trichloroethene	**5.92**	0.300	1.00	5.00			092663-001	SW846-8260B
	cis-1,2-Dichloroethene	0.590	0.300	1.00	70.0	J		092663-001	SW846-8260B
LWDS-MW1 15-Nov-12	Trichloroethene	**18.1**	0.300	1.00	5.00			093069-001	SW846-8260B
	cis-1,2-Dichloroethene	3.31	0.300	1.00	70.0			093069-001	SW846-8260B
TAV-MW2 31-Oct-12	Trichloroethene	0.510	0.300	1.00	5.00	J		093039-001	SW846-8260B
TAV-MW4 08-Nov-12	Chloroform	0.720	0.300	1.00	NE	J		093058-001	SW846-8260B
	Trichloroethene	2.43	0.300	1.00	5.00			093058-001	SW846-8260B
TAV-MW5 24-Oct-12	Toluene	0.340	0.300	1.00	1000	J		093026-001	SW846-8260B
TAV-MW6 12-Nov-12	Trichloroethene	**16.1**	0.300	1.00	5.00			093061-001	SW846-8260B
	cis-1,2-Dichloroethene	2.58	0.300	1.00	70.0			093061-001	SW846-8260B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

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-MW8 01-Nov-12	Trichloroethene	1.70	0.300	1.00	5.00			093041-001	SW846-8260B
TAV-MW10	Trichloroethene	**16.2**	0.300	1.00	5.00			093065-001	SW846-8260B
13-Nov-12	cis-1,2-Dichloroethene	2.56	0.300	1.00	70.0			093065-001	SW846-8260B
TAV-MW10 (Duplicate)	Trichloroethene	**15.8**	0.300	1.00	5.00			093066-001	SW846-8260B
13-Nov-12	cis-1,2-Dichloroethene	2.45	0.300	1.00	70.0			093066-001	SW846-8260B
TAV-MW11	Toluene	0.310	0.300	1.00	1000	J		093045-001	SW846-8260B
05-Nov-12	Trichloroethene	2.57	0.300	1.00	5.00			093045-001	SW846-8260B
	cis-1,2-Dichloroethene	0.330	0.300	1.00	70.0	J		093045-001	SW846-8260B
TAV-MW12	Trichloroethene	**6.85**	0.300	1.00	5.00			093053-001	SW846-8260B
07-Nov-12	cis-1,2-Dichloroethene	0.350	0.300	1.00	70.0	J		093053-001	SW846-8260B
TAV-MW12 (Duplicate)	Trichloroethene	**6.81**	0.300	1.00	5.00			093054-001	SW846-8260B
07-Nov-12	cis-1,2-Dichloroethene	0.350	0.300	1.00	70.0	J		093054-001	SW846-8260B
TAV-MW14	Trichloroethene	**6.90**	0.300	1.00	5.00			093059-001	SW846-8260B
09-Nov-12	cis-1,2-Dichloroethene	0.790	0.300	1.00	70.0	J		093059-001	SW846-8260B

Refer to footnotes on page 5A-81.

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 2012

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300 - 0.325	Chlorobenzene	0.250 - 0.300
1,1,2,2-Tetrachloroethane	0.250 - 0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.250 - 0.300	Chloroform	0.250 - 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	0.250 - 0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.250 - 0.300	Methylcyclohexane	3.00
1,2-Dichloropropane	0.250 - 0.300	Methylene chloride	3.00
1,3-Dichlorobenzene	0.300	Styrene	0.250 - 0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
1,4-Dioxane	15.0	Tetrachloroethene	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	Toluene	0.250 - 0.300
2-Butanone	1.25 - 2.00	Trichloroethene	0.250 - 0.300
2-Hexanone	1.25 - 2.20	Trichlorofluoromethane	0.300
4-methyl-, 2-Pentanone	1.25 - 1.50	Vinyl acetate	1.5
Acetone	3.00 - 3.50	Vinyl chloride	0.300 - 0.500
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.250 - 0.300	cis-1,3-Dichloropropene	0.250 - 0.300
Bromoform	0.250 - 0.300	m-, p-Xylene	0.300
Bromomethane	0.300	o-Xylene	0.300
Carbon disulfide	1.25 - 1.50	trans-1,2-Dichloroethene	0.300
Carbon tetrachloride	0.300	trans-1,3-Dichloropropene	0.250 - 0.300

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1 01-Mar-12	Nitrate plus nitrite as N	8.90	0.500	2.50	10.0			091774-018	EPA 353.2
LWDS-MW1 05-Mar-12	Nitrate plus nitrite as N	**11.2**	0.500	2.50	10.0			091791-018	EPA 353.2
LWDS-MW2 21-Feb-12	Nitrate plus nitrite as N	8.90	0.500	2.50	10.0			091770-018	EPA 353.2
TAV-MW2 20-Feb-12	Nitrate plus nitrite as N	2.70	0.500	2.50	10.0			091763-018	EPA 353.2
TAV-MW4 23-Feb-12	Nitrate plus nitrite as N	5.55	0.500	2.50	10.0			091779-018	EPA 353.2
TAV-MW6 28-Feb-12	Nitrate plus nitrite as N	8.20	0.500	2.50	10.0			091786-018	EPA 353.2
TAV-MW8 21-Feb-12	Nitrate plus nitrite as N	5.50	0.500	2.50	10.0			091767-018	EPA 353.2
TAV-MW8 (Duplicate) 21-Feb-12	Nitrate plus nitrite as N	5.04	0.100	0.500	10.0			091768-018	EPA 353.2
TAV-MW10 29-Feb-12	Nitrate plus nitrite as N	**11.3**	0.500	2.50	10.0			091788-018	EPA 353.2
TAV-MW11 22-Feb-12	Nitrate plus nitrite as N	6.25	0.500	2.50	10.0			091772-018	EPA 353.2
TAV-MW12 23-Feb-12	Nitrate plus nitrite as N	5.15	0.500	2.50	10.0			091777-018	EPA 353.2
TAV-MW13 20-Feb-12	Nitrate plus nitrite as N	5.25	0.500	2.50	10.0			091760-018	EPA 353.2
TAV-MW14 27-Feb-12	Nitrate plus nitrite as N	7.55	0.500	2.50	10.0			091783-018	EPA 353.2
TAV-MW14 (Duplicate) 27-Feb-12	Nitrate plus nitrite as N	7.50	0.500	2.50	10.0			091784-018	EPA 353.2
AVN-1 30-May-12	Nitrate plus nitrite as N	10.0	0.170	0.500	10.0	B		092393-018	EPA 353.2
AVN-1 (Duplicate) 30-May-12	Nitrate plus nitrite as N	8.51	0.170	0.500	10.0	B		092394-018	EPA 353.2
LWDS-MW1 08-Jun-12	Nitrate plus nitrite as N	**13.6**	0.170	0.500	10.0			092445-018	EPA 353.2
LWDS-MW2 23-May-12	Nitrate plus nitrite as N	7.94	0.170	0.500	10.0			092386-018	EPA 353.2

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 21-May-12	Nitrate plus nitrite as N	2.59	0.170	0.500	10.0			092381-018	EPA 353.2
TAV-MW3 17-May-12	Nitrate plus nitrite as N	5.28	0.170	0.500	10.0			092374-018	EPA 353.2
TAV-MW4 01-Jun-12	Nitrate plus nitrite as N	5.56	0.170	0.500	10.0			092447-018	EPA 353.2
TAV-MW5 14-May-12	Nitrate plus nitrite as N	7.35	0.170	0.500	10.0			092365-018	EPA 353.2
TAV-MW6 05-Jun-12	Nitrate plus nitrite as N	8.42	0.170	0.500	10.0			092398-018	EPA 353.2
TAV-MW7 16-May-12	Nitrate plus nitrite as N	3.97	0.170	0.500	10.0			092372-018	EPA 353.2
TAV-MW8 22-May-12	Nitrate plus nitrite as N	5.40	0.170	0.500	10.0			092383-018	EPA 353.2
TAV-MW9 18-May-12	Nitrate plus nitrite as N	3.47	0.170	0.500	10.0			092378-018	EPA 353.2
TAV-MW9 (Duplicate) 18-May-12	Nitrate plus nitrite as N	3.50	0.170	0.500	10.0			092379-018	EPA 353.2
TAV-MW10 06-Jun-12	Nitrate plus nitrite as N	**11.8**	0.170	0.500	10.0			092451-018	EPA 353.2
TAV-MW11 29-May-12	Nitrate plus nitrite as N	6.98	0.170	0.500	10.0	B		092388-018	EPA 353.2
TAV-MW12 31-May-12	Nitrate plus nitrite as N	5.54	0.170	0.500	10.0	B		092396-018	EPA 353.2
TAV-MW13 15-May-12	Nitrate plus nitrite as N	5.79	0.170	0.500	10.0			092369-018	EPA 353.2
TAV-MW13 (Duplicate) 15-May-12	Nitrate plus nitrite as N	6.00	0.170	0.500	10.0			092370-018	EPA 353.2
TAV-MW14 04-Jun-12	Nitrate plus nitrite as N	8.22	0.170	0.500	10.0			092449-018	EPA 353.2
AVN-1 31-Jul-12	Nitrate plus nitrite as N	9.03	0.170	0.500	10.0			092654-018	EPA 353.2
LWDS-MW1 09-Aug-12	Nitrate plus nitrite as N	**11.4**	0.170	0.500	10.0			092670-018	EPA 353.2
LWDS-MW2 30-Jul-12	Nitrate plus nitrite as N	7.46	0.170	0.500	10.0			092652-018	EPA 353.2

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 24-Jul-12	Nitrate plus nitrite as N	2.69	0.085	0.250	10.0			092642-018	EPA 353.2
TAV-MW4 02-Aug-12	Nitrate plus nitrite as N	5.58	0.170	0.500	10.0			092660-018	EPA 353.2
TAV-MW4 (Duplicate) 02-Aug-12	Nitrate plus nitrite as N	5.55	0.170	0.500	10.0			092661-018	EPA 353.2
TAV-MW6 06-Aug-12	Nitrate plus nitrite as N	8.80	0.425	1.25	10.0			092665-018	EPA 353.2
TAV-MW8 25-Jul-12	Nitrate plus nitrite as N	5.75	0.170	0.500	10.0			092645-018	EPA 353.2
TAV-MW10 07-Aug-12	Nitrate plus nitrite as N	**12.3**	0.425	1.25	10.0			092668-018	EPA 353.2
TAV-MW11 26-Jul-12	Nitrate plus nitrite as N	6.33	0.170	0.500	10.0			092649-018	EPA 353.2
TAV-MW11 (Duplicate) 26-Jul-12	Nitrate plus nitrite as N	6.36	0.170	0.500	10.0			092650-018	EPA 353.2
TAV-MW12 01-Aug-12	Nitrate plus nitrite as N	6.03	0.170	0.500	10.0			092656-018	EPA 353.2
TAV-MW13 23-Jul-12	Nitrate plus nitrite as N	5.28	0.170	0.500	10.0			092639-018	EPA 353.2
TAV-MW14 03-Aug-12	Nitrate plus nitrite as N	7.90	0.425	1.25	10.0			092663-018	EPA 353.2
AVN-1 06-Nov-12	Nitrate plus nitrite as N	9.78	0.170	0.500	10.0			093048-018	EPA 353.2
LWDS-MW1 15-Nov-12	Nitrate plus nitrite as N	**12.0**	0.45	1.25	10.0			093069-018	EPA 353.2
LWDS-MW2 02-Nov-12	Nitrate plus nitrite as N	7.57	0.170	0.500	10.0			093043-018	EPA 353.2
TAV-MW2 31-Oct-12	Nitrate plus nitrite as N	2.61	0.170	0.500	10.0			093039-018	EPA 353.2
TAV-MW3 29-Oct-12	Nitrate plus nitrite as N	5.20	0.425	1.25	10.0			093034-018	EPA 353.2
TAV-MW3 (Duplicate) 29-Oct-12	Nitrate plus nitrite as N	5.10	0.425	1.25	10.0			093035-018	EPA 353.2

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 08-Nov-12	Nitrate plus nitrite as N	5.73	0.170	0.500	10.0			093056-z018	EPA 353.2
TAV-MW5 24-Oct-12	Nitrate plus nitrite as N	6.97	0.170	0.500	10.0			093026-018	EPA 353.2
TAV-MW6 12-Nov-12	Nitrate plus nitrite as N	8.40	0.425	1.25	10.0			093061-018	EPA 353.2
TAV-MW7 26-Oct-12	Nitrate plus nitrite as N	3.97	0.170	0.500	10.0			093030-018	EPA 353.2
TAV-MW8 01-Nov-12	Nitrate plus nitrite as N	5.65	0.425	1.25	10.0			093041-018	EPA 353.2
TAV-MW9 30-Oct-12	Nitrate plus nitrite as N	3.53	0.425	1.25	10.0			093037-018	EPA 353.2
TAV-MW10 13-Nov-12	Nitrate plus nitrite as N	**11.8**	0.425	1.25	10.0			093065-018	EPA 353.2
TAV-MW10 (Duplicate) 13-Nov-12	Nitrate plus nitrite as N	**12.0**	0.425	1.25	10.0			093066-018	EPA 353.2
TAV-MW11 05-Nov-12	Nitrate plus nitrite as N	6.47	0.170	0.500	10.0			093045-018	EPA 353.2
TAV-MW12 07-Nov-12	Nitrate plus nitrite as N	6.81	0.170	0.500	10.0			093053-018	EPA 353.2
TAV-MW12 (Duplicate) 07-Nov-12	Nitrate plus nitrite as N	5.83	0.170	0.500	10.0			093054-018	EPA 353.2
TAV-MW13 25-Oct-12	Nitrate plus nitrite as N	5.59	0.170	0.500	10.0			093028-018	EPA 353.2
TAV-MW14 09-Nov-12	Nitrate plus nitrite as N	8.58	0.425	1.25	10.0			093059-018	EPA 353.2

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.066	0.200	NE			091774-016	SW846 9056
01-Mar-12	Sulfate	31.6	0.100	0.400	NE			091774-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091774-029	SW846 9034
	Bicarbonate Alkalinity	153	0.725	1.00	NE		J	091774-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	091774-022	SM 2320B
LWDS-MW1	Chloride	73.3	0.670	2.00	NE			091791-016	SW846 9056
05-Mar-12	Sulfate	37.9	1.33	4.00	NE			091791-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091791-029	SW846 9034
	Bicarbonate Alkalinity	195	0.725	1.00	NE			091791-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091791-022	SM 2320B
LWDS-MW2	Chloride	12.5	0.066	0.200	NE			091770-016	SW846 9056
21-Feb-12	Sulfate	38.2	0.100	0.400	NE			091770-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091770-029	SW846 9034
	Bicarbonate Alkalinity	177	0.725	1.00	NE			091770-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091770-022	SM 2320B
TAV-MW2	Chloride	53.5	0.660	2.00	NE			091763-016	SW846 9056
20-Feb-12	Sulfate	46.9	1.00	4.00	NE			091763-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091763-029	SW846 9034
	Bicarbonate Alkalinity	247	0.725	1.00	NE			091763-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091763-022	SM 2320B
TAV-MW4	Chloride	34.2	0.330	1.00	NE			091779-016	SW846 9056
23-Feb-12	Sulfate	33.3	0.100	0.400	NE			091779-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091779-029	SW846 9034
	Bicarbonate Alkalinity	175	0.725	1.00	NE			091779-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091779-022	SM 2320B
TAV-MW6	Chloride	67.1	0.660	2.00	NE			091786-016	SW846 9056
28-Feb-12	Sulfate	42.6	1.00	4.00	NE			091786-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091786-029	SW846 9034
	Bicarbonate Alkalinity	200	0.725	1.00	NE		J	091786-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	091786-022	SM 2320B
TAV-MW8	Chloride	33.6	0.330	1.00	NE			091767-016	SW846 9056
21-Feb-12	Sulfate	44.6	0.500	2.00	NE			091767-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091767-029	SW846 9034
	Bicarbonate Alkalinity	191	0.725	1.00	NE			091767-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091767-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	33.6	0.330	1.00	NE			091768-016	SW846 9056
21-Feb-12	Sulfate	43.7	0.500	2.00	NE			091768-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091768-029	SW846 9034
	Bicarbonate Alkalinity	190	0.725	1.00	NE			091768-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091768-022	SM 2320B
TAV-MW10	Chloride	49.1	0.330	1.00	NE			091788-016	SW846 9056
29-Feb-12	Sulfate	43.6	0.500	2.00	NE			091788-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091788-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE		J	091788-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	091788-022	SM 2320B
TAV-MW11	Chloride	34.5	0.330	1.00	NE			091772-016	SW846 9056
22-Feb-12	Sulfate	36.2	0.500	2.00	NE			091772-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091772-029	SW846 9034
	Bicarbonate Alkalinity	186	0.725	1.00	NE			091772-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091772-022	SM 2320B
TAV-MW12	Chloride	32.7	0.330	1.00	NE			091777-016	SW846 9056
23-Feb-12	Sulfate	38.5	0.500	2.00	NE			091777-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091777-029	SW846 9034
	Bicarbonate Alkalinity	218	0.725	1.00	NE			091777-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091777-022	SM 2320B
TAV-MW13	Chloride	18.8	0.066	0.200	NE			091760-016	SW846 9056
20-Feb-12	Sulfate	43.0	0.500	2.00	NE			091760-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091760-029	SW846 9034
	Bicarbonate Alkalinity	201	0.725	1.00	NE			091760-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091760-022	SM 2320B
TAV-MW14	Chloride	50.2	0.330	1.00	NE			091783-016	SW846 9056
27-Feb-12	Sulfate	50.7	0.500	2.00	NE			091783-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091783-029	SW846 9034
	Bicarbonate Alkalinity	211	0.725	1.00	NE		J	091783-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	091783-022	SM 2320B
TAV-MW14 (Duplicate)	Chloride	51.6	0.330	1.00	NE			091784-016	SW846 9056
27-Feb-12	Sulfate	52.0	0.500	2.00	NE			091784-016	SW846 9056
	Acid Soluble Sulfides	ND	0.650	2.50	NE	U		091784-029	SW846 9034
	Bicarbonate Alkalinity	212	0.725	1.00	NE		J	091784-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	091784-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	9.56	0.067	0.200	NE			092393-016	SW846 9056
30-May-12	Sulfate	32.2	0.133	0.400	NE			092393-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092393-029	SW846 9034
	Bicarbonate Alkalinity	155	0.725	1.00	NE			092393-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092393-022	SM 2320B
AVN-1 (Duplicate)	Chloride	9.57	0.067	0.200	NE			092394-016	SW846 9056
30-May-12	Sulfate	32.3	0.133	0.400	NE			092394-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092394-029	SW846 9034
	Bicarbonate Alkalinity	156	0.725	1.00	NE			092394-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092394-022	SM 2320B
LWDS-MW1	Chloride	72.1	0.670	2.00	NE			092445-016	SW846 9056
08-Jun-12	Sulfate	37.9	1.33	4.00	NE			092445-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092445-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE			092445-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092445-022	SM 2320B
LWDS-MW2	Chloride	12.5	0.134	0.400	NE			092386-016	SW846 9056
23-May-12	Sulfate	39.5	0.266	0.800	NE			092386-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092386-029	SW846 9034
	Bicarbonate Alkalinity	181	0.725	1.00	NE			092386-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092386-022	SM 2320B
TAV-MW2	Chloride	62.5	0.670	2.00	NE			092381-016	SW846 9056
21-May-12	Sulfate	55.8	1.33	4.00	NE			092381-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092381-029	SW846 9034
	Bicarbonate Alkalinity	256	0.725	1.00	NE			092381-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092381-022	SM 2320B
TAV-MW3	Chloride	21.9	0.134	0.400	NE			092374-016	SW846 9056
17-May-12	Sulfate	69.2	0.266	0.800	NE			092374-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092374-029	SW846 9034
	Bicarbonate Alkalinity	192	0.725	1.00	NE			092374-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092374-022	SM 2320B
TAV-MW4	Chloride	38.6	0.335	1.00	NE			092447-016	SW846 9056
01-Jun-12	Sulfate	36.7	0.133	0.400	NE			092447-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092447-029	SW846 9034
	Bicarbonate Alkalinity	176	0.725	1.00	NE			092447-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092447-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5	Chloride	19.2	0.067	0.200	NE			092365-016	SW846 9056
14-May-12	Sulfate	43.0	0.266	0.800	NE			092365-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092365-029	SW846 9034
	Bicarbonate Alkalinity	197	0.725	1.00	NE			092365-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092365-022	SM 2320B
TAV-MW6	Chloride	69.3	0.670	2.00	NE			092398-016	SW846 9056
05-Jun-12	Sulfate	43.1	1.33	4.00	NE			092398-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092398-029	SW846 9034
	Bicarbonate Alkalinity	202	0.725	1.00	NE			092398-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092398-022	SM 2320B
TAV-MW7	Chloride	29.8	0.134	0.400	NE			092372-016	SW846 9056
16-May-12	Sulfate	68.9	0.266	0.800	NE			092372-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092372-029	SW846 9034
	Bicarbonate Alkalinity	229	0.725	1.00	NE			092372-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092372-022	SM 2320B
TAV-MW8	Chloride	39.1	0.335	1.00	NE			092383-016	SW846 9056
22-May-12	Sulfate	53.6	0.665	2.00	NE			092383-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092383-029	SW846 9034
	Bicarbonate Alkalinity	195	0.725	1.00	NE			092383-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092383-022	SM 2320B
TAV-MW9	Chloride	35.3	0.335	1.00	NE			092378-016	SW846 9056
18-May-12	Sulfate	61.3	0.665	2.00	NE			092378-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092378-029	SW846 9034
	Bicarbonate Alkalinity	251	0.725	1.00	NE			092378-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092378-022	SM 2320B
TAV-MW9 (Duplicate)	Chloride	35.8	0.335	1.00	NE			092379-016	SW846 9056
18-May-12	Sulfate	62.4	0.665	2.00	NE			092379-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092379-029	SW846 9034
	Bicarbonate Alkalinity	248	0.725	1.00	NE			092379-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092379-022	SM 2320B
TAV-MW10	Chloride	49.9	0.335	1.00	NE			092451-016	SW846 9056
06-Jun-12	Sulfate	44.7	0.665	2.00	NE			092451-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092451-029	SW846 9034
	Bicarbonate Alkalinity	202	0.725	1.00	NE			092451-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092451-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	41.0	0.335	1.00	NE			092388-016	SW846 9056
29-May-12	Sulfate	43.0	0.665	2.00	NE			092388-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092388-029	SW846 9034
	Bicarbonate Alkalinity	189	0.725	1.00	NE			092388-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092388-022	SM 2320B
TAV-MW12	Chloride	37.7	0.335	1.00	NE			092396-016	SW846 9056
31-May-12	Sulfate	45.5	0.665	2.00	NE			092396-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092396-029	SW846 9034
	Bicarbonate Alkalinity	229	0.725	1.00	NE			092396-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092396-022	SM 2320B
TAV-MW13	Chloride	18.2	0.134	0.400	NE			092369-016	SW846 9056
15-May-12	Sulfate	52.9	0.266	0.800	NE			092369-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092369-029	SW846 9034
	Bicarbonate Alkalinity	211	0.725	1.00	NE			092369-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092369-022	SM 2320B
TAV-MW13 (Duplicate)	Chloride	18.6	0.134	0.400	NE			092370-016	SW846 9056
15-May-12	Sulfate	54.0	0.266	0.800	NE			092370-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092370-029	SW846 9034
	Bicarbonate Alkalinity	211	0.725	1.00	NE			092370-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092370-022	SM 2320B
TAV-MW14	Chloride	52.7	0.335	1.00	NE			092449-016	SW846 9056
04-Jun-12	Sulfate	53.2	0.665	2.00	NE			092449-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		092449-029	SW846 9034
	Bicarbonate Alkalinity	213	0.725	1.00	NE			092449-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092449-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.170	0.067	0.200	NE	J		092654-016	SW846 9056
31-Jul-12	Chloride	8.90	0.067	0.200	NE		J+	092654-016	SW846 9056
	Fluoride	1.21	0.033	0.100	4.0			092654-016	SW846 9056
	Sulfate	30.0	0.133	0.400	NE		J+	092654-016	SW846 9056
	Bicarbonate Alkalinity	157	0.725	1.00	NE			092654-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092654-022	SM 2320B
LWDS-MW1	Bromide	0.813	0.067	0.200	NE			092670-016	SW846 9056
09-Aug-12	Chloride	74.8	0.670	2.00	NE			092670-016	SW846 9056
	Fluoride	0.619	0.033	0.100	4.0			092670-016	SW846 9056
	Sulfate	38.0	1.33	4.00	NE			092670-016	SW846 9056
	Bicarbonate Alkalinity	205	0.725	1.00	NE			092670-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092670-022	SM 2320B
LWDS-MW2	Bromide	0.190	0.067	0.200	NE	J		092652-016	SW846 9056
30-Jul-12	Chloride	12.3	0.067	0.200	NE		J+	092652-016	SW846 9056
	Fluoride	1.25	0.033	0.100	4.0			092652-016	SW846 9056
	Sulfate	39.1	0.133	0.400	NE		J+	092652-016	SW846 9056
	Bicarbonate Alkalinity	180	0.725	1.00	NE			092652-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092652-022	SM 2320B
TAV-MW2	Bromide	0.376	0.067	0.200	NE			092642-016	SW846 9056
24-Jul-12	Chloride	64.9	0.335	1.00	NE			092642-016	SW846 9056
	Fluoride	1.01	0.033	0.100	4.0			092642-016	SW846 9056
	Sulfate	53.2	0.665	2.00	NE			092642-016	SW846 9056
	Bicarbonate Alkalinity	253	0.725	1.00	NE			092642-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092642-022	SM 2320B
TAV-MW4	Bromide	0.418	0.067	0.200	NE			092660-016	SW846 9056
02-Aug-12	Chloride	33.3	0.670	2.00	NE		J+	092660-016	SW846 9056
	Fluoride	1.17	0.033	0.100	4.0			092660-016	SW846 9056
	Sulfate	34.1	0.133	0.400	NE		J+	092660-016	SW846 9056
	Bicarbonate Alkalinity	184	0.725	1.00	NE			092660-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092660-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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)	Bromide	0.439	0.067	0.200	NE			092661-016	SW846 9056
02-Aug-12	Chloride	34.9	0.670	2.00	NE		J+	092661-016	SW846 9056
	Fluoride	1.18	0.033	0.100	4.0			092661-016	SW846 9056
	Sulfate	34.0	0.133	0.400	NE		J+	092661-016	SW846 9056
	Bicarbonate Alkalinity	180	0.725	1.00	NE			092661-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092661-022	SM 2320B
TAV-MW6	Bromide	0.884	0.067	0.200	NE			092665-016	SW846 9056
06-Aug-12	Chloride	67.3	0.670	2.00	NE			092665-016	SW846 9056
	Fluoride	1.12	0.033	0.100	4.0			092665-016	SW846 9056
	Sulfate	41.2	1.33	4.00	NE			092665-016	SW846 9056
	Bicarbonate Alkalinity	202	0.725	1.00	NE			092665-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092665-022	SM 2320B
TAV-MW8	Bromide	0.299	0.067	0.200	NE			092645-016	SW846 9056
25-Jul-12	Chloride	37.4	0.335	1.00	NE			092645-016	SW846 9056
	Fluoride	1.37	0.033	0.100	4.0			092645-016	SW846 9056
	Sulfate	49.7	0.665	2.00	NE			092645-016	SW846 9056
	Bicarbonate Alkalinity	195	0.725	1.00	NE			092645-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092645-022	SM 2320B
TAV-MW10	Bromide	0.346	0.067	0.200	NE			092668-016	SW846 9056
07-Aug-12	Chloride	47.3	0.670	2.00	NE			092668-016	SW846 9056
	Fluoride	1.36	0.033	0.100	4.0			092668-016	SW846 9056
	Sulfate	43.9	1.33	4.00	NE			092668-016	SW846 9056
	Bicarbonate Alkalinity	205	0.725	1.00	NE	B		092668-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092668-022	SM 2320B
TAV-MW11	Bromide	0.421	0.067	0.200	NE			092649-016	SW846 9056
26-Jul-12	Chloride	39.4	0.335	1.00	NE			092649-016	SW846 9056
	Fluoride	1.31	0.033	0.100	4.0			092649-016	SW846 9056
	Sulfate	40.8	0.665	2.00	NE			092649-016	SW846 9056
	Bicarbonate Alkalinity	191	0.725	1.00	NE			092649-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092649-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 (Duplicate)	Bromide	0.430	0.067	0.200	NE			092650-016	SW846 9056
26-Jul-12	Chloride	39.5	0.335	1.00	NE			092650-016	SW846 9056
	Fluoride	1.31	0.033	0.100	4.0			092650-016	SW846 9056
	Sulfate	40.5	0.665	2.00	NE			092650-016	SW846 9056
	Bicarbonate Alkalinity	189	0.725	1.00	NE			092650-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092650-022	SM 2320B
TAV-MW12	Bromide	0.263	0.067	0.200	NE			092656-016	SW846 9056
01-Aug-12	Chloride	33.9	0.670	2.00	NE		J	092656-016	SW846 9056
	Fluoride	1.22	0.033	0.100	4.0			092656-016	SW846 9056
	Sulfate	43.0	1.33	4.00	NE		J	092656-016	SW846 9056
	Bicarbonate Alkalinity	221	0.725	1.00	NE			092656-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092656-022	SM 2320B
TAV-MW13	Bromide	0.190	0.067	0.200	NE	J		092639-016	SW846 9056
23-Jul-12	Chloride	19.6	0.067	0.200	NE			092639-016	SW846 9056
	Fluoride	1.17	0.033	0.100	4.0			092639-016	SW846 9056
	Sulfate	50.9	0.266	0.800	NE			092639-016	SW846 9056
	Bicarbonate Alkalinity	206	0.725	1.00	NE			092639-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092639-022	SM 2320B
TAV-MW14	Bromide	0.365	0.067	0.200	NE			092663-016	SW846 9056
03-Aug-12	Chloride	46.9	0.670	2.00	NE			092663-016	SW846 9056
	Fluoride	1.33	0.033	0.100	4.0			092663-016	SW846 9056
	Sulfate	49.6	1.33	4.00	NE			092663-016	SW846 9056
	Bicarbonate Alkalinity	113	0.725	1.00	NE			092663-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092663-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	9.69	0.067	0.200	NE			093048-016	SW846 9056
06-Nov-12	Sulfate	32.8	0.133	0.400	NE			093048-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093048-029	SW846 9034
	Bicarbonate Alkalinity	157	0.725	1.00	NE			093048-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093048-022	SM 2320B
LWDS-MW1	Chloride	75.2	0.670	2.00	NE			093069-016	SW846 9056
15-Nov-12	Sulfate	40.1	1.33	4.00	NE			093069-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093069-029	SW846 9034
	Bicarbonate Alkalinity	201	0.725	1.00	NE			093069-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093069-022	SM 2320B
LWDS-MW2	Chloride	12.3	0.670	2.00	NE			093043-016	SW846 9056
02-Nov-12	Sulfate	39.6	1.33	4.00	NE			093043-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093043-029	SW846 9034
	Bicarbonate Alkalinity	179	0.725	1.00	NE			093043-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093043-022	SM 2320B
TAV-MW2	Chloride	67.3	0.335	1.00	NE			093039-016	SW846 9056
31-Oct-12	Sulfate	56.4	0.665	2.00	NE			093039-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093039-029	SW846 9034
	Bicarbonate Alkalinity	254	0.725	1.00	NE			093039-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093039-022	SM 2320B
TAV-MW3	Chloride	19.9	0.670	2.00	NE		J-	093034-016	SW846 9056
29-Oct-12	Sulfate	64.5	1.33	4.00	NE			093034-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093034-029	SW846 9034
	Bicarbonate Alkalinity	197	0.725	1.00	NE			093034-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093034-022	SM 2320B
TAV-MW3 (Duplicate)	Chloride	20.6	0.670	2.00	NE		J-	093035-016	SW846 9056
29-Oct-12	Sulfate	64.6	1.33	4.00	NE			093035-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093035-029	SW846 9034
	Bicarbonate Alkalinity	194	0.725	1.00	NE			093035-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093035-022	SM 2320B
TAV-MW4	Chloride	37.1	0.670	2.00	NE			093056-016	SW846 9056
08-Nov-12	Sulfate	36.2	1.33	4.00	NE			093056-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093056-029	SW846 9034
	Bicarbonate Alkalinity	183	0.725	1.00	NE			093056-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093056-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5	Chloride	18.9	0.067	0.200	NE			093026-016	SW846 9056
24-Oct-12	Sulfate	42.6	0.266	0.800	NE			093026-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093026-029	SW846 9034
	Bicarbonate Alkalinity	191	0.725	1.00	NE			093026-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093026-022	SM 2320B
TAV-MW6	Chloride	67.6	0.670	2.00	NE			093061-016	SW846 9056
12-Nov-12	Sulfate	42.9	1.33	4.00	NE			093061-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093061-029	SW846 9034
	Bicarbonate Alkalinity	208	0.725	1.00	NE			093061-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093061-022	SM 2320B
TAV-MW7	Chloride	29.1	0.134	0.400	NE			093030-016	SW846 9056
26-Oct-12	Sulfate	67.1	0.266	0.800	NE			093030-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093030-029	SW846 9034
	Bicarbonate Alkalinity	235	0.725	1.00	NE			093030-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093030-022	SM 2320B
TAV-MW8	Chloride	39.4	0.335	1.00	NE			093041-016	SW846 9056
01-Nov-12	Sulfate	53.3	0.665	2.00	NE			093041-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093041-029	SW846 9034
	Bicarbonate Alkalinity	192	0.725	1.00	NE			093041-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093041-022	SM 2320B
TAV-MW9	Chloride	32.6	0.134	0.400	NE			093037-016	SW846 9056
30-Oct-12	Sulfate	56.5	0.266	0.800	NE			093037-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093037-029	SW846 9034
	Bicarbonate Alkalinity	225	0.725	1.00	NE			093037-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093037-022	SM 2320B
TAV-MW10	Chloride	46.6	0.670	2.00	NE			093065-016	SW846 9056
13-Nov-12	Sulfate	45.5	1.33	4.00	NE			093065-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093065-029	SW846 9034
	Bicarbonate Alkalinity	199	0.725	1.00	NE			093065-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093065-022	SM 2320B
TAV-MW10 (Duplicate)	Chloride	46.7	0.670	2.00	NE			093066-016	SW846 9056
13-Nov-12	Sulfate	45.9	1.33	4.00	NE			093066-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093066-029	SW846 9034
	Bicarbonate Alkalinity	200	0.725	1.00	NE			093066-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093066-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	38.4	0.670	2.00	NE			093045-016	SW846 9056
05-Nov-12	Sulfate	42.6	1.33	4.00	NE			093045-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093045-029	SW846 9034
	Bicarbonate Alkalinity	186	0.725	1.00	NE			093045-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093045-022	SM 2320B
TAV-MW12	Chloride	35.6	0.670	2.00	NE			093053-016	SW846 9056
07-Nov-12	Sulfate	45.7	1.33	4.00	NE			093053-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093053-029	SW846 9034
	Bicarbonate Alkalinity	219	0.725	1.00	NE			093053-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093053-022	SM 2320B
TAV-MW12 (Duplicate)	Chloride	35.9	0.670	2.00	NE			093054-016	SW846 9056
07-Nov-12	Sulfate	45.8	1.33	4.00	NE			093054-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093054-029	SW846 9034
	Bicarbonate Alkalinity	217	0.725	1.00	NE			093054-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093054-022	SM 2320B
TAV-MW13	Chloride	18.9	0.134	0.400	NE			093028-016	SW846 9056
25-Oct-12	Sulfate	52.9	0.266	0.800	NE			093028-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093028-029	SW846 9034
	Bicarbonate Alkalinity	203	0.725	1.00	NE			093028-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093028-022	SM 2320B
TAV-MW14	Chloride	49.1	0.670	2.00	NE			093059-016	SW846 9056
09-Nov-12	Sulfate	53.6	1.33	4.00	NE			093059-016	SW846 9056
	Acid Soluble Sulfides	ND	0.835	2.50	NE	U		093059-029	SW846 9034
	Bicarbonate Alkalinity	212	0.725	1.00	NE	B		093059-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093059-022	SM 2320B

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.689	0.330	1.00	NE	J		091774-004	SW846 9060
01-Mar-12	Total Organic Carbon #2	0.890	0.330	1.00	NE	J		091774-004	SW846 9060
	Total Organic Carbon #3	0.740	0.330	1.00	NE	J		091774-004	SW846 9060
	Total Organic Carbon #4	0.786	0.330	1.00	NE	J		091774-004	SW846 9060
	Total Organic Carbon Average	0.776	0.330	1.00	NE	J		091774-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.870	0.330	1.00	NE	J		091791-004	SW846 9060
05-Mar-12	Total Organic Carbon #2	1.11	0.330	1.00	NE			091791-004	SW846 9060
	Total Organic Carbon #3	0.920	0.330	1.00	NE	J		091791-004	SW846 9060
	Total Organic Carbon #4	0.973	0.330	1.00	NE	J		091791-004	SW846 9060
	Total Organic Carbon Average	0.969	0.330	1.00	NE	J		091791-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	ND	0.330	1.00	NE	U		091770-004	SW846 9060
21-Feb-12	Total Organic Carbon #2	0.411	0.330	1.00	NE	J		091770-004	SW846 9060
	Total Organic Carbon #3	0.400	0.330	1.00	NE	J		091770-004	SW846 9060
	Total Organic Carbon #4	0.397	0.330	1.00	NE	J		091770-004	SW846 9060
	Total Organic Carbon Average	0.379	0.330	1.00	NE	J		091770-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	ND	0.330	1.00	NE	U		091763-004	SW846 9060
20-Feb-12	Total Organic Carbon #2	0.366	0.330	1.00	NE	J		091763-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		091763-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		091763-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		091763-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	ND	0.330	1.00	NE	U		091779-004	SW846 9060
23-Feb-12	Total Organic Carbon #2	ND	0.330	1.00	NE	U		091779-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		091779-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		091779-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		091779-004	SW846 9060
TAV-MW6	Total Organic Carbon #1	0.864	0.330	1.00	NE	J		091786-004	SW846 9060
28-Feb-12	Total Organic Carbon #2	1.03	0.330	1.00	NE			091786-004	SW846 9060
	Total Organic Carbon #3	0.923	0.330	1.00	NE	J		091786-004	SW846 9060
	Total Organic Carbon #4	0.958	0.330	1.00	NE	J		091786-004	SW846 9060
	Total Organic Carbon Average	0.944	0.330	1.00	NE	J		091786-004	SW846 9060
TAV-MW8	Total Organic Carbon #1	0.376	0.330	1.00	NE	J		091767-004	SW846 9060
21-Feb-12	Total Organic Carbon #2	0.523	0.330	1.00	NE	J		091767-004	SW846 9060
	Total Organic Carbon #3	0.432	0.330	1.00	NE	J		091767-004	SW846 9060
	Total Organic Carbon #4	0.452	0.330	1.00	NE	J		091767-004	SW846 9060
	Total Organic Carbon Average	0.446	0.330	1.00	NE	J		091767-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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)	Total Organic Carbon #1	0.356	0.330	1.00	NE	J		091768-004	SW846 9060
21-Feb-12	Total Organic Carbon #2	0.467	0.330	1.00	NE	J		091768-004	SW846 9060
	Total Organic Carbon #3	0.397	0.330	1.00	NE	J		091768-004	SW846 9060
	Total Organic Carbon #4	0.455	0.330	1.00	NE	J		091768-004	SW846 9060
	Total Organic Carbon Average	0.419	0.330	1.00	NE	J		091768-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	0.520	0.330	1.00	NE	J		091788-004	SW846 9060
29-Feb-12	Total Organic Carbon #2	0.769	0.330	1.00	NE	J		091788-004	SW846 9060
	Total Organic Carbon #3	0.569	0.330	1.00	NE	J		091788-004	SW846 9060
	Total Organic Carbon #4	0.619	0.330	1.00	NE	J		091788-004	SW846 9060
	Total Organic Carbon Average	0.619	0.330	1.00	NE	J		091788-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.346	0.330	1.00	NE	J		091772-004	SW846 9060
22-Feb-12	Total Organic Carbon #2	0.555	0.330	1.00	NE	J		091772-004	SW846 9060
	Total Organic Carbon #3	0.420	0.330	1.00	NE	J		091772-004	SW846 9060
	Total Organic Carbon #4	0.415	0.330	1.00	NE	J		091772-004	SW846 9060
	Total Organic Carbon Average	0.434	0.330	1.00	NE	J		091772-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.452	0.330	1.00	NE	J		091777-004	SW846 9060
23-Feb-12	Total Organic Carbon #2	0.673	0.330	1.00	NE	J		091777-004	SW846 9060
	Total Organic Carbon #3	0.510	0.330	1.00	NE	J		091777-004	SW846 9060
	Total Organic Carbon #4	0.505	0.330	1.00	NE	J		091777-004	SW846 9060
	Total Organic Carbon Average	0.535	0.330	1.00	NE	J		091777-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.449	0.330	1.00	NE	J		091760-004	SW846 9060
20-Feb-12	Total Organic Carbon #2	0.555	0.330	1.00	NE	J		091760-004	SW846 9060
	Total Organic Carbon #3	0.482	0.330	1.00	NE	J		091760-004	SW846 9060
	Total Organic Carbon #4	0.480	0.330	1.00	NE	J		091760-004	SW846 9060
	Total Organic Carbon Average	0.491	0.330	1.00	NE	J		091760-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.669	0.330	1.00	NE	J		091783-004	SW846 9060
27-Feb-12	Total Organic Carbon #2	0.937	0.330	1.00	NE	J		091783-004	SW846 9060
	Total Organic Carbon #3	0.872	0.330	1.00	NE	J		091783-004	SW846 9060
	Total Organic Carbon #4	0.857	0.330	1.00	NE	J		091783-004	SW846 9060
	Total Organic Carbon Average	0.834	0.330	1.00	NE	J		091783-004	SW846 9060
TAV-MW14 (Duplicate)	Total Organic Carbon #1	0.527	0.330	1.00	NE	J		091784-004	SW846 9060
27-Feb-12	Total Organic Carbon #2	0.787	0.330	1.00	NE	J		091784-004	SW846 9060
	Total Organic Carbon #3	0.566	0.330	1.00	NE	J		091784-004	SW846 9060
	Total Organic Carbon #4	0.702	0.330	1.00	NE	J		091784-004	SW846 9060
	Total Organic Carbon Average	0.646	0.330	1.00	NE	J		091784-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	ND	0.330	1.00	NE	U	UJ	092393-004	SW846 9060
30-May-12	Total Organic Carbon #2	0.526	0.330	1.00	NE	J	7.15UJ	092393-004	SW846 9060
	Total Organic Carbon #3	0.399	0.330	1.00	NE	J	7.15UJ	092393-004	SW846 9060
	Total Organic Carbon #4	0.513	0.330	1.00	NE	J	7.15UJ	092393-004	SW846 9060
	Total Organic Carbon Average	0.405	0.330	1.00	NE	J	7.15UJ	092393-004	SW846 9060
AVN-1 (Duplicate)	Total Organic Carbon #1	0.439	0.330	1.00	NE	J	7.15UJ	092394-004	SW846 9060
30-May-12	Total Organic Carbon #2	ND	0.330	1.00	NE	U	UJ	092394-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U	UJ	092394-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U	UJ	092394-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U	UJ	092394-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.916	0.330	1.00	NE	J	J-	092445-004	SW846 9060
08-Jun-12	Total Organic Carbon #2	1.04	0.330	1.00	NE		J-	092445-004	SW846 9060
	Total Organic Carbon #3	0.978	0.330	1.00	NE	J	J-	092445-004	SW846 9060
	Total Organic Carbon #4	0.930	0.330	1.00	NE	J	J-	092445-004	SW846 9060
	Total Organic Carbon Average	0.967	0.330	1.00	NE	J	J-	092445-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	ND	0.330	1.00	NE	U	UJ	092386-004	SW846 9060
23-May-12	Total Organic Carbon #2	0.490	0.330	1.00	NE	J	J-	092386-004	SW846 9060
	Total Organic Carbon #3	0.395	0.330	1.00	NE	J	J-	092386-004	SW846 9060
	Total Organic Carbon #4	0.394	0.330	1.00	NE	J	J-	092386-004	SW846 9060
	Total Organic Carbon Average	0.375	0.330	1.00	NE	J	J-	092386-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	1.96	0.330	1.00	NE			092381-004	SW846 9060
21-May-12	Total Organic Carbon #2	2.35	0.330	1.00	NE			092381-004	SW846 9060
	Total Organic Carbon #3	2.11	0.330	1.00	NE			092381-004	SW846 9060
	Total Organic Carbon #4	2.35	0.330	1.00	NE			092381-004	SW846 9060
	Total Organic Carbon Average	2.19	0.330	1.00	NE			092381-004	SW846 9060
TAV-MW3	Total Organic Carbon #1	0.831	0.330	1.00	NE	J	J-	092374-004	SW846 9060
17-May-12	Total Organic Carbon #2	1.07	0.330	1.00	NE		J-	092374-004	SW846 9060
	Total Organic Carbon #3	0.894	0.330	1.00	NE	J	J-	092374-004	SW846 9060
	Total Organic Carbon #4	0.977	0.330	1.00	NE	J	J-	092374-004	SW846 9060
	Total Organic Carbon Average	0.942	0.330	1.00	NE	J	J-	092374-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.686	0.330	1.00	NE	J	J-	092447-004	SW846 9060
01-Jun-12	Total Organic Carbon #2	0.778	0.330	1.00	NE	J	J-	092447-004	SW846 9060
	Total Organic Carbon #3	0.591	0.330	1.00	NE	J	J-	092447-004	SW846 9060
	Total Organic Carbon #4	0.695	0.330	1.00	NE	J	J-	092447-004	SW846 9060
	Total Organic Carbon Average	0.687	0.330	1.00	NE	J	J-	092447-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Total Organic Carbon #1	0.984	0.330	1.00	NE	J	J-	092365-004	SW846 9060
14-May-12	Total Organic Carbon #2	1.06	0.330	1.00	NE		J-	092365-004	SW846 9060
	Total Organic Carbon #3	1.06	0.330	1.00	NE		J-	092365-004	SW846 9060
	Total Organic Carbon #4	0.974	0.330	1.00	NE	J	J-	092365-004	SW846 9060
	Total Organic Carbon Average	1.02	0.330	1.00	NE		J-	092365-004	SW846 9060
TAV-MW6	Total Organic Carbon #1	1.35	0.330	1.00	NE			092398-004	SW846 9060
05-Jun-12	Total Organic Carbon #2	1.44	0.330	1.00	NE			092398-004	SW846 9060
	Total Organic Carbon #3	1.27	0.330	1.00	NE			092398-004	SW846 9060
	Total Organic Carbon #4	1.27	0.330	1.00	NE			092398-004	SW846 9060
	Total Organic Carbon Average	1.33	0.330	1.00	NE			092398-004	SW846 9060
TAV-MW7	Total Organic Carbon #1	0.686	0.330	1.00	NE	J	J-	092372-004	SW846 9060
16-May-12	Total Organic Carbon #2	1.04	0.330	1.00	NE		J-	092372-004	SW846 9060
	Total Organic Carbon #3	0.780	0.330	1.00	NE	J	J-	092372-004	SW846 9060
	Total Organic Carbon #4	0.864	0.330	1.00	NE	J	J-	092372-004	SW846 9060
	Total Organic Carbon Average	0.844	0.330	1.00	NE	J	J-	092372-004	SW846 9060
TAV-MW8	Total Organic Carbon #1	ND	0.330	1.00	NE	U	UJ	092383-004	SW846 9060
22-May-12	Total Organic Carbon #2	0.576	0.330	1.00	NE	J	J-	092383-004	SW846 9060
	Total Organic Carbon #3	0.589	0.330	1.00	NE	J	J-	092383-004	SW846 9060
	Total Organic Carbon #4	0.567	0.330	1.00	NE	J	J-	092383-004	SW846 9060
	Total Organic Carbon Average	0.502	0.330	1.00	NE	J	J-	092383-004	SW846 9060
TAV-MW9	Total Organic Carbon #1	1.19	0.330	1.00	NE		J-	092378-004	SW846 9060
18-May-12	Total Organic Carbon #2	1.34	0.330	1.00	NE			092378-004	SW846 9060
	Total Organic Carbon #3	1.02	0.330	1.00	NE		J-	092378-004	SW846 9060
	Total Organic Carbon #4	0.967	0.330	1.00	NE	J	J-	092378-004	SW846 9060
	Total Organic Carbon Average	1.13	0.330	1.00	NE		J-	092378-004	SW846 9060
TAV-MW9 (Duplicate)	Total Organic Carbon #1	ND	0.330	1.00	NE	U	UJ	092379-004	SW846 9060
18-May-12	Total Organic Carbon #2	0.650	0.330	1.00	NE	J	J-	092379-004	SW846 9060
	Total Organic Carbon #3	0.650	0.330	1.00	NE	J	J-	092379-004	SW846 9060
	Total Organic Carbon #4	0.339	0.330	1.00	NE	J	J-	092379-004	SW846 9060
	Total Organic Carbon Average	0.455	0.330	1.00	NE	J	J-	092379-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	1.12	0.330	1.00	NE			092451-004	SW846 9060
06-Jun-12	Total Organic Carbon #2	1.17	0.330	1.00	NE			092451-004	SW846 9060
	Total Organic Carbon #3	1.08	0.330	1.00	NE			092451-004	SW846 9060
	Total Organic Carbon #4	1.09	0.330	1.00	NE			092451-004	SW846 9060
	Total Organic Carbon Average	1.12	0.330	1.00	NE			092451-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW11	Total Organic Carbon #1	0.364	0.330	1.00	NE	J	J-	092388-004	SW846 9060
29-May-12	Total Organic Carbon #2	0.523	0.330	1.00	NE	J	J-	092388-004	SW846 9060
	Total Organic Carbon #3	0.438	0.330	1.00	NE	J	J-	092388-004	SW846 9060
	Total Organic Carbon #4	0.450	0.330	1.00	NE	J	J-	092388-004	SW846 9060
	Total Organic Carbon Average	0.444	0.330	1.00	NE	J	J-	092388-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.601	0.330	1.00	NE	J	J-	092396-004	SW846 9060
31-May-12	Total Organic Carbon #2	0.588	0.330	1.00	NE	J	J-	092396-004	SW846 9060
	Total Organic Carbon #3	0.548	0.330	1.00	NE	J	J-	092396-004	SW846 9060
	Total Organic Carbon #4	0.400	0.330	1.00	NE	J	J-	092396-004	SW846 9060
	Total Organic Carbon Average	0.534	0.330	1.00	NE	J	J-	092396-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.601	0.330	1.00	NE	J	J-	092369-004	SW846 9060
15-May-12	Total Organic Carbon #2	0.795	0.330	1.00	NE	J	J-	092369-004	SW846 9060
	Total Organic Carbon #3	0.668	0.330	1.00	NE	J	J-	092369-004	SW846 9060
	Total Organic Carbon #4	0.600	0.330	1.00	NE	J	J-	092369-004	SW846 9060
	Total Organic Carbon Average	0.666	0.330	1.00	NE	J	J-	092369-004	SW846 9060
TAV-MW13 (Duplicate)	Total Organic Carbon #1	ND	0.330	1.00	NE	U	UJ	092370-004	SW846 9060
15-May-12	Total Organic Carbon #2	ND	0.330	1.00	NE	U	UJ	092370-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U	UJ	092370-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U	UJ	092370-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U	UJ	092370-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	1.09	0.330	1.00	NE			092449-004	SW846 9060
04-Jun-12	Total Organic Carbon #2	1.19	0.330	1.00	NE			092449-004	SW846 9060
	Total Organic Carbon #3	1.10	0.330	1.00	NE			092449-004	SW846 9060
	Total Organic Carbon #4	1.05	0.330	1.00	NE			092449-004	SW846 9060
	Total Organic Carbon Average	1.11	0.330	1.00	NE			092449-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.856	0.330	1.00	NE	J	J-	092654-004	SW846 9060
31-Jul-12	Total Organic Carbon #2	1.10	0.330	1.00	NE		J-	092654-004	SW846 9060
	Total Organic Carbon #3	0.929	0.330	1.00	NE	J	J-	092654-004	SW846 9060
	Total Organic Carbon #4	0.956	0.330	1.00	NE	J	J-	092654-004	SW846 9060
	Total Organic Carbon Average	0.960	0.330	1.00	NE	J	J-	092654-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.759	0.330	1.00	NE	J		092670-004	SW846 9060
09-Aug-12	Total Organic Carbon #2	1.03	0.330	1.00	NE			092670-004	SW846 9060
	Total Organic Carbon #3	0.813	0.330	1.00	NE	J		092670-004	SW846 9060
	Total Organic Carbon #4	0.850	0.330	1.00	NE	J		092670-004	SW846 9060
	Total Organic Carbon Average	0.864	0.330	1.00	NE	J		092670-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	0.916	0.330	1.00	NE	J	J-	092652-004	SW846 9060
30-Jul-12	Total Organic Carbon #2	1.08	0.330	1.00	NE		J-	092652-004	SW846 9060
	Total Organic Carbon #3	0.919	0.330	1.00	NE	J	J-	092652-004	SW846 9060
	Total Organic Carbon #4	0.963	0.330	1.00	NE	J	J-	092652-004	SW846 9060
	Total Organic Carbon Average	0.970	0.330	1.00	NE	J	J-	092652-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.876	0.330	1.00	NE	J	J-	092642-004	SW846 9060
24-Jul-12	Total Organic Carbon #2	1.35	0.330	1.00	NE			092642-004	SW846 9060
	Total Organic Carbon #3	1.20	0.330	1.00	NE		J-	092642-004	SW846 9060
	Total Organic Carbon #4	1.07	0.330	1.00	NE		J-	092642-004	SW846 9060
	Total Organic Carbon Average	1.12	0.330	1.00	NE		J-	092642-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	0.702	0.330	1.00	NE	J	3.97UJ	092660-004	SW846 9060
02-Aug-12	Total Organic Carbon #2	0.921	0.330	1.00	NE	J	4.36UJ	092660-004	SW846 9060
	Total Organic Carbon #3	0.785	0.330	1.00	NE	J	3.86UJ	092660-004	SW846 9060
	Total Organic Carbon #4	0.730	0.330	1.00	NE	J	3.64UJ	092660-004	SW846 9060
	Total Organic Carbon Average	0.784	0.330	1.00	NE	J	3.90UJ	092660-004	SW846 9060
TAV-MW4 (Duplicate)	Total Organic Carbon #1	0.930	0.330	1.00	NE	J	3.97UJ	092661-004	SW846 9060
02-Aug-12	Total Organic Carbon #2	1.18	0.330	1.00	NE		4.36UJ	092661-004	SW846 9060
	Total Organic Carbon #3	0.969	0.330	1.00	NE	J	3.86UJ	092661-004	SW846 9060
	Total Organic Carbon #4	1.04	0.330	1.00	NE		3.64UJ	092661-004	SW846 9060
	Total Organic Carbon Average	1.03	0.330	1.00	NE		3.90UJ	092661-004	SW846 9060
TAV-MW6	Total Organic Carbon #1	0.675	0.330	1.00	NE	J		092665-004	SW846 9060
06-Aug-12	Total Organic Carbon #2	1.01	0.330	1.00	NE			092665-004	SW846 9060
	Total Organic Carbon #3	0.764	0.330	1.00	NE	J		092665-004	SW846 9060
	Total Organic Carbon #4	0.850	0.330	1.00	NE	J		092665-004	SW846 9060
	Total Organic Carbon Average	0.826	0.330	1.00	NE	J		092665-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.828	0.330	1.00	NE	J	J-	092645-004	SW846 9060
25-Jul-12	Total Organic Carbon #2	1.43	0.330	1.00	NE			092645-004	SW846 9060
	Total Organic Carbon #3	1.10	0.330	1.00	NE		J-	092645-004	SW846 9060
	Total Organic Carbon #4	1.35	0.330	1.00	NE			092645-004	SW846 9060
	Total Organic Carbon Average	1.18	0.330	1.00	NE		J-	092645-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	0.722	0.330	1.00	NE	J		092668-004	SW846 9060
07-Aug-12	Total Organic Carbon #2	1.06	0.330	1.00	NE			092668-004	SW846 9060
	Total Organic Carbon #3	0.854	0.330	1.00	NE	J		092668-004	SW846 9060
	Total Organic Carbon #4	0.770	0.330	1.00	NE	J		092668-004	SW846 9060
	Total Organic Carbon Average	0.850	0.330	1.00	NE	J		092668-004	SW846 9060
TAV-MW11	Total Organic Carbon #1	0.734	0.330	1.00	NE	J	2.98UJ	092649-004	SW846 9060
26-Jul-12	Total Organic Carbon #2	1.03	0.330	1.00	NE		3.20UJ	092649-004	SW846 9060
	Total Organic Carbon #3	1.09	0.330	1.00	NE		3.35UJ	092649-004	SW846 9060
	Total Organic Carbon #4	1.17	0.330	1.00	NE		3.45UJ	092649-004	SW846 9060
	Total Organic Carbon Average	1.01	0.330	1.00	NE		3.246UJ	092649-004	SW846 9060
TAV-MW11 (Duplicate)	Total Organic Carbon #1	0.813	0.330	1.00	NE	J	2.98UJ	092650-004	SW846 9060
26-Jul-12	Total Organic Carbon #2	1.26	0.330	1.00	NE		3.20UJ	092650-004	SW846 9060
	Total Organic Carbon #3	0.979	0.330	1.00	NE	J	3.35UJ	092650-004	SW846 9060
	Total Organic Carbon #4	1.14	0.330	1.00	NE		3.45UJ	092650-004	SW846 9060
	Total Organic Carbon Average	1.05	0.330	1.00	NE		3.246UJ	092650-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.897	0.330	1.00	NE	J	J-	092656-004	SW846 9060
01-Aug-12	Total Organic Carbon #2	1.21	0.330	1.00	NE		J-	092656-004	SW846 9060
	Total Organic Carbon #3	1.01	0.330	1.00	NE		J-	092656-004	SW846 9060
	Total Organic Carbon #4	1.18	0.330	1.00	NE		J-	092656-004	SW846 9060
	Total Organic Carbon Average	1.07	0.330	1.00	NE		J-	092656-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.713	0.330	1.00	NE	J	J-	092639-004	SW846 9060
23-Jul-12	Total Organic Carbon #2	1.16	0.330	1.00	NE		J-	092639-004	SW846 9060
	Total Organic Carbon #3	0.924	0.330	1.00	NE	J	J-	092639-004	SW846 9060
	Total Organic Carbon #4	1.19	0.330	1.00	NE		J-	092639-004	SW846 9060
	Total Organic Carbon Average	0.997	0.330	1.00	NE	J	J-	092639-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.702	0.330	1.00	NE	J		092663-004	SW846 9060
03-Aug-12	Total Organic Carbon #2	1.05	0.330	1.00	NE			092663-004	SW846 9060
	Total Organic Carbon #3	0.723	0.330	1.00	NE	J		092663-004	SW846 9060
	Total Organic Carbon #4	0.868	0.330	1.00	NE	J		092663-004	SW846 9060
	Total Organic Carbon Average	0.836	0.330	1.00	NE	J		092663-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	ND	0.330	1.00	NE	U		093048-004	SW846 9060
06-Nov-12	Total Organic Carbon #2	ND	0.330	1.00	NE	U		093048-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		093048-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		093048-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		093048-004	SW846 9060
LWDS-MW1	Total Organic Carbon #1	0.615	0.330	1.00	NE	J	3.1U	093069-004	SW846 9060
15-Nov-12	Total Organic Carbon #2	0.684	0.330	1.00	NE	J	3.1U	093069-004	SW846 9060
	Total Organic Carbon #3	0.633	0.330	1.00	NE	J	3.1U	093069-004	SW846 9060
	Total Organic Carbon #4	0.601	0.330	1.00	NE	J	3.1U	093069-004	SW846 9060
	Total Organic Carbon Average	0.633	0.330	1.00	NE	J	3.1U	093069-004	SW846 9060
LWDS-MW2	Total Organic Carbon #1	ND	0.330	1.00	NE	U		093043-004	SW846 9060
02-Nov-12	Total Organic Carbon #2	ND	0.330	1.00	NE	U		093043-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		093043-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		093043-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		093043-004	SW846 9060
TAV-MW2	Total Organic Carbon #1	0.906	0.330	1.00	NE	J	3.045U	093039-004	SW846 9060
31-Oct-12	Total Organic Carbon #2	0.840	0.330	1.00	NE	J	3.045U	093039-004	SW846 9060
	Total Organic Carbon #3	0.839	0.330	1.00	NE	J	3.045U	093039-004	SW846 9060
	Total Organic Carbon #4	0.888	0.330	1.00	NE	J	3.045U	093039-004	SW846 9060
	Total Organic Carbon Average	0.868	0.330	1.00	NE	B, J	3.045U	093039-004	SW846 9060
TAV-MW3	Total Organic Carbon #1	0.652	0.330	1.00	NE	J	2.16U	093034-004	SW846 9060
29-Oct-12	Total Organic Carbon #2	0.763	0.330	1.00	NE	J	2.55U	093034-004	SW846 9060
	Total Organic Carbon #3	0.622	0.330	1.00	NE	J	2.38U	093034-004	SW846 9060
	Total Organic Carbon #4	0.628	0.330	1.00	NE	J	2.27U	093034-004	SW846 9060
	Total Organic Carbon Average	0.666	0.330	1.00	NE	J	2.34U	093034-004	SW846 9060
TAV-MW3 (Duplicate)	Total Organic Carbon #1	0.682	0.330	1.00	NE	J	2.16U	093035-004	SW846 9060
29-Oct-12	Total Organic Carbon #2	0.798	0.330	1.00	NE	J	2.55U	093035-004	SW846 9060
	Total Organic Carbon #3	0.707	0.330	1.00	NE	J	2.38U	093035-004	SW846 9060
	Total Organic Carbon #4	0.750	0.330	1.00	NE	J	2.27U	093035-004	SW846 9060
	Total Organic Carbon Average	0.734	0.330	1.00	NE	J	2.34U	093035-004	SW846 9060
TAV-MW4	Total Organic Carbon #1	ND	0.330	1.00	NE	U		093056-004	SW846 9060
08-Nov-12	Total Organic Carbon #2	0.360	0.330	1.00	NE	J		093056-004	SW846 9060
	Total Organic Carbon #3	ND	0.330	1.00	NE	U		093056-004	SW846 9060
	Total Organic Carbon #4	ND	0.330	1.00	NE	U		093056-004	SW846 9060
	Total Organic Carbon Average	ND	0.330	1.00	NE	U		093056-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Total Organic Carbon #1	0.458	0.330	1.00	NE	J		093026-004	SW846 9060
24-Oct-12	Total Organic Carbon #2	0.626	0.330	1.00	NE	J		093026-004	SW846 9060
	Total Organic Carbon #3	0.504	0.330	1.00	NE	J		093026-004	SW846 9060
	Total Organic Carbon #4	0.556	0.330	1.00	NE	J		093026-004	SW846 9060
	Total Organic Carbon Average	0.536	0.330	1.00	NE	J		093026-004	SW846 9060
TAV-MW6	Total Organic Carbon #1	0.704	0.330	1.00	NE	J	3.1U	093061-004	SW846 9060
12-Nov-12	Total Organic Carbon #2	0.476	0.330	1.00	NE	J	3.1U	093061-004	SW846 9060
	Total Organic Carbon #3	0.413	0.330	1.00	NE	J	3.1U	093061-004	SW846 9060
	Total Organic Carbon #4	0.460	0.330	1.00	NE	J	3.1U	093061-004	SW846 9060
	Total Organic Carbon Average	0.513	0.330	1.00	NE	B, J	3.1U	093061-004	SW846 9060
TAV-MW7	Total Organic Carbon #1	0.610	0.330	1.00	NE	J		093030-004	SW846 9060
26-Oct-12	Total Organic Carbon #2	0.863	0.330	1.00	NE	J		093030-004	SW846 9060
	Total Organic Carbon #3	0.649	0.330	1.00	NE	J		093030-004	SW846 9060
	Total Organic Carbon #4	0.788	0.330	1.00	NE	J		093030-004	SW846 9060
	Total Organic Carbon Average	0.728	0.330	1.00	NE	J		093030-004	SW846 9060
TAV-MW8	Total Organic Carbon #1	0.779	0.330	1.00	NE	J	3.045U	093041-004	SW846 9060
01-Nov-12	Total Organic Carbon #2	0.900	0.330	1.00	NE	J	3.045U	093041-004	SW846 9060
	Total Organic Carbon #3	0.803	0.330	1.00	NE	J	3.045U	093041-004	SW846 9060
	Total Organic Carbon #4	0.836	0.330	1.00	NE	J	3.045U	093041-004	SW846 9060
	Total Organic Carbon Average	0.829	0.330	1.00	NE	B, J	3.045U	093041-004	SW846 9060
TAV-MW9	Total Organic Carbon #1	0.911	0.330	1.00	NE	J	3.045U	093037-004	SW846 9060
30-Oct-12	Total Organic Carbon #2	0.929	0.330	1.00	NE	J	3.045U	093037-004	SW846 9060
	Total Organic Carbon #3	0.923	0.330	1.00	NE	J	3.045U	093037-004	SW846 9060
	Total Organic Carbon #4	0.888	0.330	1.00	NE	J	3.045U	093037-004	SW846 9060
	Total Organic Carbon Average	0.913	0.330	1.00	NE	B, J	3.045U	093037-004	SW846 9060
TAV-MW10	Total Organic Carbon #1	0.393	0.330	1.00	NE	J	3.1U	093065-004	SW846 9060
13-Nov-12	Total Organic Carbon #2	0.508	0.330	1.00	NE	J	3.1U	093065-004	SW846 9060
	Total Organic Carbon #3	0.369	0.330	1.00	NE	J	3.1U	093065-004	SW846 9060
	Total Organic Carbon #4	0.414	0.330	1.00	NE	J	3.1U	093065-004	SW846 9060
	Total Organic Carbon Average	0.421	0.330	1.00	NE	B, J	3.1U	093065-004	SW846 9060
TAV-MW10 (Duplicate)	Total Organic Carbon #1	0.438	0.330	1.00	NE	J	3.1U	093066-004	SW846 9060
13-Nov-12	Total Organic Carbon #2	0.471	0.330	1.00	NE	J	3.1U	093066-004	SW846 9060
	Total Organic Carbon #3	0.419	0.330	1.00	NE	J	3.1U	093066-004	SW846 9060
	Total Organic Carbon #4	0.429	0.330	1.00	NE	J	3.1U	093066-004	SW846 9060
	Total Organic Carbon Average	0.439	0.330	1.00	NE	B, J	3.1U	093066-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW11	Total Organic Carbon #1	ND	0.330	1.00	NE	U		093045-004	SW846 9060
05-Nov-12	Total Organic Carbon #2	0.409	0.330	1.00	NE	J		093045-004	SW846 9060
	Total Organic Carbon #3	0.360	0.330	1.00	NE	J		093045-004	SW846 9060
	Total Organic Carbon #4	0.330	0.330	1.00	NE	J		093045-004	SW846 9060
	Total Organic Carbon Average	0.344	0.330	1.00	NE	J		093045-004	SW846 9060
TAV-MW12	Total Organic Carbon #1	0.339	0.330	1.00	NE	J		093053-004	SW846 9060
07-Nov-12	Total Organic Carbon #2	0.494	0.330	1.00	NE	J		093053-004	SW846 9060
	Total Organic Carbon #3	0.378	0.330	1.00	NE	J		093053-004	SW846 9060
	Total Organic Carbon #4	0.389	0.330	1.00	NE	J		093053-004	SW846 9060
	Total Organic Carbon Average	0.400	0.330	1.00	NE	J		093053-004	SW846 9060
TAV-MW12 (Duplicate)	Total Organic Carbon #1	0.424	0.330	1.00	NE	J		093054-004	SW846 9060
07-Nov-12	Total Organic Carbon #2	0.544	0.330	1.00	NE	J		093054-004	SW846 9060
	Total Organic Carbon #3	0.455	0.330	1.00	NE	J		093054-004	SW846 9060
	Total Organic Carbon #4	0.491	0.330	1.00	NE	J		093054-004	SW846 9060
	Total Organic Carbon Average	0.479	0.330	1.00	NE	J		093054-004	SW846 9060
TAV-MW13	Total Organic Carbon #1	0.613	0.330	1.00	NE	J		093028-004	SW846 9060
25-Oct-12	Total Organic Carbon #2	0.702	0.330	1.00	NE	J		093028-004	SW846 9060
	Total Organic Carbon #3	0.651	0.330	1.00	NE	J		093028-004	SW846 9060
	Total Organic Carbon #4	0.718	0.330	1.00	NE	J		093028-004	SW846 9060
	Total Organic Carbon Average	0.671	0.330	1.00	NE	J		093028-004	SW846 9060
TAV-MW14	Total Organic Carbon #1	0.677	0.330	1.00	NE	J	3.1U	093059-004	SW846 9060
09-Nov-12	Total Organic Carbon #2	0.418	0.330	1.00	NE	J	3.1U	093059-004	SW846 9060
	Total Organic Carbon #3	0.426	0.330	1.00	NE	J	3.1U	093059-004	SW846 9060
	Total Organic Carbon #4	0.456	0.330	1.00	NE	J	3.1U	093059-004	SW846 9060
	Total Organic Carbon Average	0.494	0.330	1.00	NE	B, J	3.1U	093059-004	SW846 9060

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	41.5	0.060	0.200	NE	B		091774-010	SW846 6020
01-Mar-12	Magnesium	9.88	0.010	0.030	NE		J	091774-010	SW846 6020
	Potassium	3.65	0.080	0.300	NE			091774-010	SW846 6020
	Sodium	39.7	0.080	0.250	NE			091774-010	SW846 6020
LWDS-MW1	Calcium	67.7	0.300	1.00	NE	B		091791-010	SW846 6020
05-Mar-12	Magnesium	21.1	0.010	0.030	NE			091791-010	SW846 6020
	Potassium	3.37	0.080	0.300	NE			091791-010	SW846 6020
	Sodium	66.7	0.400	1.25	NE			091791-010	SW846 6020
LWDS-MW2	Calcium	43.8	0.060	0.200	NE			091770-010	SW846 6020
21-Feb-12	Magnesium	13.7	0.010	0.030	NE			091770-010	SW846 6020
	Potassium	2.84	0.080	0.300	NE			091770-010	SW846 6020
	Sodium	43.5	0.080	0.250	NE			091770-010	SW846 6020
TAV-MW2	Calcium	76.2	0.600	2.00	NE			091763-010	SW846 6020
20-Feb-12	Magnesium	23.7	0.010	0.030	NE			091763-010	SW846 6020
	Potassium	3.90	0.080	0.300	NE			091763-010	SW846 6020
	Sodium	70.2	0.800	2.50	NE			091763-010	SW846 6020
TAV-MW4	Calcium	49.1	0.060	0.200	NE			091779-010	SW846 6020
23-Feb-12	Magnesium	15.0	0.010	0.030	NE			091779-010	SW846 6020
	Potassium	3.32	0.080	0.300	NE			091779-010	SW846 6020
	Sodium	46.9	0.080	0.250	NE			091779-010	SW846 6020
TAV-MW6	Calcium	61.1	0.300	1.00	NE	B		091786-010	SW846 6020
28-Feb-12	Magnesium	19.3	0.010	0.030	NE		J	091786-010	SW846 6020
	Potassium	3.88	0.080	0.300	NE			091786-010	SW846 6020
	Sodium	57.6	0.400	1.22	NE			091786-010	SW846 6020
TAV-MW8	Calcium	58.0	0.600	2.00	NE			091767-010	SW846 6020
21-Feb-12	Magnesium	16.5	0.010	0.030	NE			091767-010	SW846 6020
	Potassium	3.71	0.080	0.300	NE			091767-010	SW846 6020
	Sodium	56.9	0.800	2.50	NE			091767-010	SW846 6020
TAV-MW8 (Duplicate)	Calcium	58.1	0.600	2.00	NE			091768-010	SW846 6020
21-Feb-12	Magnesium	16.6	0.010	0.030	NE			091768-010	SW846 6020
	Potassium	3.72	0.080	0.300	NE			091768-010	SW846 6020
	Sodium	57.0	0.800	2.50	NE			091768-010	SW846 6020
TAV-MW10	Calcium	63.8	0.300	1.00	NE	B		091788-010	SW846 6020
29-Feb-12	Magnesium	17.3	0.010	0.030	NE		J	091788-010	SW846 6020
	Potassium	4.70	0.080	0.300	NE			091788-010	SW846 6020
	Sodium	57.4	0.400	1.25	NE			091788-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 22-Feb-12	Calcium	53.8	0.600	2.00	NE			091772-010	SW846 6020
	Magnesium	14.1	0.010	0.030	NE			091772-010	SW846 6020
	Potassium	3.53	0.080	0.300	NE			091772-010	SW846 6020
	Sodium	48.1	0.080	2.00	NE			091772-010	SW846 6020
TAV-MW12 23-Feb-12	Calcium	58.6	0.600	2.00	NE			091777-010	SW846 6020
	Magnesium	18.1	0.010	0.030	NE			091777-010	SW846 6020
	Potassium	3.70	0.080	0.300	NE			091777-010	SW846 6020
	Sodium	59.0	0.800	2.50	NE			091777-010	SW846 6020
TAV-MW13 20-Feb-12	Calcium	49.5	0.060	0.200	NE			091760-010	SW846 6020
	Magnesium	14.9	0.010	0.030	NE			091760-010	SW846 6020
	Potassium	3.48	0.080	0.300	NE			091760-010	SW846 6020
	Sodium	48.3	0.080	0.250	NE			091760-010	SW846 6020
TAV-MW14 27-Feb-12	Calcium	74.0	0.300	1.00	NE	B		091783-010	SW846 6020
	Magnesium	18.2	0.010	0.030	NE			091783-010	SW846 6020
	Potassium	4.07	0.080	0.300	NE			091783-010	SW846 6020
	Sodium	67.2	0.400	1.25	NE			091783-010	SW846 6020
TAV-MW14 (Duplicate) 27-Feb-12	Calcium	70.2	0.300	1.00	NE	B		091784-010	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			091784-010	SW846 6020
	Potassium	4.24	0.080	0.300	NE			091784-010	SW846 6020
	Sodium	67.0	0.400	1.25	NE			091784-010	SW846 6020
AVN-1 30-May-12	Calcium	44.7	0.060	0.200	NE			092393-009	SW846 6020
	Magnesium	9.94	0.010	0.030	NE			092393-009	SW846 6020
	Potassium	3.50	0.080	0.300	NE			092393-009	SW846 6020
	Sodium	40.5	0.080	0.250	NE			092393-009	SW846 6020
AVN-1 (Duplicate) 30-May-12	Calcium	45.3	0.060	0.200	NE			092394-009	SW846 6020
	Magnesium	10.3	0.010	0.030	NE			092394-009	SW846 6020
	Potassium	3.67	0.080	0.300	NE			092394-009	SW846 6020
	Sodium	38.9	0.080	0.250	NE			092394-009	SW846 6020
LWDS-MW1 08-Jun-12	Calcium	67.6	0.300	1.00	NE			092445-009	SW846 6020
	Magnesium	19.6	0.010	0.030	NE		J	092445-009	SW846 6020
	Potassium	2.93	0.080	0.300	NE			092445-009	SW846 6020
	Sodium	63.7	0.400	1.25	NE			092445-009	SW846 6020
LWDS-MW2 23-May-12	Calcium	43.1	0.060	0.200	NE			092386-009	SW846 6020
	Magnesium	12.4	0.010	0.030	NE			092386-009	SW846 6020
	Potassium	2.81	0.080	0.300	NE			092386-009	SW846 6020
	Sodium	38.9	0.080	0.250	NE			092386-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Calcium	71.0	0.300	1.00	NE			092381-009	SW846 6020
21-May-12	Magnesium	22.3	0.010	0.030	NE			092381-009	SW846 6020
	Potassium	3.82	0.080	0.300	NE			092381-009	SW846 6020
	Sodium	64.3	0.400	1.25	NE			092381-009	SW846 6020
TAV-MW3	Calcium	56.2	0.300	1.00	NE			092374-009	SW846 6020
17-May-12	Magnesium	13.1	0.010	0.030	NE			092374-009	SW846 6020
	Potassium	3.96	0.080	0.300	NE			092374-009	SW846 6020
	Sodium	54.9	0.400	1.25	NE		J	092374-009	SW846 6020
TAV-MW4	Calcium	49.0	0.060	0.200	NE	B		092447-009	SW846 6020
01-Jun-12	Magnesium	15.1	0.010	0.030	NE			092447-009	SW846 6020
	Potassium	3.09	0.080	0.300	NE			092447-009	SW846 6020
	Sodium	40.8	0.080	0.250	NE			092447-009	SW846 6020
TAV-MW5	Calcium	45.3	0.060	0.200	NE			092365-009	SW846 6020
14-May-12	Magnesium	12.4	0.010	0.030	NE			092365-009	SW846 6020
	Potassium	2.75	0.080	0.300	NE			092365-009	SW846 6020
	Sodium	44.2	0.080	0.250	NE		J	092365-009	SW846 6020
TAV-MW6	Calcium	63.7	0.300	1.00	NE	B		092398-009	SW846 6020
05-Jun-12	Magnesium	18.5	0.010	0.030	NE			092398-009	SW846 6020
	Potassium	3.51	0.080	0.300	NE			092398-009	SW846 6020
	Sodium	61.5	0.400	1.25	NE			092398-009	SW846 6020
TAV-MW7	Calcium	61.5	0.300	1.00	NE			092372-009	SW846 6020
16-May-12	Magnesium	18.4	0.010	0.030	NE			092372-009	SW846 6020
	Potassium	4.05	0.080	0.300	NE			092372-009	SW846 6020
	Sodium	60.6	0.400	1.25	NE		J	092372-009	SW846 6020
TAV-MW8	Calcium	52.0	0.300	1.00	NE			092383-009	SW846 6020
22-May-12	Magnesium	15.4	0.010	0.030	NE			092383-009	SW846 6020
	Potassium	3.78	0.080	0.300	NE			092383-009	SW846 6020
	Sodium	53.6	0.400	1.25	NE			092383-009	SW846 6020
TAV-MW9	Calcium	59.6	0.300	1.00	NE			092378-009	SW846 6020
18-May-12	Magnesium	19.0	0.010	0.030	NE			092378-009	SW846 6020
	Potassium	4.07	0.080	0.300	NE			092378-009	SW846 6020
	Sodium	57.2	0.400	1.25	NE			092378-009	SW846 6020
TAV-MW9 (Duplicate)	Calcium	62.2	0.300	1.00	NE			092379-009	SW846 6020
18-May-12	Magnesium	20.0	0.010	0.030	NE			092379-009	SW846 6020
	Potassium	4.11	0.080	0.300	NE			092379-009	SW846 6020
	Sodium	64.3	0.400	1.25	NE			092379-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	63.6	0.300	1.00	NE	B		092451-009	SW846 6020
06-Jun-12	Magnesium	17.7	0.010	0.030	NE			092451-009	SW846 6020
	Potassium	4.01	0.080	0.300	NE			092451-009	SW846 6020
	Sodium	55.9	0.400	1.25	NE			092451-009	SW846 6020
TAV-MW11	Calcium	59.4	0.300	1.00	NE			092388-009	SW846 6020
29-May-12	Magnesium	15.8	0.010	0.030	NE			092388-009	SW846 6020
	Potassium	3.80	0.080	0.300	NE			092388-009	SW846 6020
	Sodium	67.7	0.400	1.25	NE			092388-009	SW846 6020
TAV-MW12	Calcium	55.4	0.300	1.00	NE			092396-009	SW846 6020
31-May-12	Magnesium	18.4	0.010	0.030	NE			092396-009	SW846 6020
	Potassium	3.77	0.080	0.300	NE			092396-009	SW846 6020
	Sodium	56.2	0.400	1.25	NE			092396-009	SW846 6020
TAV-MW13	Calcium	46.3	0.060	0.200	NE			092369-009	SW846 6020
15-May-12	Magnesium	13.8	0.010	0.030	NE			092369-009	SW846 6020
	Potassium	3.40	0.080	0.300	NE			092369-009	SW846 6020
	Sodium	45.7	0.080	0.250	NE		J	092369-009	SW846 6020
TAV-MW13 (Duplicate)	Calcium	47.3	0.060	0.200	NE			092370-009	SW846 6020
15-May-12	Magnesium	15.0	0.010	0.030	NE			092370-009	SW846 6020
	Potassium	3.27	0.080	0.300	NE			092370-009	SW846 6020
	Sodium	50.4	0.400	1.25	NE		J	092370-009	SW846 6020
TAV-MW14	Calcium	60.4	0.300	1.00	NE		J	092449-009	SW846 6020
04-Jun-12	Magnesium	19.4	0.010	0.030	NE		J	092449-009	SW846 6020
	Potassium	4.23	0.080	0.300	NE		J	092449-009	SW846 6020
	Sodium	62.5	0.400	1.25	NE		J	092449-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.135	0.015	0.050	NE			092654-009	SW846 6020
31-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092654-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092654-009	SW846 6020
	Barium	0.0663	0.0006	0.002	2.00			092654-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092654-009	SW846 6020
	Cadmium	0.000281	0.00011	0.001	0.005	J		092654-009	SW846 6020
	Calcium	38.4	0.060	0.200	NE			092654-009	SW846 6020
	Chromium	0.012	0.002	0.010	0.100			092654-009	SW846 6020
	Cobalt	0.000207	0.0001	0.001	NE	J		092654-009	SW846 6020
	Copper	0.00198	0.00035	0.001	NE	B	0.0030U	092654-009	SW846 6020
	Iron	0.263	0.033	0.100	NE			092654-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092654-009	SW846 6020
	Magnesium	9.50	0.010	0.030	NE			092654-009	SW846 6020
	Manganese	0.00426	0.001	0.005	NE	J		092654-009	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092654-009	SW846 7470
	Nickel	0.00321	0.0005	0.002	NE	B		092654-009	SW846 6020
	Potassium	3.69	0.080	0.300	NE			092654-009	SW846 6020
	Selenium	0.00186	0.0015	0.005	0.050	J		092654-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092654-009	SW846 6020
	Sodium	36.2	0.080	0.250	NE			092654-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092654-009	SW846 6020
	Uranium	0.00211	0.000067	0.0002	0.030			092654-009	SW846 6020
	Vanadium	0.00731	0.001	0.005	NE			092654-009	SW846 6010
	Zinc	0.0102	0.0035	0.010	NE			092654-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Aluminum	0.0504	0.015	0.050	NE			092670-009	SW846 6020
09-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092670-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092670-009	SW846 6020
	Barium	0.0789	0.0006	0.002	2.00			092670-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092670-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092670-009	SW846 6020
	Calcium	60.1	0.300	1.00	NE			092670-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092670-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092670-009	SW846 6020
	Copper	0.00105	0.00035	0.001	NE			092670-009	SW846 6020
	Iron	0.142	0.033	0.100	NE			092670-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092670-009	SW846 6020
	Magnesium	17.7	0.010	0.030	NE			092670-009	SW846 6020
	Manganese	0.00213	0.001	0.005	NE	J		092670-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092670-009	SW846 7470
	Nickel	0.00126	0.0005	0.002	NE	J		092670-009	SW846 6020
	Potassium	2.78	0.080	0.300	NE			092670-009	SW846 6020
	Selenium	0.0033	0.0015	0.005	0.050	J	NJ-	092670-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092670-009	SW846 6020
	Sodium	59.3	0.400	1.25	NE		J	092670-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092670-009	SW846 6020
	Uranium	0.00331	0.000067	0.0002	0.030			092670-009	SW846 6020
	Vanadium	0.00481	0.001	0.005	NE	J		092670-009	SW846 6010
	Zinc	0.00827	0.0035	0.010	NE	J		092670-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW2	Aluminum	0.0267	0.015	0.050	NE	J		092652-009	SW846 6020
30-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092652-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092652-009	SW846 6020
	Barium	0.0639	0.0006	0.002	2.00			092652-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092652-009	SW846 6020
	Cadmium	0.000237	0.00011	0.001	0.005	J		092652-009	SW846 6020
	Calcium	43.3	0.060	0.200	NE			092652-009	SW846 6020
	Chromium	0.00404	0.002	0.010	0.100	J		092652-009	SW846 6020
	Cobalt	0.00016	0.0001	0.001	NE	J		092652-009	SW846 6020
	Copper	0.002	0.00035	0.001	NE	B	0.0030U	092652-009	SW846 6020
	Iron	0.158	0.033	0.100	NE			092652-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092652-009	SW846 6020
	Magnesium	13.1	0.010	0.030	NE			092652-009	SW846 6020
	Manganese	0.0011	0.001	0.005	NE	J		092652-009	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092652-009	SW846 7470
	Nickel	0.00167	0.0005	0.002	NE	B, J	0.00286U	092652-009	SW846 6020
	Potassium	2.95	0.080	0.300	NE			092652-009	SW846 6020
	Selenium	0.00209	0.0015	0.005	0.050	J		092652-009	SW846 6020
	Silver	0.00186	0.0002	0.001	NE			092652-009	SW846 6020
	Sodium	44.5	0.080	0.250	NE			092652-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092652-009	SW846 6020
	Uranium	0.0031	0.000067	0.0002	0.030			092652-009	SW846 6020
	Vanadium	0.00713	0.001	0.005	NE			092652-009	SW846 6010
	Zinc	0.00994	0.0035	0.010	NE	J		092652-009	SW846 6020

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Table 5A-6 *(Continued)*
Summary of Metal 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-MW2	Aluminum	ND	0.015	0.050	NE	U		092642-009	SW846 6020
24-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092642-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092642-009	SW846 6020
	Barium	0.062	0.0006	0.002	2.00			092642-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092642-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092642-009	SW846 6020
	Calcium	71.3	0.300	1.00	NE			092642-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092642-009	SW846 6020
	Cobalt	0.000204	0.0001	0.001	NE	J		092642-009	SW846 6020
	Copper	0.00148	0.00035	0.001	NE	B	0.00378U	092642-009	SW846 6020
	Iron	0.232	0.033	0.100	NE			092642-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092642-009	SW846 6020
	Magnesium	21.8	0.010	0.030	NE			092642-009	SW846 6020
	Manganese	0.00161	0.001	0.005	NE	J		092642-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092642-009	SW846 7470
	Nickel	0.00147	0.0005	0.002	NE	J		092642-009	SW846 6020
	Potassium	3.69	0.080	0.300	NE			092642-009	SW846 6020
	Selenium	0.00223	0.0015	0.005	0.050	J		092642-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092642-009	SW846 6020
	Sodium	59.2	0.400	1.25	NE			092642-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092642-009	SW846 6020
	Uranium	0.00669	0.000067	0.0002	0.030	B		092642-009	SW846 6020
	Vanadium	0.00475	0.001	0.005	NE	J		092642-009	SW846 6010
	Zinc	0.00599	0.0035	0.010	NE	J		092642-009	SW846 6020

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092660-009	SW846 6020
02-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092660-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092660-009	SW846 6020
	Barium	0.0756	0.0006	0.002	2.00			092660-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092660-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092660-009	SW846 6020
	Calcium	48.5	0.060	0.200	NE			092660-009	SW846 6020
	Chromium	0.0262	0.002	0.010	0.100			092660-009	SW846 6020
	Cobalt	0.000155	0.0001	0.001	NE	J		092660-009	SW846 6020
	Copper	0.00116	0.00035	0.001	NE	B	0.0030U	092660-009	SW846 6020
	Iron	0.144	0.033	0.100	NE			092660-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092660-009	SW846 6020
	Magnesium	15.3	0.010	0.030	NE			092660-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092660-009	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092660-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	B, J	0.00286U	092660-009	SW846 6020
	Potassium	3.45	0.080	0.300	NE			092660-009	SW846 6020
	Selenium	0.00357	0.0015	0.005	0.050	J		092660-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092660-009	SW846 6020
	Sodium	49.7	0.080	0.250	NE			092660-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092660-009	SW846 6020
	Uranium	0.00313	0.000067	0.0002	0.030			092660-009	SW846 6020
	Vanadium	0.00662	0.001	0.005	NE			092660-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092660-009	SW846 6020

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Table 5A-6 *(Continued)*
Summary of Metal 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-MW4 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092661-009	SW846 6020
02-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092661-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092661-009	SW846 6020
	Barium	0.0773	0.0006	0.002	2.00			092661-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092661-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092661-009	SW846 6020
	Calcium	48.8	0.060	0.200	NE			092661-009	SW846 6020
	Chromium	0.0259	0.002	0.010	0.100			092661-009	SW846 6020
	Cobalt	0.000145	0.0001	0.001	NE	J		092661-009	SW846 6020
	Copper	0.00143	0.00035	0.001	NE	B	0.0030U	092661-009	SW846 6020
	Iron	0.141	0.033	0.100	NE			092661-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092661-009	SW846 6020
	Magnesium	16.3	0.010	0.030	NE			092661-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092661-009	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092661-009	SW846 7470
	Nickel	0.00147	0.0005	0.002	NE	B, J	0.00286U	092661-009	SW846 6020
	Potassium	3.97	0.080	0.300	NE			092661-009	SW846 6020
	Selenium	0.00336	0.0015	0.005	0.050	J		092661-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092661-009	SW846 6020
	Sodium	49.8	0.080	0.250	NE			092661-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092661-009	SW846 6020
	Uranium	0.00312	0.000067	0.0002	0.030			092661-009	SW846 6020
	Vanadium	0.00619	0.001	0.005	NE			092661-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092661-009	SW846 6020

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW6	Aluminum	0.130	0.015	0.050	NE			092665-009	SW846 6020
06-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092665-009	SW846 6020
	Arsenic	0.00178	0.0017	0.005	0.010	J		092665-009	SW846 6020
	Barium	0.0654	0.0006	0.002	2.00			092665-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092665-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092665-009	SW846 6020
	Calcium	65.8	0.300	1.00	NE			092665-009	SW846 6020
	Chromium	0.00236	0.002	0.010	0.100	J		092665-009	SW846 6020
	Cobalt	0.000153	0.0001	0.001	NE	J		092665-009	SW846 6020
	Copper	0.000726	0.00035	0.001	NE	J		092665-009	SW846 6020
	Iron	0.211	0.033	0.100	NE			092665-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092665-009	SW846 6020
	Magnesium	18.9	0.010	0.030	NE			092665-009	SW846 6020
	Manganese	0.00378	0.001	0.005	NE	J		092665-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092665-009	SW846 7470
	Nickel	0.00156	0.0005	0.002	NE	J		092665-009	SW846 6020
	Potassium	3.89	0.080	0.300	NE			092665-009	SW846 6020
	Selenium	0.00444	0.0015	0.005	0.050	J		092665-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092665-009	SW846 6020
	Sodium	64.4	0.400	1.25	NE			092665-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092665-009	SW846 6020
	Uranium	0.0038	0.000067	0.0002	0.030			092665-009	SW846 6020
	Vanadium	0.00657	0.001	0.005	NE			092665-009	SW846 6010
	Zinc	0.00387	0.0035	0.010	NE	J		092665-009	SW846 6020

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Table 5A-6 *(Continued)*
Summary of Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8	Aluminum	0.111	0.015	0.050	NE			092645-009	SW846 6020
25-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092645-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092645-009	SW846 6020
	Barium	0.0507	0.0006	0.002	2.00			092645-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092645-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092645-009	SW846 6020
	Calcium	53.4	0.300	1.00	NE			092645-009	SW846 6020
	Chromium	0.00268	0.002	0.010	0.100	J		092645-009	SW846 6020
	Cobalt	0.000138	0.0001	0.001	NE	J		092645-009	SW846 6020
	Copper	0.00138	0.00035	0.001	NE	B	0.00378U	092645-009	SW846 6020
	Iron	0.230	0.033	0.100	NE			092645-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092645-009	SW846 6020
	Magnesium	15.6	0.010	0.030	NE			092645-009	SW846 6020
	Manganese	0.00292	0.001	0.005	NE	J		092645-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092645-009	SW846 7470
	Nickel	0.00116	0.0005	0.002	NE	J		092645-009	SW846 6020
	Potassium	3.49	0.080	0.300	NE			092645-009	SW846 6020
	Selenium	0.00226	0.0015	0.005	0.050	J		092645-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092645-009	SW846 6020
	Sodium	53.6	0.400	1.25	NE			092645-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092645-009	SW846 6020
	Uranium	0.00355	0.000067	0.0002	0.030	B		092645-009	SW846 6020
	Vanadium	0.00578	0.001	0.005	NE			092645-009	SW846 6010
	Zinc	0.00498	0.0035	0.010	NE	J		092645-009	SW846 6020

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Table 5A-6 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW10	Aluminum	ND	0.015	0.050	NE	U		092668-009	SW846 6020
07-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092668-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092668-009	SW846 6020
	Barium	0.0606	0.0006	0.002	2.00			092668-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092668-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092668-009	SW846 6020
	Calcium	67.3	0.300	1.00	NE			092668-009	SW846 6020
	Chromium	0.00236	0.002	0.010	0.100	J		092668-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092668-009	SW846 6020
	Copper	0.000563	0.00035	0.001	NE	J		092668-009	SW846 6020
	Iron	0.0922	0.033	0.100	NE	J		092668-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092668-009	SW846 6020
	Magnesium	18.5	0.010	0.030	NE			092668-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092668-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092668-009	SW846 7470
	Nickel	0.00139	0.0005	0.002	NE	J		092668-009	SW846 6020
	Potassium	4.47	0.080	0.300	NE			092668-009	SW846 6020
	Selenium	0.0028	0.0015	0.005	0.050	J		092668-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092668-009	SW846 6020
	Sodium	63.1	0.400	1.25	NE			092668-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092668-009	SW846 6020
	Uranium	0.00358	0.000067	0.0002	0.030			092668-009	SW846 6020
	Vanadium	0.00578	0.001	0.005	NE			092668-009	SW846 6010
	Zinc	0.00911	0.0035	0.010	NE	J		092668-009	SW846 6020

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Table 5A-6 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW11	Aluminum	ND	0.015	0.050	NE	U		092649-009	SW846 6020
26-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092649-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092649-009	SW846 6020
	Barium	0.0691	0.0006	0.002	2.00			092649-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092649-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092649-009	SW846 6020
	Calcium	53.6	0.300	1.00	NE			092649-009	SW846 6020
	Chromium	0.00342	0.002	0.010	0.100	J		092649-009	SW846 6020
	Cobalt	0.000113	0.0001	0.001	NE	J		092649-009	SW846 6020
	Copper	0.00234	0.00035	0.001	NE	B	0.00378U	092649-009	SW846 6020
	Iron	0.164	0.033	0.100	NE			092649-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092649-009	SW846 6020
	Magnesium	15.3	0.010	0.030	NE			092649-009	SW846 6020
	Manganese	0.00555	0.001	0.005	NE			092649-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092649-009	SW846 7470
	Nickel	0.00129	0.0005	0.002	NE	J		092649-009	SW846 6020
	Potassium	3.53	0.080	0.300	NE			092649-009	SW846 6020
	Selenium	0.00308	0.0015	0.005	0.050	J		092649-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092649-009	SW846 6020
	Sodium	48.2	0.080	0.250	NE			092649-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092649-009	SW846 6020
	Uranium	0.00329	0.000067	0.0002	0.030	B		092649-009	SW846 6020
	Vanadium	0.00535	0.001	0.005	NE			092649-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092649-009	SW846 6020

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Table 5A-6 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW11 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092650-009	SW846 6020
26-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092650-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092650-009	SW846 6020
	Barium	0.0678	0.0006	0.002	2.00			092650-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092650-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092650-009	SW846 6020
	Calcium	53.8	0.300	1.00	NE			092650-009	SW846 6020
	Chromium	0.00338	0.002	0.010	0.100	J		092650-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		092650-009	SW846 6020
	Copper	0.000899	0.00035	0.001	NE	B, J	0.00378U	092650-009	SW846 6020
	Iron	0.158	0.033	0.100	NE			092650-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092650-009	SW846 6020
	Magnesium	14.7	0.010	0.030	NE			092650-009	SW846 6020
	Manganese	0.00592	0.001	0.005	NE			092650-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092650-009	SW846 7470
	Nickel	0.00104	0.0005	0.002	NE	J		092650-009	SW846 6020
	Potassium	3.50	0.080	0.300	NE			092650-009	SW846 6020
	Selenium	0.00318	0.0015	0.005	0.050	J		092650-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092650-009	SW846 6020
	Sodium	46.6	0.080	0.250	NE			092650-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092650-009	SW846 6020
	Uranium	0.00327	0.000067	0.0002	0.030	B		092650-009	SW846 6020
	Vanadium	0.00505	0.001	0.005	NE			092650-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092650-009	SW846 6020

Refer to footnotes on page 5A-81.

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW12	Aluminum	ND	0.015	0.050	NE	U		092656-009	SW846 6020
01-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092656-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092656-009	SW846 6020
	Barium	0.0626	0.0006	0.002	2.00			092656-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092656-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092656-009	SW846 6020
	Calcium	58.1	0.300	1.00	NE			092656-009	SW846 6020
	Chromium	0.00271	0.002	0.010	0.100	J		092656-009	SW846 6020
	Cobalt	0.000102	0.0001	0.001	NE	J		092656-009	SW846 6020
	Copper	0.000675	0.00035	0.001	NE	B, J	0.00323U	092656-009	SW846 6020
	Iron	0.132	0.033	0.100	NE			092656-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092656-009	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			092656-009	SW846 6020
	Manganese	0.00243	0.001	0.005	NE	J		092656-009	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092656-009	SW846 7470
	Nickel	0.00131	0.0005	0.002	NE	J		092656-009	SW846 6020
	Potassium	3.91	0.080	0.300	NE			092656-009	SW846 6020
	Selenium	0.00235	0.0015	0.005	0.050	J		092656-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092656-009	SW846 6020
	Sodium	54.3	0.400	1.25	NE			092656-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092656-009	SW846 6020
	Uranium	0.00459	0.000067	0.0002	0.030			092656-009	SW846 6020
	Vanadium	0.00474	0.001	0.005	NE	J		092656-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092656-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.0459	0.015	0.050	NE	J		092639-009	SW846 6020
23-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092639-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092639-009	SW846 6020
	Barium	0.0583	0.0006	0.002	2.00			092639-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092639-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092639-009	SW846 6020
	Calcium	48.2	0.060	0.200	NE			092639-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092639-009	SW846 6020
	Cobalt	0.000147	0.0001	0.001	NE	J		092639-009	SW846 6020
	Copper	0.0011	0.00035	0.001	NE	B	0.00378U	092639-009	SW846 6020
	Iron	0.190	0.033	0.100	NE			092639-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092639-009	SW846 6020
	Magnesium	14.7	0.010	0.030	NE			092639-009	SW846 6020
	Manganese	0.0123	0.001	0.005	NE			092639-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092639-009	SW846 7470
	Nickel	0.00123	0.0005	0.002	NE	J		092639-009	SW846 6020
	Potassium	3.39	0.080	0.300	NE			092639-009	SW846 6020
	Selenium	0.00173	0.0015	0.005	0.050	J		092639-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092639-009	SW846 6020
	Sodium	47.1	0.080	0.250	NE			092639-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092639-009	SW846 6020
	Uranium	0.00402	0.000067	0.0002	0.030	B		092639-009	SW846 6020
	Vanadium	0.00535	0.001	0.005	NE			092639-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092639-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.0158	0.015	0.050	NE	J		092663-009	SW846 6020
03-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092663-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092663-009	SW846 6020
	Barium	0.059	0.0006	0.002	2.00			092663-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092663-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092663-009	SW846 6020
	Calcium	66.6	0.300	1.00	NE			092663-009	SW846 6020
	Chromium	0.00208	0.002	0.010	0.100	J		092663-009	SW846 6020
	Cobalt	0.0001	0.0001	0.001	NE	J		092663-009	SW846 6020
	Copper	0.00253	0.00035	0.001	NE			092663-009	SW846 6020
	Iron	0.0869	0.033	0.100	NE	J		092663-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092663-009	SW846 6020
	Magnesium	17.8	0.010	0.030	NE			092663-009	SW846 6020
	Manganese	0.00135	0.001	0.005	NE	J		092663-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092663-009	SW846 7470
	Nickel	0.00138	0.0005	0.002	NE	J		092663-009	SW846 6020
	Potassium	4.54	0.080	0.300	NE			092663-009	SW846 6020
	Selenium	0.00284	0.0015	0.005	0.050	J		092663-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092663-009	SW846 6020
	Sodium	68.7	0.400	1.25	NE			092663-009	SW846 6020
	Thallium	0.000732	0.00045	0.002	0.002	B, J	0.00396U	092663-009	SW846 6020
	Uranium	0.00421	0.000067	0.0002	0.030			092663-009	SW846 6020
	Vanadium	0.0044	0.001	0.005	NE	J		092663-009	SW846 6010
	Zinc	0.00432	0.0035	0.010	NE	J		092663-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	44.9	0.060	0.200	NE	B		093048-009	SW846 6020
06-Nov-12	Magnesium	10.3	0.010	0.030	NE		J	093048-009	SW846 6020
	Potassium	3.41	0.080	0.300	NE			093048-009	SW846 6020
	Sodium	38.9	0.080	0.250	NE		J	093048-009	SW846 6020
LWDS-MW1	Calcium	66.4	0.300	1.00	NE			093069-009	SW846 6020
15-Nov-12	Magnesium	21.2	0.010	0.030	NE			093069-009	SW846 6020
	Potassium	3.25	0.080	0.300	NE			093069-009	SW846 6020
	Sodium	67.1	0.400	1.25	NE			093069-009	SW846 6020
LWDS-MW2	Calcium	47.2	0.060	0.200	NE	B		093043-009	SW846 6020
02-Nov-12	Magnesium	13.6	0.010	0.030	NE		J	093043-009	SW846 6020
	Potassium	2.78	0.080	0.300	NE			093043-009	SW846 6020
	Sodium	45.0	0.080	0.250	NE		J	093043-009	SW846 6020
TAV-MW2	Calcium	71.6	0.300	1.00	NE			093039-009	SW846 6020
31-Oct-12	Magnesium	22.1	0.050	0.150	NE		J	093039-009	SW846 6020
	Potassium	3.75	0.080	0.300	NE			093039-009	SW846 6020
	Sodium	59.8	0.800	2.50	NE			093039-009	SW846 6020
TAV-MW3	Calcium	55.9	0.300	1.00	NE			093034-009	SW846 6020
29-Oct-12	Magnesium	13.3	0.010	0.030	NE			093034-009	SW846 6020
	Potassium	4.37	0.080	0.300	NE			093034-009	SW846 6020
	Sodium	54.1	0.400	1.25	NE			093034-009	SW846 6020
TAV-MW3 (Duplicate)	Calcium	55.4	0.300	1.00	NE			093035-009	SW846 6020
29-Oct-12	Magnesium	14.3	0.010	0.030	NE			093035-009	SW846 6020
	Potassium	4.19	0.080	0.300	NE			093035-009	SW846 6020
	Sodium	53.3	0.400	1.25	NE			093035-009	SW846 6020
TAV-MW4	Calcium	54.1	0.300	1.00	NE	B		093056-009	SW846 6020
08-Nov-12	Magnesium	15.1	0.010	0.030	NE		J	093056-009	SW846 6020
	Potassium	3.34	0.080	0.300	NE			093056-009	SW846 6020
	Sodium	46.2	0.080	0.250	NE		J	093056-009	SW846 6020
TAV-MW5	Calcium	45.2	0.060	0.200	NE			093026-009	SW846 6020
24-Oct-12	Magnesium	13.0	0.010	0.030	NE			093026-009	SW846 6020
	Potassium	2.76	0.080	0.300	NE			093026-009	SW846 6020
	Sodium	44.4	0.080	0.250	NE		J	093026-009	SW846 6020
TAV-MW6	Calcium	68.0	0.300	1.00	NE			093061-009	SW846 6020
12-Nov-12	Magnesium	21.2	0.010	0.030	NE			093061-009	SW846 6020
	Potassium	4.25	0.080	0.300	NE			093061-009	SW846 6020
	Sodium	69.5	0.400	1.25	NE			093061-009	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Calcium	63.4	0.300	1.00	NE			093030-009	SW846 6020
26-Oct-12	Magnesium	19.4	0.010	0.030	NE			093030-009	SW846 6020
	Potassium	3.84	0.080	0.300	NE			093030-009	SW846 6020
	Sodium	58.9	0.400	1.25	NE			093030-009	SW846 6020
TAV-MW8	Calcium	55.2	0.300	1.00	NE			093041-009	SW846 6020
01-Nov-12	Magnesium	16.1	0.050	0.150	NE		J	093041-009	SW846 6020
	Potassium	3.66	0.080	0.300	NE			093041-009	SW846 6020
	Sodium	53.0	0.800	2.50	NE			093041-009	SW846 6020
TAV-MW9	Calcium	59.0	0.300	1.00	NE			093037-009	SW846 6020
30-Oct-12	Magnesium	19.0	0.050	0.150	NE		J	093037-009	SW846 6020
	Potassium	4.07	0.080	0.300	NE			093037-009	SW846 6020
	Sodium	52.6	0.800	2.50	NE			093037-009	SW846 6020
TAV-MW10	Calcium	65.0	0.300	1.00	NE			093065-009	SW846 6020
13-Nov-12	Magnesium	17.7	0.010	0.030	NE			093065-009	SW846 6020
	Potassium	4.90	0.080	0.300	NE			093065-009	SW846 6020
	Sodium	61.7	0.400	1.25	NE			093065-009	SW846 6020
TAV-MW10 (Duplicate)	Calcium	66.5	0.300	1.00	NE			093066-009	SW846 6020
13-Nov-12	Magnesium	17.9	0.010	0.030	NE			093066-009	SW846 6020
	Potassium	4.66	0.080	0.300	NE			093066-009	SW846 6020
	Sodium	70.6	0.400	1.25	NE			093066-009	SW846 6020
TAV-MW11	Calcium	57.9	0.300	1.00	NE	B		093045-009	SW846 6020
05-Nov-12	Magnesium	15.5	0.010	0.030	NE		J	093045-009	SW846 6020
	Potassium	3.93	0.080	0.300	NE			093045-009	SW846 6020
	Sodium	56.4	0.400	1.25	NE		J	093045-009	SW846 6020
TAV-MW12	Calcium	59.3	0.300	1.00	NE	B		093053-009	SW846 6020
07-Nov-12	Magnesium	18.6	0.010	0.030	NE		J	093053-009	SW846 6020
	Potassium	3.93	0.080	0.300	NE			093053-009	SW846 6020
	Sodium	56.6	0.400	1.25	NE		J	093053-009	SW846 6020
TAV-MW12 (Duplicate)	Calcium	61.7	0.300	1.00	NE	B		093054-009	SW846 6020
07-Nov-12	Magnesium	19.9	0.010	0.030	NE		J	093054-009	SW846 6020
	Potassium	3.99	0.080	0.300	NE			093054-009	SW846 6020
	Sodium	62.4	0.400	1.25	NE		J	093054-009	SW846 6020
TAV-MW13	Calcium	53.9	0.300	1.00	NE			093028-009	SW846 6020
25-Oct-12	Magnesium	15.8	0.010	0.030	NE			093028-009	SW846 6020
	Potassium	3.42	0.080	0.300	NE			093028-009	SW846 6020
	Sodium	52.1	0.400	1.25	NE			093028-009	SW846 6020

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Table 5A-6 *(Concluded)*
Summary of Metal 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-MW14	Calcium	61.8	0.300	1.00	NE	B		093059-009	SW846 6020
09-Nov-12	Magnesium	20.5	0.010	0.030	NE			093059-009	SW846 6020
	Potassium	4.51	0.080	0.300	NE			093059-009	SW846 6020
	Sodium	60.1	0.400	1.25	NE			093059-009	SW846 6020

Refer to footnotes on page 5A-81.

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Iron	0.099	0.033	0.100	NE	J	J	091774-009	SW846 6020
01-Mar-12	Manganese	ND	0.001	0.005	NE	U		091774-009	SW846 6020
LWDS-MW1	Iron	0.124	0.033	0.100	NE		J	091791-009	SW846 6020
05-Mar-12	Manganese	ND	0.001	0.005	NE	U		091791-009	SW846 6020
LWDS-MW2	Iron	0.105	0.033	0.100	NE			091770-009	SW846 6020
21-Feb-12	Manganese	ND	0.001	0.005	NE	U		091770-009	SW846 6020
TAV-MW2	Iron	0.166	0.033	0.100	NE			091763-009	SW846 6020
20-Feb-12	Manganese	ND	0.001	0.005	NE	U		091763-009	SW846 6020
TAV-MW4	Iron	0.115	0.033	0.100	NE			091779-009	SW846 6020
23-Feb-12	Manganese	ND	0.001	0.005	NE	U		091779-009	SW846 6020
TAV-MW6	Iron	0.133	0.033	0.100	NE		J	091786-009	SW846 6020
28-Feb-12	Manganese	ND	0.001	0.005	NE	U		091786-009	SW846 6020
TAV-MW8	Iron	0.121	0.033	0.100	NE			091767-009	SW846 6020
21-Feb-12	Manganese	ND	0.001	0.005	NE	U		091767-009	SW846 6020
TAV-MW8 (Duplicate)	Iron	0.118	0.033	0.100	NE			091768-009	SW846 6020
21-Feb-12	Manganese	ND	0.001	0.005	NE	U		091768-009	SW846 6020
TAV-MW10	Iron	0.145	0.033	0.100	NE		J	091788-009	SW846 6020
29-Feb-12	Manganese	ND	0.001	0.005	NE	U		091788-009	SW846 6020
TAV-MW11	Iron	0.110	0.033	0.100	NE			091772-009	SW846 6020
22-Feb-12	Manganese	0.0015	0.001	0.005	NE	J		091772-009	SW846 6020
TAV-MW12	Iron	0.115	0.033	0.100	NE			091777-009	SW846 6020
23-Feb-12	Manganese	ND	0.001	0.005	NE	U		091777-009	SW846 6020
TAV-MW13	Iron	0.101	0.033	0.100	NE			091760-009	SW846 6020
20-Feb-12	Manganese	ND	0.001	0.005	NE	U		091760-009	SW846 6020
TAV-MW14	Iron	0.0903	0.033	0.100	NE	J		091783-009	SW846 6020
27-Feb-12	Manganese	0.00161	0.001	0.005	NE	J		091783-009	SW846 6020
TAV-MW14 (Duplicate)	Iron	0.085	0.033	0.100	NE	J		091784-009	SW846 6020
27-Feb-12	Manganese	0.00163	0.001	0.005	NE	J		091784-009	SW846 6020
AVN-1	Iron	0.161	0.033	0.100	NE			092393-010	SW846 6020
30-May-12	Manganese	ND	0.001	0.005	NE	U		092393-010	SW846 6020
AVN-1 (Duplicate)	Iron	ND	0.033	0.100	NE	U		092394-010	SW846 6020
30-May-12	Manganese	0.00208	0.001	0.005	NE	J		092394-010	SW846 6020
LWDS-MW1	Iron	0.190	0.033	0.100	NE			092445-010	SW846 6020
08-Jun-12	Manganese	ND	0.001	0.005	NE	U		092445-010	SW846 6020

Refer to footnotes on page 5A-81.

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW2	Iron	0.103	0.033	0.100	NE			092386-010	SW846 6020
23-May-12	Manganese	ND	0.001	0.005	NE	U		092386-010	SW846 6020
TAV-MW2	Iron	0.169	0.033	0.100	NE			092381-010	SW846 6020
21-May-12	Manganese	ND	0.001	0.005	NE	U		092381-010	SW846 6020
TAV-MW3	Iron	0.111	0.033	0.100	NE			092374-010	SW846 6020
17-May-12	Manganese	ND	0.001	0.005	NE	U		092374-010	SW846 6020
TAV-MW4	Iron	0.151	0.033	0.100	NE			092447-010	SW846 6020
01-Jun-12	Manganese	ND	0.001	0.005	NE	U		092447-010	SW846 6020
TAV-MW5	Iron	0.100	0.033	0.100	NE	J		092365-010	SW846 6020
14-May-12	Manganese	0.00121	0.001	0.005	NE	J		092365-010	SW846 6020
TAV-MW6	Iron	0.192	0.033	0.100	NE			092398-010	SW846 6020
05-Jun-12	Manganese	0.00199	0.001	0.005	NE	J		092398-010	SW846 6020
TAV-MW7	Iron	0.123	0.033	0.100	NE			092372-010	SW846 6020
16-May-12	Manganese	ND	0.001	0.005	NE	U		092372-010	SW846 6020
TAV-MW8	Iron	0.121	0.033	0.100	NE			092383-010	SW846 6020
22-May-12	Manganese	ND	0.001	0.005	NE	U		092383-010	SW846 6020
TAV-MW9	Iron	0.149	0.033	0.100	NE			092378-010	SW846 6020
18-May-12	Manganese	ND	0.001	0.005	NE	U		092378-010	SW846 6020
TAV-MW9 (Duplicate)	Iron	0.154	0.033	0.100	NE			092379-010	SW846 6020
18-May-12	Manganese	ND	0.001	0.005	NE	U		092379-010	SW846 6020
TAV-MW10	Iron	0.175	0.033	0.100	NE			092451-010	SW846 6020
06-Jun-12	Manganese	ND	0.001	0.005	NE	U		092451-010	SW846 6020
TAV-MW11	Iron	0.204	0.033	0.100	NE			092388-010	SW846 6020
29-May-12	Manganese	ND	0.001	0.005	NE	U		092388-010	SW846 6020
TAV-MW12	Iron	0.216	0.033	0.100	NE			092396-010	SW846 6020
31-May-12	Manganese	0.00113	0.001	0.005	NE	J		092396-010	SW846 6020
TAV-MW13	Iron	0.114	0.033	0.100	NE			092369-010	SW846 6020
15-May-12	Manganese	ND	0.001	0.005	NE	U		092369-010	SW846 6020
TAV-MW13 (Duplicate)	Iron	0.114	0.033	0.100	NE			092370-010	SW846 6020
15-May-12	Manganese	ND	0.001	0.005	NE	U		092370-010	SW846 6020
TAV-MW14	Iron	0.0509	0.033	0.100	NE	J		092449-010	SW846 6020
04-Jun-12	Manganese	ND	0.001	0.005	NE	U		092449-010	SW846 6020

Refer to footnotes on page 5A-81.

Table 5A-7 *(Continued)*
Summary of Filtered Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Aluminum	ND	0.015	0.050	NE	U		092654-010	SW846 6020
31-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092654-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092654-010	SW846 6020
	Barium	0.0696	0.0006	0.002	2.00			092654-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092654-010	SW846 6020
	Cadmium	0.000309	0.00011	0.001	0.005	J		092654-010	SW846 6020
	Calcium	39.7	0.060	0.200	NE			092654-010	SW846 6020
	Chromium	0.00316	0.002	0.010	0.100	J		092654-010	SW846 6020
	Cobalt	0.000121	0.0001	0.001	NE	J		092654-010	SW846 6020
	Copper	0.00147	0.00035	0.001	NE	B	0.0030U	092654-010	SW846 6020
	Iron	0.115	0.033	0.100	NE			092654-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092654-010	SW846 6020
	Magnesium	10.3	0.010	0.030	NE			092654-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092654-010	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092654-010	SW846 7470
	Nickel	0.0019	0.0005	0.002	NE	B, J	0.00286U	092654-010	SW846 6020
	Potassium	3.80	0.080	0.300	NE			092654-010	SW846 6020
	Selenium	0.00188	0.0015	0.005	0.050	J		092654-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092654-010	SW846 6020
	Sodium	38.9	0.080	0.250	NE			092654-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092654-010	SW846 6020
	Uranium	0.0022	0.000067	0.0002	0.030			092654-010	SW846 6020
	Vanadium	0.00687	0.001	0.005	NE			092654-010	SW846 6010
	Zinc	0.00379	0.0035	0.010	NE	J		092654-010	SW846 6020

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW1	Aluminum	ND	0.015	0.050	NE	U		092670-010	SW846 6020
09-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092670-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092670-010	SW846 6020
	Barium	0.0864	0.0006	0.002	2.00			092670-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092670-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092670-010	SW846 6020
	Calcium	68.0	0.300	1.00	NE			092670-010	SW846 6020
	Chromium	0.00229	0.002	0.010	0.100	J		092670-010	SW846 6020
	Cobalt	0.00011	0.0001	0.001	NE	J		092670-010	SW846 6020
	Copper	0.000696	0.00035	0.001	NE	J	NJ-	092670-010	SW846 6020
	Iron	0.212	0.033	0.100	NE	B		092670-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092670-010	SW846 6020
	Magnesium	21.9	0.010	0.030	NE		J	092670-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092670-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092670-010	SW846 7470
	Nickel	0.00165	0.0005	0.002	NE	J		092670-010	SW846 6020
	Potassium	3.36	0.080	0.300	NE			092670-010	SW846 6020
	Selenium	0.00657	0.0015	0.005	0.050			092670-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092670-010	SW846 6020
	Sodium	66.2	0.400	1.25	NE			092670-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092670-010	SW846 6020
	Uranium	0.00341	0.000067	0.0002	0.030	B		092670-010	SW846 6020
	Vanadium	0.00495	0.001	0.005	NE	J		092670-010	SW846 6010
	Zinc	0.00838	0.0035	0.010	NE	J		092670-010	SW846 6020

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
LWDS-MW2	Aluminum	ND	0.015	0.050	NE	U		092652-010	SW846 6020
30-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092652-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092652-010	SW846 6020
	Barium	0.0617	0.0006	0.002	2.00			092652-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092652-010	SW846 6020
	Cadmium	0.000398	0.00011	0.001	0.005	J		092652-010	SW846 6020
	Calcium	43.4	0.060	0.200	NE			092652-010	SW846 6020
	Chromium	0.00378	0.002	0.010	0.100	J		092652-010	SW846 6020
	Cobalt	0.000148	0.0001	0.001	NE	J		092652-010	SW846 6020
	Copper	0.00179	0.00035	0.001	NE	B	0.0030U	092652-010	SW846 6020
	Iron	0.114	0.033	0.100	NE			092652-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092652-010	SW846 6020
	Magnesium	13.8	0.010	0.030	NE			092652-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092652-010	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092652-010	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	B, J	0.00286U	092652-010	SW846 6020
	Potassium	2.92	0.080	0.300	NE			092652-010	SW846 6020
	Selenium	0.00197	0.0015	0.005	0.050	J		092652-010	SW846 6020
	Silver	0.00103	0.0002	0.001	NE			092652-010	SW846 6020
	Sodium	42.8	0.080	0.250	NE			092652-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092652-010	SW846 6020
	Uranium	0.0031	0.000067	0.0002	0.030			092652-010	SW846 6020
	Vanadium	0.00654	0.001	0.005	NE			092652-010	SW846 6010
	Zinc	0.00424	0.0035	0.010	NE	J		092652-010	SW846 6020

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Table 5A-7 *(Continued)*
Summary of Filtered Metal 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-MW2	Aluminum	ND	0.015	0.050	NE	U		092642-010	SW846 6020
24-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092642-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092642-010	SW846 6020
	Barium	0.0631	0.0006	0.002	2.00			092642-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092642-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092642-010	SW846 6020
	Calcium	73.0	0.300	1.00	NE			092642-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092642-010	SW846 6020
	Cobalt	0.000261	0.0001	0.001	NE	J		092642-010	SW846 6020
	Copper	0.00101	0.00035	0.001	NE	B	0.00378U	092642-010	SW846 6020
	Iron	0.200	0.033	0.100	NE			092642-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092642-010	SW846 6020
	Magnesium	22.9	0.010	0.030	NE			092642-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092642-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092642-010	SW846 7470
	Nickel	0.00145	0.0005	0.002	NE	J		092642-010	SW846 6020
	Potassium	3.68	0.080	0.300	NE			092642-010	SW846 6020
	Selenium	0.00222	0.0015	0.005	0.050	J		092642-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092642-010	SW846 6020
	Sodium	63.0	0.400	1.25	NE			092642-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092642-010	SW846 6020
	Uranium	0.00628	0.000067	0.0002	0.030	B		092642-010	SW846 6020
	Vanadium	0.00525	0.001	0.005	NE			092642-010	SW846 6010
	Zinc	0.00382	0.0035	0.010	NE	J		092642-010	SW846 6020

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Table 5A-7 *(Continued)*
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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-MW4	Aluminum	ND	0.015	0.050	NE	U		092660-010	SW846 6020
02-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092660-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092660-010	SW846 6020
	Barium	0.0808	0.0006	0.002	2.00			092660-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092660-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092660-010	SW846 6020
	Calcium	48.0	0.060	0.200	NE			092660-010	SW846 6020
	Chromium	0.0245	0.002	0.010	0.100			092660-010	SW846 6020
	Cobalt	0.00014	0.0001	0.001	NE	J		092660-010	SW846 6020
	Copper	0.00107	0.00035	0.001	NE	B	0.0030U	092660-010	SW846 6020
	Iron	0.131	0.033	0.100	NE			092660-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092660-010	SW846 6020
	Magnesium	15.1	0.010	0.030	NE			092660-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092660-010	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092660-010	SW846 7470
	Nickel	0.00141	0.0005	0.002	NE	B, J	0.00286U	092660-010	SW846 6020
	Potassium	3.57	0.080	0.300	NE			092660-010	SW846 6020
	Selenium	0.00316	0.0015	0.005	0.050	J		092660-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092660-010	SW846 6020
	Sodium	47.2	0.400	1.25	NE			092660-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092660-010	SW846 6020
	Uranium	0.00311	0.000067	0.0002	0.030			092660-010	SW846 6020
	Vanadium	0.00636	0.001	0.005	NE			092660-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092660-010	SW846 6020

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Table 5A-7 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092661-009	SW846 6020
02-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092661-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092661-009	SW846 6020
	Barium	0.0794	0.0006	0.002	2.00			092661-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092661-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092661-009	SW846 6020
	Calcium	47.4	0.060	0.200	NE			092661-009	SW846 6020
	Chromium	0.0242	0.002	0.010	0.100			092661-009	SW846 6020
	Cobalt	0.000144	0.0001	0.001	NE	J		092661-009	SW846 6020
	Copper	0.00109	0.00035	0.001	NE	B	0.0030U	092661-009	SW846 6020
	Iron	0.124	0.033	0.100	NE			092661-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092661-009	SW846 6020
	Magnesium	14.1	0.010	0.030	NE			092661-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092661-009	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092661-009	SW846 7470
	Nickel	0.00142	0.0005	0.002	NE	B, J	0.00286U	092661-009	SW846 6020
	Potassium	3.51	0.080	0.300	NE			092661-009	SW846 6020
	Selenium	0.00335	0.0015	0.005	0.050	J		092661-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092661-009	SW846 6020
	Sodium	47.9	0.400	1.25	NE			092661-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092661-009	SW846 6020
	Uranium	0.00306	0.000067	0.0002	0.030			092661-009	SW846 6020
	Vanadium	0.00647	0.001	0.005	NE			092661-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092661-009	SW846 6020

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Table 5A-7 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW6	Aluminum	ND	0.015	0.050	NE	U		092665-010	SW846 6020
06-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092665-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092665-010	SW846 6020
	Barium	0.0682	0.0006	0.002	2.00			092665-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092665-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092665-010	SW846 6020
	Calcium	65.1	0.300	1.00	NE			092665-010	SW846 6020
	Chromium	0.00235	0.002	0.010	0.100	J		092665-010	SW846 6020
	Cobalt	0.000133	0.0001	0.001	NE	J		092665-010	SW846 6020
	Copper	0.000357	0.00035	0.001	NE	J	NJ-	092665-010	SW846 6020
	Iron	0.186	0.033	0.100	NE	B	0.206U	092665-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092665-010	SW846 6020
	Magnesium	20.5	0.010	0.030	NE		J	092665-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092665-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092665-010	SW846 7470
	Nickel	0.00148	0.0005	0.002	NE	J		092665-010	SW846 6020
	Potassium	3.76	0.080	0.300	NE			092665-010	SW846 6020
	Selenium	0.00455	0.0015	0.005	0.050	J		092665-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092665-010	SW846 6020
	Sodium	65.4	0.400	1.25	NE			092665-010	SW846 6020
	Thallium	0.000754	0.00045	0.002	0.002	B, J	0.00266U	092665-010	SW846 6020
	Uranium	0.00399	0.000067	0.0002	0.030	B		092665-010	SW846 6020
	Vanadium	0.00608	0.001	0.005	NE			092665-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092665-010	SW846 6020

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Table 5A-7 *(Continued)*
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW8	Aluminum	ND	0.015	0.050	NE	U		092645-010	SW846 6020
25-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092645-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092645-010	SW846 6020
	Barium	0.0548	0.0006	0.002	2.00			092645-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092645-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092645-010	SW846 6020
	Calcium	54.3	0.300	1.00	NE			092645-010	SW846 6020
	Chromium	0.00315	0.002	0.010	0.100	J		092645-010	SW846 6020
	Cobalt	0.000126	0.0001	0.001	NE	J		092645-010	SW846 6020
	Copper	0.00102	0.00035	0.001	NE	B	0.00378U	092645-010	SW846 6020
	Iron	0.169	0.033	0.100	NE			092645-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092645-010	SW846 6020
	Magnesium	15.7	0.010	0.030	NE			092645-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092645-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092645-010	SW846 7470
	Nickel	0.00119	0.0005	0.002	NE	J		092645-010	SW846 6020
	Potassium	3.66	0.080	0.300	NE			092645-010	SW846 6020
	Selenium	0.00217	0.0015	0.005	0.050	J		092645-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092645-010	SW846 6020
	Sodium	54.0	0.400	1.25	NE			092645-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092645-010	SW846 6020
	Uranium	0.00341	0.000067	0.0002	0.030	B		092645-010	SW846 6020
	Vanadium	0.00619	0.001	0.005	NE			092645-010	SW846 6010
	Zinc	0.00515	0.0035	0.010	NE	J		092645-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092668-010	SW846 6020
07-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092668-010	SW846 6020
	Arsenic	0.00196	0.0017	0.005	0.010	J		092668-010	SW846 6020
	Barium	0.0641	0.0006	0.002	2.00			092668-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092668-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092668-010	SW846 6020
	Calcium	63.4	0.300	1.00	NE			092668-010	SW846 6020
	Chromium	0.00216	0.002	0.010	0.100	J		092668-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092668-010	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	092668-010	SW846 6020
	Iron	0.174	0.033	0.100	NE	B	0.206U	092668-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092668-010	SW846 6020
	Magnesium	17.1	0.010	0.030	NE		J	092668-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092668-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092668-010	SW846 7470
	Nickel	0.00125	0.0005	0.002	NE	J		092668-010	SW846 6020
	Potassium	4.36	0.080	0.300	NE			092668-010	SW846 6020
	Selenium	0.00346	0.0015	0.005	0.050	J		092668-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092668-010	SW846 6020
	Sodium	62.3	0.400	1.25	NE			092668-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092668-010	SW846 6020
	Uranium	0.0036	0.000067	0.0002	0.030	B		092668-010	SW846 6020
	Vanadium	0.00577	0.001	0.005	NE			092668-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092668-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092649-010	SW846 6020
26-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092649-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092649-010	SW846 6020
	Barium	0.0658	0.0006	0.002	2.00			092649-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092649-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092649-010	SW846 6020
	Calcium	52.8	0.300	1.00	NE			092649-010	SW846 6020
	Chromium	0.00363	0.002	0.010	0.100	J		092649-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092649-010	SW846 6020
	Copper	0.00092	0.00035	0.001	NE	B, J	0.00378U	092649-010	SW846 6020
	Iron	0.159	0.033	0.100	NE			092649-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092649-010	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			092649-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092649-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092649-010	SW846 7470
	Nickel	0.00109	0.0005	0.002	NE	J		092649-010	SW846 6020
	Potassium	3.43	0.080	0.300	NE			092649-010	SW846 6020
	Selenium	0.00294	0.0015	0.005	0.050	J		092649-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092649-010	SW846 6020
	Sodium	48.2	0.080	0.250	NE			092649-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092649-010	SW846 6020
	Uranium	0.00314	0.000067	0.0002	0.030	B		092649-010	SW846 6020
	Vanadium	0.00558	0.001	0.005	NE			092649-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092649-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092650-010	SW846 6020
26-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092650-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092650-010	SW846 6020
	Barium	0.0668	0.0006	0.002	2.00			092650-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092650-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092650-010	SW846 6020
	Calcium	53.0	0.300	1.00	NE			092650-010	SW846 6020
	Chromium	0.00414	0.002	0.010	0.100	J		092650-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092650-010	SW846 6020
	Copper	0.000831	0.00035	0.001	NE	B, J	0.00378U	092650-010	SW846 6020
	Iron	0.157	0.033	0.100	NE			092650-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092650-010	SW846 6020
	Magnesium	14.5	0.010	0.030	NE			092650-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092650-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092650-010	SW846 7470
	Nickel	0.00134	0.0005	0.002	NE	J		092650-010	SW846 6020
	Potassium	3.46	0.080	0.300	NE			092650-010	SW846 6020
	Selenium	0.00303	0.0015	0.005	0.050	J		092650-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092650-010	SW846 6020
	Sodium	47.0	0.080	0.250	NE			092650-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092650-010	SW846 6020
	Uranium	0.00331	0.000067	0.0002	0.030	B		092650-010	SW846 6020
	Vanadium	0.00549	0.001	0.005	NE			092650-010	SW846 6010
	Zinc	0.0035	0.0035	0.010	NE	J		092650-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092656-010	SW846 6020
01-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092656-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092656-010	SW846 6020
	Barium	0.0543	0.0006	0.002	2.00			092656-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092656-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092656-010	SW846 6020
	Calcium	56.4	0.300	1.00	NE			092656-010	SW846 6020
	Chromium	0.00287	0.002	0.010	0.100	J		092656-010	SW846 6020
	Cobalt	0.000115	0.0001	0.001	NE	J		092656-010	SW846 6020
	Copper	0.00119	0.00035	0.001	NE	B	0.00323U	092656-010	SW846 6020
	Iron	0.112	0.033	0.100	NE			092656-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092656-010	SW846 6020
	Magnesium	19.0	0.010	0.030	NE			092656-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092656-010	SW846 6020
	Mercury	ND	0.00067	0.002	0.002	U	UJ	092656-010	SW846 7470
	Nickel	0.00128	0.0005	0.002	NE	J		092656-010	SW846 6020
	Potassium	3.89	0.080	0.300	NE			092656-010	SW846 6020
	Selenium	0.00245	0.0015	0.005	0.050	J		092656-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092656-010	SW846 6020
	Sodium	53.9	0.400	1.25	NE			092656-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092656-010	SW846 6020
	Uranium	0.00409	0.000067	0.0002	0.030			092656-010	SW846 6020
	Vanadium	0.00455	0.001	0.005	NE	J		092656-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092656-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092639-010	SW846 6020
23-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092639-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092639-010	SW846 6020
	Barium	0.0595	0.0006	0.002	2.00			092639-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092639-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092639-010	SW846 6020
	Calcium	48.2	0.060	0.200	NE			092639-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092639-010	SW846 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		092639-010	SW846 6020
	Copper	0.000975	0.00035	0.001	NE	B, J	0.00378U	092639-010	SW846 6020
	Iron	0.149	0.033	0.100	NE			092639-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092639-010	SW846 6020
	Magnesium	15.0	0.010	0.030	NE			092639-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092639-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092639-010	SW846 7470
	Nickel	0.00103	0.0005	0.002	NE	J		092639-010	SW846 6020
	Potassium	3.27	0.080	0.300	NE			092639-010	SW846 6020
	Selenium	0.00193	0.0015	0.005	0.050	J		092639-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092639-010	SW846 6020
	Sodium	45.3	0.080	0.250	NE			092639-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092639-010	SW846 6020
	Uranium	0.00413	0.000067	0.0002	0.030	B		092639-010	SW846 6020
	Vanadium	0.00559	0.001	0.005	NE			092639-010	SW846 6010
	Zinc	0.00486	0.0035	0.010	NE	J		092639-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092663-010	SW846 6020
03-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092663-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092663-010	SW846 6020
	Barium	0.0582	0.0006	0.002	2.00			092663-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092663-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092663-010	SW846 6020
	Calcium	67.0	0.300	1.00	NE			092663-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092663-010	SW846 6020
	Cobalt	0.000102	0.0001	0.001	NE	J		092663-010	SW846 6020
	Copper	0.000572	0.00035	0.001	NE	J		092663-010	SW846 6020
	Iron	0.0932	0.033	0.100	NE	J		092663-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092663-010	SW846 6020
	Magnesium	19.7	0.010	0.030	NE			092663-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092663-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092663-010	SW846 7470
	Nickel	0.00131	0.0005	0.002	NE	J		092663-010	SW846 6020
	Potassium	4.51	0.080	0.300	NE			092663-010	SW846 6020
	Selenium	0.00294	0.0015	0.005	0.050	J		092663-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092663-010	SW846 6020
	Sodium	70.0	0.400	1.25	NE			092663-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092663-010	SW846 6020
	Uranium	0.00423	0.000067	0.0002	0.030			092663-010	SW846 6020
	Vanadium	0.00438	0.001	0.005	NE	J		092663-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092663-010	SW846 6020

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

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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Iron	0.155	0.033	0.100	NE			093048-010	SW846 6020
06-Nov-12	Manganese	ND	0.001	0.005	NE	U		093048-010	SW846 6020
LWDS-MW1	Iron	0.139	0.033	0.100	NE			093069-010	SW846 6020
15-Nov-12	Manganese	ND	0.001	0.005	NE	U		093069-010	SW846 6020
LWDS-MW2	Iron	0.152	0.033	0.100	NE			093043-010	SW846 6020
02-Nov-12	Manganese	ND	0.001	0.005	NE	U		093043-010	SW846 6020
TAV-MW2	Iron	0.231	0.033	0.100	NE			093039-010	SW846 6020
31-Oct-12	Manganese	ND	0.001	0.005	NE	U		093039-010	SW846 6020
TAV-MW3	Iron	0.0847	0.033	0.100	NE	J		093034-010	SW846 6020
29-Oct-12	Manganese	ND	0.001	0.005	NE	U		093034-010	SW846 6020
TAV-MW3 (Duplicate)	Iron	0.0849	0.033	0.100	NE	J		093035-010	SW846 6020
29-Oct-12	Manganese	ND	0.001	0.005	NE	U		093035-010	SW846 6020
TAV-MW4	Iron	0.191	0.033	0.100	NE			093056-010	SW846 6020
08-Nov-12	Manganese	ND	0.001	0.005	NE	U		093056-010	SW846 6020
TAV-MW5	Iron	0.141	0.033	0.100	NE			093026-010	SW846 6020
24-Oct-12	Manganese	ND	0.001	0.005	NE	U		093026-010	SW846 6020
TAV-MW6	Iron	0.145	0.033	0.100	NE			093061-010	SW846 6020
12-Nov-12	Manganese	ND	0.001	0.005	NE	U		093061-010	SW846 6020
TAV-MW7	Iron	0.101	0.033	0.100	NE			093030-010	SW846 6020
26-Oct-12	Manganese	ND	0.001	0.005	NE	U		093030-010	SW846 6020
TAV-MW8	Iron	0.181	0.033	0.100	NE			093041-010	SW846 6020
01-Nov-12	Manganese	ND	0.001	0.005	NE	U		093041-010	SW846 6020
TAV-MW9	Iron	0.200	0.033	0.100	NE			093037-010	SW846 6020
30-Oct-12	Manganese	ND	0.001	0.005	NE	U		093037-010	SW846 6020
TAV-MW10	Iron	0.134	0.033	0.100	NE			093065-010	SW846 6020
13-Nov-12	Manganese	ND	0.001	0.005	NE	U		093065-010	SW846 6020
TAV-MW10 (Duplicate)	Iron	0.135	0.033	0.100	NE			093066-010	SW846 6020
13-Nov-12	Manganese	ND	0.001	0.005	NE	U		093066-010	SW846 6020
TAV-MW11	Iron	0.188	0.033	0.100	NE			093045-010	SW846 6020
05-Nov-12	Manganese	ND	0.001	0.005	NE	U		093045-010	SW846 6020
TAV-MW12	Iron	0.200	0.033	0.100	NE		0.23U	093053-010	SW846 6020
07-Nov-12	Manganese	ND	0.001	0.005	NE	U		093053-010	SW846 6020
TAV-MW12 (Duplicate)	Iron	0.179	0.033	0.100	NE		0.23U	093054-010	SW846 6020
07-Nov-12	Manganese	ND	0.001	0.005	NE	U		093054-010	SW846 6020

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Table 5A-7 *(Concluded)*
Summary of Filtered Metal 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-MW13	Iron	0.0891	0.033	0.100	NE	J		093028-010	SW846 6020
25-Oct-12	Manganese	ND	0.001	0.005	NE	U		093028-010	SW846 6020
TAV-MW14	Iron	0.198	0.033	0.100	NE			093059-010	SW846 6020
09-Nov-12	Manganese	ND	0.001	0.005	NE	U		093059-010	SW846 6020

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Americium-241	-4.68 ± 6.98	9.56	4.67	NE	U	BD	092654-033	EPA 901.1
31-Jul-12	Cesium-137	1.79 ± 1.78	2.93	1.41	NE	U	BD	092654-033	EPA 901.1
	Cobalt-60	0.701 ± 1.69	3.07	1.45	NE	U	BD	092654-033	EPA 901.1
	Potassium-40	34.5 ± 31.7	22.0	10.2	NE	X	R	092654-033	EPA 901.1
	Gross Alpha	3.27	NA	NA	15 pCi/L	NA	None	092654-034	EPA 900.0
	Gross Beta	4.89 ± 1.29	1.49	0.723	4 mrem/yr			092654-034	EPA 900.0
	Tritium	-70.8 ± 134	236	114	NE	U	BD	092654-036	EPA 906.0 M
LWDS-MW1	Americium-241	-10.9 ± 14.3	23.0	11.1	NE	U	BD	092670-033	EPA 901.1
09-Aug-12	Cesium-137	-0.355 ± 1.72	3.06	1.46	NE	U	BD	092670-033	EPA 901.1
	Cobalt-60	-0.0508 ± 1.81	3.32	1.54	NE	U	BD	092670-033	EPA 901.1
	Potassium-40	50.9 ± 40.5	32.0	14.8	NE		J	092670-033	EPA 901.1
	Gross Alpha	0.75	NA	NA	15 pCi/L	NA	None	092670-034	EPA 900.0
	Gross Beta	3.94 ± 1.17	1.48	0.720	4 mrem/yr		J	092670-034	EPA 900.0
	Tritium	-78.1 ± 104	205	93.8	NE	U	BD	092670-036	EPA 906.0 M
LWDS-MW2	Americium-241	2.36 ± 10.9	16.1	7.91	NE	U	BD	092652-033	EPA 901.1
30-Jul-12	Cesium-137	0.446 ± 2.02	3.53	1.71	NE	U	BD	092652-033	EPA 901.1
	Cobalt-60	1.40 ± 1.85	3.29	1.55	NE	U	BD	092652-033	EPA 901.1
	Potassium-40	78.0 ± 32.2	28.6	13.4	NE	X	R	092652-033	EPA 901.1
	Gross Alpha	3.62	NA	NA	15 pCi/L	NA	None	092652-034	EPA 900.0
	Gross Beta	3.69 ± 1.10	1.38	0.668	4 mrem/yr		J	092652-034	EPA 900.0
	Tritium	-29.3 ± 134	234	113	NE	U	BD	092652-036	EPA 906.0 M
TAV-MW2	Americium-241	-4.69 ± 12.8	21.3	10.4	NE	U	BD	092642-033	EPA 901.1
24-Jul-12	Cesium-137	0.465 ± 1.96	3.44	1.65	NE	U	BD	092642-033	EPA 901.1
	Cobalt-60	1.06 ± 2.16	3.87	1.82	NE	U	BD	092642-033	EPA 901.1
	Potassium-40	-7.24 ± 38.8	51.2	24.5	NE	U	BD	092642-033	EPA 901.1
	Gross Alpha	3.97	NA	NA	15 pCi/L	NA	None	092642-034	EPA 900.0
	Gross Beta	5.34 ± 1.57	1.93	0.932	4 mrem/yr		J	092642-034	EPA 900.0
	Tritium	52.4 ± 85.1	147	64.9	NE	U	BD	092642-036	EPA 906.0 M

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4	Americium-241	2.77 ± 4.84	8.16	3.99	NE	U	BD	092660-033	EPA 901.1
02-Aug-12	Cesium-137	0.471 ± 1.60	2.85	1.37	NE	U	BD	092660-033	EPA 901.1
	Cobalt-60	1.73 ± 1.86	3.21	1.53	NE	U	BD	092660-033	EPA 901.1
	Potassium-40	9.84 ± 42.9	27.3	12.8	NE	U	BD	092660-033	EPA 901.1
	Gross Alpha	1.59	NA	NA	15 pCi/L	NA	None	092660-034	EPA 900.0
	Gross Beta	5.10 ± 1.27	1.36	0.661	4 mrem/yr			092660-034	EPA 900.0
	Tritium	-32.3 ± 134	235	114	NE	U	BD	092660-036	EPA 906.0 M
TAV-MW4 (Duplicate)	Americium-241	0.958 ± 9.50	14.8	7.21	NE	U	BD	092661-033	EPA 901.1
02-Aug-12	Cesium-137	6.36 ± 2.63	6.36	1.36	NE	U	BD	092661-033	EPA 901.1
	Cobalt-60	-0.383 ± 1.56	2.72	1.28	NE	U	BD	092661-033	EPA 901.1
	Potassium-40	31.9 ± 24.0	31.9	14.9	NE	U	BD	092661-033	EPA 901.1
	Gross Alpha	0.59	NA	NA	15 pCi/L	NA	None	092661-034	EPA 900.0
	Gross Beta	4.32 ± 1.19	1.41	0.684	4 mrem/yr			092661-034	EPA 900.0
	Tritium	-79.4 ± 133	235	114	NE	U	BD	092661-036	EPA 906.0 M
TAV-MW6	Americium-241	-3.58 ± 13.0	21.8	10.7	NE	U	BD	092665-033	EPA 901.1
06-Aug-12	Cesium-137	0.834 ± 2.15	3.75	1.80	NE	U	BD	092665-033	EPA 901.1
	Cobalt-60	0.500 ± 1.97	3.55	1.66	NE	U	BD	092665-033	EPA 901.1
	Potassium-40	-26.6 ± 39.5	46.9	22.3	NE	U	BD	092665-033	EPA 901.1
	Gross Alpha	2.05	NA	NA	15 pCi/L	NA	None	092665-034	EPA 900.0
	Gross Beta	5.64 ± 1.27	1.16	0.560	4 mrem/yr			092665-034	EPA 900.0
	Tritium	74.2 ± 88.5	147	65.0	NE	U	BD	092665-036	EPA 906.0 M
TAV-MW8	Americium-241	7.42 ± 14.1	20.4	9.98	NE	U	BD	092645-033	EPA 901.1
25-Jul-12	Cesium-137	2.12 ± 2.20	3.62	1.75	NE	U	BD	092645-033	EPA 901.1
	Cobalt-60	0.688 ± 2.25	4.04	1.92	NE	U	BD	092645-033	EPA 901.1
	Potassium-40	33.3 ± 46.5	37.1	17.6	NE	U	BD	092645-033	EPA 901.1
	Gross Alpha	3.38	NA	NA	15 pCi/L	NA	None	092645-034	EPA 900.0
	Gross Beta	4.17 ± 1.15	1.39	0.672	4 mrem/yr			092645-034	EPA 900.0
	Tritium	34.5 ± 81.6	146	64.2	NE	U	BD	092645-036	EPA 906.0 M

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW10	Americium-241	-50.8 ± 26.4	18.4	8.95	NE	U	BD	092668-033	EPA 901.1
07-Aug-12	Cesium-137	0.363 ± 1.80	3.24	1.54	NE	U	BD	092668-033	EPA 901.1
	Cobalt-60	-1.54 ± 2.15	3.47	1.61	NE	U	BD	092668-033	EPA 901.1
	Potassium-40	72.3 ± 41.1	33.4	15.5	NE		J	092668-033	EPA 901.1
	Gross Alpha	0.83	NA	NA	15 pCi/L	NA	None	092668-034	EPA 900.0
	Gross Beta	4.63 ± 1.14	1.15	0.557	4 mrem/yr			092668-034	EPA 900.0
	Tritium	-17 ± 74.6	146	64.7	NE	U	BD	092668-036	EPA 906.0 M
TAV-MW11	Americium-241	3.17 ± 5.53	8.38	4.10	NE	U	BD	092649-033	EPA 901.1
26-Jul-12	Cesium-137	-0.85 ± 1.60	2.70	1.30	NE	U	BD	092649-033	EPA 901.1
	Cobalt-60	2.40 ± 2.10	3.18	1.51	NE	U	BD	092649-033	EPA 901.1
	Potassium-40	7.39 ± 40.9	27.6	13.0	NE	U	BD	092649-033	EPA 901.1
	Gross Alpha	2.75	NA	NA	15 pCi/L	NA	None	092649-034	EPA 900.0
	Gross Beta	3.78 ± 1.02	1.19	0.575	4 mrem/yr		NJ+	092649-034	EPA 900.0
	Tritium	6.08 ± 94.5	176	78.7	NE	U	BD	092649-036	EPA 906.0 M
TAV-MW11 (Duplicate)	Americium-241	2.21 ± 11.2	17.9	8.78	NE	U	BD	092650-033	EPA 901.1
26-Jul-12	Cesium-137	3.28 ± 3.76	3.40	1.64	NE	U	BD	092650-033	EPA 901.1
	Cobalt-60	1.11 ± 2.17	3.83	1.81	NE	U	BD	092650-033	EPA 901.1
	Potassium-40	28.2 ± 57.0	37.8	17.9	NE	U	BD	092650-033	EPA 901.1
	Gross Alpha	3.42	NA	NA	15 pCi/L	NA	None	092650-034	EPA 900.0
	Gross Beta	3.58 ± 1.08	1.37	0.663	4 mrem/yr		NJ+	092650-034	EPA 900.0
	Tritium	17.6 ± 80.5	148	65.4	NE	U	BD	092650-036	EPA 906.0 M
TAV-MW12	Americium-241	-16.8 ± 16.1	23.2	11.4	NE	U	BD	092656-033	EPA 901.1
01-Aug-12	Cesium-137	-0.846 ± 1.79	3.05	1.46	NE	U	BD	092656-033	EPA 901.1
	Cobalt-60	0.422 ± 1.82	3.37	1.58	NE	U	BD	092656-033	EPA 901.1
	Potassium-40	2.20 ± 38.7	29.3	13.6	NE	U	BD	092656-033	EPA 901.1
	Gross Alpha	0.58	NA	NA	15 pCi/L	NA	None	092656-034	EPA 900.0
	Gross Beta	3.83 ± 1.21	1.57	0.762	4 mrem/yr		J	092656-034	EPA 900.0
	Tritium	-62.1 ± 134	236	114	NE	U	BD	092656-036	EPA 906.0 M

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW13	Americium-241	3.54 ± 7.51	11.3	5.54	NE	U	BD	092639-033	EPA 901.1
23-Jul-12	Cesium-137	0.235 ± 1.81	3.11	1.49	NE	U	BD	092639-033	EPA 901.1
	Cobalt-60	0.842 ± 1.95	3.46	1.63	NE	U	BD	092639-033	EPA 901.1
	Potassium-40	2.61 ± 43.7	31.4	14.7	NE	U	BD	092639-033	EPA 901.1
	Gross Alpha	2.52	NA	NA	15 pCi/L	NA	None	092639-034	EPA 900.0
	Gross Beta	4.51 ± 1.25	1.53	0.743	4 mrem/yr		J	092639-034	EPA 900.0
	Tritium	43.3 ± 78.4	137	60.4	NE	U	BD	092639-036	EPA 906.0 M
TAV-MW14	Americium-241	-13.5 ± 9.35	11.5	5.62	NE	U	BD	092663-033	EPA 901.1
03-Aug-12	Cesium-137	0.452 ± 1.82	3.13	1.50	NE	U	BD	092663-033	EPA 901.1
	Cobalt-60	1.66 ± 1.99	3.44	1.63	NE	U	BD	092663-033	EPA 901.1
	Potassium-40	-29.6 ± 40.6	40.6	19.3	NE	U	BD	092663-033	EPA 901.1
	Gross Alpha	2.50	NA	NA	15 pCi/L	NA	None	092663-034	EPA 900.0
	Gross Beta	5.60 ± 1.30	1.26	0.609	4 mrem/yr			092663-034	EPA 900.0
	Tritium	-22.7 ± 73.8	146	64.7	NE	U	BD	092663-036	EPA 906.0 M

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

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	01-Mar-12	19.31	395	88.2	7.90	1.48	40.0	3.87
LWDS-MW1	05-Mar-12	17.65	667	76.8	7.69	0.57	77.1	7.35
LWDS-MW2	21-Feb-12	18.05	454	113.8	7.77	0.22	47.4	4.48
TAV-MW2	20-Feb-12	14.91	782	385.6	7.11	0.44	52.3	5.30
TAV-MW4	23-Feb-12	20.02	434	99.2	7.73	0.72	70.6	6.42
TAV-MW6	28-Feb-12	18.22	662	108.5	7.62	2.14	73.3	6.89
TAV-MW8	21-Feb-12	17.34	637	391.7	7.27	2.89	63.8	6.11
TAV-MW10	29-Feb-12	18.50	608	89.9	7.64	0.14	74.8	6.99
TAV-MW11	22-Feb-12	19.07	623	384.9	7.27	0.24	72.1	6.67
TAV-MW12	23-Feb-12	20.45	666	389.6	7.23	0.52	62.2	5.64
TAV-MW13	20-Feb-12	17.52	519	92.1	7.66	0.82	22.7	2.16
TAV-MW14	27-Feb-12	18.71	730	388.3	7.24	1.60	75.2	7.00
AVN-1	30-May-12	21.28	384	147.5	7.61	0.33	44.4	3.94
LWDS-MW1	08-Jun-12	23.26	670	152.8	7.37	0.43	82.5	7.03
LWDS-MW2	23-May-12	21.51	430	143.1	7.49	0.85	51.8	4.54
TAV-MW2	21-May-12	21.80	664	162.2	7.22	1.80	57.6	5.05
TAV-MW3	17-May-12	21.26	502	120.2	7.42	2.10	71.9	6.37
TAV-MW4	01-Jun-12	22.45	479	168.2	7.46	0.95	74.2	6.41
TAV-MW5	14-May-12	20.60	458	154.0	7.43	0.45	44.3	4.00
TAV-MW6	05-Jun-12	21.79	631	165.0	7.35	6.61	74.3	6.51
TAV-MW7	16-May-12	20.60	555	104.3	7.30	2.25	5.0	0.45
TAV-MW8	08-May-12	22.57	539	162.4	7.39	4.74	68.7	5.92
TAV-MW9	18-May-12	21.30	543	123.8	7.23	3.70	18.8	1.66
TAV-MW10	06-Jun-12	22.90	602	166.8	7.36	0.17	74.7	6.39
TAV-MW11	29-May-12	21.13	522	155.8	7.45	0.51	78.7	7.00
TAV-MW12	31-May-12	21.65	557	152.4	7.35	0.93	66.5	5.84
TAV-MW13	15-May-12	21.32	488	122.9	7.39	0.61	25.2	2.22
TAV-MW14	04-Jun-12	22.58	610	151.8	7.34	1.55	78.2	6.75

Refer to footnotes on page 5A-81.

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

Calendar Year 2012

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	31-Jul-12	22.91	416	161.7	7.54	1.30	44.5	3.81
LWDS-MW1	09-Aug-12	24.12	725	163.4	7.32	1.33	83.1	7.00
LWDS-MW2	30-Jul-12	22.16	463	169.4	7.45	0.97	48.5	4.22
TAV-MW2	24-Jul-12	22.22	716	147.9	7.21	0.55	54.7	4.73
TAV-MW4	02-Aug-12	22.20	517	179.3	7.41	0.85	72.5	6.30
TAV-MW6	06-Aug-12	21.29	684	178.1	7.30	7.28	75.0	6.63
TAV-MW8	25-Jul-12	21.56	577	150.3	7.39	4.22	63.1	5.55
TAV-MW10	07-Aug-12	22.77	650	177.3	7.31	0.21	73.8	6.29
TAV-MW11	26-Jul-12	21.81	563	161.5	7.40	0.37	74.2	6.49
TAV-MW12	01-Aug-12	22.11	601	207.3	7.29	0.64	65.0	5.66
TAV-MW13	23-Jul-12	22.85	527	128.8	7.35	1.33	26.9	2.30
TAV-MW14	03-Aug-12	21.29	659	168.4	7.33	0.79	73.1	6.47
AVN-1	06-Nov-12	21.10	389	190.8	7.26	1.91	43.3	3.84
LWDS-MW1	15-Nov-12	17.68	670	173.3	7.21	1.00	74.8	7.12
LWDS-MW2	02-Nov-12	20.24	435	177.3	7.20	1.30	47.4	4.27
TAV-MW2	31-Oct-12	19.34	672	194.1	6.92	0.88	51.4	4.72
TAV-MW3	29-Oct-12	20.82	510	186.3	7.16	1.40	66.3	5.91
TAV-MW4	08-Nov-12	18.90	482	198.1	7.14	0.79	70.6	6.56
TAV-MW5	24-Oct-12	21.36	467	181.0	7.15	0.39	54.8	4.85
TAV-MW6	12-Nov-12	17.25	638	201.7	7.07	7.65	72.0	6.85
TAV-MW7	26-Oct-12	18.70	565	159.7	7.01	1.32	4.2	0.39
TAV-MW8	01-Nov-12	18.28	544	186.1	7.10	5.90	65.2	6.13
TAV-MW9	30-Oct-12	19.31	572	190.0	6.89	2.65	19.0	1.75
TAV-MW10	13-Nov-12	18.87	604	184.9	7.11	0.36	73.5	6.82
TAV-MW11	05-Nov-12	22.42	531	223.5	7.17	0.54	78.1	6.77
TAV-MW12	07-Nov-12	20.75	565	196.1	7.05	0.54	68.2	6.11
TAV-MW13	25-Oct-12	19.99	494	153.8	7.09	0.66	26.3	2.38
TAV-MW14	09-Nov-12	19.20	614	197.5	7.04	1.19	74.6	6.88

Refer to footnotes on page 5A-81.

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Footnotes for Technical Area V Groundwater Monitoring Tables

[a]Result

- Values in bold exceed the established MCL.
- ND = not detected (at method detection limit).
- 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 7A- 1-4)
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- pCi/L = picocuries per liter

[b]MDL or MDA

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.

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.

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

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.

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.

[d]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.
- 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).

[e]Laboratory Qualifier

B	=	Analyte is detected in associated laboratory method blank.
J	=	Amount detected is below the practical quantitation limit (PQL).
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 Technical Area V Groundwater Monitoring 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.
J+	=	The associated numerical value is an estimated quantity with a suspected positive bias.
None	=	No data validation for corrected gross alpha activity.
NJ+	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
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

- 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, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, Cincinnati, Ohio
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual*, 27th ed., Vol. 1, Rev. 1992, HASL-300.

[h]Field Water Quality Measurements

- Field measurements collected prior to sampling.

°C	= degrees Celsius.
% sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 5B
Technical Area V
Plots

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Attachment 5B Plots

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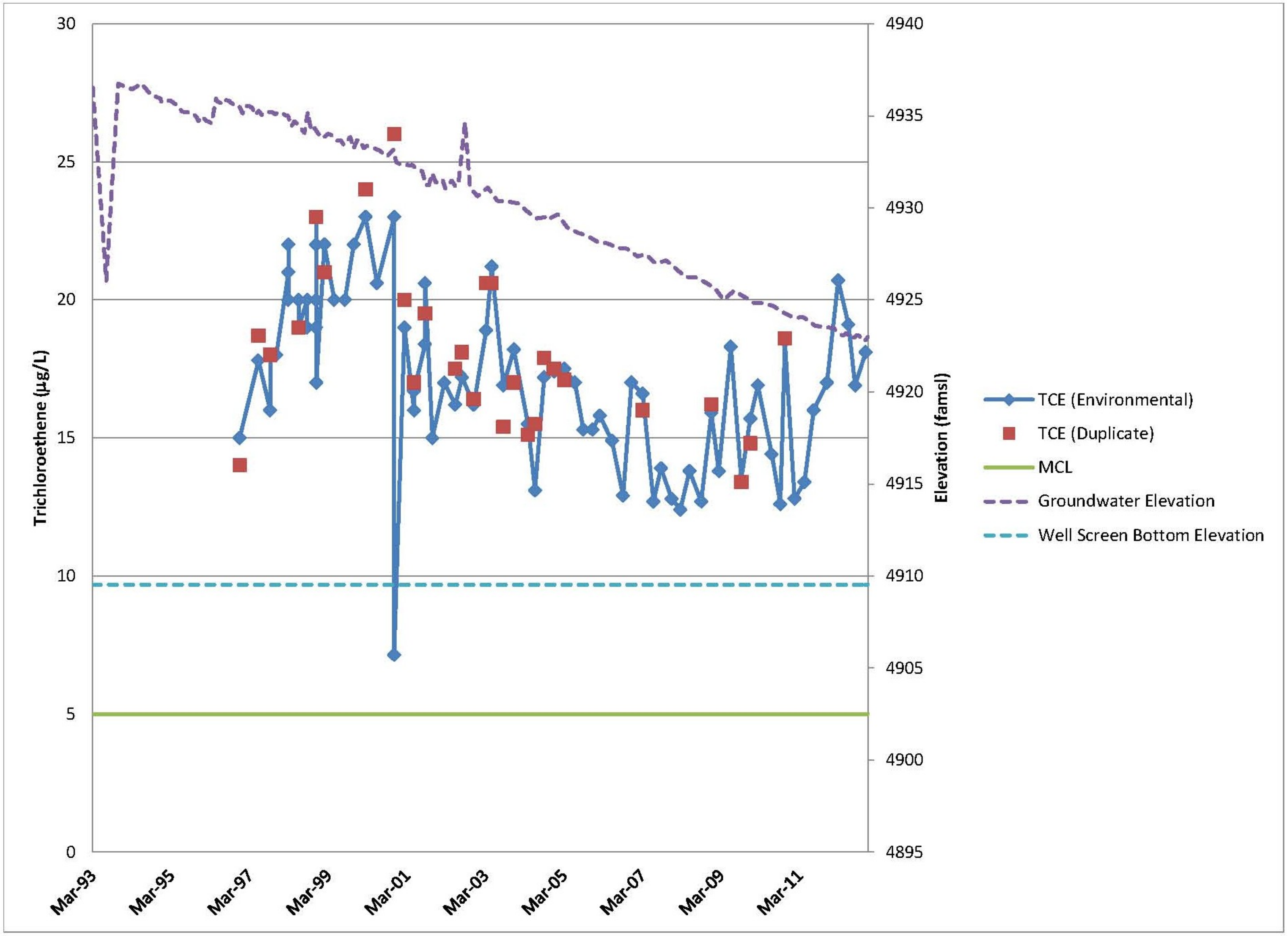

Figure 5B-1. Trichloroethene Concentrations, LWDS-MW1

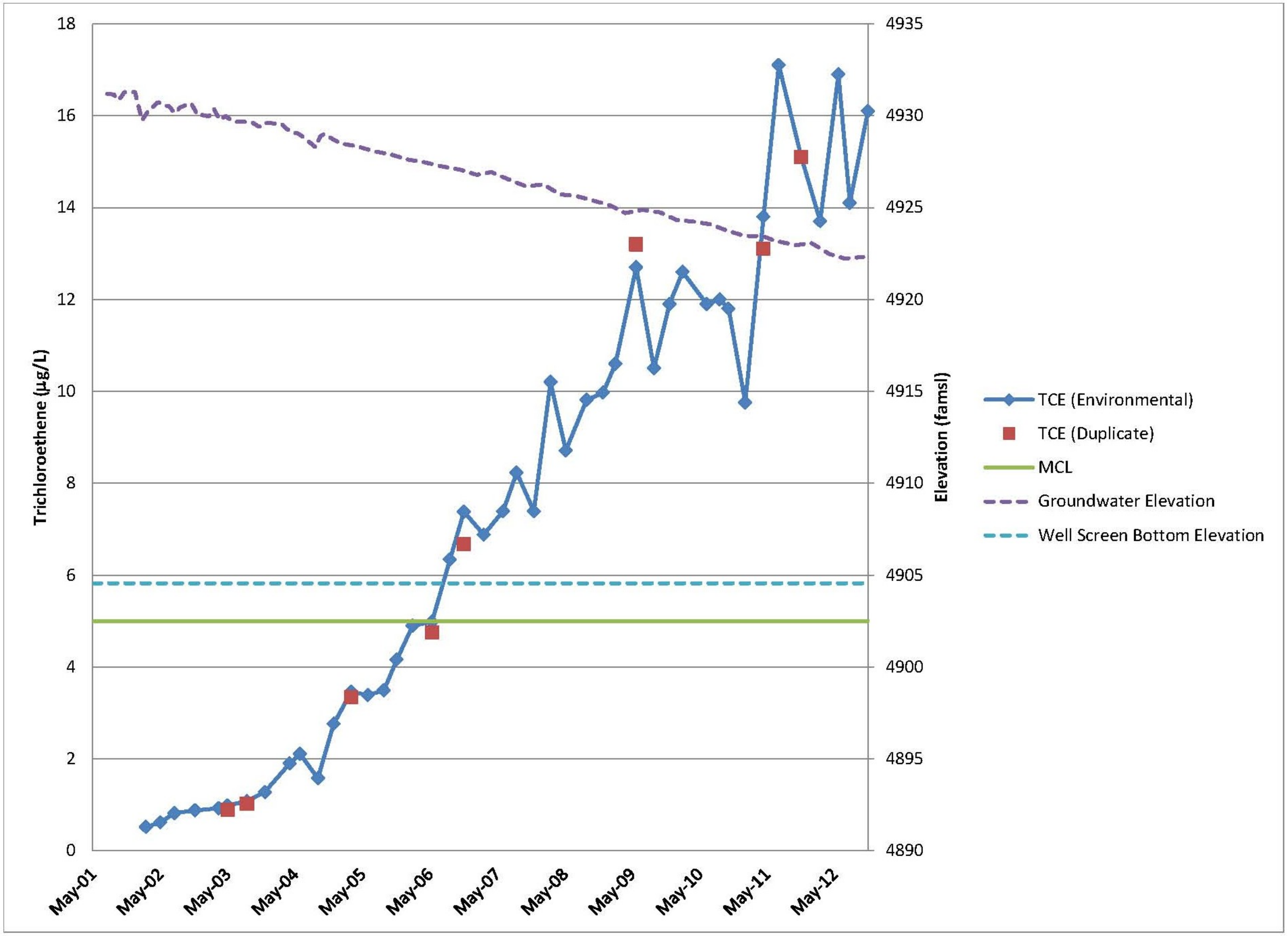

Figure 5B-2. Trichloroethene Concentrations, TAV-MW6

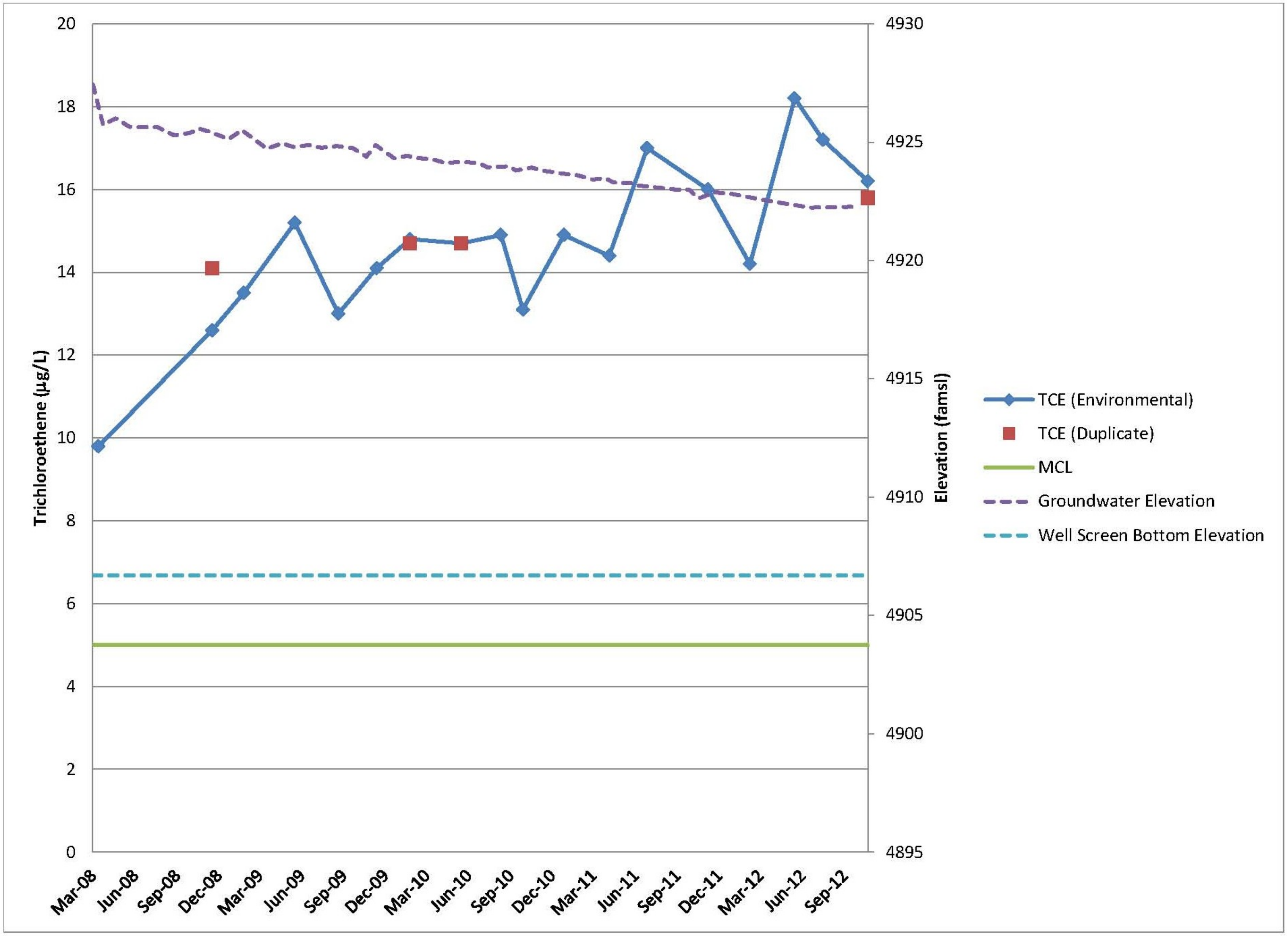

Figure 5B-3. Trichloroethene Concentrations, TAV-MW10

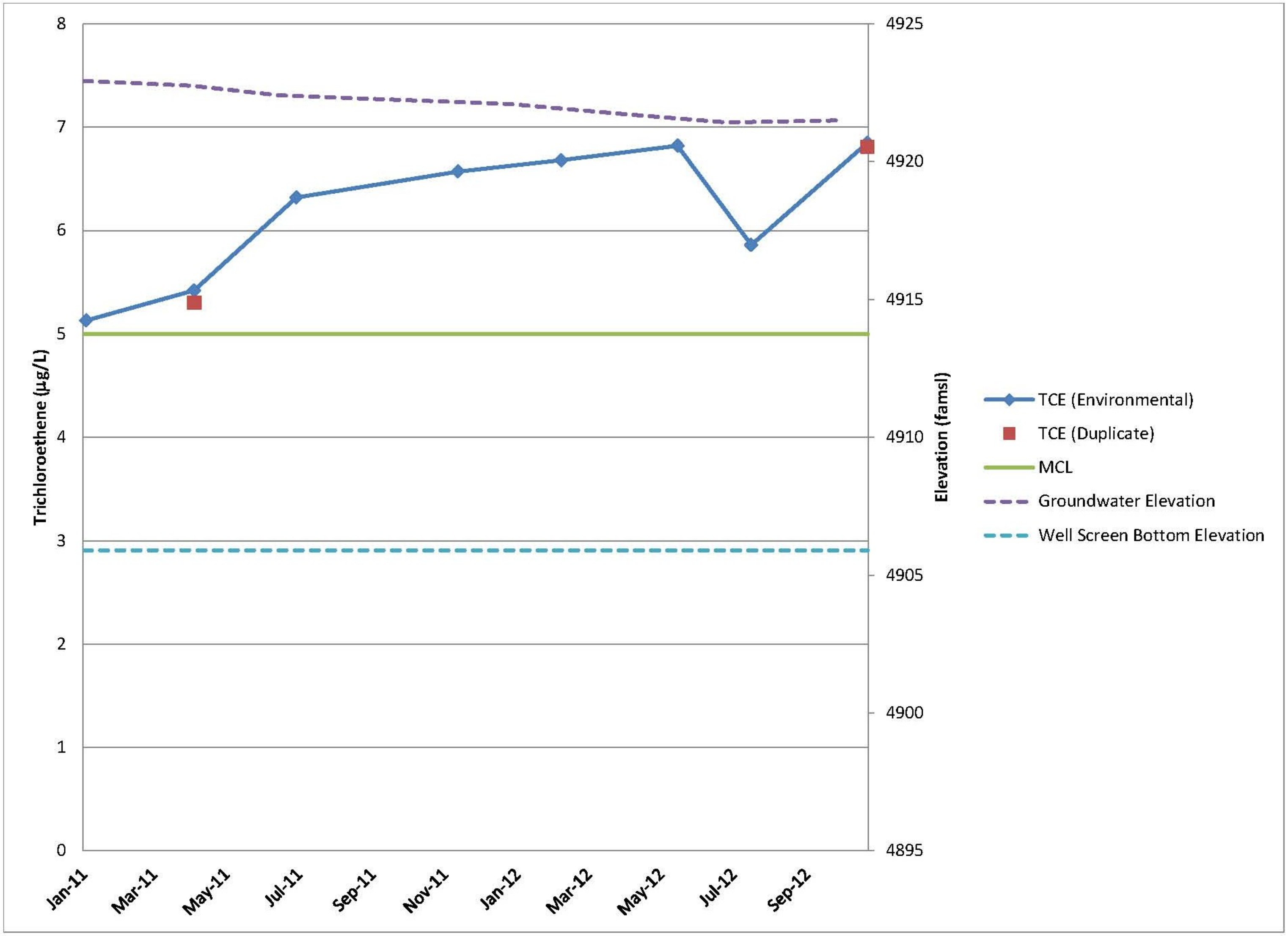

Figure 5B-4. Trichloroethene Concentrations, TAV-MW12

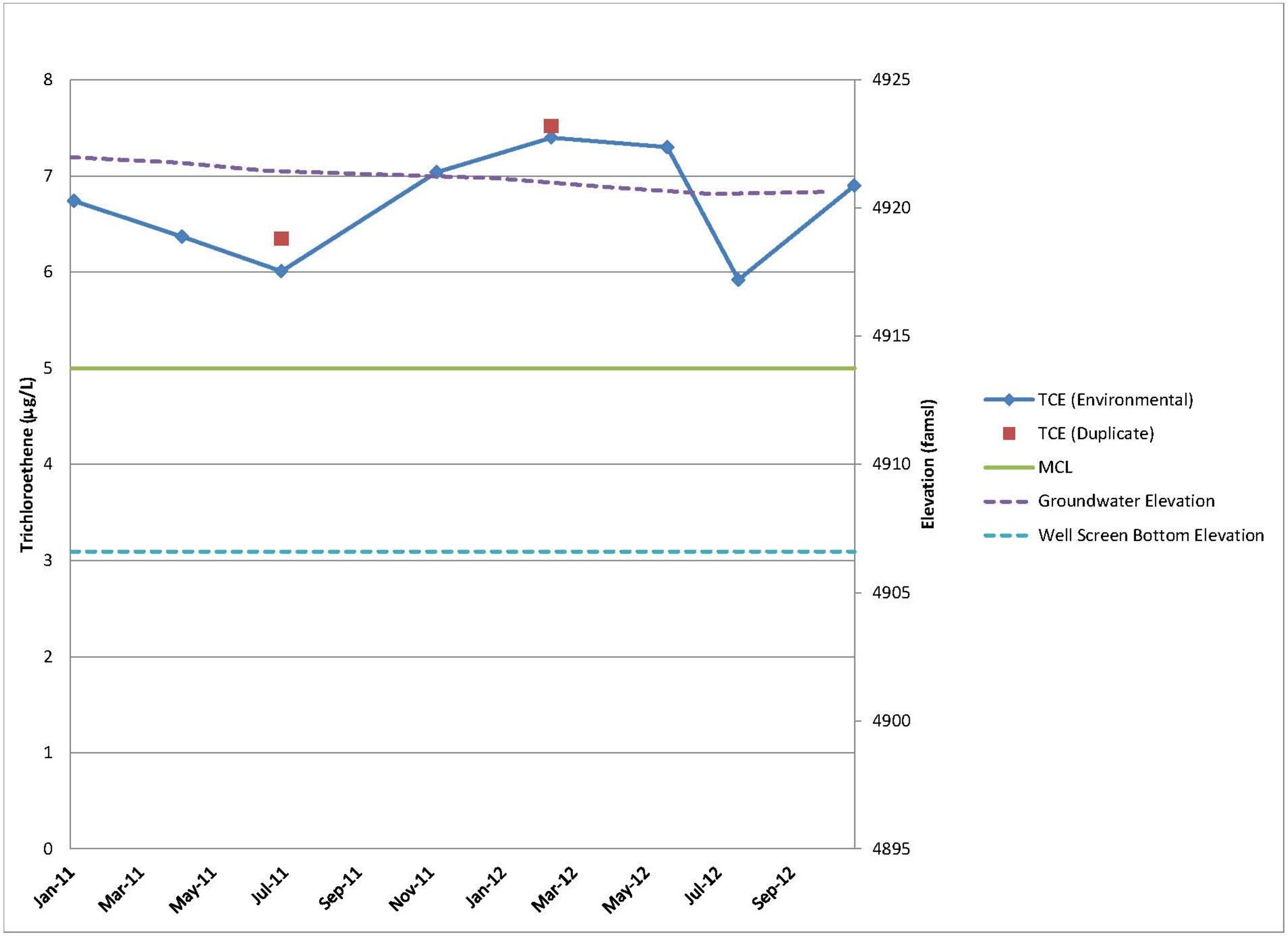

Figure 5B-5. Trichloroethene Concentrations, TAV-MW14

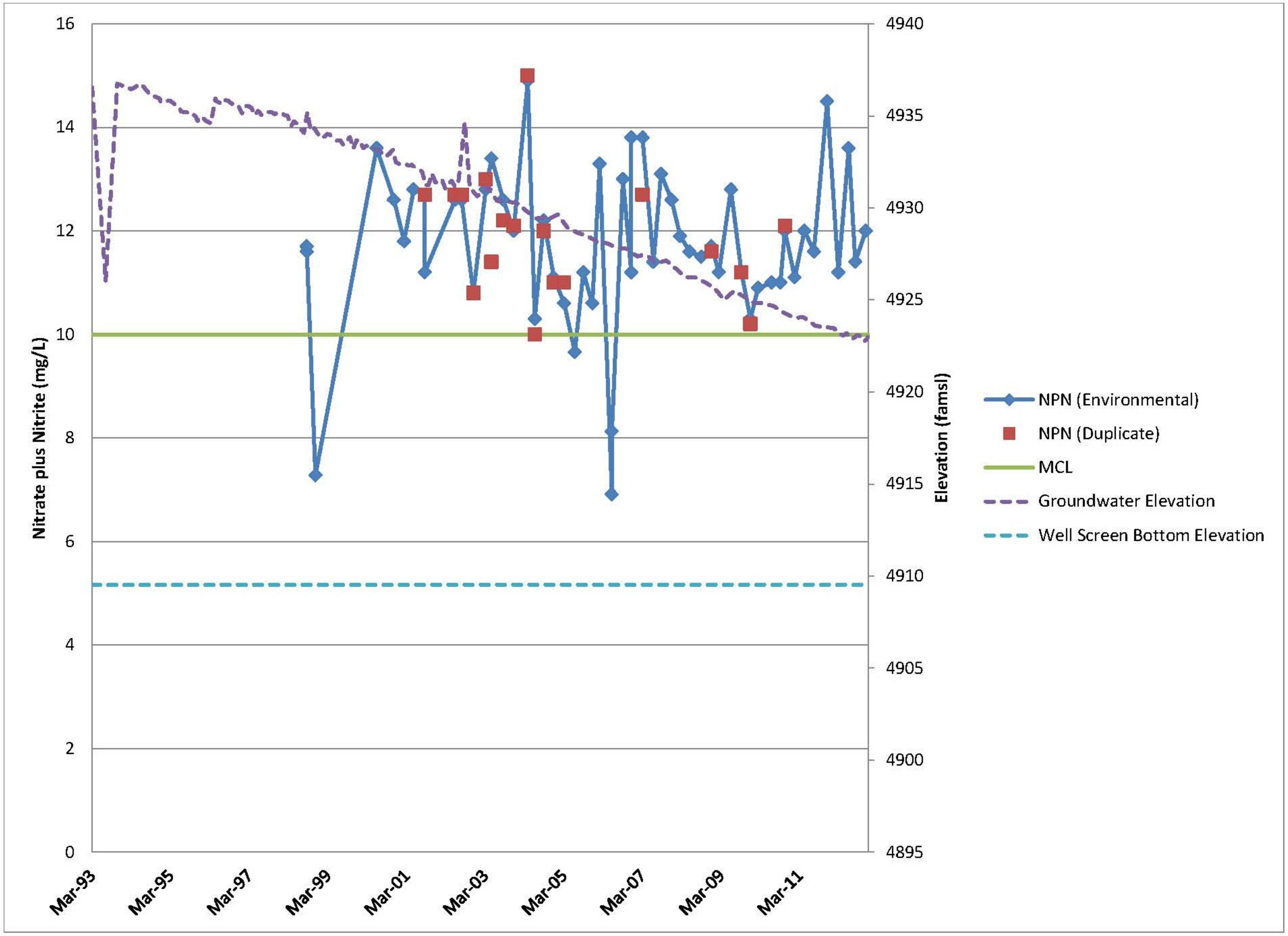

Figure 5B-6. Nitrate Plus Nitrite Concentrations, LWDS-MW1

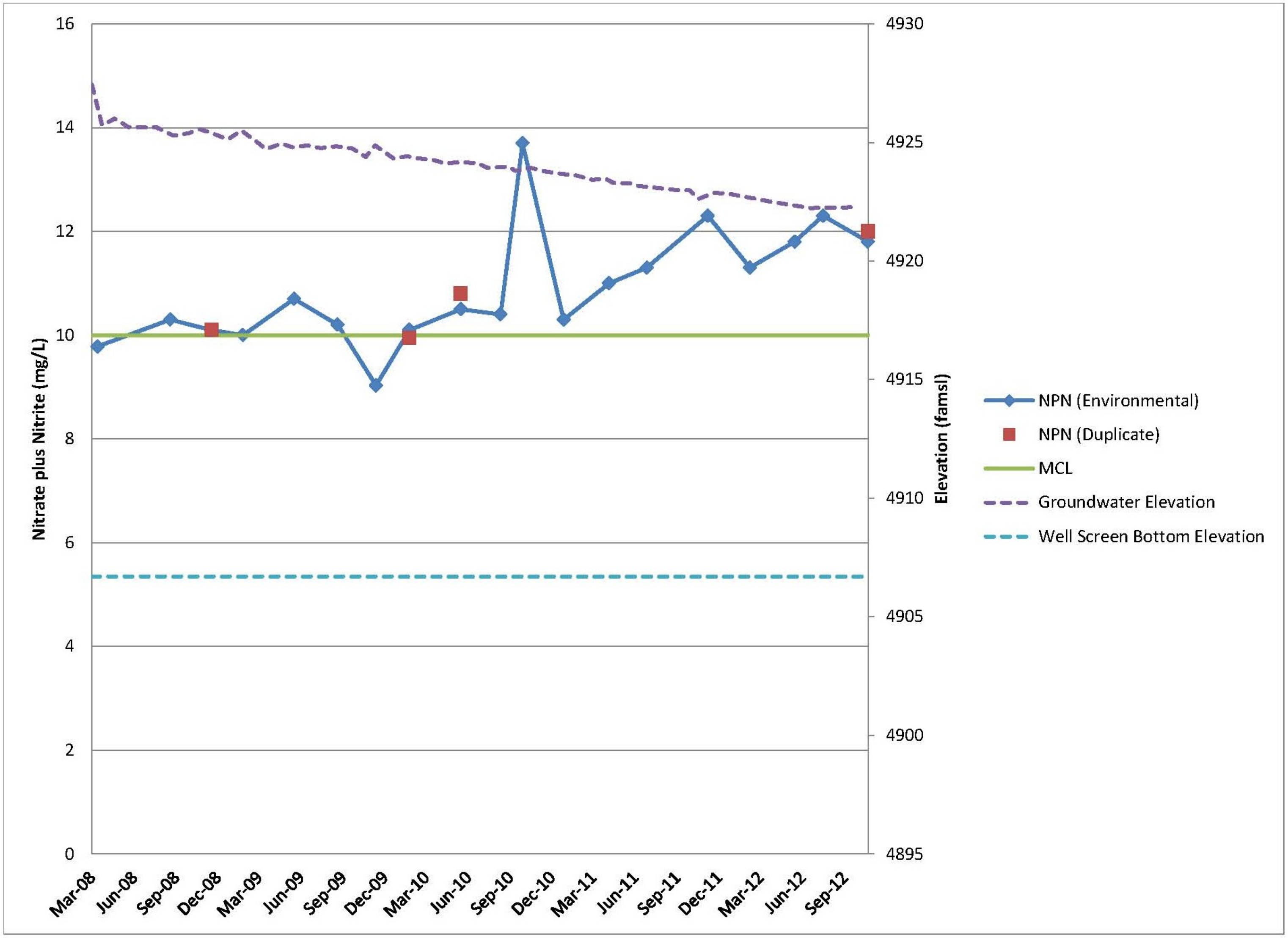

Figure 5B-7. Nitrate Plus Nitrite Concentrations, TAV-MW10

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Attachment 5C
Technical Area V
Hydrographs

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Attachment 5C Hydrographs

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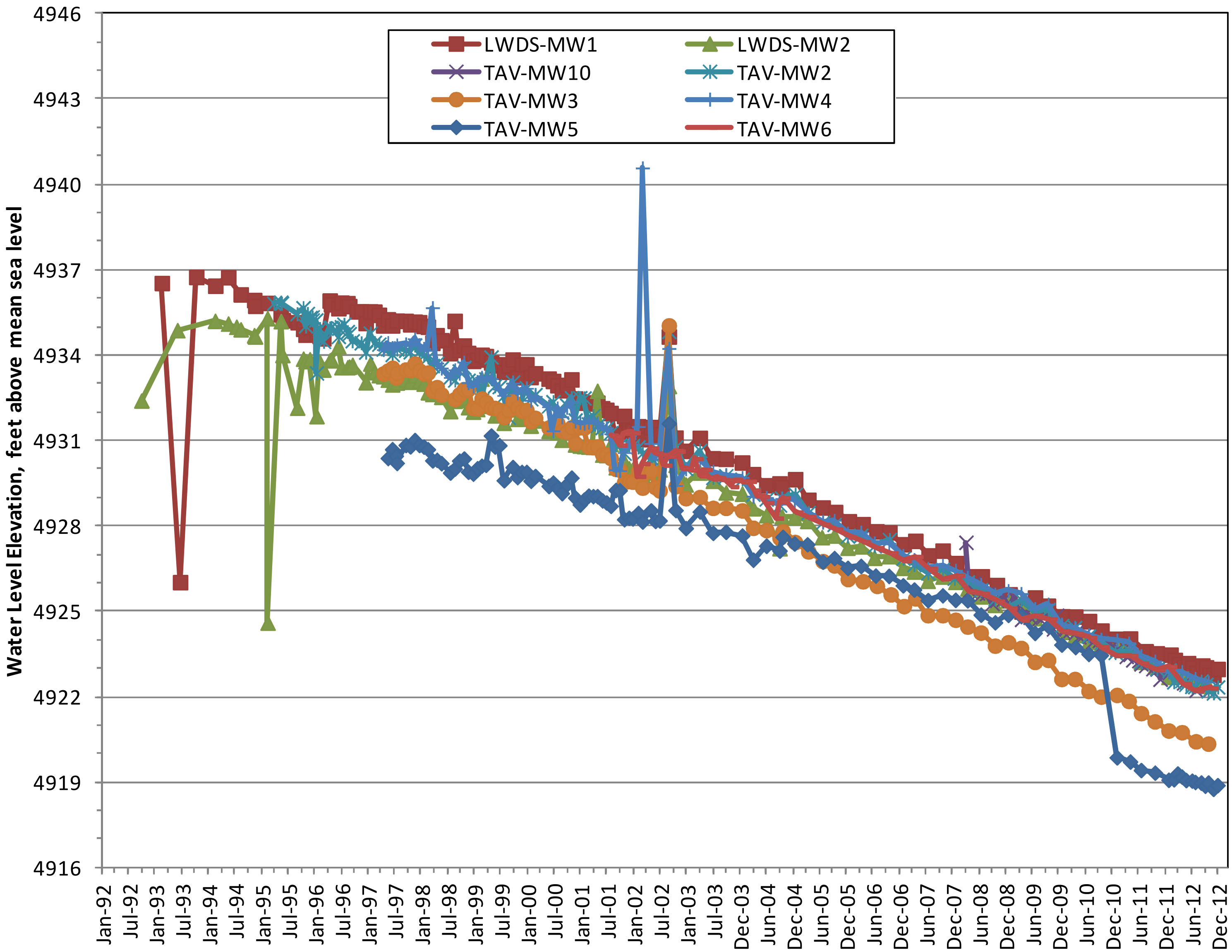

Figure 5C-1. TA-V Study Area Wells (1 of 3)

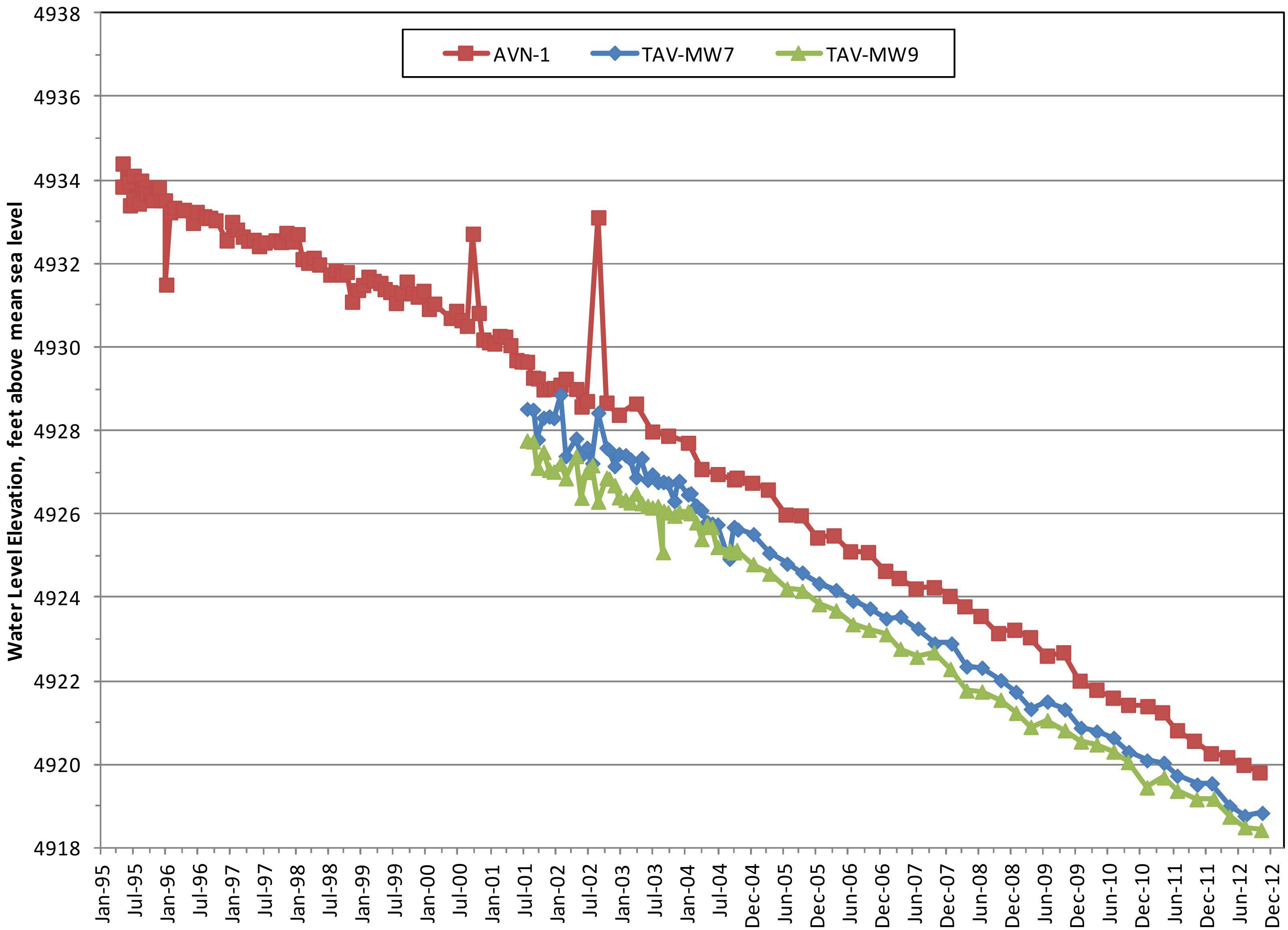

Figure 5C-2. TA-V Study Area Wells (2 of 3)

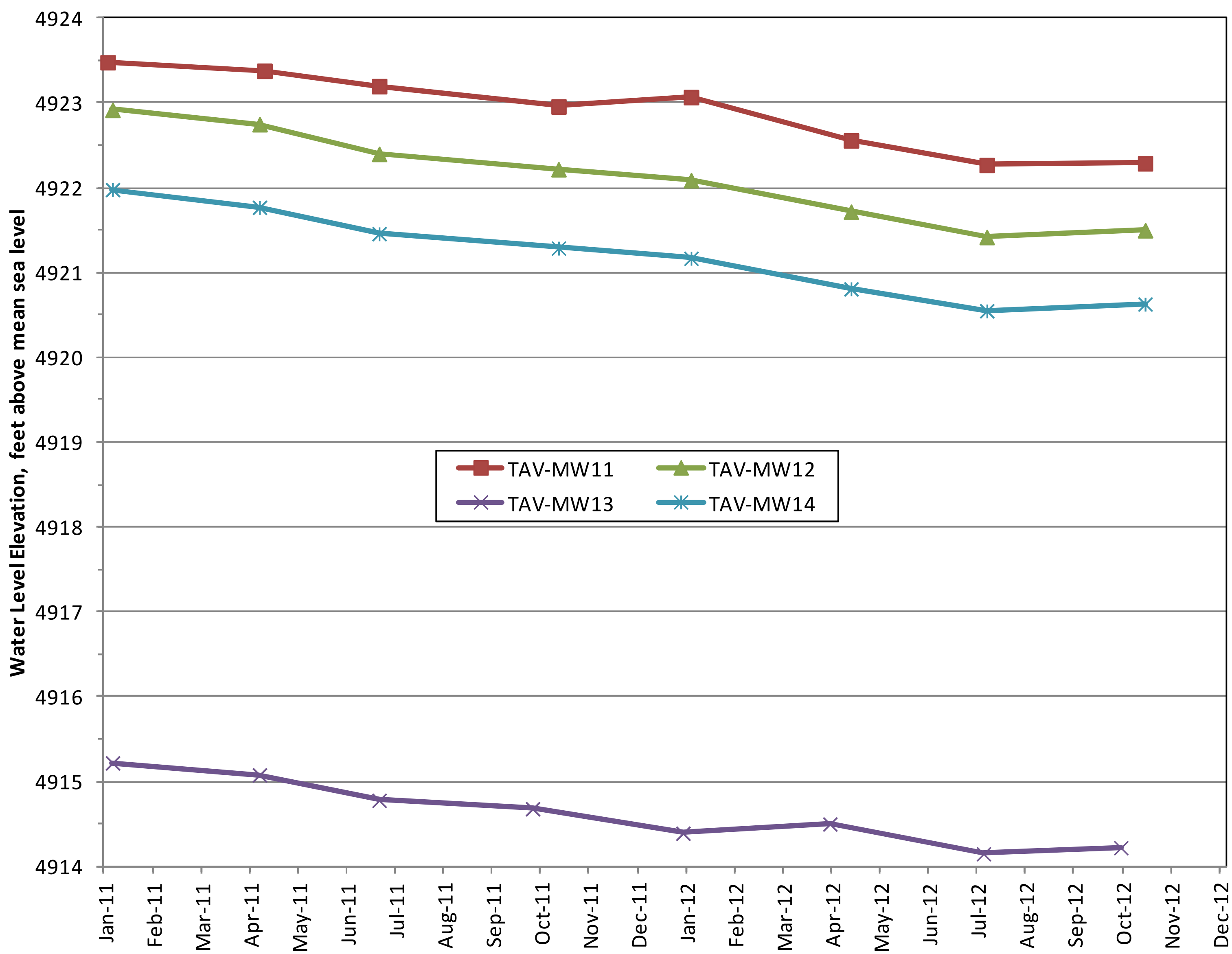

Figure 5C-3. TA-V Study Area Wells (3 of 3)

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Attachment 5D
Technical Area V
Soil-Vapor Monitoring
Calendar Year 2012 Activities

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Attachment 5D Tables

Attachment 5D Figures

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Technical Area V Soil-Vapor Monitoring
Calendar Year 2012 Activities

Sandia National Laboratories, New Mexico (SNL/NM) personnel performed soil-vapor sampling at areas inside and near Technical Area (TA)-V during four sampling events in 2012. Soil-vapor sampling activities were conducted to meet requirements established in the *Technical Area V Groundwater Investigation Work Plan, Revision 2*, which was submitted as Appendix A of the responses to the New Mexico Environment Department Notice of Disapproval (SNL February 2010), and in conformance with procedures outlined in the event-specific Mini-Sampling and Analysis Plans (SAP) listed in Table 5D-1 (SNL February 2012, April 2012, July 2012, and October 2012).

The report entitled *Summary Report for Technical Area-V Groundwater and Soil-Vapor Monitoring Well Installation* (SNL June 2011) documents the field activities performed during the installation of three soil-vapor monitoring wells in and around TA-V at SNL/NM (Figure 5D-1). Table 5D-2 summarizes the soil-vapor monitoring wells that were installed at TA-V from January through March 2011, and the well completion diagrams are provided in Figures 5D-2 through 5D-4.

This summary describes sampling activities and presents analytical results for the four Calendar Year (CY) 2012 sampling events. Environmental samples were collected from soil-vapor monitoring wells TAV-SV01, TAV-SV02, and TAV-SV03 at each sampling port (Table 5D-2). Samples collected from all wells were analyzed for volatile organic compounds (VOC) by analytical method U.S. Environmental Protection Agency (EPA) TO-15 for all quarterly sampling events. A duplicate sample was collected at each monitoring well from a selected sampling depth.

Well Evacuation

Purging removes stagnant air from each tube and draws representative soil vapor from the soil pore space surrounding the sampling port in the subsurface. In accordance with the Mini-SAPs (SNL February 2012, April 2012, July 2012, and October 2012), the minimum purge requirement is three tubing volumes. Purging continued until field measurements for VOCs stabilized. VOCs were measured by attaching a VOC monitoring instrument to the exhaust port of the vacuum pump.

The TA-V soil-vapor sampling equipment includes a vacuum pump, a sampling manifold assembly, and a multiport-purging chamber. The multiport-purging chamber is equipped with individual valves, fittings, and tubing, which can be connected to up to 10 individual sampling ports. The multiport-purging chamber allows up to 10 sampling locations to be purged at the same time. During sampling, valves were connected to each sampling port and purged until minimum purge requirements were satisfied. After the purge was complete, vapor samples were collected in SUMMA® canisters.

Analytical Results

Soil-vapor samples were submitted to TestAmerica California for chemical analyses by EPA Method TO-15. Analytical reports from the laboratory, including certificates of analyses, analytical methods, method detection limits (MDL), practical quantitation limits, dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Records Center.

Table 5D-3 summarizes detected VOCs in soil-vapor samples collected during the four 2012 sampling events. Table 5D-4 lists the MDLs for associated VOCs. Table 5D-5 summarizes field measurements collected prior to, and after sample collection. Field measurements included organic vapor readings obtained from each sampling port and vacuum pressure readings for each sample container.

VOCs detected during these four sampling events include the following constituents:

- 1,1,2-Trichloro-1,2,2-trifluoroethane
- 1,1-Dichloroethane
- 1,1-Dichloroethene
- 1,2,4-Trimethylbenzene
- 1,2,-Dichlorobenzene
- 2-Butanone
- 2-Hexanone
- 4-Ethyltoluene
- 4-Methyl-2-pentanone
- Acetone
- Benzene
- Bromodichloromethane
- Bromoform
- Carbon disulfide
- Carbon tetrachloride
- Chloroform
- Chloromethane
- cis-1,2-Dichloroethene
- Dibromochloromethane
- Dichlorodifluoromethane
- Ethyl benzene
- m,p-Xylene
- Methylene chloride
- o-Xylene
- Tetrachloroethene
- Toluene
- Total xylenes
- Trichloroethene (TCE)
- Trichlorofluoromethane

TCE was detected in almost all samples at all depths at concentrations ranging up to a maximum detection of 2,400 parts per billion by volume (ppbv) in the 350-foot-depth sample collected from monitoring well TAV-SV03 during the February 2012 sampling event. The concentrations of all VOCs have been added together to provide the Total VOC concentration. The maximum concentration of Total VOCs is 2,813 ppbv in the 350-foot-depth sample collected from monitoring well TAV-SV03 during the February 2012 sampling event. The concentrations of TCE and Total VOCs versus depth have been plotted for all sampling events on Figures 5D-5 through 5D-10. The concentrations of VOCs appear to be stable over time. It appears that the soil-vapor concentrations in the vadose zone have recovered from disequilibrium conditions brought on by the drilling and installation of the soil-vapor monitoring wells.

Field Quality Control Samples

Field QC samples included duplicate environmental and field QC blank samples. The field QC samples were submitted for analysis along with the soil-vapor samples in accordance with QC procedures specified in the Mini-SAPs (SNL February 2012, April 2012, July 2012, and October 2012).

Duplicate Environmental Samples

Duplicate environmental samples are collected to estimate the overall reproducibility of the sampling and analytical process. Duplicate samples were collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. Duplicate environmental samples were analyzed for all analytical parameters. The Mini-SAPs do not specify QC acceptance criteria for duplicate sample data (SNL February 2012, April 2012, July 2012, and October 2012); however, relative percent difference (RPD) calculations were performed for detected analytes. Table 5D-6 summarizes the results of duplicate sample analyses and calculated RPD values.

Field Quality Control Blank Samples

Field QC blank samples are submitted whenever samples are collected for VOC analysis to assess whether contamination of the samples occurred during shipment and storage. The sample is prepared in the field by collecting an ultra-pure nitrogen gas sample. Three field QC blank samples were submitted during each of the four sampling events. No VOCs were detected above laboratory MDLs in any QC blank sample, except acetone and benzene (February 2012 sampling event); acetone and toluene (May 2012 sampling event); acetone and TCE (August 2012 sampling event); and acetone (November 2012 sampling event). If compounds were detected in associated environmental samples at concentrations less than five times the blank concentration, then detected values were qualified as not detected during data validation.

Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples were analyzed concurrently with all soil-vapor samples. The chemical and radiological data were reviewed and qualified in accordance with Administrative Operating Procedure 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL May 2011).

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern.

Variances and Nonconformances

No variances or nonconformances from requirements in the TA-V Mini-SAPs (SNL February 2012, April 2012, July 2012, and October 2012) were identified during the sampling activities for these four soil-vapor sampling events. One project-specific issue occurred during the November 2012 sampling event, the environmental sample from TAV-SV02 (300 feet below ground surface sample port) was received by the laboratory at ambient pressure. The laboratory proceeded with analysis and results are reported. The laboratory did not determine a reason as the samples were received in good condition and field logs indicate that sample was submitted with a negative vacuum pressure. A duplicate sample was collected from this location and results from this duplicate are comparable to historical values.

Summary

During CY 2012, environmental samples were collected from soil-vapor monitoring wells TAV-SV01, TAV-SV02, and TAV-SV03 at multiple depths during four sampling events. The soil-vapor samples were analyzed for VOCs by analytical EPA Method TO-15. TCE was detected in almost all samples at all depths at concentrations ranging up to 2,400 ppbv. The maximum concentration of Total VOCs is 2,813 ppbv. The concentrations appear to be stable over time.

References

SNL October 2012 Sandia National Laboratories/New Mexico (SNL/NM), October 2012. *TA-V Soil-Vapor Monitoring Mini-SAP for First Quarter, Fiscal Year 2013*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico, October 8, 2012.

SNL July 2012 Sandia National Laboratories/New Mexico (SNL/NM), July 2012. *TA-V Soil-Vapor Monitoring Mini-SAP for Fourth Quarter, Fiscal Year 2012*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico, July 16, 2012.

SNL April 2012 Sandia National Laboratories/New Mexico (SNL/NM), April 2012. *TA-V Soil-Vapor Monitoring Mini-SAP for Third Quarter, Fiscal Year 2012*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico, April 26, 2012.

SNL February 2012 Sandia National Laboratories/New Mexico (SNL/NM), February 2012. *TA-V Soil-Vapor Monitoring Mini-SAP for Second Quarter, Fiscal Year 2012*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico, February 1, 2012.

SNL June 2011 Sandia National Laboratories/New Mexico (SNL/NM), June 2011. *Summary Report for Technical Area-V Groundwater and Soil-Vapor Monitoring Well Installation*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico, June 30, 2011.

SNL May 2011 Sandia National Laboratories/New Mexico (SNL/NM), May 2011. *Data Validation Procedure for Chemical and Radiochemical Data*, AOP 00-03, Revision 3, Sandia National Laboratories, Albuquerque, New Mexico, May 11, 2011.

SNL February 2010 Sandia National Laboratories/New Mexico (SNL/NM), February 2010. *DOE/Sandia Responses to NMED's Comments in Notice of Disapproval: Corrective Measures Evaluation Report for Technical Area V Groundwater, July 2005—November 2009 Response to Notice of Deficiency, Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-05-027*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico, February 22, 2010.

Attachment 5D
Tables

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Table 5D-1
Soil-Vapor Monitoring Sampling Dates for the TA-V Study Area, Calendar Year 2012

Dates of Sampling Event	SAP
February 24, 2012	*TA-V Soil-Vapor Monitoring Mini-SAP for Second Quarter, Fiscal Year 2012* (SNL February 2012)
May 24, 2012	*TA-V Soil-Vapor Monitoring Mini-SAP for Third Quarter, Fiscal Year 2012* (SNL April 2012)
August 10 to 13, 2012	*TA-V Soil-Vapor Monitoring Mini-SAP for Fourth Quarter, Fiscal Year 2012* (SNL July 2012)
November 15 to 16, 2012	*TA-V Soil-Vapor Monitoring Mini-SAP for First Quarter, Fiscal Year 2013* (SNL October 2012)

Refer to footnotes on page 5D-67.

Table 5D-2
Summary of TA-V Soil-Vapor Monitoring Wells Sampled in Calendar Year 2012

Well	Approximate Location	Sampling Intervals (ft bgs)	
TAV-SV01	Adjacent to Groundwater Monitoring Well LWDS-MW1	49.5–50.5 99.5–100.5 149.5–150.5 199.5–200.5 249.5–250.5	299.5–300.5 349.5–350.5 399.5–400.5 449.5–450.5 499.5–500.5
TAV-SV02	Adjacent to Groundwater Monitoring Wells TAV-MW6 and TAV-MW7	49.5–50.5 99.5–100.5 149.5–150.5 199.5–200.5 249.5–250.5	299.5–300.5 349.5–350.5 399.5–400.5 449.5–450.5 499.5–500.5
TAV-SV03	Adjacent to Groundwater Monitoring Well TAV-MW11	49.5–50.5 99.5–100.5 149.5–150.5 199.5–200.5 249.5–250.5	299.5–300.5 349.5–350.5 399.5–400.5 449.5–450.5 499.5–500.5

Refer to footnotes on page 5D-67.

Table 5D-3
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-50	Acetone	4.3	0.30	0.80			091844-001	EPA TO-15
24-Feb-12	2-Butanone	0.67	0.40	0.80	J		091844-001	EPA TO-15
	Carbon disulfide	1.9	0.20	0.80			091844-001	EPA TO-15
	Chloroform	0.12	0.10	0.30	J		091844-001	EPA TO-15
	Chloromethane	0.28	0.20	0.80	J		091844-001	EPA TO-15
	Dichlorodifluoromethane	0.57	0.15	0.40			091844-001	EPA TO-15
	Tetrachloroethene	0.29	0.20	0.40	J		091844-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.67	0.20	0.40			091844-001	EPA TO-15
	Trichloroethene	2.3	0.20	0.40			091844-001	EPA TO-15
	Trichlorofluoromethane	0.26	0.15	0.40	J		091844-001	EPA TO-15
	Total VOCs	11.36	NA	NA	NA	NA	091844-001	EPA TO-15
TAV-SV01-100	Acetone	8.0	0.30	0.80			091845-001	EPA TO-15
24-Feb-12	Bromodichloromethane	0.23	0.15	0.30	J		091845-001	EPA TO-15
	2-Butanone	1.7	0.40	0.80			091845-001	EPA TO-15
	Carbon disulfide	1.7	0.20	0.80			091845-001	EPA TO-15
	Carbon tetrachloride	0.25	0.25	0.80	J		091845-001	EPA TO-15
	Chloroform	0.53	0.10	0.30			091845-001	EPA TO-15
	Chloromethane	0.54	0.20	0.80	J		091845-001	EPA TO-15
	Dibromochloromethane	0.19	0.10	0.40	J		091845-001	EPA TO-15
	Dichlorodifluoromethane	0.51	0.15	0.40			091845-001	EPA TO-15
	Methylene chloride	0.44	0.20	0.40			091845-001	EPA TO-15
	Tetrachloroethene	0.75	0.20	0.40			091845-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.5	0.20	0.40			091845-001	EPA TO-15
	Trichloroethene	5.1	0.20	0.40			091845-001	EPA TO-15
	Trichlorofluoromethane	0.28	0.15	0.40	J		091845-001	EPA TO-15
	Total VOCs	21.72	NA	NA	NA	NA	091845-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds,
Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-150	Acetone	3.2	0.30	0.80			091846-001	EPA TO-15
24-Feb-12	Benzene	0.16	0.15	0.30	J		091846-001	EPA TO-15
	Bromodichloromethane	1.6	0.15	0.30			091846-001	EPA TO-15
	2-Butanone	1.0	0.40	0.80			091846-001	EPA TO-15
	Carbon tetrachloride	0.52	0.25	0.80	J		091846-001	EPA TO-15
	Chloroform	3.6	0.10	0.30			091846-001	EPA TO-15
	Dibromochloromethane	1.0	0.10	0.40			091846-001	EPA TO-15
	Dichlorodifluoromethane	0.51	0.15	0.40			091846-001	EPA TO-15
	1,1-Dichloroethane	0.23	0.15	0.30	J		091846-001	EPA TO-15
	Tetrachloroethene	0.84	0.20	0.40			091846-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.6	0.20	0.40			091846-001	EPA TO-15
	Trichloroethene	18	0.20	0.40			091846-001	EPA TO-15
	Trichlorofluoromethane	0.28	0.15	0.40	J		091846-001	EPA TO-15
	Total VOCs	33.54	NA	NA	NA	NA	091846-001	EPA TO-15
TAV-SV01-200	Acetone	8.0	0.30	0.80			091847-001	EPA TO-15
24-Feb-12	Benzene	0.58	0.15	0.30			091847-001	EPA TO-15
	Bromodichloromethane	3.9	0.15	0.30			091847-001	EPA TO-15
	Bromoform	0.36	0.20	0.40	J	J+	091847-001	EPA TO-15
	2-Butanone	1.5	0.40	0.80			091847-001	EPA TO-15
	Carbon disulfide	0.23	0.20	0.80	J		091847-001	EPA TO-15
	Carbon tetrachloride	1.4	0.25	0.80			091847-001	EPA TO-15
	Chloroform	8.3	0.10	0.30			091847-001	EPA TO-15
	Dibromochloromethane	3.2	0.10	0.40			091847-001	EPA TO-15
	Dichlorodifluoromethane	0.36	0.15	0.40	J		091847-001	EPA TO-15
	1,1-Dichloroethane	1.6	0.15	0.30			091847-001	EPA TO-15
	1,1-Dichloroethene	0.93	0.20	0.80			091847-001	EPA TO-15
	cis-1,2-Dichloroethene	0.8	0.20	0.40			091847-001	EPA TO-15
	Methylene chloride	0.23	0.20	0.40	J		091847-001	EPA TO-15
	Tetrachloroethene	1.0	0.20	0.40			091847-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.2	0.20	0.40			091847-001	EPA TO-15
	Trichloroethene	67	0.49	0.99			091847-001	EPA TO-15
	Trichlorofluoromethane	0.29	0.15	0.40	J		091847-001	EPA TO-15
	Total VOCs	104.88	NA	NA	NA	NA	091847-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds,
Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-250	Acetone	5.9	0.30	0.80			091848-001	EPA TO-15
24-Feb-12	Benzene	1.7	0.15	0.30			091848-001	EPA TO-15
	Bromodichloromethane	4.3	0.15	0.30			091848-001	EPA TO-15
	Bromoform	0.53	0.20	0.40		J+	091848-001	EPA TO-15
	2-Butanone	1.1	0.40	0.80			091848-001	EPA TO-15
	Carbon disulfide	0.20	0.20	0.80	J		091848-001	EPA TO-15
	Carbon tetrachloride	2.1	0.25	0.80			091848-001	EPA TO-15
	Chloroform	9.7	0.10	0.30			091848-001	EPA TO-15
	Dibromochloromethane	3.9	0.10	0.40			091848-001	EPA TO-15
	Dichlorodifluoromethane	0.28	0.15	0.40	J		091848-001	EPA TO-15
	1,1-Dichloroethane	2.3	0.15	0.30			091848-001	EPA TO-15
	1,1-Dichloroethene	1.7	0.20	0.80			091848-001	EPA TO-15
	cis-1,2-Dichloroethene	2.4	0.20	0.40			091848-001	EPA TO-15
	Methylene chloride	0.73	0.20	0.40			091848-001	EPA TO-15
	Tetrachloroethene	1.5	0.20	0.40			091848-001	EPA TO-15
	Toluene	0.23	0.20	0.40	J		091848-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.1	0.20	0.40			091848-001	EPA TO-15
	Trichloroethene	100	1.1	2.2			091848-001	EPA TO-15
	Trichlorofluoromethane	0.27	0.15	0.40	J		091848-001	EPA TO-15
	Total VOCs	143.94	NA	NA	NA	NA	091848-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-300	Acetone	3.1	0.30	0.80			091849-001	EPA TO-15
24-Feb-12	Benzene	0.73	0.15	0.30			091849-001	EPA TO-15
	Bromodichloromethane	3.9	0.15	0.30			091849-001	EPA TO-15
	Bromoform	0.70	0.20	0.40		J+	091849-001	EPA TO-15
	2-Butanone	0.60	0.40	0.80	J		091849-001	EPA TO-15
	Carbon disulfide	0.36	0.20	0.80	J		091849-001	EPA TO-15
	Carbon tetrachloride	2.3	0.25	0.80			091849-001	EPA TO-15
	Chloroform	10	0.10	0.30			091849-001	EPA TO-15
	Dibromochloromethane	3.4	0.10	0.40			091849-001	EPA TO-15
	Dichlorodifluoromethane	0.24	0.15	0.40	J		091849-001	EPA TO-15
	1,1-Dichloroethane	1.7	0.15	0.30			091849-001	EPA TO-15
	1,1-Dichloroethene	1.8	0.20	0.80			091849-001	EPA TO-15
	cis-1,2-Dichloroethene	3.1	0.20	0.40			091849-001	EPA TO-15
	Methylene chloride	0.86	0.20	0.40			091849-001	EPA TO-15
	Tetrachloroethene	1.5	0.20	0.40			091849-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.3	0.20	0.40			091849-001	EPA TO-15
	Trichloroethene	98	1.2	2.3			091849-001	EPA TO-15
	Trichlorofluoromethane	0.20	0.15	0.40	J		091849-001	EPA TO-15
	Total VOCs	134.79	NA	NA	NA	NA	091849-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-300 (Duplicate) 24-Feb-12	Benzene	0.97	0.15	0.30			091850-001	EPA TO-15
	Bromodichloromethane	3.9	0.15	0.30			091850-001	EPA TO-15
	Bromoform	0.74	0.20	0.40		J+	091850-001	EPA TO-15
	2-Butanone	1.0	0.40	0.80			091850-001	EPA TO-15
	Carbon disulfide	0.22	0.20	0.80	J		091850-001	EPA TO-15
	Carbon tetrachloride	2.4	0.25	0.80			091850-001	EPA TO-15
	Chloroform	10	0.10	0.30			091850-001	EPA TO-15
	Dibromochloromethane	3.4	0.10	0.40			091850-001	EPA TO-15
	Dichlorodifluoromethane	0.24	0.15	0.40	J		091850-001	EPA TO-15
	1,1-Dichloroethane	1.6	0.15	0.30			091850-001	EPA TO-15
	1,1-Dichloroethene	1.8	0.20	0.80			091850-001	EPA TO-15
	cis-1,2-Dichloroethene	3.1	0.20	0.40			091850-001	EPA TO-15
	Methylene chloride	0.81	0.20	0.40			091850-001	EPA TO-15
	Tetrachloroethene	1.5	0.20	0.40			091850-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.2	0.20	0.40			091850-001	EPA TO-15
	Trichloroethene	94	1.3	2.5			091850-001	EPA TO-15
	Trichlorofluoromethane	0.19	0.15	0.40	J		091850-001	EPA TO-15
	Total VOCs	128.07	NA	NA	NA	NA	091850-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-350	Acetone	6.3	0.30	0.80			091851-001	EPA TO-15
24-Feb-12	Benzene	0.58	0.15	0.30			091851-001	EPA TO-15
	Bromodichloromethane	4.6	0.15	0.30			091851-001	EPA TO-15
	Bromoform	1.0	0.20	0.40		J+	091851-001	EPA TO-15
	2-Butanone	1.2	0.40	0.80			091851-001	EPA TO-15
	Carbon tetrachloride	1.8	0.25	0.80			091851-001	EPA TO-15
	Chloroform	9.7	0.10	0.30			091851-001	EPA TO-15
	Dibromochloromethane	4.5	0.10	0.40			091851-001	EPA TO-15
	Dichlorodifluoromethane	0.22	0.15	0.40	J		091851-001	EPA TO-15
	1,1-Dichloroethane	0.77	0.15	0.30			091851-001	EPA TO-15
	1,1-Dichloroethene	1.2	0.20	0.80			091851-001	EPA TO-15
	cis-1,2-Dichloroethene	5.6	0.20	0.40			091851-001	EPA TO-15
	Methylene chloride	0.96	0.20	0.40			091851-001	EPA TO-15
	Tetrachloroethene	1.3	0.20	0.40			091851-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.2	0.20	0.40			091851-001	EPA TO-15
	Trichloroethene	84	1.3	2.6			091851-001	EPA TO-15
	Trichlorofluoromethane	0.19	0.15	0.40	J		091851-001	EPA TO-15
	Total VOCs	126.12	NA	NA	NA	NA	091851-001	EPA TO-15
TAV-SV01-400	Bromodichloromethane	3.3	1.2	2.3			091852-001	EPA TO-15
24-Feb-12	2-Butanone	13	3.1	6.3			091852-001	EPA TO-15
	Chloroform	8.6	0.78	2.3			091852-001	EPA TO-15
	Dibromochloromethane	3.2	0.78	3.1			091852-001	EPA TO-15
	1,1-Dichloroethane	2.1	1.2	2.3	J		091852-001	EPA TO-15
	cis-1,2-Dichloroethene	55	1.6	3.1			091852-001	EPA TO-15
	Tetrachloroethene	4.2	1.6	3.1			091852-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.9	1.6	3.1			091852-001	EPA TO-15
	Trichloroethene	390	3.1	6.2			091852-001	EPA TO-15
	Total VOCs	483.3	NA	NA	NA	NA	091852-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-450	Acetone	24	12	32	J		091853-001	EPA TO-15
24-Feb-12	Chloroform	6.9	4.0	12	J		091853-001	EPA TO-15
	cis-1,2-Dichloroethene	210	7.9	16			091853-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	10	7.9	16	J		091853-001	EPA TO-15
	Trichloroethene	1500	7.9	16			091853-001	EPA TO-15
	Total VOCs	1750.9	NA	NA	NA	NA	091853-001	EPA TO-15
TAV-SV01-500	Acetone	11	7.9	21	J		091854-001	EPA TO-15
24-Feb-12	Chloroform	4	2.6	7.9	J		091854-001	EPA TO-15
	cis-1,2-Dichloroethene	36	5.3	11			091854-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	14	5.3	11			091854-001	EPA TO-15
	Trichloroethene	920	5.3	11			091854-001	EPA TO-15
	Total VOCs	985	NA	NA	NA	NA	091854-001	EPA TO-15
TAV-SV02-050	Benzene	0.18	0.15	0.30	J	0.30U	091832-001	EPA TO-15
24-Feb-12	Bromodichloromethane	11	0.15	0.30			091832-001	EPA TO-15
	2-Butanone	0.65	0.40	0.80	J		091832-001	EPA TO-15
	Chloroform	10	0.10	0.30	B		091832-001	EPA TO-15
	Dibromochloromethane	0.90	0.10	0.40			091832-001	EPA TO-15
	Dichlorodifluoromethane	0.60	0.15	0.40			091832-001	EPA TO-15
	Methylene chloride	0.61	0.20	0.40			091832-001	EPA TO-15
	Tetrachloroethene	0.70	0.20	0.40			091832-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	53	0.20	0.40			091832-001	EPA TO-15
	Trichloroethene	7.2	0.20	0.40			091832-001	EPA TO-15
	Trichlorofluoromethane	1.1	0.15	0.40			091832-001	EPA TO-15
	Total VOCs	85.76	NA	NA	NA	NA	091832-001	EPA TO-15
TAV-SV02-050 (Duplicate)	Bromodichloromethane	11	0.15	0.30			091833-001	EPA TO-15
24-Feb-12	Chloroform	10	0.10	0.30	B		091833-001	EPA TO-15
	Dibromochloromethane	0.87	0.10	0.40			091833-001	EPA TO-15
	Dichlorodifluoromethane	0.60	0.15	0.40			091833-001	EPA TO-15
	Methylene chloride	0.61	0.20	0.40			091833-001	EPA TO-15
	Tetrachloroethene	0.69	0.20	0.40			091833-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	51	0.20	0.40			091833-001	EPA TO-15
	Trichloroethene	6.5	0.20	0.40			091833-001	EPA TO-15
	Trichlorofluoromethane	1.1	0.15	0.40			091833-001	EPA TO-15
	Total VOCs	82.37	NA	NA	NA	NA	091833-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-100	Bromodichloromethane	40	0.15	0.30			091834-001	EPA TO-15
24-Feb-12	Bromoform	0.21	0.20	0.40	J	J	091834-001	EPA TO-15
	2-Butanone	0.40	0.40	0.80	J		091834-001	EPA TO-15
	Carbon disulfide	0.45	0.20	0.80	J		091834-001	EPA TO-15
	Carbon tetrachloride	0.31	0.25	0.80	J		091834-001	EPA TO-15
	Chloroform	47	0.10	0.30	B		091834-001	EPA TO-15
	Chloromethane	0.27	0.20	0.80	J		091834-001	EPA TO-15
	Dibromochloromethane	6.4	0.10	0.40			091834-001	EPA TO-15
	Dichlorodifluoromethane	0.65	0.15	0.40			091834-001	EPA TO-15
	Methylene chloride	2.0	0.20	0.40			091834-001	EPA TO-15
	Tetrachloroethene	3.2	0.20	0.40			091834-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	250	1.4	2.8			091834-001	EPA TO-15
	Trichloroethene	38	0.20	0.40			091834-001	EPA TO-15
	Trichlorofluoromethane	4.0	0.15	0.40			091834-001	EPA TO-15
	Xylene	0.23	0.20	0.40	J		091834-001	EPA TO-15
	Xylene, M.P	0.23	0.20	0.80	J		091834-001	EPA TO-15
	Total VOCs	393.12	NA	NA	NA	NA	091834-001	EPA TO-15
TAV-SV02-150	Benzene	0.20	0.15	0.30	J	0.30U	091835-001	EPA TO-15
24-Feb-12	Bromoform	0.80	0.20	0.40		J	091835-001	EPA TO-15
	2-Butanone	0.59	0.40	0.80	J		091835-001	EPA TO-15
	Carbon tetrachloride	0.50	0.25	0.80	J		091835-001	EPA TO-15
	Chloroform	54	0.10	0.30	B		091835-001	EPA TO-15
	Dibromochloromethane	12	0.10	0.40			091835-001	EPA TO-15
	Dichlorodifluoromethane	0.70	0.15	0.40			091835-001	EPA TO-15
	1,2-Dichlorobenzene	0.66	0.15	0.40			091835-001	EPA TO-15
	Methylene chloride	1.0	0.20	0.40			091835-001	EPA TO-15
	Tetrachloroethene	4.6	0.20	0.40			091835-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	530	5.1	10			091835-001	EPA TO-15
	Trichloroethene	52	0.50	1.0			091835-001	EPA TO-15
	Trichlorofluoromethane	6.6	0.15	0.40			091835-001	EPA TO-15
	Total VOCs	663.45	NA	NA	NA	NA	091835-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-200	Acetone	9.6	3.5	9.3			091836-001	EPA TO-15
24-Feb-12	Bromodichloromethane	27	1.7	3.5			091836-001	EPA TO-15
	Chloroform	35	1.2	3.5			091836-001	EPA TO-15
	Dibromochloromethane	13	1.2	4.6			091836-001	EPA TO-15
	1,1-Dichloroethane	2.5	1.7	3.5	J		091836-001	EPA TO-15
	cis-1,2-Dichloroethene	3.0	2.3	4.6	J		091836-001	EPA TO-15
	Tetrachloroethene	4.6	2.3	4.6			091836-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	320	2.3	4.6			091836-001	EPA TO-15
	Trichloroethene	350	2.3	4.6			091836-001	EPA TO-15
	Trichlorofluoromethane	3.5	1.7	4.6	J		091836-001	EPA TO-15
	Total VOCs	768.20	NA	NA	NA	NA	091836-001	EPA TO-15
TAV-SV02-250	Acetone	27	3.6	9.7			091837-001	EPA TO-15
24-Feb-12	Bromodichloromethane	9.3	1.8	3.6			091837-001	EPA TO-15
	Chloroform	19	1.2	3.6			091837-001	EPA TO-15
	Dibromochloromethane	3.0	1.2	4.8	J		091837-001	EPA TO-15
	1,1-Dichloroethane	2.9	1.8	3.6	J		091837-001	EPA TO-15
	cis-1,2-Dichloroethene	3.2	2.4	4.8	J		091837-001	EPA TO-15
	Tetrachloroethene	4.3	2.4	4.8	J		091837-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	280	2.4	4.8			091837-001	EPA TO-15
	Trichloroethene	400	2.4	4.8			091837-001	EPA TO-15
	Total VOCs	748.70	NA	NA	NA	NA	091837-001	EPA TO-15
TAV-SV02-300	Bromodichloromethane	13	1.7	3.3			091838-001	EPA TO-15
24-Feb-12	2-Butanone	11	4.4	8.9			091838-001	EPA TO-15
	Chloroform	23	1.1	3.3			091838-001	EPA TO-15
	Dibromochloromethane	4.9	1.1	4.4			091838-001	EPA TO-15
	1,1-Dichloroethane	3.2	1.7	3.3	J		091838-001	EPA TO-15
	cis-1,2-Dichloroethene	4.1	2.2	4.4	J		091838-001	EPA TO-15
	Tetrachloroethene	4.6	2.2	4.4			091838-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	290	2.2	4.4			091838-001	EPA TO-15
	Trichloroethene	410	2.2	4.4			091838-001	EPA TO-15
	Trichlorofluoromethane	3.2	1.7	4.4	J		091838-001	EPA TO-15
	Total VOCs	767.00	NA	NA	NA	NA	091838-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-350	Acetone	4.0	3.7	9.9	J	9.9U	091839-001	EPA TO-15
24-Feb-12	Benzene	2.0	1.9	3.7	J	3.7U	091839-001	EPA TO-15
	Bromodichloromethane	15	1.9	3.7			091839-001	EPA TO-15
	Chloroform	26	1.2	3.7			091839-001	EPA TO-15
	Dibromochloromethane	6.4	1.2	5.0			091839-001	EPA TO-15
	Tetrachloroethene	4.4	2.5	5.0	J		091839-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	290	2.5	5.0			091839-001	EPA TO-15
	Trichloroethene	460	2.5	5.0			091839-001	EPA TO-15
	Trichlorofluoromethane	3.1	1.9	5.0	J		091839-001	EPA TO-15
	Total VOCs	804.90	NA	NA	NA	NA	091839-001	EPA TO-15
TAV-SV02-400	Bromodichloromethane	12	0.15	0.30			091840-001	EPA TO-15
24-Feb-12	Bromoform	0.63	0.20	0.40		J	091840-001	EPA TO-15
	2-Butanone	0.40	0.40	0.80	J		091840-001	EPA TO-15
	Carbon disulfide	0.34	0.20	0.80	J		091840-001	EPA TO-15
	Carbon tetrachloride	1.9	0.25	0.80			091840-001	EPA TO-15
	Chloroform	23	0.10	0.30			091840-001	EPA TO-15
	Dibromochloromethane	5.6	0.10	0.40			091840-001	EPA TO-15
	Dichlorodifluoromethane	0.61	0.15	0.40			091840-001	EPA TO-15
	1,2-Dichlorobenzene	0.19	0.15	0.40	J		091840-001	EPA TO-15
	1,1-Dichloroethane	4.5	0.15	0.30			091840-001	EPA TO-15
	1,1-Dichloroethene	1.2	0.20	0.80			091840-001	EPA TO-15
	cis-1,2-Dichloroethene	8.9	0.20	0.40			091840-001	EPA TO-15
	Methylene chloride	0.38	0.20	0.40	J		091840-001	EPA TO-15
	Tetrachloroethene	6.1	0.20	0.40			091840-001	EPA TO-15
	Toluene	0.21	0.20	0.40	J		091840-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	250	4.1	8.1			091840-001	EPA TO-15
	Trichloroethene	570	4.1	8.1			091840-001	EPA TO-15
	Trichlorofluoromethane	6.0	0.15	0.40			091840-001	EPA TO-15
	Total VOCs	891.96	NA	NA	NA	NA	091840-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-450	Bromodichloromethane	13	1.8	3.5			091841-001	EPA TO-15
24-Feb-12	Chloroform	23	1.2	3.5			091841-001	EPA TO-15
	Dibromochloromethane	5.4	1.2	4.7			091841-001	EPA TO-15
	1,1-Dichloroethane	2.7	1.8	3.5	J		091841-001	EPA TO-15
	cis-1,2-Dichloroethene	6.0	2.3	4.7			091841-001	EPA TO-15
	Tetrachloroethene	5.0	2.3	4.7			091841-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	300	2.3	4.7			091841-001	EPA TO-15
	Trichloroethene	400	2.3	4.7			091841-001	EPA TO-15
	Trichlorofluoromethane	3.6	1.8	4.7	J		091841-001	EPA TO-15
	Total VOCs	758.70	NA	NA	NA	NA	091841-001	EPA TO-15
TAV-SV02-500	Acetone	25	7.9	21			091842-001	EPA TO-15
24-Feb-12	Chloroform	11	2.6	7.9			091842-001	EPA TO-15
	cis-1,2-Dichloroethene	94	5.3	11			091842-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	160	5.3	11			091842-001	EPA TO-15
	Trichloroethene	1200	5.3	11			091842-001	EPA TO-15
	Total VOCs	1490.00	NA	NA	NA	NA	091842-001	EPA TO-15
TAV-SV03-050	Acetone	4.1	0.30	0.80			091820-001	EPA TO-15
24-Feb-12	Benzene	0.24	0.15	0.30	J		091820-001	EPA TO-15
	2-Butanone	0.90	0.40	0.80			091820-001	EPA TO-15
	Dichlorodifluoromethane	0.76	0.15	0.40			091820-001	EPA TO-15
	1,1-Dichloroethane	0.43	0.20	0.80	J		091820-001	EPA TO-15
	Tetrachloroethene	1.6	0.20	0.40			091820-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	150	1.6	3.2			091820-001	EPA TO-15
	Trichloroethene	6.8	0.20	0.40			091820-001	EPA TO-15
	Total VOCs	164.83	NA	NA	NA	NA	091820-001	EPA TO-15
TAV-SV03-100	Acetone	2.1	0.30	0.80			091821-001	EPA TO-15
24-Feb-12	Benzene	0.42	0.15	0.30			091821-001	EPA TO-15
	2-Butanone	0.47	0.40	0.80	J		091821-001	EPA TO-15
	Chloromethane	0.23	0.20	0.80	J		091821-001	EPA TO-15
	Dichlorodifluoromethane	0.98	0.15	0.40			091821-001	EPA TO-15
	Tetrachloroethene	2.0	0.20	0.40			091821-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	590	16	32			091821-001	EPA TO-15
	Trichloroethene	32	0.20	0.40			091821-001	EPA TO-15
	Trichlorofluoromethane	1.3	0.15	0.40			091821-001	EPA TO-15
	Total VOCs	629.50	NA	NA	NA	NA	091821-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-150	Acetone	6.2	0.30	0.80			091822-001	EPA TO-15
24-Feb-12	Benzene	2.1	0.15	0.30			091822-001	EPA TO-15
	2-Butanone	0.87	0.40	0.80			091822-001	EPA TO-15
	Chloroform	1.1	0.10	0.30	B		091822-001	EPA TO-15
	Chloromethane	0.25	0.20	0.80	J		091822-001	EPA TO-15
	Dichlorodifluoromethane	1.1	0.15	0.40			091822-001	EPA TO-15
	Tetrachloroethene	2.2	0.20	0.40			091822-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	860	9.4	19			091822-001	EPA TO-15
	Trichloroethene	100	1.8	3.7			091822-001	EPA TO-15
	Trichlorofluoromethane	2.1	0.15	0.40			091822-001	EPA TO-15
	Total VOCs	975.92	NA	NA	NA	NA	091822-001	EPA TO-15
TAV-SV03-200	Acetone	4.6	3.5	9.4	J		091823-001	EPA TO-15
24-Feb-12	Benzene	5.2	1.8	3.5			091823-001	EPA TO-15
	Chloroform	3.7	1.2	3.5	B		091823-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	780	6.0	12			091823-001	EPA TO-15
	Trichloroethene	320	2.3	4.7			091823-001	EPA TO-15
	Trichlorofluoromethane	1.8	1.8	4.7	J		091823-001	EPA TO-15
	Total VOCs	1115.30	NA	NA	NA	NA	091823-001	EPA TO-15
TAV-SV03-250	Benzene	41	2.6	5.2			091824-001	EPA TO-15
24-Feb-12	Chloroform	5.9	1.7	5.2			091824-001	EPA TO-15
	Toluene	6.2	3.4	6.9	J		091824-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	730	3.4	6.9			091824-001	EPA TO-15
	Trichloroethene	790	3.4	6.9			091824-001	EPA TO-15
	Total VOCs	1573.10	NA	NA	NA	NA	091824-001	EPA TO-15
TAV-SV03-300	Benzene	26	8.9	18			091825-001	EPA TO-15
24-Feb-12	Chloroform	6.5	5.9	18	B, J		091825-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	430	12	24			091825-001	EPA TO-15
	Trichloroethene	1900	12	24			091825-001	EPA TO-15
	Total VOCs	2362.50	NA	NA	NA	NA	091825-001	EPA TO-15
TAV-SV03-350	Benzene	33	12	23			091826-001	EPA TO-15
24-Feb-12	1,1,2-Trichloro-1,2,2-trifluoroethane	380	16	31			091826-001	EPA TO-15
	Trichloroethene	2400	16	31			091826-001	EPA TO-15
	Total VOCs	2813.00	NA	NA	NA	NA	091826-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds,
Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-400	Acetone	6.6	2.4	6.5			091827-001	EPA TO-15
24-Feb-12	Benzene	2.6	1.2	2.4			091827-001	EPA TO-15
	Chloroform	1.1	0.81	2.4	J		091827-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	58	1.6	3.2			091827-001	EPA TO-15
	Trichloroethene	430	1.6	3.2			091827-001	EPA TO-15
	Total VOCs	498.30	NA	NA	NA	NA	091827-001	EPA TO-15
TAV-SV03-450	Acetone	27	11	28	J		091828-001	EPA TO-15
24-Feb-12	Benzene	8.2	5.3	11	J		091828-001	EPA TO-15
	Chloroform	3.8	3.6	11	B, J		091828-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	270	7.1	14			091828-001	EPA TO-15
	Trichloroethene	1200	7.1	14			091828-001	EPA TO-15
	Total VOCs	1509.00	NA	NA	NA	NA	091828-001	EPA TO-15
TAV-SV03-450 (Duplicate)	Chloroform	3.2	2.8	8.4	B, J		091829-001	EPA TO-15
24-Feb-12	1,1,2-Trichloro-1,2,2-trifluoroethane	200	5.6	11			091829-001	EPA TO-15
	Trichloroethene	940	5.6	11			091829-001	EPA TO-15
	Total VOCs	1143.20	NA	NA	NA	NA	091829-001	EPA TO-15
TAV-SV03-500	Acetone	13	1.7	4.7			091830-001	EPA TO-15
24-Feb-12	Benzene	1.9	0.87	1.7			091830-001	EPA TO-15
	Carbon disulfide	2.3	1.2	4.7	J		091830-001	EPA TO-15
	Chloroform	0.62	0.58	1.7	J		091830-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	110	1.2	2.3			091830-001	EPA TO-15
	Trichloroethene	280	1.2	2.3			091830-001	EPA TO-15
	Total VOCs	407.82	NA	NA	NA	NA	091830-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-50	Acetone	4.5	0.30	0.80		U	092409-001	EPA TO-15
24-May-12	2-Butanone	0.74	0.40	0.80	J		092409-001	EPA TO-15
	Carbon disulfide	2.1	0.20	0.80			092409-001	EPA TO-15
	Dichlorodifluoromethane	0.52	0.15	0.40			092409-001	EPA TO-15
	cis-1,2-Dichloroethene	0.22	0.20	0.40	J		092409-001	EPA TO-15
	Tetrachloroethene	0.51	0.20	0.40			092409-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.99	0.20	0.40			092409-001	EPA TO-15
	Trichloroethene	3.0	0.20	0.40			092409-001	EPA TO-15
	Trichlorofluoromethane	0.25	0.15	0.40	J		092409-001	EPA TO-15
	Total VOCs	8.33	NA	NA	NA	NA	092409-001	EPA TO-15
TAV-SV01-100	Acetone	11	0.30	0.80			092410-001	EPA TO-15
24-May-12	Bromodichloromethane	0.37	0.15	0.30			092410-001	EPA TO-15
	2-Butanone	1.6	0.40	0.80			092410-001	EPA TO-15
	Carbon disulfide	0.51	0.20	0.80	J		092410-001	EPA TO-15
	Carbon tetrachloride	0.36	0.25	0.80	J*		092410-001	EPA TO-15
	Chloroform	0.85	0.10	0.30			092410-001	EPA TO-15
	Dibromochloromethane	0.28	0.10	0.40	J		092410-001	EPA TO-15
	Dichlorodifluoromethane	0.48	0.15	0.40			092410-001	EPA TO-15
	Tetrachloroethene	0.85	0.20	0.40			092410-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.8	0.20	0.40			092410-001	EPA TO-15
	Trichloroethene	7.0	0.20	0.40			092410-001	EPA TO-15
	Trichlorofluoromethane	0.26	0.15	0.40	J		092410-001	EPA TO-15
	Total VOCs	25.36	NA	NA	NA	NA	092410-001	EPA TO-15
TAV-SV01-150	Acetone	2.4	0.30	0.80		U	092411-001	EPA TO-15
24-May-12	Benzene	0.30	0.15	0.30			092411-001	EPA TO-15
	Bromodichloromethane	3.4	0.15	0.30			092411-001	EPA TO-15
	Carbon tetrachloride	0.73	0.25	0.80	J*		092411-001	EPA TO-15
	Chloroform	6.7	0.10	0.30			092411-001	EPA TO-15
	Dibromochloromethane	1.5	0.10	0.40			092411-001	EPA TO-15
	Dichlorodifluoromethane	0.39	0.15	0.40	J		092411-001	EPA TO-15
	1,1-Dichloroethane	0.43	0.15	0.30			092411-001	EPA TO-15
	Tetrachloroethene	1.0	0.20	0.40			092411-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.4	0.20	0.40			092411-001	EPA TO-15
	Trichloroethene	25	0.20	0.40			092411-001	EPA TO-15
	Trichlorofluoromethane	0.26	0.15	0.40	J		092411-001	EPA TO-15
	Total VOCs	43.11	NA	NA	NA	NA	092411-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-200 24-May-12	Acetone	11	0.30	0.80			092412-001	EPA TO-15
	Benzene	0.64	0.15	0.30			092412-001	EPA TO-15
	Bromodichloromethane	4.3	0.15	0.30			092412-001	EPA TO-15
	Bromoform	0.44	0.20	0.40			092412-001	EPA TO-15
	2-Butanone	2.9	0.40	0.80			092412-001	EPA TO-15
	Carbon disulfide	0.32	0.20	0.80	J		092412-001	EPA TO-15
	Carbon tetrachloride	1.5	0.25	0.80	*		092412-001	EPA TO-15
	Chloroform	7.9	0.10	0.30			092412-001	EPA TO-15
	Dibromochloromethane	3.4	0.10	0.40			092412-001	EPA TO-15
	Dichlorodifluoromethane	0.32	0.15	0.40	J		092412-001	EPA TO-15
	1,1-Dichloroethane	1.7	0.15	0.30			092412-001	EPA TO-15
	1,1-Dichloroethene	1.1	0.20	0.80			092412-001	EPA TO-15
	cis-1,2-Dichloroethene	0.92	0.20	0.40			092412-001	EPA TO-15
	2-Hexanone	0.60	0.25	0.40			092412-001	EPA TO-15
	Methylene chloride	0.28	0.20	0.40	J		092412-001	EPA TO-15
	Tetrachloroethene	1.1	0.20	0.40			092412-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	4.7	0.20	0.40			092412-001	EPA TO-15
	Trichloroethene	56	0.20	0.40			092412-001	EPA TO-15
	Trichlorofluoromethane	0.26	0.15	0.40	J		092412-001	EPA TO-15
	Total VOCs	99.38	NA	NA	NA	NA	092412-001	EPA TO-15
TAV-SV01-200 (Duplicate) 24-May-12	Acetone	1.3	0.30	0.80		U	092413-001	EPA TO-15
	Benzene	0.67	0.15	0.30			092413-001	EPA TO-15
	Bromodichloromethane	4.4	0.15	0.30			092413-001	EPA TO-15
	Bromoform	0.43	0.20	0.40			092413-001	EPA TO-15
	Carbon disulfide	1.9	0.20	0.80			092413-001	EPA TO-15
	Carbon tetrachloride	1.6	0.25	0.80	*		092413-001	EPA TO-15
	Chloroform	8.1	0.10	0.30			092413-001	EPA TO-15
	Dibromochloromethane	3.5	0.10	0.40			092413-001	EPA TO-15
	Dichlorodifluoromethane	0.34	0.15	0.40	J		092413-001	EPA TO-15
	1,1-Dichloroethane	1.7	0.15	0.30			092413-001	EPA TO-15
	1,1-Dichloroethene	1.2	0.20	0.80			092413-001	EPA TO-15
	cis-1,2-Dichloroethene	0.96	0.20	0.40			092413-001	EPA TO-15
	Methylene chloride	0.29	0.20	0.40	J		092413-001	EPA TO-15
	Tetrachloroethene	1.2	0.20	0.40			092413-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	0.20	0.40			092413-001	EPA TO-15
	Trichloroethene	59	0.20	0.40			092413-001	EPA TO-15
	Total VOCs	90.29	NA	NA	NA	NA	092413-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-250	Acetone	3.3	0.30	0.80		U	092414-001	EPA TO-15
24-May-12	Benzene	0.82	0.15	0.30			092414-001	EPA TO-15
	Bromodichloromethane	4.8	0.15	0.30			092414-001	EPA TO-15
	Bromoform	0.59	0.20	0.40			092414-001	EPA TO-15
	2-Butanone	0.53	0.40	0.80	J		092414-001	EPA TO-15
	Carbon disulfide	0.75	0.20	0.80	J		092414-001	EPA TO-15
	Carbon tetrachloride	2.2	0.25	0.80	*		092414-001	EPA TO-15
	Chloroform	9.1	0.10	0.30			092414-001	EPA TO-15
	Dibromochloromethane	4.0	0.10	0.40			092414-001	EPA TO-15
	Dichlorodifluoromethane	0.25	0.15	0.40	J		092414-001	EPA TO-15
	1,1-Dichloroethane	2.3	0.15	0.30			092414-001	EPA TO-15
	1,1-Dichloroethene	1.7	0.20	0.80			092414-001	EPA TO-15
	cis-1,2-Dichloroethene	2.3	0.20	0.40			092414-001	EPA TO-15
	Methylene chloride	0.63	0.20	0.40			092414-001	EPA TO-15
	Tetrachloroethene	1.5	0.20	0.40			092414-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	4.6	0.20	0.40			092414-001	EPA TO-15
	Trichloroethene	88	1.2	2.4			092414-001	EPA TO-15
	Total VOCs	124.07	NA	NA	NA	NA	092414-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-300	Acetone	19	0.30	0.80			092415-001	EPA TO-15
24-May-12	Benzene	0.72	0.15	0.30			092415-001	EPA TO-15
	Bromodichloromethane	4.7	0.15	0.30			092415-001	EPA TO-15
	Bromoform	0.92	0.20	0.40			092415-001	EPA TO-15
	2-Butanone	7.0	0.40	0.80			092415-001	EPA TO-15
	Carbon disulfide	24	0.20	0.80			092415-001	EPA TO-15
	Carbon tetrachloride	2.8	0.25	0.80	*		092415-001	EPA TO-15
	Chloroform	10	0.10	0.30			092415-001	EPA TO-15
	Chloromethane	0.45	0.20	0.80	J		092415-001	EPA TO-15
	Dibromochloromethane	3.9	0.10	0.40			092415-001	EPA TO-15
	Dichlorodifluoromethane	0.23	0.15	0.40	J		092415-001	EPA TO-15
	1,1-Dichloroethane	1.9	0.15	0.30			092415-001	EPA TO-15
	1,1-Dichloroethene	2.1	0.20	0.80			092415-001	EPA TO-15
	cis-1,2-Dichloroethene	3.5	0.20	0.40			092415-001	EPA TO-15
	Methylene chloride	0.93	0.20	0.40			092415-001	EPA TO-15
	4-Methyl-2-pentanone	0.26	0.20	0.40	J		092415-001	EPA TO-15
	Tetrachloroethene	1.7	0.20	0.40			092415-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.4	0.20	0.40			092415-001	EPA TO-15
	Trichloroethene	88	1.1	2.1			092415-001	EPA TO-15
	Total VOCs	174.51	NA	NA	NA	NA	092415-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-350	Acetone	13	0.30	0.80			092416-001	EPA TO-15
24-May-12	Benzene	0.50	0.15	0.30			092416-001	EPA TO-15
	Bromodichloromethane	3.8	0.15	0.30			092416-001	EPA TO-15
	Bromoform	0.84	0.20	0.40			092416-001	EPA TO-15
	2-Butanone	1.1	0.40	0.80			092416-001	EPA TO-15
	Carbon disulfide	3.0	0.20	0.80			092416-001	EPA TO-15
	Carbon tetrachloride	1.5	0.25	0.80	*		092416-001	EPA TO-15
	Chloroform	7.4	0.10	0.30			092416-001	EPA TO-15
	Chloromethane	0.40	0.20	0.80	J		092416-001	EPA TO-15
	Dibromochloromethane	3.5	0.10	0.40			092416-001	EPA TO-15
	Dichlorodifluoromethane	0.41	0.15	0.40			092416-001	EPA TO-15
	1,1-Dichloroethane	0.57	0.15	0.30			092416-001	EPA TO-15
	1,1-Dichloroethene	0.92	0.20	0.80			092416-001	EPA TO-15
	cis-1,2-Dichloroethene	4.4	0.20	0.40			092416-001	EPA TO-15
	Methylene chloride	3.9	0.20	0.40			092416-001	EPA TO-15
	Tetrachloroethene	1.0	0.20	0.40			092416-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.4	0.20	0.40			092416-001	EPA TO-15
	Trichloroethene	53	0.20	0.40			092416-001	EPA TO-15
	Total VOCs	100.64	NA	NA	NA	NA	092416-001	EPA TO-15
TAV-SV01-400	Acetone	28	3.5	9.3			092417-001	EPA TO-15
24-May-12	Bromodichloromethane	3.6	1.7	3.5			092417-001	EPA TO-15
	2-Butanone	7.5	4.6	9.3	J		092417-001	EPA TO-15
	Chloroform	8.4	1.2	3.5			092417-001	EPA TO-15
	Dibromochloromethane	3.2	1.2	4.6	J		092417-001	EPA TO-15
	1,1-Dichloroethane	2.4	1.7	3.5	J		092417-001	EPA TO-15
	cis-1,2-Dichloroethene	54	2.3	4.6			092417-001	EPA TO-15
	Tetrachloroethene	4.7	2.3	4.6			092417-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.3	2.3	4.6	J		092417-001	EPA TO-15
	Trichloroethene	380	2.6	4.6			092417-001	EPA TO-15
	Total VOCs	495.10	NA	NA	NA	NA	092417-001	EPA TO-15
TAV-SV01-450	Acetone	29	10	28			092418-001	EPA TO-15
24-May-12	Chloroform	6.8	3.5	10	J		092418-001	EPA TO-15
	cis-1,2-Dichloroethene	190	6.9	14			092418-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	10	6.9	14	J		092418-001	EPA TO-15
	Trichloroethene	1000	6.9	14			092418-001	EPA TO-15
	Total VOCs	1235.80	NA	NA	NA	NA	092418-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-500	Acetone	11	4.1	11			092419-001	EPA TO-15
24-May-12	Chloroform	4.0	1.4	4.1	J		092419-001	EPA TO-15
	cis-1,2-Dichloroethene	43	2.7	5.4			092419-001	EPA TO-15
	Tetrachloroethene	3.0	2.7	5.7	J		092419-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	9.0	2.7	5.7			092419-001	EPA TO-15
	Trichloroethene	680	2.7	5.7			092419-001	EPA TO-15
	Total VOCs	750.00	NA	NA	NA	NA	092419-001	EPA TO-15
TAV-SV02-050	Acetone	9.8	0.30	0.80			092421-001	EPA TO-15
24-May-12	Benzene	0.19	0.15	0.30	J		092421-001	EPA TO-15
	Bromodichloromethane	14	0.15	0.30			092421-001	EPA TO-15
	2-Butanone	2.1	0.40	0.80			092421-001	EPA TO-15
	Carbon disulfide	2.7	0.20	0.80			092421-001	EPA TO-15
	Chloroform	11	0.10	0.30			092421-001	EPA TO-15
	Chloromethane	0.70	0.20	0.80	J		092421-001	EPA TO-15
	Dibromochloromethane	1.3	0.10	0.40			092421-001	EPA TO-15
	Dichlorodifluoromethane	0.59	0.15	0.40			092421-001	EPA TO-15
	Methylene chloride	0.67	0.20	0.40			092421-001	EPA TO-15
	Tetrachloroethene	1.1	0.20	0.40			092421-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	69	0.54	1.1			092421-001	EPA TO-15
	Trichloroethene	13	0.20	0.40			092421-001	EPA TO-15
	Total VOCs	126.15	NA	NA	NA	NA	092421-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-100	Acetone	5.8	0.30	0.80			092422-001	EPA TO-15
24-May-12	Benzene	0.22	0.15	0.30	J		092422-001	EPA TO-15
	Bromodichloromethane	43	0.15	0.30			092422-001	EPA TO-15
	Bromoform	0.38	0.20	0.40	J		092422-001	EPA TO-15
	2-Butanone	0.61	0.40	0.80	J		092422-001	EPA TO-15
	Carbon disulfide	0.33	0.20	0.80	J		092422-001	EPA TO-15
	Carbon tetrachloride	0.62	0.25	0.80	J*		092422-001	EPA TO-15
	Chloroform	44	0.10	0.30			092422-001	EPA TO-15
	Dibromochloromethane	8.3	0.10	0.40			092422-001	EPA TO-15
	Dichlorodifluoromethane	0.65	0.15	0.40			092422-001	EPA TO-15
	1,1-Dichloroethane	0.22	0.15	0.30	J		092422-001	EPA TO-15
	Methylene chloride	2.2	0.20	0.40			092422-001	EPA TO-15
	Tetrachloroethene	4.1	0.20	0.40			092422-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	350	2.2	4.4			092422-001	EPA TO-15
	Trichloroethene	46	0.20	0.40			092422-001	EPA TO-15
	Total VOCs	506.43	NA	NA	NA	NA	092422-001	EPA TO-15
TAV-SV02-150	Acetone	11	0.30	0.80			092423-001	EPA TO-15
24-May-12	Benzene	0.36	0.15	0.30			092423-001	EPA TO-15
	Bromodichloromethane	43	0.15	0.30			092423-001	EPA TO-15
	Bromoform	0.97	0.20	0.40			092423-001	EPA TO-15
	2-Butanone	1.2	0.40	0.80			092423-001	EPA TO-15
	Carbon disulfide	0.88	0.25	0.80			092423-001	EPA TO-15
	Carbon tetrachloride	0.69	0.10	0.80	J*		092423-001	EPA TO-15
	Chloroform	47	0.20	0.30			092423-001	EPA TO-15
	Chloromethane	0.49	0.10	0.80	J		092423-001	EPA TO-15
	Dibromochloromethane	12	0.15	0.40			092423-001	EPA TO-15
	Dichlorodifluoromethane	0.73	0.15	0.40			092423-001	EPA TO-15
	1,2-Dichlorobenzene	0.95	0.15	0.40			092423-001	EPA TO-15
	1,1-Dichloroethane	0.17	0.20	0.30	J		092423-001	EPA TO-15
	Methylene chloride	1.2	0.20	0.40			092423-001	EPA TO-15
	Tetrachloroethene	4.7	0.20	0.40			092423-001	EPA TO-15
	Toluene	0.21	0.20	0.40	J		092423-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	410	2.2	4.4			092423-001	EPA TO-15
	Trichloroethene	48	0.20	0.40			092423-001	EPA TO-15
	Total VOCs	583.55	NA	NA	NA	NA	092423-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-150 (Duplicate) 24-May-12	Acetone	11	0.30	0.80			092424-001	EPA TO-15
	Benzene	0.20	0.15	0.30	J		092424-001	EPA TO-15
	Bromodichloromethane	40	0.15	0.30			092424-001	EPA TO-15
	Bromoform	0.90	0.20	0.40			092424-001	EPA TO-15
	2-Butanone	1.3	0.40	0.80			092424-001	EPA TO-15
	Carbon disulfide	0.58	0.20	0.80	J		092424-001	EPA TO-15
	Carbon tetrachloride	0.64	0.25	0.80	J*		092424-001	EPA TO-15
	Chloroform	44	0.10	0.30			092424-001	EPA TO-15
	Dibromochloromethane	12	0.10	0.40			092424-001	EPA TO-15
	Dichlorodifluoromethane	0.72	0.15	0.40			092424-001	EPA TO-15
	1,2-Dichlorobenzene	0.95	0.15	0.40			092424-001	EPA TO-15
	1,1-Dichloroethane	0.17	0.15	0.30	J		092424-001	EPA TO-15
	2-Hexanone	0.28	0.25	0.40	J		092424-001	EPA TO-15
	Methylene chloride	1.1	0.20	0.40			092424-001	EPA TO-15
	Tetrachloroethene	4.5	0.20	0.40			092424-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	420	2.2	4.4			092424-001	EPA TO-15
	Trichloroethene	45	0.20	0.40			092424-001	EPA TO-15
	Total VOCs	583.34	NA	NA	NA	NA	092424-001	EPA TO-15
TAV-SV02-200 24-May-12	Acetone	6.3	2.2	5.8		J	092425-001	EPA TO-15
	Bromodichloromethane	21	1.1	2.2			092425-001	EPA TO-15
	Chloroform	28	0.72	2.2			092425-001	EPA TO-15
	Dibromochloromethane	11	0.72	2.9			092425-001	EPA TO-15
	1,1-Dichloroethane	2.7	1.1	2.2			092425-001	EPA TO-15
	cis-1,2-Dichloroethene	3.6	1.4	2.9			092425-001	EPA TO-15
	Tetrachloroethene	5.0	1.4	2.9			092425-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	230	1.4	2.9			092425-001	EPA TO-15
	Trichloroethene	270	1.4	2.9			092425-001	EPA TO-15
	Trichlorofluoromethane	2.4	1.1	2.9	J		092425-001	EPA TO-15
	Total VOCs	580.00	NA	NA	NA	NA	092425-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-250	Bromodichloromethane	8.0	1.4	2.8			092426-001	EPA TO-15
24-May-12	2-Butanone	3.8	3.8	7.6	J		092426-001	EPA TO-15
	Chloroform	16	0.95	2.8			092426-001	EPA TO-15
	Dibromochloromethane	3.0	0.95	3.8	J		092426-001	EPA TO-15
	1,2-Dichlorobenzene	1.8	1.4	3.8	J		092426-001	EPA TO-15
	1,1-Dichloroethane	2.9	1.4	2.8			092426-001	EPA TO-15
	cis-1,2-Dichloroethene	4.0	1.9	3.8			092426-001	EPA TO-15
	Tetrachloroethene	4.7	1.9	3.8			092426-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	210	1.9	3.8			092426-001	EPA TO-15
	Trichloroethene	290	1.9	3.8			092426-001	EPA TO-15
	Trichlorofluoromethane	2.3	1.4	3.8	J		092426-001	EPA TO-15
	Total VOCs	546.50	NA	NA	NA	NA	092426-001	EPA TO-15
TAV-SV02-300	Bromodichloromethane	11	2.1	4.3			092427-001	EPA TO-15
24-May-12	2-Butanone	6.2	5.7	11	J		092427-001	EPA TO-15
	Carbon disulfide	10	2.8	11	J		092427-001	EPA TO-15
	Chloroform	20	1.4	4.3			092427-001	EPA TO-15
	Dibromochloromethane	4.4	1.4	5.7	J		092427-001	EPA TO-15
	1,1-Dichloroethane	3.4	2.1	4.3	J		092427-001	EPA TO-15
	cis-1,2-Dichloroethene	4.8	2.8	5.7	J		092427-001	EPA TO-15
	Tetrachloroethene	4.8	2.8	5.7	J		092427-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	220	2.8	5.7			092427-001	EPA TO-15
	Trichloroethene	310	2.8	5.7			092427-001	EPA TO-15
	Trichlorofluoromethane	2.3	2.1	5.7	J		092427-001	EPA TO-15
	Total VOCs	596.90	NA	NA	NA	NA	092427-001	EPA TO-15
TAV-SV02-350	Bromodichloromethane	13	2.3	4.5			092428-001	EPA TO-15
24-May-12	Carbon disulfide	20	3.0	12			092428-001	EPA TO-15
	Chloroform	16	1.5	4.5			092428-001	EPA TO-15
	Dibromochloromethane	5.2	1.5	6.0	J		092428-001	EPA TO-15
	1,1-Dichloroethane	3.8	2.3	4.5	J		092428-001	EPA TO-15
	cis-1,2-Dichloroethene	4.6	3.0	6.0	J		092428-001	EPA TO-15
	Tetrachloroethene	4.7	3.0	6.0	J		092428-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	240	3.0	6.0			092428-001	EPA TO-15
	Trichloroethene	370	3.0	6.0			092428-001	EPA TO-15
	Total VOCs	677.30	NA	NA	NA	NA	092428-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-400	Bromodichloromethane	8.5	2.9	5.8			092429-001	EPA TO-15
24-May-12	Chloroform	18	1.9	5.8			092429-001	EPA TO-15
	Dibromochloromethane	3.6	1.9	7.7	J		092429-001	EPA TO-15
	1,1-Dichloroethane	4.4	2.9	5.8	J		092429-001	EPA TO-15
	cis-1,2-Dichloroethene	7.3	3.9	7.7	J		092429-001	EPA TO-15
	Tetrachloroethene	5.0	3.9	7.7	J		092429-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	210	3.9	7.7			092429-001	EPA TO-15
	Trichloroethene	430	3.9	7.7			092429-001	EPA TO-15
	Total VOCs	686.80	NA	NA	NA	NA	092429-001	EPA TO-15
TAV-SV02-450	Bromodichloromethane	10	2.1	4.2			092430-001	EPA TO-15
24-May-12	Chloroform	19	1.4	4.2			092430-001	EPA TO-15
	Dibromochloromethane	4.2	1.4	5.6	J		092430-001	EPA TO-15
	1,1-Dichloroethane	2.8	2.1	4.2	J		092430-001	EPA TO-15
	cis-1,2-Dichloroethene	7.6	2.8	5.6			092430-001	EPA TO-15
	Tetrachloroethene	5.1	2.8	5.6	J		092430-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	230	2.8	5.6			092430-001	EPA TO-15
	Trichloroethene	300	2.8	5.6			092430-001	EPA TO-15
	Trichlorofluoromethane	2.5	2.1	5.6	J		092430-001	EPA TO-15
	Total VOCs	581.20	NA	NA	NA	NA	092430-001	EPA TO-15
TAV-SV02-500	Carbon disulfide	40	6.1	25			092431-001	EPA TO-15
24-May-12	Chloroform	9.7	3.1	9.2			092431-001	EPA TO-15
	cis-1,2-Dichloroethene	88	6.1	12			092431-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	150	6.1	12			092431-001	EPA TO-15
	Trichloroethene	800	6.1	12			092431-001	EPA TO-15
	Total VOCs	1087.17	NA	NA	NA	NA	092431-001	EPA TO-15
TAV-SV03-050	Acetone	17	0.30	0.80		J	092433-001	EPA TO-15
24-May-12	2-Butanone	1.7	0.40	0.80			092433-001	EPA TO-15
	Carbon disulfide	1.5	0.20	0.80			092433-001	EPA TO-15
	Chloroform	0.20	0.10	0.30	J		092433-001	EPA TO-15
	Dichlorodifluoromethane	0.69	0.15	0.40			092433-001	EPA TO-15
	Tetrachloroethene	1.5	0.20	0.40			092433-001	EPA TO-15
	Toluene	0.25	0.20	0.40	J	0.4U	092433-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	160	0.98	2.0			092433-001	EPA TO-15
	Trichloroethene	8.6	0.20	0.40			092433-001	EPA TO-15
	Trichlorofluoromethane	0.61	0.15	0.40			092433-001	EPA TO-15
	Total VOCs	191.80	NA	NA	NA	NA	092433-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-100	Acetone	4.4	0.30	0.80		J	092434-001	EPA TO-15
24-May-12	2-Butanone	0.94	0.40	0.80			092434-001	EPA TO-15
	Carbon disulfide	5.5	0.20	0.80			092434-001	EPA TO-15
	Chloroform	0.49	0.10	0.30			092434-001	EPA TO-15
	Chloromethane	1.2	0.20	0.80			092434-001	EPA TO-15
	Dichlorodifluoromethane	0.80	0.15	0.40			092434-001	EPA TO-15
	Tetrachloroethene	2.1	0.20	0.40			092434-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	500	3.9	7.8			092434-001	EPA TO-15
	Trichloroethene	31	0.20	0.40			092434-001	EPA TO-15
	Trichlorofluoromethane	1.3	0.15	0.40			092434-001	EPA TO-15
	Total VOCs	547.73	NA	NA	NA	NA	092434-001	EPA TO-15
TAV-SV03-150	Benzene	4.0	1.0	2.1			092435-001	EPA TO-15
24-May-12	Chloroform	1.4	0.70	2.1	J		092435-001	EPA TO-15
	Dichlorodifluoromethane	1.1	1.0	2.8	J		092435-001	EPA TO-15
	Tetrachloroethene	1.9	1.4	2.8	J		092435-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	630	4.5	8.9			092435-001	EPA TO-15
	Trichloroethene	180	1.4	2.8			092435-001	EPA TO-15
	Trichlorofluoromethane	1.6	1.0	2.8	J		092435-001	EPA TO-15
	Total VOCs	820.00	NA	NA	NA	NA	092435-001	EPA TO-15
TAV-SV03-200	Benzene	9.9	2.6	5.2			092436-001	EPA TO-15
24-May-12	Chloroform	3.7	1.7	5.2	J		092436-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	570	3.5	7.0			092436-001	EPA TO-15
	Trichloroethene	380	3.5	7.0			092436-001	EPA TO-15
	Total VOCs	963.60	NA	NA	NA	NA	092436-001	EPA TO-15
TAV-SV03-250	Benzene	47	3.9	7.7			092437-001	EPA TO-15
24-May-12	Carbon disulfide	15	5.1	21	J		092437-001	EPA TO-15
	Chloroform	5.5	2.6	7.7	J		092437-001	EPA TO-15
	Toluene	6.9	5.1	10	J	10U	092437-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	510	5.1	10			092437-001	EPA TO-15
	Trichloroethene	640	5.1	10			092437-001	EPA TO-15
	Total VOCs	1217.50	NA	NA	NA	NA	092437-001	EPA TO-15
TAV-SV03-300	Benzene	28	10	20			092438-001	EPA TO-15
24-May-12	1,1,2-Trichloro-1,2,2-trifluoroethane	350	13	27			092438-001	EPA TO-15
	Trichloroethene	1400	13	24			092438-001	EPA TO-15
	Total VOCs	1778.00	NA	NA	NA	NA	092438-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Concluded)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-300 (Duplicate)	Benzene	29	9.4	19			092439-001	EPA TO-15
24-May-12	1,1,2-Trichloro-1,2,2-trifluoroethane	380	13	25			092439-001	EPA TO-15
	Trichloroethene	1500	13	25			092439-001	EPA TO-15
	Total VOCs	1909.00	NA	NA	NA	NA	092439-001	EPA TO-15
TAV-SV03-350	Benzene	14	12	23	J		092440-001	EPA TO-15
24-May-12	1,1,2-Trichloro-1,2,2-trifluoroethane	320	15	31			092440-001	EPA TO-15
	Trichloroethene	1800	15	31			092440-001	EPA TO-15
	Total VOCs	2134.00	NA	NA	NA	NA	092440-001	EPA TO-15
TAV-SV03-400	Benzene	8.0	7.8	16	J		092441-001	EPA TO-15
24-May-12	Carbon disulfide	13	10	42	J		092441-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	240	10	21			092441-001	EPA TO-15
	Trichloroethene	1500	10	21			092441-001	EPA TO-15
	Total VOCs	1761.00	NA	NA	NA	NA	092441-001	EPA TO-15
TAV-SV03-450	1,1,2-Trichloro-1,2,2-trifluoroethane	250	9.1	18			092442-001	EPA TO-15
24-May-12	Trichloroethene	940	9.1	18			092442-001	EPA TO-15
	Total VOCs	1190	NA	NA	NA	NA	092442-001	EPA TO-15
TAV-SV03-500	Acetone	6.2	2.7	7.1	J	J	092443-001	EPA TO-15
24-May-12	Benzene	2.9	1.3	2.7			092443-001	EPA TO-15
	Carbon disulfide	14	1.8	7.1			092443-001	EPA TO-15
	Ethylbenzene	1.4	1.3	3.5	J		092443-001	EPA TO-15
	4-Ethyltoluene	2.2	1.8	3.5	J		092443-001	EPA TO-15
	Toluene	5.8	1.8	3.5			092443-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	76	1.8	3.5			092443-001	EPA TO-15
	1,2,4-Trimethylbenzene	4.7	2.2	22	J		092443-001	EPA TO-15
	Trichloroethene	190	1.8	3.5			092443-001	EPA TO-15
	m,p-Xylene	4.8	1.8	7.1	J		092443-001	EPA TO-15
	o-Xylene	2.4	1.8	3.5	J		092443-001	EPA TO-15
	Total Xylenes	7.2	1.8	3.5			092443-001	EPA TO-15
	Total VOCs	317.6	NA	NA	NA	NA	092443-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-50	Acetone	7.9	0.30	0.80			092774-001	EPA TO-15
10-Aug-12	2-Butanone	1.7	0.40	0.80			092774-001	EPA TO-15
	Carbon disulfide	1.4	0.20	0.80			092774-001	EPA TO-15
	Chloromethane	0.29	0.20	0.80	J		092774-001	EPA TO-15
	Dichlorodifluoromethane	0.46	0.15	0.40			092774-001	EPA TO-15
	Tetrachloroethene	0.76	0.20	0.40			092774-001	EPA TO-15
	Toluene	0.24	0.20	0.40	J		092774-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.47	0.20	0.40			092774-001	EPA TO-15
	Trichloroethene	0.67	0.20	0.40		U	092774-001	EPA TO-15
	Trichlorofluoromethane	0.23	0.15	0.40	J		092774-001	EPA TO-15
	Total VOCs	13.45	NA	NA	NA	NA	092774-001	EPA TO-15
TAV-SV01-100	Acetone	18	0.30	0.80			092775-001	EPA TO-15
10-Aug-12	Bromodichloromethane	0.17	0.15	0.30	J		092775-001	EPA TO-15
	2-Butanone	2.6	0.40	0.80			092775-001	EPA TO-15
	Carbon disulfide	1.1	0.20	0.80			092775-001	EPA TO-15
	Chloroform	0.47	0.10	0.30			092775-001	EPA TO-15
	Chloromethane	0.51	0.20	0.80	J		092775-001	EPA TO-15
	Dibromochloromethane	0.15	0.10	0.40	J		092775-001	EPA TO-15
	Dichlorodifluoromethane	0.47	0.15	0.40			092775-001	EPA TO-15
	Tetrachloroethene	1.2	0.20	0.40			092775-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.6	0.20	0.40			092775-001	EPA TO-15
	Trichloroethene	4.4	0.20	0.40			092775-001	EPA TO-15
	Trichlorofluoromethane	0.24	0.15	0.40	J		092775-001	EPA TO-15
	Total VOCs	30.91	NA	NA	NA	NA	092775-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-150	Acetone	5.8	0.30	0.80			092776-001	EPA TO-15
10-Aug-12	Benzene	0.20	0.15	0.30	J		092776-001	EPA TO-15
	Bromodichloromethane	2.1	0.15	0.30			092776-001	EPA TO-15
	2-Butanone	1.3	0.40	0.80			092776-001	EPA TO-15
	Carbon disulfide	6.8	0.20	0.80			092776-001	EPA TO-15
	Carbon tetrachloride	0.48	0.25	0.80	J		092776-001	EPA TO-15
	Chloroform	4.2	0.10	0.30			092776-001	EPA TO-15
	Chloromethane	0.60	0.20	0.80	J		092776-001	EPA TO-15
	Dibromochloromethane	1.1	0.10	0.40			092776-001	EPA TO-15
	Dichlorodifluoromethane	0.42	0.15	0.40			092776-001	EPA TO-15
	1,1-Dichloroethane	0.25	0.15	0.30	J		092776-001	EPA TO-15
	Tetrachloroethene	1.3	0.20	0.40			092776-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.9	0.20	0.40			092776-001	EPA TO-15
	Trichloroethene	20	0.20	0.40			092776-001	EPA TO-15
	Trichlorofluoromethane	0.24	0.15	0.40	J		092776-001	EPA TO-15
	Total VOCs	47.69	NA	NA	NA	NA	092776-001	EPA TO-15
TAV-SV01-200	Acetone	3.4	0.30	0.80			092777-001	EPA TO-15
10-Aug-12	Benzene	0.66	0.15	0.30			092777-001	EPA TO-15
	Bromodichloromethane	4.5	0.15	0.30			092777-001	EPA TO-15
	Bromoform	0.31	0.20	0.40	J		092777-001	EPA TO-15
	2-Butanone	0.46	0.40	0.80	J		092777-001	EPA TO-15
	Carbon disulfide	7.7	0.20	0.80			092777-001	EPA TO-15
	Carbon tetrachloride	1.2	0.25	0.80			092777-001	EPA TO-15
	Chloroform	9.4	0.10	0.30			092777-001	EPA TO-15
	Dibromochloromethane	3.3	0.10	0.40			092777-001	EPA TO-15
	Dichlorodifluoromethane	0.30	0.15	0.40	J		092777-001	EPA TO-15
	1,1-Dichloroethane	1.6	0.15	0.30			092777-001	EPA TO-15
	1,1-Dichloroethene	1.0	0.20	0.80			092777-001	EPA TO-15
	cis-1,2-Dichloroethene	0.85	0.20	0.40			092777-001	EPA TO-15
	Methylene chloride	0.24	0.20	0.40	J		092777-001	EPA TO-15
	Tetrachloroethene	1.3	0.20	0.40			092777-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6	0.20	0.40			092777-001	EPA TO-15
	Trichloroethene	66	0.54	1.1			092777-001	EPA TO-15
	Trichlorofluoromethane	0.27	0.15	0.40	J		092777-001	EPA TO-15
	Total VOCs	168.09	NA	NA	NA	NA	092777-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-250	Acetone	15	0.30	0.80			092778-001	EPA TO-15
10-Aug-12	Benzene	0.81	0.15	0.30			092778-001	EPA TO-15
	Bromodichloromethane	4.2	0.15	0.30			092778-001	EPA TO-15
	Bromoform	0.45	0.20	0.40			092778-001	EPA TO-15
	2-Butanone	2.8	0.40	0.80			092778-001	EPA TO-15
	Carbon disulfide	0.74	0.20	0.80	J		092778-001	EPA TO-15
	Carbon tetrachloride	1.8	0.25	0.80			092778-001	EPA TO-15
	Chloroform	9.3	0.10	0.30			092778-001	EPA TO-15
	Dibromochloromethane	3.7	0.10	0.40			092778-001	EPA TO-15
	Dichlorodifluoromethane	0.22	0.15	0.40	J		092778-001	EPA TO-15
	1,1-Dichloroethane	2.2	0.15	0.30			092778-001	EPA TO-15
	1,1-Dichloroethene	1.7	0.20	0.80			092778-001	EPA TO-15
	cis-1,2-Dichloroethene	2.4	0.20	0.40			092778-001	EPA TO-15
	2-Hexanone	0.63	0.25	0.40			092778-001	EPA TO-15
	Methylene chloride	0.53	0.20	0.40			092778-001	EPA TO-15
	Tetrachloroethene	1.6	0.20	0.40			092778-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.1	0.20	0.40			092778-001	EPA TO-15
	Trichloroethene	100	1.1	2.1			092778-001	EPA TO-15
	Trichlorofluoromethane	0.22	0.15	0.40	J		092778-001	EPA TO-15
	Total VOCs	153.40	NA	NA	NA	NA	092778-001	EPA TO-15
TAV-SV01-300	Acetone	13	1.6	4.2	B		092779-001	EPA TO-15
10-Aug-12	Bromodichloromethane	3.8	0.80	1.6			092779-001	EPA TO-15
	Carbon tetrachloride	2.0	1.3	4.2	J		092779-001	EPA TO-15
	Chloroform	9.3	0.53	1.6			092779-001	EPA TO-15
	Dibromochloromethane	2.9	0.53	2.1			092779-001	EPA TO-15
	1,1-Dichloroethane	1.8	0.80	1.6			092779-001	EPA TO-15
	1,1-Dichloroethene	1.7	1.1	4.2	J		092779-001	EPA TO-15
	cis-1,2-Dichloroethene	2.7	1.1	2.1			092779-001	EPA TO-15
	Tetrachloroethene	1.5	1.1	2.1	J		092779-001	EPA TO-15
	Trichloroethene	100	1.1	2.1			092779-001	EPA TO-15
	Total VOCs	138.7	NA	NA	NA	NA	092779-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-350	Acetone	4.0	0.30	0.80			092780-001	EPA TO-15
10-Aug-12	Benzene	0.61	0.15	0.30			092780-001	EPA TO-15
	Bromodichloromethane	4.6	0.15	0.30			092780-001	EPA TO-15
	Bromoform	0.72	0.20	0.40			092780-001	EPA TO-15
	2-Butanone	0.56	0.40	0.80	J		092780-001	EPA TO-15
	Carbon disulfide	16	0.20	0.80			092780-001	EPA TO-15
	Carbon tetrachloride	1.9	0.25	0.80			092780-001	EPA TO-15
	Chloroform	9.5	0.10	0.30			092780-001	EPA TO-15
	Chloromethane	0.31	0.20	0.80	J		092780-001	EPA TO-15
	Dibromochloromethane	4.1	0.10	0.40			092780-001	EPA TO-15
	Dichlorodifluoromethane	0.17	0.15	0.40	J		092780-001	EPA TO-15
	1,1-Dichloroethane	0.92	0.15	0.30			092780-001	EPA TO-15
	1,1-Dichloroethene	1.4	0.20	0.80			092780-001	EPA TO-15
	cis-1,2-Dichloroethene	5.3	0.20	0.40			092780-001	EPA TO-15
	Methylene chloride	0.99	0.20	0.40			092780-001	EPA TO-15
	Tetrachloroethene	1.7	0.20	0.40			092780-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.4	0.20	0.40			092780-001	EPA TO-15
	Trichloroethene	88	1.1	2.1			092780-001	EPA TO-15
	Trichlorofluoromethane	0.15	0.15	0.40	J		092780-001	EPA TO-15
	Total VOCs	143.33	NA	NA	NA	NA	092780-001	EPA TO-15
TAV-SV01-400	Bromodichloromethane	3.3	2.0	4.0	J		092781-001	EPA TO-15
10-Aug-12	Chloroform	8.4	1.3	4.0			092781-001	EPA TO-15
	Dibromochloromethane	2.8	1.3	5.3	J		092781-001	EPA TO-15
	cis-1,2-Dichloroethene	41	2.6	5.3			092781-001	EPA TO-15
	Tetrachloroethene	3.7	2.6	5.3	J		092781-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.0	2.6	5.3	J		092781-001	EPA TO-15
	Trichloroethene	350	2.6	5.3			092781-001	EPA TO-15
	Total VOCs	412.20	NA	NA	NA	NA	092781-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-450	Acetone	20	14	37	J		092782-001	EPA TO-15
10-Aug-12	Chloroform	5.7	4.6	14	J		092782-001	EPA TO-15
	cis-1,2-Dichloroethene	170	9.2	18			092782-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	15	9.2	18	J		092782-001	EPA TO-15
	Trichloroethene	1100	9.2	18			092782-001	EPA TO-15
	Total VOCs	1310.70	NA	NA	NA	NA	092782-001	EPA TO-15
TAV-SV01-500	cis-1,2-Dichloroethene	50	9.2	18			092783-001	EPA TO-15
10-Aug-12	1,1,2-Trichloro-1,2,2-trifluoroethane	12	9.2	18	J		092783-001	EPA TO-15
	Trichloroethene	920	9.2	18			092783-001	EPA TO-15
	Total VOCs	982.00	NA	NA	NA	NA	092783-001	EPA TO-15
TAV-SV01-500 (Duplicate)	cis-1,2-Dichloroethene	51	10	20			092784-001	EPA TO-15
10-Aug-12	1,1,2-Trichloro-1,2,2-trifluoroethane	12	10	20	J		092784-001	EPA TO-15
	Trichloroethene	940	10	20			092784-001	EPA TO-15
	Total VOCs	1003.00	NA	NA	NA	NA	092784-001	EPA TO-15
TAV-SV02-050	Bromodichloromethane	6.9	0.15	0.30			092762-001	EPA TO-15
13-Aug-12	2-Butanone	2.0	0.40	0.80			092762-001	EPA TO-15
	Carbon disulfide	0.24	0.20	0.80	J		092762-001	EPA TO-15
	Chloroform	4.9	0.10	0.30			092762-001	EPA TO-15
	Dibromochloromethane	0.53	0.10	0.40			092762-001	EPA TO-15
	Dichlorodifluoromethane	0.47	0.15	0.40			092762-001	EPA TO-15
	2-Hexanone	0.42	0.25	0.40			092762-001	EPA TO-15
	Methylene chloride	0.30	0.20	0.40	J		092762-001	EPA TO-15
	Tetrachloroethene	0.76	0.20	0.40			092762-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	39	0.20	0.40			092762-001	EPA TO-15
	Trichloroethene	8.6	0.20	0.40			092762-001	EPA TO-15
	Trichlorofluoromethane	0.93	0.15	0.40			092762-001	EPA TO-15
	Total VOCs	65.05	NA	NA	NA	NA	092762-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-100	Bromodichloromethane	35	0.30	0.60			092763-001	EPA TO-15
13-Aug-12	2-Butanone	0.89	0.80	1.6	J		092763-001	EPA TO-15
	Carbon disulfide	1.4	0.40	1.6	J		092763-001	EPA TO-15
	Chloroform	36	0.20	0.60			092763-001	EPA TO-15
	Dibromochloromethane	4.7	0.20	0.80			092763-001	EPA TO-15
	Dichlorodifluoromethane	0.54	0.30	0.80	J		092763-001	EPA TO-15
	Methylene chloride	1.8	0.40	0.80			092763-001	EPA TO-15
	Tetrachloroethene	3.5	0.40	0.80			092763-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	270	4.4	8.8			092763-001	EPA TO-15
	Trichloroethene	39	0.40	0.80			092763-001	EPA TO-15
	Trichlorofluoromethane	4.1	0.30	0.80			092763-001	EPA TO-15
	Total VOCs	396.93	NA	NA	NA	NA	092763-001	EPA TO-15
TAV-SV02-150	Acetone	7.8	6.4	17	B, J	17U	092764-001	EPA TO-15
13-Aug-12	Bromodichloromethane	29	3.2	6.4			092764-001	EPA TO-15
	Chloroform	41	2.1	6.4			092764-001	EPA TO-15
	Dibromochloromethane	7.9	2.1	8.6	J		092764-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	450	4.3	8.6			092764-001	EPA TO-15
	Trichloroethene	44	4.3	8.6			092764-001	EPA TO-15
	Trichlorofluoromethane	3.7	3.2	8.6	J		092764-001	EPA TO-15
	Total VOCs	575.60	NA	NA	NA	NA	092764-001	EPA TO-15
TAV-SV02-200	Acetone	23	3.5	9.2			092765-001	EPA TO-15
13-Aug-12	Bromodichloromethane	29	1.7	3.5			092765-001	EPA TO-15
	Chloroform	33	1.2	3.5			092765-001	EPA TO-15
	Dibromochloromethane	12	1.2	4.6			092765-001	EPA TO-15
	1,1-Dichloroethane	1.9	1.7	3.5	J		092765-001	EPA TO-15
	Tetrachloroethene	4.6	2.3	4.6			092765-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	290	2.3	4.6			092765-001	EPA TO-15
	Trichloroethene	270	2.3	4.6			092765-001	EPA TO-15
	Trichlorofluoromethane	3.0	1.7	4.6	J		092765-001	EPA TO-15
	Total VOCs	666.50	NA	NA	NA	NA	092765-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-250	Acetone	29	3.8	10			092766-001	EPA TO-15
13-Aug-12	Bromodichloromethane	9.4	1.9	3.8			092766-001	EPA TO-15
	Chloroform	17	1.3	3.8			092766-001	EPA TO-15
	Dibromochloromethane	3.1	1.3	5.1	J		092766-001	EPA TO-15
	Tetrachloroethene	4.4	2.6	5.1	J		092766-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	220	2.6	5.1			092766-001	EPA TO-15
	Trichloroethene	350	2.6	5.1			092766-001	EPA TO-15
	Trichlorofluoromethane	2.8	1.9	5.1	J		092766-001	EPA TO-15
	Total VOCs	635.70	NA	NA	NA	NA	092766-001	EPA TO-15
TAV-SV02-250 (Duplicate)	Acetone	5.3	3.9	10	J		092767-001	EPA TO-15
13-Aug-12	Bromodichloromethane	9.7	2.0	3.9			092767-001	EPA TO-15
	Chloroform	17	1.3	3.9			092767-001	EPA TO-15
	Dibromochloromethane	3.1	1.3	5.2	J		092767-001	EPA TO-15
	Tetrachloroethene	4.8	2.6	5.2	J		092767-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	220	2.6	5.2			092767-001	EPA TO-15
	Trichloroethene	350	2.6	5.2			092767-001	EPA TO-15
	Trichlorofluoromethane	2.8	2.0	5.2	J		092767-001	EPA TO-15
	Total VOCs	612.70	NA	NA	NA	NA	092767-001	EPA TO-15
TAV-SV02-300	Bromodichloromethane	21	3.0	5.9			092768-001	EPA TO-15
13-Aug-12	Chloroform	32	2.0	5.9			092768-001	EPA TO-15
	Dibromochloromethane	7.3	2.0	7.9	J		092768-001	EPA TO-15
	cis-1,2-Dichloroethene	4.8	3.9	7.9	J		092768-001	EPA TO-15
	Tetrachloroethene	6.6	3.9	7.9	J		092768-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	350	3.9	7.9			092768-001	EPA TO-15
	Trichloroethene	490	3.9	7.9			092768-001	EPA TO-15
	Trichlorofluoromethane	4.0	3.0	7.9	J		092768-001	EPA TO-15
	Total VOCs	915.70	NA	NA	NA	NA	092768-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-350	Acetone	14	5.3	14	B	U	092769-001	EPA TO-15
13-Aug-12	Bromodichloromethane	15	2.6	5.3			092769-001	EPA TO-15
	Chloroform	24	1.8	5.3			092769-001	EPA TO-15
	Dibromochloromethane	6.0	1.8	7.0	J		092769-001	EPA TO-15
	1,1-Dichloroethane	3.4	2.6	5.3	J		092769-001	EPA TO-15
	cis-1,2-Dichloroethene	3.8	3.5	7.0	J		092769-001	EPA TO-15
	Tetrachloroethene	4.6	3.5	7.0	J		092769-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	250	3.5	7.0			092769-001	EPA TO-15
	Trichloroethene	340	3.5	7.0			092769-001	EPA TO-15
	Trichlorofluoromethane	2.7	2.6	7.0	J		092769-001	EPA TO-15
	Total VOCs	649.50	NA	NA	NA	NA	092769-001	EPA TO-15
TAV-SV02-400	Acetone	9.4	6.4	17	B, J	17U	092770-001	EPA TO-15
13-Aug-12	Bromodichloromethane	7.6	3.2	6.4			092770-001	EPA TO-15
	Chloroform	18	2.1	6.4			092770-001	EPA TO-15
	Dibromochloromethane	3.2	2.1	8.5	J		092770-001	EPA TO-15
	1,1-Dichloroethane	4.8	3.2	6.4	J		092770-001	EPA TO-15
	cis-1,2-Dichloroethene	8.1	4.2	8.5	J		092770-001	EPA TO-15
	Tetrachloroethene	5.3	4.2	8.5	J		092770-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	210	4.2	8.5			092770-001	EPA TO-15
	Trichloroethene	510	4.2	8.5			092770-001	EPA TO-15
	Total VOCs	767.00	NA	NA	NA	NA	092770-001	EPA TO-15
TAV-SV02-450	Bromodichloromethane	15	1.9	3.9			092771-001	EPA TO-15
13-Aug-12	Chloroform	25	1.3	3.9			092771-001	EPA TO-15
	Dibromochloromethane	6.4	1.3	5.2			092771-001	EPA TO-15
	1,1-Dichloroethane	2.8	1.9	3.9	J		092771-001	EPA TO-15
	cis-1,2-Dichloroethene	5.4	2.6	5.2			092771-001	EPA TO-15
	Tetrachloroethene	5.3	2.6	5.2			092771-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	310	2.6	5.2			092771-001	EPA TO-15
	Trichloroethene	310	2.6	5.2			092771-001	EPA TO-15
	Trichlorofluoromethane	3.2	1.9	5.2	J		092771-001	EPA TO-15
	Total VOCs	683.10	NA	NA	NA	NA	092771-001	EPA TO-15
TAV-SV02-500	Acetone	16	12	33	B, J	33U	092772-001	EPA TO-15
13-Aug-12	Chloroform	11	4.1	12	J		092772-001	EPA TO-15
	cis-1,2-Dichloroethene	110	8.2	16			092772-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	200	8.2	16			092772-001	EPA TO-15
	Trichloroethene	1100	8.2	16			092772-001	EPA TO-15
	Total VOCs	1421.00	NA	NA	NA	NA	092772-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-050	Acetone	14	0.30	0.80	B		092750-001	EPA TO-15
13-Aug-12	2-Butanone	1.2	0.40	0.80			092750-001	EPA TO-15
	Dichlorodifluoromethane	0.56	0.15	0.40			092750-001	EPA TO-15
	Tetrachloroethene	1.3	0.20	0.40			092750-001	EPA TO-15
	Toluene	0.37	0.20	0.40	J		092750-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	98	1.1	2.3			092750-001	EPA TO-15
	Trichloroethene	5.0	0.20	0.40			092750-001	EPA TO-15
	Trichlorofluoromethane	0.42	0.15	0.40			092750-001	EPA TO-15
	Total VOCs	120.85	NA	NA	NA	NA	092750-001	EPA TO-15
TAV-SV03-050 (Duplicate)	Acetone	7.3	0.30	0.80	B		092751-001	EPA TO-15
13-Aug-12	2-Butanone	0.94	0.40	0.80			092751-001	EPA TO-15
	Dichlorodifluoromethane	0.57	0.15	0.40			092751-001	EPA TO-15
	1,1-Dichloroethene	0.29	0.20	0.80	J		092751-001	EPA TO-15
	Tetrachloroethene	1.2	0.20	0.40			092751-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	98	1.1	2.2			092751-001	EPA TO-15
	Trichloroethene	4.7	0.20	0.40			092751-001	EPA TO-15
	Trichlorofluoromethane	0.42	0.15	0.40			092751-001	EPA TO-15
	Total VOCs	113.42	NA	NA	NA	NA	092751-001	EPA TO-15
TAV-SV03-100	Acetone	11	0.30	0.80	B		092752-001	EPA TO-15
13-Aug-12	2-Butanone	1.6	0.40	0.80			092752-001	EPA TO-15
	Chloroform	0.34	0.10	0.30			092752-001	EPA TO-15
	Dichlorodifluoromethane	0.79	0.15	0.40			092752-001	EPA TO-15
	Tetrachloroethene	1.9	0.20	0.40			092752-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	430	4.2	8.5			092752-001	EPA TO-15
	Trichloroethene	32	0.20	0.40			092752-001	EPA TO-15
	Trichlorofluoromethane	1.2	0.15	0.40			092752-001	EPA TO-15
	Total VOCs	478.83	NA	NA	NA	NA	092752-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-150	Acetone	14	0.30	0.80	B		092753-001	EPA TO-15
13-Aug-12	Benzene	1.9	0.15	0.30			092753-001	EPA TO-15
	2-Butanone	1.9	0.40	0.80			092753-001	EPA TO-15
	Carbon disulfide	0.40	0.20	0.80	J		092753-001	EPA TO-15
	Chloroform	1.0	0.10	0.30			092753-001	EPA TO-15
	Chloromethane	0.40	0.20	0.80	J		092753-001	EPA TO-15
	Dichlorodifluoromethane	0.89	0.15	0.40			092753-001	EPA TO-15
	Tetrachloroethene	2.0	0.20	0.40			092753-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	620	5.2	10			092753-001	EPA TO-15
	Trichloroethene	100	5.2	10			092753-001	EPA TO-15
	Trichlorofluoromethane	2.0	0.15	0.40			092753-001	EPA TO-15
	Total VOCs	744.49	NA	NA	NA	NA	092753-001	EPA TO-15
TAV-SV03-200	Acetone	17	3.1	8.2	B		092754-001	EPA TO-15
13-Aug-12	Benzene	3.7	1.5	3.1			092754-001	EPA TO-15
	Carbon disulfide	4.4	2.0	8.2	J		092754-001	EPA TO-15
	Chloroform	3.2	1.0	3.1			092754-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	560	5.1	10			092754-001	EPA TO-15
	Trichloroethene	310	2.0	4.1			092754-001	EPA TO-15
	Total VOCs	898.30	NA	NA	NA	NA	092754-001	EPA TO-15
TAV-SV03-250	Benzene	37	0.80	1.6			092755-001	EPA TO-15
13-Aug-12	2-Butanone	3.2	2.1	4.2	J		092755-001	EPA TO-15
	Carbon disulfide	1.1	1.1	4.2	J		092755-001	EPA TO-15
	Chloroform	5.1	0.53	1.6			092755-001	EPA TO-15
	Dichlorodifluoromethane	1.1	0.80	2.1	J		092755-001	EPA TO-15
	Tetrachloroethene	1.4	1.1	2.1	J		092755-001	EPA TO-15
	Toluene	4.9	1.1	2.1			092755-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	520	5.3	11			092755-001	EPA TO-15
	Trichloroethene	640	5.3	11			092755-001	EPA TO-15
	Trichlorofluoromethane	1.6	0.80	2.1	J		092755-001	EPA TO-15
	Total VOCs	1215.40	NA	NA	NA	NA	092755-001	EPA TO-15
TAV-SV03-300	Benzene	34	10	21			092756-001	EPA TO-15
13-Aug-12	1,1,2-Trichloro-1,2,2-trifluoroethane	440	14	28			092756-001	EPA TO-15
	Trichloroethene	1800	14	28			092756-001	EPA TO-15
	Total VOCs	2274.00	NA	NA	NA	NA	092756-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-350	1,1,2-Trichloro-1,2,2-trifluoroethane	360	19	37			092757-001	EPA TO-15
13-Aug-12	Trichloroethene	2100	19	37			092757-001	EPA TO-15
	Total VOCs	2460.00	NA	NA	NA	NA	092757-001	EPA TO-15
TAV-SV03-400	Acetone	25	22	58	B, J		092758-001	EPA TO-15
13-Aug-12	1,1,2-Trichloro-1,2,2-trifluoroethane	280	15	29			092758-001	EPA TO-15
	Trichloroethene	1700	15	29			092758-001	EPA TO-15
	Total VOCs	2005.00	NA	NA	NA	NA	092758-001	EPA TO-15
TAV-SV03-450	Acetone	29	17	44	B, J		092759-001	EPA TO-15
13-Aug-12	1,1,2-Trichloro-1,2,2-trifluoroethane	320	11	22			092759-001	EPA TO-15
	Trichloroethene	1400	11	22			092759-001	EPA TO-15
	Total VOCs	1749.00	NA	NA	NA	NA	092759-001	EPA TO-15
TAV-SV03-500	Acetone	20	2.7	7.1	B		092760-001	EPA TO-15
13-Aug-12	2-Butanone	3.7	3.5	7.1	J		092760-001	EPA TO-15
	Carbon disulfide	5.9	1.8	7.1	J		092760-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	64	1.8	3.5			092760-001	EPA TO-15
	Trichloroethene	200	1.8	3.5			092760-001	EPA TO-15
	Total VOCs	293.60	NA	NA	NA	NA	092760-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-50	Carbon disulfide	0.74	0.20	0.80	J		093095-001	EPA TO-15
15-Nov-12	Dichlorodifluoromethane	0.41	0.15	0.40			093095-001	EPA TO-15
	Tetrachloroethene	0.51	0.15	0.40			093095-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.38	0.20	0.40	J		093095-001	EPA TO-15
	Trichloroethene	0.22	0.15	0.40	J		093095-001	EPA TO-15
	Trichlorofluoromethane	0.19	0.15	0.40	J		093095-001	EPA TO-15
	Total VOCs	2.45	NA	NA	NA	NA	093095-001	EPA TO-15
TAV-SV01-100	Acetone	8.0	0.60	1.20			093096-001	EPA TO-15
15-Nov-12	Bromodichloromethane	0.19	0.15	0.30	J		093096-001	EPA TO-15
	2-Butanone	1.6	0.40	0.80			093096-001	EPA TO-15
	Carbon disulfide	0.33	0.20	0.80	J		093096-001	EPA TO-15
	Chloroform	0.40	0.10	0.30			093096-001	EPA TO-15
	Dibromochloromethane	0.14	0.10	0.40	J		093096-001	EPA TO-15
	Dichlorodifluoromethane	0.40	0.15	0.40			093096-001	EPA TO-15
	2-Hexanone	0.26	0.20	0.80	J		093096-001	EPA TO-15
	Tetrachloroethene	0.81	0.15	0.40			093096-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.3	0.20	0.40			093096-001	EPA TO-15
	Trichloroethene	3.7	0.15	0.40			093096-001	EPA TO-15
	Total VOCs	17.13	NA	NA	NA	NA	093096-001	EPA TO-15
TAV-SV01-150	Bromodichloromethane	2.0	0.15	0.30			093097-001	EPA TO-15
15-Nov-12	2-Butanone	1.2	0.40	0.80			093097-001	EPA TO-15
	Carbon tetrachloride	0.57	0.20	0.80	J		093097-001	EPA TO-15
	Chloroform	3.3	0.10	0.30			093097-001	EPA TO-15
	Dibromochloromethane	1.0	0.10	0.40			093097-001	EPA TO-15
	Tetrachloroethene	0.84	0.15	0.40			093097-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.3	0.20	0.40			093097-001	EPA TO-15
	Trichloroethene	19	0.15	0.40			093097-001	EPA TO-15
	Total VOCs	30.21	NA	NA	NA	NA	093097-001	EPA TO-15
TAV-SV01-200	Bromodichloromethane	4.9	0.95	1.9			093098-001	EPA TO-15
15-Nov-12	Carbon tetrachloride	1.9	1.3	5.0	J		093098-001	EPA TO-15
	Chloroform	10	0.63	1.9			093098-001	EPA TO-15
	Dibromochloromethane	3.1	0.63	2.5			093098-001	EPA TO-15
	1,1-Dichloroethane	1.6	0.95	1.9	J		093098-001	EPA TO-15
	Tetrachloroethene	1.2	0.95	2.5	J		093098-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8	1.3	2.5			093098-001	EPA TO-15
	Trichloroethene	65	0.95	2.5			093098-001	EPA TO-15
	Total VOCs	93.5	NA	NA	NA	NA	093098-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-250	Bromodichloromethane	4.2	0.95	1.9			093099-001	EPA TO-15
15-Nov-12	Carbon tetrachloride	2.8	1.3	5.1	J		093099-001	EPA TO-15
	Chloroform	9.6	0.63	1.9			093099-001	EPA TO-15
	Dibromochloromethane	3.4	0.63	2.5			093099-001	EPA TO-15
	1,1-Dichloroethane	2.5	0.95	1.9			093099-001	EPA TO-15
	1,1-Dichloroethene	1.6	1.3	5.1	J		093099-001	EPA TO-15
	cis-1,2-Dichloroethene	2.1	1.3	2.5	J		093099-001	EPA TO-15
	Tetrachloroethene	1.6	0.95	2.5	J		093099-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	5.2	1.3	2.5			093099-001	EPA TO-15
	Trichloroethene	100	0.95	2.5			093099-001	EPA TO-15
	Total VOCs	133	NA	NA	NA	NA	093099-001	EPA TO-15
TAV-SV01-300	Bromodichloromethane	4.2	0.97	1.9			093100-001	EPA TO-15
15-Nov-12	Carbon tetrachloride	3.5	1.3	5.2	J		093100-001	EPA TO-15
	Chloroform	10	0.65	1.9			093100-001	EPA TO-15
	Dibromochloromethane	3.1	0.65	2.6			093100-001	EPA TO-15
	1,1-Dichloroethane	1.6	0.97	1.9	J		093100-001	EPA TO-15
	1,1-Dichloroethene	2.0	1.3	5.2	J		093100-001	EPA TO-15
	cis-1,2-Dichloroethene	2.7	1.3	2.6			093100-001	EPA TO-15
	Tetrachloroethene	1.8	0.97	2.6	J		093100-001	EPA TO-15
	Toluene	5.2	0.97	2.6			093100-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.1	1.3	2.6			093100-001	EPA TO-15
	Trichloroethene	100	0.97	2.6			093100-001	EPA TO-15
	Total VOCs	137.2	NA	NA	NA	NA	093100-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-350 15-Nov-12	Acetone	3.4	1.5	3.0			093101-001	EPA TO-15
	Benzene	0.57	0.50	1.0	J		093101-001	EPA TO-15
	Bromodichloromethane	4.1	0.38	0.75			093101-001	EPA TO-15
	Bromoform	0.61	0.50	2.0	J		093101-001	EPA TO-15
	Carbon tetrachloride	2.3	0.50	2.0			093101-001	EPA TO-15
	Chloroform	7.9	0.25	0.75			093101-001	EPA TO-15
	Dibromochloromethane	3.5	0.25	1.0			093101-001	EPA TO-15
	1,1-Dichloroethane	0.93	0.38	0.75			093101-001	EPA TO-15
	1,1-Dichloroethene	1.3	0.50	2.0	J		093101-001	EPA TO-15
	cis-1,2-Dichloroethene	4.1	0.50	1.0			093101-001	EPA TO-15
	Methylene chloride	0.88	0.50	1.0	J		093101-001	EPA TO-15
	Tetrachloroethene	1.5	0.38	1.0			093101-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.8	0.50	1.0			093101-001	EPA TO-15
	Trichloroethene	100	0.94	2.5			093101-001	EPA TO-15
	Total VOCs	133.89	NA	NA	NA	NA	093101-001	EPA TO-15
TAV-SV01-350 (Duplicate) 15-Nov-12	Acetone	2.5	1.6	3.2	J		093102-001	EPA TO-15
	Bromodichloromethane	4.1	0.40	0.80			093102-001	EPA TO-15
	Bromoform	0.64	0.53	2.1	J		093102-001	EPA TO-15
	Carbon tetrachloride	2.4	0.53	2.1			093102-001	EPA TO-15
	Chloroform	8.0	0.27	0.80			093102-001	EPA TO-15
	Dibromochloromethane	3.6	0.27	1.1			093102-001	EPA TO-15
	1,1-Dichloroethane	0.88	0.40	0.80			093102-001	EPA TO-15
	1,1-Dichloroethene	1.3	0.53	2.1	J		093102-001	EPA TO-15
	cis-1,2-Dichloroethene	4.0	0.53	1.1			093102-001	EPA TO-15
	Methylene chloride	0.94	0.53	1.1	J		093102-001	EPA TO-15
	Tetrachloroethene	1.6	0.40	1.1			093102-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	2.6	0.53	1.1			093102-001	EPA TO-15
	Trichloroethene	99	1.0	2.7			093102-001	EPA TO-15
	Total VOCs	131.56	NA	NA	NA	NA	093102-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV01-400	Acetone	21	17	34	J		093103-001	EPA TO-15
15-Nov-12	Chloroform	7.3	2.9	8.6	J		093103-001	EPA TO-15
	cis-1,2-Dichloroethene	31	5.7	11			093103-001	EPA TO-15
	Trichloroethene	320	4.3	11			093103-001	EPA TO-15
	Total VOCs	379.3	NA	NA	NA	NA	093103-001	EPA TO-15
TAV-SV01-450	cis-1,2-Dichloroethene	160	15	31			093104-001	EPA TO-15
15-Nov-12	1,1,2-Trichloro-1,2,2-trifluoroethane	18	15	31	J		093104-001	EPA TO-15
	Trichloroethene	1200	12	31			093104-001	EPA TO-15
	Total VOCs	1378	NA	NA	NA	NA	093104-001	EPA TO-15
TAV-SV01-500	cis-1,2-Dichloroethene	50	16	32			093105-001	EPA TO-15
15-Nov-12	1,1,2-Trichloro-1,2,2-trifluoroethane	18	16	32	J		093105-001	EPA TO-15
	Trichloroethene	1000	12	32			093105-001	EPA TO-15
	Total VOCs	1068	NA	NA	NA	NA	093105-001	EPA TO-15
TAV-SV02-050	Acetone	3.5	0.60	1.2		U	093107-001	EPA TO-15
16-Nov-12	Bromodichloromethane	6.6	0.15	0.30			093107-001	EPA TO-15
	Chloroform	5.4	0.10	0.30			093107-001	EPA TO-15
	Dibromochloromethane	0.39	0.10	0.40	J		093107-001	EPA TO-15
	Dichlorodifluoromethane	0.39	0.15	0.40	J		093107-001	EPA TO-15
	Tetrachloroethene	1.0	0.15	0.40			093107-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	54	1.0	2.0			093107-001	EPA TO-15
	Trichloroethene	9.8	0.15	0.40			093107-001	EPA TO-15
	Trichlorofluoromethane	1.2	0.15	0.40			093107-001	EPA TO-15
	Total VOCs	78.78	NA	NA	NA	NA	093107-001	EPA TO-15
TAV-SV02-100	Bromodichloromethane	37	0.49	0.98			093108-001	EPA TO-15
16-Nov-12	Chloroform	36	0.33	0.98			093108-001	EPA TO-15
	Dibromochloromethane	4.1	0.33	1.3			093108-001	EPA TO-15
	Methylene chloride	2.1	0.65	1.3			093108-001	EPA TO-15
	Tetrachloroethene	3.7	0.49	1.3			093108-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	270	5.2	10			093108-001	EPA TO-15
	Trichloroethene	41	0.49	1.3			093108-001	EPA TO-15
	Total VOCs	393.9	NA	NA	NA	NA	093108-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-150	Acetone	5.7	1.9	3.7			093109-001	EPA TO-15
16-Nov-12	Bromodichloromethane	40	0.46	0.93			093109-001	EPA TO-15
	Carbon tetrachloride	0.82	0.62	2.5	J		093109-001	EPA TO-15
	Chloroform	44	0.31	0.93			093109-001	EPA TO-15
	Dibromochloromethane	9.9	0.31	1.2			093109-001	EPA TO-15
	Dichlorodifluoromethane	0.69	0.46	1.2	J		093109-001	EPA TO-15
	1,1-Dichloroethane	1.6	0.62	2.5	J		093109-001	EPA TO-15
	Tetrachloroethene	4.5	0.46	1.2			093109-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	460	6.2	12			093109-001	EPA TO-15
	Trichloroethene	54	0.46	1.2			093109-001	EPA TO-15
	Total VOCs	621.21	NA	NA	NA	NA	093109-001	EPA TO-15
TAV-SV02-200	Acetone	11	9.2	18	J		093110-001	EPA TO-15
16-Nov-12	Bromodichloromethane	40	2.3	4.6			093110-001	EPA TO-15
	Chloroform	44	1.5	4.6			093110-001	EPA TO-15
	Dibromochloromethane	15	1.5	6.1			093110-001	EPA TO-15
	Tetrachloroethene	5.9	2.3	6.1	J		093110-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	310	6.1	12			093110-001	EPA TO-15
	Trichloroethene	280	2.3	6.1			093110-001	EPA TO-15
	Trichlorofluoromethane	3.8	2.3	6.1	J		093110-001	EPA TO-15
	Total VOCs	709.7	NA	NA	NA	NA	093110-001	EPA TO-15
TAV-SV02-250	Bromodichloromethane	1.9	0.71	1.4			093111-001	EPA TO-15
16-Nov-12	2-Butanone	3.0	1.9	3.8	J		093111-001	EPA TO-15
	Chloroform	4.6	0.47	1.4			093111-001	EPA TO-15
	Dibromochloromethane	0.65	0.47	1.9	J		093111-001	EPA TO-15
	Tetrachloroethene	0.90	0.71	1.9	J		093111-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	62	0.94	1.9			093111-001	EPA TO-15
	Trichloroethene	60	0.71	1.9			093111-001	EPA TO-15
	Total VOCs	133.05	NA	NA	NA	NA	093111-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds,
Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-300	Acetone	39	7.3	15			093112-001	EPA TO-15
16-Nov-12	Bromodichloromethane	6.9	1.8	3.7			093112-001	EPA TO-15
	2-Butanone	6.0	4.9	9.8	J		093112-001	EPA TO-15
	Chloroform	12	1.2	3.7			093112-001	EPA TO-15
	Dibromochloromethane	2.5	1.2	4.9	J		093112-001	EPA TO-15
	Methylene chloride	9.8	2.4	4.9			093112-001	EPA TO-15
	Tetrachloroethene	4.3	1.8	4.9	J		093112-001	EPA TO-15
	Toluene	100	1.8	4.9			093112-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	120	2.4	4.9			093112-001	EPA TO-15
	Trichloroethene	160	1.8	4.9			093112-001	EPA TO-15
	Xylenes	4.4	1.8	4.9	J		093112-001	EPA TO-15
	m,p-Xylene	3.4	2.4	9.8	J		093112-001	EPA TO-15
	Total VOCs	464.9	NA	NA	NA	NA	093112-001	EPA TO-15
TAV-SV02-300 (Duplicate)	Bromodichloromethane	17	5.0	10			093113-001	EPA TO-15
16-Nov-12	Chloroform	27	3.3	10			093113-001	EPA TO-15
	Dibromochloromethane	6.2	3.3	13	J		093113-001	EPA TO-15
	Tetrachloroethene	5.3	5.0	13	J		093113-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	280	6.7	13			093113-001	EPA TO-15
	Trichloroethene	370	5.0	13			093113-001	EPA TO-15
	Total VOCs	705.5	NA	NA	NA	NA	093113-001	EPA TO-15
TAV-SV02-350	Bromodichloromethane	22	3.2	6.4			093114-001	EPA TO-15
16-Nov-12	Chloroform	30	2.1	6.4			093114-001	EPA TO-15
	Dibromochloromethane	8.2	2.1	8.6	J		093114-001	EPA TO-15
	Tetrachloroethene	4.7	3.2	8.6	J		093114-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	280	4.3	8.6			093114-001	EPA TO-15
	Trichloroethene	340	3.2	8.6			093114-001	EPA TO-15
	Trichlorofluoromethane	3.2	3.2	8.6	J		093114-001	EPA TO-15
	Total VOCs	688.1	NA	NA	NA	NA	093114-001	EPA TO-15
TAV-SV02-400	Bromodichloromethane	12	6.0	12			093115-001	EPA TO-15
16-Nov-12	Chloroform	23	4.0	12			093115-001	EPA TO-15
	Dibromochloromethane	4.4	4.0	16	J		093115-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	230	8.0	16			093115-001	EPA TO-15
	Trichloroethene	540	6.0	16			093115-001	EPA TO-15
	Total VOCs	809.4	NA	NA	NA	NA	093115-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Continued)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV02-450	Bromodichloromethane	19	3.8	7.6			093116-001	EPA TO-15
16-Nov-12	Chloroform	29	2.5	7.6			093116-001	EPA TO-15
	Dibromochloromethane	7.3	2.5	10	J		093116-001	EPA TO-15
	Tetrachloroethene	5.1	3.8	10	J		093116-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	290	5.1	10			093116-001	EPA TO-15
	Trichloroethene	340	3.8	10			093116-001	EPA TO-15
	Trichlorofluoromethane	3.8	3.8	10	J		093116-001	EPA TO-15
	Total VOCs	694.2	NA	NA	NA	NA	093116-001	EPA TO-15
TAV-SV02-500	Chloroform	13	8.1	24	J		093117-001	EPA TO-15
16-Nov-12	cis-1,2-Dichloroethene	82	16	32			093117-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	170	16	32			093117-001	EPA TO-15
	Trichloroethene	1100	12	32			093117-001	EPA TO-15
	Total VOCs	1365	NA	NA	NA	NA	093117-001	EPA TO-15
TAV-SV03-050	Tetrachloroethene	1.3	0.15	0.40			093119-001	EPA TO-15
16-Nov-12	1,1,2-Trichloro-1,2,2-trifluoroethane	120	5.3	11			093119-001	EPA TO-15
	Trichloroethene	6.2	0.15	0.40			093119-001	EPA TO-15
	Total VOCs	127.5	NA	NA	NA	NA	093119-001	EPA TO-15
TAV-SV03-100	1,1,2-Trichloro-1,2,2-trifluoroethane	500	6.6	13			093120-001	EPA TO-15
16-Nov-12	Trichloroethene	27	5.0	13			093120-001	EPA TO-15
	Total VOCs	527	NA	NA	NA	NA	093120-001	EPA TO-15
TAV-SV03-150	1,1,2-Trichloro-1,2,2-trifluoroethane	130	2.0	4.0			093121-001	EPA TO-15
16-Nov-12	Trichloroethene	20	1.5	4.0			093121-001	EPA TO-15
	Total VOCs	150	NA	NA	NA	NA	093121-001	EPA TO-15
TAV-SV03-200	Acetone	22	15	30	J		093122-001	EPA TO-15
16-Nov-12	Chloroform	3.4	2.5	7.4	J		093122-001	EPA TO-15
	Chloromethane	17	9.9	20	J		093122-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	650	14	29			093122-001	EPA TO-15
	Trichloroethene	320	3.7	9.9			093122-001	EPA TO-15
	Total VOCs	1012.4	NA	NA	NA	NA	093122-001	EPA TO-15
TAV-SV03-200 (Duplicate)	Chloroform	3.6	2.5	7.5	J		093123-001	EPA TO-15
16-Nov-12	1,1,2-Trichloro-1,2,2-trifluoroethane	650	14	28			093123-001	EPA TO-15
	Trichloroethene	290	3.8	10			093123-001	EPA TO-15
	Total VOCs	943.6	NA	NA	NA	NA	093123-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-3 *(Concluded)*
Summary of Detected Volatile Organic Compounds, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Analyte	Result[a] (ppbv)	MDL[b] (ppbv)	PQL[c] (ppbv)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
TAV-SV03-250	Benzene	26	7.9	16			093124-001	EPA TO-15
16-Nov-12	Chloroform	5.5	3.9	12	J		093124-001	EPA TO-15
	1,1,2-Trichloro-1,2,2-trifluoroethane	620	7.9	16			093124-001	EPA TO-15
	Trichloroethene	640	5.9	16			093124-001	EPA TO-15
	Total VOCs	1291.5	NA	NA	NA	NA	093124-001	EPA TO-15
TAV-SV03-300	Benzene	29	29	57	J		093125-001	EPA TO-15
16-Nov-12	1,1,2-Trichloro-1,2,2-trifluoroethane	420	29	57			093125-001	EPA TO-15
	Trichloroethene	1700	21	57			093125-001	EPA TO-15
	Total VOCs	2149	NA	NA	NA	NA	093125-001	EPA TO-15
TAV-SV03-350	1,1,2-Trichloro-1,2,2-trifluoroethane	410	28	55			093126-001	EPA TO-15
16-Nov-12	Trichloroethene	1900	21	55			093126-001	EPA TO-15
	Total VOCs	2310	NA	NA	NA	NA	093126-001	EPA TO-15
TAV-SV03-400	1,1,2-Trichloro-1,2,2-trifluoroethane	410	27	53			093127-001	EPA TO-15
16-Nov-12	Trichloroethene	1800	20	53			093127-001	EPA TO-15
	Total VOCs	2210	NA	NA	NA	NA	093127-001	EPA TO-15
TAV-SV03-450	1,1,2-Trichloro-1,2,2-trifluoroethane	380	19	38			093128-001	EPA TO-15
16-Nov-12	Trichloroethene	1300	14	38			093128-001	EPA TO-15
	Total VOCs	1680	NA	NA	NA	NA	093128-001	EPA TO-15
TAV-SV03-500	2-Butanone	2.0	1.9	3.9	J		093129-001	EPA TO-15
16-Nov-12	1,1,2-Trichloro-1,2,2-trifluoroethane	22	0.96	1.9			093129-001	EPA TO-15
	Trichloroethene	70	0.72	1.9			093129-001	EPA TO-15
	Total VOCs	94	NA	NA	NA	NA	093129-001	EPA TO-15

Refer to footnotes on page 5D-67.

Table 5D-4
Method Detection Limits for Volatile Organic Compounds (EPA Method[f] TO-15), Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Analyte (TO-15)	MDL[b] (ppbv)
1,1,1-Trichloroethane	0.15 - 21.0
1,1,2,2-Tetrachloroethane	0.10 - 14.0
1,1,2-Trichloroethane	0.15 - 21.0
1,1-Dichloroethane	0.15 - 21.0
1,1-Dichloroethene	0.20 - 29.0
1,2,2-tetrafluoroethane, 1,2-Dichloro-1	0.15 - 21.0
1,2,4-Trichlorobenzene	0.70 - 100.0
1,2,4-Trimethylbenzene	0.20 - 29.0
1,2-Dibromoethane	0.20 - 29.0
1,2-Dichlorobenzene	0.15 - 21.0
1,2-Dichloroethane	0.20 - 29.0
1,2-Dichloropropane	0.15 - 21.0
1,3,5-Trimethylbenzene	0.15 - 21.0
1,3-Dichlorobenzene	0.15 - 21.0
1,4-Dichlorobenzene	0.15 - 21.0
2,2-trifluoroethane, 1,1,2-Trichloro-1	0.20 - 29.0
2-Butanone	0.40 - 57.0
2-Hexanone	0.20 - 29.0
4-Ethyltoluene	0.15 - 21.0
4-methyl-, 2-Pentanone	0.15 - 21.0
Acetone	0.30 - 86.0
Benzene	0.15 - 29.0
Benzyl chloride	0.20 - 29.0
Bromodichloromethane	0.15 - 21.0
Bromoform	0.20 - 29.0
Bromomethane	0.20 - 29.0
Carbon disulfide	0.20 - 29.0
Carbon tetrachloride	0.20 - 29.0
Chlorobenzene	0.10 - 14.0
Chloroethane	0.20 - 100
Chloroform	0.10 - 14.0
Chloromethane	0.20 - 57.0
Dibromochloromethane	0.10 - 14.0
Dichlorodifluoromethane	0.15 - 21.0
Ethyl benzene	0.15 - 21.0
Hexachlorobutadiene	0.20 - 29.0
Methylene chloride	0.20 - 29.0
Styrene	0.15 - 21.0
Tetrachloroethene	0.15 - 21.0
Toluene	0.15 - 21.0
Trichloroethene	0.15 - 21.0
Trichlorofluoromethane	0.15 - 21.0
Vinyl acetate	0.20 - 29.0
Vinyl chloride	0.10 - 21.0
Xylene	0.15 - 21.0
cis-1,2-Dichloroethene	0.20 - 29.0
cis-1,3-Dichloropropene	0.15 - 21.0
m-, p-Xylene	0.20 - 29.0
o-Xylene	0.15 - 21.0
trans-1,2-Dichloroethene	0.20 - 29.0
trans-1,3-Dichloropropene	0.15 - 21.0

Refer to footnotes on page 5D-67.

Table 5D-5
Summary of Photoionization Detector and Vacuum Pressure Field Measurements[9], Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Sample Date	PID (ppm)	Purge Volume (cu-ft)	Canister Number	Starting Vacuum Pressure (in-Hg)	Ending Vacuum Pressure (in-Hg)
TAV-SV01-050		0.0	0.065	34000100	-27	-8
TAV-SV01-100		0.0	0.117	34000125	-28	-7
TAV-SV01-150		0.0	0.168	34001277	-28	-7
TAV-SV01-200		0.0	0.219	34000102	-28	-6
TAV-SV01-250		0.0	0.270	34001271	-28	-8
TAV-SV01-300	24-Feb-12	0.0	0.321	34000197	-29	-8
TAV-SV01-300 (Duplicate)		0.0	0.321	34000120	-28	-8
TAV-SV01-350		0.0	0.372	34000112	-29	-8
TAV-SV01-400		0.0	0.423	34000101	-28	-8
TAV-SV01-450		0.0	0.475	34000121	-28	-6
TAV-SV01-500		0.0	0.526	34000113	-28	-8
TAV-SV02-050		0.0	0.065	34001275	-27	-8
TAV-SV02-050 (Duplicate)		0.0	0.065	34000005	-27	-8
TAV-SV02-100		0.0	0.117	34001239	-27	-8
TAV-SV02-150		0.0	0.168	34001238	-27	-8
TAV-SV02-200		0.0	0.219	34001237	-27	-7
TAV-SV02-250	24-Feb-12	0.0	0.270	34000402	-27	-8
TAV-SV02-300		0.0	0.321	34000115	-27	-8
TAV-SV02-350		0.0	0.372	34000198	-27	-8
TAV-SV02-400		0.0	0.423	34000822	-28	-8
TAV-SV02-450		0.0	0.475	34000371	-27	-8
TAV-SV02-500		0.0	0.526	34000098	-28	-8
TAV-SV03-050		0.0	0.065	34000109	-27	-8
TAV-SV03-100		0.0	0.117	34000114	-27	-8
TAV-SV03-150		0.1	0.168	34000007	-27	-8
TAV-SV03-200		0.0	0.219	34000099	-27	-7
TAV-SV03-250		0.0	0.270	34001235	-27	-8
TAV-SV03-300	24-Feb-12	0.0	0.321	34001236	-27	-8
TAV-SV03-350		0.0	0.372	34000117	-27	-8
TAV-SV03-400		0.0	0.423	34001270	-27	-7
TAV-SV03-450		0.0	0.475	34001272	-27	-8
TAV-SV03-450 (Duplicate)		0.0	0.475	34000071	-26	-8
TAV-SV03-500		0.0	0.526	34000568	-27	-8

Refer to footnotes on page 5D-67.

Table 5D-5 *(Continued)*
Summary of Photoionization Detector and Vacuum Pressure Field Measurements[9], Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Sample Date	PID (ppm)	Purge Volume (cu-ft)	Canister Number	Starting Vacuum Pressure (in-Hg)	Ending Vacuum Pressure (in-Hg)
TAV-SV01-050	24-May-12	0.0	0.065	34000439	-29	-8
TAV-SV01-100		0.0	0.117	34001304	-29	-8
TAV-SV01-150		0.0	0.168	34000541	-29	-8
TAV-SV01-200		0.0	0.219	34001172	-29	-8
TAV-SV01-200 (Duplicate)				34000869	-29	-8
TAV-SV01-250		0.0	0.270	34001290	-29	-8
TAV-SV01-300		0.0	0.321	34001522	-29	-8
TAV-SV01-350		0.0	0.372	34000721	-30	-8
TAV-SV01-400		0.0	0.423	34000060	-29	-8
TAV-SV01-450		0.0	0.475	34000179	-29	-8
TAV-SV01-500		0.0	0.526	34001293	-28	-7
TAV-SV02-050	24-May-12	0.0	0.065	34001461	-28	-8
TAV-SV02-100		0.0	0.117	34000226	-29	-8
TAV-SV02-150		0.0	0.168	34000594	-29	-8
TAV-SV02-150 (Duplicate)				34001291	-29	-8
TAV-SV02-200		0.0	0.219	34000402	-28	-8
TAV-SV02-250		0.0	0.270	34001160	-29	-8
TAV-SV02-300		0.0	0.321	34001566	-29	-8
TAV-SV02-350		0.0	0.372	34000048	-29	-8
TAV-SV02-400		0.0	0.423	34000693	-29	-8
TAV-SV02-450		0.0	0.475	34000028	-29	-8
TAV-SV02-500		0.0	0.526	34000584	-29	-8
TAV-SV03-050	24-May-12	0.0	0.065	34000035	-27	-8
TAV-SV03-100		0.0	0.117	34001754	-27	-8
TAV-SV03-150		0.0	0.168	34001217	-26	-8
TAV-SV03-200		0.0	0.219	34000033	-26	-8
TAV-SV03-250		0.0	0.270	34000782	-28	-8
TAV-SV03-300		0.0	0.321	34001288	-29	-8
TAV-SV03-300 (Duplicate)				34000429	-29	-8
TAV-SV03-350		0.0	0.372	34001302	-29	-8
TAV-SV03-400		0.0	0.423	34000271	-29	-8
TAV-SV03-450		0.0	0.475	34000054	-29	-8
TAV-SV03-500		0.0	0.526	34000131	-28	-8

Refer to footnotes on page 5D-67.

Table 5D-5 *(Continued)*
Summary of Photoionization Detector and Vacuum Pressure Field Measurements[9], Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Sample Date	PID (ppm)	Purge Volume (cu-ft)	Canister Number	Starting Vacuum Pressure (in-Hg)	Ending Vacuum Pressure (in-Hg)
TAV-SV01-050		0.0	0.065	34000493	-27	-8
TAV-SV01-100		0.0	0.117	34000919	-28	-8
TAV-SV01-150		0.0	0.168	34000897	-27	-8
TAV-SV01-200		0.0	0.219	34000041	-27	-8
TAV-SV01-250		0.0	0.270	34000035	-27	-8
TAV-SV01-300	10-Aug-12	0.0	0.321	34000125	-27	-8
TAV-SV01-350		0.0	0.372	34000510	-27	-8
TAV-SV01-400		0.0	0.423	34000693	-27	-8
TAV-SV01-450		0.0	0.475	34000530	-27	-8
TAV-SV01-500		0.0	0.526	34000533	-28	-8
TAV-SV01-500 (Duplicate)				34000074	-27	-8
TAV-SV02-050		0.0	0.065	34001151	-27	-8
TAV-SV02-100		0.0	0.117	34001145	-27	-8
TAV-SV02-150		0.0	0.168	34000187	-27	-8
TAV-SV02-200		0.0	0.219	34001330	-27	-8
TAV-SV02-250		0.0	0.270	34000381	-27	-8
TAV-SV02-250 (Duplicate)	13-Aug-12			34000201	-27	-8
TAV-SV02-300		0.0	0.321	34000569	-26	-8
TAV-SV02-350		0.0	0.372	34000392	-27	-8
TAV-SV02-400		0.0	0.423	34001176	-26	-8
TAV-SV02-450		0.0	0.475	34000148	-28	-8
TAV-SV02-500		0.0	0.526	34001353	-27	-8
TAV-SV03-050		0.0	0.065	34000829	-26	-8
TAV-SV03-050 (Duplicate)				34001044	-27	-8
TAV-SV03-100		0.0	0.117	34000223	-27	-8
TAV-SV03-150		0.0	0.168	34000210	-27	-8
TAV-SV03-200		0.0	0.219	34001147	-27	-8
TAV-SV03-250	13-Aug-12	0.0	0.270	34000115	-27	-8
TAV-SV03-300		0.0	0.321	34000695	-27	-8
TAV-SV03-350		0.0	0.372	34000007	-27	-8
TAV-SV03-400		0.0	0.423	34000092	-27	-8
TAV-SV03-450		0.0	0.475	34000104	-27	-8
TAV-SV03-500		0.0	0.526	34001440	-27	-8

Refer to footnotes on page 5D-67.

Table 5D-5 *(Concluded)*
Summary of Photoionization Detector and Vacuum Pressure Field Measurements[g], Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Sample Port	Sample Date	PID (ppm)	Purge Volume (cu-ft)	Canister Number	Starting Vacuum Pressure (in-Hg)	Ending Vacuum Pressure (in-Hg)
TAV-SV01-050	15-Nov-12	0.0	0.065	34001290	-28	-8
TAV-SV01-100		0.0	0.117	34001214	-28	-8
TAV-SV01-150		0.0	0.168	34001450	-27	-8
TAV-SV01-200		0.0	0.219	34000113	-26	-8
TAV-SV01-250		0.0	0.270	34001512	-26	-8
TAV-SV01-300		0.0	0.321	34000140	-26	-8
TAV-SV01-350		0.0	0.372	34000178	-26	-8
TAV-SV01-350 (Duplicate)				34000100	-26	-8
TAV-SV01-400		0.0	0.423	34001387	-26	-8
TAV-SV01-450		0.0	0.475	34000340	-26	-8
TAV-SV01-500		0.0	0.526	34001483	-26	-8
TAV-SV02-050	16-Nov-12	0.0	0.065	34001155	-26	-8
TAV-SV02-100		0.0	0.117	34000076	-26	-8
TAV-SV02-150		0.0	0.168	34000023	-26	-8
TAV-SV02-200		0.0	0.219	34001123	-26	-8
TAV-SV02-250		0.0	0.270	34000553	-26	-8
TAV-SV02-300		0.0	0.321	34001640	-21	-8
TAV-SV02-300 (Duplicate)				34000855	-26	-8
TAV-SV02-350		0.0	0.372	34000077	-26	-8
TAV-SV02-400		0.0	0.423	34000341	-25	-8
TAV-SV02-450		0.0	0.475	34001589	-26	-8
TAV-SV02-500		0.0	0.526	34000367	-26	-8
TAV-SV03-050	16-Nov-12	0.0	0.065	34001216	-26	-8
TAV-SV03-100		0.0	0.117	34000349	-26	-8
TAV-SV03-150		0.0	0.168	34001482	-26	-8
TAV-SV03-200		0.0	0.219	34000343	-26	-8
TAV-SV03-200 (Duplicate)				34000342	-26	-8
TAV-SV03-250		0.0	0.270	34000797	-26	-8
TAV-SV03-300		0.0	0.321	34001524	-26	-8
TAV-SV03-350		0.0	0.372	34001449	-25	-8
TAV-SV03-400		0.0	0.423	34000406	-25	-8
TAV-SV03-450		0.0	0.475	34001150	-26	-8
TAV-SV03-500		0.0	0.526	34000819	-26	-8

Refer to footnotes on page 5D-67.

Table 5D-6
Summary of Duplicate Samples,
Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Parameter	Environmental Sample (R_1)	Duplicate Sample (R_2)	RPD[h]
	ppbv unless otherwise noted		
February 2012 Sampling Event			
TAV-SV01-300			
Acetone	3.1	ND	NC
Benzene	0.73	0.97	28
Bromodichloromethane	3.9	3.9	< 1
Bromoform	0.70	0.74	6
2-Butanone	0.60	1.0	50
Carbon disulfide	0.36	0.22	48
Carbon tetrachloride	2.3	2.4	4
Chloroform	10	10	< 1
Dibromochloromethane	3.4	3.4	< 1
Dichlorodifluoromethane	0.24	0.24	< 1
1,1-Dichloroethane	1.7	1.6	6
1,1-Dichloroethene	1.8	1.8	< 1
cis-1,2-Dichloroethene	3.1	3.1	< 1
Methylene chloride	0.86	0.81	6
Tetrachloroethene	1.5	1.5	< 1
1,1,2-Trichloro-1,2,2-trifluoroethane	2.3	2.2	4
Trichloroethene	98	94	4
Trichlorofluoromethane	0.20	0.19	5
TAV-SV02-050			
Bromodichloromethane	11	11	< 1
2-Butanone	0.65	ND	NC
Chloroform	10	10	< 1
Dibromochloromethane	0.90	0.87	3
Dichlorodifluoromethane	0.60	0.60	< 1
Methylene chloride	0.61	0.61	< 1
Tetrachloroethene	0.70	0.69	1
1,1,2-Trichloro-1,2,2-trifluoroethane	53	51	4
Trichloroethene	7.2	6.5	10
Trichlorofluoromethane	1.1	1.1	< 1
TAV-SV03-450			
Acetone	27	ND	NC
Benzene	8.2	ND	NC
Chloroform	3.8	3.2	17
1,1,2-Trichloro-1,2,2-trifluoroethane	270	200	30
Trichloroethene	1200	940	24

Refer to footnotes on page 5D-67.

Table 5D-6 *(Continued)*
Summary of Duplicate Samples, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Parameter	Environmental Sample (R_1)	Duplicate Sample (R_2)	RPD[h]
	ppbv unless otherwise noted		
May 2012 Sampling Event			
TAV-SV01-200			
Acetone	11	ND	NC
Benzene	0.64	0.67	5
Bromodichloromethane	4.3	4.4	2
Bromoform	0.44	0.43	2
2-Butanone	2.9	ND	NC
Carbon disulfide	0.32	1.9	142
Carbon tetrachloride	1.5	1.6	6
Chloroform	7.9	8.1	2
Dibromochloromethane	3.4	3.5	3
Dichlorodifluoromethane	0.32	0.34	6
1,1-Dichloroethane	1.7	1.7	< 1
1,1-Dichloroethene	1.1	1.2	9
cis-1,2-Dichloroethene	0.92	0.96	4
2-Hexanone	0.60	ND	NC
Methylene chloride	0.28	0.29	4
Tetrachloroethene	1.1	1.2	9
1,1,2-Trichloro-1,2,2-trifluoroethane	4.7	5.0	6
Trichloroethene	56	59	5
Trichlorofluoromethane	0.26	ND	NC

Refer to footnotes on page 5D-67.

Table 5D-6 *(Continued)*
Summary of Duplicate Samples, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Parameter	Environmental Sample (R_1)	Duplicate Sample (R_2)	RPD[h]
	ppbv unless otherwise noted		
May 2012 Sampling Event			
TAV-SV02-150			
Acetone	11	11	< 1
Benzene	0.36	0.20	57
Bromodichloromethane	43	40	7
Bromoform	0.97	0.90	7
2-Butanone	1.2	1.3	8
Carbon disulfide	0.88	0.58	41
Carbon tetrachloride	0.69	0.64	8
Chloroform	47	44	7
Chloromethane	0.49	ND	NC
Dibromochloromethane	12	12	< 1
Dichlorodifluoromethane	0.73	0.72	1
1,2-Dichlorobenzene	0.95	0.95	< 1
1,1-Dichloroethane	0.17	0.17	< 1
2-Hexanone	ND	0.28	NC
Methylene chloride	1.2	1.1	9
Tetrachloroethene	4.7	4.5	4
Toluene	0.21	ND	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	410	420	2
Trichloroethene	48	45	6
TAV-SV03-300			
Benzene	28	29	4
1,1,2-Trichloro-1,2,2-trifluoroethane	350	380	8
Trichloroethene	1400	1500	7

Refer to footnotes on page 5D-67.

Table 5D-6 *(Continued)*
Summary of Duplicate Samples, Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Parameter	Environmental Sample (R_1)	Duplicate Sample (R_2)	RPD[h]
	ppbv unless otherwise noted		
August 2012 Sampling Event			
TAV-SV01-500			
cis-1,2-Dichloroethene	50	51	2
1,1,2-Trichloro-1,2,2-trifluoroethane	12	12	< 1
Trichloroethene	920	940	2
TAV-SV02-250			
Acetone	29	5.3	138
Bromodichloromethane	9.4	9.7	3
Chloroform	17	17	< 1
Dibromochloromethane	3.1	3.1	< 1
Tetrachloroethene	4.4	4.8	9
1,1,2-Trichloro-1,2,2-trifluoroethane	220	220	< 1
Trichloroethene	350	350	< 1
Trichlorofluoromethane	2.8	2.8	< 1
TAV-SV03-050			
Acetone	14	7.3	63
2-Butanone	1.8	0.94	63
Dichlorodifluoromethane	0.56	0.57	2
1,1-Dichloroethene	ND	0.29	NC
Tetrachloroethene	1.3	1.2	8
Toluene	0.37	ND	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	98	98	< 1
Trichloroethene	5.0	4.7	6
Trichlorofluoromethane	0.42	0.42	< 1

Refer to footnotes on page 5D-67.

Table 5D-6 *(Concluded)*
Summary of Duplicate Samples,
Technical Area V Soil-Vapor Monitoring

Calendar Year 2012

Well ID/Parameter	Environmental Sample (R_1)	Duplicate Sample (R_2)	RPD[h]
	ppbv unless otherwise noted		
November 2012 Sampling Event			
TAV-SV01-350			
Acetone	3.4	2.5	31
Benzene	0.57	ND	NC
Bromodichloromethane	4.1	4.1	< 1
Bromoform	0.61	0.64	5
Carbon tetrachloride	2.3	2.4	4
Chloroform	7.9	8.0	1
Dibromochloromethane	3.5	3.6	3
1,1-Dichloroethane	0.93	0.88	6
1,1-Dichloroethene	1.3	1.3	< 1
cis-1,2-Dichloroethene	4.1	4.0	2
Methylene chloride	0.88	0.94	7
Tetrachloroethene	1.5	1.6	6
1,1,2-Trichloro-1,2,2-trifluoroethane	2.8	2.6	7
Trichloroethene	100	99	1
TAV-SV03-200			
Acetone	22	ND	NC
Chloroform	3.4	3.6	6
Chloromethane	17	ND	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	650	650	< 1
Trichloroethene	320	290	10

Refer to footnotes on page 5D-67.

Footnotes for Technical Area V Soil-Vapor Monitoring Tables

bgs	= Below ground surface.
cu-ft	= Cubic feet.
EPA	= U.S. Environmental Protection Agency.
ft	= Foot (feet).
ID	= identifier.
In-Hg	= inches of mercury.
LWDS	= Liquid Waste Disposal System.
MW	= Monitoring well.
No.	= Number.
PID	= photoionization detector.
ppbv	= parts per million by volume.
ppm	= parts per million.
SAP	= Sampling and Analysis Plan.
SNL	= Sandia National Laboratories.
SV	= Soil vapor.
TA-V	= Technical Area V.

[a]**Result**

- ppbv = parts per billion by volume.
- Total VOCs = sum of validated detected volatile organic compounds.

[b]**MDL**

Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.
NA = Not applicable.
ppbv = parts per billion by volume.

[c]**PQL**

Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
NA = Not applicable.
ppbv = parts per billion by volume.

[d]**Laboratory Qualifier**

*	=	Laboratory control sample or laboratory control sample duplicate exceeds the control limits.
B	=	Analyte is detected in associated laboratory method blank.
J	=	Estimated value. Analyte detected at a level below the PQL and greater than or equal to the MDL.
NA	=	Not applicable.

[e]**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.
NA	=	Not applicable.
U	=	The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for but was not detected. The associated numerical value is an estimate and may be inaccurate or imprecise.

Footnotes for Technical Area V Soil-Vapor Monitoring Tables (Concluded)

[f]**Analytical Method**

- EPA, 1999, *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS),* Center for Environmental Research Information, Office of Research and Development, Cincinnati, Ohio.

[g]**Field Measurements**

- Field measurements collected prior to and after sampling.

[h]**RPD**

RPD = Relative percent difference is calculated with the following equation and rounded to nearest whole number.

$$RPD = \frac{|R_1 - R_2|}{[(R_1 + R_2)/2]} x\ 100$$

where:

where:	R_1	= analytical result
	R_2	= duplicate analytical result
	NC	= not calculated
	ND	= analyte not detected at the MDL

Attachment 5D
Figures

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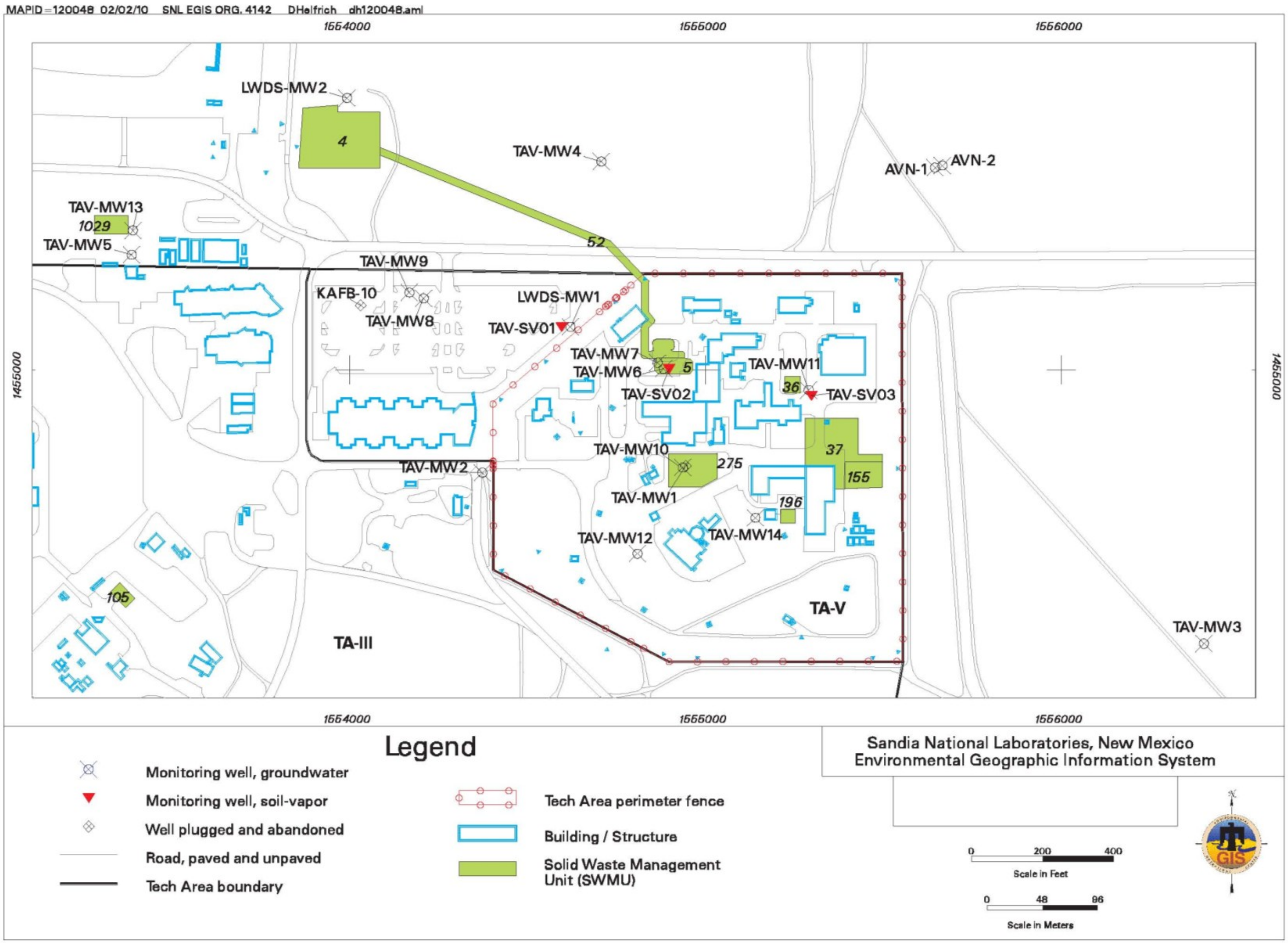


Figure 5D-1. TA-V Soil-Vapor Monitoring Well Locations

Well Name: TAV-SV01
Project Name: TAV SOIL VAPOR WELLS
NMOSE Well File Code: N/A
Owner Name: SNL/NM
Date Drilling Started: 1/27/2011
Date Well Dev. Completed: 3/17/2011

Drilling Contractor: WDC EXPLORATION & WELLS
Drilling Method: ARCH
Borehole Depth (FBGS): 506
Casing Depth (FBGS):
Geo Location: TA-V
Completion Zone: ALLUVIAL FAN FACIES
Completion Formation: SANTA FE

Survey Data

Survey Date: 3/29/2011
Surveyed By: SURVEYING CONTROL, INC.

State Plane Coordinates: NAD 83
(X) Easting: 1554596.11
(Y) Northing: 1455120.73

Surveyed Evaluations (FAMSL) NAVD 88

Protective Casing: 5423.48
Top of Inner Well Casing:
Concrete Pad: 5423.43
Ground Surface: 5423.4

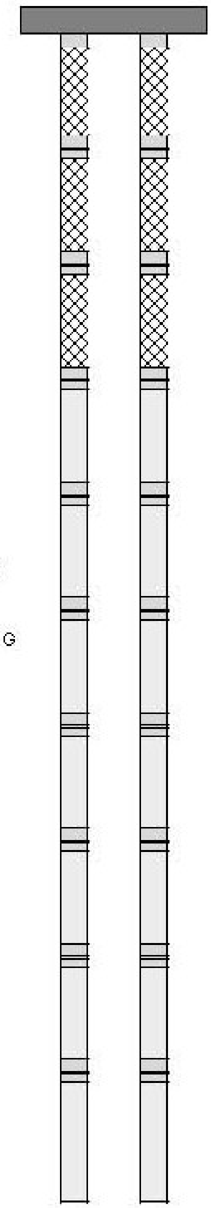
Calculated Depths and Elevations

Initial Depth to Water (FBGS):
Date Initial Depth Measured:
Last Measured Water Elevation (FAMSL):
Date Last Measured:

Miscellaneous Information

Screen Slot Size (in.): n/a
Date Updated: 02-MAY-2011
Date Printed from EDMS: 4/17/2012 11:03:20 AM

Comments:
SV = SOIL VAPOR. SVSS=SOIL VAPOR SAMPLING SCREEN.



Completion Data Measured Depths (FBGS)

Casing Stickup:

Interval	Material	Start	Stop	Length	ID/OD (in.)
BOREHOLE		0	506	506	/ 9.625
VAULT		0	6	6	
SEAL	BENTONITE CHIPS	6	44	38	
SV SAMPLING ZONE	10/20 SILICA SAND	44	54	10	
SVSS 50	STAINLESS STEEL	49.5	50.5	1	/ 0.375
SEAL	BENTONITE CHIPS	54	94	40	
SV SAMPLING ZONE	10/20 SILICA SAND	94	104	10	
SVSS 100	STAINLESS STEEL	99.5	100.5	1	/ 0.375
SEAL	BENTONITE CHIPS	104	144	40	
SV SAMPLING ZONE	10/20 SILICA SAND	144	154	10	
SVSS 150	STAINLESS STEEL	149.5	150.5	1	/ 0.375
SEAL	BENTONITE CHIPS	154	194	40	
SV SAMPLING ZONE	10/20 SILICA SAND	194	204	10	
SVSS 200	STAINLESS STEEL	199.5	200.5	1	/ 0.375
SEAL	BENTONITE CHIPS	204	244	40	
SV SAMPLING ZONE	10/20 SILICA SAND	244	254	10	
SVSS 250	STAINLESS STEEL	249.5	250.5	1	/ 0.375
SEAL	BENTONITE CHIPS	254	294	40	
SV SAMPLING ZONE	10/20 SILICA SAND	294	304	10	
SVSS 300	STAINLESS STEEL	299.5	300.5	1	/ 0.375
SEAL	BENTONITE CHIPS	304	344	40	
SV SAMPLING ZONE	10/20 SILICA SAND	344	354	10	
SVSS 350	STAINLESS STEEL	349.5	350.5	1	/ 0.375
SEAL	BENTONITE CHIPS	354	394	40	
SV SAMPLING ZONE	10/20 SILICA SAND	394	404	10	
SVSS 400	STAINLESS STEEL	399.5	400.5	1	/ 0.375
SEAL	BENTONITE CHIPS	404	444	40	
SV SAMPLING ZONE	10/20 SILICA SAND	444	454	10	
SVSS 450	STAINLESS STEEL	449.5	450.5	1	/ 0.375
SEAL	BENTONITE CHIPS	454	494	40	
SV SAMPLING ZONE	10/20 SILICA SAND	494	506	12	
SVSS 500	STAINLESS STEEL	499.5	500.5	1	/ 0.375

Some well diagram info truncated due to numeric constraints.

Figure 5D-2. Soil-Vapor Monitoring Well Completion Information for TAV-SV01

Well Name: TAV-SV02
Project Name: TAV SOIL VAPOR WELLS
NMOSE Well File Code: N/A
Owner Name: SNL/NM
Date Drilling Started: 3/3/2011
Date Well Dev. Completed: 3/17/2011

Drilling Contractor: WDC EXPLORATION & WELLS
Drilling Method: ARCH
Borehole Depth (FBGS): 506
Casing Depth (FBGS):
Geo Location: TA-V
Completion Zone: ALLUVIAL FAN FACIES
Completion Formation: SANTA FE

Survey Data

Survey Date: 3/29/2011
Surveyed By: SURVEYING CONTROL, INC.

State Plane Coordinates: NAD 83
(X) Easting: 1554898.53
(Y) Northing: 1455002.42

Surveyed Evaluations (FAMSL) NAVD 88

Protective Casing: 5431.91
Top of Inner Well Casing:
Concrete Pad: 5431.88
Ground Surface: 5431.9

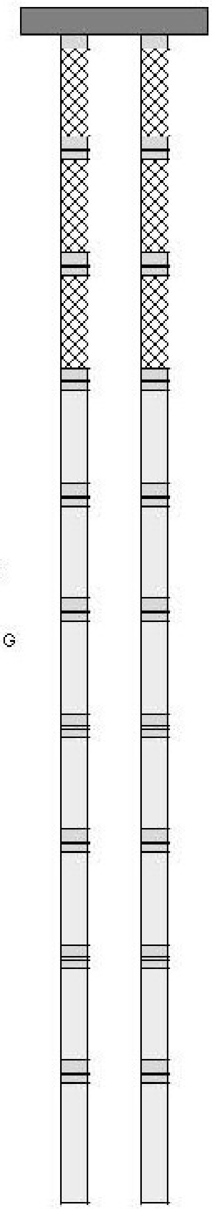
Calculated Depths and Elevations

Initial Depth to Water (FBGS):
Date Initial Depth Measured:
Last Measured Water Elevation (FAMSL):
Date Last Measured:

Miscellaneous Information

Screen Slot Size (in.): n/a
Date Updated: 02-MAY-2011
Date Printed from EDMS: 4/17/2012 11:04:53 AM

Comments:
SV = SOIL VAPOR. SVSS=SOIL VAPOR SAMPLING SCREEN.



Completion Data Measured Depths (FBGS)

Casing Stickup:

Interval	Material	Start	Stop	Length	ID/OD(in.)
BOREHOLE		0	506	506	/ 9.625
VAULT		0	6	6	
SEAL	BENTONITE CHIPS	6	44	38	
SV SAMPLING ZONE	10/20 SILICA SAND	44	54	10	
SVSS 50	STAINLESS STEEL	49.5	50.5	1	/ 0.375
SEAL	BENTONITE CHIPS	54	94	40	
SV SAMPLING ZONE	10/20 SILICA SAND	94	104	10	
SVSS 100	STAINLESS STEEL	99.5	100.5	1	/ 0.375
SEAL	BENTONITE CHIPS	104	144	40	
SV SAMPLING ZONE	10/20 SILICA SAND	144	154	10	
SVSS 150	STAINLESS STEEL	149.5	150.5	1	/ 0.375
SEAL	BENTONITE CHIPS	154	194	40	
SV SAMPLING ZONE	10/20 SILICA SAND	194	204	10	
SVSS 200	STAINLESS STEEL	199.5	200.5	1	/ 0.375
SEAL	BENTONITE CHIPS	204	244	40	
SV SAMPLING ZONE	10/20 SILICA SAND	244	254	10	
SVSS 250	STAINLESS STEEL	249.5	250.5	1	/ 0.375
SEAL	BENTONITE CHIPS	254	294	40	
SV SAMPLING ZONE	10/20 SILICA SAND	294	304	10	
SVSS 300	STAINLESS STEEL	299.5	300.5	1	/ 0.375
SEAL	BENTONITE CHIPS	304	344	40	
SV SAMPLING ZONE	10/20 SILICA SAND	344	354	10	
SVSS 350	STAINLESS STEEL	349.5	350.5	1	/ 0.375
SEAL	BENTONITE CHIPS	354	394	40	
SV SAMPLING ZONE	10/20 SILICA SAND	394	404	10	
SVSS 400	STAINLESS STEEL	399.5	400.5	1	/ 0.375
SEAL	BENTONITE CHIPS	404	444	40	
SV SAMPLING ZONE	10/20 SILICA SAND	444	454	10	
SVSS 450	STAINLESS STEEL	449.5	450.5	1	/ 0.375
SEAL	BENTONITE CHIPS	454	494	40	
SV SAMPLING ZONE	10/20 SILICA SAND	494	506	12	
SVSS 500	STAINLESS STEEL	499.5	500.5	1	/ 0.375

Some well diagram info truncated due to numeric constraints.

Figure 5D-3. Soil-Vapor Monitoring Well Completion Information for TAV-SV02

Well Name: TAV-SV03
Project Name: TAV SOIL VAPOR WELLS
NMOSE Well File Code: N/A
Owner Name: SNL/NM
Date Drilling Started: 2/22/2011
Date Well Dev. Completed: 3/17/2011

Drilling Contractor: WDC EXPLORATION & WELLS
Drilling Method: ARCH
Borehole Depth (FBGS): 506
Casing Depth (FBGS):
Geo Location: TA-V
Completion Zone: ALLUVIAL FAN FACIES
Completion Formation: SANTA FE

Survey Data

Survey Date: 3/29/2011
Surveyed By: SURVEYING CONTROL, INC.

State Plane Coordinates: NAD 83
(X) Easting: 1555298.42
(Y) Northing: 1454927.34

Surveyed Evaluations (FAMSL) NAVD 88

Protective Casing: 5440.19
Top of Inner Well Casing:
Concrete Pad: 5440.20
Ground Surface: 5440.2

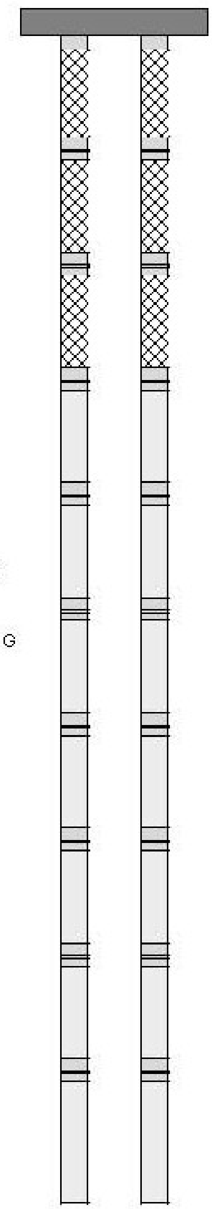
Calculated Depths and Elevations

Initial Depth to Water (FBGS):
Date Initial Depth Measured:
Last Measured Water Elevation (FAMSL):
Date Last Measured:

Miscellaneous Information

Screen Slot Size (in.): n/a
Date Updated: 02-MAY-2011
Date Printed from EDMS: 4/17/2012 11:06:11 AM

Comments:
SV = SOIL VAPOR. SVSS=SOIL VAPOR SAMPLING SCREEN.



Completion Data Measured Depths (FBGS)

Casing Stickup:

Interval	Material	Start	Stop	Length	ID/OD(in.)
BOREHOLE		0	100	100	/ 11.75
VAULT		0	6	6	
SEAL	BENTONITE CHIPS	6	44	38	
SV SAMPLING ZONE	10/20 SILICA SAND	44	54	10	
SVSS 50	STAINLESS STEEL	49.5	50.5	1	/ 0.375
SEAL	BENTONITE CHIPS	54	94	40	
SV SAMPLING ZONE	10/20 SILICA SAND	94	104	10	
SVSS 100	STAINLESS STEEL	99.5	100.5	1	/ 0.375
BOREHOLE		100	507	407	/ 9.625
SEAL	BENTONITE CHIPS	104	144	40	
SV SAMPLING ZONE	10/20 SILICA SAND	144	154	10	
SVSS 150	STAINLESS STEEL	149.5	150.5	1	/ 0.375
SEAL	BENTONITE CHIPS	154	194	40	
SV SAMPLING ZONE	10/20 SILICA SAND	194	204	10	
SVSS 200	STAINLESS STEEL	199.5	200.5	1	/ 0.375
SEAL	BENTONITE CHIPS	204	244	40	
SV SAMPLING ZONE	10/20 SILICA SAND	244	254	10	
SVSS 250	STAINLESS STEEL	249.5	250.5	1	/ 0.375
SEAL	BENTONITE CHIPS	254	294	40	
SV SAMPLING ZONE	10/20 SILICA SAND	294	304	10	
SVSS 300	STAINLESS STEEL	299.5	300.5	1	/ 0.375
SEAL	BENTONITE CHIPS	304	344	40	
SV SAMPLING ZONE	10/20 SILICA SAND	344	354	10	
SVSS 350	STAINLESS STEEL	349.5	350.5	1	/ 0.375
SEAL	BENTONITE CHIPS	354	394	40	
SV SAMPLING ZONE	10/20 SILICA SAND	394	404	10	
SVSS 400	STAINLESS STEEL	399.5	400.5	1	/ 0.375
SEAL	BENTONITE CHIPS	404	444	40	
SV SAMPLING ZONE	10/20 SILICA SAND	444	454	10	
SVSS 450	STAINLESS STEEL	449.5	450.5	1	/ 0.375
SEAL	BENTONITE CHIPS	454	494	40	
SV SAMPLING ZONE	10/20 SILICA SAND	494	507	13	
SVSS 500	STAINLESS STEEL	499.5	500.5	1	

Some well diagram info truncated due to numeric constraints.

Figure 5D-4. Soil-Vapor Monitoring Well Completion Information for TAV-SV03

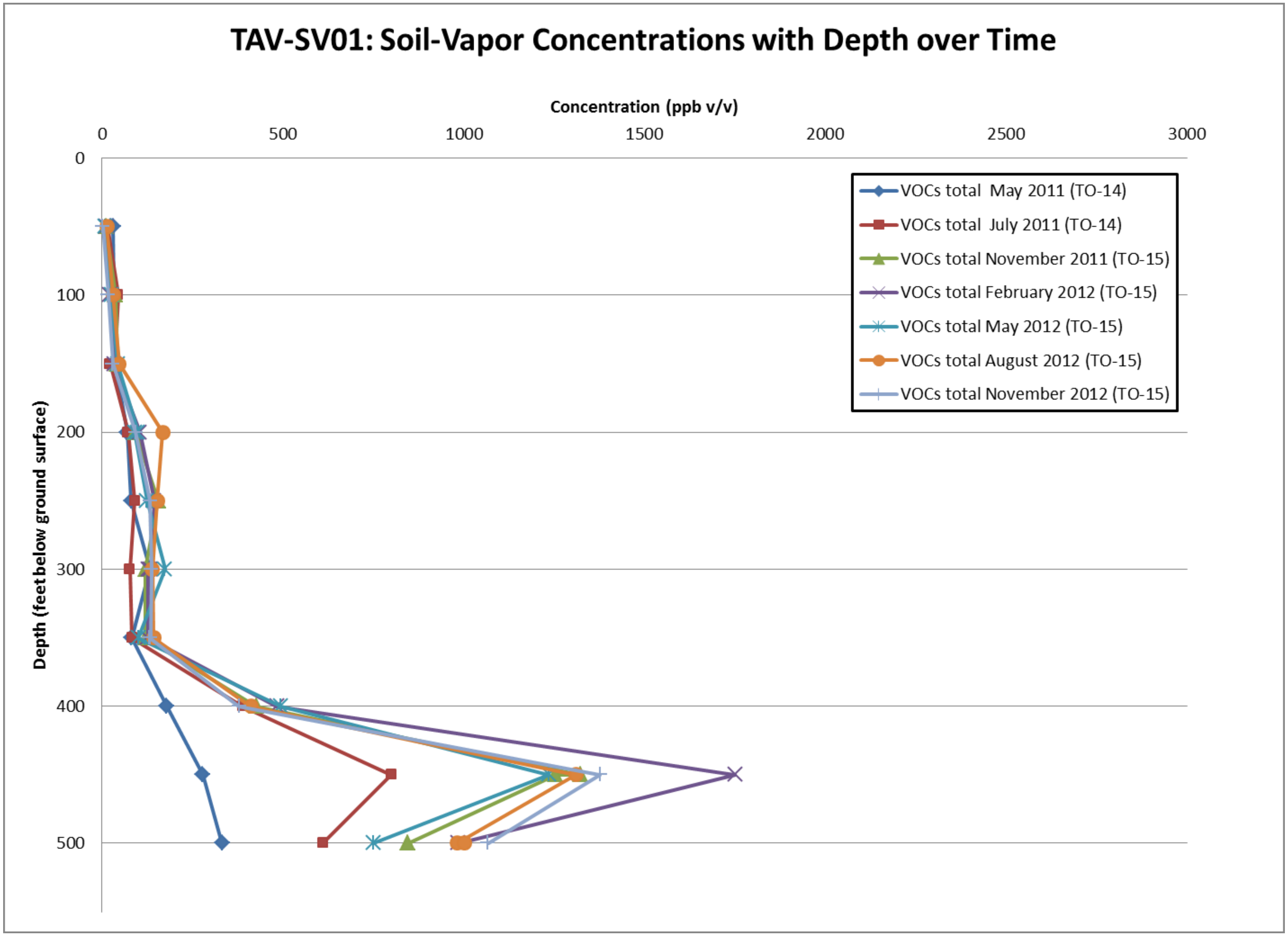


Figure 5D-5. TA-V Soil-Vapor Monitoring Total VOC Results (ppbv) at TAV-SV01

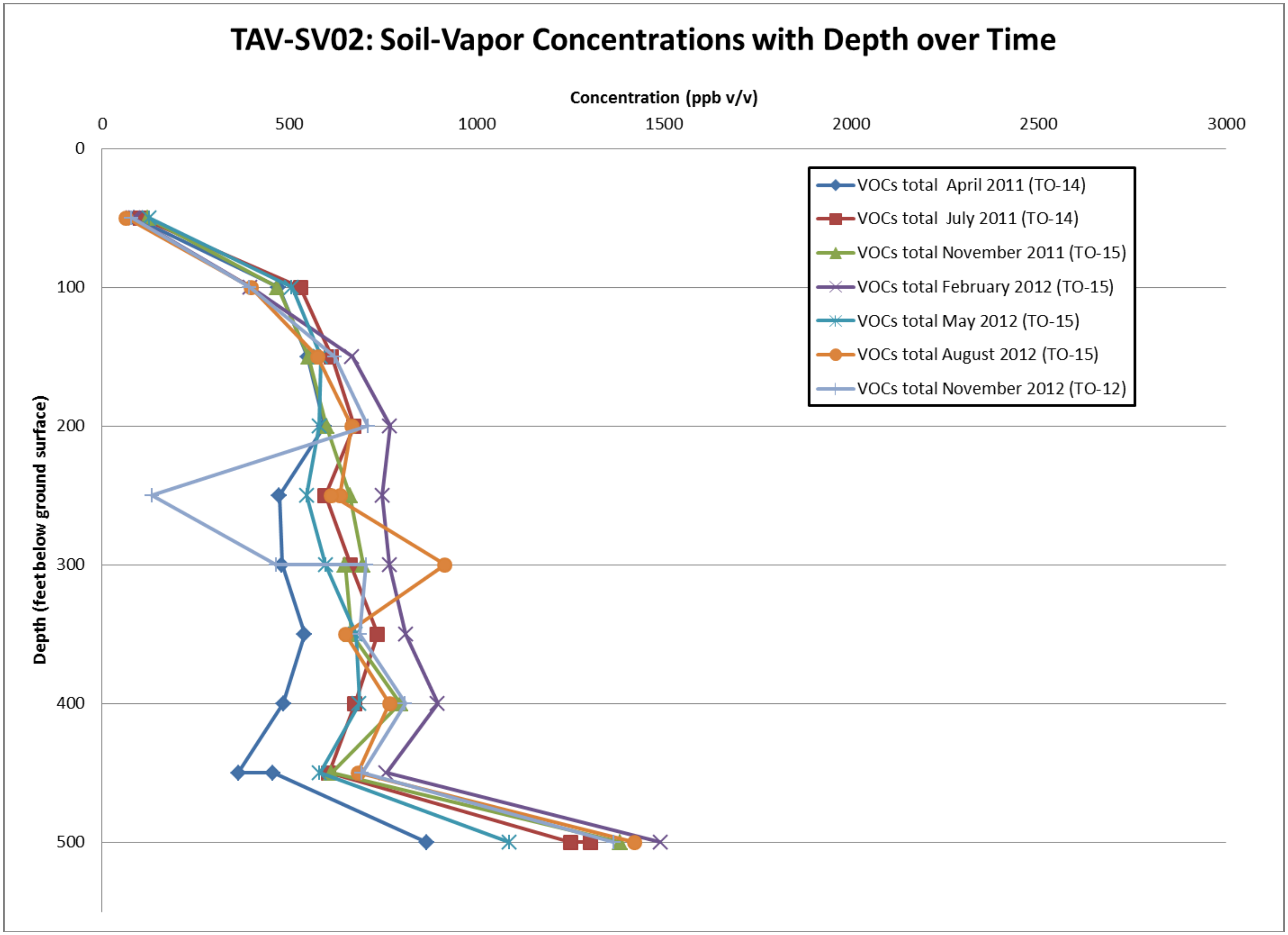


Figure 5D-6. TA-V Soil-Vapor Monitoring Total VOC Results (ppbv) at TAV-SV02

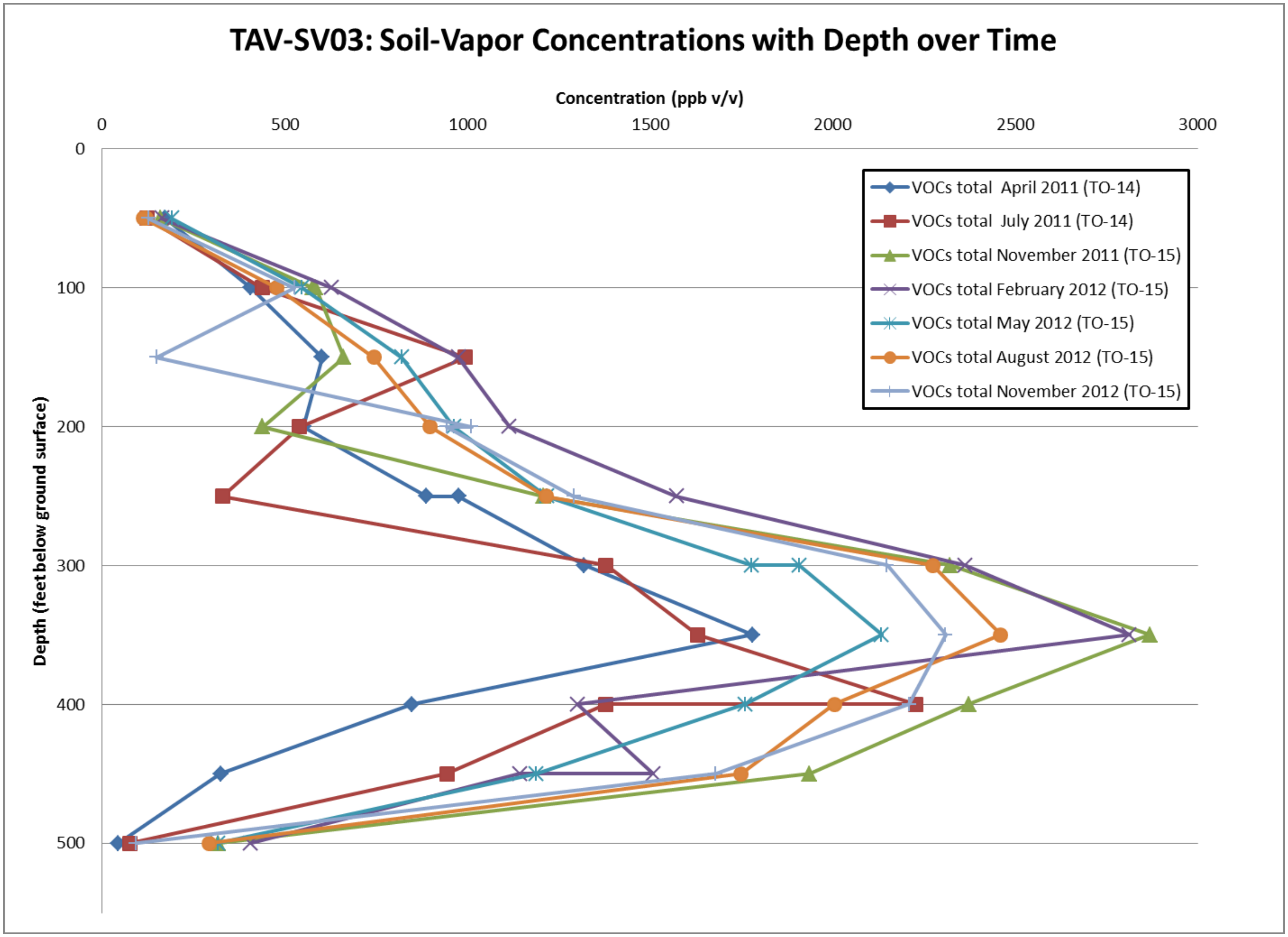


Figure 5D-7. TA-V Soil-Vapor Monitoring Total VOC Results (ppbv) at TAV-SV03

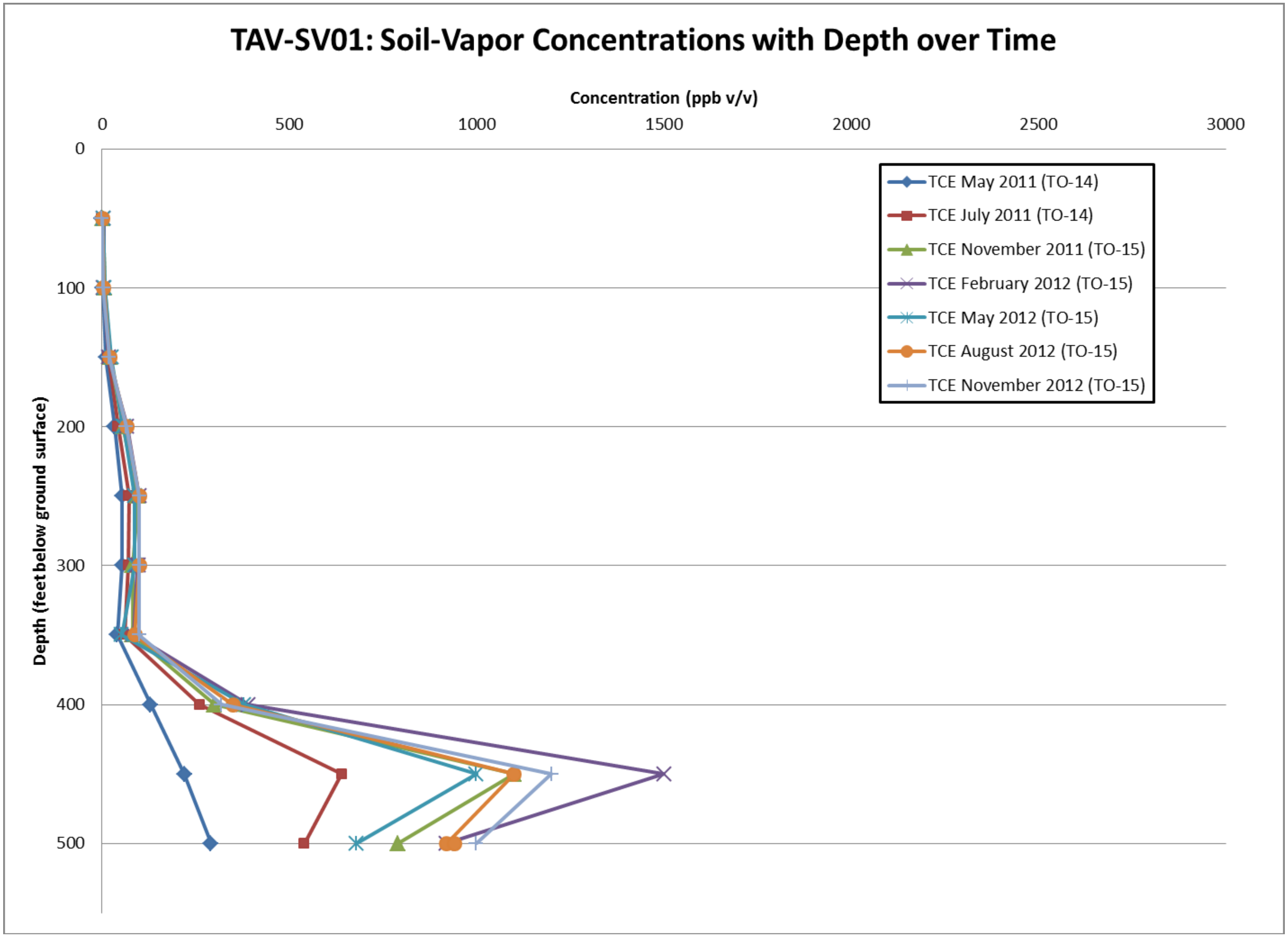


Figure 5D-8. TA-V Soil-Vapor Monitoring TCE Results (ppbv) at TAV-SV01

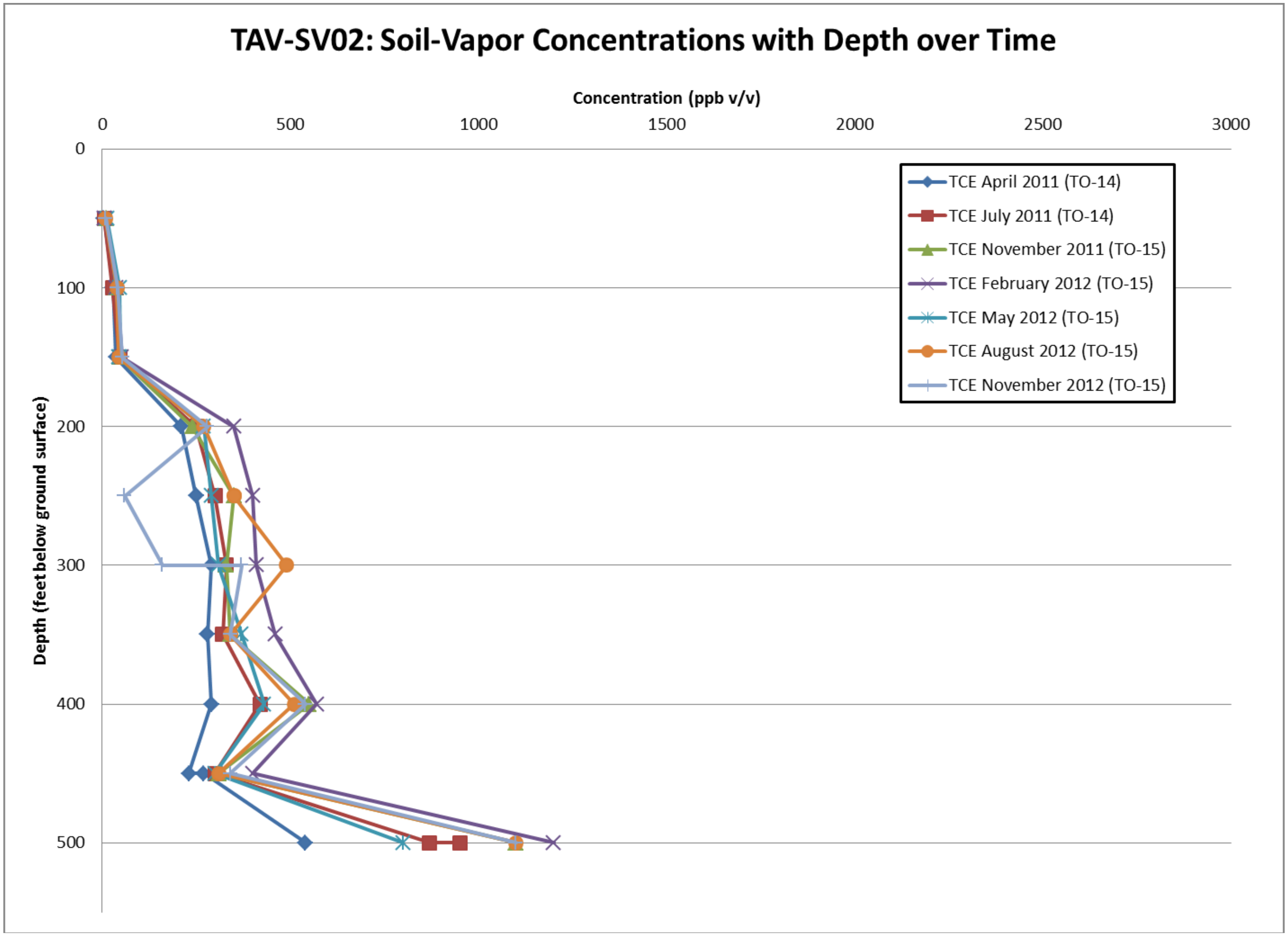


Figure 5D-9. TA-V Soil-Vapor Monitoring TCE Results (ppbv) at TAV-SV02

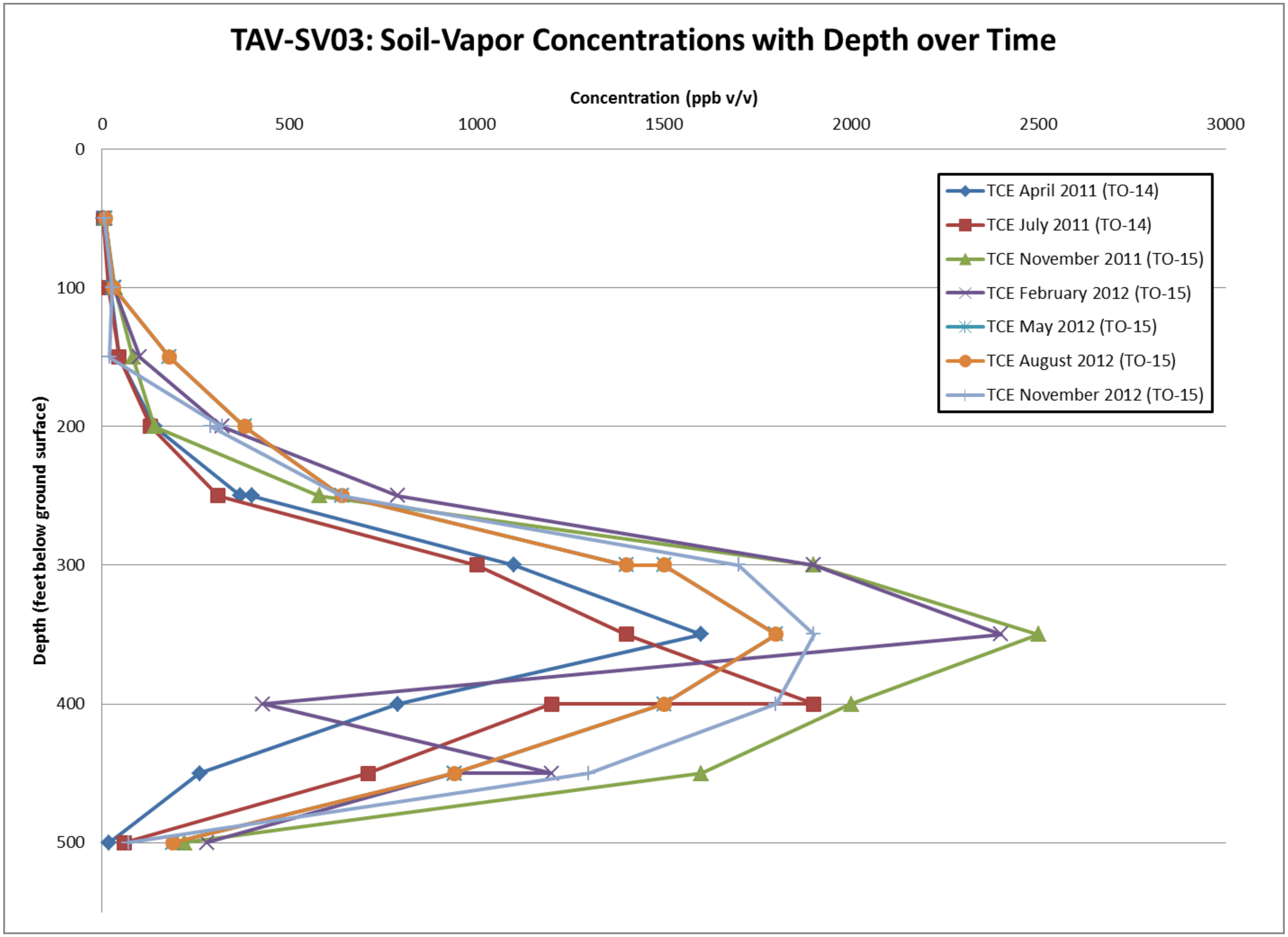


Figure 5D-10. TA-V Soil-Vapor Monitoring TCE Results (ppbv) at TAV-SV03

6.0 Tijeras Arroyo Groundwater Study Area

6.1 Introduction

Trichloroethene (TCE) and nitrate have been identified as constituents of concern (COCs) in groundwater at the Tijeras Arroyo Groundwater (TAG) study area 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 study area monitoring wells. Since August 1996, the historical maximum TCE concentration detected at the site has been 9.6 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 study area include low concentrations of TCE at scattered locations in the perched groundwater system (PGWS) and low concentrations of nitrate at scattered locations in the PGWS and regional aquifer.

6.1.1 Location

The TAG study area encompasses approximately 40 square miles (sq mi) in the north-central portion of Kirtland Air Force Base (KAFB) (Figure 6-1). Three of the five Technical Areas (TAs) at Sandia National Laboratories, New Mexico (SNL/NM) are within the TAG study area. Together, the three TAs (TA-I, TA-II, and TA-IV) encompass approximately 641 acres. The SNL/NM facility is a government-owned, contractor-operated, multi-program laboratory overseen by the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) through the Sandia Field Office in Albuquerque, New Mexico. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM under Contract DE-AC04-94AL85000.

The parties identified as potentially responsible for groundwater contamination within the TAG area include the DOE/NNSA and its contractor Sandia, KAFB, 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 inactive 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 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 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 other manufacturing facilities and the early work at SNL/NM concentrated on prototype research and manufacturing of experimental devices. Since 1949, SNL/NM has grown from a factory-style ordnance facility to a national laboratory dedicated to research, development, and testing

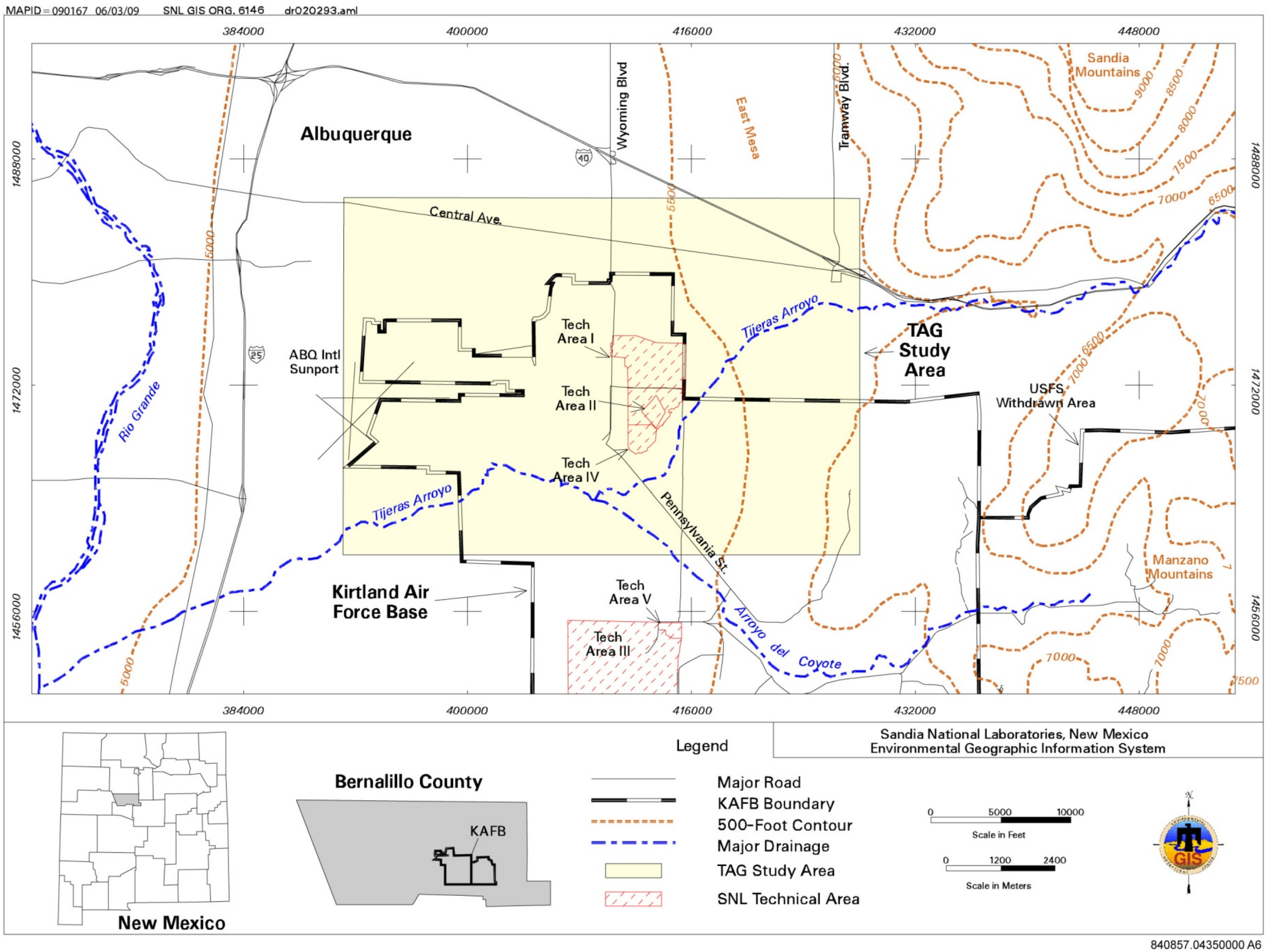


Figure 6-1. Location of the TAG Study Area

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 ER Project) has conducted numerous groundwater investigations in the TAG study area 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 study area 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 study area, the results of which are presented in the *Tijeras Arroyo Groundwater Investigation Report* (SNL November 2005).

6.1.3 Monitoring History

Investigations of groundwater quality in the TAG study area 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.

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 *Tijeras Arroyo Groundwater 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 the initial discoveries of TCE and nitrate at the TAG study area, numerous characterization activities have been conducted (Table 6-1). The results of these characterization activities are summarized in the *Tijeras Arroyo Groundwater 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 Order) became effective between the DOE, Sandia, and the NMED, and the Order specifies TAG as an area of groundwater contamination (NMED April 2004). In response to the Order, DOE/Sandia submitted the *Tijeras Arroyo Groundwater Corrective Measures Evaluation Work Plan* to the NMED in July 2004 (SNL July 2004). After fulfilling the requirements of the Corrective Measures Evaluations (CME) Work Plan, DOE/Sandia submitted the CME Report to the NMED (SNL August 2005).

Table 6-1. Historical Timeline of the TAG Study Area

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 Calendar Year 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 Calendar Year 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 Calendar Year 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 Calendar Year 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 Calendar Year 1997 SNL/NM Annual Groundwater Monitoring Report.	SNL March 1998b
March	1998	Fiscal Year 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 Fiscal Year 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 Fiscal Year 1999 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2000
June	2000	Fiscal Year 1998 Sandia North Groundwater Investigation Annual Report submitted to the NMED.	SNL June 2000

Table 6-1. Historical Timeline of the TAG Study Area *(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 Fiscal Year 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 Fiscal Year 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 Fiscal Year 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	ER Project conducts slug (hydraulic conductivity) tests at groundwater monitoring wells.	Collins May 2004
March	2004	Groundwater sampling analytical results for TAG wells reported in the Fiscal Year 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 were 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 Fiscal Year 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 Fiscal Year 2005 SNL/NM Annual Groundwater Monitoring Report.	SNL November 2006
March	2007	Groundwater sampling analytical results for TAG wells reported in the Fiscal Year 2006 SNL/NM Annual Groundwater Monitoring Report.	SNL March 2007
March	2008	Groundwater sampling analytical results for TAG wells reported in the Fiscal Year 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

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

Month	Year	Event	Reference
June	2009	Groundwater sampling analytical results for TAG wells reported in the Calendar Year 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 study area.	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 Calendar Year 2009 SNL/NM Annual Groundwater Monitoring Report.	SNL October 2010
September	2011	Groundwater sampling analytical results for TAG wells reported in the Calendar Year 2010 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2011
September	2012	Groundwater sampling analytical results for TAG wells reported in the Calendar Year 2011 SNL/NM Annual Groundwater Monitoring Report.	SNL September 2012

NOTES:

µg/L = Microgram(s) per liter.
BGW = Balleau Groundwater, Inc.
CME = Corrective Measures Evaluation.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
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.
USGS = U.S. Geological Survey.

Table XI-1 of the 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, 21 wells in the TAG study area are monitored for water quality, and 30 wells are monitored for water levels (Figure 6-2; Table 6-2). Two groundwater systems are present in the TAG study area: the PGWS at approximately 220 to 330 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).

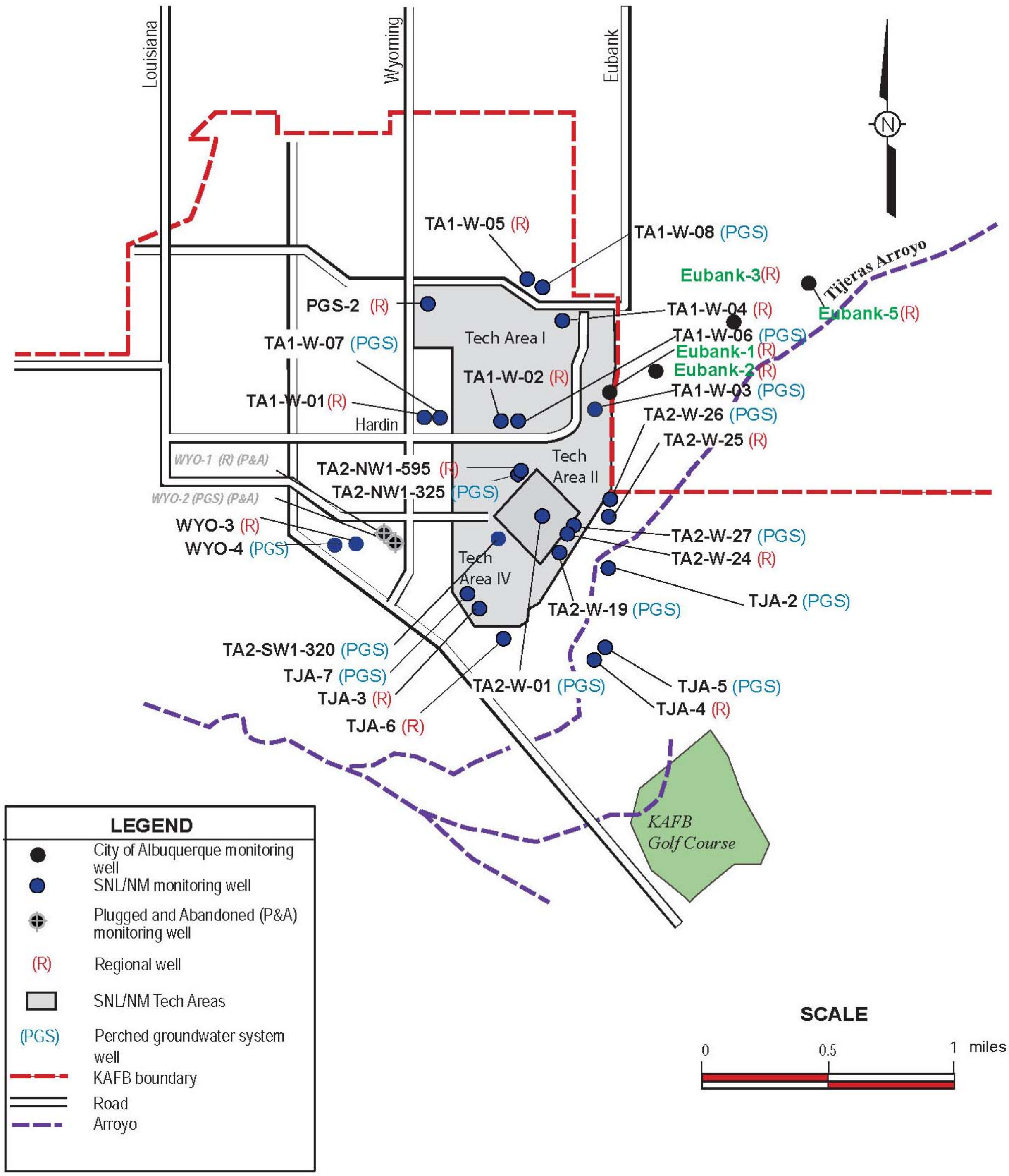


Figure 6-2. Tijeras Arroyo Groundwater (TAG) Investigation Monitoring Well Locations

Table 6-2. Groundwater Monitoring Wells in the TAG Study Area

Well	Installation Year	WQ	WL	Comments
Eubank-1	1988		✓	Regional aquifer (COA well)
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
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.
COA = City of Albuquerque.
PGWS = Perched Groundwater System.
TAG = Tijeras Arroyo Groundwater.
WL = Water level.
WQ = Water quality.

6.1.5 Summary of Calendar Year 2012 Activities

The following activities took place for the TAG investigation during Calendar Year (CY) 2012:

- Monthly, quarterly, or annual water level measurements were obtained from TAG wells.
- Quarterly groundwater sampling events were conducted at seven wells (TA2-SW1-320, TA2-W-19, TA2-W-26, TJA-2, TJA-4, TJA-7, and WYO-4) in March, June, August/September, and November/December 2012 (SNL February 2012, May 2012, July 2012, and November 2012).

- Semiannual groundwater sampling was conducted at four wells (TA2-W-01, TA2-W-27, TJA-3, and TJA-6) in March 2012 and August/September 2012 (SNL February 2012 and July 2012).

- 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 2011 (SNL July 2012).

- 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 2013):

- Monthly, quarterly, or annual water level measurements for TAG wells.

- Quarterly groundwater sampling at seven wells: TA2-SW1-320, TA2-W-19, TA2-W-26, TJA-2, TJA-4, TJA-7, and WYO-4.

- Semiannual groundwater sampling at four wells: TA2-W-01, TA2-W-27, TJA-3, and TJA-6.

- Annual groundwater sampling 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.

6.1.7 Current Conceptual Model

Two groundwater systems are present in the TAG study area: the PGWS at approximately 220 to 330 ft bgs, and the regional aquifer at approximately 440 to 570 ft bgs. 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 study area is well understood and based on a significant number of monitoring wells. Groundwater occurs in both the PGWS and 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 study area, the depth to groundwater for the PGWS ranges from 220 to 330 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 too thin or permeable to yield sufficient volumes of water for the construction of monitoring wells. The PGWS is not used as a water supply source.

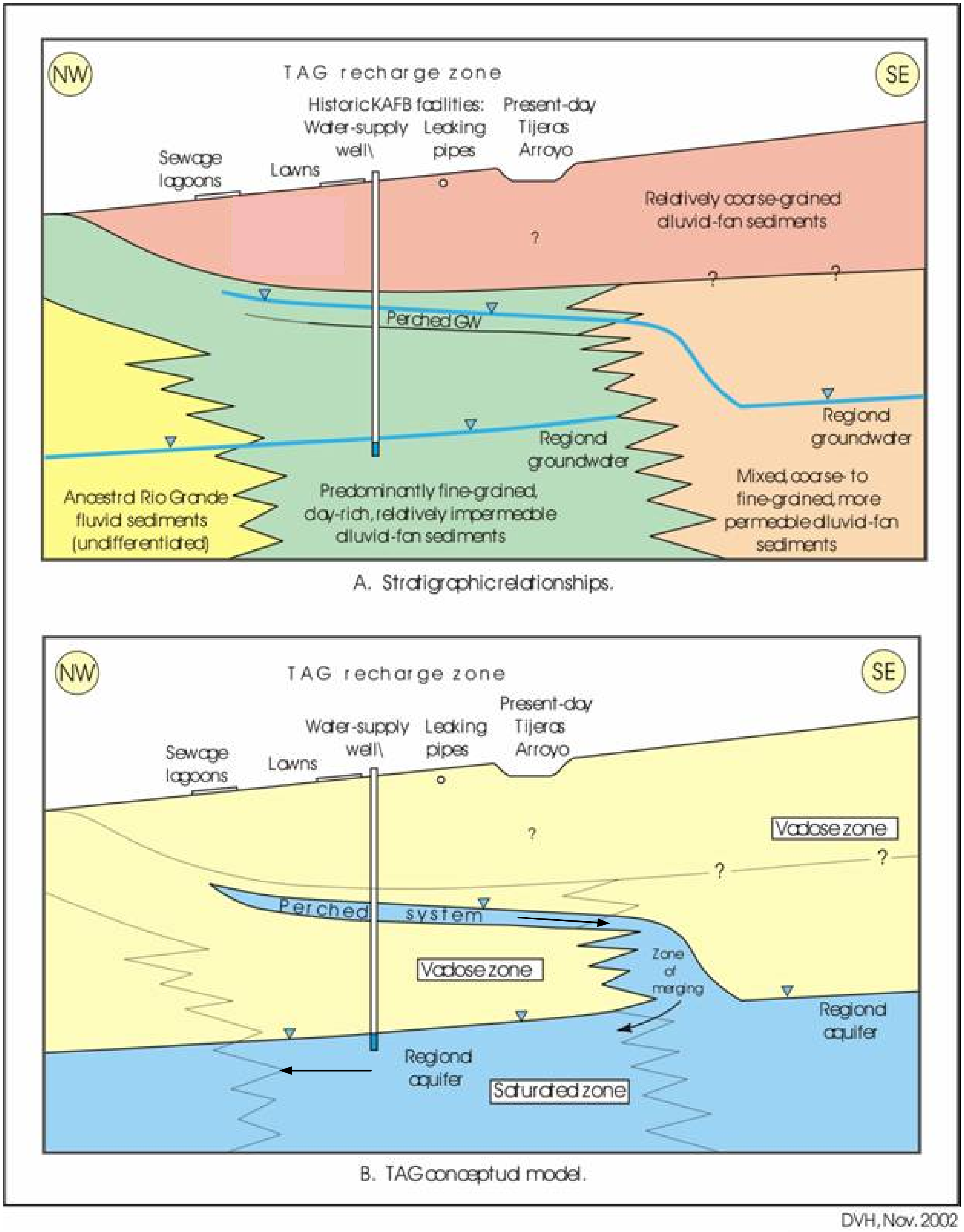


Figure 6-3. TAG Conceptual Model Illustration

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 0.008 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 study area.

Multiple overlapping lenses and layers of low conductivity, mostly unsaturated sediments, serve as a perching horizon beneath the PGWS. Beneath the central TAG study area, 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 study area as well as the Albuquerque Basin. Across the TAG study area, 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 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 0.009 ft/ft across the TAG study area, but is steeper near water-supply wells operated by KAFB, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), or 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. The mounding 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 generally decreasing in the northwestern portion of the study area but are increasing in the southeastern area. 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 signatures of the PGWS vary between well locations but tend 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 study area 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 a fluvial lithofacies. Both lithofacies are less than 5 Mega Annum (Ma) 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 fluvial lithofacies is derived from the ARG to the north and is typically well sorted and medium- to coarse-grained.

6.1.7.2 Hydrologic Conditions at the TAG Study Area

The thickness of the vadose zone is reduced in the central portion of the TAG study area 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 220 to 330 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 study area 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 a variable horizontal gradient of approximately 0.008 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.

6.1.7.3 Local Direction of Flow

Figure 6-4 presents the October 2012 potentiometric surface for the PGWS. The direction of groundwater flow in the PGWS is toward the southeast. The variable horizontal gradient of the PGWS is approximately 0.008 ft/ft. Historically, water levels in the PGWS have fluctuated across the study area (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 response to ongoing water operations (BGW February 2001) (Attachment 6C, Figures 6C-1 through 6C-7).

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

Characteristic	PGWS	Regional Aquifer
Pressure Head	Unconfined (water table) conditions	Unconfined to semiconfined 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 0.008 ft/ft	Approximate average of 0.009 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 study area	Increasing water levels in the north, declining water levels in the center, and increasing in the southeast part of the TAG study area
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.
ARG = Ancestral Rio Grande (lithofacies).
ft = Foot (feet).
ft/ft = Feet/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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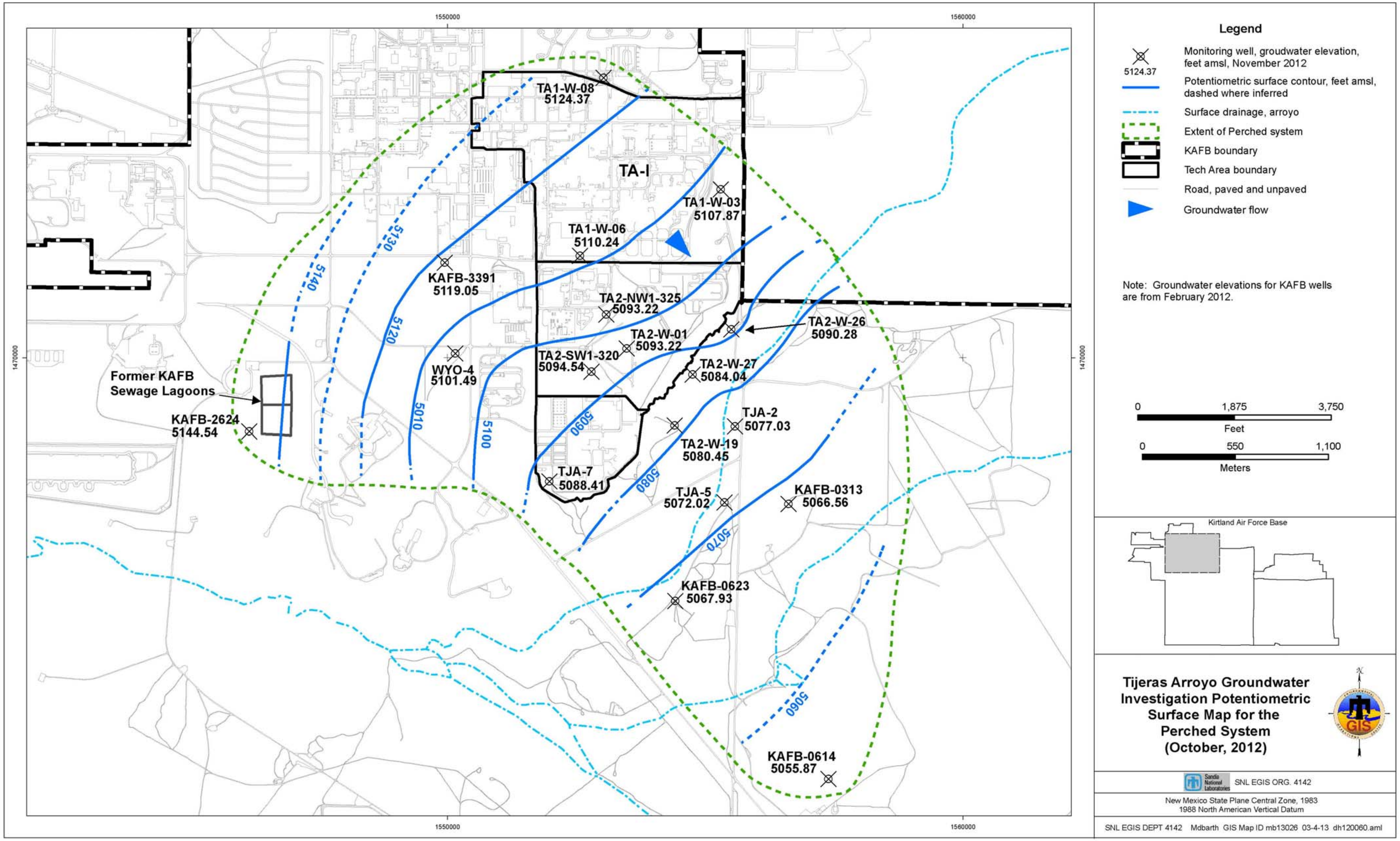

Figure 6-4. Tijeras Arroyo Groundwater Investigation Potentiometric Surface Map for the Perched Groundwater System (October 2012)

Figure 6-5 presents the October 2012 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 central portion of the study area is approximately 0.009 ft/ft. Vertical flow gradients within the TAG study area 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 study area (SNL November 2005) (Attachment 6C, Figures 6C-8 through 6C-12). 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 study area 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. 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 Installation Restoration Program (IRP), 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 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 waste line and 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.

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 waste 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.

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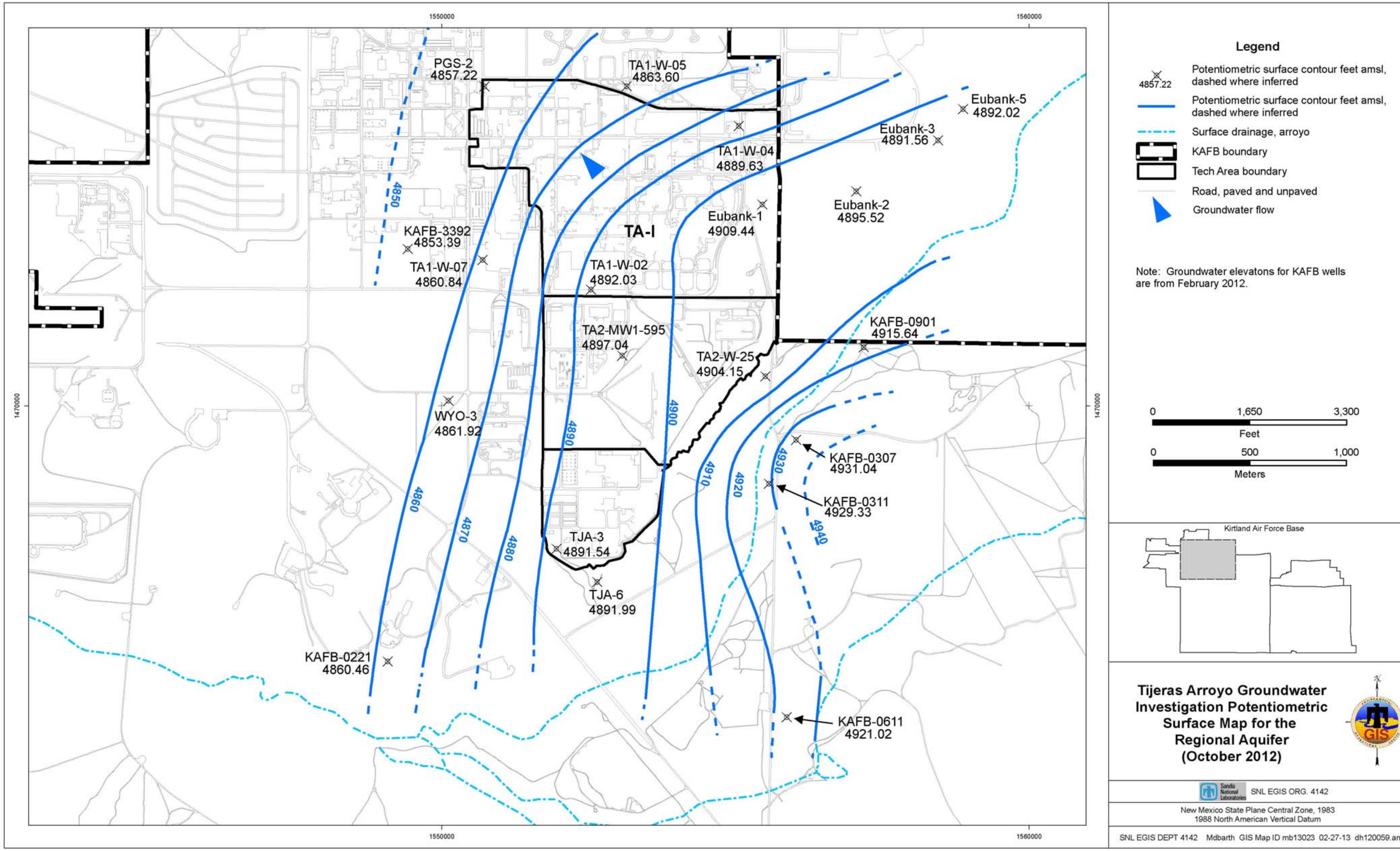

Figure 6-5. Tijeras Arroyo Groundwater Investigation Potentiometric Surface Map for the Regional Aquifer (October 2012)

Soil-vapor and soil samples collected from the vadose zone (land surface to the water table) during drilling operations and from the 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 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 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., vapor or 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 is discontinuous across the PGWS and does not indicate a single 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 9.6 μg/L for monitoring well TA2-W-26 (March 1998); the results for groundwater samples from only three TAG study area 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 study area 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 study area. 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 study area regional aquifer monitoring wells exceed the MCL of 5 µg/L for TCE.

For the regional aquifer, groundwater samples from nine SNL/NM TAG study area 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 and KAFB well fields to the north and northwest. 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 ABCWUA and KAFB well fields.

6.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of SNL/NM ER Operations as well as implements and enforces federal 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 study area are contained in the 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). More recently TAG activities have been conducted as required by the NMED-approved TAG Investigation Work Plan (SNL June 2003).

The 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 Order (NMED April 2004). The TAG investigation must comply with requirements set forth in the Order for site characterization and the development of a CME. The 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 Order.

Although the Order requires that DOE/Sandia evaluate the nature and extent of contamination in the TAG study area, no specific reporting requirements are prescribed in the 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 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 Order (NMED April 2004). Additional information on radionuclides and the scope of the Order is available in Section III.A of the Order.

6.3 Scope of Activities

The CY 2012 activities for the TAG investigation, including plans and reports, are listed in Section 6.1.5. However, the recent field activity completed in the study area was solely groundwater monitoring. 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), split, 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. Split samples are used to verify the performance of the analytical laboratory. 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 study area that exceed 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.

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

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

Table 6-4. Groundwater Monitoring Well Network and Sampling Dates for the TAG Study Area, Calendar Year 2012

Date of Sampling Event	Wells Sampled		SAP
March 2012	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 FY12, 2nd Quarter Sampling* (SNL February 2012)
June 2012	TA2-SW1-320 TA2-W-19 TA2-W-26 TJA-2	TJA-4 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY12, 3rd Quarter Sampling* (SNL May 2012)
August/September 2012	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 FY12, 4th Quarter Sampling* (SNL July 2012)
November/December 2012	TA2-SW1-320 TA2-W-19 TA2-W-26 TJA-2	TJA-4 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY13, 1st Quarter Sampling* (SNL November 2012)

NOTES:
FY = Fiscal Year.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
TAG = Tijeras Arroyo Groundwater.

Table 6-5. Parameters Sampled at TAG Wells for Each Sampling Event, Calendar Year 2012

Parameter	March 2012		
NPN VOCs	TA2-SW1-320 (QED™) TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27	TJA-2 TJA-2 (dup) TJA-3 TJA-4 TJA-6	TJA-6 (dup) TJA-7 WYO-4
Parameter	**June 2012**		
NPN VOCs	TA2-SW1-320 (QED™) TA2-SW1-320 (QED™) (dup) TA2-W-19 TA2-W-19 (dup) TA2-W-26	TJA-2 TJA-4 TJA-7 WYO-4	
Parameter	**August/September 2012**		
Alkalinity Anions Gamma Spec* Gross alpha/beta activity NPN TAL Metals, plus Total Uranium Tritium VOCs	PGS-2 (QED™) TA1-W-01 TA1-W-01 (dup) TA1-W-02 TA1-W-03 TA1-W-04 TA1-W-04 (dup) TA1-W-05	TA1-W-06 TA1-W-08 TA2-NW1-595 TA2-SW1-320 (QED™) TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27	TJA-2 TJA-3 TJA-3 (dup) TJA-4 TJA-6 TJA-7 WYO-3 WYO-4
Parameter	**November/December 2012**		
NPN VOCs	TA2-SW1-320 (QED™) TA2-W-19 TA2-W-26 TJA-2	TJA-4 TJA-7 WYO-4 WYO-4 (dup)	

NOTES:
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).
QED™ = QED Environmental Systems, Inc. (MicroPurge® low-flow sampling method).
TAG = Tijeras Arroyo Groundwater.
TAL = Target Analyte List.
VOC = Volatile organic compound.

Seven VOCs were detected during CY 2012. 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 9.42 µg/L in the sample collected during the March 2012 sampling event. Figure 6B-1 (Attachment 6B) shows that the TCE concentrations in samples from monitoring well WYO-4 slightly exceed the MCL, and the trend ranges from stable to slightly 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-19, TJA-2, TJA-4, and TJA-7. The maximum concentration of NPN detected during this reporting period is 32.1 mg/L in the sample from monitoring well TJA-4 collected during the September 2012 sampling event. Figures 6B-2 through 6B-6 (Attachment 6B) show that the NPN concentrations in monitoring wells TA2-SW1-320, TJA-4, and TJA-7 have generally exceeded the

MCL for the duration of the wells, and trends range from slightly increasing to slightly decreasing over time. In contrast, NPN concentrations in monitoring wells TA2-W-19 and TJA-2 only occasionally exceeded the MCL, and trends are slightly increasing over time.

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. 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, potential of hydrogen (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 (relative percent difference [RPD] values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters, except for two analytes. During the August/September 2012 sampling event, the RPD for bromide in monitoring well TJA-3 and nickel in monitoring well TA1-W-04 are calculated at 46 and 109, respectively. Both bromide and nickel concentrations are reported below associated practical quantitation limits and the calculated RPD values are estimated.

The results for the EB analyses are as follows:

- **March 2012 Sampling Event—**The EB sample was collected prior to sampling monitoring wells TJA-2 and TJA-6 and submitted for analysis of VOCs and NPN. The organic compounds bromodichloromethane, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was required, since these compounds were not detected in the associated environmental samples.

- **June 2012 Sampling Event—**An EB sample was collected prior to sampling monitoring well TA2-W-19 and submitted for analysis of VOCs and NPN. Bromodichloromethane, chloroform, dibromochloromethane, and toluene were detected in the EB sample. No corrective action was required for bromodichloromethane, chloroform, or dibromochloromethane since these compounds were not detected in the associated environmental sample. Toluene results in associated environmental samples were qualified as not detected during data validation since sample results are less than 10 times the EB value.

- **August/September 2012 Sampling Event—**EB samples were collected prior to sampling monitoring wells TA1-W-01, TA1-W-04, and TJA-3 and submitted for all analyses. Additional EB samples were collected for VOC analysis only prior to sampling monitoring wells TA2-W-26, TA2-W-27, and TJA-6. Bromodichloromethane, bromoform, calcium, chloroform, chloride, copper, dibromochloromethane, lead, sodium, and toluene were detected above laboratory MDLs. No corrective action was necessary for bromodichloromethane, bromoform, calcium, chloride, dibromochloromethane, lead, or sodium since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result. Because chloroform, copper, and toluene were detected in environmental samples at concentrations less than five times the associated EB results, the reported concentrations of these three analytes were qualified as not detected during data validation.

- **November/December 2012 Sampling Event—**An EB sample was collected prior to sampling monitoring well WYO-4 and submitted for analysis of VOCs and NPN and an EB sample was collected prior to TJA-2 and submitted for analysis of VOCs only. Bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was required since these compounds were not detected in the associated environmental samples.

The results for the TB analyses are as follows:

- **March 2012 Sampling Event—**Methylene chloride was detected in TBs associated with monitoring wells TA2-SW1-320, TA2-W-19, TA2-W-26, and TJA-2 samples. Methylene chloride results in associated environmental samples were qualified as not detected during data validation since the sample results are less than 10 times the TB value.

- **June 2012 Sampling Event—**Toluene was detected in TBs associated with monitoring wells TA2-W-19, TA2-W-26, TJA-4, and TJA-7 samples. Toluene results in associated environmental samples were qualified as not detected during data validation since sample results are less than 10 times the TB value.

- **August/September 2012 Sampling Event—**Methylene chloride was detected in the TB associated with monitoring well TA1-W-01 samples. Methylene chloride result in monitoring well TA1-W-01 duplicate environmental sample was qualified as not detected during data validation since sample result is less than 10 times the TB value.

- **November/December 2012 Sampling Event—**No VOCs were detected above laboratory MDLs in any TB sample.

The results for the FB analyses are as follows:

- **March 2012 Sampling Event—**FB samples were collected at monitoring wells TA2-SW1-320 and TJA-4. The compounds detected included bromodichloromethane, chloroform, dibromochloromethane, and TCE. No corrective action was required, since these compounds were not detected in the associated environmental samples.

- **June 2012 Sampling Event—**FB samples were collected at monitoring wells TJA-7 and WYO-4. The compounds detected included bromodichloromethane, chloroform, and dibromochloromethane. No corrective action was required, since these compounds were not detected in the associated environmental samples.

- **August/September 2012 Sampling Event—**FB samples were collected at monitoring wells TA1-W-03, TA2-W-27, and TJA-2. The compounds detected in FB samples included bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was required, since these compounds were not detected in the associated environmental samples, except for chloroform. Chloroform in monitoring well TA1-W-03 was qualified as not detected during data validation, since the compound was reported in the FB at a concentration greater than the environmental sample result.

- **November/December 2012 Sampling Event—**A FB sample was collected at monitoring well TJA-2. The compounds detected included bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was required, since these compounds were not detected in the associated environmental sample.

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 2012, May 2012, July 2012, and November 2012) 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 a minimum of 80 percent of the original water level and then samples were collected. (2) A QED Environmental Systems, Inc. (QED™) (MicroPurge® low-flow sampling method) sampling system was used to collect a groundwater sample from monitoring wells PGS-2 and TA2-SW1-320. Conventional sampling equipment cannot be lowered to the proper sampling depth in either of these two wells due to well construction issues.

- **March 2012 Sampling Event—**A new groundwater sampling truck including new stainless steel tubing, valves, and sampling manifold was used at all TAG monitoring wells. Toluene was detected at low-level concentrations in nine environmental groundwater samples collected using the new truck. The concentrations of toluene ranged from 0.260 μg/L to 1.161 μg/L, far below the MCL of 1,000 μg/L. All QC requirements from the analytical laboratory were within acceptable range. The low-level toluene detections may be attributed to material (i.e., pipe sealant) in the new sampling equipment. SNL/NM personnel performed several equipment decontaminations prior to use, but additional decontaminations and the collection of additional field QC samples will be necessary to determine the actual source of toluene.

- **June 2012 Sampling Event—**No variances, nonconformances, or project-specific issues relevant to requirements in the TAG Investigation mini-SAP (SNL July 2012) were identified during June 2012 sampling activities.

- **August/September 2012 Sampling Event—**Toluene is not commonly detected in Tijeras Arroyo groundwater samples. A new water sampling truck was used, and the new tubing, valves, and sampling manifold system installed in the new water truck may have contributed to the low level detection of toluene. As a result, the sampling manifold system was modified with a backflow protection valve and the flow meter was moved to the discharge line. Three additional VOC equipment blank samples were collected after completion of modifications. Toluene detections in groundwater samples have decreased in frequency since the modification of the manifold system.

- **November/December 2012 Sampling Event**—Very high turbidity measurements were observed during purging and sampling activities at monitoring well TA2-SW1-320. The QED™ sampling system was pulled and field team members discovered sediment and possibly grout material on the pump system. In January 2013, SNL/NM personnel performed a video camera survey and revealed damaged well casings at two sections (approximately 61 and 102 ft below top of casing). DOE/NNSA and Sandia will continue to monitor this well on a quarterly frequency until a final determination is made by NMED and SNL/NM.

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 current conceptual model, and plans for studies to be completed during CY 2013 at the TAG study area.

The TAG study area encompasses an area of approximately 40 sq mi in the north-central portion of KAFB. 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, June, August/September, and November/December 2012. 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. 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 study area wells. NPN concentrations exceed the MCL of 10 mg/L in samples from monitoring wells TA2-SW1-320, TA2-W-19, TJA-2, TJA-4, and TJA-7, with a maximum concentration of 32.1 mg/L in the sample from monitoring well TJA-4 collected during the September 2012 sampling event.

TCE exceeds 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 9.42 µg/L in the sample collected during the March 2012 sampling event. TCE concentrations in monitoring well WYO-4 have slightly exceeded the MCL for the duration of the well, and the trend ranges from stable to slightly increasing over time.

The analytical results for this reporting period are consistent with historical concentrations. The following conclusions are based on a comprehensive review of available information for current groundwater contamination conditions in the TAG study area:

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

- Based on the historical use and disposal of chlorinated solvents, the extent of TCE in groundwater is probably 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 study area.

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

- The minor detections of toluene at concentrations less than three orders of magnitude below the MCL appear to be related to the newly-installed sampling equipment and do not represent toluene contamination of groundwater.

- The current conceptual model described in Section 6.1.7 does not require modification based on the analytical results for this reporting period.

Ongoing environmental studies of the TAG study area 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 IRP personnel with respect to the results of TCE and nitrate abatement studies.

- As available, obtain groundwater results from both KAFB 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 this 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 2012

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-SW1-320 13-Mar-12	Methylene chloride	3.71	3.00	10.0	5.00	J	10.00U	091891-001	SW846-8260B
TA2-W-01	Tetrachloroethene	0.530	0.300	1.00	5.00	J		091880-001	SW846-8260B
06-Mar-12	Toluene	0.440	0.250	1.00	1000	J		091880-001	SW846-8260B
	Trichloroethene	1.71	0.250	1.00	5.00			091880-001	SW846-8260B
TA2-W-19	1,1-Dichloroethane	0.430	0.300	1.00	NE	J		091894-001	SW846-8260B
13-Mar-12	Methylene chloride	4.04	3.00	10.0	5.00	J	10.00U	091894-001	SW846-8260B
	Toluene	0.300	0.250	1.00	1000	J		091894-001	SW846-8260B
	Trichloroethene	3.19	0.250	1.00	5.00			091894-001	SW846-8260B
	cis-1,2-Dichloroethene	0.530	0.300	1.00	70.0	J		091894-001	SW846-8260B
TA2-W-26	Chloroform	0.320	0.250	1.00	NE	J		091896-001	SW846-8260B
14-Mar-12	Methylene chloride	4.16	3.00	10.0	5.00	J	10.00U	091896-001	SW846-8260B
	Tetrachloroethene	0.860	0.300	1.00	5.00	J		091896-001	SW846-8260B
	Toluene	0.260	0.250	1.00	1000	J		091896-001	SW846-8260B
	Trichloroethene	0.930	0.250	1.00	5.00	J		091896-001	SW846-8260B
	cis-1,2-Dichloroethene	0.360	0.300	1.00	70.0	J		091896-001	SW846-8260B
TA2-W-27	Tetrachloroethene	1.54	0.300	1.00	5.00			091882-001	SW846-8260B
07-Mar-12	Toluene	0.260	0.250	1.00	1000	J		091882-001	SW846-8260B
	Trichloroethene	1.20	0.250	1.00	5.00			091882-001	SW846-8260B
TJA-2	1,1-Dichloroethane	0.410	0.300	1.00	NE	J		091900-001	SW846-8260B
15-Mar-12	Methylene chloride	3.72	3.00	10.0	5.00	J	10.00U	091900-001	SW846-8260B
	Toluene	0.260	0.250	1.00	1000	J		091900-001	SW846-8260B
	Trichloroethene	3.14	0.250	1.00	5.00			091900-001	SW846-8260B
	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		091900-001	SW846-8260B
TJA-2 (Duplicate)	Methylene chloride	3.56	3.00	10.0	5.00	J	10.00U	091901-001	SW846-8260B
15-Mar-12	Toluene	0.270	0.250	1.00	1000	J		091901-001	SW846-8260B
	Trichloroethene	3.30	0.250	1.00	5.00			091901-001	SW846-8260B
	cis-1,2-Dichloroethene	0.460	0.300	1.00	70.0	J		091901-001	SW846-8260B
TJA-4 20-Mar-12	Toluene	0.340	0.300	1.00	1000	J		091905-001	SW846-8260B
TJA-6 12-Mar-12	Toluene	0.780	0.250	1.00	1000	J		091886-001	SW846-8260B
TJA-6 (Duplicate) 12-Mar-12	Toluene	0.720	0.250	1.00	1000	J		091887-001	SW846-8260B
TJA-7	Toluene	0.390	0.300	1.00	1000	J		091908-001	SW846-8260B
21-Mar-12	Trichloroethene	0.670	0.300	1.00	5.00	J		091908-001	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 2012

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]
WYO-4 19-Mar-12	1,1-Dichloroethane	1.04	0.300	1.00	NE			091903-001	SW846-8260B
	Toluene	1.61	0.300	1.00	1000			091903-001	SW846-8260B
	Trichloroethene	**9.42**	0.300	1.00	5.00			091903-001	SW846-8260B
	cis-1,2-Dichloroethene	2.12	0.300	1.00	70.0			091903-001	SW846-8260B
TA2-W-19 12-Jun-12	1,1-Dichloroethane	0.580	0.300	1.00	NE	J		092512-001	SW846-8260B
	Toluene	0.540	0.300	1.00	1000	J	1.0U	092512-001	SW846-8260B
	Trichloroethene	3.75	0.300	1.00	5.00			092512-001	SW846-8260B
	cis-1,2-Dichloroethene	0.580	0.300	1.00	70.0	J		092512-001	SW846-8260B
TA2-W-19 (Duplicate) 12-Jun-12	1,1-Dichloroethane	0.560	0.300	1.00	NE	J		092513-001	SW846-8260B
	Toluene	0.540	0.300	1.00	1000	J	1.0U	092513-001	SW846-8260B
	Trichloroethene	4.00	0.300	1.00	5.00			092513-001	SW846-8260B
	cis-1,2-Dichloroethene	0.540	0.300	1.00	70.0	J		092513-001	SW846-8260B
TA2-W-26 11-Jun-12	Chloroform	0.300	0.300	1.00	NE	J		092508-001	SW846-8260B
	Tetrachloroethene	0.850	0.300	1.00	5.00	J		092508-001	SW846-8260B
	Toluene	0.870	0.300	1.00	1000	J	1.0U	092508-001	SW846-8260B
	Trichloroethene	1.10	0.300	1.00	5.00			092508-001	SW846-8260B
	cis-1,2-Dichloroethene	0.320	0.300	1.00	70.0	J		092508-001	SW846-8260B
TJA-2 13-Jun-12	1,1-Dichloroethane	0.440	0.300	1.00	NE	J		092515-001	SW846-8260B
	Toluene	0.610	0.300	1.00	1000	J		092515-001	SW846-8260B
	Trichloroethene	3.91	0.300	1.00	5.00			092515-001	SW846-8260B
	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		092515-001	SW846-8260B
TJA-4 15-Jun-12	Toluene	0.510	0.300	1.00	1000	J	1.0U	092523-001	SW846-8260B
TJA-7 18-Jun-12	Toluene	1.09	0.300	1.00	1000		U	092525-001	SW846-8260B
	Trichloroethene	0.660	0.300	1.00	5.00	J		092525-001	SW846-8260B
WYO-4 21-Jun-12	1,1-Dichloroethane	1.07	0.300	1.00	NE			092520-001	SW846-8260B
	Toluene	2.47	0.300	1.00	1000			092520-001	SW846-8260B
	Trichloroethene	**8.57**	0.300	1.00	5.00			092520-001	SW846-8260B
	cis-1,2-Dichloroethene	1.83	0.300	1.00	70.0			092520-001	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 2012

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-01 16-Aug-12	Toluene	0.490	0.300	1.00	1000	J	3.70U	092803-001	SW846-8260B
TA1-W-01 (Duplicate)	Methylene chloride	3.09	3.00	10.0	5.00	J	31.6UJ	092804-001	SW846-8260B
16-Aug-12	Toluene	0.450	0.300	1.00	1000	J	3.70U	092804-001	SW846-8260B
TA1-W-02 15-Aug-12	Toluene	0.560	0.300	1.00	1000	J		092799-001	SW846-8260B
TA1-W-03	Chloroform	0.430	0.300	1.00	NE	J	1.00U	092808-001	SW846-8260B
20-Aug-12	Toluene	0.610	0.300	1.00	1000	J		092808-001	SW846-8260B
TA1-W-05 21-Aug-12	Toluene	0.350	0.300	1.00	1000	J		092811-001	SW846-8260B
TA1-W-06	1,1-Dichloroethene	0.920	0.300	1.00	7.00	J		092813-001	SW846-8260B
22-Aug-12	Chloroform	0.340	0.300	1.00	NE	J		092813-001	SW846-8260B
	Toluene	0.360	0.300	1.00	1000	J		092813-001	SW846-8260B
	Trichloroethene	0.390	0.300	1.00	5.00	J		092813-001	SW846-8260B
TA1-W-08 28-Aug-12	Toluene	0.360	0.300	1.00	1000	J		092822-001	SW846-8260B
TA2-W-01	Tetrachloroethene	0.320	0.300	1.00	5.00	J		092824-001	SW846-8260B
04-Sep-12	Toluene	0.430	0.300	1.00	1000	J		092824-001	SW846-8260B
	Trichloroethene	1.26	0.300	1.00	5.00			092824-001	SW846-8260B
TA2-W-19	1,1-Dichloroethane	0.440	0.300	1.00	NE	J		092840-001	SW846-8260B
12-Sep-12	Trichloroethene	3.12	0.300	1.00	5.00			092840-001	SW846-8260B
	cis-1,2-Dichloroethene	0.380	0.300	1.00	70.0	J		092840-001	SW846-8260B
TA2-W-26	Chloroform	0.300	0.300	1.00	NE	J	1.00U	092842-001	SW846-8260B
13-Sep-12	Tetrachloroethene	0.820	0.300	1.00	5.00	J		092842-001	SW846-8260B
	Trichloroethene	0.880	0.300	1.00	5.00	J		092842-001	SW846-8260B
	cis-1,2-Dichloroethene	0.310	0.300	1.00	70.0	J		092842-001	SW846-8260B
TA2-W-27	Tetrachloroethene	1.16	0.300	1.00	5.00			092826-001	SW846-8260B
06-Sep-12	Trichloroethene	0.860	0.300	1.00	5.00	J		092826-001	SW846-8260B
TJA-2	1,1-Dichloroethane	0.480	0.300	1.00	NE	J		092846-001	SW846-8260B
18-Sep-12	Toluene	0.360	0.300	1.00	1000	J		092846-001	SW846-8260B
	Trichloroethene	3.96	0.300	1.00	5.00			092846-001	SW846-8260B
	cis-1,2-Dichloroethene	0.530	0.300	1.00	70.0	J		092846-001	SW846-8260B
TJA-3 10-Sep-12	Trichloroethene	2.09	0.300	1.00	5.00			092833-001	SW846-8260B
TJA-3 (Duplicate) 10-Sep-12	Trichloroethene	2.02	0.300	1.00	5.00			092834-001	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 2012

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-7	Toluene	0.320	0.300	1.00	1000	J		092851-001	SW846-8260B
20-Sep-12	Trichloroethene	0.750	0.300	1.00	5.00	J		092851-001	SW846-8260B
WYO-3 27-Aug-12	Toluene	0.960	0.300	1.00	1000	J		092820-001	SW846-8260B
WYO-4	1,1-Dichloroethane	1.04	0.300	1.00	NE			092844-001	SW846-8260B
17-Sep-12	Toluene	1.51	0.300	1.00	1000			092844-001	SW846-8260B
	Trichloroethene	**7.81**	0.300	1.00	5.00			092844-001	SW846-8260B
	cis-1,2-Dichloroethene	2.11	0.300	1.00	70.0			092844-001	SW846-8260B
TA2-W-19	1,1-Dichloroethane	0.450	0.300	1.00	NE	J		093158-001	SW846-8260B
27-Nov-12	Trichloroethene	3.43	0.300	1.00	5.00			093158-001	SW846-8260B
	cis-1,2-Dichloroethene	0.430	0.300	1.00	70.0	J		093158-001	SW846-8260B
TA2-W-26	Chloroform	0.360	0.300	1.00	NE	J		093156-001	SW846-8260B
26-Nov-12	Tetrachloroethene	1.12	0.300	1.00	5.00			093156-001	SW846-8260B
	Toluene	0.350	0.300	1.00	1000	J		093156-001	SW846-8260B
	Trichloroethene	1.62	0.300	1.00	5.00			093156-001	SW846-8260B
	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		093156-001	SW846-8260B
TJA-2	1,1-Dichloroethane	0.430	0.300	1.00	NE	J		093164-001	SW846-8260B
29-Nov-12	Trichloroethene	3.77	0.300	1.00	5.00			093164-001	SW846-8260B
	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		093164-001	SW846-8260B
TJA-7 05-Dec-12	Trichloroethene	0.850	0.300	1.00	5.00	J		093174-001	SW846-8260B
WYO-4	1,1-Dichloroethane	0.970	0.300	1.00	NE	J		093169-001	SW846-8260B
03-Dec-12	Toluene	0.370	0.300	1.00	1000	J		093169-001	SW846-8260B
	Trichloroethene	**9.03**	0.300	1.00	5.00			093169-001	SW846-8260B
	cis-1,2-Dichloroethene	1.78	0.300	1.00	70.0			093169-001	SW846-8260B
WYO-4 (Duplicate)	1,1-Dichloroethane	1.00	0.300	1.00	NE			093170-001	SW846-8260B
03-Dec-12	Toluene	0.390	0.300	1.00	1000	J		093170-001	SW846-8260B
	Trichloroethene	**9.26**	0.300	1.00	5.00			093170-001	SW846-8260B
	cis-1,2-Dichloroethene	1.86	0.300	1.00	70.0			093170-001	SW846-8260B

Refer to footnotes on page 6A-51.

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

Calendar Year 2012

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300 - 0.325	Chlorobenzene	0.250 - 0.300
1,1,2,2-Tetrachloroethane	0.250 - 0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.250 - 0.300	Chloroform	0.250 - 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	0.250 - 0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.250 - 0.300	Methylcyclohexane	3.00
1,2-Dichloropropane	0.250 - 0.300	Methylene chloride	3.00
1,3-Dichlorobenzene	0.300	Styrene	0.250 - 0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
1,4-Dioxane	15.0	Tetrachloroethene	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	Toluene	0.250 - 0.300
2-Butanone	1.25 - 2.00	Trichloroethene	0.250 - 0.300
2-Hexanone	1.25 - 2.20	Trichlorofluoromethane	0.300
4-methyl-, 2-Pentanone	1.25 - 1.50	Vinyl acetate	1.5
Acetone	3.00 - 3.50	Vinyl chloride	0.300 - 0.500
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.250 - 0.300	cis-1,3-Dichloropropene	0.250 - 0.300
Bromoform	0.250 - 0.300	m-, p-Xylene	0.300
Bromomethane	0.300	o-Xylene	0.300
Carbon disulfide	1.25 - 1.50	trans-1,2-Dichloroethene	0.300
Carbon tetrachloride	0.300	trans-1,3-Dichloropropene	0.250 - 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 2012

Well ID	Analyte	Result[a] (mg/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 13-Mar-12	Nitrate plus nitrite as N	**20.0**	0.500	2.50	10.0			091891-018	EPA 353.2
TA2-W-01 06-Mar-12	Nitrate plus nitrite as N	4.06	0.100	0.500	10.0			091880-018	EPA 353.2
TA2-W-19 13-Mar-12	Nitrate plus nitrite as N	9.65	0.500	2.50	10.0			091894-018	EPA 353.2
TA2-W-26 14-Mar-12	Nitrate plus nitrite as N	4.97	0.100	0.500	10.0			091896-018	EPA 353.2
TA2-W-27 07-Mar-12	Nitrate plus nitrite as N	3.72	0.100	0.500	10.0			091882-018	EPA 353.2
TJA-2 15-Mar-12	Nitrate plus nitrite as N	9.90	0.500	2.50	10.0			091900-018	EPA 353.2
TJA-2 (Duplicate) 15-Mar-12	Nitrate plus nitrite as N	9.95	0.500	2.50	10.0			091901-018	EPA 353.2
TJA-3 13-Mar-12	Nitrate plus nitrite as N	2.71	0.100	0.500	10.0			091889-018	EPA 353.2
TJA-4 20-Mar-12	Nitrate plus nitrite as N	**28.0**	0.250	1.25	10.0			091905-018	EPA 353.2
TJA-6 12-Mar-12	Nitrate plus nitrite as N	2.62	0.100	0.500	10.0			091886-018	EPA 353.2
TJA-6 (Duplicate) 12-Mar-12	Nitrate plus nitrite as N	2.65	0.100	0.500	10.0			091887-018	EPA 353.2
TJA-7 21-Mar-12	Nitrate plus nitrite as N	**22.7**	0.250	1.25	10.0			091908-018	EPA 353.2
WYO-4 19-Mar-12	Nitrate plus nitrite as N	2.91	0.100	0.500	10.0			091903-018	EPA 353.2
TA2-SW1-320 14-Jun-12	Nitrate plus nitrite as N	**21.0**	0.850	2.50	10.0			092517-018	EPA 353.2
TA2-SW1-320 (Duplicate) 14-Jun-12	Nitrate plus nitrite as N	**20.7**	0.850	2.50	10.0			092518-018	EPA 353.2
TA2-W-19 12-Jun-12	Nitrate plus nitrite as N	**10.1**	0.170	0.500	10.0			092512-018	EPA 353.2
TA2-W-19 (Duplicate) 12-Jun-12	Nitrate plus nitrite as N	**13.7**	0.170	0.500	10.0			092513-018	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 2012

Well ID	Analyte	Result[a] (mg/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 11-Jun-12	Nitrate plus nitrite as N	6.84	0.170	0.500	10.0			092508-018	EPA 353.2
TJA-2 13-Jun-12	Nitrate plus nitrite as N	**10.6**	0.170	0.500	10.0			092515-018	EPA 353.2
TJA-4 15-Jun-12	Nitrate plus nitrite as N	**31.4**	0.850	2.50	10.0			092523-018	EPA 353.2
TJA-7 18-Jun-12	Nitrate plus nitrite as N	**25.7**	0.850	2.50	10.0			092525-018	EPA 353.2
WYO-4 21-Jun-12	Nitrate plus nitrite as N	3.49	0.170	0.500	10.0			092520-018	EPA 353.2
PGS-2 17-Aug-12	Nitrate plus nitrite as N	1.32	0.085	0.250	10.0	B		092806-018	EPA 353.2
TA1-W-01 16-Aug-12	Nitrate plus nitrite as N	3.04	0.085	0.250	10.0			092803-018	EPA 353.2
TA1-W-01 (Duplicate) 16-Aug-12	Nitrate plus nitrite as N	2.99	0.085	0.250	10.0			092804-018	EPA 353.2
TA1-W-02 15-Aug-12	Nitrate plus nitrite as N	1.14	0.085	0.250	10.0			092799-018	EPA 353.2
TA1-W-03 20-Aug-12	Nitrate plus nitrite as N	6.74	0.170	0.500	10.0	B		092808-018	EPA 353.2
TA1-W-04 23-Aug-12	Nitrate plus nitrite as N	1.78	0.085	0.250	10.0	B		092817-018	EPA 353.2
TA1-W-04 (Duplicate) 23-Aug-12	Nitrate plus nitrite as N	1.74	0.085	0.250	10.0	B		092818-018	EPA 353.2
TA1-W-05 21-Aug-12	Nitrate plus nitrite as N	1.18	0.085	0.250	10.0	B		092811-018	EPA 353.2
TA1-W-06 22-Aug-12	Nitrate plus nitrite as N	3.11	0.085	0.250	10.0	B		092813-018	EPA 353.2
TA1-W-08 28-Aug-12	Nitrate plus nitrite as N	7.16	0.170	0.500	10.0			092822-018	EPA 353.2
TA2-SW1-320 11-Sep-12	Nitrate plus nitrite as N	**20.9**	0.850	2.50	10.0			092836-018	EPA 353.2
TA2-NW1-595 29-Aug-12	Nitrate plus nitrite as N	3.66	0.170	0.500	10.0			092838-018	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 2012

Well ID	Analyte	Result[a] (mg/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 04-Sep-12	Nitrate plus nitrite as N	4.65	0.085	0.250	10.0			092824-018	EPA 353.2
TA2-W-19 12-Sep-12	Nitrate plus nitrite as N	9.18	0.425	1.25	10.0			092840-018	EPA 353.2
TA2-W-26 13-Sep-12	Nitrate plus nitrite as N	5.80	0.085	0.250	10.0			092842-018	EPA 353.2
TA2-W-27 06-Sep-12	Nitrate plus nitrite as N	4.21	0.085	0.250	10.0			092826-018	EPA 353.2
TJA-2 18-Sep-12	Nitrate plus nitrite as N	**10.3**	0.170	0.500	10.0			092846-018	EPA 353.2
TJA-3 10-Sep-12	Nitrate plus nitrite as N	2.47	0.085	0.250	10.0			092833-018	EPA 353.2
TJA-3 (Duplicate) 10-Sep-12	Nitrate plus nitrite as N	2.50	0.085	0.250	10.0			092834-018	EPA 353.2
TJA-4 19-Sep-12	Nitrate plus nitrite as N	**32.1**	0.850	2.50	10.0			092849-018	EPA 353.2
TJA-6 07-Sep-12	Nitrate plus nitrite as N	2.44	0.085	0.250	10.0			092829-018	EPA 353.2
TJA-7 20-Sep-12	Nitrate plus nitrite as N	**26.2**	0.850	2.50	10.0			092851-018	EPA 353.2
WYO-3 27-Aug-12	Nitrate plus nitrite as N	1.92	0.085	0.250	10.0			092820-018	EPA 353.2
WYO-4 17-Sep-12	Nitrate plus nitrite as N	2.95	0.085	0.250	10.0			092844-018	EPA 353.2
TA2-SW1-320 28-Nov-12	Nitrate plus nitrite as N	**20.9**	0.850	2.50	10.0			093162-018	EPA 353.2
TA2-W-19 27-Nov-12	Nitrate plus nitrite as N	**10.6**	0.425	1.25	10.0			093158-018	EPA 353.2
TA2-W-26 26-Nov-12	Nitrate plus nitrite as N	5.43	0.170	0.500	10.0			093156-018	EPA 353.2
TJA-2 29-Nov-12	Nitrate plus nitrite as N	**11.0**	0.425	1.25	10.0			093164-018	EPA 353.2
TJA-4 04-Dec-12	Nitrate plus nitrite as N	**28.8**	1.70	5.00	10.0			093172-018	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 2012

Well ID	Analyte	Result[a] (mg/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 05-Dec-12	Nitrate plus nitrite as N	**23.5**	1.70	5.00	10.0			093174-018	EPA 353.2
WYO-4 03-Dec-12	Nitrate plus nitrite as N	2.98	0.425	1.25	10.0			093169-018	EPA 353.2
WYO-4 (Duplicate) 03-Dec-12	Nitrate plus nitrite as N	3.23	0.425	1.25	10.0			093170-018	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 2012

Well ID	Analyte	Result[a] (mg/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	0.268	0.067	0.200	NE			092806-016	SW846 9056
17-Aug-12	Chloride	19.8	0.067	0.200	NE			092806-016	SW846 9056
	Fluoride	0.0666	0.033	0.100	4.0	J	J+	092806-016	SW846 9056
	Sulfate	71.7	1.33	4.00	NE			092806-016	SW846 9056
	Bicarbonate Alkalinity	217	0.725	1.00	NE			092806-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092806-022	SM 2320B
TA1-W-01	Bromide	0.216	0.067	0.200	NE			092803-016	SW846 9056
16-Aug-12	Chloride	15.7	0.067	0.200	NE			092803-016	SW846 9056
	Fluoride	0.447	0.033	0.100	4.0			092803-016	SW846 9056
	Sulfate	75.0	1.33	4.00	NE			092803-016	SW846 9056
	Bicarbonate Alkalinity	176	0.725	1.00	NE			092803-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092803-022	SM 2320B
TA1-W-01 (Duplicate)	Bromide	0.215	0.067	0.200	NE			092804-016	SW846 9056
16-Aug-12	Chloride	15.7	0.067	0.200	NE			092804-016	SW846 9056
	Fluoride	0.462	0.033	0.100	4.0			092804-016	SW846 9056
	Sulfate	72.6	1.33	4.00	NE			092804-016	SW846 9056
	Bicarbonate Alkalinity	173	0.725	1.00	NE			092804-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092804-022	SM 2320B
TA1-W-02	Bromide	0.186	0.067	0.200	NE	J		092799-016	SW846 9056
15-Aug-12	Chloride	14.6	0.067	0.200	NE			092799-016	SW846 9056
	Fluoride	0.446	0.033	0.100	4.0			092799-016	SW846 9056
	Sulfate	68.5	1.33	4.00	NE			092799-016	SW846 9056
	Bicarbonate Alkalinity	168	0.725	1.00	NE			092799-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092799-022	SM 2320B
TA1-W-03	Bromide	3.34	0.067	0.200	NE			092808-016	SW846 9056
20-Aug-12	Chloride	238	6.70	20.0	NE			092808-016	SW846 9056
	Fluoride	0.253	0.033	0.100	4.0			092808-016	SW846 9056
	Sulfate	485	13.3	40.0	NE			092808-016	SW846 9056
	Bicarbonate Alkalinity	71.8	0.725	1.00	NE			092808-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092808-022	SM 2320B
TA1-W-04	Bromide	0.160	0.067	0.200	NE	J		092817-016	SW846 9056
23-Aug-12	Chloride	15.0	0.067	0.200	NE			092817-016	SW846 9056
	Fluoride	0.400	0.033	0.100	4.0			092817-016	SW846 9056
	Sulfate	55.5	1.33	4.00	NE			092817-016	SW846 9056
	Bicarbonate Alkalinity	171	0.725	1.00	NE			092817-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092817-022	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 2012

Well ID	Analyte	Result[a] (mg/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 (Duplicate)	Bromide	0.194	0.067	0.200	NE	J		092818-016	SW846 9056
23-Aug-12	Chloride	15.1	0.067	0.200	NE			092818-016	SW846 9056
	Fluoride	0.420	0.033	0.100	4.0			092818-016	SW846 9056
	Sulfate	56.3	1.33	4.00	NE			092818-016	SW846 9056
	Bicarbonate Alkalinity	174	0.725	1.00	NE			092818-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092818-022	SM 2320B
TA1-W-05	Bromide	0.151	0.067	0.200	NE	J		092811-016	SW846 9056
21-Aug-12	Chloride	11.3	0.067	0.200	NE			092811-016	SW846 9056
	Fluoride	0.330	0.033	0.100	4.0			092811-016	SW846 9056
	Sulfate	93.3	1.33	4.00	NE			092811-016	SW846 9056
	Bicarbonate Alkalinity	208	0.725	1.00	NE			092811-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092811-022	SM 2320B
TA1-W-06	Bromide	1.27	0.067	0.200	NE			092813-016	SW846 9056
22-Aug-12	Chloride	95.7	0.670	2.00	NE			092813-016	SW846 9056
	Fluoride	0.314	0.033	0.100	4.0			092813-016	SW846 9056
	Sulfate	194	1.33	4.00	NE			092813-016	SW846 9056
	Bicarbonate Alkalinity	88.1	0.725	1.00	NE			092813-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092813-022	SM 2320B
TA1-W-08	Bromide	2.82	0.067	0.200	NE			092822-016	SW846 9056
28-Aug-12	Chloride	225	6.70	20.0	NE			092822-016	SW846 9056
	Fluoride	0.250	0.033	0.100	4.0			092822-016	SW846 9056
	Sulfate	722	13.3	40.0	NE			092822-016	SW846 9056
	Bicarbonate Alkalinity	82.8	0.725	1.00	NE			092822-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092822-022	SM 2320B
TA2-SW1-320	Bromide	0.531	0.067	0.200	NE			092836-016	SW846 9056
11-Sep-12	Chloride	31.4	0.335	1.00	NE			092836-016	SW846 9056
	Fluoride	0.394	0.033	0.100	4.0			092836-016	SW846 9056
	Sulfate	14.3	0.133	0.400	NE			092836-016	SW846 9056
	Bicarbonate Alkalinity	114	0.725	1.00	NE			092836-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092836-022	SM 2320B
TA2-NW1-595	Bromide	1.43	0.067	0.200	NE			092838-016	SW846 9056
29-Aug-12	Chloride	102	0.670	2.00	NE			092838-016	SW846 9056
	Fluoride	0.322	0.033	0.100	4.0			092838-016	SW846 9056
	Sulfate	105	1.33	4.00	NE			092838-016	SW846 9056
	Bicarbonate Alkalinity	137	0.725	1.00	NE			092838-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092838-022	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 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01	Bromide	1.37	0.067	0.200	NE			092824-016	SW846 9056
04-Sep-12	Chloride	93.3	0.670	2.00	NE			092824-016	SW846 9056
	Fluoride	0.319	0.033	0.100	4.0			092824-016	SW846 9056
	Sulfate	52.7	1.33	4.00	NE			092824-016	SW846 9056
	Bicarbonate Alkalinity	103	0.725	1.00	NE			092824-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092824-022	SM 2320B
TA2-W-19	Bromide	0.933	0.067	0.200	NE			092840-016	SW846 9056
12-Sep-12	Chloride	62.6	0.670	2.00	NE			092840-016	SW846 9056
	Fluoride	0.373	0.033	0.100	4.0			092840-016	SW846 9056
	Sulfate	54.5	1.33	4.00	NE			092840-016	SW846 9056
	Bicarbonate Alkalinity	109	0.725	1.00	NE			092840-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092840-022	SM 2320B
TA2-W-26	Bromide	2.38	0.067	0.200	NE			092842-016	SW846 9056
13-Sep-12	Chloride	172	1.34	4.00	NE			092842-016	SW846 9056
	Fluoride	0.313	0.033	0.100	4.0			092842-016	SW846 9056
	Sulfate	353	2.66	8.00	NE			092842-016	SW846 9056
	Bicarbonate Alkalinity	84.4	0.725	1.00	NE			092842-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092842-022	SM 2320B
TA2-W-27	Bromide	1.46	0.067	0.200	NE			092826-016	SW846 9056
06-Sep-12	Chloride	108	0.670	2.00	NE			092826-016	SW846 9056
	Fluoride	0.306	0.033	0.100	4.0			092826-016	SW846 9056
	Sulfate	142	1.33	4.00	NE			092826-016	SW846 9056
	Bicarbonate Alkalinity	99.6	0.725	1.00	NE			092826-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092826-022	SM 2320B
TJA-2	Bromide	0.906	0.067	0.200	NE			092846-016	SW846 9056
18-Sep-12	Chloride	60.1	0.670	2.00	NE			092846-016	SW846 9056
	Fluoride	0.326	0.033	0.100	4.0			092846-016	SW846 9056
	Sulfate	51.4	1.33	4.00	NE			092846-016	SW846 9056
	Bicarbonate Alkalinity	113	0.725	1.00	NE			092846-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092846-022	SM 2320B
TJA-3	Bromide	0.0963	0.067	0.200	NE	J		092833-016	SW846 9056
10-Sep-12	Chloride	13.0	0.067	0.200	NE			092833-016	SW846 9056
	Fluoride	0.351	0.033	0.100	4.0			092833-016	SW846 9056
	Sulfate	74.4	0.665	2.00	NE			092833-016	SW846 9056
	Bicarbonate Alkalinity	169	0.725	1.00	NE			092833-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092833-022	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 2012

Well ID	Analyte	Result[a] (mg/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 (Duplicate)	Bromide	0.154	0.067	0.200	NE	J		092834-016	SW846 9056
10-Sep-12	Chloride	13.0	0.067	0.200	NE			092834-016	SW846 9056
	Fluoride	0.320	0.033	0.100	4.0			092834-016	SW846 9056
	Sulfate	73.6	0.665	2.00	NE			092834-016	SW846 9056
	Bicarbonate Alkalinity	172	0.725	1.00	NE			092834-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092834-022	SM 2320B
TJA-4	Bromide	0.310	0.067	0.200	NE			092849-016	SW846 9056
19-Sep-12	Chloride	21.3	0.134	0.400	NE			092849-016	SW846 9056
	Fluoride	0.360	0.033	0.100	4.0			092849-016	SW846 9056
	Sulfate	16.9	1.33	4.00	NE			092849-016	SW846 9056
	Bicarbonate Alkalinity	137	0.725	1.00	NE			092849-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092849-022	SM 2320B
TJA-6	Bromide	0.163	0.067	0.200	NE	J		092829-016	SW846 9056
07-Sep-12	Chloride	14.9	0.067	0.200	NE			092829-016	SW846 9056
	Fluoride	0.394	0.033	0.100	4.0			092829-016	SW846 9056
	Sulfate	60.3	0.665	2.00	NE			092829-016	SW846 9056
	Bicarbonate Alkalinity	164	0.725	1.00	NE			092829-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092829-022	SM 2320B
TJA-7	Bromide	0.398	0.067	0.200	NE			092851-016	SW846 9056
20-Sep-12	Chloride	24.2	0.134	0.400	NE			092851-016	SW846 9056
	Fluoride	0.346	0.033	0.100	4.0			092851-016	SW846 9056
	Sulfate	20.6	0.133	0.400	NE			092851-016	SW846 9056
	Bicarbonate Alkalinity	131	0.725	1.00	NE			092851-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092851-022	SM 2320B
WYO-3	Bromide	0.199	0.067	0.200	NE	J		092820-016	SW846 9056
27-Aug-12	Chloride	15.4	0.067	0.200	NE			092820-016	SW846 9056
	Fluoride	0.597	0.033	0.100	4.0			092820-016	SW846 9056
	Sulfate	85.6	1.33	4.00	NE			092820-016	SW846 9056
	Bicarbonate Alkalinity	131	0.725	1.00	NE			092820-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092820-022	SM 2320B
WYO-4	Bromide	1.20	0.067	0.200	NE			092844-016	SW846 9056
17-Sep-12	Chloride	107	0.670	2.00	NE			092844-016	SW846 9056
	Fluoride	0.354	0.033	0.100	4.0			092844-016	SW846 9056
	Sulfate	49.9	1.33	4.00	NE			092844-016	SW846 9056
	Bicarbonate Alkalinity	98.0	0.725	1.00	NE			092844-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092844-022	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 2012

Well ID	Analyte	Result[a] (mg/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		092806-009	SW846 6020
17-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092806-009	SW846 6020
	Arsenic	0.00274	0.0017	0.005	0.010	J		092806-009	SW846 6020
	Barium	0.068	0.0006	0.002	2.00			092806-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092806-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092806-009	SW846 6020
	Calcium	65.3	0.300	1.00	NE			092806-009	SW846 6020
	Chromium	0.00408	0.002	0.010	0.100	J		092806-009	SW846 6020
	Cobalt	0.000114	0.0001	0.001	NE	J		092806-009	SW846 6020
	Copper	0.000821	0.00035	0.001	NE	J		092806-009	SW846 6020
	Iron	0.187	0.033	0.100	NE			092806-009	SW846 6020
	Lead	0.00106	0.0005	0.002	NE	J	NJ-	092806-009	SW846 6020
	Magnesium	12.4	0.010	0.030	NE			092806-009	SW846 6020
	Manganese	0.00114	0.001	0.005	NE	J		092806-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092806-009	SW846 7470
	Nickel	0.0231	0.0005	0.002	NE			092806-009	SW846 6020
	Potassium	3.06	0.080	0.300	NE			092806-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092806-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092806-009	SW846 6020
	Sodium	42.7	0.080	0.250	NE		J	092806-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092806-009	SW846 6020
	Uranium	0.000647	0.000067	0.0002	0.030			092806-009	SW846 6020
	Vanadium	0.00497	0.001	0.005	NE	J		092806-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092806-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.0323	0.015	0.050	NE	J		092803-009	SW846 6020
16-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092803-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092803-009	SW846 6020
	Barium	0.0482	0.0006	0.002	2.00			092803-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092803-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092803-009	SW846 6020
	Calcium	70.7	0.300	1.00	NE			092803-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092803-009	SW846 6020
	Cobalt	0.000123	0.0001	0.001	NE	J		092803-009	SW846 6020
	Copper	0.000793	0.00035	0.001	NE	J	0.00447U	092803-009	SW846 6020
	Iron	0.168	0.033	0.100	NE			092803-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092803-009	SW846 6020
	Magnesium	14.7	0.010	0.030	NE			092803-009	SW846 6020
	Manganese	0.00118	0.001	0.005	NE	J		092803-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092803-009	SW846 7470
	Nickel	0.00158	0.0005	0.002	NE	J		092803-009	SW846 6020
	Potassium	2.49	0.080	0.300	NE			092803-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092803-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092803-009	SW846 6020
	Sodium	25.2	0.080	0.250	NE	B		092803-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092803-009	SW846 6020
	Uranium	0.00354	0.000067	0.0002	0.030	B		092803-009	SW846 6020
	Vanadium	0.00528	0.001	0.005	NE			092803-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092803-009	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]
TA1-W-01 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092804-009	SW846 6020
16-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092804-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092804-009	SW846 6020
	Barium	0.0492	0.0006	0.002	2.00			092804-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092804-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092804-009	SW846 6020
	Calcium	70.8	0.300	1.00	NE			092804-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092804-009	SW846 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		092804-009	SW846 6020
	Copper	0.00067	0.00035	0.001	NE	J	0.00447U	092804-009	SW846 6020
	Iron	0.139	0.033	0.100	NE			092804-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092804-009	SW846 6020
	Magnesium	14.3	0.010	0.030	NE			092804-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092804-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092804-009	SW846 7470
	Nickel	0.00144	0.0005	0.002	NE	J		092804-009	SW846 6020
	Potassium	2.49	0.080	0.300	NE			092804-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092804-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092804-009	SW846 6020
	Sodium	26.6	0.080	0.250	NE	B		092804-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092804-009	SW846 6020
	Uranium	0.00357	0.000067	0.0002	0.030	B		092804-009	SW846 6020
	Vanadium	0.00477	0.001	0.005	NE	J		092804-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092804-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.0691	0.015	0.050	NE			092799-009	SW846 6020
15-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092799-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092799-009	SW846 6020
	Barium	0.048	0.0006	0.002	2.00			092799-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092799-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092799-009	SW846 6020
	Calcium	68.8	0.300	1.00	NE			092799-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092799-009	SW846 6020
	Cobalt	0.000131	0.0001	0.001	NE	J		092799-009	SW846 6020
	Copper	0.000973	0.00035	0.001	NE	J		092799-009	SW846 6020
	Iron	0.187	0.033	0.100	NE			092799-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092799-009	SW846 6020
	Magnesium	13.3	0.010	0.030	NE			092799-009	SW846 6020
	Manganese	0.00585	0.001	0.005	NE			092799-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092799-009	SW846 7470
	Nickel	0.00193	0.0005	0.002	NE	J		092799-009	SW846 6020
	Potassium	2.27	0.080	0.300	NE			092799-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092799-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092799-009	SW846 6020
	Sodium	21.9	0.080	0.250	NE	B		092799-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092799-009	SW846 6020
	Uranium	0.00325	0.000067	0.0002	0.030	B		092799-009	SW846 6020
	Vanadium	0.00505	0.001	0.005	NE			092799-009	SW846 6010
	Zinc	0.00794	0.0035	0.010	NE	J		092799-009	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]
TA1-W-03	Aluminum	ND	0.015	0.050	NE	U		092808-009	SW846 6020
20-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092808-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092808-009	SW846 6020
	Barium	0.0302	0.0006	0.002	2.00			092808-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092808-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092808-009	SW846 6020
	Calcium	292	0.600	2.00	NE			092808-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092808-009	SW846 6020
	Cobalt	0.000326	0.0001	0.001	NE	J		092808-009	SW846 6020
	Copper	0.00155	0.00035	0.001	NE			092808-009	SW846 6020
	Iron	0.830	0.033	0.100	NE			092808-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	092808-009	SW846 6020
	Magnesium	32.8	0.010	0.030	NE			092808-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092808-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092808-009	SW846 7470
	Nickel	0.00444	0.0005	0.002	NE			092808-009	SW846 6020
	Potassium	2.86	0.080	0.300	NE			092808-009	SW846 6020
	Selenium	0.0366	0.0015	0.005	0.050			092808-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092808-009	SW846 6020
	Sodium	48.8	0.080	0.250	NE		J	092808-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092808-009	SW846 6020
	Uranium	0.00124	0.000067	0.0002	0.030			092808-009	SW846 6020
	Vanadium	0.00227	0.001	0.005	NE	J		092808-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092808-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.0249	0.015	0.050	NE	J	J+	092817-009	SW846 6020
23-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092817-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092817-009	SW846 6020
	Barium	0.051	0.0006	0.002	2.00			092817-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092817-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092817-009	SW846 6020
	Calcium	66.4	0.300	1.00	NE			092817-009	SW846 6020
	Chromium	0.00762	0.002	0.010	0.100	J		092817-009	SW846 6020
	Cobalt	0.000139	0.0001	0.001	NE	J		092817-009	SW846 6020
	Copper	0.000971	0.00035	0.001	NE	J	0.016U	092817-009	SW846 6020
	Iron	0.254	0.033	0.100	NE			092817-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	092817-009	SW846 6020
	Magnesium	10.6	0.010	0.030	NE			092817-009	SW846 6020
	Manganese	0.00313	0.001	0.005	NE	J		092817-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092817-009	SW846 7470
	Nickel	0.00414	0.0005	0.002	NE			092817-009	SW846 6020
	Potassium	2.31	0.080	0.300	NE			092817-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092817-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092817-009	SW846 6020
	Sodium	22.9	0.080	0.250	NE		J	092817-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092817-009	SW846 6020
	Uranium	0.003	0.000067	0.0002	0.030			092817-009	SW846 6020
	Vanadium	0.00488	0.001	0.005	NE	J		092817-009	SW846 6010
	Zinc	0.00358	0.0035	0.010	NE	J	J+	092817-009	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]
TA1-W-04 (Duplicate)	Aluminum	0.022	0.015	0.050	NE	J	J+	092818-009	SW846 6020
23-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092818-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092818-009	SW846 6020
	Barium	0.0521	0.0006	0.002	2.00			092818-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092818-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092818-009	SW846 6020
	Calcium	67.7	0.300	1.00	NE			092818-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092818-009	SW846 6020
	Cobalt	0.000103	0.0001	0.001	NE	J		092818-009	SW846 6020
	Copper	0.000776	0.00035	0.001	NE	J	0.016U	092818-009	SW846 6020
	Iron	0.234	0.033	0.100	NE			092818-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	092818-009	SW846 6020
	Magnesium	11.8	0.010	0.030	NE			092818-009	SW846 6020
	Manganese	0.00259	0.001	0.005	NE	J		092818-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092818-009	SW846 7470
	Nickel	0.00134	0.0005	0.002	NE	J		092818-009	SW846 6020
	Potassium	2.22	0.080	0.300	NE			092818-009	SW846 6020
	Selenium	0.0016	0.0015	0.005	0.050	J		092818-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092818-009	SW846 6020
	Sodium	22.3	0.080	0.250	NE		J	092818-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092818-009	SW846 6020
	Uranium	0.00298	0.000067	0.0002	0.030			092818-009	SW846 6020
	Vanadium	0.00444	0.001	0.005	NE	J		092818-009	SW846 6010
	Zinc	0.0046	0.0035	0.010	NE	J	J+	092818-009	SW846 6020

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Table 6A-5 *(Continued)*
Summary of Target Analyte List Metals plus Uranium Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-05	Aluminum	ND	0.015	0.050	NE	U		092811-009	SW846 6020
21-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092811-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092811-009	SW846 6020
	Barium	0.0368	0.0006	0.002	2.00			092811-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092811-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092811-009	SW846 6020
	Calcium	88.0	0.300	1.00	NE			092811-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092811-009	SW846 6020
	Cobalt	0.000116	0.0001	0.001	NE	J		092811-009	SW846 6020
	Copper	0.000879	0.00035	0.001	NE	J		092811-009	SW846 6020
	Iron	0.267	0.033	0.100	NE			092811-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	092811-009	SW846 6020
	Magnesium	11.7	0.010	0.030	NE			092811-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092811-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092811-009	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	J		092811-009	SW846 6020
	Potassium	2.54	0.080	0.300	NE			092811-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092811-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092811-009	SW846 6020
	Sodium	28.3	0.080	0.250	NE		J	092811-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092811-009	SW846 6020
	Uranium	0.00346	0.000067	0.0002	0.030			092811-009	SW846 6020
	Vanadium	0.00302	0.001	0.005	NE	J		092811-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092811-009	SW846 6020

Refer to footnotes on page 6A-51.

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]
TA1-W-06	Aluminum	0.0913	0.015	0.050	NE		J+	092813-009	SW846 6020
22-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092813-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092813-009	SW846 6020
	Barium	0.0252	0.0006	0.002	2.00			092813-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092813-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092813-009	SW846 6020
	Calcium	132	0.300	1.00	NE			092813-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092813-009	SW846 6020
	Cobalt	0.000204	0.0001	0.001	NE	J		092813-009	SW846 6020
	Copper	0.0012	0.00035	0.001	NE			092813-009	SW846 6020
	Iron	0.470	0.033	0.100	NE			092813-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	092813-009	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			092813-009	SW846 6020
	Manganese	0.00187	0.001	0.005	NE	J		092813-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092813-009	SW846 7470
	Nickel	0.00219	0.0005	0.002	NE			092813-009	SW846 6020
	Potassium	2.26	0.080	0.300	NE			092813-009	SW846 6020
	Selenium	0.00952	0.0015	0.005	0.050			092813-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092813-009	SW846 6020
	Sodium	29.1	0.080	0.250	NE		J	092813-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092813-009	SW846 6020
	Uranium	0.00116	0.000067	0.0002	0.030			092813-009	SW846 6020
	Vanadium	0.00369	0.001	0.005	NE	J		092813-009	SW846 6010
	Zinc	0.00352	0.0035	0.010	NE	J	J+	092813-009	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]
TA1-W-08	Aluminum	0.0189	0.015	0.050	NE	J		092822-009	SW846 6020
28-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092822-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092822-009	SW846 6020
	Barium	0.0191	0.0006	0.002	2.00			092822-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092822-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092822-009	SW846 6020
	Calcium	353	0.600	2.00	NE			092822-009	SW846 6020
	Chromium	0.00289	0.002	0.010	0.100	J		092822-009	SW846 6020
	Cobalt	0.000418	0.0001	0.001	NE	J		092822-009	SW846 6020
	Copper	0.00231	0.00035	0.001	NE			092822-009	SW846 6020
	Iron	1.01	0.033	0.100	NE			092822-009	SW846 6020
	Lead	0.000637	0.0005	0.002	NE	B, J	0.00372U	092822-009	SW846 6020
	Magnesium	40.6	0.010	0.030	NE			092822-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092822-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092822-009	SW846 7470
	Nickel	0.00572	0.0005	0.002	NE			092822-009	SW846 6020
	Potassium	3.22	0.080	0.300	NE			092822-009	SW846 6020
	Selenium	0.0319	0.0015	0.005	0.050			092822-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092822-009	SW846 6020
	Sodium	88.0	0.080	0.250	NE			092822-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092822-009	SW846 6020
	Uranium	0.00179	0.000067	0.0002	0.030			092822-009	SW846 6020
	Vanadium	0.00235	0.001	0.005	NE	J		092822-009	SW846 6010
	Zinc	0.00506	0.0035	0.010	NE	J		092822-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.922	0.015	0.050	NE			092836-009	SW846 6020
11-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092836-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092836-009	SW846 6020
	Barium	0.223	0.006	0.020	2.00			092836-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092836-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092836-009	SW846 6020
	Calcium	70.3	0.600	2.00	NE			092836-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092836-009	SW846 6020
	Cobalt	0.000429	0.0001	0.001	NE	J		092836-009	SW846 6020
	Copper	0.00127	0.00035	0.001	NE			092836-009	SW846 6020
	Iron	0.904	0.033	0.100	NE			092836-009	SW846 6020
	Lead	0.000605	0.0005	0.002	NE	J		092836-009	SW846 6020
	Magnesium	12.1	0.100	0.300	NE			092836-009	SW846 6020
	Manganese	0.021	0.001	0.005	NE			092836-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092836-009	SW846 7470
	Nickel	0.00183	0.0005	0.002	NE	J		092836-009	SW846 6020
	Potassium	2.18	0.080	0.300	NE			092836-009	SW846 6020
	Selenium	0.00369	0.0015	0.005	0.050	J		092836-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092836-009	SW846 6020
	Sodium	19.7	0.800	2.50	NE			092836-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092836-009	SW846 6020
	Uranium	0.00137	0.000067	0.0002	0.030			092836-009	SW846 6020
	Vanadium	0.00685	0.001	0.005	NE			092836-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092836-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092838-009	SW846 6020
29-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092838-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092838-009	SW846 6020
	Barium	0.0444	0.0006	0.002	2.00			092838-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092838-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092838-009	SW846 6020
	Calcium	114	0.600	2.00	NE			092838-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092838-009	SW846 6020
	Cobalt	0.000143	0.0001	0.001	NE	J		092838-009	SW846 6020
	Copper	0.000964	0.00035	0.001	NE	J		092838-009	SW846 6020
	Iron	0.318	0.033	0.100	NE			092838-009	SW846 6020
	Lead	0.000586	0.0005	0.002	NE	B, J	0.00372U	092838-009	SW846 6020
	Magnesium	18.4	0.010	0.030	NE			092838-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092838-009	SW846 6020
	Mercury	ND	0.00067	0.0002	0.002	U	UJ	092838-009	SW846 7470
	Nickel	0.00197	0.0005	0.002	NE	J		092838-009	SW846 6020
	Potassium	2.72	0.080	0.300	NE			092838-009	SW846 6020
	Selenium	0.0091	0.0015	0.005	0.050			092838-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092838-009	SW846 6020
	Sodium	32.8	0.800	2.50	NE			092838-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092838-009	SW846 6020
	Uranium	0.00237	0.000067	0.0002	0.030			092838-009	SW846 6020
	Vanadium	0.00289	0.001	0.005	NE	J		092838-009	SW846 6010
	Zinc	0.00619	0.0035	0.010	NE	J		092838-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092824-009	SW846 6020
04-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092824-009	SW846 6020
	Arsenic	0.00204	0.0017	0.005	0.010	J		092824-009	SW846 6020
	Barium	0.087	0.0006	0.002	2.00			092824-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092824-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092824-009	SW846 6020
	Calcium	83.4	0.300	1.00	NE			092824-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092824-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092824-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U	UJ	092824-009	SW846 6020
	Iron	0.228	0.033	0.100	NE			092824-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092824-009	SW846 6020
	Magnesium	11.7	0.010	0.030	NE		J	092824-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092824-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092824-009	SW846 7470
	Nickel	0.00123	0.0005	0.002	NE	J		092824-009	SW846 6020
	Potassium	1.82	0.080	0.300	NE			092824-009	SW846 6020
	Selenium	0.00712	0.0015	0.005	0.050			092824-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092824-009	SW846 6020
	Sodium	21.6	0.080	0.250	NE			092824-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092824-009	SW846 6020
	Uranium	0.00101	0.000067	0.0002	0.030			092824-009	SW846 6020
	Vanadium	0.00421	0.001	0.005	NE	J		092824-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092824-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092840-009	SW846 6020
12-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092840-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092840-009	SW846 6020
	Barium	0.0365	0.0006	0.002	2.00		J	092840-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092840-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092840-009	SW846 6020
	Calcium	78.1	0.600	2.00	NE			092840-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092840-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092840-009	SW846 6020
	Copper	0.000444	0.00035	0.001	NE	J		092840-009	SW846 6020
	Iron	0.123	0.033	0.100	NE			092840-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092840-009	SW846 6020
	Magnesium	11.0	0.100	0.300	NE			092840-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092840-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092840-009	SW846 7470
	Nickel	0.00132	0.0005	0.002	NE	J		092840-009	SW846 6020
	Potassium	1.41	0.080	0.300	NE			092840-009	SW846 6020
	Selenium	0.00347	0.0015	0.005	0.050	J		092840-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092840-009	SW846 6020
	Sodium	21.4	0.800	2.50	NE			092840-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092840-009	SW846 6020
	Uranium	0.000883	0.000067	0.0002	0.030			092840-009	SW846 6020
	Vanadium	0.00435	0.001	0.005	NE	J		092840-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092840-009	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	ND	0.015	0.050	NE	U		092842-009	SW846 6020
13-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092842-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092842-009	SW846 6020
	Barium	0.0561	0.0006	0.002	2.00		J	092842-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092842-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092842-009	SW846 6020
	Calcium	219	1.50	5.00	NE			092842-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092842-009	SW846 6020
	Cobalt	0.000193	0.0001	0.001	NE	J		092842-009	SW846 6020
	Copper	0.00136	0.00035	0.001	NE			092842-009	SW846 6020
	Iron	0.391	0.033	0.100	NE			092842-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092842-009	SW846 6020
	Magnesium	26.2	0.100	0.300	NE			092842-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092842-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092842-009	SW846 7470
	Nickel	0.00335	0.0005	0.002	NE			092842-009	SW846 6020
	Potassium	2.19	0.080	0.300	NE			092842-009	SW846 6020
	Selenium	0.0157	0.0015	0.005	0.050			092842-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092842-009	SW846 6020
	Sodium	37.6	0.800	2.50	NE			092842-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092842-009	SW846 6020
	Uranium	0.00106	0.000067	0.0002	0.030			092842-009	SW846 6020
	Vanadium	0.00253	0.001	0.005	NE	J		092842-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092842-009	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	ND	0.015	0.050	NE	U		092826-009	SW846 6020
06-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092826-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092826-009	SW846 6020
	Barium	0.0564	0.0006	0.002	2.00			092826-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092826-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092826-009	SW846 6020
	Calcium	129	0.600	2.00	NE			092826-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092826-009	SW846 6020
	Cobalt	0.000133	0.0001	0.001	NE	J		092826-009	SW846 6020
	Copper	0.000642	0.00035	0.001	NE	J	NJ-	092826-009	SW846 6020
	Iron	0.342	0.033	0.100	NE			092826-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092826-009	SW846 6020
	Magnesium	16.4	0.010	0.030	NE		J	092826-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092826-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092826-009	SW846 7470
	Nickel	0.00164	0.0005	0.002	NE	J		092826-009	SW846 6020
	Potassium	2.17	0.080	0.300	NE			092826-009	SW846 6020
	Selenium	0.00942	0.0015	0.005	0.050			092826-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092826-009	SW846 6020
	Sodium	31.3	0.080	0.250	NE			092826-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092826-009	SW846 6020
	Uranium	0.0012	0.000067	0.0002	0.030			092826-009	SW846 6020
	Vanadium	0.0038	0.001	0.005	NE	J		092826-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092826-009	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-2	Aluminum	ND	0.015	0.050	NE	U		092846-009	SW846 6020
18-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092846-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092846-009	SW846 6020
	Barium	0.0457	0.0006	0.002	2.00			092846-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092846-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092846-009	SW846 6020
	Calcium	83.0	0.600	2.00	NE			092846-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092846-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092846-009	SW846 6020
	Copper	0.000672	0.00035	0.001	NE	J		092846-009	SW846 6020
	Iron	0.165	0.033	0.100	NE			092846-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092846-009	SW846 6020
	Magnesium	12.4	0.010	0.030	NE			092846-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092846-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092846-009	SW846 7470
	Nickel	0.00114	0.0005	0.002	NE	J		092846-009	SW846 6020
	Potassium	1.95	0.080	0.300	NE			092846-009	SW846 6020
	Selenium	0.00537	0.0015	0.005	0.050			092846-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092846-009	SW846 6020
	Sodium	23.7	0.080	0.250	NE			092846-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092846-009	SW846 6020
	Uranium	0.00135	0.000067	0.0002	0.030	B		092846-009	SW846 6020
	Vanadium	0.00411	0.001	0.005	NE	J		092846-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092846-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092833-009	SW846 6020
10-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092833-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092833-009	SW846 6020
	Barium	0.0408	0.0006	0.002	2.00			092833-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092833-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092833-009	SW846 6020
	Calcium	70.1	0.600	2.00	NE			092833-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092833-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092833-009	SW846 6020
	Copper	0.000694	0.00035	0.001	NE	J	0.01195U	092833-009	SW846 6020
	Iron	0.118	0.033	0.100	NE			092833-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092833-009	SW846 6020
	Magnesium	11.1	0.100	0.300	NE			092833-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092833-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092833-009	SW846 7470
	Nickel	0.00124	0.0005	0.002	NE	J		092833-009	SW846 6020
	Potassium	1.85	0.080	0.300	NE			092833-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092833-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092833-009	SW846 6020
	Sodium	24.2	0.800	2.50	NE			092833-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092833-009	SW846 6020
	Uranium	0.00232	0.000067	0.0002	0.030			092833-009	SW846 6020
	Vanadium	0.00341	0.001	0.005	NE	J		092833-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092833-009	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 2012

Well ID	Analyte	Result[a] (mg/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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092834-009	SW846 6020
10-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092834-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092834-009	SW846 6020
	Barium	0.0399	0.0006	0.002	2.00			092834-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092834-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092834-009	SW846 6020
	Calcium	74.1	0.600	2.00	NE			092834-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092834-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092834-009	SW846 6020
	Copper	0.000769	0.00035	0.001	NE	J	0.01195U	092834-009	SW846 6020
	Iron	0.124	0.033	0.100	NE			092834-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092834-009	SW846 6020
	Magnesium	11.7	0.100	0.300	NE			092834-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092834-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092834-009	SW846 7470
	Nickel	0.00125	0.0005	0.002	NE	J		092834-009	SW846 6020
	Potassium	1.81	0.080	0.300	NE			092834-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092834-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092834-009	SW846 6020
	Sodium	25.3	0.800	2.50	NE			092834-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092834-009	SW846 6020
	Uranium	0.00229	0.000067	0.0002	0.030			092834-009	SW846 6020
	Vanadium	0.00374	0.001	0.005	NE	J		092834-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092834-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092849-009	SW846 6020
19-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092849-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092849-009	SW846 6020
	Barium	0.184	0.0006	0.002	2.00			092849-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092849-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092849-009	SW846 6020
	Calcium	75.1	0.600	2.00	NE			092849-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092849-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092849-009	SW846 6020
	Copper	0.000356	0.00035	0.001	NE	J		092849-009	SW846 6020
	Iron	0.130	0.033	0.100	NE			092849-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092849-009	SW846 6020
	Magnesium	14.0	0.010	0.030	NE			092849-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092849-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092849-009	SW846 7470
	Nickel	0.000854	0.0005	0.002	NE	J		092849-009	SW846 6020
	Potassium	3.32	0.080	0.300	NE			092849-009	SW846 6020
	Selenium	0.00414	0.0015	0.005	0.050	J		092849-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092849-009	SW846 6020
	Sodium	27.3	0.080	0.250	NE			092849-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092849-009	SW846 6020
	Uranium	0.00303	0.000067	0.0002	0.030	B		092849-009	SW846 6020
	Vanadium	0.00404	0.001	0.005	NE	J		092849-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092849-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.241	0.015	0.050	NE			092829-009	SW846 6020
07-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092829-009	SW846 6020
	Arsenic	0.00192	0.0017	0.005	0.010	J		092829-009	SW846 6020
	Barium	0.0664	0.0006	0.002	2.00			092829-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092829-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092829-009	SW846 6020
	Calcium	65.1	0.600	2.00	NE			092829-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092829-009	SW846 6020
	Cobalt	0.000159	0.0001	0.001	NE	J		092829-009	SW846 6020
	Copper	0.00112	0.00035	0.001	NE			092829-009	SW846 6020
	Iron	0.312	0.033	0.100	NE			092829-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092829-009	SW846 6020
	Magnesium	11.6	0.100	0.300	NE			092829-009	SW846 6020
	Manganese	0.00729	0.001	0.005	NE			092829-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092829-009	SW846 7470
	Nickel	0.00153	0.0005	0.002	NE	J		092829-009	SW846 6020
	Potassium	2.36	0.080	0.300	NE			092829-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092829-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092829-009	SW846 6020
	Sodium	22.7	0.800	2.50	NE			092829-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092829-009	SW846 6020
	Uranium	0.00308	0.000067	0.0002	0.030			092829-009	SW846 6020
	Vanadium	0.0052	0.001	0.005	NE			092829-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092829-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.0329	0.015	0.050	NE	J		092851-009	SW846 6020
20-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092851-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092851-009	SW846 6020
	Barium	0.221	0.0006	0.002	2.00			092851-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092851-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092851-009	SW846 6020
	Calcium	73.8	0.600	2.00	NE			092851-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092851-009	SW846 6020
	Cobalt	0.000758	0.0001	0.001	NE	J		092851-009	SW846 6020
	Copper	0.000526	0.00035	0.001	NE	J		092851-009	SW846 6020
	Iron	0.149	0.033	0.100	NE			092851-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092851-009	SW846 6020
	Magnesium	13.3	0.010	0.030	NE			092851-009	SW846 6020
	Manganese	0.00109	0.001	0.005	NE	J		092851-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092851-009	SW846 7470
	Nickel	0.00105	0.0005	0.002	NE	J		092851-009	SW846 6020
	Potassium	2.14	0.080	0.300	NE			092851-009	SW846 6020
	Selenium	0.00475	0.0015	0.005	0.050	J		092851-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092851-009	SW846 6020
	Sodium	20.7	0.080	0.250	NE			092851-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092851-009	SW846 6020
	Uranium	0.00181	0.000067	0.0002	0.030	B		092851-009	SW846 6020
	Vanadium	0.00503	0.001	0.005	NE			092851-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092851-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.0335	0.015	0.050	NE	J		092820-009	SW846 6020
27-Aug-12	Antimony	ND	0.001	0.003	0.006	U		092820-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092820-009	SW846 6020
	Barium	0.0378	0.0006	0.002	2.00			092820-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092820-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092820-009	SW846 6020
	Calcium	60.7	0.300	1.00	NE			092820-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092820-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092820-009	SW846 6020
	Copper	0.000851	0.00035	0.001	NE	J		092820-009	SW846 6020
	Iron	0.194	0.033	0.100	NE			092820-009	SW846 6020
	Lead	0.000689	0.0005	0.002	NE	B, J	0.00372U	092820-009	SW846 6020
	Magnesium	11.2	0.010	0.030	NE			092820-009	SW846 6020
	Manganese	0.00193	0.001	0.005	NE	J		092820-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092820-009	SW846 7470
	Nickel	0.00115	0.0005	0.002	NE	J		092820-009	SW846 6020
	Potassium	2.13	0.080	0.300	NE			092820-009	SW846 6020
	Selenium	0.00153	0.0015	0.005	0.050	J		092820-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092820-009	SW846 6020
	Sodium	25.2	0.400	1.25	NE			092820-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092820-009	SW846 6020
	Uranium	0.00243	0.000067	0.0002	0.030			092820-009	SW846 6020
	Vanadium	0.00624	0.001	0.005	NE			092820-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092820-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092844-009	SW846 6020
17-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092844-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092844-009	SW846 6020
	Barium	0.147	0.0006	0.002	2.00			092844-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092844-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092844-009	SW846 6020
	Calcium	86.4	0.600	2.00	NE			092844-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092844-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092844-009	SW846 6020
	Copper	0.000527	0.00035	0.001	NE	J		092844-009	SW846 6020
	Iron	0.196	0.033	0.100	NE			092844-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092844-009	SW846 6020
	Magnesium	13.4	0.010	0.030	NE			092844-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092844-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092844-009	SW846 7470
	Nickel	0.00109	0.0005	0.002	NE	J		092844-009	SW846 6020
	Potassium	1.85	0.080	0.300	NE			092844-009	SW846 6020
	Selenium	0.0056	0.0015	0.005	0.050			092844-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092844-009	SW846 6020
	Sodium	21.4	0.080	0.250	NE			092844-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092844-009	SW846 6020
	Uranium	0.00114	0.000067	0.0002	0.030	B		092844-009	SW846 6020
	Vanadium	0.00482	0.001	0.005	NE	J		092844-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092844-009	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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
PGS-2	Americium-241	2.48 ± 10.5	16.9	8.21	NE	U	BD	092806-033	EPA 901.1
17-Aug-12	Cesium-137	0.064 ± 1.69	2.88	1.38	NE	U	BD	092806-033	EPA 901.1
	Cobalt-60	0.647 ± 1.68	3.11	1.46	NE	U	BD	092806-033	EPA 901.1
	Potassium-40	16.6 ± 39.2	29.9	14.0	NE	U	BD	092806-033	EPA 901.1
	Gross Alpha	-0.11	NA	NA	15 pCi/L	NA	None	092806-034	EPA 900.0
	Gross Beta	1.25 ± 1.18	1.94	0.942	4 mrem/yr	U	BD	092806-034	EPA 900.0
	Tritium	-48.2 ± 105	201	91.9	NE	U	BD	092806-036	EPA 906.0 M
TA1-W-01	Americium-241	1.92 ± 3.06	4.89	2.39	NE	U	BD	092803-033	EPA 901.1
16-Aug-12	Cesium-137	1.37 ± 2.35	4.00	1.92	NE	U	BD	092803-033	EPA 901.1
	Cobalt-60	0.844 ± 2.19	4.05	1.90	NE	U	BD	092803-033	EPA 901.1
	Potassium-40	-32.4 ± 51.8	50.2	23.8	NE	U	BD	092803-033	EPA 901.1
	Gross Alpha	0.59	NA	NA	15 pCi/L	NA	None	092803-034	EPA 900.0
	Gross Beta	3.29 ± 0.985	1.23	0.593	4 mrem/yr		NJ+	092803-034	EPA 900.0
	Tritium	-102 ± 102	207	94.8	NE	U	BD	092803-036	EPA 906.0 M
TA1-W-01 (Duplicate)	Americium-241	1.19 ± 10.7	15.9	7.81	NE	U	BD	092804-033	EPA 901.1
16-Aug-12	Cesium-137	-0.0497 ± 2.07	3.60	1.74	NE	U	BD	092804-033	EPA 901.1
	Cobalt-60	0.254 ± 1.95	3.49	1.65	NE	U	BD	092804-033	EPA 901.1
	Potassium-40	35.1 ± 28.3	35.1	15.8	NE	U	BD	092804-033	EPA 901.1
	Gross Alpha	0.68	NA	NA	15 pCi/L	NA	None	092804-034	EPA 900.0
	Gross Beta	2.46 ± 0.946	1.34	0.648	4 mrem/yr		NJ+	092804-034	EPA 900.0
	Tritium	-78.4 ± 104	206	94.1	NE	U	BD	092804-036	EPA 906.0 M
TA1-W-02	Americium-241	-10.8 ± 8.74	12.0	5.86	NE	U	BD	092799-033	EPA 901.1
15-Aug-12	Cesium-137	0.523 ± 1.84	3.17	1.52	NE	U	BD	092799-033	EPA 901.1
	Cobalt-60	1.63 ± 2.00	3.46	1.64	NE	U	BD	092799-033	EPA 901.1
	Potassium-40	-18.5 ± 40.7	46.0	22.0	NE	U	BD	092799-033	EPA 901.1
	Gross Alpha	2.86	NA	NA	15 pCi/L	NA	None	092799-034	EPA 900.0
	Gross Beta	3.15 ± 1.06	1.42	0.691	4 mrem/yr		J	092799-034	EPA 900.0
	Tritium	-118 ± 98.7	204	93.3	NE	U	BD	092799-036	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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-03	Americium-241	-1.59 ± 6.75	11.7	5.72	NE	U	BD	092808-033	EPA 901.1
20-Aug-12	Cesium-137	2.10 ± 3.14	2.93	1.40	NE	U	BD	092808-033	EPA 901.1
	Cobalt-60	0.676 ± 1.75	3.18	1.50	NE	U	BD	092808-033	EPA 901.1
	Potassium-40	-35.2 ± 34.4	39.4	18.8	NE	U	BD	092808-033	EPA 901.1
	Gross Alpha	-1.40	NA	NA	15 pCi/L	NA	None	092808-034	EPA 900.0
	Gross Beta	1.44 ± 2.92	4.96	2.41	4 mrem/yr	U	BD	092808-034	EPA 900.0
	Tritium	-94.9 ± 101	204	93.2	NE	U	BD	092808-036	EPA 906.0 M
TA1-W-04	Americium-241	3.55 ± 3.44	5.13	2.51	NE	U	BD	092817-033	EPA 901.1
23-Aug-12	Cesium-137	-0.412 ± 2.19	3.70	1.77	NE	U	BD	092817-033	EPA 901.1
	Cobalt-60	-0.0837 ± 2.38	4.31	2.03	NE	U	BD	092817-033	EPA 901.1
	Potassium-40	-34.5 ± 42.6	47.0	22.2	NE	U	BD	092817-033	EPA 901.1
	Gross Alpha	0.07	NA	NA	15 pCi/L	NA	None	092817-034	EPA 900.0
	Gross Beta	3.25 ± 1.05	1.38	0.671	4 mrem/yr		J	092817-034	EPA 900.0
	Tritium	-34.6 ± 108	204	93.5	NE	U	BD	092817-036	EPA 906.0 M
TA1-W-04 (Duplicate)	Americium-241	-11.5 ± 11.0	15.5	7.58	NE	U	BD	092818-033	EPA 901.1
23-Aug-12	Cesium-137	2.04 ± 2.22	3.64	1.76	NE	U	BD	092818-033	EPA 901.1
	Cobalt-60	0.208 ± 1.89	3.38	1.60	NE	U	BD	092818-033	EPA 901.1
	Potassium-40	24.8 ± 36.7	30.2	14.2	NE	U	BD	092818-033	EPA 901.1
	Gross Alpha	0.23	NA	NA	15 pCi/L	NA	None	092818-034	EPA 900.0
	Gross Beta	1.33 ± 0.958	1.54	0.750	4 mrem/yr	U	BD	092818-034	EPA 900.0
	Tritium	-118 ± 98.3	203	92.9	NE	U	BD	092818-036	EPA 906.0 M
TA1-W-05	Americium-241	-1.81 ± 14.2	20.5	10.1	NE	U	BD	092811-033	EPA 901.1
21-Aug-12	Cesium-137	-0.695 ± 1.92	3.26	1.57	NE	U	BD	092811-033	EPA 901.1
	Cobalt-60	1.85 ± 2.33	4.07	1.93	NE	U	BD	092811-033	EPA 901.1
	Potassium-40	-23.9 ± 43.2	46.0	22.0	NE	U	BD	092811-033	EPA 901.1
	Gross Alpha	1.30	NA	NA	15 pCi/L	NA	None	092811-034	EPA 900.0
	Gross Beta	0.505 ± 1.30	2.20	1.07	4 mrem/yr	U	BD	092811-034	EPA 900.0
	Tritium	-118 ± 98.9	204	93.4	NE	U	BD	092811-036	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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06	Americium-241	-5.21 ± 7.45	12.0	5.86	NE	U	BD	092813-033	EPA 901.1
22-Aug-12	Cesium-137	1.07 ± 1.87	3.18	1.53	NE	U	BD	092813-033	EPA 901.1
	Cobalt-60	-0.372 ± 2.00	3.44	1.63	NE	U	BD	092813-033	EPA 901.1
	Potassium-40	51.4 ± 31.7	51.4	20.6	NE	U	BD	092813-033	EPA 901.1
	Gross Alpha	-0.84	NA	NA	15 pCi/L	NA	None	092813-034	EPA 900.0
	Gross Beta	0.281 ± 1.60	2.75	1.34	4 mrem/yr	U	BD	092813-034	EPA 900.0
	Tritium	-107 ± 100	204	93.4	NE	U	BD	092813-036	EPA 906.0 M
TA1-W-08	Americium-241	5.13 ± 7.96	12.2	5.96	NE	U	BD	092822-033	EPA 901.1
28-Aug-12	Cesium-137	1.97 ± 2.54	4.45	2.12	NE	U	BD	092822-033	EPA 901.1
	Cobalt-60	-1.06 ± 2.73	4.71	2.18	NE	U	BD	092822-033	EPA 901.1
	Potassium-40	3.53 ± 54.3	45.5	20.9	NE	U	BD	092822-033	EPA 901.1
	Gross Alpha	-2.84	NA	NA	15 pCi/L	NA	None	092822-R34	EPA 900.0
	Gross Beta	-1.48 ± 1.93	3.47	1.67	4 mrem/yr	U	BD	092822-R34	EPA 900.0
	Tritium	-3.47 ± 61.5	114	51.9	NE	U	BD	092822-036	EPA 906.0 M
TA2-SW1-320	Americium-241	-7.44 ± 10.5	16.9	8.26	NE	U	BD	092836-033	EPA 901.1
11-Sep-12	Cesium-137	-3.48 ± 4.15	3.69	1.79	NE	U	BD	092836-033	EPA 901.1
	Cobalt-60	1.52 ± 1.96	3.40	1.62	NE	U	BD	092836-033	EPA 901.1
	Potassium-40	1.48 ± 42.7	27.8	13.1	NE	U	BD	092836-033	EPA 901.1
	Gross Alpha	1.10	NA	NA	15 pCi/L	NA	None	092836-034	EPA 900.0
	Gross Beta	3.49 ± 1.19	1.63	0.792	4 mrem/yr		J	092836-034	EPA 900.0
	Tritium	40.5 ± 87.4	154	68.6	NE	U	BD	092836-036	EPA 906.0 M
TA2-NW1-595	Americium-241	-0.41 ± 7.66	12.3	6.01	NE	U	BD	092838-033	EPA 901.1
29-Aug-12	Cesium-137	-0.0995 ± 1.70	2.88	1.38	NE	U	BD	092838-033	EPA 901.1
	Cobalt-60	1.11 ± 1.82	3.31	1.56	NE	U	BD	092838-033	EPA 901.1
	Potassium-40	52.1 ± 38.7	28.3	13.2	NE		J	092838-033	EPA 901.1
	Gross Alpha	2.09	NA	NA	15 pCi/L	NA	None	092838-034	EPA 900.0
	Gross Beta	1.57 ± 0.694	0.995	0.475	4 mrem/yr		J	092838-034	EPA 900.0
	Tritium	-44.8 ± 56.5	114	51.6	NE	U	BD	092838-036	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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01	Americium-241	-42.4 ± 24.7	23.1	11.3	NE	U	BD	092824-033	EPA 901.1
04-Sep-12	Cesium-137	-0.234 ± 2.18	3.78	1.83	NE	U	BD	092824-033	EPA 901.1
	Cobalt-60	-0.319 ± 2.36	4.15	1.98	NE	U	BD	092824-033	EPA 901.1
	Potassium-40	1.48 ± 46.7	39.6	18.8	NE	U	BD	092824-033	EPA 901.1
	Gross Alpha	1.23	NA	NA	15 pCi/L	NA	None	092824-034	EPA 900.0
	Gross Beta	2.29 ± 0.882	1.24	0.596	4mrem/yr		J	092824-034	EPA 900.0
	Tritium	50.0 ± 67.4	114	51.7	NE	U	BD	092824-036	EPA 906.0 M
TA2-W-19	Americium-241	2.87 ± 7.68	12.0	5.86	NE	U	BD	092840-033	EPA 901.1
12-Sep-12	Cesium-137	1.17 ± 2.42	4.35	2.07	NE	U	BD	092840-033	EPA 901.1
	Cobalt-60	-4.48 ± 4.13	4.03	1.84	NE	U	BD	092840-033	EPA 901.1
	Potassium-40	-54.8 ± 55.5	55.6	26.0	NE	U	BD	092840-033	EPA 901.1
	Gross Alpha	0.80	NA	NA	15 pCi/L	NA	None	092840-034	EPA 900.0
	Gross Beta	1.79 ± 0.729	0.998	0.472	4 mrem/yr		J	092840-034	EPA 900.0
	Tritium	-86.7 ± 66.8	136	62.8	NE	U	BD	092840-036	EPA 906.0 M
TA2-W-26	Americium-241	-7.02 ± 7.22	10.3	5.06	NE	U	BD	092842-033	EPA 901.1
13-Sep-12	Cesium-137	1.29 ± 1.93	3.22	1.56	NE	U	BD	092842-033	EPA 901.1
	Cobalt-60	1.10 ± 1.88	3.36	1.60	NE	U	BD	092842-033	EPA 901.1
	Potassium-40	8.45 ± 47.0	31.2	14.8	NE	U	BD	092842-033	EPA 901.1
	Gross Alpha	1.28	NA	NA	15 pCi/L	NA	None	092842-034	EPA 900.0
	Gross Beta	1.69 ± 2.49	4.17	2.03	4 mrem/yr	U	BD	092842-034	EPA 900.0
	Tritium	-71.1 ± 69.8	138	64.0	NE	U	BD	092842-036	EPA 906.0 M
TA2-W-27	Americium-241	-8.37 ± 9.33	14.3	7.04	NE	U	BD	092826-033	EPA 901.1
06-Sep-12	Cesium-137	3.08 ± 2.70	3.66	1.77	NE	U	BD	092826-033	EPA 901.1
	Cobalt-60	1.37 ± 2.28	3.96	1.89	NE	U	BD	092826-033	EPA 901.1
	Potassium-40	22.6 ± 28.4	43.4	20.7	NE	U	BD	092826-033	EPA 901.1
	Gross Alpha	1.90	NA	NA	15 pCi/L	NA	None	092826-034	EPA 900.0
	Gross Beta	1.33 ± 0.719	1.09	0.525	4 mrem/yr		J	092826-034	EPA 900.0
	Tritium	3.31 ± 59.4	109	49.6	NE	U	BD	092826-036	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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-2	Americium-241	-1.62 ± 10.7	16.9	8.24	NE	U	BD	092846-033	EPA 901.1
18-Sep-12	Cesium-137	1.01 ± 1.65	2.80	1.34	NE	U	BD	092846-033	EPA 901.1
	Cobalt-60	-1.99 ± 1.83	2.63	1.22	NE	U	BD	092846-033	EPA 901.1
	Potassium-40	0.717 ± 41.6	29.7	13.9	NE	U	BD	092846-033	EPA 901.1
	Gross Alpha	1.04	NA	NA	15 pCi/L	NA	None	092846-034	EPA 900.0
	Gross Beta	0.838 ± 0.643	1.03	0.493	4 mrem/yr	U	BD	092846-034	EPA 900.0
	Tritium	-54.9 ± 70.5	137	63.3	NE	U	BD	092846-036	EPA 906.0 M
TJA-3	Americium-241	2.89 ± 7.44	11.0	5.37	NE	U	BD	092833-033	EPA 901.1
10-Sep-12	Cesium-137	0.332 ± 1.80	3.16	1.52	NE	U	BD	092833-033	EPA 901.1
	Cobalt-60	1.90 ± 1.90	3.25	1.54	NE	U	BD	092833-033	EPA 901.1
	Potassium-40	31.1 ± 39.6	28.6	13.4	NE	X	R	092833-033	EPA 901.1
	Gross Alpha	1.40	NA	NA	15 pCi/L	NA	None	092833-034	EPA 900.0
	Gross Beta	2.63 ± 1.13	1.67	0.815	4 mrem/yr		J	092833-034	EPA 900.0
	Tritium	61.3 ± 87.4	149	66.1	NE	U	BD	092833-036	EPA 906.0 M
TJA-3 (Duplicate)	Americium-241	2.73 ± 7.62	11.1	5.44	NE	U	BD	092834-033	EPA 901.1
10-Sep-12	Cesium-137	-0.582 ± 1.94	3.22	1.56	NE	U	BD	092834-033	EPA 901.1
	Cobalt-60	0.288 ± 1.82	3.28	1.56	NE	U	BD	092834-033	EPA 901.1
	Potassium-40	50.7 ± 43.2	28.4	13.4	NE		J	092834-033	EPA 901.1
	Gross Alpha	1.39	NA	NA	15 pCi/L	NA	None	092834-034	EPA 900.0
	Gross Beta	2.57 ± 0.992	1.43	0.696	4 mrem/yr		J	092834-034	EPA 900.0
	Tritium	80.9 ± 93.3	154	68.5	NE	U	BD	092834-036	EPA 906.0 M
TJA-4	Americium-241	0.460 ± 6.77	11.8	5.76	NE	U	BD	092849-033	EPA 901.1
19-Sep-12	Cesium-137	0.0559 ± 2.33	4.18	1.98	NE	U	BD	092849-033	EPA 901.1
	Cobalt-60	-0.721 ± 2.62	4.62	2.13	NE	U	BD	092849-033	EPA 901.1
	Potassium-40	71.1 ± 43.8	71.1	29.2	NE	U	BD	092849-033	EPA 901.1
	Gross Alpha	0.76	NA	NA	15 pCi/L	NA	None	092849-034	EPA 900.0
	Gross Beta	3.75 ± 1.05	1.22	0.587	4 mrem/yr			092849-034	EPA 900.0
	Tritium	-41.6 ± 72.5	138	64.0	NE	U	BD	092849-036	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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-6	Americium-241	-7.61 ± 8.34	12.7	6.25	NE	U	BD	092829-033	EPA 901.1
07-Sep-12	Cesium-137	-0.163 ± 1.98	3.36	1.62	NE	U	BD	092829-033	EPA 901.1
	Cobalt-60	1.59 ± 2.15	3.72	1.77	NE	U	BD	092829-033	EPA 901.1
	Potassium-40	59.6 ± 32.3	32.2	15.1	NE		J	092829-033	EPA 901.1
	Gross Alpha	1.60	NA	NA	15 pCi/L	NA	None	092829-034	EPA 900.0
	Gross Beta	2.72 ± 0.914	1.24	0.606	4 mrem/yr		J	092829-034	EPA 900.0
	Tritium	34.7 ± 86.6	155	68.6	NE	U	BD	092829-036	EPA 906.0 M
TJA-7	Americium-241	-0.499 ± 3.16	4.71	2.30	NE	U	BD	092851-033	EPA 901.1
20-Sep-12	Cesium-137	1.24 ± 2.19	3.75	1.79	NE	U	BD	092851-033	EPA 901.1
	Cobalt-60	0.722 ± 2.24	4.15	1.94	NE	U	BD	092851-033	EPA 901.1
	Potassium-40	33.3 ± 29.4	49.1	23.2	NE	U	BD	092851-033	EPA 901.1
	Gross Alpha	1.27	NA	NA	15 pCi/L	NA	None	092851-034	EPA 900.0
	Gross Beta	1.50 ± 1.08	1.73	0.845	4 mrem/yr	U	BD	092851-034	EPA 900.0
	Tritium	-67.2 ± 69.7	138	63.6	NE	U	BD	092851-036	EPA 906.0 M
WYO-3	Americium-241	3.71 ± 10.6	16.9	8.24	NE	U	BD	092820-033	EPA 901.1
27-Aug-12	Cesium-137	0.948 ± 1.63	2.79	1.33	NE	U	BD	092820-033	EPA 901.1
	Cobalt-60	1.60 ± 1.81	3.23	1.52	NE	U	BD	092820-033	EPA 901.1
	Potassium-40	1.99 ± 45.5	27.5	12.8	NE	U	BD	092820-033	EPA 901.1
	Gross Alpha	2.24	NA	NA	15 pCi/L	NA	None	092820-034	EPA 900.0
	Gross Beta	1.39 ± 0.686	0.994	0.473	4 mrem/yr		J	092820-034	EPA 900.0
	Tritium	18.3 ± 61.4	110	49.8	NE	U	BD	092820-036	EPA 906.0 M
WYO-4	Americium-241	7.66 ± 15.8	24.1	11.7	NE	U	BD	092844-033	EPA 901.1
17-Sep-12	Cesium-137	-1.05 ± 1.65	2.74	1.30	NE	U	BD	092844-033	EPA 901.1
	Cobalt-60	-0.501 ± 1.85	3.14	1.47	NE	U	BD	092844-033	EPA 901.1
	Potassium-40	38.8 ± 33.7	24.1	11.1	NE		J	092844-033	EPA 901.1
	Gross Alpha	1.23	NA	NA	15 pCi/L	NA	None	092844-034	EPA 900.0
	Gross Beta	1.25 ± 0.767	1.20	0.576	4 mrem/yr		J	092844-034	EPA 900.0
	Tritium	-33.6 ± 70.9	134	62.0	NE	U	BD	092844-036	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 2012

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-SW1-320	13-Mar-12	15.90	544	378.7	7.64	4.89	75.9	7.46
TA2-W-01	06-Mar-12	18.84	543	88.5	7.86	0.13	83.5	7.76
TA2-W-19	13-Mar-12	19.09	524	92.5	7.88	0.62	91.2	8.38
TA2-W-26	14-Mar-12	17.60	1179	110.5	7.73	1.45	78.6	7.47
TA2-W-27	07-Mar-12	18.73	763	96.3	7.79	0.43	89.4	8 .32
TJA-2	15-Mar-12	17.21	533	90.5	7.88	0.68	82.7	7.95
TJA-3	09-Mar-12	17.59	527	384.1	7.23	2.33	73.4	7.00
TJA-4	20-Mar-12	15.02	513	59.8	7.85	0.46	56.4	5.74
TJA-6	12-Mar-12	18.40	434	98.6	7.78	3.27	60.1	5.64
TJA-7	21-Mar-12	16.78	480	75.9	7.91	1.69	78.3	7.56
WYO-4	19-Mar-12	14.32	601	87.4	7.96	0.30	79.5	8.12
TA2-SW1-320	14-Jun-12	20.56	445	168.5	7.68	9.36	82.9	7.44
TA2-W-19	12-Jun-12	19.51	518	177.6	7.55	0.29	89.3	8.20
TA2-W-26	11-Jun-12	20.57	1137	170.9	7.42	0.80	83.1	7.44
TJA-2	13-Jun-12	19.94	514	172.0	7.55	0.25	87.4	7.91
TJA-4	15-Jun-12	19.50	491	174.3	7.50	0.26	61.6	5.65
TJA-7	18-Jun-12	23.20	460	174.7	7.57	0.90	91.2	7.75
WYO-4	21-Jun-12	21.53	571	178.7	7.44	0.22	97.5	8.55
PGS-2	17-Aug-12	21.67	559	166.3	7.64	0.30	14.0	1.24
TA1-W-01	16-Aug-12	21.91	494	182.4	7.30	0.67	75.1	6.54
TA1-W-02	15-Aug-12	21.46	464	190.5	7.30	2.31	63.7	5.64
TA1-W-03	20-Aug-12	19.92	1620	174.0	7.40	0.56	84.1	7.60
TA1-W-04	23-Aug-12	20.40	451	174.0	7.38	1.43	57.1	5.14
TA1-W-05	21-Aug-12	20.68	559	181.3	7.25	0.67	77.1	6.90
TA1-W-06	22-Aug-12	19.71	820	173.4	7.53	4.46	80.8	7.37
TA1-W-08	28-Aug-12	19.60	1882	173.0	7.33	0.68	80.3	7.32
TA2-SW1-320	11-Sep-12	19.47	481	177.4	7.70	14.3	82.8	7.60
TA2-NW1-595	29-Aug-12	21.70	748	180.3	7.33	0.50	86.7	7.61
TA2-W-01	04-Sep-12	20.63	600	174.8	7.55	0.32	87.3	7.82
TA2-W-19	12-Sep-12	18.71	556	184.5	7.60	0.47	92.5	8.63

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 2012

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	13-Sep-12	16.37	1249	187.6	7.47	0.88	78.9	7.70
TA2-W-27	06-Sep-12	19.90	778	183.0	7.53	0.42	92.5	8.42
TJA-2	18-Sep-12	19.48	557	171.9	7.52	0.41	88.8	8.15
TJA-3	10-Sep-12	19.95	477	188.4	7.38	0.44	74.8	6.77
TJA-4	19-Sep-12	19.48	532	168.9	7.45	0.37	61.9	5.68
TJA-6	07-Sep-12	22.22	448	186.0	7.41	5.82	66.4	5.75
TJA-7	20-Sep-12	18.27	494	189.6	7.46	1.78	83.2	7.82
WYO-3	27-Aug-12	22.43	451	153.8	7.63	0.95	83.6	7.24
WYO-4	17-Sep-12	18.16	612	168.8	7.79	0.99	103.0	9.71
TA2-SW1-320	28-Nov-12	15.15	448	193.5	7.45	32.9	75.6	7.59
TA2-W-19	27-Nov-12	17.61	525	185.0	7.27	0.76	86.3	8.22
TA2-W-26	26-Nov-12	18.64	1183	186.9	7.20	1.16	81.5	7.57
TJA-2	29-Nov-12	18.36	523	190.2	7.28	0.60	85.6	8.06
TJA-4	04-Dec-12	17.27	499	189.1	7.19	0.56	60.0	5.75
TJA-7	05-Dec-12	18.78	464	193.3	7.25	1.17	83.9	7.81
WYO-4	03-Dec-12	13.25	571	185.3	7.43	0.53	79.2	8.25

Refer to footnotes on page 6A-51.

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Footnotes for Tijeras Arroyo Groundwater Investigation Tables

ID = identifier.
No. = Number.

[a]Result

- Values in bold exceed the established MCL.
- ND = not detected (at method detection limit).
- 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 7A- 1-4)
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- pCi/L = picocuries per liter

[b]MDL or MDA

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.

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.

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

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.

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.

[d]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.
- 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).

[e]Laboratory Qualifier

B = Analyte is detected in associated laboratory method blank.
J = Amount detected is below the practical quantitation limit (PQL).
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 Investigation 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.
None	=	No data validation for corrected gross alpha activity.
NJ+	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
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**

- 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, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0,* EPA-600/4-84-017.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*" EPA-600/4-80-032, Cincinnati, Ohio
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual*, 27th ed., Vol. 1, Rev. 1992, HASL-300.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.

[h]**Field Water Quality Measurements**

- Field measurements collected prior to sampling.

°C	= degrees Celsius.
% Sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 6B
Tijeras Arroyo Groundwater
Plots

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Attachment 6B Plots

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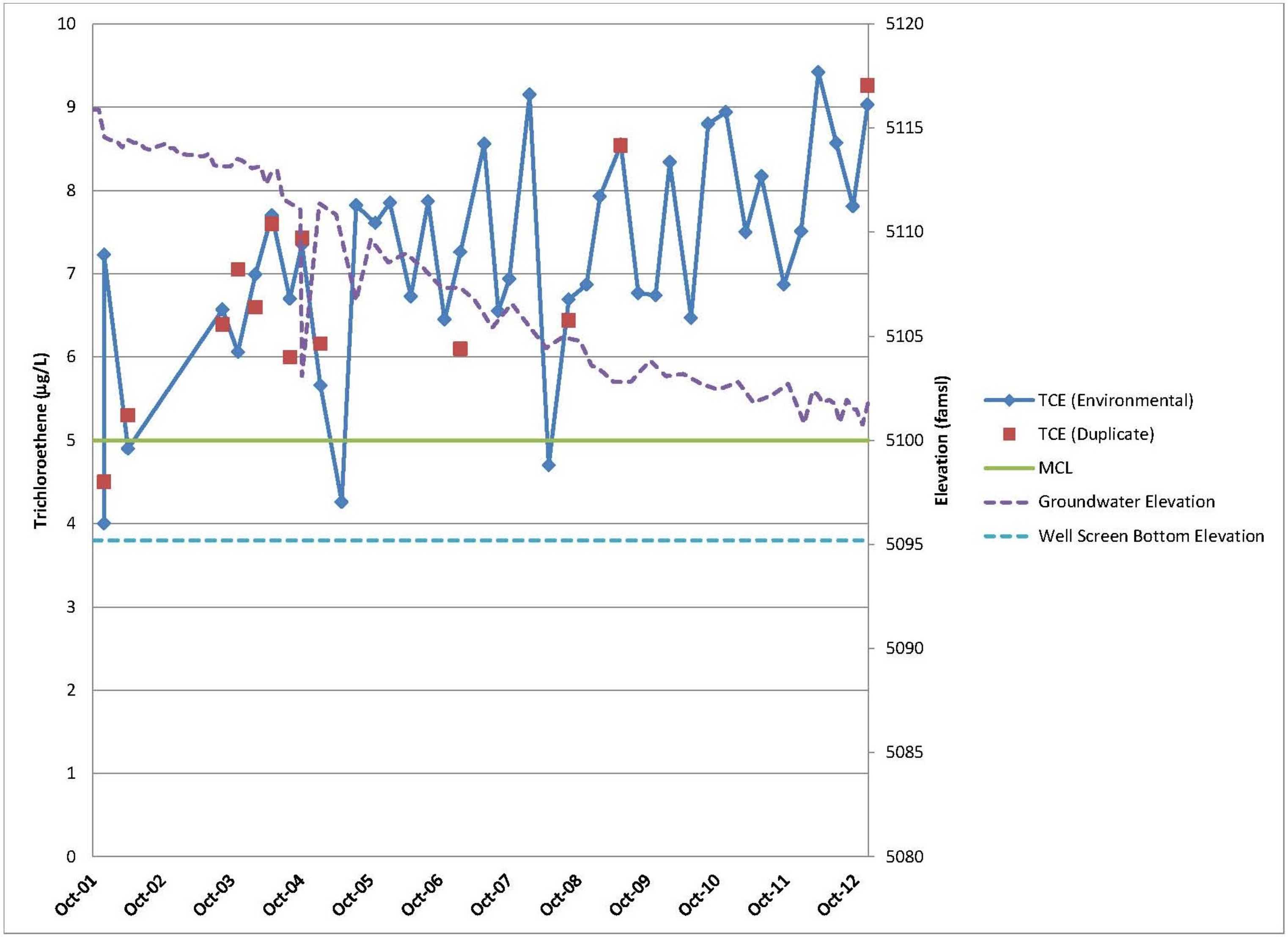

Figure 6B-1. Trichloroethene Concentrations, WYO-4

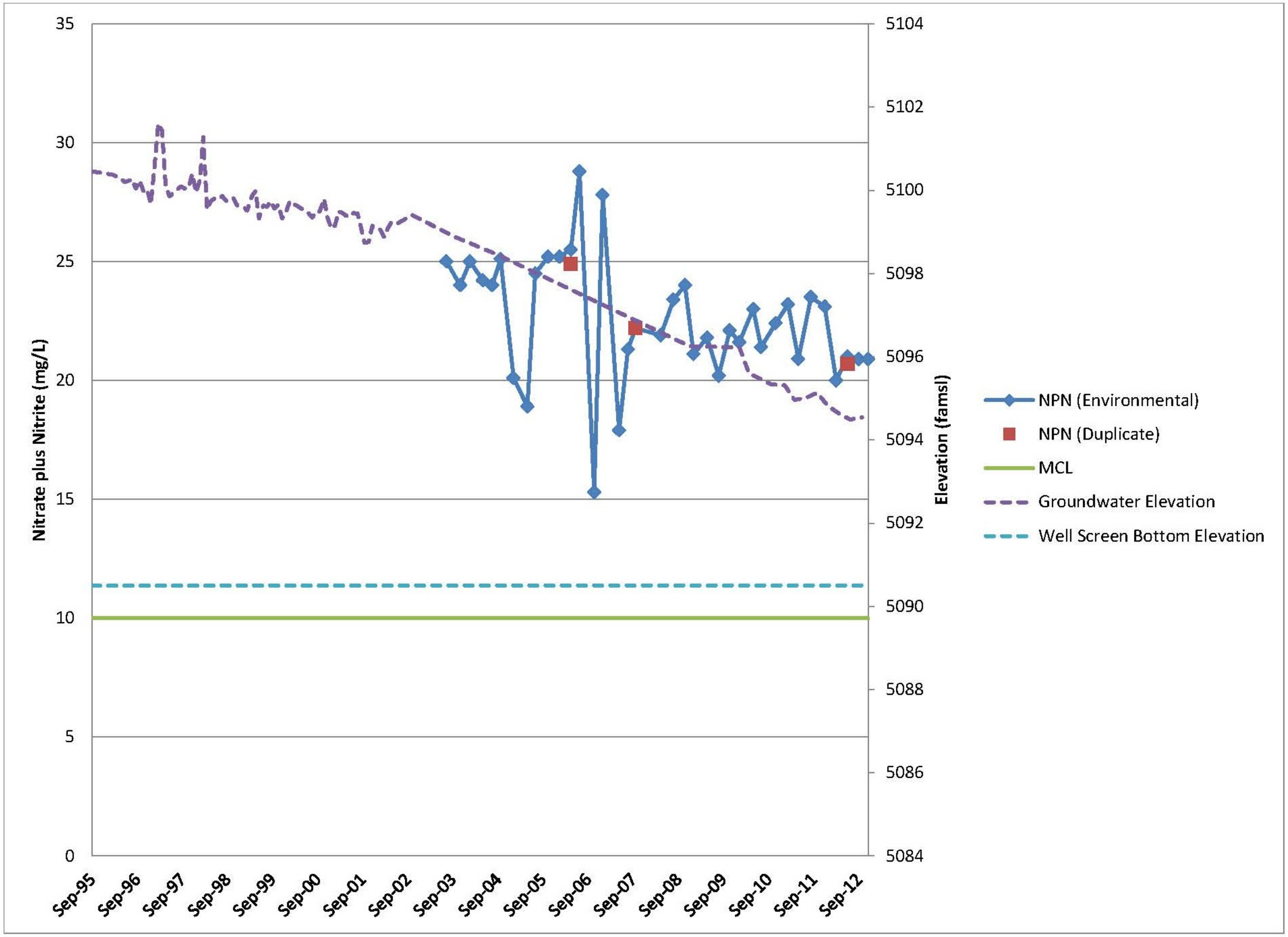

Figure 6B-2. Nitrate plus Nitrite Concentrations, TA2-SW1-320

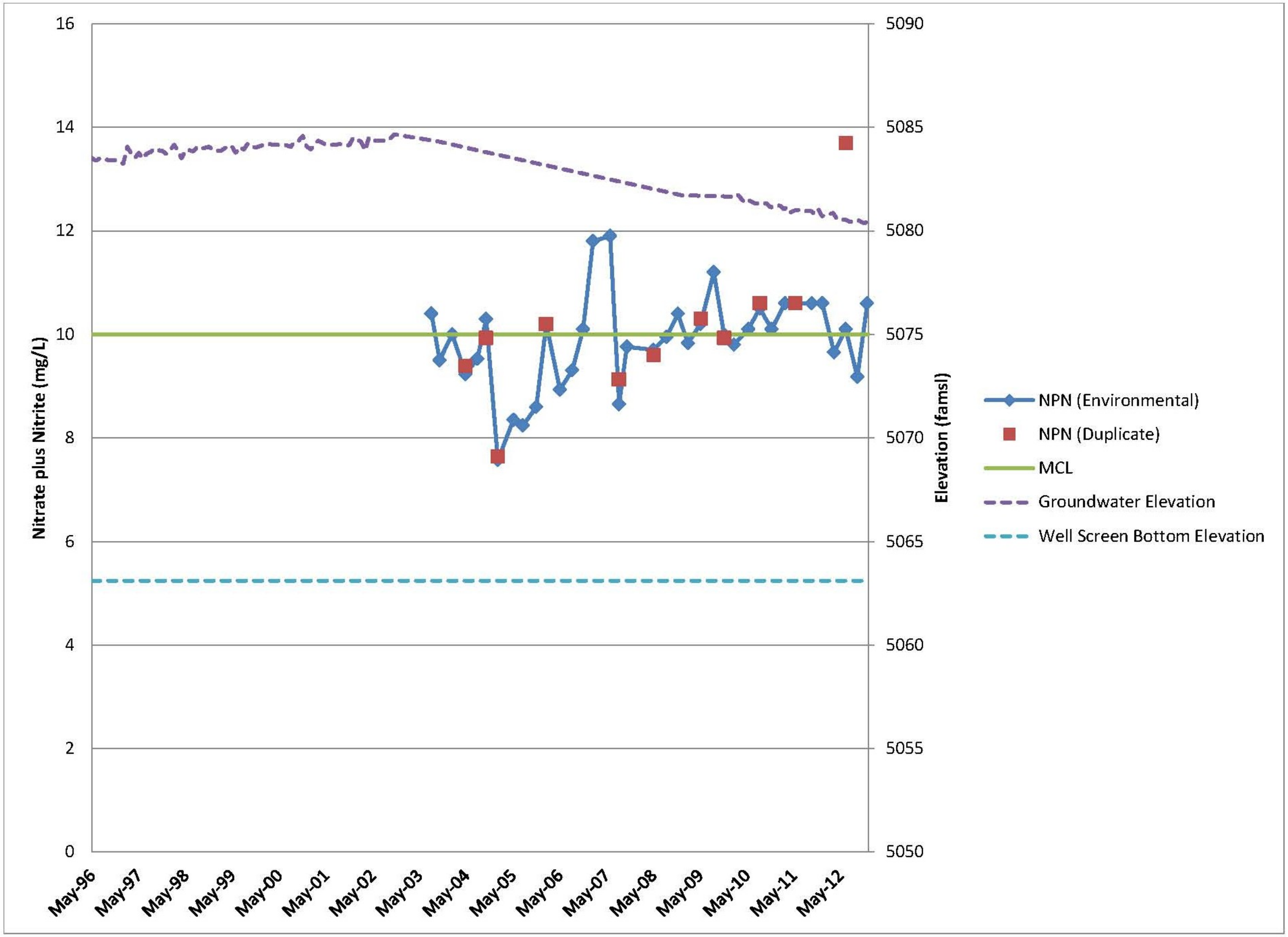

Figure 6B-3. Nitrate plus Nitrite Concentrations, TA2-W-19

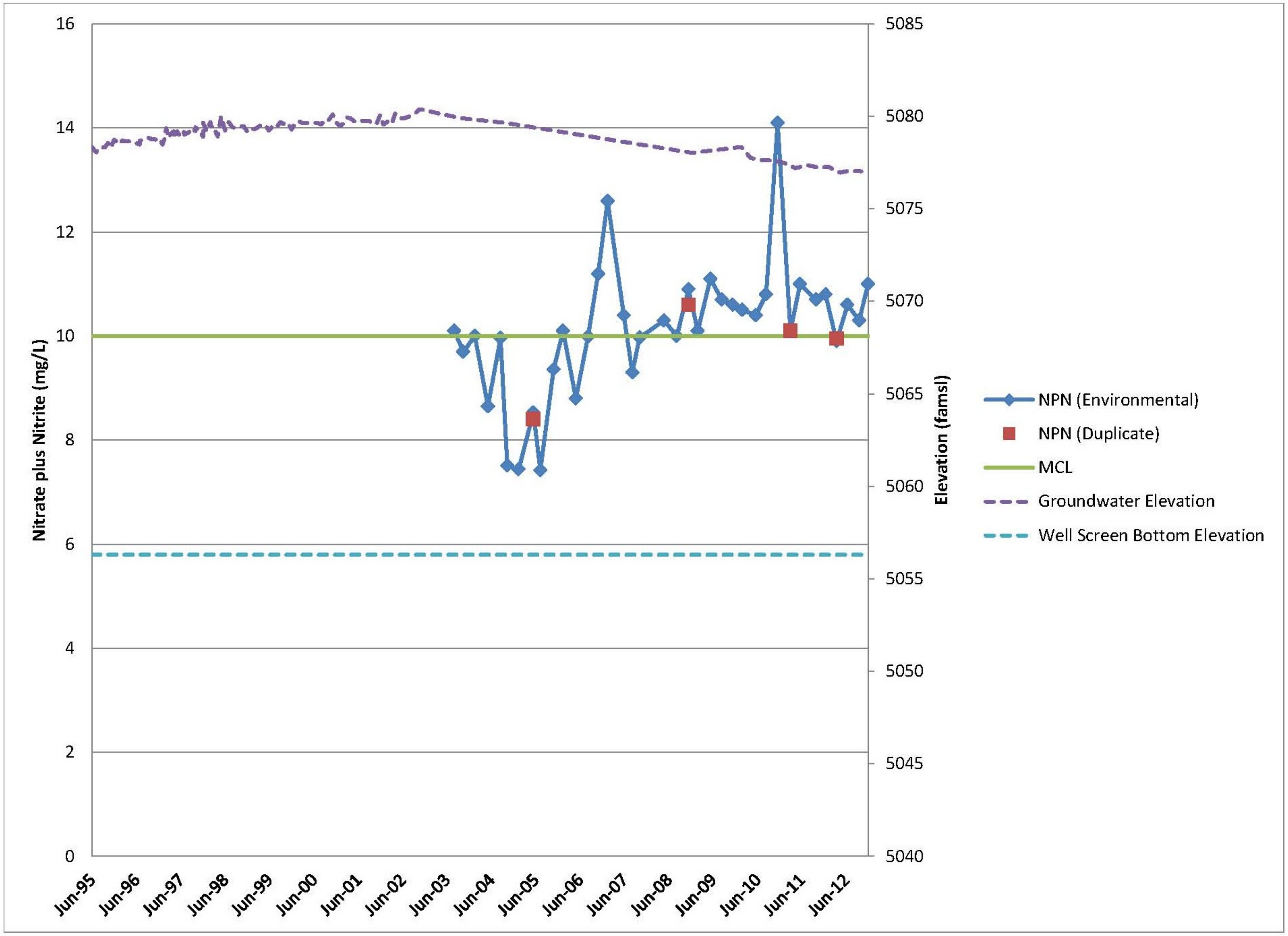

Figure 6B-4. Nitrate plus Nitrite Concentrations, TJA-2

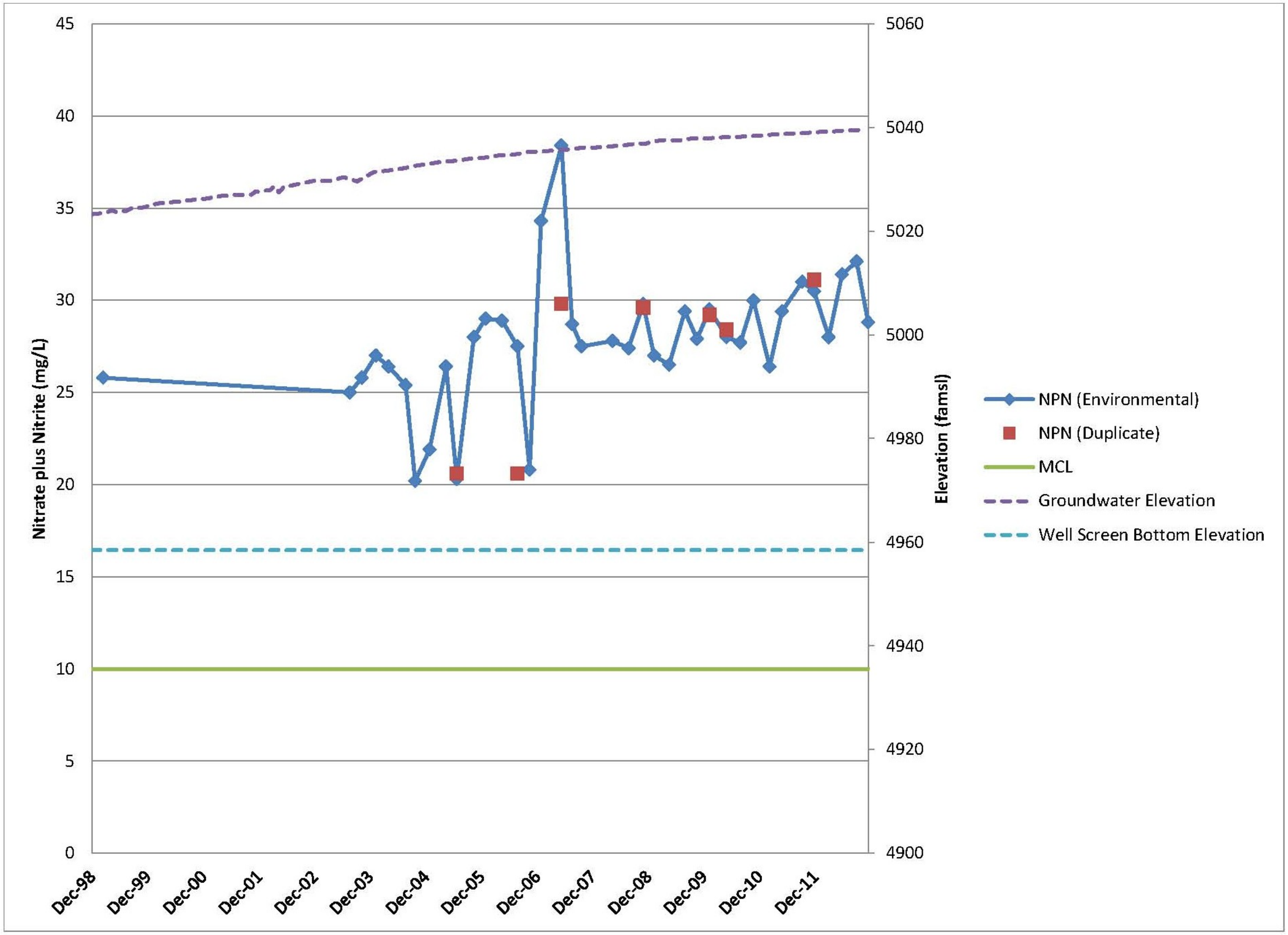

Figure 6B-5. Nitrate plus Nitrite Concentrations, TJA-4

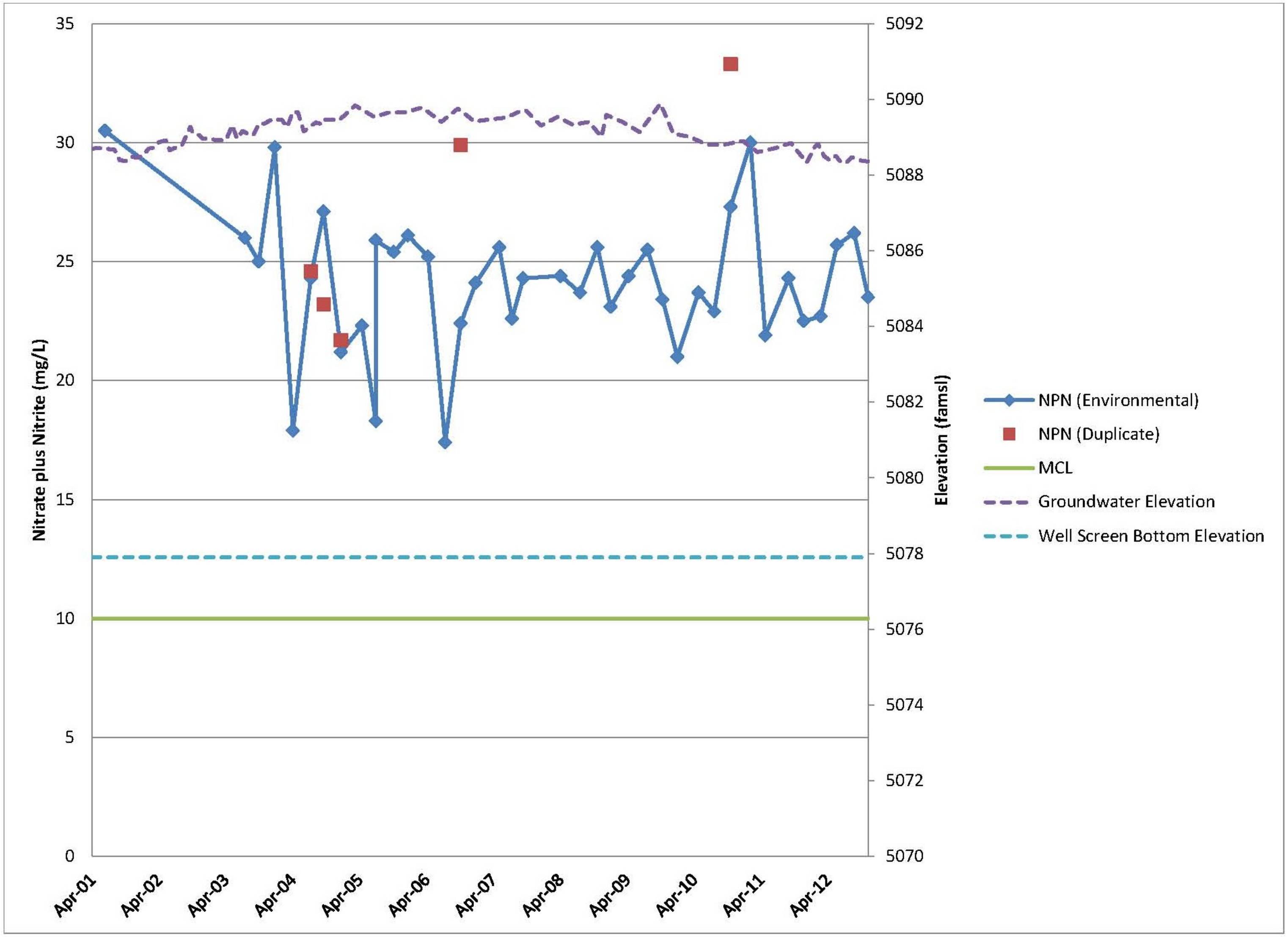

Figure 6B-6. Nitrate plus Nitrite Concentrations, TJA-7

Attachment 6C
Tijeras Arroyo Groundwater
Hydrographs

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Attachment 6C Hydrographs

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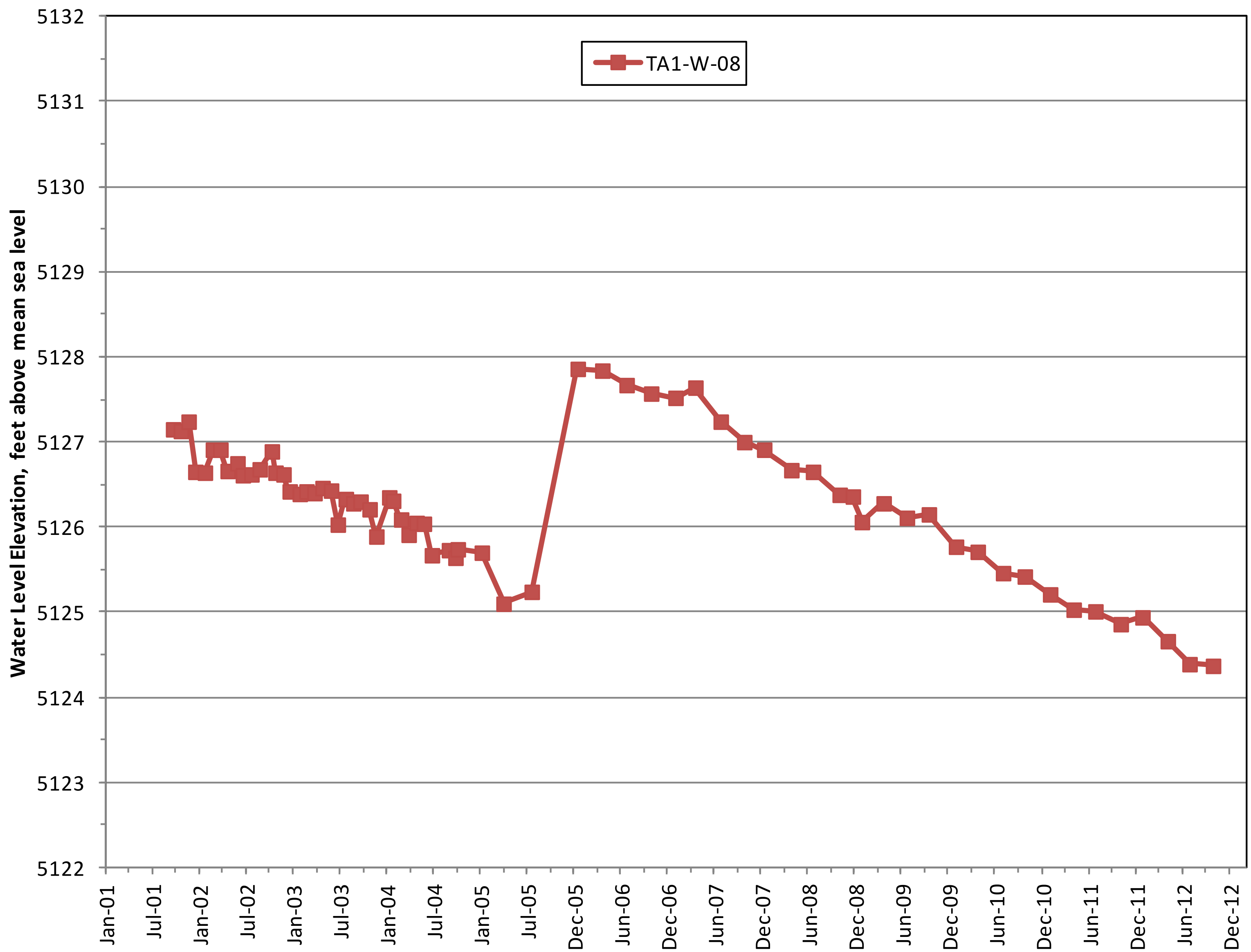

Figure 6C-1. TAG Study Area Wells (1 of 12)

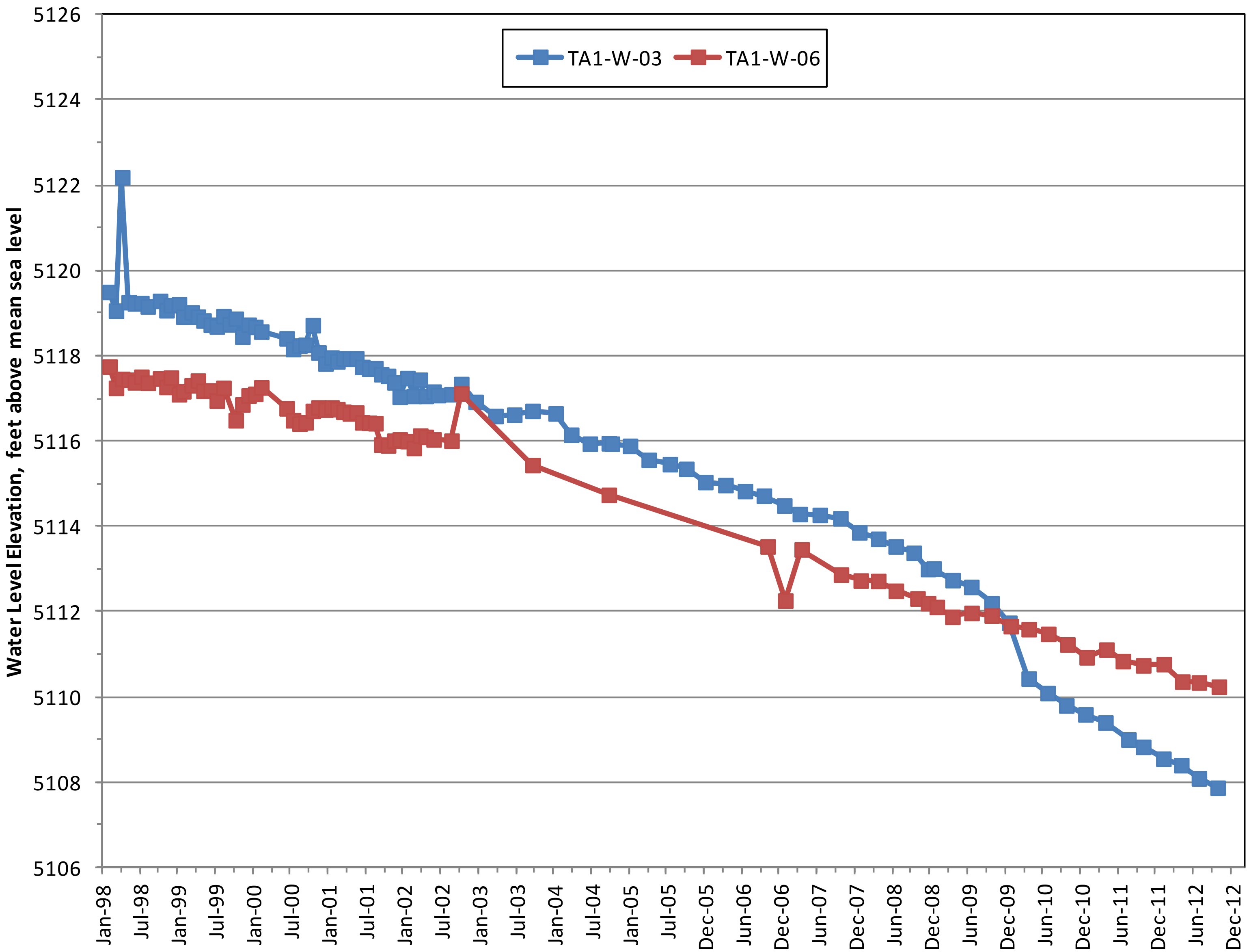

Figure 6C-2. TAG Study Area Wells (2 of 12)

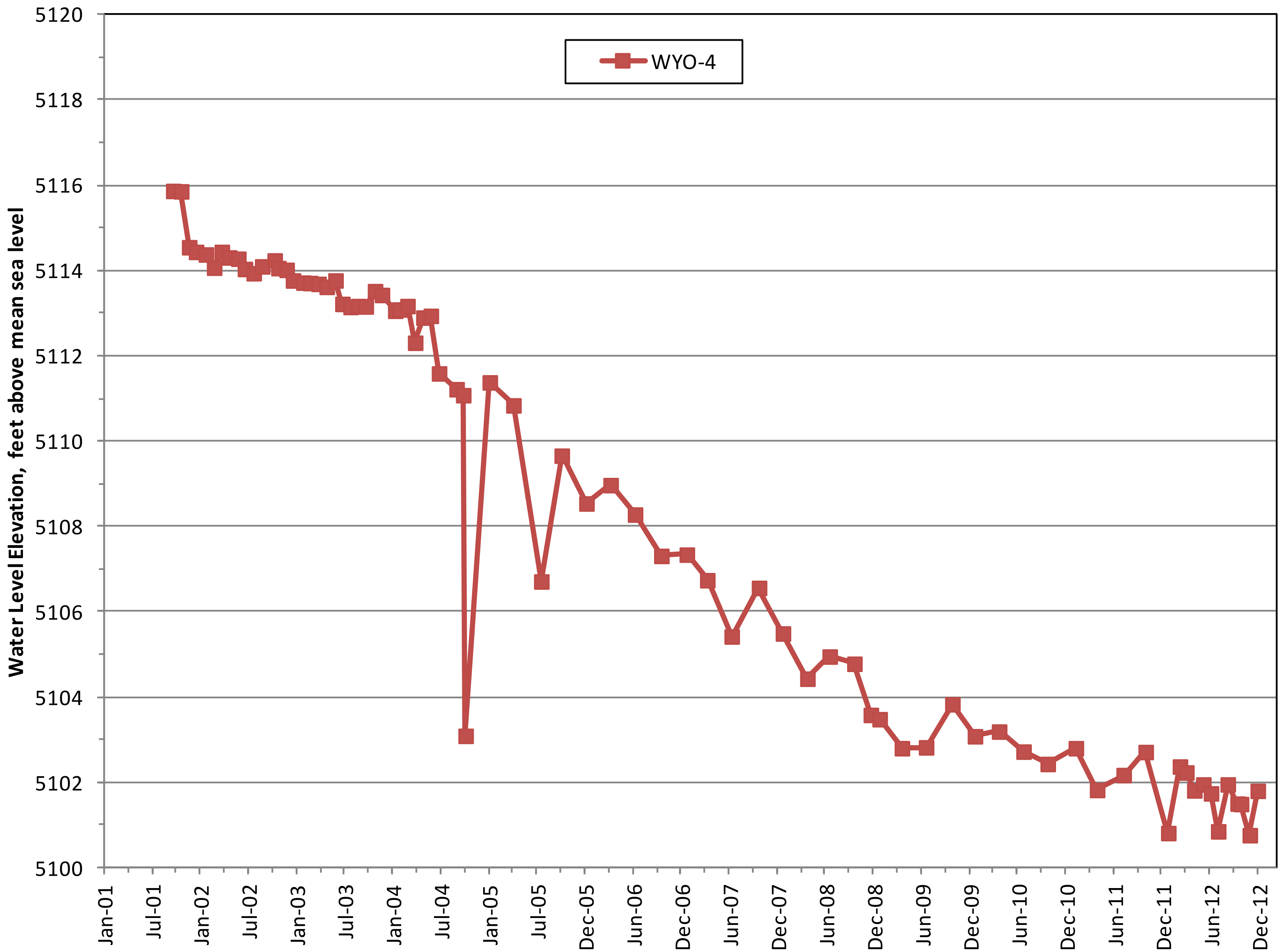

Figure 6C-3. TAG Study Area Wells (3 of 12)

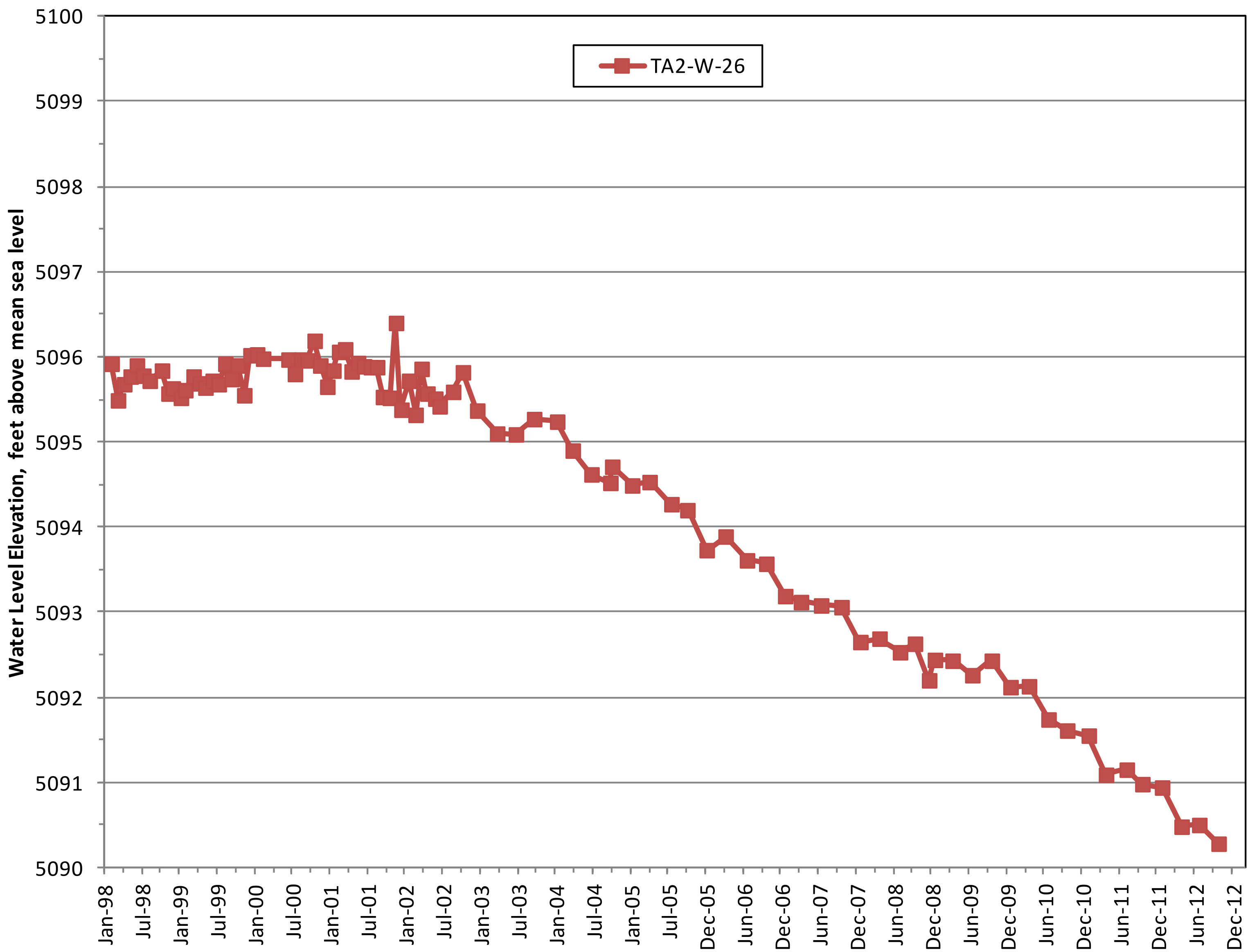

Figure 6C-4. TAG Study Area Wells (4 of 12)

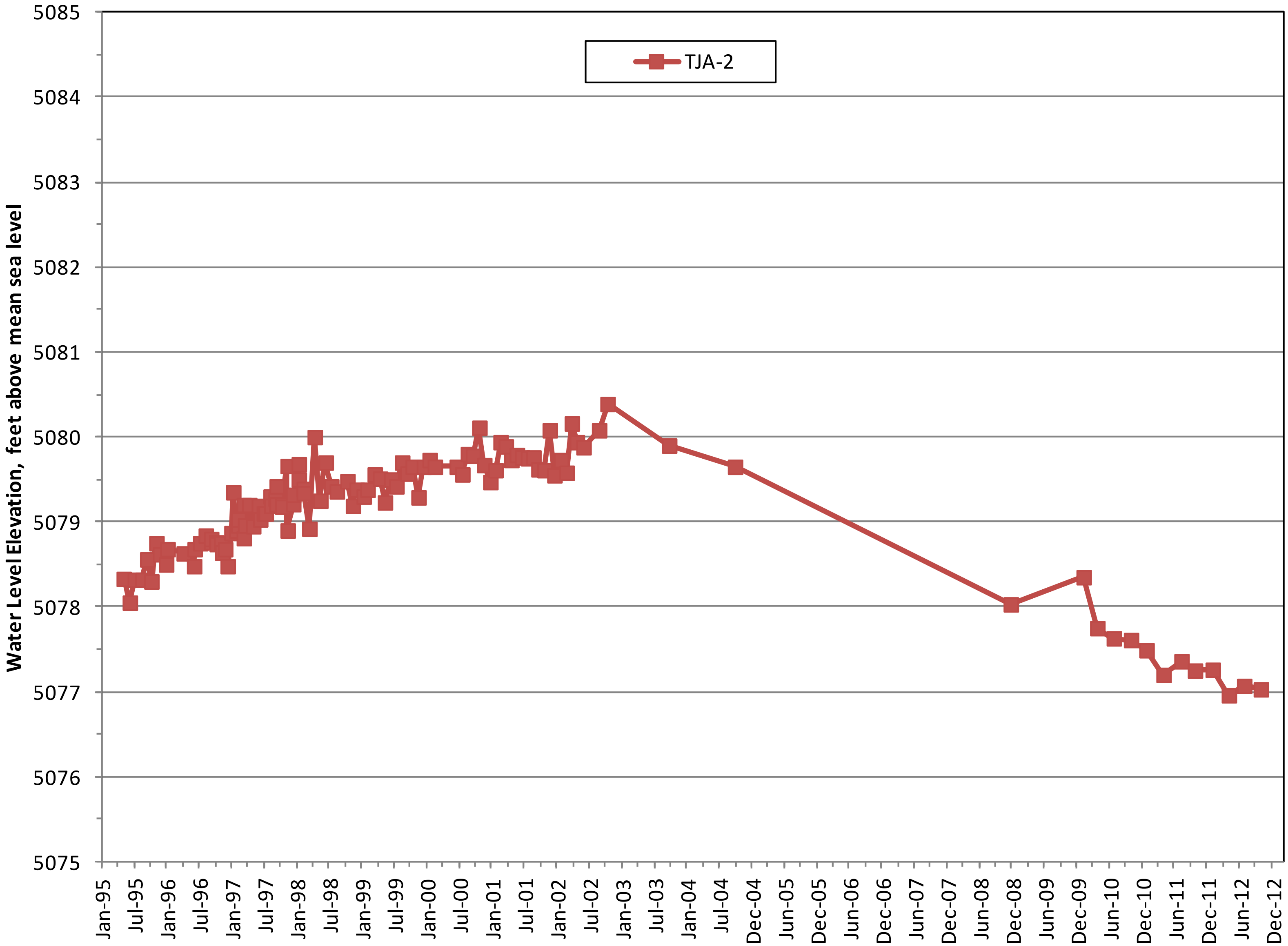

Figure 6C-5. TAG Study Area Wells (5 of 12)

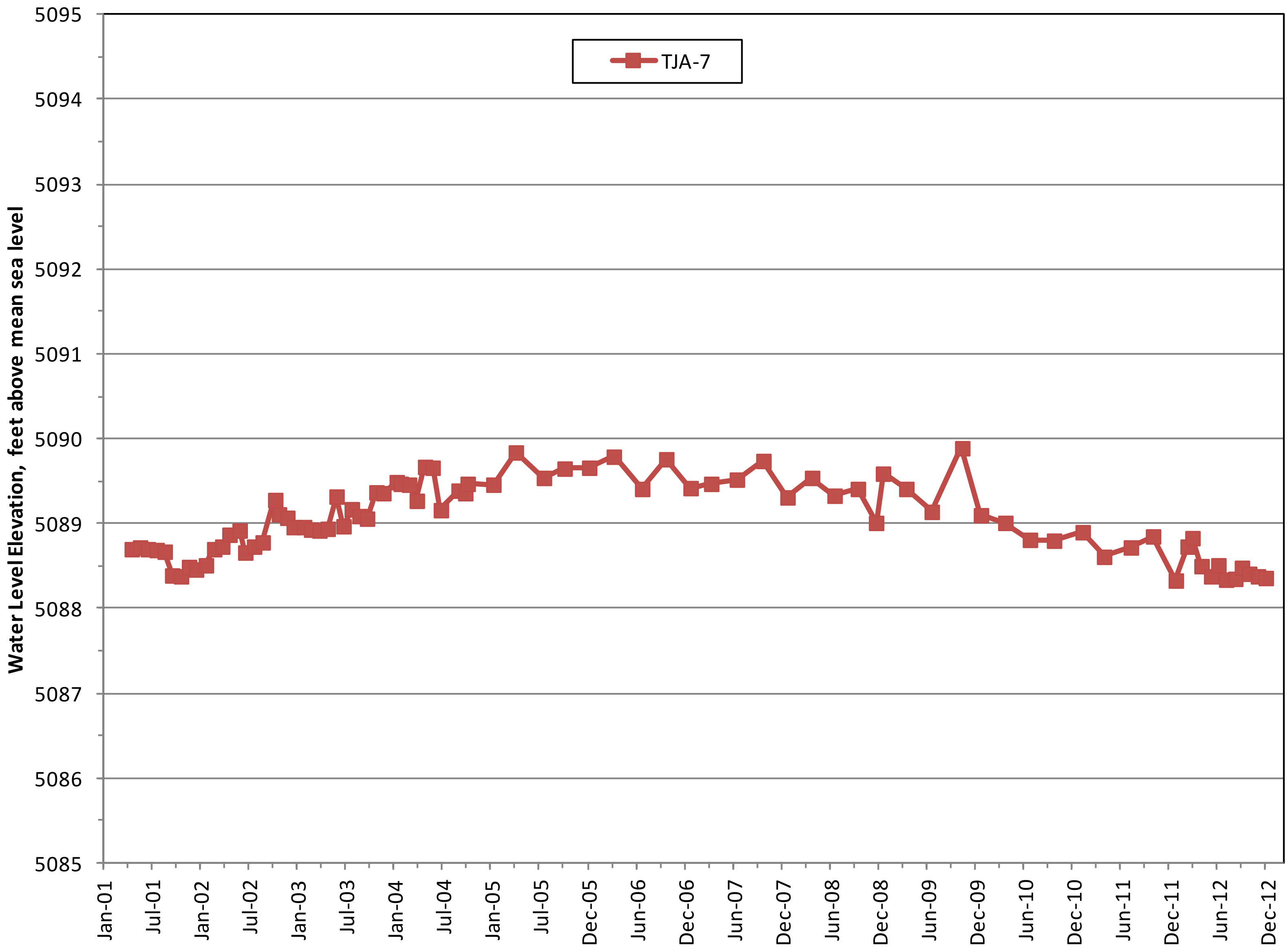

Figure 6C-6. TAG Study Area Wells (6 of 12)

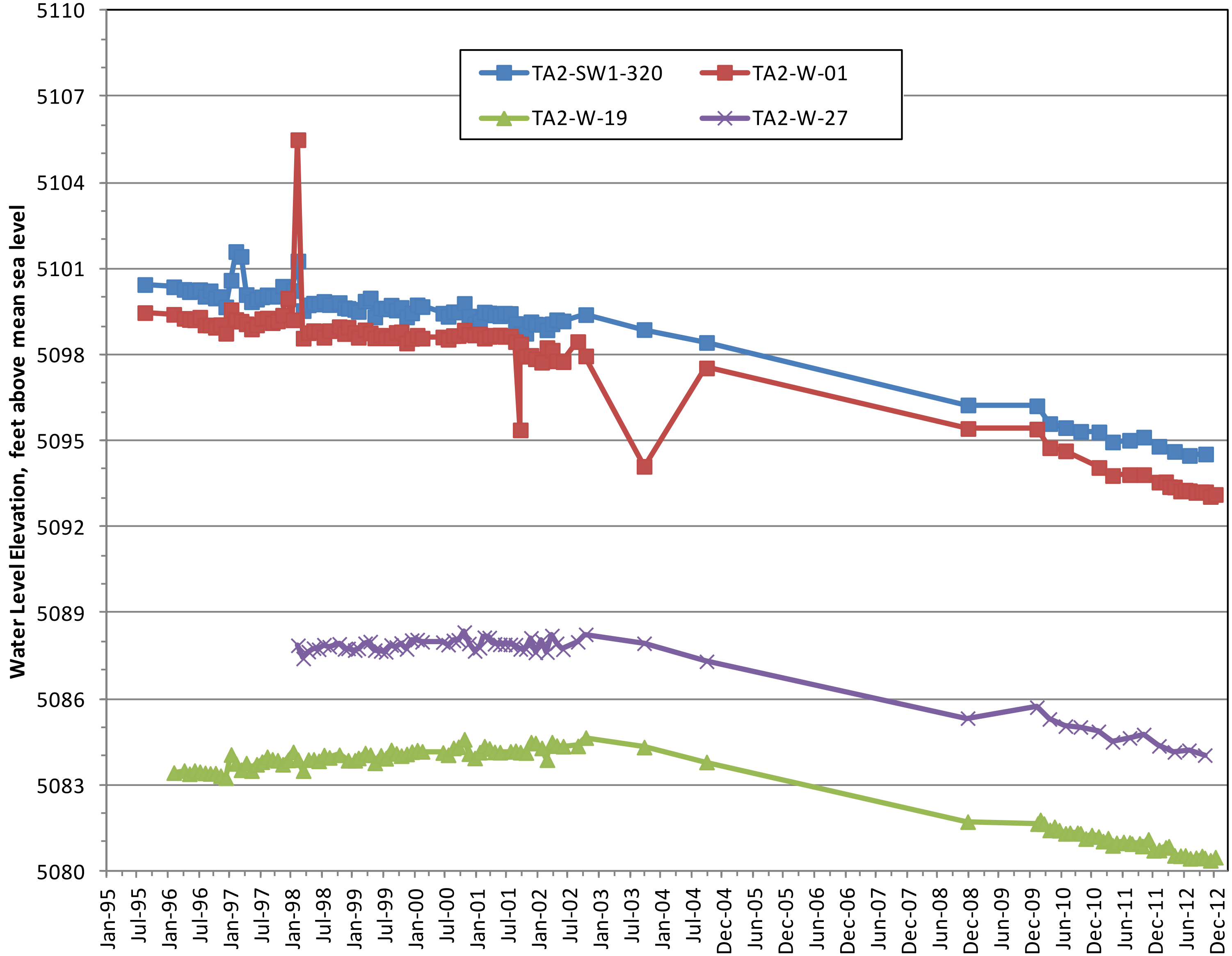

Figure 6C-7. TAG Study Area Wells (11 of 12)

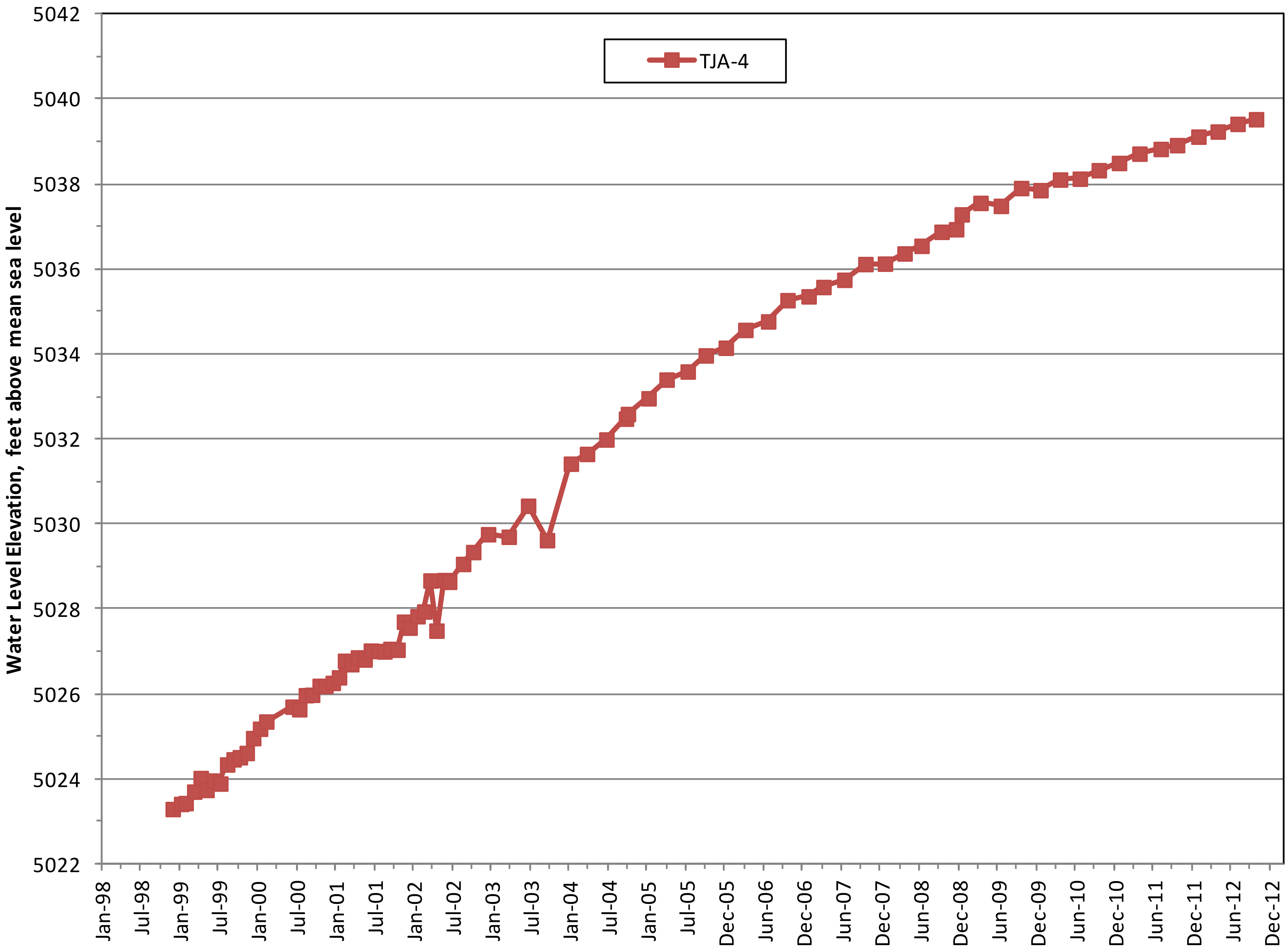

Figure 6C-8. TAG Study Area Wells (7 of 12)

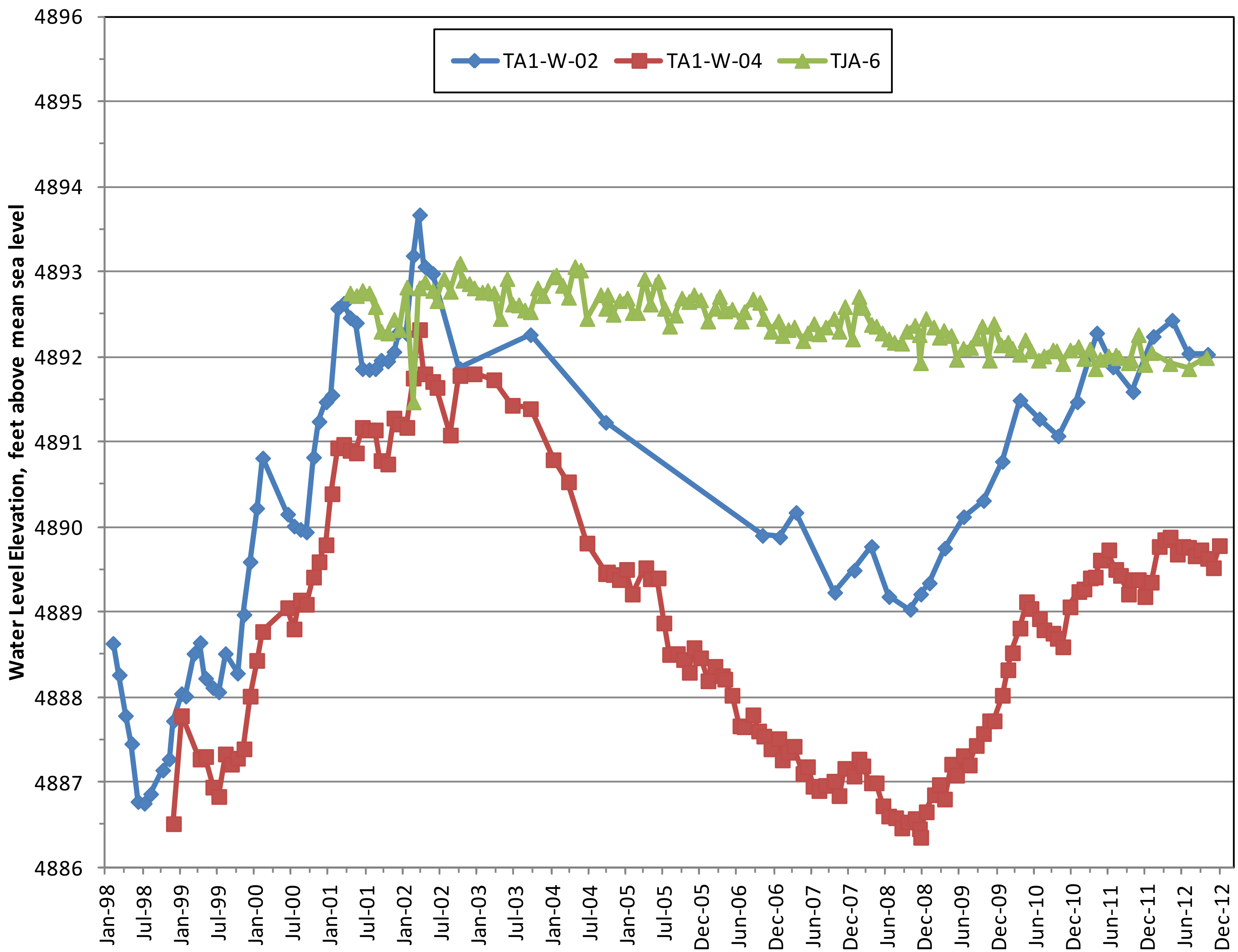

Figure 6C-9. TAG Study Area Wells (8 of 12)

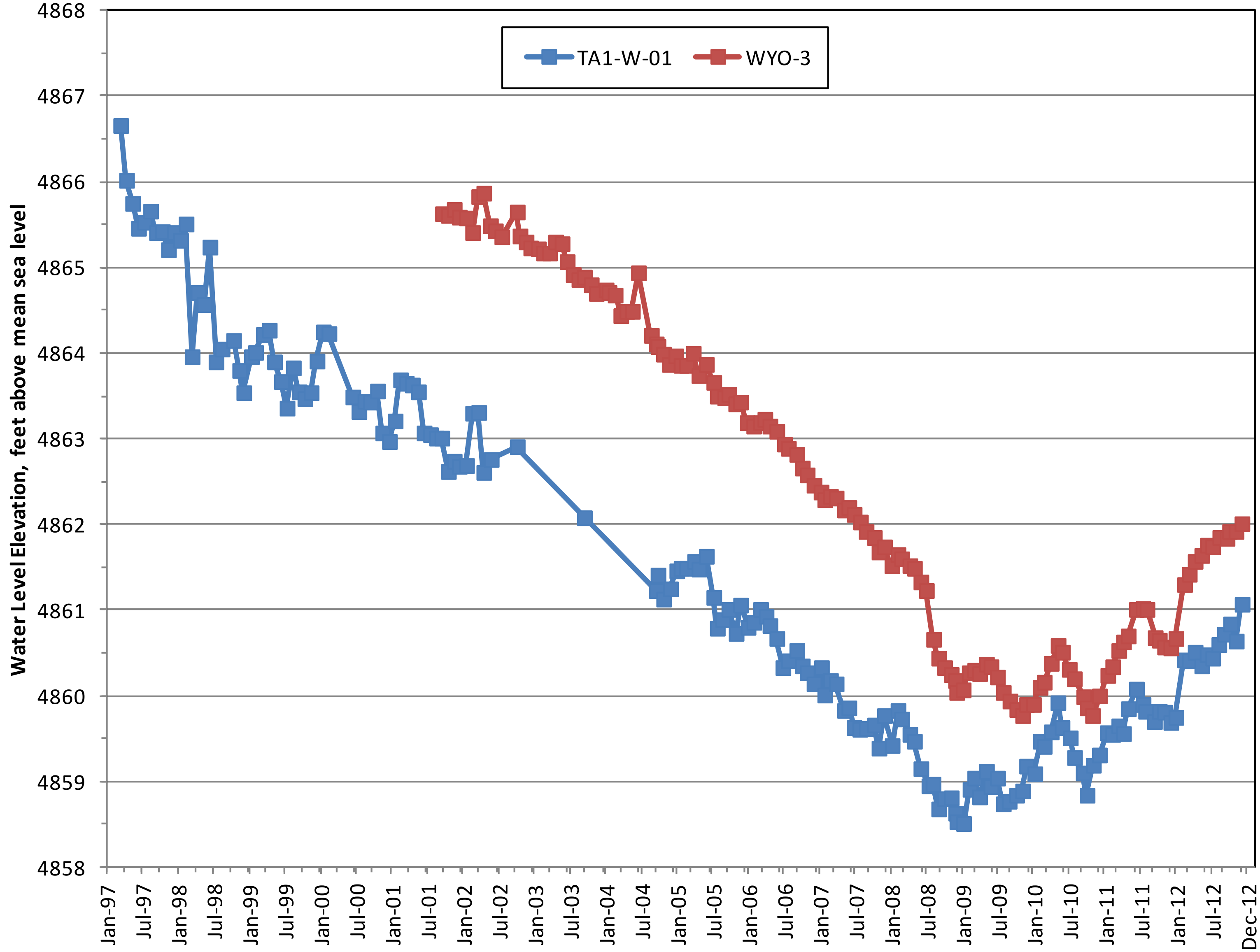

Figure 6C-10. TAG Study Area Wells (9 of 12)

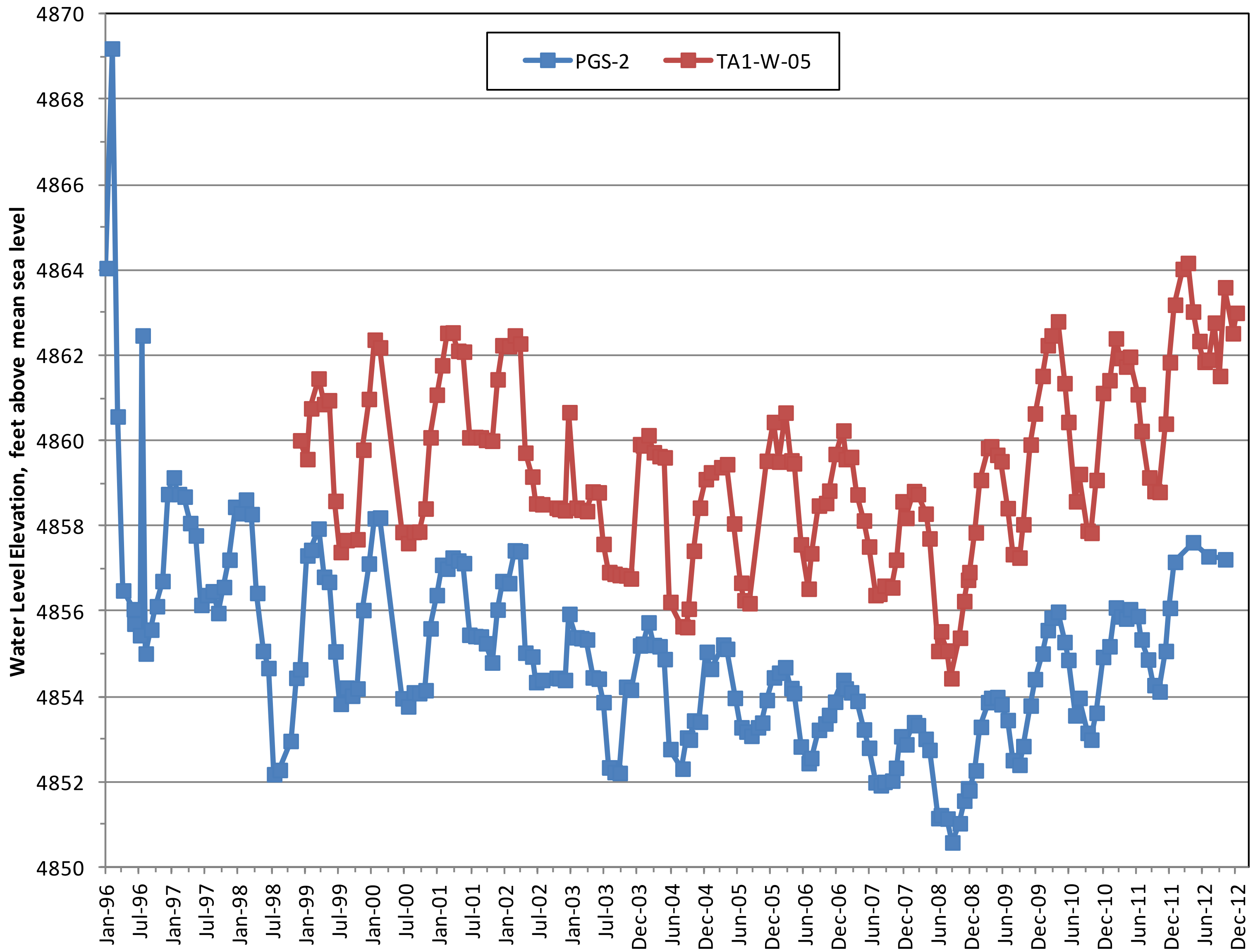

Figure 6C-11. TAG Study Area Wells (10 of 12)

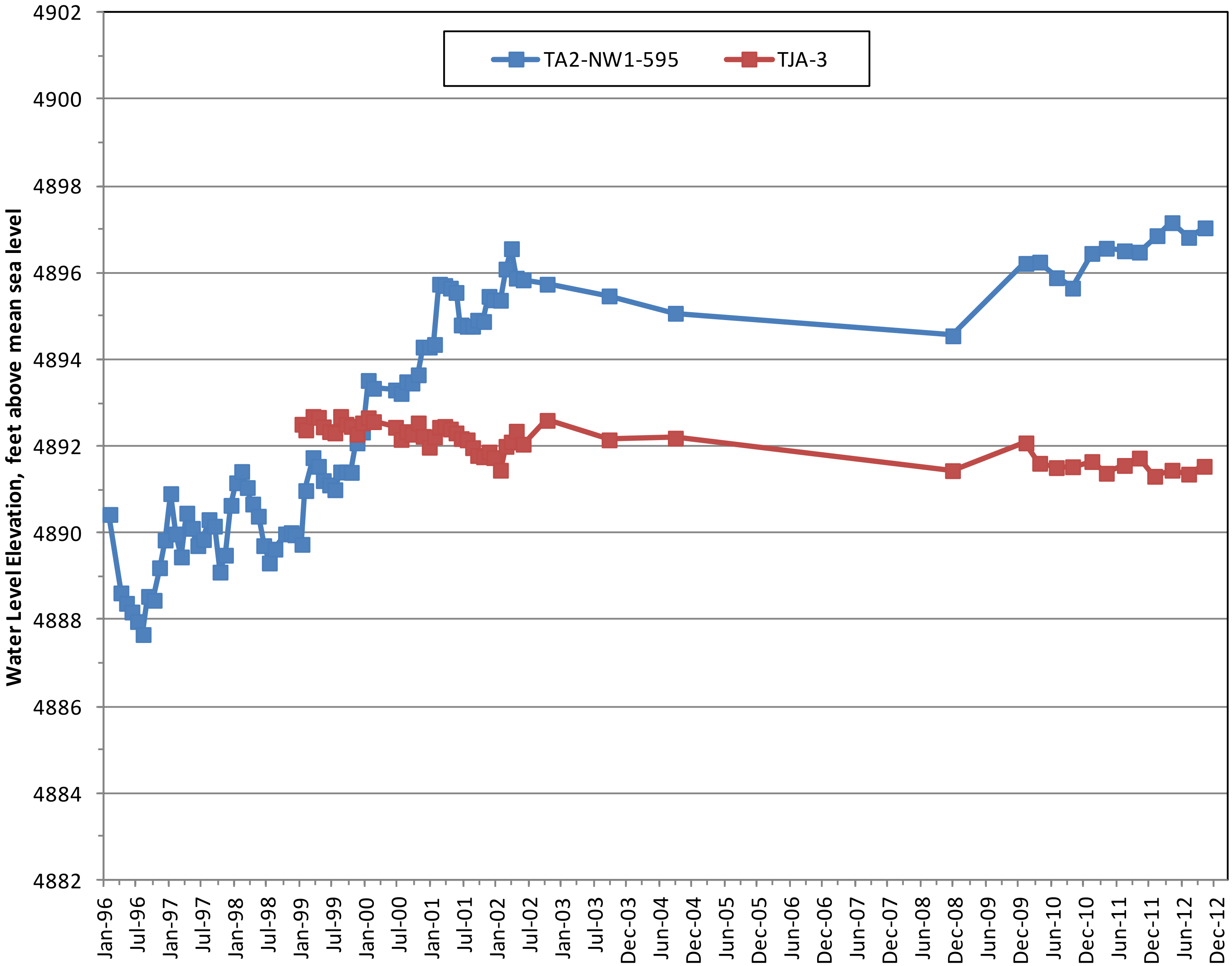

Figure 6C-12. TAG Study Area Wells (12 of 12)

7.0 Burn Site Groundwater Study Area

7.1 Introduction

Unique features of the Burn Site Groundwater (BSG) 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 39.9 milligrams per liter (mg/L). The EPA MCL and State of New Mexico drinking water standard for nitrate is 10 mg/L (as nitrogen).

Perchlorate has been detected in one groundwater monitoring well in the BSG study area. 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 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 be sampled for perchlorate using a screening level/method detection limit (MDL) of 4 micrograms per liter (µg/L) (NMED April 2004). Furthermore, the 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. Since March 2006, the maximum concentration of perchlorate in the BSG study area 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 SNL/NM facility is a government-owned/contractor-operated laboratory. Sandia, a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM for the DOE/NNSA. The DOE/NNSA Field Office administers the contract and oversees contractor operations at the site.

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 study area 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 also include open detonation of high explosive (HE) compounds (Table 7-1) 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.

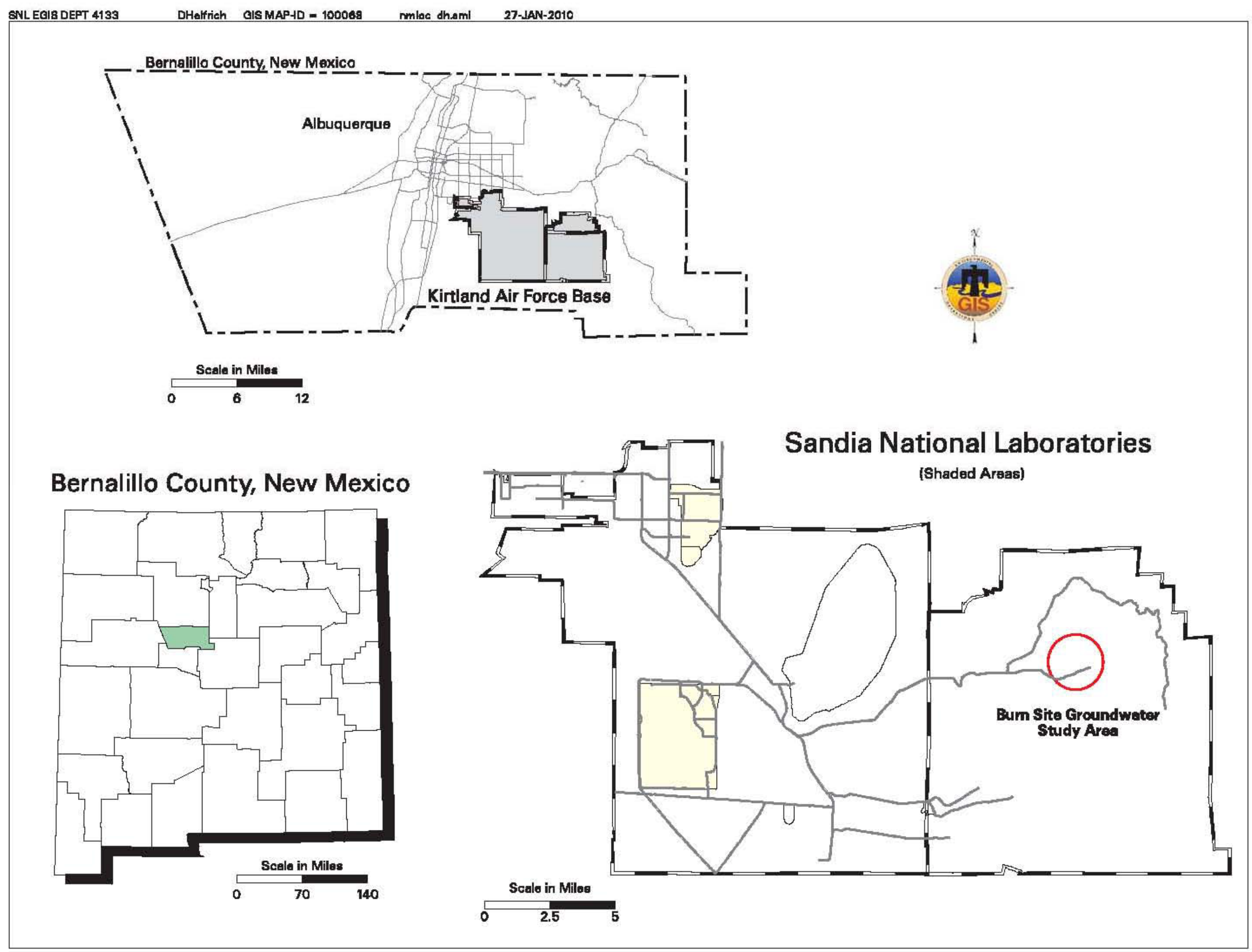

Figure 7-1. Location of the Burn Site Groundwater Study Area

Table 7-1. Historical Timeline of the Burn Site Groundwater Study Area

Month	Year	Event	Reference
	1967-early 1980s	HE testing conducted at the BSG study area 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 12AUP-01 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 study area 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 study area.	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 study area 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 Area of Concern that requires a CME.	NMED April 2004
June	2004	A CCM of the BSG study area prepared.	SNL June 2004a
June	2004	A CME work plan for the BSG study area prepared.	SNL June 2004b
January	2005	Nitrate source evaluation of deep soil in the BSG study area performed.	SNL January 2005

Table 7-1. Historical Timeline of the Burn Site Groundwater Study Area *(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 study area.	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 2009a
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, Burn Site Groundwater.	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

Table 7-1. Historical Timeline of the Burn Site Groundwater Study Area *(Concluded)*

Month	Year	Event	Reference
September	2012	GWPP Calendar Year 2011 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL September 2012a
December	2012	Completed field program to decommission BSG monitoring wells 12AUP-01, CYN-MW1D, CYN-MW2S, and install monitoring well CYN-MW13.	SNL March 2013

NOTES:

BSG	= Burn Site Groundwater.
CAC	= Corrective Action Complete.
CCM	= Current Conceptual Site Model.
CME	= Corrective Measures Evaluation.
COC	= Constituent of concern.
DOE	= U.S. Department of Energy.
ER	= Environmental Restoration.
GWPP	= Groundwater Protection Program.
HE	= High explosive.
JP-4	= Jet propellant fuel composition 4.
mg/L	= Milligram(s) per liter.
NFA	= No Further Action.
NMED	= New Mexico Environment Department.
OB	= Oversight Bureau.
RSI	= Request for Supplemental Information.
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 JP-4 (jet propellant fuel composition 4). The Light Air Transport Accident Resistant Container Unit was constructed in 1980, and other engineered burn units were constructed by 1983. These burn units used jet fuel, gasoline, and diesel for the burn tests.

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 Study Area

Well	Installation Year	WQ	WL	Comments
2AUP01	1996		√	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		√	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 installed in December 2012, replaced CYN-MW1D

NOTES:

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

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 then incorporated into the BSG study area 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 study area, numerous characterization activities have been conducted (Table 7-1). The results of these characterization activities are summarized in two versions of the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site* (SNL June 2004a and April 2008a). These two versions of the BSG conceptual site model provide a comprehensive list of groundwater monitoring data sources used to support the summary of investigations.

In April 2004, the Order became effective between the DOE, Sandia, and the NMED and the Order specifies the Burn Site as an area of groundwater contamination (NMED April 2004). In response to the Order, DOE/NNSA and Sandia submitted the Corrective Measures Evaluation (CME) Work Plan for the BSG study area 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 (TPH) 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 study area. 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/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 (Section 7.1.5). 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 existing groundwater monitoring wells, 12AUP-01, CYN-MW1D, and CYN-MW2S; and install a replacement groundwater monitoring well, CYN-MW13 (SNL February 2012). Monitoring wells 12AUP-01 and CYN-MW2S had been installed over 15 years ago 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 and served no useful purpose. 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 (12AUP-01, CYN-MW1D, and CYN-MW2S) were decommissioned in November 2012; and replacement monitoring well CYN-MW13 was installed in December 2012.

7.1.4 Current Monitoring Network

Currently eight monitoring wells in the BSG study area are monitored for water quality, including CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12 (Figure 7-2). Monitoring well CYN-MW1D (recently replaced with CYN-MW13) and the two shallow monitoring wells (12AUP-01 and CYN-MW2S) were decommissioned during Calendar Year (CY) 2012, and none of these wells were samples in CY2012. In addition, monitoring well CYN-MW3 was dry during all CY 2012 sampling events.

7.1.5 Summary of Calendar Year 2012 Activities

The following activities were performed for the BSG study area during CY 2012:

- Quarterly groundwater sampling was conducted at four monitoring wells (CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) in January 2012.

- Semiannual groundwater sampling was conducted at four monitoring wells (CYN-MW4, CYN-MW6, CYN-MW7, and CYN-MW8) in April 2012.

- Semiannual groundwater sampling was conducted at eight monitoring wells (CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12) in October 2012.

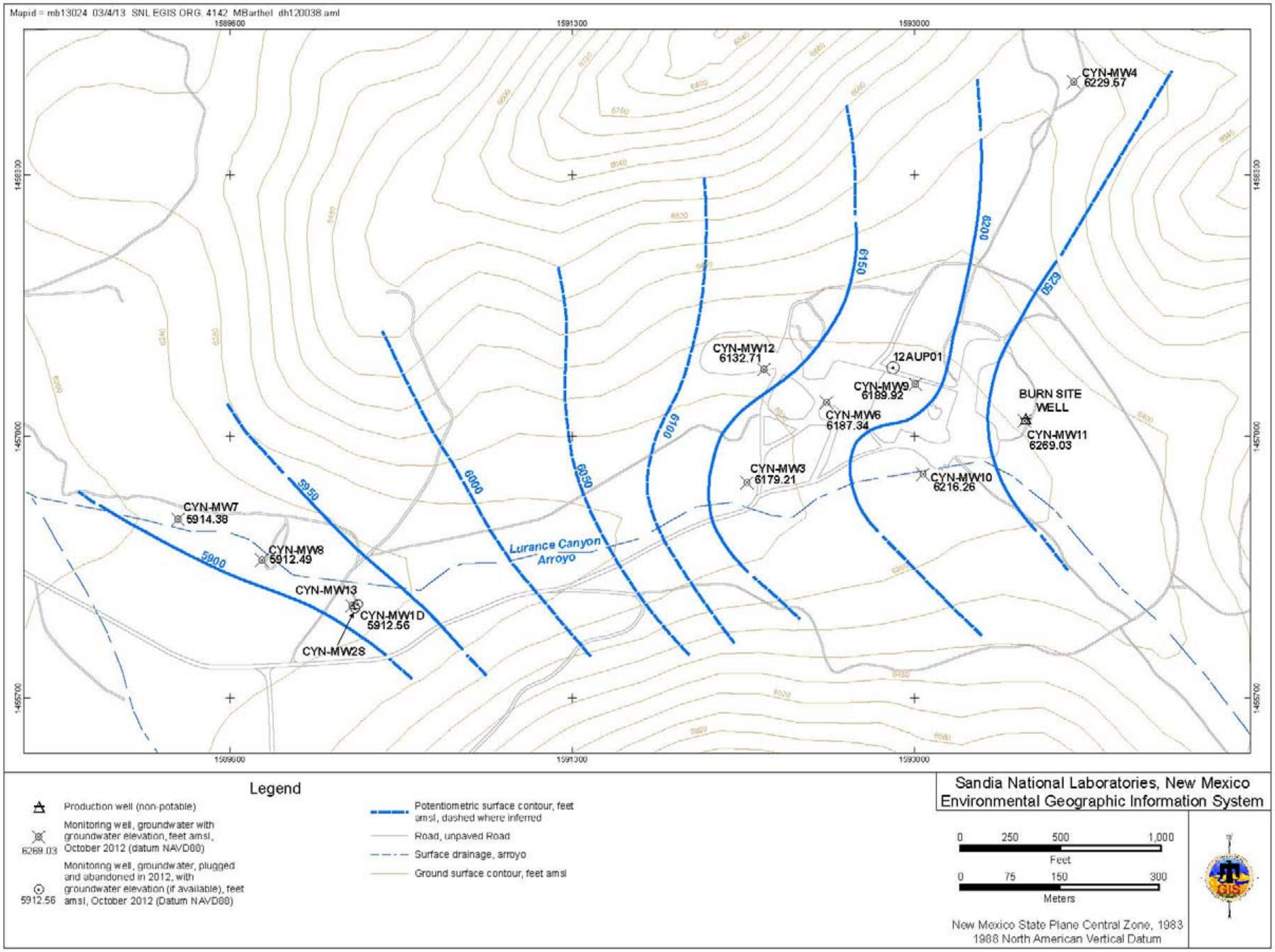

Figure 7-2. Burn Site Groundwater Study Area Potentiometric Surface Map (October 2012)

- Semiannual reporting of perchlorate analyses for monitoring well CYN-MW6 was conducted.

- Monitoring wells CYN-MW1D, CYN-MW2S, and 12AUP-01 were decommissioned in November 2012.

- Monitoring well CYN-MW13 was installed to replace monitoring well CYN-MW1D in December 2012.

- Tables of analytical results (Attachment 7A), concentration versus time graphs (Attachment 7B), and hydrographs (Attachment 7C) were prepared in support of this report.

7.1.6 Summary of Future Activities

The following activities are anticipated for the BSG study area investigation during CY 2013:

- Semiannual groundwater sampling will be conducted at nine monitoring wells (CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, and CYN-MW13) during the second and fourth quarters of CY 2013.

- A report describing the well decommissioning of monitoring wells 12AUP-01, CYN-MW1D, and CYN-MW2S; and well installation of monitoring well CYN-MW13 field activities will be prepared and submitted to the NMED.

- Due to drastically decreasing groundwater elevations, proposed modifications to the groundwater monitoring well network through plugging and abandonment of dry monitoring wells and the installation of replacement monitoring wells will be discussed with the NMED.

- Semiannual reporting of perchlorate analyses for monitoring well CYN-MW6 will be performed.

7.1.7 Current Conceptual Model

Groundwater flow in the BSG study area 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 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 permeability of the fractured bedrock units is low and well yields are minimal. 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.

The Precambrian metamorphic rocks typically are fractured as a result of the long and complex history of regional deformation. Drill core data and outcrop exposures indicate that the 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 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 study area consists of unconsolidated alluvial fill deposits 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 study area.

7.1.7.2 Hydrogeologic Conditions at the BSG Study Area

When the Burn Site Well was drilled in 1986, the depth to groundwater-bearing strata was approximately 222 ft below ground surface. Following completion of the well in fractured bedrock, the water level rose approximately 150 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) and low permeability of the fractured bedrock.

Regionally, groundwater in the western Manzanita Mountains flows generally toward the west from a groundwater flow divide located east of the BSG study area (SNL November 2001). Westward groundwater flow across 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 12AUP-01 [Figure 7-2]) 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 12AUP-01. The water level remained fairly constant for about one month. However, no water has been measured in monitoring well 12AUP-01 since 2005. No groundwater has been measured in monitoring well CYN-MW2S since installation. It is likely that significant saturation in the vadose zone 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 October 2012 potentiometric surface for the BSG monitoring well network. The general direction of groundwater flow beneath the BSG study area is to the west-southwest as indicated by the potentiometric surface. No water-supply wells are located near the BSG study area, except for the Burn Site Well that is used only rarely (last pumped in 2003) for nonpotable applications such as fire suppression. Groundwater levels in the Paleozoic and Precambrian bedrock near the BSG study area are not influenced by regional water-supply well pumping from the basin-fill deposits of the Albuquerque Basin.

The apparent horizontal groundwater gradient based on BSG monitoring wells and springs varies from approximately 0.004 to 0.14 feet per foot (ft/ft) (SNL April 2008a). 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 wide range of hydraulic gradients in Lurance Canyon indicate that localized groundwater systems associated with brecciated fault zones in the low-permeability fractured bedrock at the BSG study area are poorly connected and are effectively compartmentalized. Limited groundwater flow velocity information is based on COC first-arrival estimates. Based on contaminant 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 (ft/yr) (SNL April 2008a). No information is available about vertical flow velocity within the fractured rocks at the BSG study area. 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 metamorphic rock act as a semiconfined unit restricting vertical flow.

Water levels have been routinely monitored in BSG wells since 1999. Figures 7C-1 through 7C-5 (Attachment 7C) show groundwater levels in BSG wells that are completed in bedrock. No substantial seasonal variation in water levels is 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 study area is poorly interconnected. Water level fluctuations may be a result of local heterogeneities in hydraulic properties related to the fractured system. The BSG monitoring wells have shown significant groundwater declines over the past four to five years, with decreases in water levels ranging from 0.76 to 3.46 ft/yr. Declining water levels may be due to reduced amounts of precipitation during the drought of the last several years.

7.1.7.4 Contaminant Sources

Nitrate in the BSG study area 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 sedimentary rocks and atmospheric deposition. Evaporation and transpiration of rainwater that has infiltrated canyon alluvial sediments can increase nitrate concentrations. Potential anthropogenic nitrate sources include septic systems and the degradation of HE compounds. SNL/NM personnel have conducted several sampling events in the BSG study area to identify the source of nitrate in site soil; however, no source as been identified (SNL May 2005).

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 study area and contains open-air detonation areas where nitrate-based explosives were used. The detonations dispersed HE compounds across the ground surface, and subsequent degradation (weathering) of these HE materials most likely released nitrate. SWMU 94 testing also involved burning HE compounds and 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, and CYN-MW12 (July 2010), nitrate concentrations that exceed the MCL have been consistently detected in samples from these wells. Nitrate concentrations in samples from monitoring wells CYN-MW10 and CYN-MW11 are near or just above the MCL (Table 7-3). Nitrate concentrations in groundwater samples from monitoring wells CYN-MW4, CYN-MW7, and CYN-MW8 have not exceeded the MCL.

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 (ABCWUA) and KAFB well fields, located approximately 7 to 12 miles to the west-northwest of the study area. Numerical simulations suggest nitrate concentrations will be decreasing in groundwater 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 show that groundwater travel times exceed 600 years from the study area to the ABCWUA 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 federal regulations mandated by the 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).

Table 7-3. Summary of Historical Nitrate Concentrations in Groundwater Monitoring Wells that Exceed the MCL at the Burn Site Groundwater Study Area

Well	Historical Maximum NPN Concentration (mg/L)	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	36.6	600 ft west northwest
CYN-MW10	11.4	600 ft west southwest
CYN-MW11	11.4	30 ft south
CYN-MW12	14.4	1,300 ft west northwest

NOTES:
ft = Feet.
MCL = Maximum Contaminant Level.
mg/L = Milligrams per liter.
NPN = Nitrate plus nitrite.

All corrective action requirements pertaining to the BSG study area are contained in the 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 Order became effective in April 2004, groundwater investigations at the BSG study area 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 Order transferred regulatory authority for corrective action requirements from the HSWA module to the Order (NMED April 2004). The BSG investigation must comply with requirements set forth in the Order for site characterization and the development of a CME.

In response to the 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 which remedial alternatives were 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 Order (NMED April 2004) and with the guidance of the RCRA Corrective Action Plan (EPA 1994).

On March 1, 2005, DOE/Sandia received a letter from the NMED that rejected the CME Work Plan and stipulated the following requirements (NMED February 2005):

- DOE/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 study area. 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 study area.

- 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 include 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 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 study area and submit to the NMED a plan for such characterization. DOE/NNSA and Sandia met with the NMED in June and

July 2009 (SNL June 2009b and July 2009) and submitted a letter requesting an extension to November 30, 2009 (DOE July 2009). The results of the discussions at the June and July meetings (SNL June 2009b and July 2009) 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).

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/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 (NMED April 2004). Additional information on radionuclides and the scope of the Order is available in Section III.A of the 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 2012 include groundwater monitoring (Table 7-4), well decommissioning, and well installation. The analytical parameters for each well and each sampling event are listed in Table 7-5.

Table 7-4. Groundwater Monitoring Well Network and Sampling Dates for the Burn Site Groundwater Study Area, Calendar Year 2012

Date of Sampling Event	Wells Sampled		SAP
January 2012	CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12		*Burn Site Groundwater Monitoring, Mini-SAP for Second Quarter Fiscal Year 2012* (SNL December 2011)
April 2012	CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW8	CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12	*Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter Fiscal Year 2012* (SNL March 2012)
October 2012	CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW8	CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12	*Burn Site Groundwater Monitoring, Mini-SAP for First Quarter Fiscal Year 2013* (SNL September 2012b)

NOTES:
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.

Table 7-5. Parameters Sampled at Burn Site Groundwater Study Area Wells for Each Sampling Event, Calendar Year 2012

Parameter	January 2012	
NPN HE compounds SVOCs TPH-DRO TPH-GRO VOCs	CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW11 (dup) CYN-MW12	
Parameter	**April 2012**	
Anions Gamma Spec* Gross Alpha Gross Beta Isotopic Uranium NPN TAL Metals, plus Total Uranium TPH-DRO TPH-GRO Tritium VOCs	CYN-MW4 CYN-MW6 CYN-MW6 (dup) CYN-MW7 CYN-MW8	CYN-MW9 CYN-MW10 CYN-MW11 CYN-MW12 CYN-MW12 (dup)
HE compounds SVOCs	CYN-MW9 CYN-MW10 CYN-MW11	CYN-MW12 CYN-MW12 (dup)
Perchlorate	CYN-MW6 CYN-MW6 (dup)	
Parameter	**October 2012**	
NPN TPH-DRO TPH-GRO	CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW7 (dup) CYN-MW8	CYN-MW9 CYN-MW9 (dup) CYN-MW10 CYN-MW11 CYN-MW12
Perchlorate	CYN-MW6	

NOTES:

DRO = Diesel range organics.
Dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
GRO = Gasoline range organics.
HE = High explosive.
NPN = Nitrate plus nitrate (reported as nitrogen).
SVOC = Semivolatile organic compound.
TAL = Target Analyte List.
TPH = Total petroleum hydrocarbons.
VOC = Volatile organic compound.

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 2012 BSG sampling events are presented in Tables 7A-1 through 7A-9 (Attachment 7A). Data qualifiers are explained in the footnotes following Table 7A-9.

No VOCs, semivolatile organic compound (SVOCs), or HE compounds were detected. The MDLs for all analyzed VOCs and SVOCs are listed in Table 7A-1; and the MDLs for all analyzed HE compounds are listed in Table 7A-2.

The analytical results for nitrate plus nitrite (NPN) (reported as nitrogen) are presented in Table 7A-3, and Figure 7-3 presents NPN concentration contours for the BSG study area. NPN results exceed the MCL of 10 mg/L in samples from monitoring wells CYN-MW6, CYN-MW9, CYN-MW11, and CYN-MW12. Overall, nitrate concentrations have decreased over time. NPN concentrations in samples from the other BSG wells are less than the MCL (Table7 A-3). For CY 2012, the NPN concentrations for wells exceeding the MCL are summarized as follows:

- Monitoring well CYN-MW6 had reported concentrations of 21.3 mg/L (April 2012), 21.2 mg/L (April 2012, duplicate), and 18.6 mg/L (October 2012). The historical range of NPN concentrations for monitoring well CYN-MW6 is approximately 21 to 40 mg/L with a slightly decreasing trend (Figure 7B-1).

- Monitoring well CYN-MW9 had reported concentrations of 33.0 mg/L (January 2012), 33.1 mg/L (April 2012), 31.8 mg/L (October 2012), and 31.1 mg/L (October 2012, duplicate). The historical range of NPN concentrations for monitoring well CYN-MW9 is approximately 29 to 37 mg/L with a consistent trend (Figure 7B-2).

- Monitoring well CYN-MW11 had reported concentrations of 10.3 mg/L (January 2012), 10.1 mg/L (January 2012, duplicate), 10.0 mg/L (April 2012), and 9.38 mg/L (October 2012). The historical range of NPN concentrations for monitoring well CYN-MW11 is approximately 9 to 11 mg/L with a slightly decreasing trend (Figure 7B-3).

- Monitoring well CYN-MW12 had reported concentrations of 12.9 mg/L (January 2012), 13.2 mg/L (April 2012), 13.2 mg/L (April 2012, duplicate), and 13.4 mg/L (October 2012). The historical range of NPN concentrations for monitoring well CYN-MW12 is approximately 11 to 14 mg/L with a slightly increasing trend (Figure 7B-4).

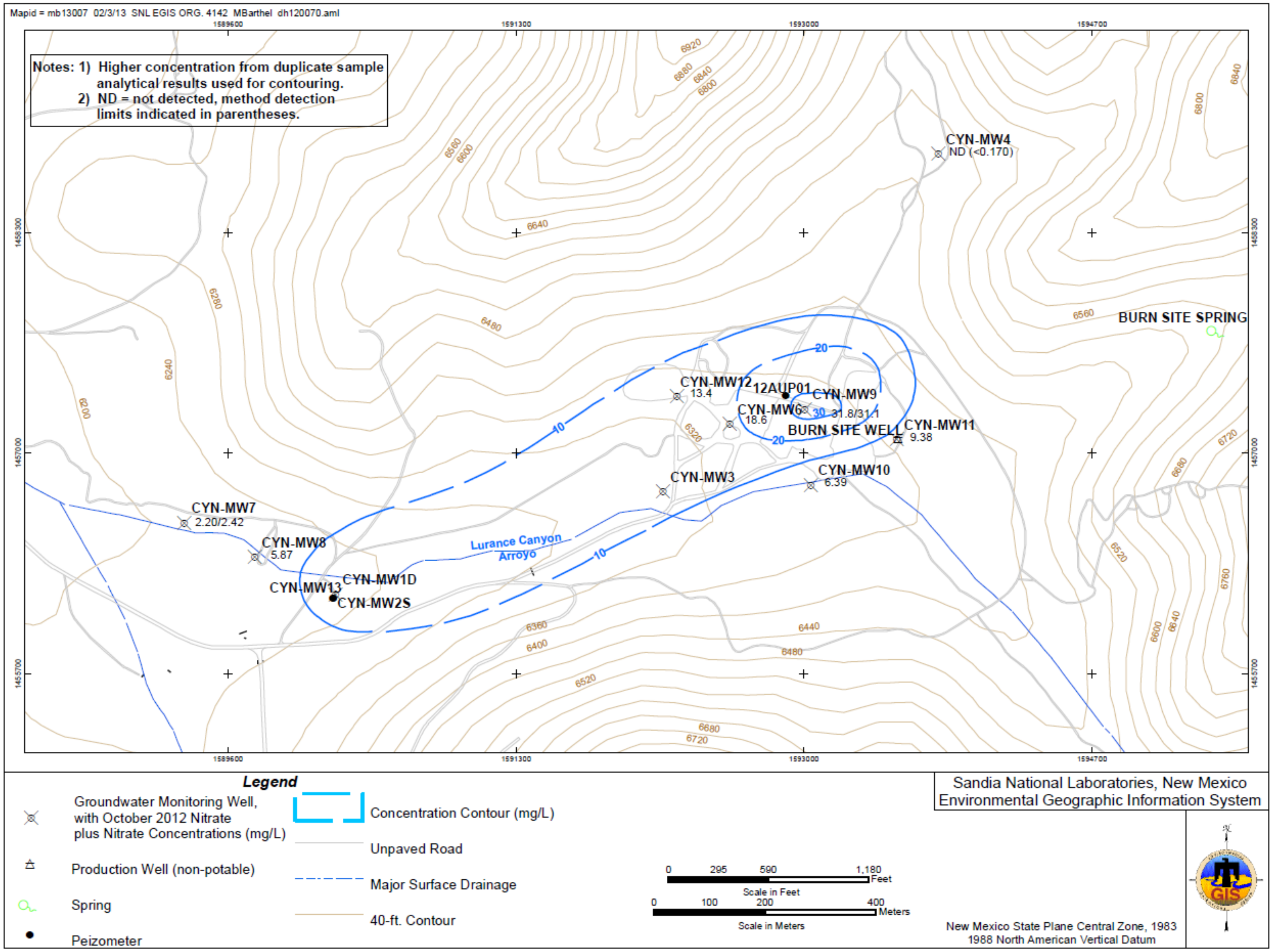

Figure 7-3. Nitrate plus Nitrite Concentration Contour Map for the Burn Site Groundwater Study Area

The results for TPH are listed for TPH-DRO and TPH-GRO in Table 7A-4. No MCLs have been established for TPH-DRO or TPH-GRO. No detections of TPH-GRO were reported for any of the samples collected during the CY 2012 sampling events. Several detections of TPH-DRO were reported in samples collected from monitoring wells CYN-MW4, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12 at concentrations ranging from 68.1 to 83.9 µg/L. However, these TPH-DRO results were qualified with "J" by the laboratory (Table 7A-4).

The analytical results for anions are presented in Table 7A-5. None of the analytes exceed MCLs, where established.

Perchlorate was detected above the MDL of 4 µg/L in samples collected from monitoring well CYN-MW6 (Table 7A-6). Perchlorate concentrations for the samples from monitoring well CYN-MW6 for CY 2012 range from 5.77 to 7.32 J µg/L. Currently no MCL is established for perchlorate. Figure 7B-5 (Attachment 7B) shows that the perchlorate concentration in this monitoring well has historically exceeded the screening level/MDL of 4 µg/L, but exhibits a slightly decreasing trend.

Total metal results are presented in Table 7A-7. No metals exceed established MCLs.

Groundwater samples were analyzed for tritium, gross alpha/beta activity, and radionuclides by gamma spectroscopy. The results are presented in Table 7A-8. All radionuclide activity results are below established MCLs, except gross alpha at monitoring well CYN-MW4 in April 2012. Gross alpha activity is measured as a screening tool and according to 40 Code of Federal Regulations Parts 9, 141, and 142, Table I-4, does not include uranium, which is measured independently. Therefore, gross alpha activity measurements were corrected by subtracting out the total uranium activity. Corrected gross alpha activity results are below the MCL of 15 picocuries per liter (pCi/L), except at monitoring well CYN-MW4. The corrected gross alpha activity result at monitoring well CYN-MW4 was calculated at 18.17 pCi/L, and is comparable to historical values and monitoring wells completed within the Precambrian bedrock (Figure 7B-6). Gamma spectroscopy analysis detected no isotopes above the associated minimum detectable activity.

Field water quality parameters are measured during sample 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 prior to sample collection are presented in Table 7A-9.

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 Tables 7A-1 through 7A-8 (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 show good correlation (relative percent difference values less than 20 for organic analyses and less than 35 for inorganic analyses) for all calculated parameters, except for sodium in monitoring well CYN-MW12 during the April 2012 sampling event. The relative percent difference for sodium was calculated at 67.

The results of the EB sample analyses are as follows:

- **January 2012 Sampling Event at Monitoring Well CYN-MW11**—The EB sample was collected prior to sampling this well and analyzed for all parameters. Acetone and chloroform were detected above the laboratory MDLs in the EB sample. No corrective action was necessary as these compounds were not detected in the associated environmental or duplicate samples.

- **April 2012 Sampling Events at Monitoring Wells CYN-MW6 and CYN-MW12**—The EB samples were collected prior to sampling this well and analyzed for all parameters. Bromodichloromethane, carbon disulfide, chloride, chloroform, dibromochloromethane, and sodium were detected above the laboratory MDLs. No corrective action was necessary for all parameters since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the EB result.

- **October 2012 Sampling Events at Monitoring Wells CYN-MW7 and CYN-MW9**—The EB samples were collected prior to sampling these wells and analyzed for all parameters. No analytes were detected above laboratory MDLs in any EB sample.

The results of the TB samples are as follows:

- **January 2012 Sampling Event**—5 VOC and 5 TPH-GRO TB samples were submitted during this sampling event. No VOCs or TPH-GRO were detected above laboratory MDLs in any TB sample.

- **April 2012 Sampling Event**—10 VOC and 10 TPH-GRO TB samples were submitted during this sampling event. No VOCs or TPH-GRO were detected above laboratory MDLs in any TB sample.

- **October 2012 Sampling Event**—A total of 10 TPH-GRO TB samples were submitted during this sampling event. No TPH-GRO was detected above laboratory MDLs in any TB sample.

The results of the FB samples are as follows:

- **January 2012 Sampling Event at Monitoring Well CYN-MW10**—TPH-GRO and VOCs were not detected in the FB sample.

- **April 2012 Sampling Event at Monitoring Wells CYN-MW6, CYN-MW8 (TPH-GRO only) and CYN-MW11**—The VOCs bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental sample. GRO was not detected in any FB sample.

- **October 2012 Sampling Event at Monitoring Wells CYN-MW8 and CYN-MW10**—TPH-GRO was not detected in any FB sample.

7.8 Variances and Nonconformances

No variances or nonconformances from field or sampling requirements specified in the BSG monitoring Mini-Sampling and Analysis Plans (SNL December 2011, March 2012, and September 2012b) occurred during sampling activities. The following project-specific issues associated with the CY 2012 sampling events for BSG occurred:

- **January 2012 Sampling Event**—A new tubing bundle and a reconditioned Bennett™ sample pump were installed on the portable Bennett™ reel prior to sampling. The sample pump did not operate smoothly at low pressure; therefore, flow rates during purging and sampling activities were slightly higher than rates during previous sampling events.

- **April 2012 Sampling Event**—GEL Laboratories LLC (GEL) did not supply GRO TB samples with the initial sample container request. GEL was notified and TB samples were provided after the start of monitoring activities. A TB sample was not submitted with monitoring well CYN-MW8 samples. A FB sample was collected to supplement the QC requirements at this location.

- **October 2012 Sampling Event**—No project-specific issues were reported during this event.

7.9 Summary and Conclusions

This section provides a brief summary of activities, discussion of COC concentrations, trends of concentrations versus time, the current conceptual site model, and plans for studies to be completed during CY 2012 at the BSG study area.

The BSG study area 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. The study area currently consists of 10 monitoring wells. Monitoring wells were sampled during January, April, and October 2012. The samples were analyzed for VOCs, SVOCs, HE compounds, TPH-DRO, TPH-GRO, NPN, Target Analyte List metals (plus uranium), anions, gross alpha/beta activity, tritium, and radionuclides by gamma spectroscopy.

As required by the NMED, semiannual sampling for perchlorate was conducted at monitoring well CYN-MW6. Perchlorate concentrations for the samples from monitoring well CYN-MW6 for CY 2012 range from 5.77 to 7.32 J µg/L (Figure 7B-5).

Monitoring well CYN-MW4 had reported corrected gross alpha activity result calculated at 18.17 pCi/L, and is comparable to historical values and monitoring wells completed within the Precambrian bedrock (Figure 7B-6).

Only NPN was detected at concentrations exceeding the MCL of 10 mg/L in samples from four BSG study area monitoring wells: CYN-MW6, CYN-MW9, CYN-MW11, and CYN-MW12. The maximum concentration reported is 33.1 mg/L in the sample collected from monitoring well CYN-MW9 during the April 2012 sampling event. For CY 2012, the NPN concentrations for samples from wells exceeding the MCL are summarized as follows:

- Monitoring well CYN-MW6 had reported concentrations of 21.3 mg/L (April 2012), 21.2 mg/L (April 2012, duplicate), and 18.6 mg/L (October 2012). The historical range of NPN concentrations for monitoring well CYN-MW6 is approximately 21 to 40 mg/L with a slightly decreasing trend (Figure 7B-1).

- Monitoring well CYN-MW9 had reported concentrations of 33.0 mg/L (January 2012), 33.1 mg/L (April 2012), 31.8 mg/L (October 2012), and 31.1 mg/L (October 2012, duplicate). The historical range of NPN concentrations for monitoring well CYN-MW9 is approximately 29 to 37 mg/L with a consistent trend (Figure 7B-2).

- Monitoring well CYN-MW11 had reported concentrations of 10.3 mg/L (January 2012), 10.1 mg/L (January 2012, duplicate), 10.0 mg/L (April 2012), and 9.38 mg/L (October 2012). The historical range of NPN concentrations for monitoring well CYN-MW11 is approximately 9 to 11 mg/L with a slightly decreasing trend (Figure 7B-3).

- Monitoring well CYN-MW12 had reported concentrations of 12.9 mg/L (January 2012), 13.2 mg/L (April 2012), 13.2 mg/L (April 2012, duplicate), and 13.4 mg/L (October 2012). The historical range of NPN concentrations for monitoring well CYN-MW12 is approximately 11 to 14 mg/L with a slightly increasing trend (Figure 7B-4).

The analytical results for this reporting period are consistent with historical concentrations. The current conceptual model described in Section 7.1.7 does not require modification based on the analytical results for this reporting period.

During CY 2013, semiannual groundwater sampling will continue at the nine BSG study area wells during the second and fourth quarters. In addition, the Well Installation Report for monitoring well CYN-MW13, and Monitoring Well Installation and Decommissioning Report for monitoring wells 12AUP01, CYN-MW1D, and CYN-MW2S will be submitted to the NMED.

7.10 References

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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
Method Detection Limits for Volatile and Semivolatile Organic Compounds, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]
1,1,1-Trichloroethane	0.300 - 0.325	8260B	1,2,4-Trichlorobenzene	3.00 - 3.19	8270C	Di-n-butyl phthalate	3.00 - 3.19	8270C
1,1,2,2-Tetrachloroethane	0.250 - 0.300	8260B	1,2-Dichlorobenzene	3.00 - 3.19	8270C	Di-n-octyl phthalate	3.00 - 3.19	8270C
1,1,2-Trichloroethane	0.250 - 0.300	8260B	1,3-Dichlorobenzene	3.00 - 3.19	8270C	Dibenz[a,h]anthracene	0.300 - 0.319	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	3.00 - 3.19	8270C	Dibenzofuran	3.00 - 3.19	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	3.00 - 3.19	8270C	Diethylphthalate	3.00 - 3.19	8270C
1,2-Dichloroethane	0.250 - 0.300	8260B	2,4,6-Trichlorophenol	3.00 - 3.19	8270C	Dimethylphthalate	3.00 - 3.19	8270C
1,2-Dichloropropane	0.250 - 0.300	8260B	2,4-Dichlorophenol	3.00 - 3.19	8270C	Dinitro-o-cresol	3.00 - 3.19	8270C
2-Butanone	1.25 - 2.00	8260B	2,4-Dimethylphenol	3.00 - 3.19	8270C	Diphenyl amine	3.00 - 3.19	8270C
2-Hexanone	1.25 - 2.20	8260B	2,4-Dinitrophenol	5.00 - 5.32	8270C	Fluoranthene	0.300 - 0.319	8270C
4-methyl-, 2-Pentanone	1.25 - 1.50	8260B	2,4-Dinitrotoluene	3.00 - 3.19	8270C	Fluorene	0.300 - 0.319	8270C
Acetone	3.00 – 3.50	8260B	2,6-Dinitrotoluene	3.00 - 3.19	8270C	Hexachlorobenzene	3.00 - 3.19	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.300 - 0.319	8270C	Hexachlorobutadiene	3.00 - 3.19	8270C
Bromodichloromethane	0.250 - 0.300	8260B	2-Chlorophenol	3.00 - 3.19	8270C	Hexachlorocyclopentadiene	3.00 - 3.19	8270C
Bromoform	0.250 - 0.300	8260B	2-Methylnaphthalene	0.300 - 0.319	8270C	Hexachloroethane	3.00 - 3.19	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	3.00 - 3.19	8270C	Indeno(1,2,3-c,d)pyrene	0.300 - 0.319	8270C
Carbon disulfide	1.25 - 1.50	8260B	2-Nitrophenol	3.00 - 3.19	8270C	Isophorone	3.00 - 3.19	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	3.00 - 3.19	8270C	Naphthalene	0.300 - 0.319	8270C
Chlorobenzene	0.250 - 0.300	8260B	3-Nitroaniline	3.00 - 3.19	8270C	Nitro-benzene	3.00 - 3.19	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	3.00 - 3.19	8270C	Pentachlorophenol	3.00 - 3.19	8270C
Chloroform	0.250 - 0.300	8260B	4-Chloro-3-methylphenol	3.00 - 3.19	8270C	Phenanthrene	0.300 - 0.319	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	3.00 - 3.19	8270C	Phenol	3.00 - 3.19	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	3.00 - 3.19	8270C	Pyrene	0.300 - 0.319	8270C
Ethyl benzene	0.250 - 0.300	8260B	4-Nitroaniline	3.00 - 3.19	8270C	bis(2-Chloroethoxy) methane	3.00 - 3.19	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	3.00 - 3.19	8270C	bis(2-Chloroethyl)ether	3.00 - 3.19	8270C
Styrene	0.250 - 0.300	8260B	Acenaphthene	0.300 - 0.319	8270C	bis(2-Ethylhexyl)phthalate	3.00 - 3.19	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.300 - 0.319	8270C	bis-Chloroisopropyl ether	3.00 - 3.19	8270C
Toluene	0.250 - 0.300	8260B	Anthracene	0.300 - 0.319	8270C	m,p-Cresol	3.00 - 3.19	8270C
Trichloroethene	0.250 - 0.300	8260B	Benzo(a)anthracene	0.300 - 0.319	8270C	n-Nitrosodipropylamine	3.00 - 3.19	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.300 - 0.319	8270C	o-Cresol	3.00 - 3.19	8270C
Vinyl chloride	0.300 – 0.500	8260B	Benzo(b)fluoranthene	0.300 - 0.319	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.300 - 0.319	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.300 - 0.319	8270C			
cis-1,3-Dichloropropene	0.250 - 0.300	8260B	Butylbenzyl phthalate	3.00 - 3.19	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.300 - 0.319	8270C			
trans-1,3-Dichloropropene	0.250 - 0.300	8260B	Chrysene	0.300 - 0.319	8270C			

Refer to footnotes on page 7A-29.

Table 7A-2
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0829 – 0.104
1,3-Dinitrobenzene	0.0829 – 0.104
2,4,6-Trinitrotoluene	0.0829 – 0.104
2,4-Dinitrotoluene	0.0829 – 0.104
2,6-Dinitrotoluene	0.0829 – 0.104
2-Amino-4,6-dinitrotoluene	0.0829 – 0.104
2-Nitrotoluene	0.0850 – 0.106
3-Nitrotoluene	0.0829 – 0.104
4-Amino-2,6-dinitrotoluene	0.0829 – 0.104
4-Nitrotoluene	0.155 – 0.195
HMX	0.0829 – 0.104
Nitro-benzene	0.0829 – 0.104
Pentaerythritol tetranitrate	0.104 – 0.130
RDX	0.0829 – 0.104
Tetryl	0.0829 – 0.104

Refer to footnotes on page 7A-29.

Table 7A-3
Summary of Nitrate plus Nitrite Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 03-Jan-12	Nitrate plus nitrite as N	**33.0**	0.500	2.50	10.0			091581-018	EPA 353.2
CYN-MW10 04-Jan-12	Nitrate plus nitrite as N	7.29	0.100	0.500	10.0			091583-018	EPA 353.2
CYN-MW11 05-Jan-12	Nitrate plus nitrite as N	**10.3**	0.100	0.500	10.0			091588-018	EPA 353.2
CYN-MW11 (Duplicate) 05-Jan-12	Nitrate plus nitrite as N	**10.1**	0.100	0.500	10.0			091589-018	EPA 353.2
CYN-MW12 06-Jan-12	Nitrate plus nitrite as N	**12.9**	0.500	2.50	10.0			091591-018	EPA 353.2
CYN-MW4 02-Apr-12	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		091972-018	EPA 353.2
CYN-MW6 16-Apr-12	Nitrate plus nitrite as N	**21.3**	0.850	2.50	10.0			091990-018	EPA 353.2
CYN-MW6 (Duplicate) 16-Apr-12	Nitrate plus nitrite as N	**21.2**	0.850	2.50	10.0			091991-018	EPA 353.2
CYN-MW7 05-Apr-12	Nitrate plus nitrite as N	2.02	0.170	0.500	10.0			091974-018	EPA 353.2
CYN-MW8 06-Apr-12	Nitrate plus nitrite as N	4.67	0.170	0.500	10.0			091976-018	EPA 353.2
CYN-MW9 12-Apr-12	Nitrate plus nitrite as N	**33.1**	0.850	2.50	10.0			091993-018	EPA 353.2
CYN-MW10 09-Apr-12	Nitrate plus nitrite as N	6.51	0.170	0.500	10.0			091978-018	EPA 353.2
CYN-MW11 10-Apr-12	Nitrate plus nitrite as N	10.0	0.850	2.50	10.0			091980-018	EPA 353.2
CYN-MW12 11-Apr-12	Nitrate plus nitrite as N	**13.2**	0.850	2.50	10.0			091985-018	EPA 353.2
CYN-MW12 (Duplicate) 11-Apr-12	Nitrate plus nitrite as N	**13.2**	0.850	2.50	10.0			091986-018	EPA 353.2

Refer to footnotes on page 7A-29.

Table 7A-3 *(Concluded)*
Summary of Nitrate plus Nitrite Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 01-Oct-12	Nitrate plus nitrite as N	ND	0.170	0.500	10.0	U	UJ	092955-018	EPA 353.2
CYN-MW6 15-Oct-12	Nitrate plus nitrite as N	**18.6**	0.850	2.50	10.0			092977-018	EPA 353.2
CYN-MW7 02-Oct-12	Nitrate plus nitrite as N	2.20	0.170	0.500	10.0			092959-018	EPA 353.2
CYN-MW7 (Duplicate) 02-Oct-12	Nitrate plus nitrite as N	2.42	0.170	0.500	10.0			092960-018	EPA 353.2
CYN-MW8 03-Oct-12	Nitrate plus nitrite as N	5.87	0.170	0.500	10.0			092962-018	EPA 353.2
CYN-MW9 10-Oct-12	Nitrate plus nitrite as N	**31.8**	0.850	2.50	10.0			092974-018	EPA 353.2
CYN-MW9 (Duplicate) 10-Oct-12	Nitrate plus nitrite as N	**31.1**	0.850	2.50	10.0			092975-018	EPA 353.2
CYN-MW10 04-Oct-12	Nitrate plus nitrite as N	6.39	0.170	0.500	10.0			092965-018	EPA 353.2
CYN-MW11 08-Oct-12	Nitrate plus nitrite as N	9.38	0.425	1.25	10.0			092968-018	EPA 353.2
CYN-MW12 09-Oct-12	Nitrate plus nitrite as N	**13.4**	0.425	1.25	10.0			092970-018	EPA 353.2

Refer to footnotes on page 7A-29.

Table 7A-4
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW9	Diesel Range Organics	ND	52.1	208	NE	U, h	UJ	091581-005	SW846 8015A/B
03-Jan-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091581-006	SW846 8015B
CYN-MW10	Diesel Range Organics	ND	53.2	213	NE	U, h	UJ	091583-005	SW846 8015A/B
04-Jan-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091583-006	SW846 8015B
CYN-MW11	Diesel Range Organics	ND	54.9	220	NE	U, h	UJ	091588-005	SW846 8015A/B
05-Jan-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091588-006	SW846 8015B
CYN-MW11 (Duplicate)	Diesel Range Organics	ND	52.1	208	NE	U, h	UJ	091589-005	SW846 8015A/B
05-Jan-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091589-006	SW846 8015B
CYN-MW12	Diesel Range Organics	ND	52.1	208	NE	U		091591-005	SW846 8015A/B
06-Jan-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091591-006	SW846 8015B
CYN-MW4	Diesel Range Organics	ND	53.8	215	NE	U		091972-005	SW846 8015A/B
02-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091972-006	SW846 8015B
CYN-MW6	Diesel Range Organics	ND	50.5	202	NE	U		091990-005	SW846 8015A/B
16-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091990-006	SW846 8015B
CYN-MW6 (Duplicate)	Diesel Range Organics	ND	50.5	202	NE	U		091991-005	SW846 8015A/B
16-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091991-006	SW846 8015B
CYN-MW7	Diesel Range Organics	ND	54.3	217	NE	U		091974-005	SW846 8015A/B
05-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091974-006	SW846 8015B
CYN-MW8	Diesel Range Organics	ND	52.1	208	NE	U		091976-005	SW846 8015A/B
06-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091976-006	SW846 8015B
CYN-MW9	Diesel Range Organics	ND	55.6	222	NE	U		091993-005	SW846 8015A/B
12-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091993-006	SW846 8015B
CYN-MW10	Diesel Range Organics	ND	54.3	217	NE	U		091978-005	SW846 8015A/B
09-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091978-006	SW846 8015B
CYN-MW11	Diesel Range Organics	ND	50.5	202	NE	U		091980-005	SW846 8015A/B
10-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091980-006	SW846 8015B
CYN-MW12	Diesel Range Organics	70.7	53.8	215	NE	J		091985-005	SW846 8015A/B
11-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091985-006	SW846 8015B
CYN-MW12 (Duplicate)	Diesel Range Organics	ND	55.6	222	NE	U		091986-005	SW846 8015A/B
11-Apr-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		091986-006	SW846 8015B

Refer to footnotes on page 7A-29.

Table 7A-4 *(Concluded)*
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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	68.1	52.1	208	NE	J	J	092955-005	SW846 8015A/B
01-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092955-006	SW846 8015B
CYN-MW6	Diesel Range Organics	ND	51.0	204	NE	U		092977-005	SW846 8015A/B
15-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092977-006	SW846 8015B
CYN-MW7	Diesel Range Organics	ND	51.0	204	NE	U	UJ	092959-005	SW846 8015A/B
02-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092959-006	SW846 8015B
CYN-MW7 (Duplicate)	Diesel Range Organics	ND	51.5	206	NE	U	UJ	092960-005	SW846 8015A/B
02-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092960-006	SW846 8015B
CYN-MW8	Diesel Range Organics	83.9	51.0	204	NE	J	J	092962-005	SW846 8015A/B
03-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092962-006	SW846 8015B
CYN-MW9	Diesel Range Organics	ND	50.0	200	NE	U		092974-005	SW846 8015A/B
10-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092974-006	SW846 8015B
CYN-MW9 (Duplicate)	Diesel Range Organics	74.3	50.0	200	NE	J		092975-005	SW846 8015A/B
10-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092975-006	SW846 8015B
CYN-MW10	Diesel Range Organics	73.3	52.1	208	NE	J	J	092965-005	SW846 8015A/B
04-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092965-006	SW846 8015B
CYN-MW11	Diesel Range Organics	80.1	50.0	200	NE	J	J+	092968-005	SW846 8015A/B
08-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092968-006	SW846 8015B
CYN-MW12	Diesel Range Organics	ND	50.0	200	NE	U		092970-005	SW846 8015A/B
09-Oct-12	Gasoline Range Organics	ND	10.5	50.0	NE	U		092970-006	SW846 8015B

Refer to footnotes on page 7A-29.

Table 7A-5
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.345	0.067	0.200	NE			091972-016	SW846 9056
02-Apr-12	Chloride	24.6	0.335	1.00	NE			091972-016	SW846 9056
	Fluoride	0.713	0.033	0.100	4.0			091972-016	SW846 9056
	Sulfate	139	0.665	2.00	NE			091972-016	SW846 9056
CYN-MW6	Bromide	0.785	0.067	0.200	NE			091990-016	SW846 9056
16-Apr-12	Chloride	55.2	0.670	2.00	NE			091990-016	SW846 9056
	Fluoride	0.595	0.033	0.100	4.0			091990-016	SW846 9056
	Sulfate	114	1.33	4.00	NE			091990-016	SW846 9056
CYN-MW6 (Duplicate)	Bromide	0.764	0.067	0.200	NE			091991-016	SW846 9056
16-Apr-12	Chloride	54.9	0.670	2.00	NE			091991-016	SW846 9056
	Fluoride	0.598	0.033	0.100	4.0			091991-016	SW846 9056
	Sulfate	114	1.33	4.00	NE			091991-016	SW846 9056
CYN-MW7	Bromide	0.589	0.067	0.200	NE			091974-016	SW846 9056
05-Apr-12	Chloride	39.7	0.670	2.00	NE			091974-016	SW846 9056
	Fluoride	1.28	0.033	0.100	4.0			091974-016	SW846 9056
	Sulfate	82.0	1.33	4.00	NE			091974-016	SW846 9056
CYN-MW8	Bromide	0.728	0.067	0.200	NE			091976-016	SW846 9056
06-Apr-12	Chloride	61.6	0.335	1.00	NE			091976-016	SW846 9056
	Fluoride	1.32	0.033	0.100	4.0			091976-016	SW846 9056
	Sulfate	124	0.665	2.00	NE			091976-016	SW846 9056
CYN-MW9	Bromide	1.03	0.067	0.200	NE			091993-016	SW846 9056
12-Apr-12	Chloride	73.2	0.670	2.00	NE			091993-016	SW846 9056
	Fluoride	0.578	0.033	0.100	4.0			091993-016	SW846 9056
	Sulfate	162	1.33	4.00	NE			091993-016	SW846 9056
CYN-MW10	Bromide	0.701	0.067	0.200	NE			091978-016	SW846 9056
09-Apr-12	Chloride	48.1	0.670	2.00	NE			091978-016	SW846 9056
	Fluoride	0.607	0.033	0.100	4.0			091978-016	SW846 9056
	Sulfate	168	1.33	4.00	NE			091978-016	SW846 9056
CYN-MW11	Bromide	0.988	0.067	0.200	NE			091980-016	SW846 9056
10-Apr-12	Chloride	76.4	0.670	2.00	NE			091980-016	SW846 9056
	Fluoride	0.684	0.033	0.100	4.0			091980-016	SW846 9056
	Sulfate	175	1.33	4.00	NE			091980-016	SW846 9056
CYN-MW12	Bromide	0.889	0.067	0.200	NE			091985-016	SW846 9056
11-Apr-12	Chloride	79.8	0.670	2.00	NE			091985-016	SW846 9056
	Fluoride	0.965	0.033	0.100	4.0			091985-016	SW846 9056
	Sulfate	200	1.33	4.00	NE			091985-016	SW846 9056

Refer to footnotes on page 7A-29.

Table 7A-5 *(Concluded)*
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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) 11-Apr-12	Bromide	0.874	0.067	0.200	NE			091986-016	SW846 9056
	Chloride	79.6	0.670	2.00	NE			091986-016	SW846 9056
	Fluoride	0.956	0.033	0.100	4.0			091986-016	SW846 9056
	Sulfate	200	1.33	4.00	NE			091986-016	SW846 9056

Refer to footnotes on page 7A-29.

Table 7A-6
Summary of Perchlorate Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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-MW6 16-Apr-12	0.00731	0.004	0.012	NE	J		091990-020	EPA 314.0
CYN-MW6 (Duplicate) 16-Apr-12	0.00732	0.004	0.012	NE	J		091991-020	EPA 314.0
CYN-MW6 15-Oct-12	0.00577	0.004	0.012	NE	J		092977-020	EPA 314.0

Refer to footnotes on page 7A-29.

Table 7A-7
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091972-010	SW846 6020
02-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091972-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091972-010	SW846 6020
	Barium	0.0419	0.0006	0.002	2.00			091972-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091972-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091972-010	SW846 6020
	Calcium	72.0	0.300	1.00	NE	B		091972-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091972-010	SW846 6020
	Cobalt	0.000136	0.0001	0.001	NE	J		091972-010	SW846 6020
	Copper	0.000789	0.00035	0.001	NE	J		091972-010	SW846 6020
	Iron	0.151	0.033	0.100	NE			091972-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091972-010	SW846 6020
	Magnesium	30.5	0.010	0.030	NE		J	091972-010	SW846 6020
	Manganese	0.00119	0.001	0.005	NE	J		091972-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091972-010	SW846 7470
	Nickel	0.00122	0.0005	0.002	NE	J		091972-010	SW846 6020
	Potassium	5.94	0.080	0.300	NE		J	091972-010	SW846 6020
	Selenium	0.0158	0.0015	0.005	0.050			091972-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091972-010	SW846 6020
	Sodium	38.6	0.080	0.250	NE		J	091972-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091972-010	SW846 6020
	Uranium	0.013	0.000067	0.0002	0.030			091972-010	SW846 6020
	Vanadium	0.00189	0.001	0.005	NE	J		091972-010	SW846 6010
	Zinc	0.014	0.0035	0.010	NE	B	0.046U	091972-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW6	Aluminum	0.0534	0.015	0.050	NE			091990-010	SW846 6020
16-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091990-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091990-010	SW846 6020
	Barium	0.059	0.0006	0.002	2.00			091990-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091990-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091990-010	SW846 6020
	Calcium	139	0.300	1.00	NE			091990-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091990-010	SW846 6020
	Cobalt	0.000577	0.0001	0.001	NE	J		091990-010	SW846 6020
	Copper	0.00262	0.00035	0.001	NE			091990-010	SW846 6020
	Iron	0.675	0.033	0.100	NE			091990-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091990-010	SW846 6020
	Magnesium	40.7	0.010	0.030	NE			091990-010	SW846 6020
	Manganese	0.00288	0.001	0.005	NE	J		091990-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	091990-010	SW846 7470
	Nickel	0.00415	0.0005	0.002	NE			091990-010	SW846 6020
	Potassium	2.17	0.080	0.300	NE			091990-010	SW846 6020
	Selenium	0.0124	0.0015	0.005	0.050			091990-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091990-010	SW846 6020
	Sodium	48.5	0.400	1.25	NE			091990-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091990-010	SW846 6020
	Uranium	0.00804	0.000067	0.0002	0.030	B		091990-010	SW846 6020
	Vanadium	0.00172	0.001	0.005	NE	J		091990-010	SW846 6010
	Zinc	0.0329	0.0035	0.010	NE			091990-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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-MW6 (Duplicate)	Aluminum	0.0468	0.015	0.050	NE	J		091991-010	SW846 6020
16-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091991-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091991-010	SW846 6020
	Barium	0.0596	0.0006	0.002	2.00			091991-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091991-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091991-010	SW846 6020
	Calcium	133	0.300	1.00	NE			091991-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091991-010	SW846 6020
	Cobalt	0.00055	0.0001	0.001	NE	J		091991-010	SW846 6020
	Copper	0.00256	0.00035	0.001	NE			091991-010	SW846 6020
	Iron	0.702	0.033	0.100	NE			091991-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091991-010	SW846 6020
	Magnesium	40.0	0.010	0.030	NE			091991-010	SW846 6020
	Manganese	0.00283	0.001	0.005	NE	J		091991-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	091991-010	SW846 7470
	Nickel	0.00408	0.0005	0.002	NE			091991-010	SW846 6020
	Potassium	2.19	0.080	0.300	NE			091991-010	SW846 6020
	Selenium	0.0119	0.0015	0.005	0.050			091991-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091991-010	SW846 6020
	Sodium	49.9	0.400	1.25	NE			091991-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091991-010	SW846 6020
	Uranium	0.00824	0.000067	0.0002	0.030	B		091991-010	SW846 6020
	Vanadium	0.00165	0.001	0.005	NE	J		091991-010	SW846 6010
	Zinc	0.0334	0.0035	0.010	NE			091991-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW7	Aluminum	ND	0.015	0.050	NE	U		091974-010	SW846 6020
05-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091974-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091974-010	SW846 6020
	Barium	0.0966	0.0006	0.002	2.00			091974-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091974-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091974-010	SW846 6020
	Calcium	105	0.300	1.00	NE	B		091974-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091974-010	SW846 6020
	Cobalt	0.000133	0.0001	0.001	NE	J		091974-010	SW846 6020
	Copper	0.00114	0.00035	0.001	NE			091974-010	SW846 6020
	Iron	0.222	0.033	0.100	NE			091974-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091974-010	SW846 6020
	Magnesium	20.1	0.010	0.030	NE		J	091974-010	SW846 6020
	Manganese	0.002	0.001	0.005	NE	J		091974-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091974-010	SW846 7470
	Nickel	0.00179	0.0005	0.002	NE	J		091974-010	SW846 6020
	Potassium	2.53	0.080	0.300	NE		J	091974-010	SW846 6020
	Selenium	0.00442	0.0015	0.005	0.050	J		091974-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091974-010	SW846 6020
	Sodium	42.9	0.080	0.250	NE		J	091974-010	SW846 6020
	Thallium	0.000462	0.00045	0.002	0.002	J	2.4U	091974-010	SW846 6020
	Uranium	0.00712	0.000067	0.0002	0.030			091974-010	SW846 6020
	Vanadium	0.00381	0.001	0.005	NE	J		091974-010	SW846 6010
	Zinc	0.0356	0.0035	0.010	NE	B	0.046U	091974-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091976-010	SW846 6020
06-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091976-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091976-010	SW846 6020
	Barium	0.0533	0.0006	0.002	2.00			091976-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091976-010	SW846 6020
	Cadmium	0.000205	0.00011	0.001	0.005	J		091976-010	SW846 6020
	Calcium	121	0.300	1.00	NE	B		091976-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091976-010	SW846 6020
	Cobalt	0.000538	0.0001	0.001	NE	J		091976-010	SW846 6020
	Copper	0.00113	0.00035	0.001	NE			091976-010	SW846 6020
	Iron	0.243	0.033	0.100	NE			091976-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091976-010	SW846 6020
	Magnesium	24.5	0.010	0.030	NE		J	091976-010	SW846 6020
	Manganese	0.00348	0.001	0.005	NE	J		091976-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091976-010	SW846 7470
	Nickel	0.00191	0.0005	0.002	NE	J		091976-010	SW846 6020
	Potassium	2.30	0.080	0.300	NE		J	091976-010	SW846 6020
	Selenium	0.00689	0.0015	0.005	0.050			091976-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091976-010	SW846 6020
	Sodium	44.5	0.080	0.250	NE		J	091976-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091976-010	SW846 6020
	Uranium	0.00822	0.000067	0.0002	0.030			091976-010	SW846 6020
	Vanadium	0.0034	0.001	0.005	NE	J		091976-010	SW846 6010
	Zinc	0.0144	0.0035	0.010	NE	B	0.046U	091976-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW9	Aluminum	ND	0.015	0.050	NE	U		091993-010	SW846 6020
12-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091993-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091993-010	SW846 6020
	Barium	0.053	0.0006	0.002	2.00			091993-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091993-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091993-010	SW846 6020
	Calcium	144	0.300	1.00	NE			091993-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091993-010	SW846 6020
	Cobalt	0.000298	0.0001	0.001	NE	J		091993-010	SW846 6020
	Copper	0.00123	0.00035	0.001	NE	B	0.00204U	091993-010	SW846 6020
	Iron	0.545	0.033	0.100	NE			091993-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091993-010	SW846 6020
	Magnesium	42.1	0.010	0.030	NE			091993-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091993-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091993-010	SW846 7470
	Nickel	0.00213	0.0005	0.002	NE			091993-010	SW846 6020
	Potassium	2.40	0.080	0.300	NE			091993-010	SW846 6020
	Selenium	0.00766	0.0015	0.005	0.050			091993-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091993-010	SW846 6020
	Sodium	36.2	0.080	0.250	NE			091993-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091993-010	SW846 6020
	Uranium	0.00685	0.000067	0.0002	0.030			091993-010	SW846 6020
	Vanadium	0.00207	0.001	0.005	NE	J		091993-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091993-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091978-010	SW846 6020
09-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091978-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091978-010	SW846 6020
	Barium	0.056	0.0006	0.002	2.00			091978-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091978-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091978-010	SW846 6020
	Calcium	126	0.600	2.00	NE			091978-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091978-010	SW846 6020
	Cobalt	0.000211	0.0001	0.001	NE	J		091978-010	SW846 6020
	Copper	0.00112	0.00035	0.001	NE			091978-010	SW846 6020
	Iron	0.377	0.033	0.100	NE			091978-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091978-010	SW846 6020
	Magnesium	31.3	0.010	0.030	NE			091978-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091978-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091978-010	SW846 7470
	Nickel	0.00232	0.0005	0.002	NE			091978-010	SW846 6020
	Potassium	1.85	0.080	0.300	NE			091978-010	SW846 6020
	Selenium	0.00716	0.0015	0.005	0.050			091978-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091978-010	SW846 6020
	Sodium	36.4	0.080	0.250	NE			091978-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091978-010	SW846 6020
	Uranium	0.00566	0.000067	0.0002	0.030			091978-010	SW846 6020
	Vanadium	0.00305	0.001	0.005	NE	J		091978-010	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091978-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091980-010	SW846 6020
10-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091980-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091980-010	SW846 6020
	Barium	0.0787	0.0006	0.002	2.00			091980-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091980-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091980-010	SW846 6020
	Calcium	122	0.300	1.00	NE			091980-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091980-010	SW846 6020
	Cobalt	0.000514	0.0001	0.001	NE	J		091980-010	SW846 6020
	Copper	0.00127	0.00035	0.001	NE			091980-010	SW846 6020
	Iron	0.490	0.033	0.100	NE			091980-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091980-010	SW846 6020
	Magnesium	39.1	0.010	0.030	NE			091980-010	SW846 6020
	Manganese	0.369	0.001	0.005	NE			091980-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091980-010	SW846 7470
	Nickel	0.00268	0.0005	0.002	NE			091980-010	SW846 6020
	Potassium	3.45	0.080	0.300	NE			091980-010	SW846 6020
	Selenium	0.00712	0.0015	0.005	0.050			091980-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091980-010	SW846 6020
	Sodium	40.0	0.080	0.250	NE			091980-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091980-010	SW846 6020
	Uranium	0.00583	0.000067	0.0002	0.030			091980-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091980-010	SW846 6010
	Zinc	0.0531	0.0035	0.010	NE			091980-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW12	Aluminum	ND	0.015	0.050	NE	U		091985-010	SW846 6020
11-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091985-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091985-010	SW846 6020
	Barium	0.0373	0.0006	0.002	2.00			091985-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091985-010	SW846 6020
	Cadmium	0.000207	0.00011	0.001	0.005	J		091985-010	SW846 6020
	Calcium	156	0.300	1.00	NE			091985-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091985-010	SW846 6020
	Cobalt	0.000593	0.0001	0.001	NE	J		091985-010	SW846 6020
	Copper	0.00149	0.00035	0.001	NE	B	0.00286U	091985-010	SW846 6020
	Iron	0.553	0.033	0.100	NE			091985-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091985-010	SW846 6020
	Magnesium	40.6	0.010	0.030	NE			091985-010	SW846 6020
	Manganese	0.0835	0.001	0.005	NE			091985-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091985-010	SW846 7470
	Nickel	0.00249	0.0005	0.002	NE			091985-010	SW846 6020
	Potassium	3.35	0.080	0.300	NE			091985-010	SW846 6020
	Selenium	0.00745	0.0015	0.005	0.050			091985-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091985-010	SW846 6020
	Sodium	87.1	0.400	1.25	NE			091985-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091985-010	SW846 6020
	Uranium	0.00896	0.000067	0.0002	0.030			091985-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091985-010	SW846 6010
	Zinc	0.0175	0.0035	0.010	NE			091985-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-7 *(Concluded)*
Summary of Total Metal Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091986-010	SW846 6020
11-Apr-12	Antimony	ND	0.001	0.003	0.006	U		091986-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091986-010	SW846 6020
	Barium	0.0351	0.0006	0.002	2.00			091986-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091986-010	SW846 6020
	Cadmium	0.00019	0.00011	0.001	0.005	J		091986-010	SW846 6020
	Calcium	147	0.300	1.00	NE			091986-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091986-010	SW846 6020
	Cobalt	0.000543	0.0001	0.001	NE	J		091986-010	SW846 6020
	Copper	0.00129	0.00035	0.001	NE	B	0.00286U	091986-010	SW846 6020
	Iron	0.551	0.033	0.100	NE			091986-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091986-010	SW846 6020
	Magnesium	39.5	0.010	0.030	NE			091986-010	SW846 6020
	Manganese	0.0689	0.001	0.005	NE			091986-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	091986-010	SW846 7470
	Nickel	0.00224	0.0005	0.002	NE			091986-010	SW846 6020
	Potassium	3.13	0.080	0.300	NE			091986-010	SW846 6020
	Selenium	0.00719	0.0015	0.005	0.050			091986-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091986-010	SW846 6020
	Sodium	43.6	0.080	0.250	NE			091986-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091986-010	SW846 6020
	Uranium	0.00838	0.000067	0.0002	0.030			091986-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091986-010	SW846 6010
	Zinc	0.017	0.0035	0.010	NE			091986-010	SW846 6020

Refer to footnotes on page 7A-29.

Table 7A-8
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Isotopic Uranium, and Tritium Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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	-5.19 ± 6.39	9.64	4.73	NE	U	BD	091972-033	EPA 901.1
02-Apr-12	Cesium-137	-0.722 ± 1.80	3.00	1.45	NE	U	BD	091972-033	EPA 901.1
	Cobalt-60	0.655 ± 1.85	3.27	1.55	NE	U	BD	091972-033	EPA 901.1
	Potassium-40	17.8 ± 44.3	28.4	13.4	NE	U	BD	091972-033	EPA 901.1
	Gross Alpha	**18.17**	NA	NA	15 pCi/L	NA	None	091972-034	EPA 900.0
	Gross Beta	12.8 ± 2.97	1.78	0.857	4 mrem/yr			091972-034	EPA 900.0
	Uranium-233/234	34.9 ± 4.54	0.143	0.0635	NE			091972-035	HASL-300
	Uranium-235/236	0.399 ± 0.119	0.0825	0.0314	NE			091972-035	HASL-300
	Uranium-238	4.33 ± 0.635	0.0919	0.038	NE			091972-035	HASL-300
	Tritium	0.00 ± 66.9	122	56.1	NE	U	BD	091972-036	EPA 906.0 M
CYN-MW6	Americium-241	-4.16 ± 12.1	20.8	10.2	NE	U	BD	091990-033	EPA 901.1
16-Apr-12	Cesium-137	1.39 ± 2.35	4.03	1.95	NE	U	BD	091990-033	EPA 901.1
	Cobalt-60	-1.33 ± 2.51	4.10	1.95	NE	U	BD	091990-033	EPA 901.1
	Potassium-40	-77 ± 56.4	55.9	26.9	NE	U	BD	091990-033	EPA 901.1
	Gross Alpha	2.71	NA	NA	15	NA	None	091990-034	EPA 900.0
	Gross Beta	5.17 ± 2.03	2.82	1.37	4 mrem/yr		NJ+	091990-034	EPA 900.0
	Uranium-233/234	8.83 ± 1.17	0.114	0.0509	NE			091990-035	HASL-300
	Uranium-235/236	0.122 ± 0.0544	0.0661	0.0252	NE		J	091990-035	HASL-300
	Uranium-238	2.24 ± 0.344	0.0736	0.0304	NE			091990-035	HASL-300
	Tritium	-57.1 ± 92.3	183	83.0	NE	U	BD	091990-036	EPA 906.0 M
CYN-MW6 (Duplicate)	Americium-241	6.00 ± 8.90	13.7	6.71	NE	U	BD	091991-033	EPA 901.1
16-Apr-12	Cesium-137	0.577 ± 3.63	3.38	1.63	NE	U	BD	091991-033	EPA 901.1
	Cobalt-60	1.47 ± 1.89	3.36	1.59	NE	U	BD	091991-033	EPA 901.1
	Potassium-40	33.0 ± 39.3	29.4	13.8	NE	X	R	091991-033	EPA 901.1
	Gross Alpha	-4.40	NA	NA	15 pCi/L	NA	None	091991-034	EPA 900.0
	Gross Beta	-0.476 ± 1.54	2.68	1.29	4 mrem/yr	U	BD	091991-034	EPA 900.0
	Uranium-233/234	9.28 ± 1.20	0.0775	0.0344	NE			091991-035	HASL-300
	Uranium-235/236	0.130 ± 0.0472	0.0488	0.017	NE		J	091991-035	HASL-300
	Uranium-238	2.51 ± 0.358	0.0498	0.0206	NE			091991-035	HASL-300
	Tritium	47.7 ± 103	180	81.5	NE	U	BD	091991-036	EPA 906.0 M

Refer to footnotes on page 7A-29.

Table 7A-8 *(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 2012

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-MW7	Americium-241	6.97 ± 14.3	21.9	10.7	NE	U	BD	091974-033	EPA 901.1
05-Apr-12	Cesium-137	0.232 ± 2.10	3.24	1.56	NE	U	BD	091974-033	EPA 901.1
	Cobalt-60	-1.54 ± 2.04	3.23	1.52	NE	U	BD	091974-033	EPA 901.1
	Potassium-40	4.51 ± 42.1	31.4	14.8	NE	U	BD	091974-033	EPA 901.1
	Gross Alpha	-2.52	NA	NA	15 pCi/L	NA	None	091974-034	EPA 900.0
	Gross Beta	8.17 ± 2.22	2.51	1.22	4 mrem/yr			091974-034	EPA 900.0
	Uranium-233/234	17.5 ± 2.24	0.0799	0.0355	NE			091974-035	HASL-300
	Uranium-235/236	0.138 ± 0.0507	0.0461	0.0176	NE		J	091974-035	HASL-300
	Uranium-238	2.18 ± 0.319	0.0514	0.0212	NE			091974-035	HASL-300
	Tritium	0.00 ± 67.8	124	56.9	NE	U	BD	091974-036	EPA 906.0 M
CYN-MW8	Americium-241	-0.764 ± 13.3	22.8	11.2	NE	U	BD	091976-033	EPA 901.1
06-Apr-12	Cesium-137	0.841 ± 4.02	6.11	2.95	NE	U	BD	091976-033	EPA 901.1
	Cobalt-60	-3.08 ± 4.26	6.69	3.17	NE	U	BD	091976-033	EPA 901.1
	Potassium-40	54.7 ± 53.1	76.8	36.6	NE	U	BD	091976-033	EPA 901.1
	Gross Alpha	3.69	NA	NA	15 pCi/L	NA	None	091976-034	EPA 900.0
	Gross Beta	1.32 ± 1.05	1.64	0.789	4 mrem/yr	U	BD	091976-034	EPA 900.0
	Uranium-233/234	24.4 ± 3.12	0.118	0.0522	NE			091976-035	HASL-300
	Uranium-235/236	0.531 ± 0.129	0.0679	0.0258	NE			091976-035	HASL-300
	Uranium-238	2.58 ± 0.391	0.0755	0.0312	NE			091976-035	HASL-300
	Tritium	-41.1 ± 63.6	123	56.7	NE	U	BD	091976-036	EPA 906.0 M
CYN-MW9	Americium-241	2.67 ± 5.44	9.22	4.52	NE	U	BD	091993-033	EPA 901.1
12-Apr-12	Cesium-137	0.810 ± 1.76	3.11	1.50	NE	U	BD	091993-033	EPA 901.1
	Cobalt-60	6.32 ± 3.72	6.32	1.88	NE	U	BD	091993-033	EPA 901.1
	Potassium-40	23.0 ± 36.6	26.2	12.3	NE	U	BD	091993-033	EPA 901.1
	Gross Alpha	-0.98	NA	NA	15 pCi/L	NA	None	091993-034	EPA 900.0
	Gross Beta	2.91 ± 1.77	2.75	1.33	4 mrem/yr		J	091993-034	EPA 900.0
	Uranium-233/234	8.14 ± 1.08	0.112	0.0499	NE			091993-035	HASL-300
	Uranium-235/236	0.165 ± 0.0636	0.0648	0.0247	NE		J	091993-035	HASL-300
	Uranium-238	2.12 ± 0.327	0.0722	0.0298	NE			091993-035	HASL-300
	Tritium	23.3 ± 91.3	166	74.1	NE	U	BD	091993-036	EPA 906.0 M

Refer to footnotes on page 7A-29.

Table 7A-8 *(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 2012

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-MW10	Americium-241	6.55 ± 8.11	12.3	6.01	NE	U	BD	091978-033	EPA 901.1
09-Apr-12	Cesium-137	0.322 ± 3.90	2.84	1.36	NE	U	BD	091978-033	EPA 901.1
	Cobalt-60	0.705 ± 1.82	3.32	1.57	NE	U	BD	091978-033	EPA 901.1
	Potassium-40	7.39 ± 33.2	30.4	14.3	NE	U	BD	091978-033	EPA 901.1
	Gross Alpha	-1.00	NA	NA	15 pCi/L	NA	None	091978-034	EPA 900.0
	Gross Beta	3.52 ± 1.23	1.62	0.780	4 mrem/yr		J	091978-034	EPA 900.0
	Uranium-233/234	5.39 ± 0.727	0.0829	0.0368	NE			091978-035	HASL-300
	Uranium-235/236	0.114 ± 0.0452	0.0479	0.0182	NE		J	091978-035	HASL-300
	Uranium-238	2.08 ± 0.309	0.0533	0.022	NE			091978-035	HASL-300
	Tritium	5.66 ± 86.7	161	72.1	NE	U	BD	091978-036	EPA 906.0 M
CYN-MW11	Americium-241	6.60 ± 13.8	20.7	10.1	NE	U	BD	091980-033	EPA 901.1
10-Apr-12	Cesium-137	0.415 ± 2.06	3.53	1.70	NE	U	BD	091980-033	EPA 901.1
	Cobalt-60	-0.0719 ± 2.09	3.63	1.72	NE	U	BD	091980-033	EPA 901.1
	Potassium-40	-22.2 ± 42.4	44.9	21.5	NE	U	BD	091980-033	EPA 901.1
	Gross Alpha	3.14	NA	NA	15 pCi/L	NA	None	091980-034	EPA 900.0
	Gross Beta	17.7 ± 3.38	2.04	0.983	4 mrem/yr			091980-034	EPA 900.0
	Uranium-233/234	5.33 ± 0.773	0.119	0.053	NE			091980-035	HASL-300
	Uranium-235/236	0.115 ± 0.0565	0.0689	0.0262	NE		J	091980-035	HASL-300
	Uranium-238	1.92 ± 0.317	0.0767	0.0317	NE			091980-035	HASL-300
	Tritium	16.8 ± 87.2	160	71.4	NE	U	BD	091980-036	EPA 906.0 M
CYN-MW12	Americium-241	4.87 ± 9.11	14.7	7.17	NE	U	BD	091985-033	EPA 901.1
11-Apr-12	Cesium-137	0.978 ± 2.01	3.04	1.46	NE	U	BD	091985-033	EPA 901.1
	Cobalt-60	1.57 ± 2.11	3.63	1.72	NE	U	BD	091985-033	EPA 901.1
	Potassium-40	34.3 ± 57.0	35.4	16.7	NE	U	BD	091985-033	EPA 901.1
	Gross Alpha	3.58	NA	NA	15 pCi/L	NA	None	091985-034	EPA 900.0
	Gross Beta	6.97 ± 2.13	2.43	1.17	4 mrem/yr		J	091985-034	EPA 900.0
	Uranium-233/234	11.7 ± 1.59	0.108	0.0479	NE			091985-035	HASL-300
	Uranium-235/236	0.109 ± 0.0544	0.0622	0.0237	NE		J	091985-035	HASL-300
	Uranium-238	2.81 ± 0.425	0.0692	0.0286	NE			091985-035	HASL-300
	Tritium	5.68 ± 87.0	162	72.4	NE	U	BD	091985-036	EPA 906.0 M

Refer to footnotes on page 7A-29.

Table 7A-8 *(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 2012

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d]	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW12 (Duplicate)	Americium-241	-5.39 ± 7.84	12.2	5.99	NE	U	BD	091986-033	EPA 901.1
11-Apr-12	Cesium-137	-1.49 ± 2.15	2.98	1.43	NE	U	BD	091986-033	EPA 901.1
	Cobalt-60	0.137 ± 1.83	3.30	1.57	NE	U	BD	091986-033	EPA 901.1
	Potassium-40	-10.3 ± 32.3	41.2	19.7	NE	U	BD	091986-033	EPA 901.1
	Gross Alpha	1.11	NA	NA	15 pCi/L	NA	None	091986-034	EPA 900.0
	Gross Beta	7.68 ± 2.14	2.44	1.18	4 mrem/yr			091986-034	EPA 900.0
	Uranium-233/234	12.6 ± 1.65	0.0883	0.0392	NE			091986-035	HASL-300
	Uranium-235/236	0.143 ± 0.0544	0.051	0.0194	NE		J	091986-035	HASL-300
	Uranium-238	2.65 ± 0.387	0.0567	0.0235	NE			091986-035	HASL-300
	Tritium	-5.64 ± 84.9	161	71.9	NE	U	BD	091986-036	EPA 906.0 M

Refer to footnotes on page 7A-29.

Table 7A-9
Summary of Field Water Quality Measurements[h], Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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-MW9	03-Jan-12	15.14	1230	407.1	6.77	0.21	53.8	5.37
CYN-MW10	04-Jan-12	15.19	964	395.0	7.15	0.16	71.0	7.11
CYN-MW11	05-Jan-12	15.93	1091	360.2	7.14	0.87	8.0	0.78
CYN-MW12	06-Jan-12	16.98	1178	388.0	6.92	0.29	11.9	1.14
CYN-MW4	02-Apr-12	15.89	676	156.9	7.64	0.37	46.3	4.61
CYN-MW6	16-Apr-12	15.79	977	132.3	7.42	6.17	30.3	3.04
CYN-MW7	05-Apr-12	18.92	719	113.7	7.46	0.65	40.9	3.78
CYN-MW8	06-Apr-12	17.78	812	116.4	7.50	0.39	49.3	4.69
CYN-MW9	12-Apr-12	16.57	1087	120.6	7.31	0.41	55.2	5.36
CYN-MW10	09-Apr-12	17.40	844	1336	7.67	0.34	74.4	7.28
CYN-MW11	10-Apr-12	17.66	960	62.4	7.55	0.37	8.8	0.83
CYN-MW12	11-Apr-12	18.86	1044	95.6	7.37	0.36	13.4	1.21
CYN-MW4	01-Oct-12	19.73	694	183.4	7.24	0.35	49.4	4.50
CYN-MW6	15-Oct-12	13.60	935	190.2	7.19	1.54	18.2	1.89
CYN-MW7	02-Oct-12	19.64	735	188.0	7.04	0.49	41.9	3.82
CYN-MW8	03-Oct-12	18.81	828	181.8	7.09	0.48	50.8	4.72
CYN-MW9	10-Oct-12	18.67	1099	180.2	6.92	0.41	54.7	5.08
CYN-MW10	04-Oct-12	18.68	849	184.1	7.26	0.31	76.6	7.14
CYN-MW11	08-Oct-12	18.51	984	63.7	7.21	0.48	4.9	0.45
CYN-MW12	09-Oct-12	18.60	1063	170.8	7.00	0.39	12.3	1.14

Refer to footnotes on page 7A-29.

Footnotes for Burn Site Groundwater Monitoring Tables

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID = Idenitifier.
N = nitrate.
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).
- 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).
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- pCi/L = picocuries per liter

[b]MDL or MDA

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.

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.

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

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.

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.

[d]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.
- 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).

[e]Laboratory Qualifier

B	=	The analyte was detected in the blank above the effective method detection limit (MDL).
J	=	Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
h	=	Prep holding time exceeded.
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 Burn Site Groundwater Monitoring 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.
NJ+	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
None	=	No data validation for corrected gross alpha activity.
U	=	The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable, and resampling and reanalysis are necessary for verification.

[g]**Analytical Method**

- EPA, 1999 (and updates), *Perchlorate in Drinking Water Using Ion Chromatograph*y, 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S Environmental Protection Agency, Cincinnati, Ohio.
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300.

[h]**Field Water Quality Measurements**

- Field measurements collected prior to sampling.

°C	=	degrees Celsius.
% Sat	=	percent saturation.
µmho/cm	=	micromhos per centimeter.
mg/L	=	milligrams per liter.
mV	=	millivolts.
NTU	=	nephelometric turbidity units.
pH	=	potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 7B
Burn Site Groundwater
Plots

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Attachment 7B Plots

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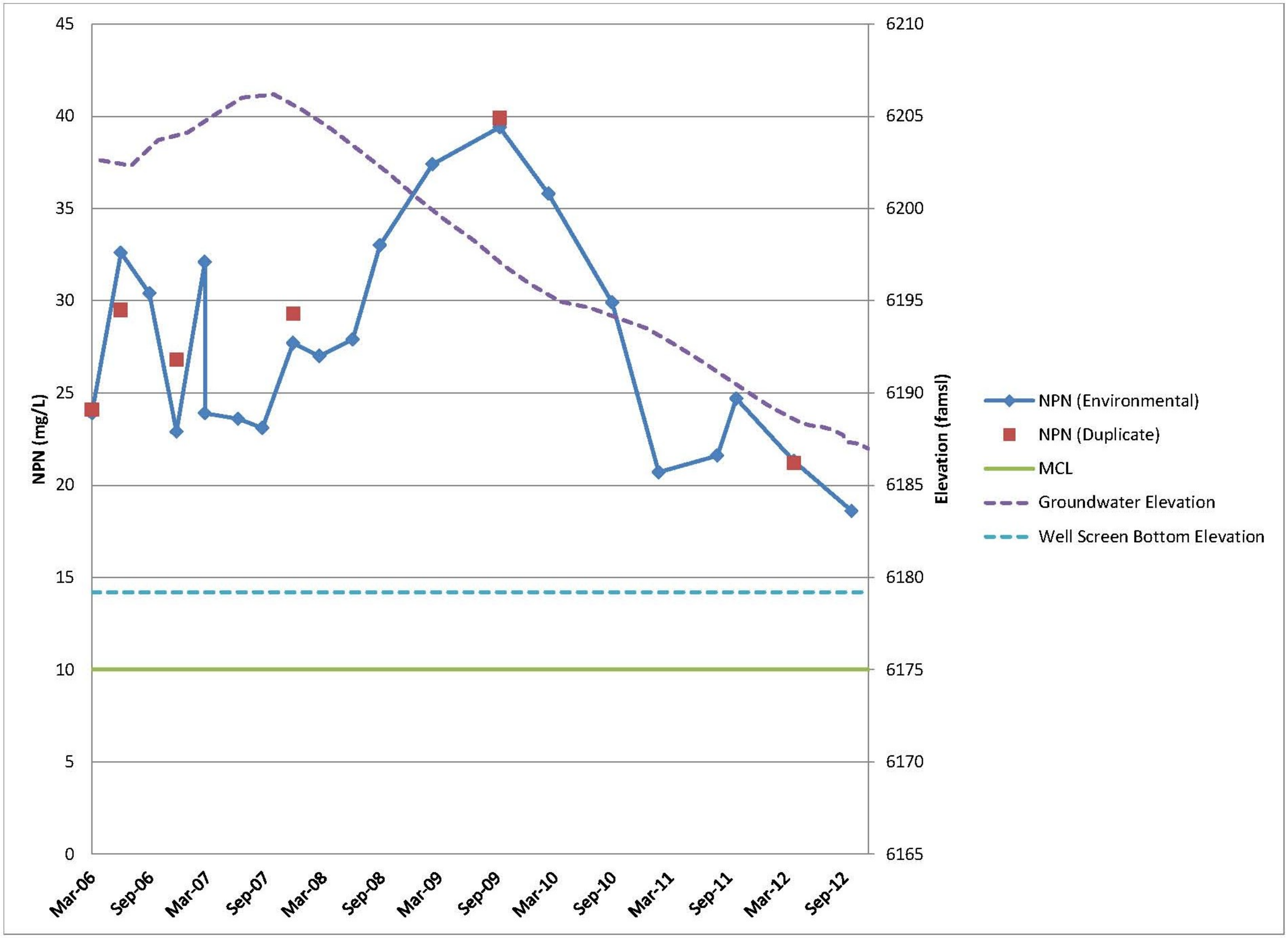

Figure 7B-1. Nitrate plus Nitrite Concentrations, CYN-MW6

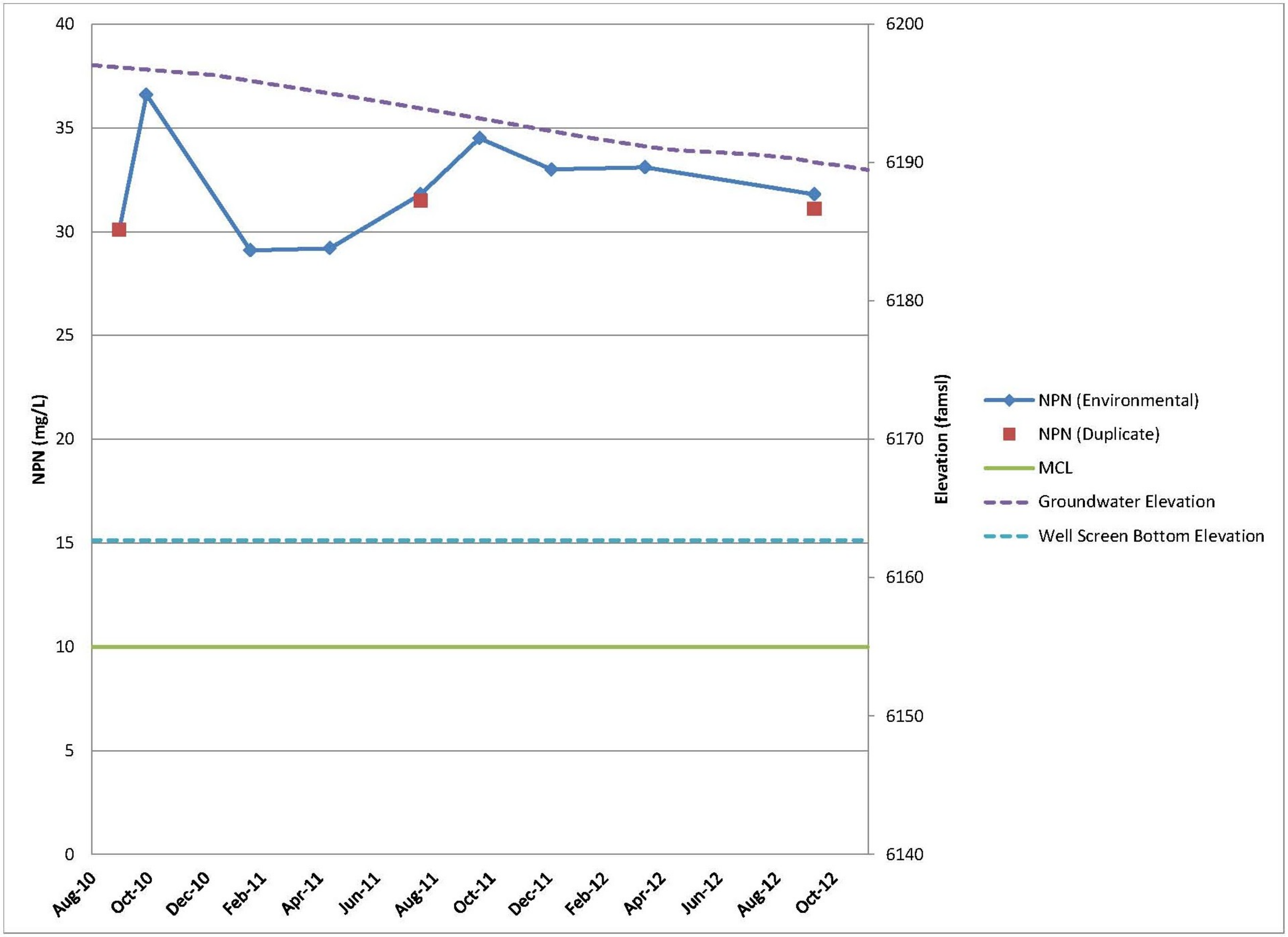

Figure 7B-2. Nitrate plus Nitrite Concentrations, CYN-MW9

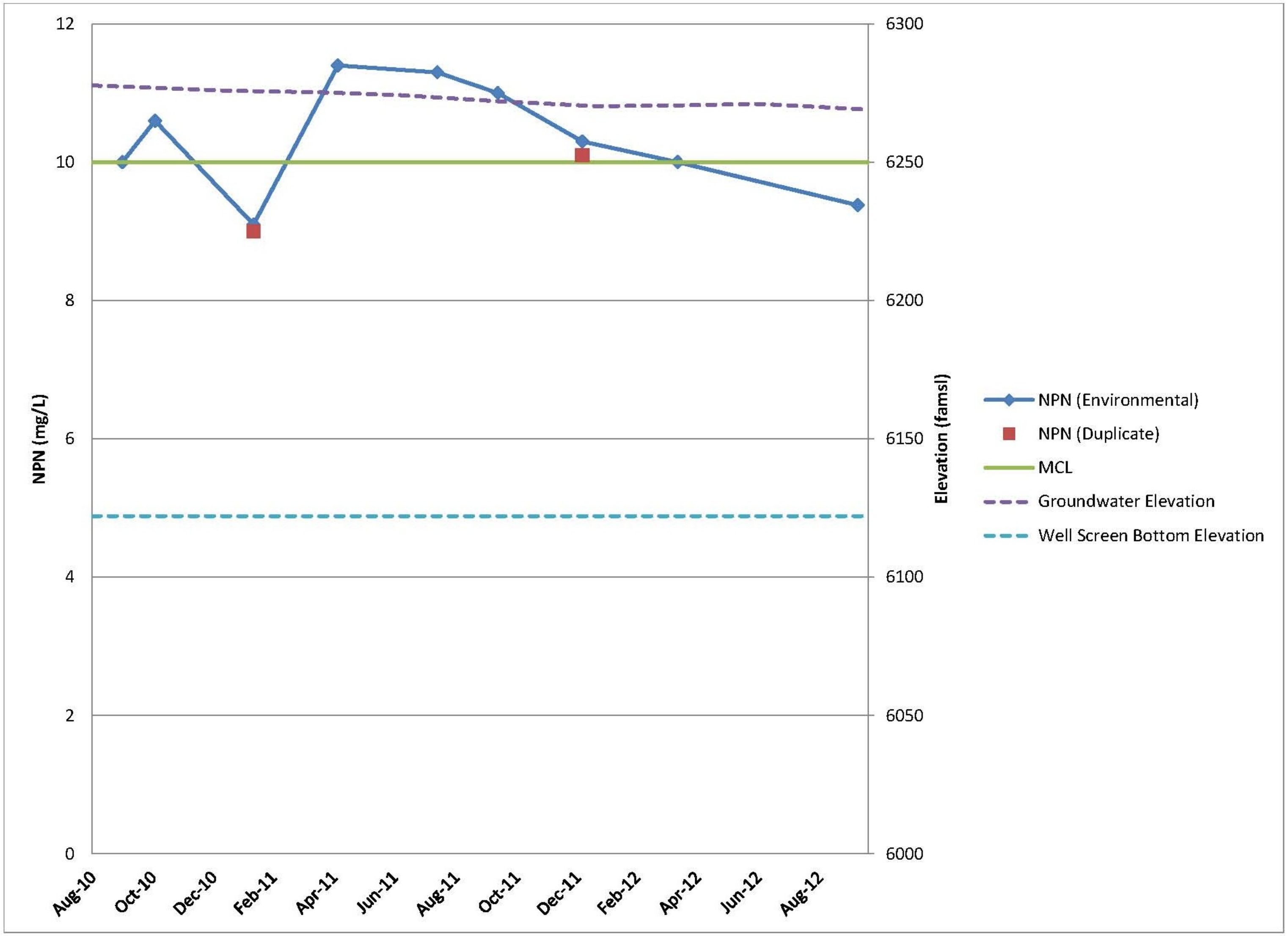

Figure 7B-3. Nitrate plus Nitrite Concentrations, CYN-MW11

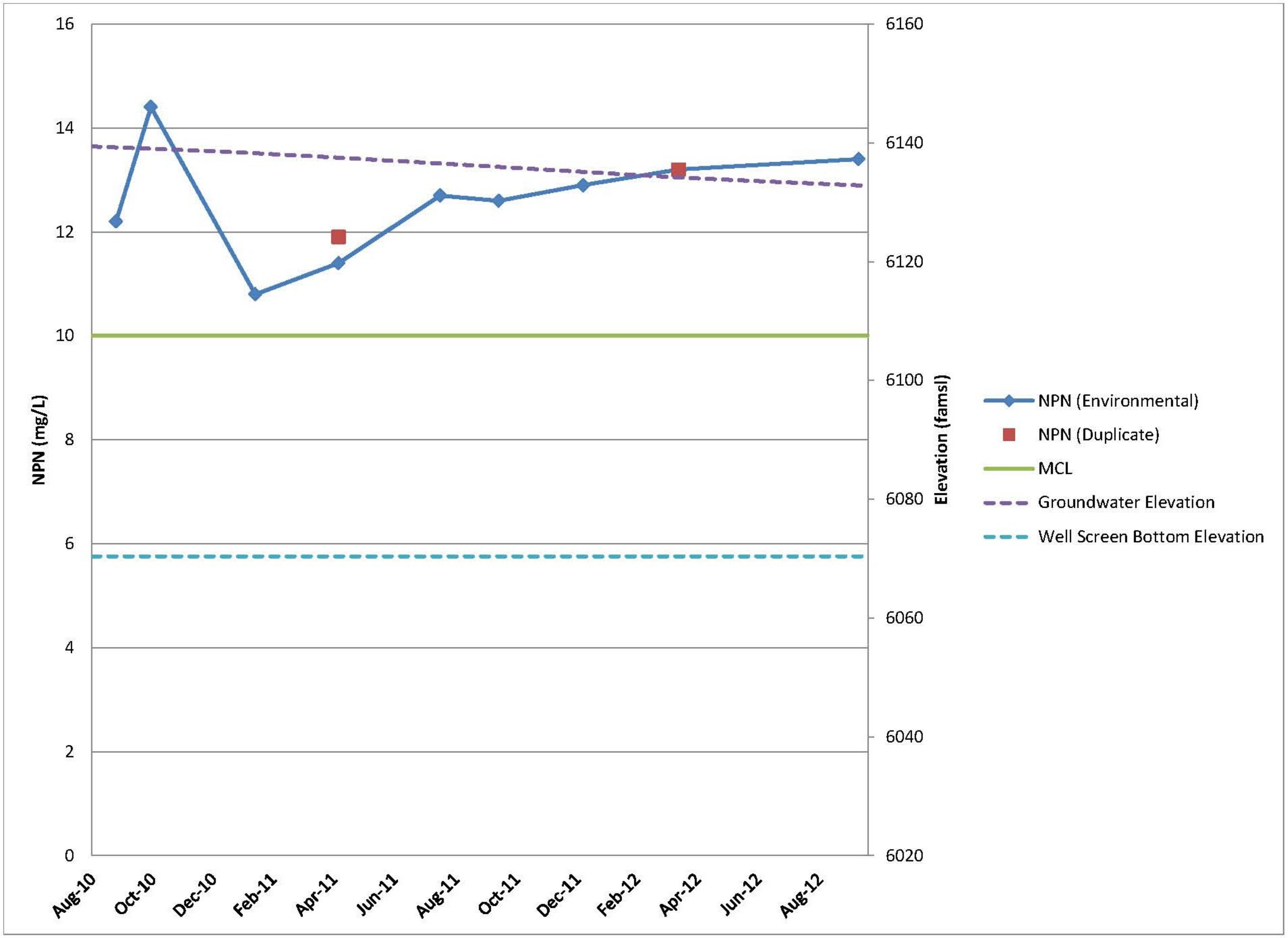

Figure 7B-4. Nitrate plus Nitrite Concentrations, CYN-MW12

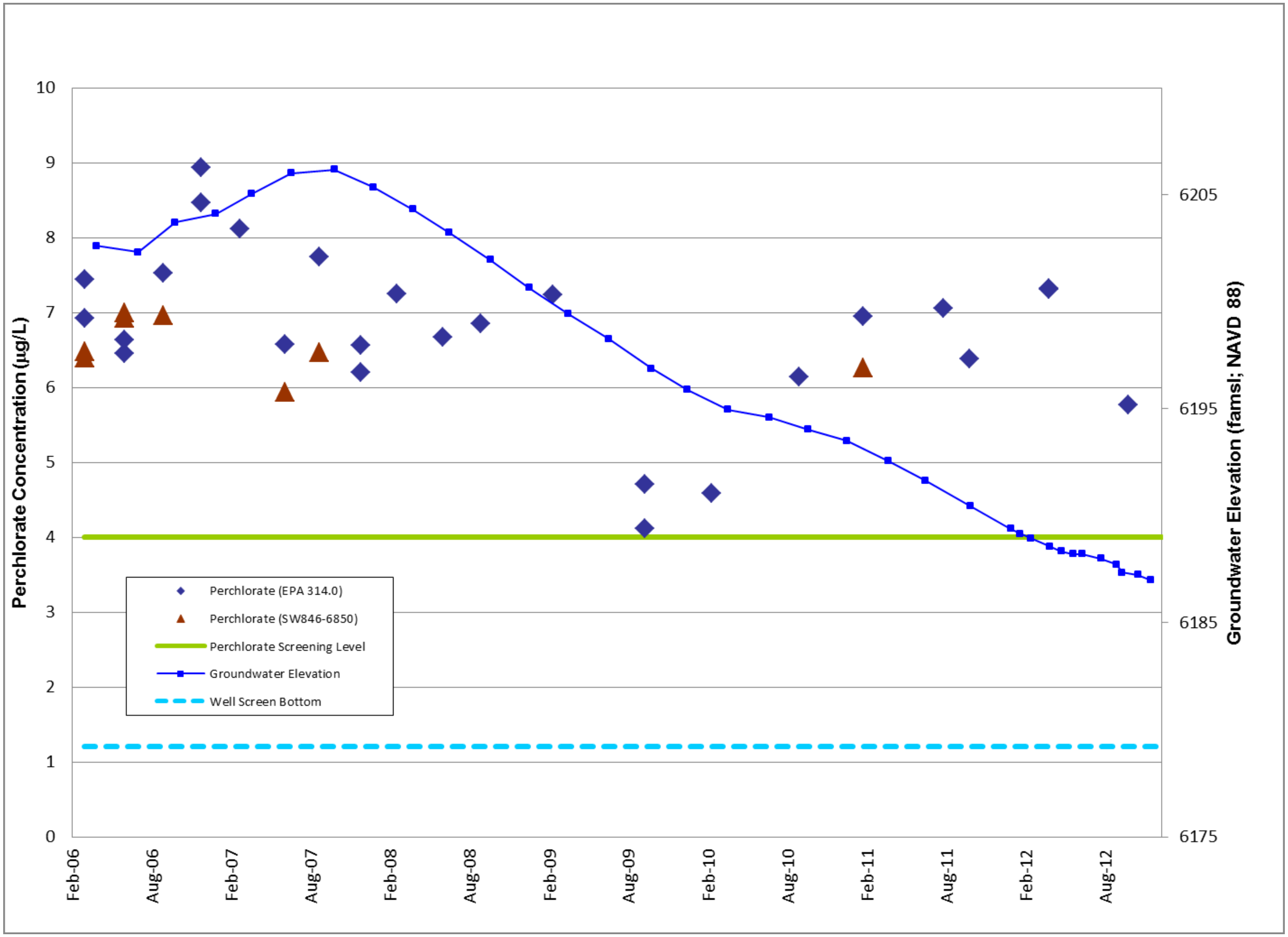

Figure 7B-5. Perchlorate Concentrations, CYN-MW6

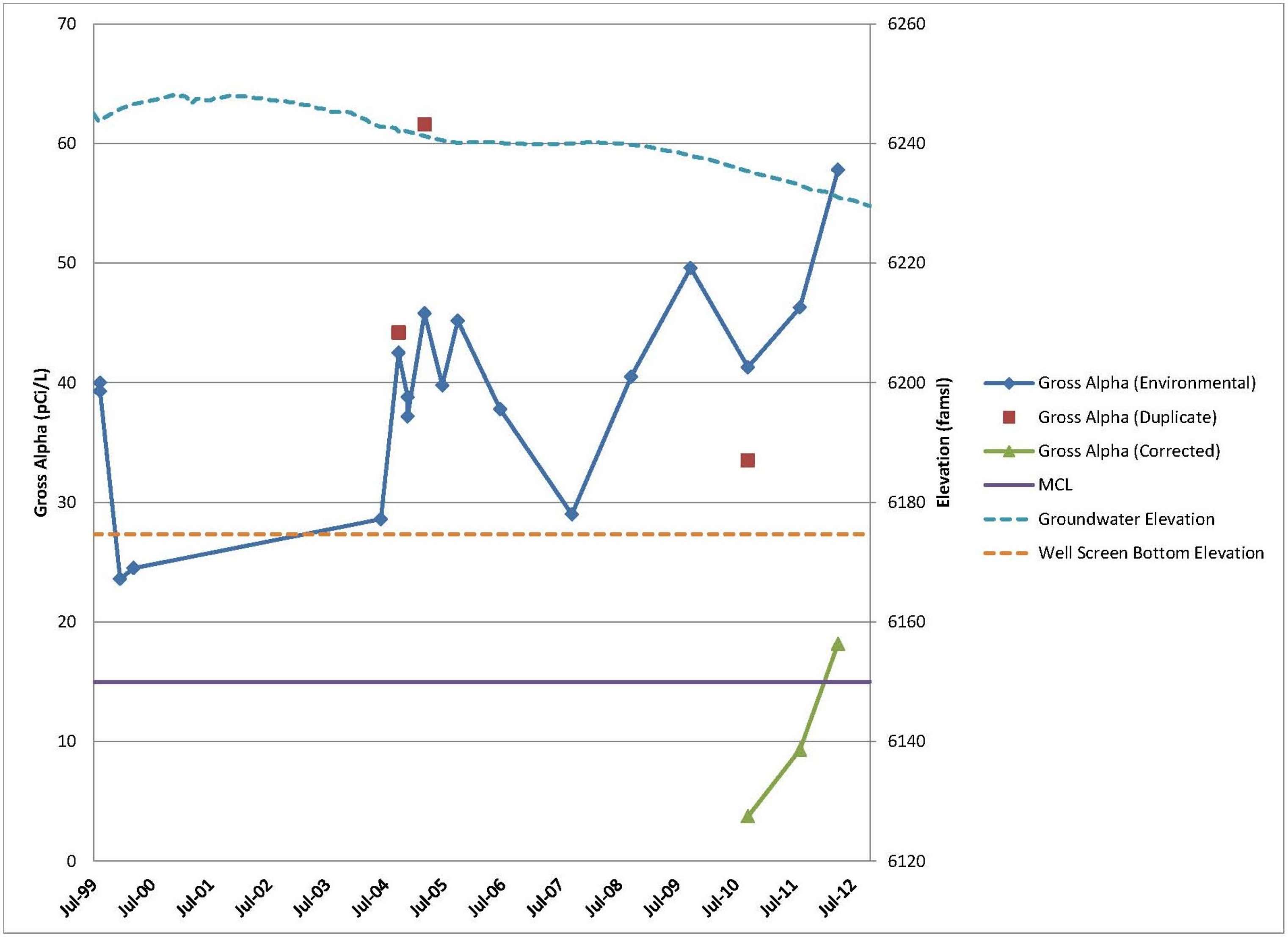

Figure 7B-6. Gross Alpha Activities, CYN-MW4

Attachment 7C
Burn Site Groundwater
Hydrographs

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Attachment 7C Hydrographs

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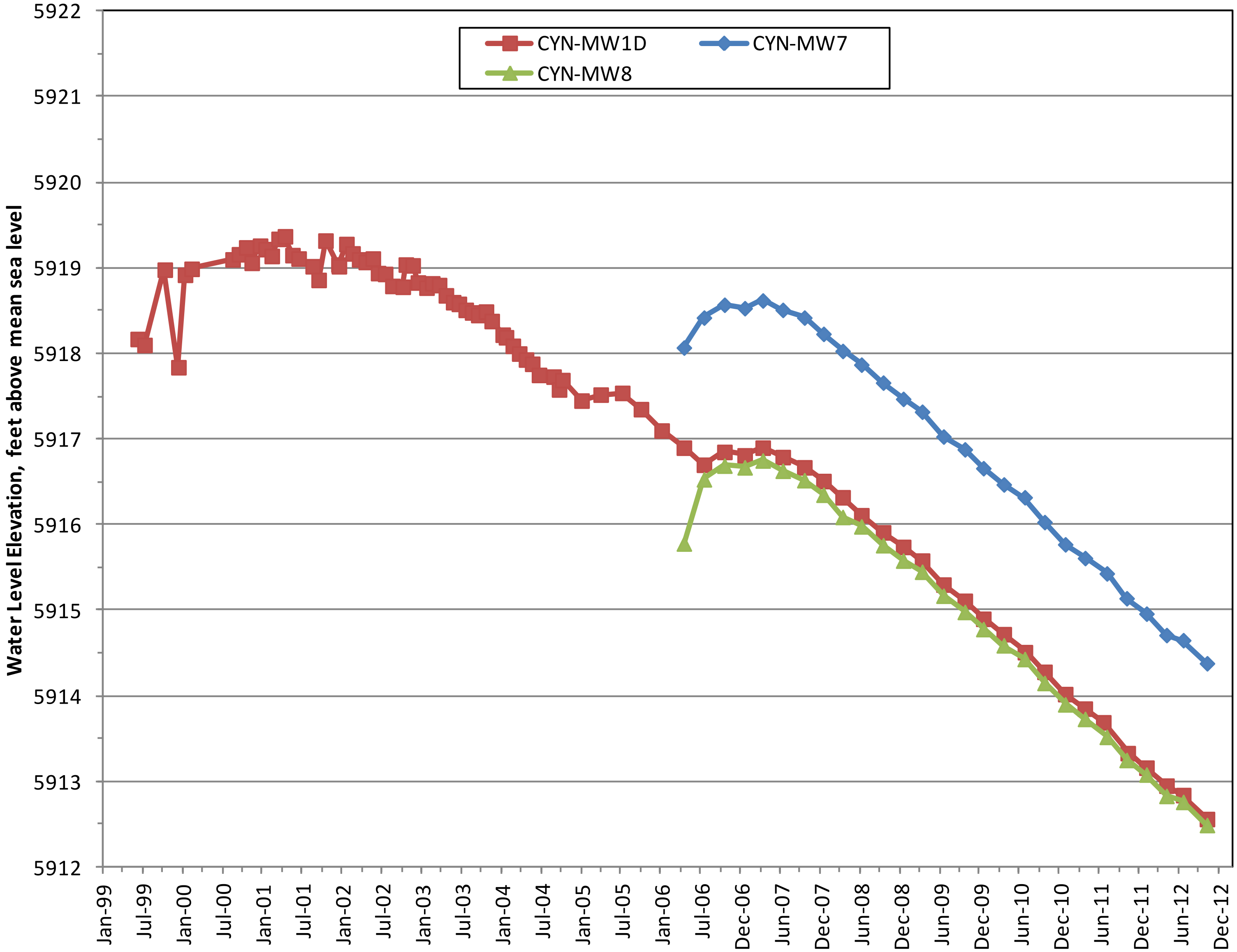

Figure 7C-1. BSG Study Area Wells (1 of 5)

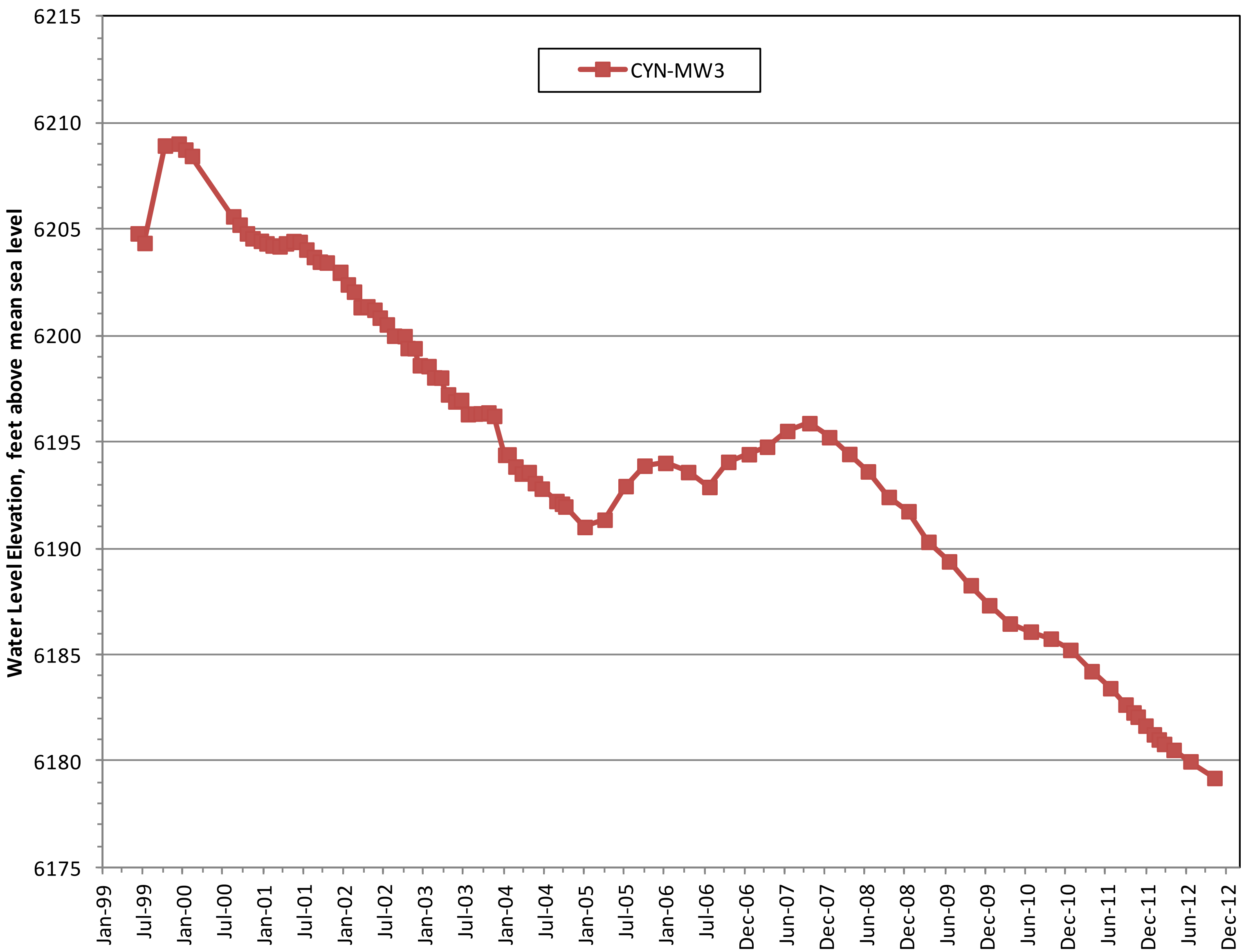

Figure 7C-2. BSG Study Area Wells (2 of 5)

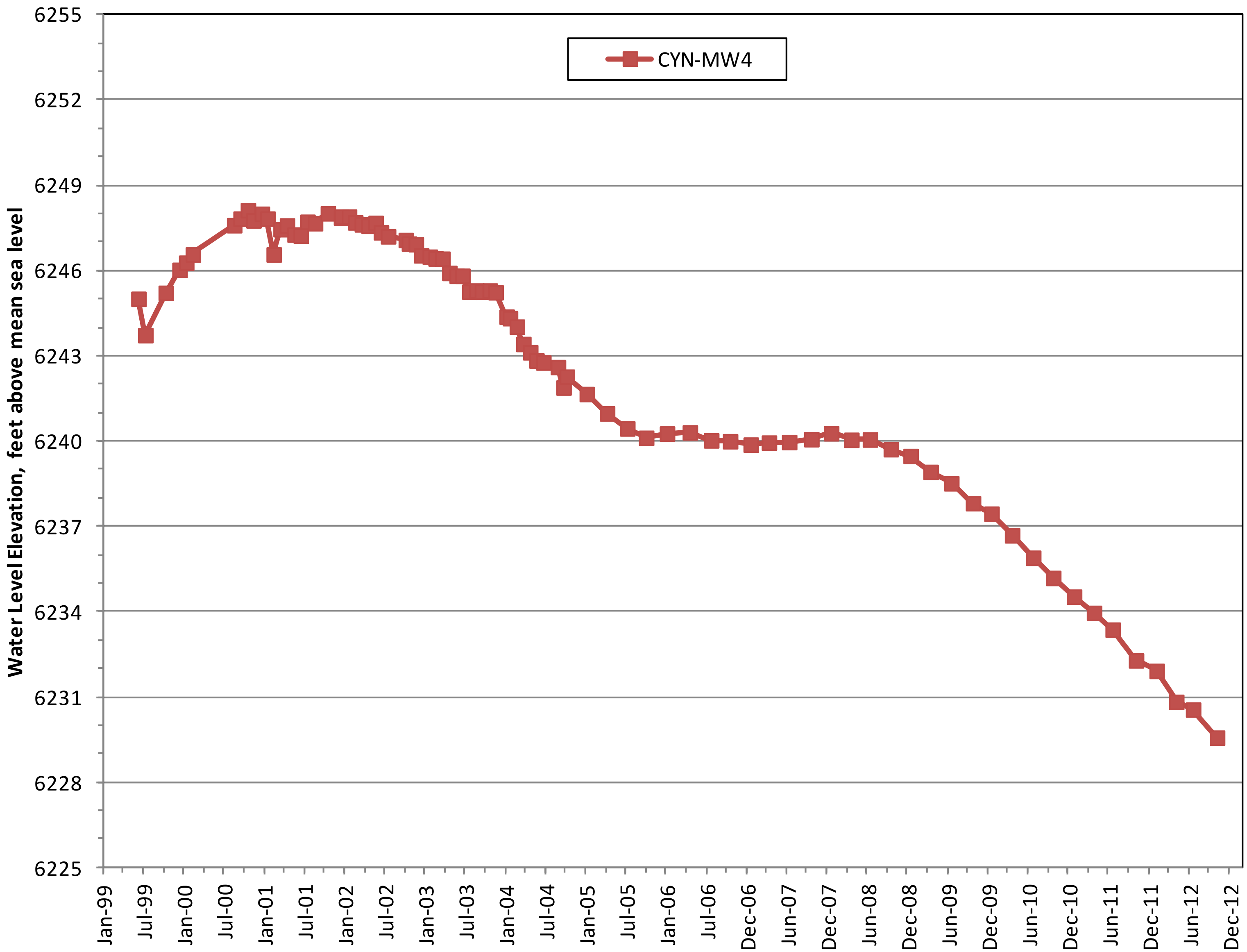

Figure 7C-3. BSG Study Area Wells (3 of 5)

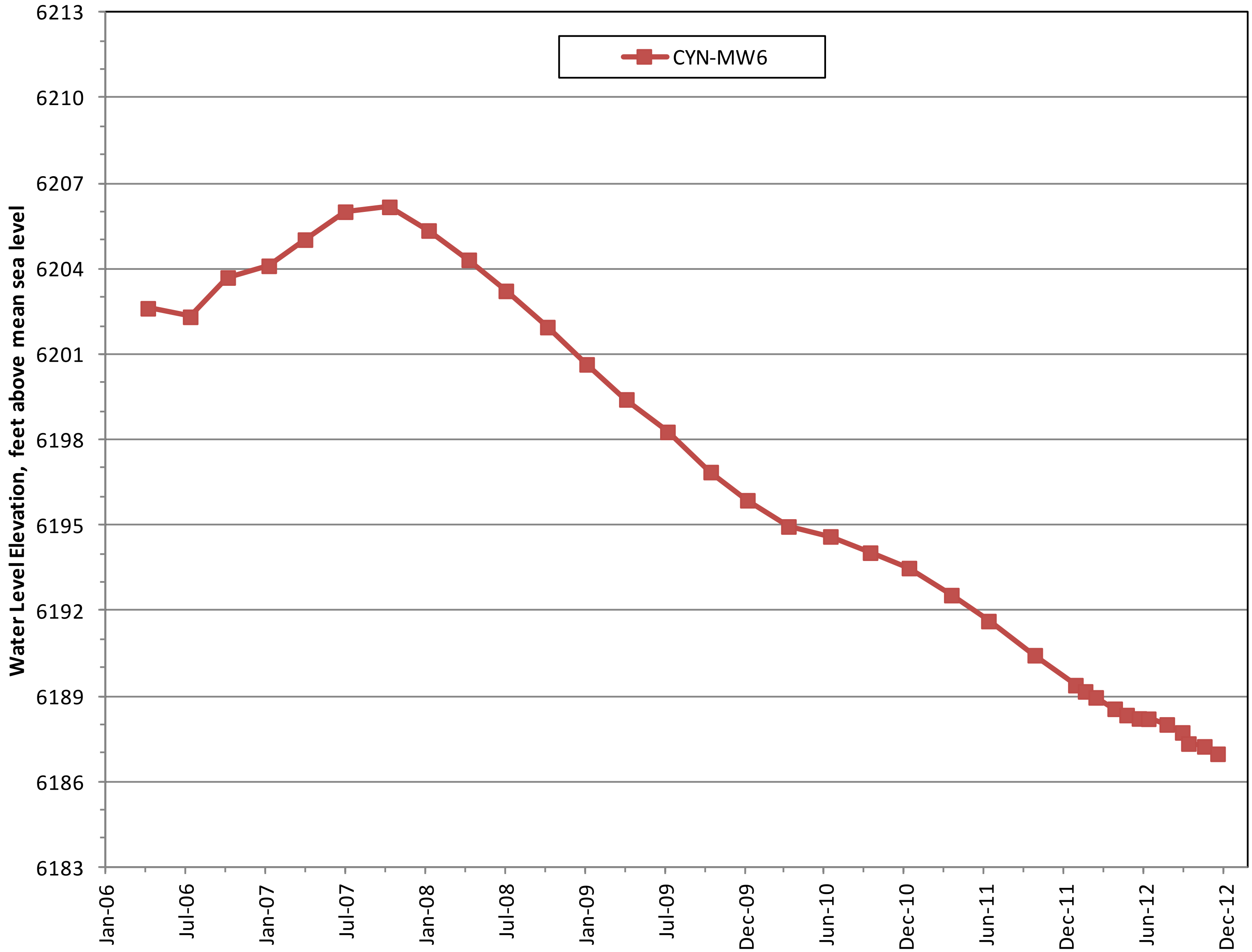

Figure 7C-4. BSG Study Area Wells (4 of 5)

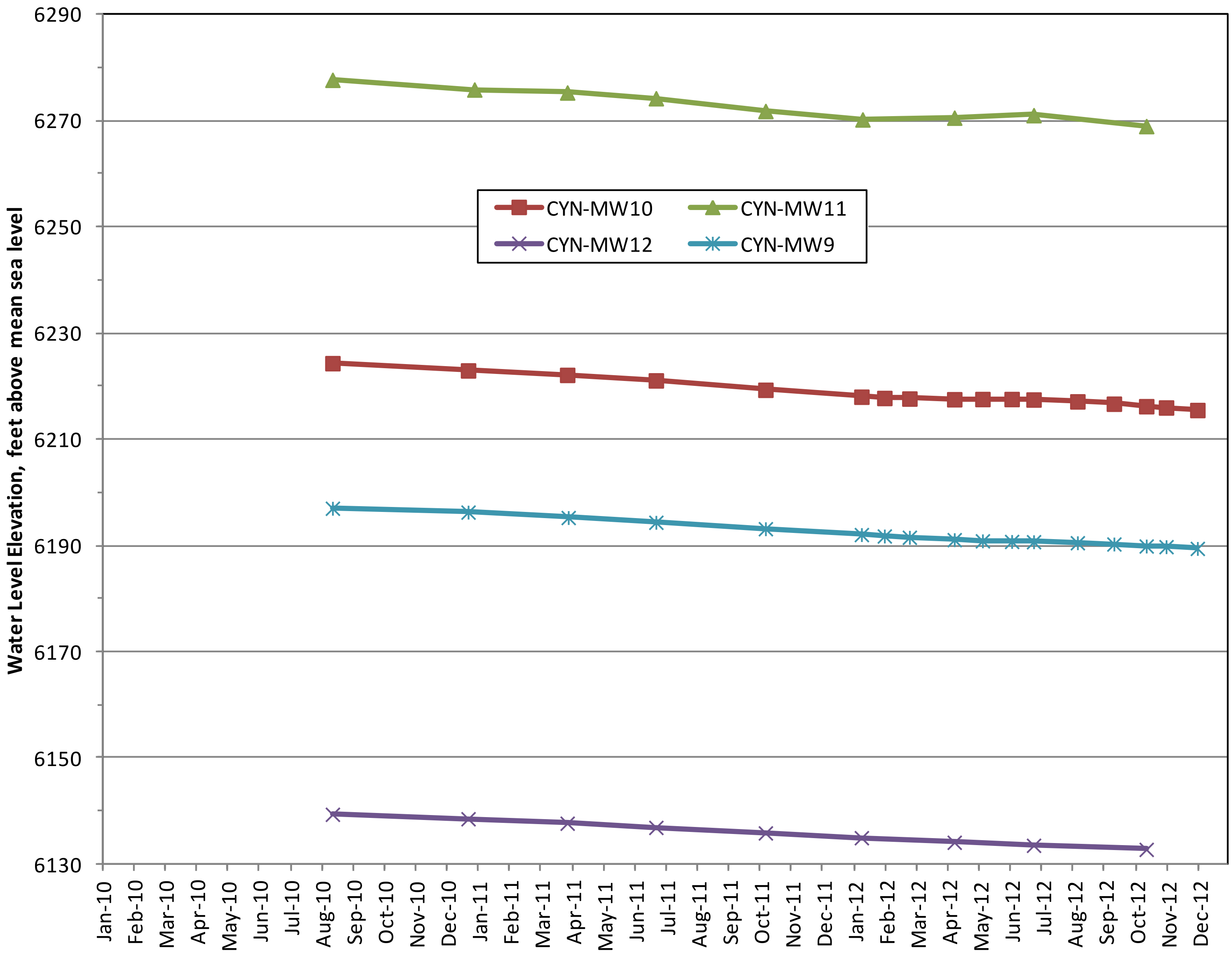

Figure 7C-5. BSG Study Area Wells (5 of 5)

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8.0 Solid Waste Management Units 8/58

8.1 Introduction

This chapter summarizes the Calendar Year (CY) 2012 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). The SNL/NM facility is a government-owned, contractor-operated, multi-program laboratory overseen by the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) through the Sandia Field Office (SFO) in Albuquerque, New Mexico. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM under Contract DE-AC04-94AL85000.

Monitoring wells CCBA-MW1 and CCBA-MW2 were installed at SWMUs 8/58 in August 2011. 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 Order) between the New Mexico Environment Department (NMED), DOE, and Sandia (NMED April 2004) and the NMED letter dated April 8, 2010, from the NMED Hazardous Waste Bureau requiring additional corrective action at SWMUs 8/58 (NMED April 2010). In April 2012, NMED approved the SWMUs 8/58 well installation report (NMED April 2012).

Monitoring well CCBA-MW1 was sampled on January 16, 2012; April 23, 2012; July 16, 2012; and October 22, 2012. Monitoring well CCBA-MW2 was sampled on January 12, 2012; April 24, 2012; July 12, 2012; and October 23, 2012. 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 2011, March 2012, June 2012a, and September 2012a). 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, radionuclides by gamma spectroscopy, and isotopic uranium.

Analytical results for the CY 2012 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 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 4.93 to 5.32 mg/L.

During CY 2013, quarterly groundwater sampling and reporting will continue at groundwater monitoring wells CCBA-MW1 and CCBA-MW2 located at SWMUs 8/58.

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 (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.

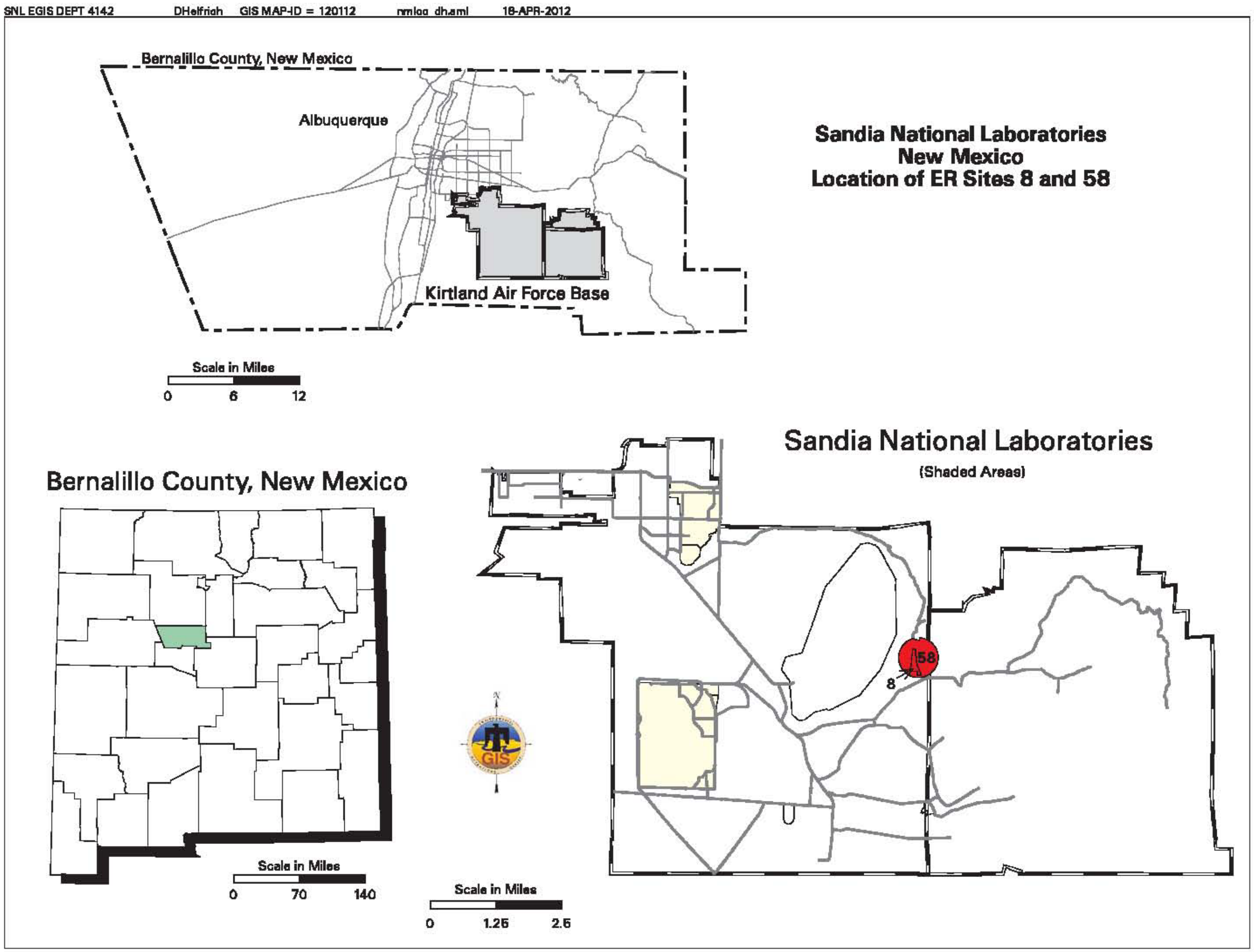

Figure 8-1. Location of SWMUs 8/58

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 the 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 aboveground 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 at the sites from the HE compound combustion by-products and associated testing materials such as metals and radionuclides. Chunks of partially combusted HE compounds were found. Emissions from the combustion of explosives would have been primarily gaseous and would have dissipated. 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 also 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.

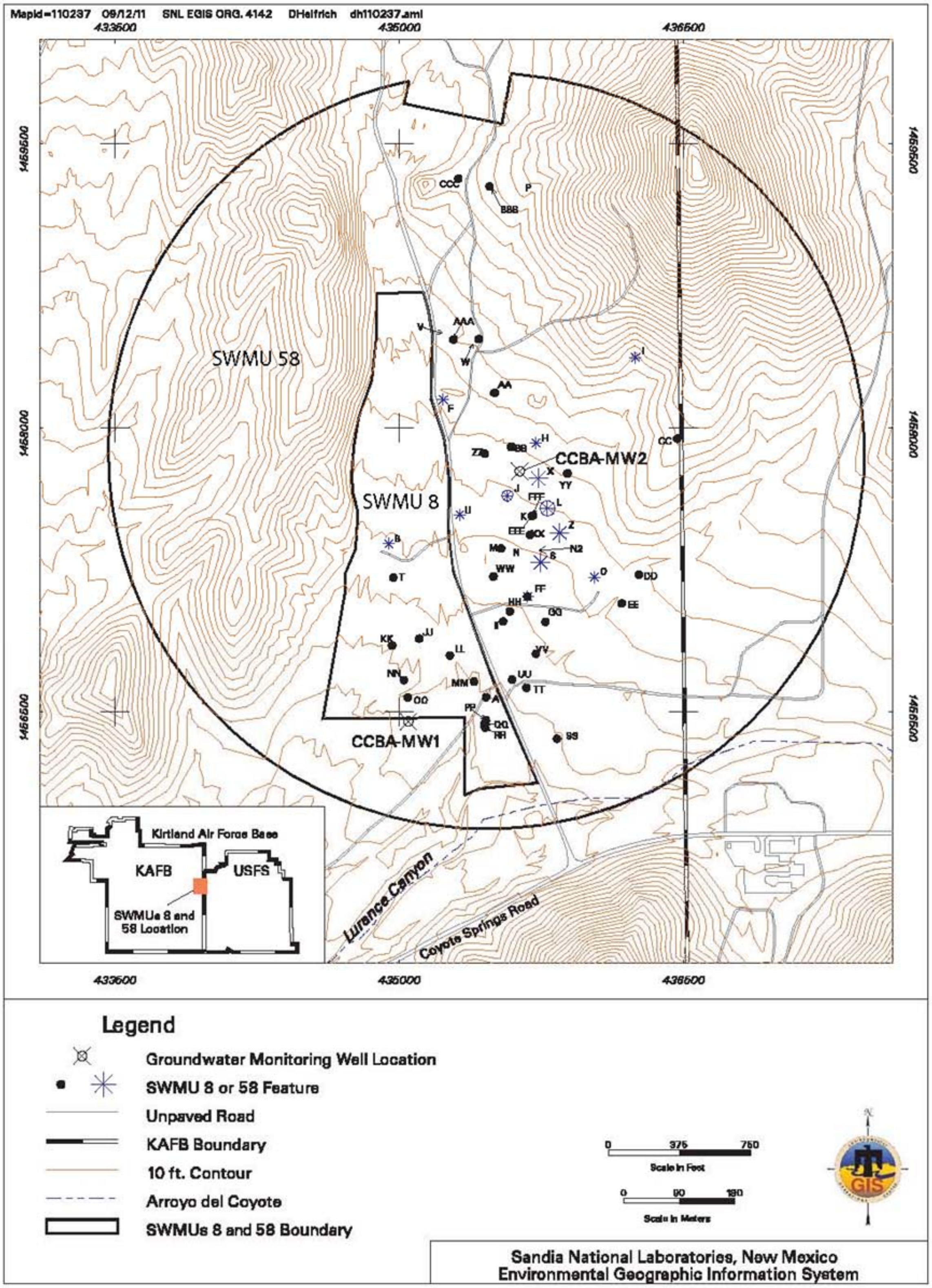

Figure 8-2. Groundwater Monitoring Wells CCBA-MW1 and CCBA-MW2 Installed at SWMUs 8/58

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 the 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 2012 as described in Section 8.1.

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 are 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, radionuclides by gamma spectroscopy, and isotopic uranium.

8.1.5 Summary of Calendar Year 2012 Activities

The following activities occurred for SWMUs 8/58 during CY 2012:

- Quarterly groundwater sampling was conducted at monitoring wells CCBA-MW1 and CCBA-MW2 in January, April, July, and October, 2012 (SNL December 2011, March 2012, June 2012a, and September 2012a).

- Tables of analytical results (Attachment 8A), concentration versus time plots (Attachment 8B), and hydrographs (Attachment 8C) were prepared.

8.1.6 Summary of Future Activities

The following activities are anticipated for SWMUs 8/58 during CY 2013:

- Quarterly groundwater sampling will be conducted at monitoring wells CCBA-MW1 and CCBA-MW2 during the first three quarters of CY 2013 to complete the required eight quarters of sampling.

- Quarterly reporting of results for chemical analyses for monitoring wells CCBA-MW1 and CCBA-MW2 groundwater samples will be performed.

Table 8-1. Historical Timeline of SWMUs 8/58

Month	Year	Event	Reference
	1950 - 1960's	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 and 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 conducted seven discrete cultural resource areas were identified.	SNL February 1995a
	1994 - 2004	VCM and VCA conducted from 1994 until 2004 to remove surface and buried contaminated soil and wastes. Housekeeping activities 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 for removal of surface debris in preparation for soil sampling during the RFI activities.	SNL May 1997
March	1997	Soil sampling at Burn Test feature and contingency borehole sampling at feature 58OO.	SNL April 2005
February	1998	Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report (SNL/NM December 1995) containing description of SWMUs 8 and 58 hydrogeology submitted to NMED	SNL February 1998
October	1998	Radiological survey of UCS	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	Meeting 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	Prepare VCA plan for UCS at SWMU 58.	SNL October 2000
October	2000	Debris removal from UCS; Radiological survey conducted.	SNL December 2000
January	2004	VCA plan submitted to NMED. Plan is 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 requests a determination of CAC without controls for SWMUs 8/58 as a whole.	SNL April 2005

Table 8-1. Historical Timeline of SWMUs 8/58 *(Continued)*

Month	Year	Event	Reference
June	2005	SWMU 8 is designated as "CAC without controls" from NMED. NMED also issues an RSI for seven features of SWMU 58. Additional sampling and analysis is 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 is included as an appendix to the response.	SNL June 2005
September	2005	NMED states the additional sampling is adequate to complete the CAC proposal pending the outcome of the sampling results. Additional field sampling begins.	NMED September 2005
March	2006	The first supplemental response and proposal for CAC for SWMUs 8/58 submitted. The new sampling analysis reveals no COCs present at levels considered hazardous to human health. DOE/NNSA and Sandia requests CAC without controls for SWMUs 8/58.	SNL March 2006
June	2006	NMED RSI states that elevated levels of lead and nickel at Feature 58FF were not sufficiently defined horizontally or vertically, therefore, additional sampling is needed.	NMED June 2006
August	2006	A SAP is submitted to NMED outlining additional sampling to be completed at Feature 58FF. Boreholes will be drilled and sampled for lead and nickel only.	SNL August 2006
September	2006	Lead and nickel samples collected from five boreholes at Feature 58FF.	SNL January 2007
October	2006	NMED officially approves the SAP for Fall 2006 sampling (after the sampling has already been 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 reveals no COCs present at levels considered hazardous to human health. DOE again requests CAC without controls for SWMUs 8/58.	SNL January 2007
June	2007	NMED approves the second RSI response and issues 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 NOD (Volume 4).	SNL January 2008
June	2009	NMED Comments that influence Outyear 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 formally stating that additional corrective action is 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 approves SWMUs 8/58 Groundwater Characterization Work Plan.	NMED January 2011

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 submitted to NMED.	SNL May 2011a
June	2011	NMED approves SWMUs 8/58 Proposed Groundwater Monitoring Well Location Adjustment.	NMED June 2011
June	2011	Request for 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 are installed.	SNL November 2011
August	2011	NMED approves 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 event conducted for monitoring wells CCBA-MW1 and CCBA-MW2.	SNL September 2012b
November	2011	Groundwater Monitoring Well Installation Report for SWMUs 8/58 submitted.	SNL November 2011
January	2012	Slug tests performed on monitoring wells CCBA-MW1 and CCBA-MW2	SNL June 2012b
April	2012	NMED approved the Well Installation Report for SWMUs 8/58 and SWMU 68	NMED April 2012
June	2012	Hydraulic conductivity calculated for monitoring wells CCBA-MW1 and CCBA-MW2.	SNL June 2012b

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.
NMED = New Mexico Environment Department.
NMFRCD = New Mexico Forestry and Resources Conservation Division.
NNSA = National Nuclear Security Administration.
NOD = Notice of Disapproval.
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.

8.1.7 Current Conceptual Model

With the installation of the two monitoring wells at SWMUs 8/58 in 2011 (Figure 8-2), understanding of the hydrogeologic regime has improved significantly. The following sections present 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. 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 SWMUs 8/58, where the elevation averages approximately 6,000 ft amsl, is estimated to be approximately 11.5 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).

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 the 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 produced water was low. From approximately 65 to 70 ft bgs, the sand and gravel contained a significant amount of cobbles. 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 rathole to deal with the severe borehole sloughing problem. Approximately 8 ft of saturated alluvium was encountered.

Quartzite bedrock was encountered at a depth of approximately 70 ft bgs. 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. A significant amount of borehole sloughing resulted in erratic returns of drill cuttings. 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. Typically, a monitoring well of similar design would be expected to 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 the monitoring well CCBA-MW2 location, 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 was not a factor in constructing the well.

Figure 8-3 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 13.57 ft higher than it was in monitoring well CCBA-MW1 in October 2011. The distance between the wells is 1,446 ft. The resulting gradient between the two wells was therefore approximately 0.01 feet per foot (ft/ft) 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.

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 8-4. The groundwater composition for both wells is of the bicarbonate type dominated by calcium. The geochemical signatures shown are consistent with previous results (Figure 8-4; SNL September

Table 8-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Wells at SWMUs 8/58

Monitoring Well	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 2012 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Approximate Pressure Head (ft[b])	Completion Zone
CCBA-MW1	5899.89	70	75	5,825	60 - 80	5,854.15	5829.90	24	Alluvium and quartzite
CCBA-MW2	5936.95	30	100	5,837	98 - 118	5,867.72	5829.00	39	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).
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

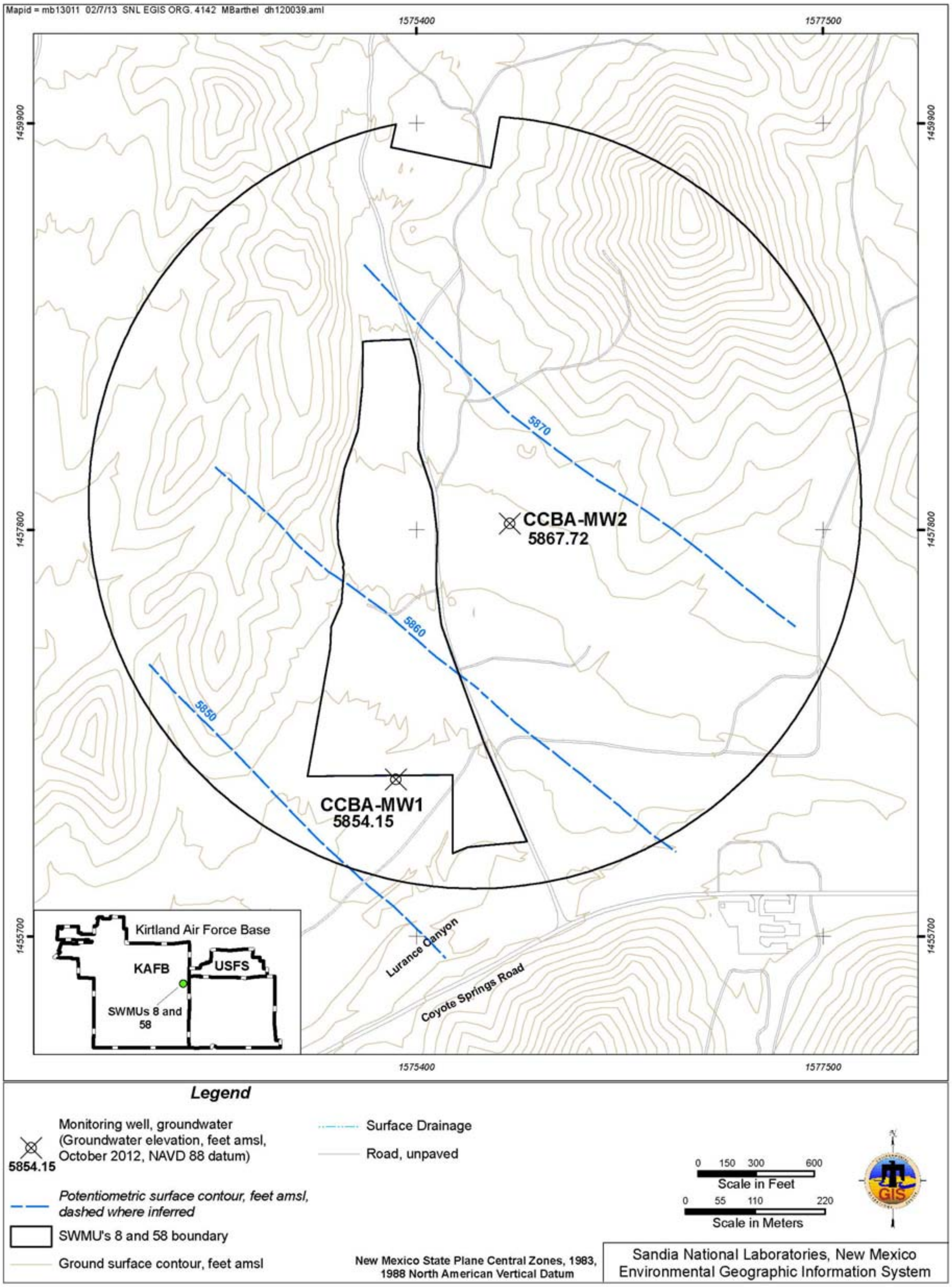

Figure 8-3. SWMUs 8/58 Potentiometric Surface Map

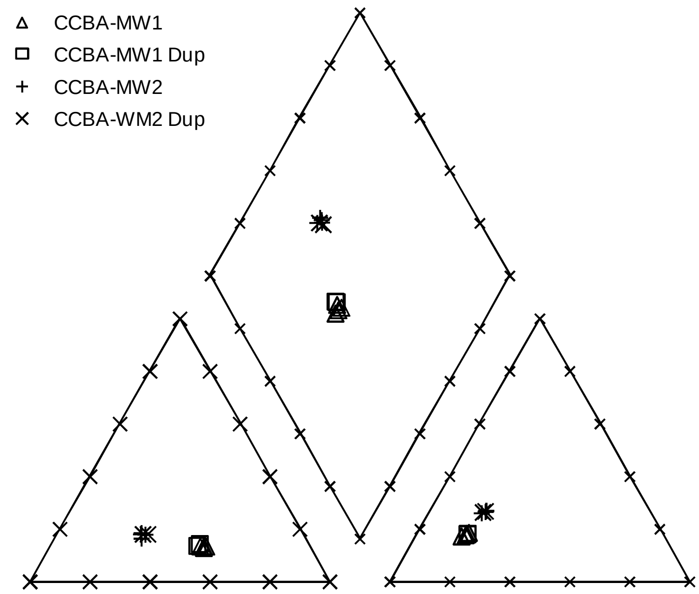

Figure 8-4. Piper Trilinear Diagram of Major Ion Chemistry for Monitoring Wells CCBA-MW1 and CCBA-MW2 at SWMUs 8/58, CY 2012

2012b) The CY 2012 data show two separate groupings for monitoring wells CCBA-WM1 and CCBA-MW2. The CY 2012 data do not indicate a mixing of two groundwater sources that was suggested by the results from CY 2011.

During sampling, the drawdown in both wells was not excessive. The quantity of water produced by each well was clearly adequate for low-flow sampling purposes. 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 2012b). 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 SWMUs 8/58 wells are 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. Naturally filled fractures in the overlying bedrock probably serve as a confining unit. Groundwater flows to the southwest. The hydraulic gradient in the fractured bedrock system is approximately 0.01 ft/ft. 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.

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. Fluoride was detected above the MCL of 4.0 mg/L in the monitoring well CCBA-MW1 groundwater samples at concentrations that ranged from 4.93 to 5.32 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. The fluoride concentrations from monitoring well CCBA-MW2 ranged from 1.48 to 1.62 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 federal 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 Portion for Solid Waste Management Units to the RCRA Part B Permit (Module IV), Sandia National Laboratories, NM5890110518* (NMED 1993).

In April 2004, the 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 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/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 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).

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 Order, as specified in Section III.A of the Order (NMED April 2004).

8.3 Scope of Activities

The only field activity completed during CY 2012 in the study area was groundwater monitoring (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 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 2012 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 2012; March 2012; June 2012a; and September 2012a).

Groundwater samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2 in January, April, July, and October 2012. 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, radionuclides by gamma spectroscopy, and isotopic uranium.

Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples include duplicate environmental, split, 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 VOCs contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory.

The NMED DOE Oversight Bureau (OB) collected split samples with Sandia during the April and October 2012 sampling events. The NMED DOE OB analytical results are not reported in this document but are available through DOE NNSA SFO.

Table 8-3. Groundwater Monitoring Well Network and Sampling Dates for SWMUs 8/58, Calendar Year 2012

Date of Sampling Event	Wells Sampled	SAP
January 2012	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2012* (SNL December 2011)
April 2012	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2012* (SNL March 2012)
July 2012	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2012* (SNL June 2012a)
October 2012	CCBA-MW1 CCBA-MW2	*SWMU 8 and 58 Groundwater Monitoring Mini-SAP for First Quarter Fiscal Year 2013* (SNL September 2012a)

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 2012

Parameter	Sampling Period	
Anions Alkalinity Filtered Cations Gamma Spec* Gross Alpha Gross Beta HE compounds Isotopic Uranium NPN Perchlorate SVOCs TAL Metals, plus Total Uranium Total Cyanide VOCs	**January 2012** CCBA-MW1 CCBA-MW1 (dup) CCBA-MW2 **July 2012** CCBA-MW1 CCBA-MW1 (dup) CCBA-MW2	**April 2012** CCBA-MW1 CCBA-MW2 CCBA-MW2 (dup) **October 2012** CCBA-MW1 CCBA-MW2 CCBA-MW2 (dup)

NOTES:
Dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
HE = High explosive.
NPN = Nitrate plus nitrate (reported as nitrogen).
SVOC = Semivolatile organic compound.
TAL = Target Analyte List.
VOC = Volatile organic compound.

The monitoring procedures, as conducted by Long-Term Stewardship/ER Operations personnel, for SWMUs 8/58 are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986) and are described in detail in Section 1.3. The groundwater flow direction and hydraulic gradient are discussed in Section 8.1.7.2. The CY 2012 water level information was used to create the potentiometric surface map presented on Figure 8-3 and the hydrograph presented on Figure 8C-1 (Attachment 8C).

8.5 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).

8.6 Summary of Analytical Results

This section discusses analytical results and field measurements for the CY 2012 sampling events at SWMUs 8/58. Data are presented in Tables 8A-1 through 8A-11 (Attachment 8A). Data qualifiers are explained in the footnotes following Table 8A-11.

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* (SNL May 2011b). 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.

With the exception of trace amounts of toluene (Table 8A-1), no VOCs, SVOCs, or HE compounds were detected above laboratory method detection limits (MDLs) in any groundwater samples collected from SWMUs 8/58. Toluene was detected above the MDLs but below the practical quantitation limit (PQL). Tables 8A-2 through 8A-4 list the MDLs for associated VOCs, SVOCs, and HE compounds, respectively (Attachment 8A). Trace amounts of toluene (0.370 to 0.600 mg/L) were detected in samples from both wells as shown in Table 8A-1. The amount detected is far below the MCL for toluene (1,000 mg/L) and is decreasing with time. The source of the toluene is thought to be the new groundwater sampling equipment. Changes to the sampling equipment (additional flushing and cleaning, moving the sample collection point forward, and moving the flow meter back to the purge point in the sampling line) appears to be reducing the amount of toluene detected.

Table 8A-5 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 1.20 to 3.72 mg/L.

Table 8A-6 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 4.93 to 5.32 mg/L and is shown on Figure 8B-1. Fluoride concentrations in monitoring well CCBA-MW2 samples ranged from of 1.48 to 1.62 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-7 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-8 (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-9 (Attachment 8A). These parameters have no established MCLs.

All groundwater samples were screened for gamma-emitting radionuclides, gross alpha activity, and gross beta activity. An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table 8A-10 (Attachment 8A). Gamma spectroscopy activities for short-list radionuclides are less than the associated minimum detectable activities for all groundwater samples.

Radioisotopic analyses included gross alpha, gross beta, and isotopic uranium analyses. All radionuclide activity results are below MCLs, where established.

Table 8A-11 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.

8.7 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. The results for each QC sample and the impact on data quality for the SWMUs 8 and 58 quarterly sampling events are discussed in the following sections.

8.7.1 Field Quality Control Samples

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

8.7.1.1 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.

- **January 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well CCBA-MW1. The duplicate sample results show good agreement (RPD values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters, except beryllium. The RPD for beryllium was calculated at 59, but is an estimated value since results are reported less than the PQL.

- **April 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well CCBA-MW2. RPD values were only calculated for detected chemical analytes. The duplicate sample results show good agreement (RPD values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

- **July 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well CCBA-MW2. RPD values were only calculated for detected chemical analytes. The duplicate sample results show good agreement (RPD values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

- **October 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well CCBA-MW2. RPD values were only calculated for detected chemical analytes. The duplicate sample results show good agreement (RPD values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

8.7.1.2 Equipment Blank Samples

EB or rinsate samples are collected to verify the equipment decontamination process. The results for EB analyses are as follows:

- **January 2012 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW1 and submitted for all analyses. Acetone, bicarbonate alkalinity, bromodichloromethane, chloroform, chloride, copper, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary for any detected parameter since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

- **April 2012 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW2 and submitted for all analyses. Bicarbonate alkalinity, bromodichloromethane, chloroform, chloride, copper, dibromochloromethane, and sodium were detected above the laboratory MDLs. Copper in the both CCBA-MW2 environmental samples were detected at concentrations less than five times the associated EB result, and qualified as not detected during data validation. No corrective action was necessary for bicarbonate alkalinity, bromodichloromethane, chloroform, chloride, dibromochloromethane, or sodium since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

- **July 2012 Sampling Event—**An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW1 and submitted for all analyses. Bromodichloromethane, chloroform, chloride, chromium, fluoride, sulfate, and toluene were detected above the laboratory MDLs. Toluene in CCBA-MW1 samples were detected at concentrations less than ten times the associated EB result, and qualified as not detected during data validation. No corrective action was necessary for bromodichloromethane, chloroform, chloride, chromium, fluoride, or sulfate since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

- **October 2012 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well CCBA-MW2 and submitted for all analyses. Bromodichloromethane, bromoform, chloroform, chloride, dibromochloromethane, and toluene were detected above the laboratory MDLs. Toluene in CCBA-MW2 samples were detected at concentrations less than ten times the associated EB result, and qualified as not detected during data validation. No corrective action was necessary for bromodichloromethane, bromoform, chloroform, chloride, or dibromochloromethane since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

8.7.1.3 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 2012, three per quarter. No VOCs were detected for all TB samples, except for the January 2012 sampling event. The January 2012 TB samples detected bromodichloromethane and chloroform. No corrective action was necessary, since these compounds were not detected in the associated environmental sample.

8.7.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions:

- **January 2012 Sampling Event—**The monitoring well CCBA-MW2 FB sample had no VOCs detected above associated laboratory MDLs.

- **April 2012 Sampling Event—**The monitoring well CCBA-MW1 FB sample detected the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

- **July 2012 Sampling Event—**The monitoring well CCBA-MW2 FB sample detected the VOC compounds bromodichloromethane, carbon disulfide, chloroform, and dibromochloromethane above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

- **October 2012 Sampling Event—**The monitoring well CCBA-MW1 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.

8.7.2 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 2012**.**

8.8 Variances and Nonconformances

No variances or nonconformances from requirements specified in the Mini-SAP for SWMUs 8/58 (SNL December 2011, March 2012, June 2012a, and September 2012a) were noted during sampling activities. However, project-specific issues identified during CY 2012 sampling activities are noted as follows:

- **January 2012 Sampling Event**—The sample pump did not operate smoothly at low pressure; therefore, flow rates during purging and sampling activities were higher than rates from the previous sampling event.

- **July and October 2012 Sampling Events**—In July and October toluene was detected at low level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new groundwater sample truck and equipment. Modifications to the groundwater sampling truck and equipment have been completed and additional decontaminations have been performed since this sampling event. The modifications to the truck include a more direct sample collection point, removal of the flow meter to the discharge line, changes to the decontamination process, and collection of more quality control samples. These modifications appear to be working as the trace toluene concentrations detected are decreasing over time.

8.9 Summary and Conclusions

Two groundwater monitoring wells were installed at SWMUs 8/58 in August 2011. During January, April, July, and October of 2012, 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 4.93 to 5.32 mg/L. This detection is most likely attributable to the quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities.

The current conceptual model described in Section 8.1.7 does not require modification based on the analytical results for this reporting period.

During CY 2013, quarterly groundwater sampling and reporting will continue for the groundwater monitoring wells (CCBA-MW1 and CCBA-MW2) located at SWMUs 8/58. The eighth and final quarterly groundwater sampling event is scheduled for the fourth quarter of Fiscal Year 2013.

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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
Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 16-Jul-12	Toluene	0.560	0.300	1.00	1000	J	1.00U	092615-001	SW846-8260
CCBA-MW1 (Duplicate) 16-Jul-12	Toluene	0.600	0.300	1.00	1000	J	1.00U	092616-001	SW846-8260
CCBA-MW2 12-Jul-12	Toluene	0.430	0.300	1.00	1000	J		092610-001	SW846-8260
CCBA-MW1 22-Oct-12	Toluene	0.530	0.300	1.00	1000	J		093013-001	SW846-8260B
CCBA-MW2 23-Oct-12	Toluene	0.370	0.300	1.00	1000	J	1.00U	093018-001	SW846-8260B
CCBA-MW2 (Duplicate) 23-Oct-12	Toluene	0.370	0.300	1.00	1000	J	1.00U	093019-001	SW846-8260B

Refer to footnotes on page 8A-33.

Table 8A-2
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 2012

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300 - 0.325	Chlorobenzene	0.250 - 0.300
1,1,2,2-Tetrachloroethane	0.250 - 0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.250 - 0.300	Chloroform	0.250 - 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	0.250 - 0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.250 - 0.300	Methylcyclohexane	3.00
1,2-Dichloropropane	0.250 - 0.300	Methylene chloride	3.00
1,3-Dichlorobenzene	0.300	Styrene	0.250 - 0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
1,4-Dioxane	15.0	Tetrachloroethene	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	Toluene	0.250 - 0.300
2-Butanone	1.25 - 2.00	Trichloroethene	0.250 - 0.300
2-Hexanone	1.25 - 2.20	Trichlorofluoromethane	0.300
4-methyl-, 2-Pentanone	1.25 - 1.50	Vinyl acetate	1.5
Acetone	3.00 - 3.50	Vinyl chloride	0.300 - 0.500
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.250 - 0.300	cis-1,3-Dichloropropene	0.250 - 0.300
Bromoform	0.250 - 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	0.250 - 0.300

Refer to footnotes on page 8A-33.

Table 8A-3
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 2012

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1'-Biphenyl 1	3.00 - 3.16	Butylbenzyl phthalate	3.00 - 3.16
1,2,4-Trichlorobenzene	3.00 - 3.16	Caprolactam	3.00 - 3.16
2,4,5-Trichlorophenol	3.00 - 3.16	Carbazole	0.300 - 0.316
2,4,6-Trichlorophenol	3.00 - 3.16	Chrysene	0.300 - 0.316
2,4-Dichlorophenol	3.00 - 3.16	Di-n-butyl phthalate	3.00 - 3.16
2,4-Dimethylphenol	3.00 - 3.16	Di-n-octyl phthalate	3.00 - 3.16
2,4-Dinitrophenol	5.00 - 5.26	Dibenz[a,h]anthracene	0.300 - 0.316
2,4-Dinitrotoluene	3.00 - 3.16	Dibenzofuran	3.00 - 3.16
2,6-Dinitrotoluene	3.00 - 3.16	Diethylphthalate	3.00 - 3.16
2-Chloronaphthalene	0.300 - 0.316	Dimethylphthalate	3.00 - 3.16
2-Chlorophenol	3.00 - 3.16	Dinitro-o-cresol	3.00 - 3.16
2-Methylnaphthalene	0.300 - 0.316	Diphenyl amine	3.00 - 3.16
2-Nitroaniline	3.00 - 3.16	Fluoranthene	0.300 - 0.316
2-Nitrophenol	3.00 - 3.16	Fluorene	0.300 - 0.316
3,3'-Dichlorobenzidine	3.00 - 3.16	Hexachlorobenzene	3.00 - 3.16
3-Nitroaniline	3.00 - 3.16	Hexachlorobutadiene	3.00 - 3.16
4-Bromophenyl phenyl ether	3.00 - 3.16	Hexachlorocyclopentadiene	3.00 - 3.16
4-Chloro-3-methylphenol	3.00 - 3.16	Hexachloroethane	3.00 - 3.16
4-Chlorobenzenamine	3.30 - 3.47	Indeno(1,2,3-c,d)pyrene	0.300 - 0.316
4-Chlorophenyl phenyl ether	3.00 - 3.16	Isophorone	3.00 - 3.16
4-Nitroaniline	3.00 - 3.16	Naphthalene	0.300 - 0.316
4-Nitrophenol	3.00 - 3.16	Nitro-benzene	3.00 - 3.16
Acenaphthene	0.300 - 0.316	Pentachlorophenol	3.00 - 3.16
Acenaphthylene	0.300 - 0.316	Phenanthrene	0.300 - 0.316
Acetophenone	3.00 - 3.16	Phenol	3.00 - 3.16
Anthracene	0.300 - 0.316	Pyrene	0.300 - 0.316
Atrazine	3.00 - 3.16	bis(2-Chloroethoxy)methane	3.00 - 3.16
Benzaldehyde	5.00 - 5.26	bis(2-Chloroethyl)ether	3.00 - 3.16
Benzo(a)anthracene	0.300 - 0.316	bis(2-Chloroisopropyl)ether	3.00 - 3.16
Benzo(a)pyrene	0.300 - 0.463	bis(2-Ethylhexyl)phthalate	3.00 - 3.16
Benzo(b)fluoranthene	0.300 - 0.316	m,p-Cresol	3.00 - 3.16
Benzo(ghi)perylene	0.300 - 0.316	n-Nitrosodipropylamine	3.00 - 3.16
Benzo(k)fluoranthene	0.300 - 0.316	o-Cresol	3.00 - 3.16

Refer to footnotes on page 8A-33.

Table 8A-4
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 2012

Analyte	MDL[b] (μg/L)
1,3,5-Trinitrobenzene	0.0825 - 0.104
1,3-Dinitrobenzene	0.0825 - 0.104
2,4,6-Trinitrotoluene	0.0825 - 0.104
2,4-Dinitrotoluene	0.0825 - 0.104
2,6-Dinitrotoluene	0.0825 - 0.104
2-Amino-4,6-dinitrotoluene	0.0825 - 0.104
2-Nitrotoluene	0.0845 - 0.106
3-Nitrotoluene	0.0825 - 0.104
4-Amino-2,6-dinitrotoluene	0.0825 - 0.104
4-Nitrotoluene	0.155 - 0.195
HMX	0.0825 - 0.104
Nitro-benzene	0.0825 - 0.104
Pentaerythritol tetranitrate	0.103 - 0.130
RDX	0.0825 - 0.104
Tetryl	0.0825 - 0.104

Refer to footnotes on page 8A-33.

Table 8A-5
Summary of Nitrate plus Nitrate Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 16-Jan-12	Nitrate plus nitrite as N	1.23	0.050	0.250	10.0	B		091615-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jan-12	Nitrate plus nitrite as N	1.20	0.050	0.250	10.0	B		091616-018	EPA 353.2
CCBA-MW2 12-Jan-12	Nitrate plus nitrite as N	2.98	0.050	0.250	10.0	B		091610-018	EPA 353.2
CCBA-MW1 23-Apr-12	Nitrate plus nitrite as N	2.17	0.170	0.500	10.0			092291-018	EPA 353.2
CCBA-MW2 24-Apr-12	Nitrate plus nitrite as N	3.72	0.170	0.500	10.0			092296-018	EPA 353.2
CCBA-MW2 (Duplicate) 24-Apr-12	Nitrate plus nitrite as N	3.14	0.170	0.500	10.0			092297-018	EPA 353.2
CCBA-MW1 16-Jul-12	Nitrate plus nitrite as N	1.41	0.085	0.250	10.0			092615-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jul-12	Nitrate plus nitrite as N	1.35	0.085	0.250	10.0			092616-018	EPA 353.2
CCBA-MW2 12-Jul-12	Nitrate plus nitrite as N	3.27	0.085	0.250	10.0			092610-018	EPA 353.2
CCBA-MW1 22-Oct-12	Nitrate plus nitrite as N	1.45	0.085	0.250	10.0			093013-018	EPA 353.2
CCBA-MW2 23-Oct-12	Nitrate plus nitrite as N	3.38	0.085	0.250	10.0			093018-018	EPA 353.2
CCBA-MW2 (Duplicate) 23-Oct-12	Nitrate plus nitrite as N	3.39	0.085	0.250	10.0			093019-018	EPA 353.2

Refer to footnotes on page 8A-33.

Table 8A-6
Summary of Alkalinity, Anion, and Total Cyanide Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	178	0.725	1.00	NE			091615-022	SM2320B
16-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091615-022	SM2320B
	Bromide	0.320	0.066	0.200	NE			091615-016	SW846 9056
	Chloride	27.4	0.132	0.400	NE			091615-016	SW846 9056
	Fluoride	**4.94**	0.033	0.100	4.0			091615-016	SW846 9056
	Sulfate	53.6	0.200	0.800	NE			091615-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091615-027	SW846 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	179	0.725	1.00	NE			091616-022	SM2320B
16-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091616-022	SM2320B
	Bromide	0.372	0.066	0.200	NE			091616-016	SW846 9056
	Chloride	27.0	0.132	0.400	NE			091616-016	SW846 9056
	Fluoride	**4.94**	0.033	0.100	4.0			091616-016	SW846 9056
	Sulfate	52.5	0.200	0.800	NE			091616-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091616-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	183	0.725	1.00	NE			091610-022	SM2320B
12-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091610-022	SM2320B
	Bromide	0.580	0.066	0.200	NE			091610-016	SW846 9056
	Chloride	36.6	0.330	1.00	NE			091610-016	SW846 9056
	Fluoride	1.49	0.033	0.100	4.0			091610-016	SW846 9056
	Sulfate	94.0	0.500	2.00	NE			091610-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091610-027	SW846 9012
CCBA-MW1	Bicarbonate Alkalinity	185	0.725	1.00	NE			092291-022	SM2320B
23-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092291-022	SM2320B
	Bromide	0.312	0.067	0.200	NE			092291-016	SW846 9056
	Chloride	24.4	0.335	1.00	NE			092291-016	SW846 9056
	Fluoride	**4.93**	0.033	0.100	4.0			092291-016	SW846 9056
	Sulfate	49.3	0.665	2.00	NE			092291-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092291-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	180	0.725	1.00	NE			092296-022	SM2320B
24-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092296-022	SM2320B
	Bromide	0.545	0.067	0.200	NE			092296-016	SW846 9056
	Chloride	32.7	0.670	2.00	NE			092296-016	SW846 9056
	Fluoride	1.54	0.033	0.100	4.0			092296-016	SW846 9056
	Sulfate	86.6	1.33	4.00	NE			092296-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092296-027	SW846 9012

Refer to footnotes on page 8A-33.

Table 8A-6 *(Continued)*
Summary of Alkalinity, Anion, and Total Cyanide Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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)	Bicarbonate Alkalinity	183	0.725	1.00	NE			092297-022	SM2320B
24-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092297-022	SM2320B
	Bromide	0.566	0.067	0.200	NE			092297-016	SW846 9056
	Chloride	34.2	0.670	2.00	NE			092297-016	SW846 9056
	Fluoride	1.54	0.033	0.100	4.0			092297-016	SW846 9056
	Sulfate	90.2	1.33	4.00	NE			092297-016	SW846 9056
	Total Cyanide	0.00441	0.00167	0.005	0.200	J	NJ-	092297-027	SW846 9012
CCBA-MW1	Bicarbonate Alkalinity	192	0.725	1.00	NE			092615-022	SM2320B
16-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092615-022	SM2320B
	Bromide	0.344	0.067	0.200	NE			092615-016	SW846 9056
	Chloride	27.9	0.134	0.400	NE	B		092615-016	SW846 9056
	Fluoride	**5.03**	0.033	0.100	4.0			092615-016	SW846 9056
	Sulfate	53.8	0.266	0.800	NE			092615-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092615-027	SW846 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	188	0.725	1.00	NE			092616-022	SM2320B
16-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092616-022	SM2320B
	Bromide	0.310	0.067	0.200	NE			092616-016	SW846 9056
	Chloride	28.2	0.134	0.400	NE	B		092616-016	SW846 9056
	Fluoride	**5.00**	0.033	0.100	4.0			092616-016	SW846 9056
	Sulfate	54.2	0.266	0.800	NE			092616-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092616-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	182	0.725	1.00	NE			092610-022	SM2320B
12-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092610-022	SM2320B
	Bromide	0.539	0.067	0.200	NE			092610-016	SW846 9056
	Chloride	36.0	0.335	1.00	NE			092610-016	SW846 9056
	Fluoride	1.48	0.033	0.100	4.0			092610-016	SW846 9056
	Sulfate	92.0	0.665	2.00	NE			092610-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092610-027	SW846 9012
CCBA-MW1	Bicarbonate Alkalinity	186	0.725	1.00	NE			093013-022	SM2320B
22-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093013-022	SM2320B
	Bromide	0.278	0.067	0.200	NE		J+	093013-016	SW846 9056
	Chloride	27.3	0.670	2.00	NE			093013-016	SW846 9056
	Fluoride	**5.32**	0.033	0.100	4.0		J+	093013-016	SW846 9056
	Sulfate	54.2	1.33	4.00	NE			093013-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093013-027	SW846 9012

Refer to footnotes on page 8A-33.

Table 8A-6 *(Concluded)*
Summary of Alkalinity, Anion, and Total Cyanide Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	183	0.725	1.00	NE			093018-022	SM2320B
23-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093018-022	SM2320B
	Bromide	0.570	0.067	0.200	NE		J+	093018-016	SW846 9056
	Chloride	36.6	0.670	2.00	NE			093018-016	SW846 9056
	Fluoride	1.62	0.033	0.100	4.0		J+	093018-016	SW846 9056
	Sulfate	94.7	1.33	4.00	NE			093018-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093018-027	SW846 9012
CCBA-MW2 (Duplicate)	Bicarbonate Alkalinity	185	0.725	1.00	NE			093019-022	SM2320B
23-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093019-022	SM2320B
	Bromide	0.571	0.067	0.200	NE		J+	093019-016	SW846 9056
	Chloride	36.4	0.670	2.00	NE			093019-016	SW846 9056
	Fluoride	1.61	0.033	0.100	4.0		J+	093019-016	SW846 9056
	Sulfate	94.2	1.33	4.00	NE			093019-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093019-027	SW846 9012

Refer to footnotes on page 8A-33.

Table 8A-7
Summary of Perchlorate Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 16-Jan-12	ND	0.004	0.012	NE	U		091615-020	EPA 314.0
CCBA-MW1 (Duplicate) 16-Jan-12	ND	0.004	0.012	NE	U		091616-020	EPA 314.0
CCBA-MW2 12-Jan-12	ND	0.004	0.012	NE	U		091610-020	EPA 314.0
CCBA-MW1 23-Apr-12	ND	0.004	0.012	NE	U		092291-020	EPA 314.0
CCBA-MW2 24-Apr-12	ND	0.004	0.012	NE	U		092296-020	EPA 314.0
CCBA-MW2 (Duplicate) 24-Apr-12	ND	0.004	0.012	NE	U		092297-020	EPA 314.0
CCBA-MW1 16-Jul-12	ND	0.004	0.012	NE	U		092615-020	EPA 314.0
CCBA-MW1 (Duplicate) 16-Jul-12	ND	0.004	0.012	NE	U		092616-020	EPA 314.0
CCBA-MW2 12-Jul-12	ND	0.004	0.012	NE	U		092610-020	EPA 314.0
CCBA-MW1 22-Oct-12	ND	0.004	0.012	NE	U		093013-020	EPA 314.0
CCBA-MW2 23-Oct-12	ND	0.004	0.012	NE	U		093018-020	EPA 314.0
CCBA-MW2 (Duplicate) 23-Oct-12	ND	0.004	0.012	NE	U		093019-020	EPA 314.0

Refer to footnotes on page 8A-33.

Table 8A-8
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	0.0437	0.015	0.050	NE	J		091615-009	SW846 6020
16-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091615-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091615-009	SW846 6020
	Barium	0.00672	0.0006	0.002	2.00			091615-009	SW846 6020
	Beryllium	0.000273	0.0002	0.0005	0.004	J		091615-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091615-009	SW846 6020
	Calcium	43.6	0.060	0.200	NE	B		091615-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091615-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		091615-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		091615-009	SW846 6020
	Iron	0.0869	0.033	0.100	NE	J		091615-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091615-009	SW846 6020
	Magnesium	10.2	0.010	0.030	NE			091615-009	SW846 6020
	Manganese	0.012	0.001	0.005	NE			091615-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091615-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U	UJ	091615-009	SW846 6020
	Potassium	4.53	0.080	0.300	NE			091615-009	SW846 6020
	Selenium	0.00207	0.0015	0.005	0.050	J		091615-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091615-009	SW846 6020
	Sodium	72.6	0.400	1.25	NE			091615-009	SW846 6020
	Thallium	0.000947	0.00045	0.002	0.002	J	0.0032U	091615-009	SW846 6020
	Uranium	0.0019	0.000067	0.0002	0.03			091615-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091615-009	SW846 6010
	Zinc	0.00359	0.0035	0.010	NE	J		091615-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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	0.0323	0.015	0.050	NE	J		091616-009	SW846 6020
16-Jan-12	Antimony	0.00114	0.001	0.003	0.006	J		091616-009	SW846 6020
	Arsenic	0.00197	0.0017	0.005	0.010	J		091616-009	SW846 6020
	Barium	0.00682	0.0006	0.002	2.00			091616-009	SW846 6020
	Beryllium	0.000501	0.0002	0.0005	0.004			091616-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091616-009	SW846 6020
	Calcium	43.6	0.060	0.200	NE	B		091616-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091616-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091616-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		091616-009	SW846 6020
	Iron	0.0893	0.033	0.100	NE	J		091616-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091616-009	SW846 6020
	Magnesium	10.4	0.010	0.030	NE			091616-009	SW846 6020
	Manganese	0.012	0.001	0.005	NE			091616-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091616-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U	UJ	091616-009	SW846 6020
	Potassium	4.50	0.080	0.300	NE			091616-009	SW846 6020
	Selenium	0.00164	0.0015	0.005	0.050	J		091616-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091616-009	SW846 6020
	Sodium	65.6	0.400	1.25	NE			091616-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091616-009	SW846 6020
	Uranium	0.0019	0.000067	0.0002	0.03			091616-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091616-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091616-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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	0.29UJ	091610-009	SW846 6020
12-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091610-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091610-009	SW846 6020
	Barium	0.0462	0.0006	0.002	2.00			091610-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091610-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091610-009	SW846 6020
	Calcium	76.5	0.300	1.00	NE			091610-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091610-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091610-009	SW846 6020
	Copper	0.000535	0.00035	0.001	NE	J		091610-009	SW846 6020
	Iron	0.136	0.033	0.100	NE			091610-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091610-009	SW846 6020
	Magnesium	15.9	0.010	0.030	NE			091610-009	SW846 6020
	Manganese	0.00328	0.001	0.005	NE	J		091610-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091610-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U	UJ	091610-009	SW846 6020
	Potassium	1.36	0.080	0.300	NE			091610-009	SW846 6020
	Selenium	0.00562	0.0015	0.005	0.050			091610-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091610-009	SW846 6020
	Sodium	45.0	0.080	0.250	NE		J	091610-009	SW846 6020
	Thallium	0.000709	0.00045	0.002	0.002	J	0.0030U	091610-009	SW846 6020
	Uranium	0.00513	0.000067	0.0002	0.03			091610-009	SW846 6020
	Vanadium	0.0104	0.001	0.005	NE			091610-009	SW846 6010
	Zinc	0.0104	0.0035	0.010	NE			091610-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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	0.0307	0.015	0.050	NE	J		092291-009	SW846 6020
23-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092291-009	SW846 6020
	Arsenic	0.00186	0.0017	0.005	0.010	J		092291-009	SW846 6020
	Barium	0.00425	0.0006	0.002	2.00			092291-009	SW846 6020
	Beryllium	0.00049	0.0002	0.0005	0.004	J		092291-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092291-009	SW846 6020
	Calcium	41.8	0.060	0.200	NE	B	J	092291-009	SW846 6020
	Chromium	0.00369	0.002	0.010	0.100	B, J	0.01885U	092291-009	SW846 6020
	Cobalt	0.000149	0.0001	0.001	NE	J		092291-009	SW846 6020
	Copper	0.000704	0.00035	0.001	NE	J		092291-009	SW846 6020
	Iron	0.163	0.033	0.100	NE			092291-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092291-009	SW846 6020
	Magnesium	9.64	0.010	0.030	NE			092291-009	SW846 6020
	Manganese	0.00714	0.001	0.005	NE			092291-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092291-009	SW846 7470
	Nickel	0.00117	0.0005	0.002	NE	J		092291-009	SW846 6020
	Potassium	4.22	0.080	0.300	NE			092291-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092291-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092291-009	SW846 6020
	Sodium	67.0	0.400	1.25	NE			092291-009	SW846 6020
	Thallium	0.000674	0.00045	0.002	0.002	J	0.0038U	092291-009	SW846 6020
	Uranium	0.002	0.000067	0.0002	0.03			092291-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092291-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092291-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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		092296-009	SW846 6020
24-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092296-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092296-009	SW846 6020
	Barium	0.0452	0.0006	0.002	2.00			092296-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092296-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092296-009	SW846 6020
	Calcium	73.4	0.300	1.00	NE	B	J	092296-009	SW846 6020
	Chromium	0.00355	0.002	0.010	0.100	B, J	0.01885U	092296-009	SW846 6020
	Cobalt	0.000131	0.0001	0.001	NE	J		092296-009	SW846 6020
	Copper	0.00118	0.00035	0.001	NE		0.00555U	092296-009	SW846 6020
	Iron	0.286	0.033	0.100	NE			092296-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092296-009	SW846 6020
	Magnesium	14.8	0.010	0.030	NE			092296-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092296-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092296-009	SW846 7470
	Nickel	0.00134	0.0005	0.002	NE	J		092296-009	SW846 6020
	Potassium	1.37	0.080	0.300	NE			092296-009	SW846 6020
	Selenium	0.00269	0.0015	0.005	0.050	J		092296-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092296-009	SW846 6020
	Sodium	42.9	0.080	0.250	NE			092296-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092296-009	SW846 6020
	Uranium	0.00565	0.000067	0.0002	0.03			092296-009	SW846 6020
	Vanadium	0.00939	0.001	0.005	NE			092296-009	SW846 6010
	Zinc	0.00714	0.0035	0.010	NE	J		092296-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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		092297-009	SW846 6020
24-Apr-12	Antimony	0.0011	0.001	0.003	0.006	J		092297-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092297-009	SW846 6020
	Barium	0.0461	0.0006	0.002	2.00			092297-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092297-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092297-009	SW846 6020
	Calcium	71.8	0.300	1.00	NE	B	J	092297-009	SW846 6020
	Chromium	0.00415	0.002	0.010	0.100	B, J	0.01885U	092297-009	SW846 6020
	Cobalt	0.000139	0.0001	0.001	NE	J		092297-009	SW846 6020
	Copper	0.00122	0.00035	0.001	NE		0.00555U	092297-009	SW846 6020
	Iron	0.294	0.033	0.100	NE			092297-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092297-009	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			092297-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092297-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092297-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	J		092297-009	SW846 6020
	Potassium	1.49	0.080	0.300	NE			092297-009	SW846 6020
	Selenium	0.00245	0.0015	0.005	0.050	J		092297-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092297-009	SW846 6020
	Sodium	43.4	0.080	0.250	NE			092297-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092297-009	SW846 6020
	Uranium	0.00579	0.000067	0.0002	0.03			092297-009	SW846 6020
	Vanadium	0.00955	0.001	0.005	NE			092297-009	SW846 6010
	Zinc	0.00647	0.0035	0.010	NE	J		092297-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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	0.0314	0.015	0.050	NE	J		092615-009	SW846 6020
16-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092615-009	SW846 6020
	Arsenic	0.0022	0.0017	0.005	0.010	J		092615-009	SW846 6020
	Barium	0.00335	0.0006	0.002	2.00			092615-009	SW846 6020
	Beryllium	0.000394	0.0002	0.0005	0.004	J		092615-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092615-009	SW846 6020
	Calcium	43.7	0.060	0.200	NE			092615-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092615-009	SW846 6020
	Cobalt	0.000101	0.0001	0.001	NE	J		092615-009	SW846 6020
	Copper	0.000437	0.00035	0.001	NE	J		092615-009	SW846 6020
	Iron	0.143	0.033	0.100	NE			092615-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092615-009	SW846 6020
	Magnesium	9.50	0.010	0.030	NE		J	092615-009	SW846 6020
	Manganese	0.00568	0.001	0.005	NE			092615-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092615-009	SW846 7470
	Nickel	0.000847	0.0005	0.002	NE	J		092615-009	SW846 6020
	Potassium	4.34	0.080	0.300	NE			092615-009	SW846 6020
	Selenium	0.00242	0.0015	0.005	0.050	J		092615-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092615-009	SW846 6020
	Sodium	69.9	0.400	1.25	NE			092615-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092615-009	SW846 6020
	Uranium	0.00181	0.000067	0.0002	0.03			092615-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092615-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092615-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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	0.0305	0.015	0.050	NE	J		092616-009	SW846 6020
16-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092616-009	SW846 6020
	Arsenic	0.0027	0.0017	0.005	0.010	J		092616-009	SW846 6020
	Barium	0.0035	0.0006	0.002	2.00			092616-009	SW846 6020
	Beryllium	0.000443	0.0002	0.0005	0.004	J		092616-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092616-009	SW846 6020
	Calcium	44.2	0.060	0.200	NE			092616-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092616-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		092616-009	SW846 6020
	Copper	0.000486	0.00035	0.001	NE	J		092616-009	SW846 6020
	Iron	0.146	0.033	0.100	NE			092616-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092616-009	SW846 6020
	Magnesium	9.73	0.010	0.030	NE		J	092616-009	SW846 6020
	Manganese	0.00568	0.001	0.005	NE			092616-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092616-009	SW846 7470
	Nickel	0.00104	0.0005	0.002	NE	J		092616-009	SW846 6020
	Potassium	4.38	0.080	0.300	NE			092616-009	SW846 6020
	Selenium	0.00241	0.0015	0.005	0.050	J		092616-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092616-009	SW846 6020
	Sodium	63.8	0.400	1.25	NE			092616-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092616-009	SW846 6020
	Uranium	0.00182	0.000067	0.0002	0.03			092616-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092616-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092616-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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		092610-009	SW846 6020
12-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092610-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092610-009	SW846 6020
	Barium	0.0472	0.0006	0.002	2.00			092610-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092610-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092610-009	SW846 6020
	Calcium	77.8	0.300	1.00	NE			092610-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092610-009	SW846 6020
	Cobalt	0.000139	0.0001	0.001	NE	J		092610-009	SW846 6020
	Copper	0.000808	0.00035	0.001	NE	B, J	0.00285U	092610-009	SW846 6020
	Iron	0.166	0.033	0.100	NE			092610-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092610-009	SW846 6020
	Magnesium	16.0	0.010	0.030	NE			092610-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092610-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092610-009	SW846 7470
	Nickel	0.00147	0.0005	0.002	NE	J		092610-009	SW846 6020
	Potassium	1.43	0.080	0.300	NE			092610-009	SW846 6020
	Selenium	0.00394	0.0015	0.005	0.050	J		092610-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092610-009	SW846 6020
	Sodium	49.3	0.400	1.25	NE			092610-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092610-009	SW846 6020
	Uranium	0.0054	0.000067	0.0002	0.03			092610-009	SW846 6020
	Vanadium	0.00953	0.001	0.005	NE			092610-009	SW846 6010
	Zinc	0.00535	0.0035	0.010	NE	J		092610-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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	0.0232	0.015	0.050	NE	J	J+	093013-009	SW846 6020
22-Oct-12	Antimony	ND	0.001	0.003	0.006	U		093013-009	SW846 6020
	Arsenic	0.00178	0.0017	0.005	0.010	J		093013-009	SW846 6020
	Barium	0.00273	0.0006	0.002	2.00			093013-009	SW846 6020
	Beryllium	0.000501	0.0002	0.0005	0.004			093013-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093013-009	SW846 6020
	Calcium	43.5	0.060	0.200	NE			093013-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093013-009	SW846 6020
	Cobalt	0.000165	0.0001	0.001	NE	J		093013-009	SW846 6020
	Copper	0.00286	0.00035	0.001	NE	B		093013-009	SW846 6020
	Iron	0.121	0.033	0.100	NE			093013-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093013-009	SW846 6020
	Magnesium	9.64	0.010	0.030	NE		J	093013-009	SW846 6020
	Manganese	0.00519	0.001	0.005	NE			093013-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093013-009	SW846 7470
	Nickel	0.0023	0.0005	0.002	NE			093013-009	SW846 6020
	Potassium	4.05	0.080	0.300	NE			093013-009	SW846 6020
	Selenium	0.00205	0.0015	0.005	0.050	J		093013-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093013-009	SW846 6020
	Sodium	66.0	0.400	1.25	NE			093013-009	SW846 6020
	Thallium	0.000551	0.00045	0.002	0.002	J		093013-009	SW846 6020
	Uranium	0.00203	0.000067	0.0002	0.03			093013-009	SW846 6020
	Vanadium	0.00145	0.001	0.005	NE	J		093013-009	SW846 6010
	Zinc	0.00854	0.0035	0.010	NE	J		093013-009	SW846 6020

Refer to footnotes on page 8A-33.
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Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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		093018-009	SW846 6020
23-Oct-12	Antimony	ND	0.001	0.003	0.006	U		093018-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093018-009	SW846 6020
	Barium	0.0433	0.0006	0.002	2.00			093018-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093018-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093018-009	SW846 6020
	Calcium	76.8	0.300	1.00	NE			093018-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093018-009	SW846 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		093018-009	SW846 6020
	Copper	0.000893	0.00035	0.001	NE	B, J	0.012UJ	093018-009	SW846 6020
	Iron	0.185	0.033	0.100	NE			093018-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093018-009	SW846 6020
	Magnesium	13.9	0.010	0.030	NE		J	093018-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093018-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093018-009	SW846 7470
	Nickel	0.00146	0.0005	0.002	NE	J		093018-009	SW846 6020
	Potassium	1.29	0.080	0.300	NE			093018-009	SW846 6020
	Selenium	0.00393	0.0015	0.005	0.050	J		093018-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093018-009	SW846 6020
	Sodium	46.0	0.080	0.250	NE			093018-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093018-009	SW846 6020
	Uranium	0.00516	0.000067	0.0002	0.03			093018-009	SW846 6020
	Vanadium	0.0103	0.001	0.005	NE			093018-009	SW846 6010
	Zinc	0.00436	0.0035	0.010	NE	J		093018-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-8 *(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 2012

Well ID	Analyte	Result[a] (mg/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		093019-009	SW846 6020
23-Oct-12	Antimony	0.00112	0.001	0.003	0.006	B, J	0.0078U	093019-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093019-009	SW846 6020
	Barium	0.0434	0.0006	0.002	2.00			093019-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093019-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093019-009	SW846 6020
	Calcium	73.3	0.300	1.00	NE			093019-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093019-009	SW846 6020
	Cobalt	0.000107	0.0001	0.001	NE	J		093019-009	SW846 6020
	Copper	0.000948	0.00035	0.001	NE	B, J	0.012UJ	093019-009	SW846 6020
	Iron	0.199	0.033	0.100	NE			093019-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093019-009	SW846 6020
	Magnesium	15.4	0.010	0.030	NE		J	093019-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093019-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093019-009	SW846 7470
	Nickel	0.00155	0.0005	0.002	NE	J		093019-009	SW846 6020
	Potassium	1.32	0.080	0.300	NE			093019-009	SW846 6020
	Selenium	0.00405	0.0015	0.005	0.050	J		093019-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093019-009	SW846 6020
	Sodium	48.6	0.080	0.250	NE			093019-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093019-009	SW846 6020
	Uranium	0.00514	0.000067	0.0002	0.03			093019-009	SW846 6020
	Vanadium	0.0113	0.001	0.005	NE			093019-009	SW846 6010
	Zinc	0.0044	0.0035	0.010	NE	J		093019-009	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-9
Summary of Cation Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 16-Jan-12	Calcium	44.2	0.060	0.200	NE	B		091615-017	SW846 6020
	Magnesium	9.61	0.010	0.030	NE			091615-017	SW846 6020
	Potassium	4.45	0.080	0.300	NE			091615-017	SW846 6020
	Sodium	67.7	0.400	1.25	NE			091615-017	SW846 6020
CCBA-MW1 (Duplicate) 16-Jan-12	Calcium	43.7	0.060	0.200	NE	B		091616-017	SW846 6020
	Magnesium	10.1	0.010	0.030	NE			091616-017	SW846 6020
	Potassium	4.78	0.080	0.300	NE			091616-017	SW846 6020
	Sodium	68.0	0.400	1.25	NE			091616-017	SW846 6020
CCBA-MW2 12-Jan-12	Calcium	76.4	0.300	1.00	NE			091610-017	SW846 6020
	Magnesium	15.7	0.010	0.030	NE			091610-017	SW846 6020
	Potassium	1.38	0.080	0.300	NE			091610-017	SW846 6020
	Sodium	48.2	0.080	0.250	NE		J	091610-017	SW846 6020
CCBA-MW1 23-Apr-12	Calcium	40.9	0.060	0.200	NE	B	J	092291-017	SW846 6020
	Magnesium	8.61	0.010	0.030	NE			092291-017	SW846 6020
	Potassium	4.19	0.080	0.300	NE			092291-017	SW846 6020
	Sodium	61.3	0.400	1.25	NE			092291-017	SW846 6020
CCBA-MW2 24-Apr-12	Calcium	76.0	0.300	1.00	NE	B	J	092296-017	SW846 6020
	Magnesium	13.2	0.010	0.030	NE			092296-017	SW846 6020
	Potassium	1.30	0.080	0.300	NE			092296-017	SW846 6020
	Sodium	44.5	0.080	0.250	NE			092296-017	SW846 6020
CCBA-MW2 (Duplicate) 24-Apr-12	Calcium	74.1	0.300	1.00	NE	B	J	092297-017	SW846 6020
	Magnesium	13.4	0.010	0.030	NE			092297-017	SW846 6020
	Potassium	1.41	0.080	0.300	NE			092297-017	SW846 6020
	Sodium	47.6	0.080	0.250	NE			092297-017	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-9 *(Concluded)*
Summary of Cation Results,
Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 16-Jul-12	Calcium	40.7	0.060	0.200	NE			092615-017	SW846 6020
	Magnesium	9.61	0.010	0.030	NE			092615-017	SW846 6020
	Potassium	4.12	0.080	0.300	NE			092615-017	SW846 6020
	Sodium	64.9	0.800	2.50	NE			092615-017	SW846 6020
CCBA-MW1 (Duplicate) 16-Jul-12	Calcium	41.5	0.060	0.200	NE			092616-017	SW846 6020
	Magnesium	9.88	0.010	0.030	NE			092616-017	SW846 6020
	Potassium	4.27	0.080	0.300	NE			092616-017	SW846 6020
	Sodium	59.5	0.800	2.50	NE			092616-017	SW846 6020
CCBA-MW2 12-Jul-12	Calcium	72.8	0.300	1.00	NE			092610-017	SW846 6020
	Magnesium	12.7	0.010	0.030	NE		J	092610-017	SW846 6020
	Potassium	1.28	0.080	0.300	NE			092610-017	SW846 6020
	Sodium	46.3	0.080	0.250	NE			092610-017	SW846 6020
CCBA-MW1 22-Oct-12	Calcium	44.7	0.060	0.200	NE			093013-017	SW846 6020
	Magnesium	9.97	0.010	0.030	NE			093013-017	SW846 6020
	Potassium	4.15	0.080	0.300	NE			093013-017	SW846 6020
	Sodium	64.2	0.400	1.25	NE			093013-017	SW846 6020
CCBA-MW2 23-Oct-12	Calcium	76.6	0.300	1.00	NE			093018-017	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			093018-017	SW846 6020
	Potassium	1.35	0.080	0.300	NE			093018-017	SW846 6020
	Sodium	46.1	0.080	0.250	NE			093018-017	SW846 6020
CCBA-MW2 (Duplicate) 23-Oct-12	Calcium	76.8	0.300	1.00	NE			093019-017	SW846 6020
	Magnesium	14.9	0.010	0.030	NE			093019-017	SW846 6020
	Potassium	1.28	0.080	0.300	NE			093019-017	SW846 6020
	Sodium	47.1	0.080	0.250	NE			093019-017	SW846 6020

Refer to footnotes on page 8A-33.

Table 8A-10
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 2012

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	1.76 ± 7.28	12.6	6.16	NE	U	BD	091615-033	EPA 901.1
16-Jan-12	Cesium-137	-0.847 ± 2.47	4.26	2.02	NE	U	BD	091615-033	EPA 901.1
	Cobalt-60	1.94 ± 2.91	5.32	2.48	NE	U	BD	091615-033	EPA 901.1
	Potassium-40	10.5 ± 61.1	42.2	19.3	NE	U	BD	091615-033	EPA 901.1
	Gross Alpha	0.99	NA	NA	15 pCi/L	NA	None	091615-034	EPA 900.0
	Gross Beta	4.61 ± 1.20	0.978	0.441	4 mrem/yr			091615-034	EPA 900.0
	Uranium-233/234	1.70 ± 0.307	0.0865	0.035	NE			091615-035	HASL-300
	Uranium-235/236	0.0341 ± 0.0391	0.0765	0.0281	NE	U	BD	091615-035	HASL-300
	Uranium-238	0.634 ± 0.151	0.0735	0.0285	NE			091615-035	HASL-300
CCBA-MW1 (Duplicate)	Americium-241	-3.76 ± 17.6	28.7	14.0	NE	U	BD	091616-033	EPA 901.1
16-Jan-12	Cesium-137	-2.65 ± 2.36	3.37	1.62	NE	U	BD	091616-033	EPA 901.1
	Cobalt-60	0.459 ± 2.05	3.67	1.74	NE	U	BD	091616-033	EPA 901.1
	Potassium-40	-22.6 ± 40.2	47.8	22.9	NE	U	BD	091616-033	EPA 901.1
	Gross Alpha	1.29	NA	NA	15 pCi/L	NA	None	091616-034	EPA 900.0
	Gross Beta	5.93 ± 1.45	0.993	0.438	4 mrem/yr			091616-034	EPA 900.0
	Uranium-233/234	1.98 ± 0.374	0.110	0.0445	NE		J+	091616-035	HASL-300
	Uranium-235/236	0.0623 ± 0.0566	0.0972	0.0357	NE	U	BD	091616-035	HASL-300
	Uranium-238	0.564 ± 0.157	0.0933	0.0363	NE		J+	091616-035	HASL-300
CCBA-MW2	Americium-241	-8.34 ± 7.20	9.81	4.82	NE	U	BD	091610-033	EPA 901.1
12-Jan-12	Cesium-137	0.148 ± 1.78	3.07	1.48	NE	U	BD	091610-033	EPA 901.1
	Cobalt-60	1.67 ± 2.16	3.69	1.76	NE	U	BD	091610-033	EPA 901.1
	Potassium-40	-42.4 ± 40.9	42.7	20.5	NE	U	BD	091610-033	EPA 901.1
	Gross Alpha	2.22	NA	NA	15 pCi/L	NA	None	091610-034	EPA 900.0
	Gross Beta	2.49 ± 0.852	1.07	0.510	4 mrem/yr		J	091610-034	EPA 900.0
	Uranium-233/234	6.93 ± 0.947	0.0632	0.026	NE			091610-035	HASL-300
	Uranium-235/236	0.118 ± 0.0506	0.0556	0.0208	NE		J	091610-035	HASL-300
	Uranium-238	1.63 ± 0.264	0.0535	0.0211	NE			091610-035	HASL-300

Refer to footnotes on page 8A-33.

Table 8A-10 *(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 2012

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	-3.18 ± 16.1	23.6	11.6	NE	U	BD	092291-033	EPA 901.1
23-Apr-12	Cesium-137	-0.851 ± 3.13	4.48	2.18	NE	U	BD	092291-033	EPA 901.1
	Cobalt-60	0.875 ± 2.54	4.54	2.18	NE	U	BD	092291-033	EPA 901.1
	Potassium-40	97.0 ± 41.1	40.9	19.5	NE	X	R	092291-033	EPA 901.1
	Gross Alpha	-0.42	NA	NA	15 pCi/L	NA	None	092291-034	EPA 900.0
	Gross Beta	4.93 ± 1.11	0.942	0.449	4 mrem/yr			092291-034	EPA 900.0
	Uranium-233/234	1.74 ± 0.280	0.0805	0.0343	NE			092291-035	HASL-300
	Uranium-235/236	0.0382 ± 0.0358	0.0571	0.0211	NE	U	BD	092291-035	HASL-300
	Uranium-238	0.561 ± 0.123	0.0402	0.0141	NE			092291-035	HASL-300
CCBA-MW2	Americium-241	0.557 ± 6.16	10.6	5.20	NE	U	BD	092296-033	EPA 901.1
24-Apr-12	Cesium-137	2.51 ± 2.35	3.37	1.63	NE	U	BD	092296-033	EPA 901.1
	Cobalt-60	-2.58 ± 3.17	3.62	1.73	NE	U	BD	092296-033	EPA 901.1
	Potassium-40	33.4 ± 45.4	28.7	13.5	NE	X	R	092296-033	EPA 901.1
	Gross Alpha	5.18	NA	NA	15 pCi/L	NA	None	092296-034	EPA 900.0
	Gross Beta	2.17 ± 1.25	1.94	0.946	4 mrem/yr		J	092296-034	EPA 900.0
	Uranium-233/234	7.15 ± 0.906	0.045	0.0192	NE			092296-035	HASL-300
	Uranium-235/236	0.0764 ± 0.0325	0.0319	0.0118	NE		J	092296-035	HASL-300
	Uranium-238	1.69 ± 0.241	0.0225	0.00789	NE			092296-035	HASL-300
CCBA-MW2 (Duplicate)	Americium-241	7.53 ± 5.44	7.54	3.35	NE	U	BD	092297-033	EPA 901.1
24-Apr-12	Cesium-137	-1.72 ± 6.12	6.27	3.07	NE	U	BD	092297-033	EPA 901.1
	Cobalt-60	2.93 ± 2.88	4.73	2.26	NE	U	BD	092297-033	EPA 901.1
	Potassium-40	-6.38 ± 43.4	51.7	24.8	NE	U	BD	092297-033	EPA 901.1
	Gross Alpha	2.13	NA	NA	15 pCi/L	NA	None	092297-034	EPA 900.0
	Gross Beta	1.94 ± 0.739	0.982	0.468	4 mrem/yr		J	092297-034	EPA 900.0
	Uranium-233/234	6.87 ± 0.923	0.0659	0.028	NE			092297-035	HASL-300
	Uranium-235/236	0.0894 ± 0.0426	0.0467	0.0173	NE		J	092297-035	HASL-300
	Uranium-238	1.71 ± 0.266	0.0329	0.0115	NE			092297-035	HASL-300

Refer to footnotes on page 8A-33.

Table 8A-10 *(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 2012

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	-0.0219 ± 24.3	39.8	19.6	NE	U	BD	092615-033	EPA 901.1
16-Jul-12	Cesium-137	-0.296 ± 2.85	4.28	2.08	NE	U	BD	092615-033	EPA 901.1
	Cobalt-60	0.516 ± 2.60	4.60	2.20	NE	U	BD	092615-033	EPA 901.1
	Potassium-40	63.6 ± 33.2	45.2	21.6	NE	X	R	092615-033	EPA 901.1
	Gross Alpha	6.08	NA	NA	15 pCi/L	NA	None	092615-034	EPA 900.0
	Gross Beta	5.70 ± 1.41	1.52	0.735	4 mrem/yr			092615-034	EPA 900.0
	Uranium-233/234	2.00 ± 0.337	0.146	0.0657	NE			092615-035	HASL-300
	Uranium-235/236	0.0393 ± 0.0448	0.0524	0.0173	NE	U	BD	092615-035	HASL-300
	Uranium-238	0.657 ± 0.146	0.092	0.0388	NE			092615-035	HASL-300
CCBA-MW1 (Duplicate)	Americium-241	4.69 ± 17.1	29.1	14.3	NE	U	BD	092616-033	EPA 901.1
16-Jul-12	Cesium-137	1.67 ± 2.66	4.01	1.94	NE	U	BD	092616-033	EPA 901.1
	Cobalt-60	-1.16 ± 2.67	4.49	2.15	NE	U	BD	092616-033	EPA 901.1
	Potassium-40	16.8 ± 54.9	41.4	19.7	NE	U	BD	092616-033	EPA 901.1
	Gross Alpha	-0.49	NA	NA	15 pCi/L	NA	None	092616-034	EPA 900.0
	Gross Beta	5.01 ± 1.23	1.31	0.635	4 mrem/yr			092616-034	EPA 900.0
	Uranium-233/234	1.75 ± 0.277	0.105	0.0473	NE			092616-035	HASL-300
	Uranium-235/236	0.00 ± 0.0185	0.0377	0.0125	NE	U	BD	092616-035	HASL-300
	Uranium-238	0.591 ± 0.120	0.0662	0.028	NE			092616-035	HASL-300
CCBA-MW2	Americium-241	7.99 ± 8.40	11.3	5.57	NE	U	BD	092610-033	EPA 901.1
12-Jul-12	Cesium-137	-0.29 ± 1.97	3.32	1.61	NE	U	BD	092610-033	EPA 901.1
	Cobalt-60	-1.4 ± 1.88	3.03	1.44	NE	U	BD	092610-033	EPA 901.1
	Potassium-40	2.98 ± 50.4	32.0	15.2	NE	U	BD	092610-033	EPA 901.1
	Gross Alpha	-6.55	NA	NA	15 pCi/L	NA	None	092610-034	EPA 900.0
	Gross Beta	3.86 ± 1.15	1.44	0.696	4 mrem/yr		J	092610-034	EPA 900.0
	Uranium-233/234	7.33 ± 0.996	0.140	0.0633	NE			092610-035	HASL-300
	Uranium-235/236	0.107 ± 0.0556	0.0505	0.0167	NE		J	092610-035	HASL-300
	Uranium-238	1.60 ± 0.268	0.0886	0.0374	NE			092610-035	HASL-300

Refer to footnotes on page 8A-33.

Table 8A-10 *(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 2012

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	13.3 ± 15.2	21.5	10.5	NE	U	BD	093013-033	EPA 901.1
22-Oct-12	Cesium-137	-3.75 ± 2.59	3.17	1.52	NE	U	BD	093013-033	EPA 901.1
	Cobalt-60	2.24 ± 2.26	3.86	1.83	NE	U	BD	093013-033	EPA 901.1
	Potassium-40	18.6 ± 45.2	37.0	17.5	NE	U	BD	093013-033	EPA 901.1
	Gross Alpha	0.38	NA	NA	15 pCi/L	NA	None	093013-034	EPA 900.0
	Gross Beta	3.65 ± 0.964	1.10	0.532	4 mrem/yr		J	093013-034	EPA 900.0
	Uranium-233/234	1.88 ± 0.343	0.127	0.0538	NE			093013-035	HASL-300
	Uranium-235/236	0.0358 ± 0.0432	0.0923	0.0341	NE	U	BD	093013-035	HASL-300
	Uranium-238	0.716 ± 0.172	0.0865	0.0335	NE			093013-035	HASL-300
CCBA-MW2	Americium-241	4.84 ± 6.70	9.93	4.88	NE	U	BD	093018-033	EPA 901.1
23-Oct-12	Cesium-137	1.62 ± 1.94	3.28	1.59	NE	U	BD	093018-033	EPA 901.1
	Cobalt-60	2.85 ± 2.22	3.49	1.66	NE	U	BD	093018-033	EPA 901.1
	Potassium-40	33.6 ± 37.5	28.0	13.2	NE	X	R	093018-033	EPA 901.1
	Gross Alpha	-0.46	NA	NA	15 pCi/L	NA	None	093018-034	EPA 900.0
	Gross Beta	4.17 ± 1.22	1.49	0.723	4 mrem/yr		J	093018-034	EPA 900.0
	Uranium-233/234	7.11 ± 0.921	0.0495	0.0209	NE			093018-035	HASL-300
	Uranium-235/236	0.0974 ± 0.0404	0.0359	0.0133	NE		J	093018-035	HASL-300
	Uranium-238	1.68 ± 0.247	0.0337	0.013	NE			093018-035	HASL-300
CCBA-MW2 (Duplicate)	Americium-241	-5.9 ± 12.9	21.2	10.4	NE	U	BD	093019-033	EPA 901.1
23-Oct-12	Cesium-137	-1.69 ± 2.33	3.68	1.77	NE	U	BD	093019-033	EPA 901.1
	Cobalt-60	1.19 ± 2.41	4.29	2.03	NE	U	BD	093019-033	EPA 901.1
	Potassium-40	-39.2 ± 50.5	50.4	24.0	NE	U	BD	093019-033	EPA 901.1
	Gross Alpha	2.00	NA	NA	15 pCi/L	NA	None	093019-034	EPA 900.0
	Gross Beta	2.43 ± 0.825	1.05	0.504	4 mrem/yr		J	093019-034	EPA 900.0
	Uranium-233/234	7.59 ± 0.972	0.0462	0.0195	NE			093019-035	HASL-300
	Uranium-235/236	0.107 ± 0.0418	0.0335	0.0124	NE			093019-035	HASL-300
	Uranium-238	1.80 ± 0.258	0.0314	0.0122	NE			093019-035	HASL-300

Refer to footnotes on page 8A-33.

Table 8A-11
Summary of Field Water Quality Measurements[h], Solid Waste Management Units 8/58 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	16-Jan-12	14.03	567	416.7	6.49	0.20	27.3	2.82
CCBA-MW2	12-Jan-12	14.45	686	383.1	7.39	1.24	57.6	5.88
CCBA-MW1	23-Apr-12	16.51	509	112.5	6.96	0.40	28.8	2.80
CCBA-MW2	24-Apr-12	18.90	610	102.0	7.87	0.48	63.5	5.86
CCBA-MW1	16-Jul-12	18.81	482	173.9	6.46	0.33	31.6	2.92
CCBA-MW2	12-Jul-12	18.39	569	141.0	7.37	0.41	62.4	5.86
CCBA-MW1	22-Oct-12	16.63	492	159.0	6.29	0.64	36.2	3.51
CCBA-MW2	23-Oct-12	17.67	577	159.0	7.22	0.46	63.6	6.02

Refer to footnotes on page 8A-33.

Footnotes for Solid Waste Management Units 8/58 Groundwater Monitoring Tables

HMX	=	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	=	identifier.
N	=	nitrogen.
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).
- 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 Code of Federal Regulations [CFR] Parts 9, 141, and 142, Table 8A-1-4).
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- pCi/L = picocuries per liter

[b]MDL or MDA

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.

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.

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

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.

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.

[d]MCL

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards (EPA May 2009).
- NE = not established.
- 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 8A-1-4).
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

[e]Laboratory Qualifier

B	=	The analyte was detected in the blank above the effective method detection limit (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.
X	=	Data rejected due to peak not meeting identification criteria.

Footnotes for Solid Waste Management Units 8/58 Groundwater Monitoring 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.
NJ-	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected negative bias.
None	=	No data validation for corrected gross alpha activity.
U	=	The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable, and resampling or reanalysis are necessary for verification.

[g]**Analytical Method**

- 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, Cincinnati, Ohio
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300.

[h]**Field Water Quality Measurements**

- Field measurements collected prior to sampling.

°C	= degrees Celsius.
% Sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 8B
Solid Waste Management Units 8/58
Plots

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Attachment 8B Plots

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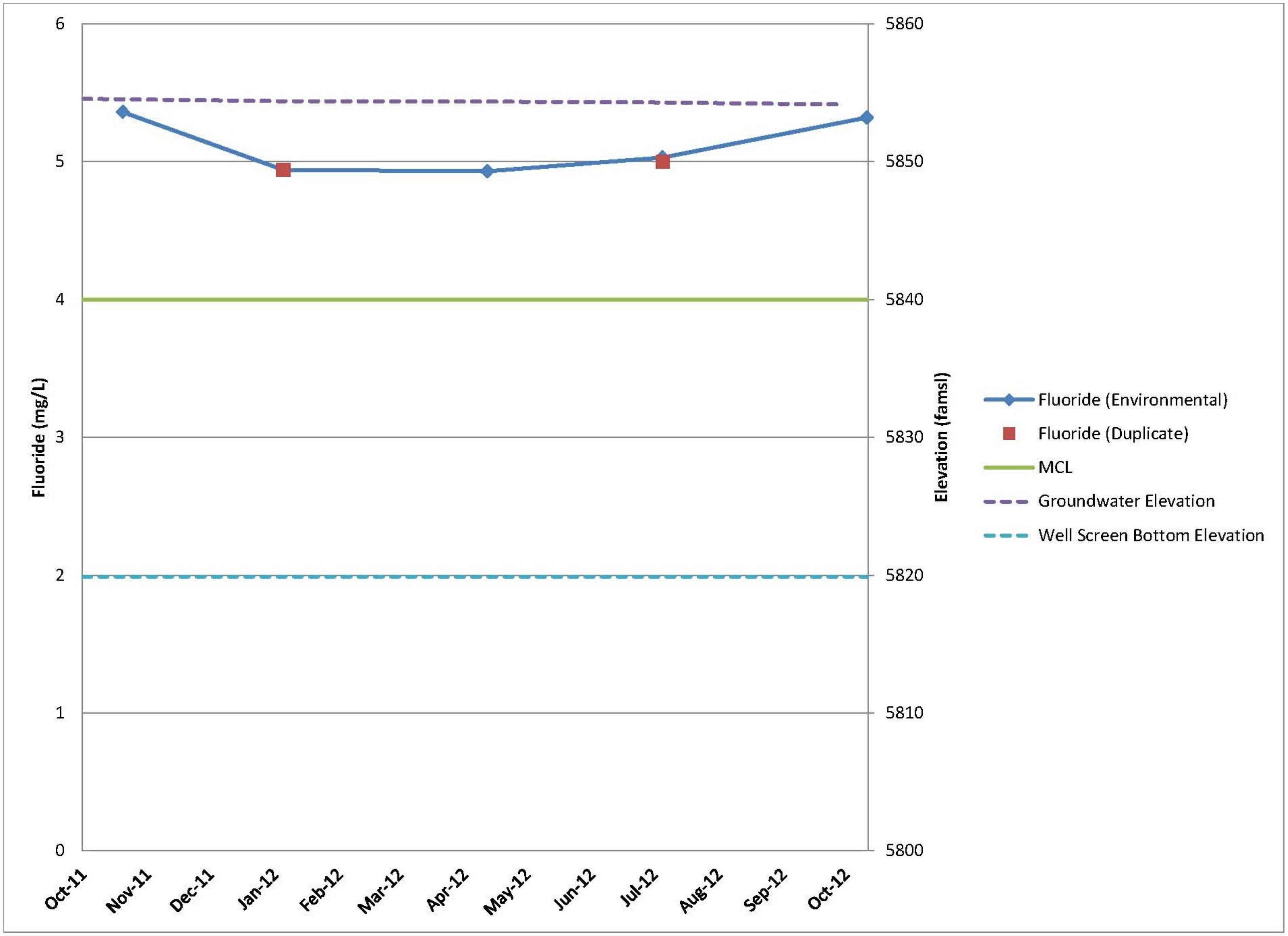

Figure 8B-1. Fluoride Concentrations, CCBA-MW1

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Attachment 8C
Solid Waste Management Units 8/58
Hydrographs

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Attachment 8C Hydrographs

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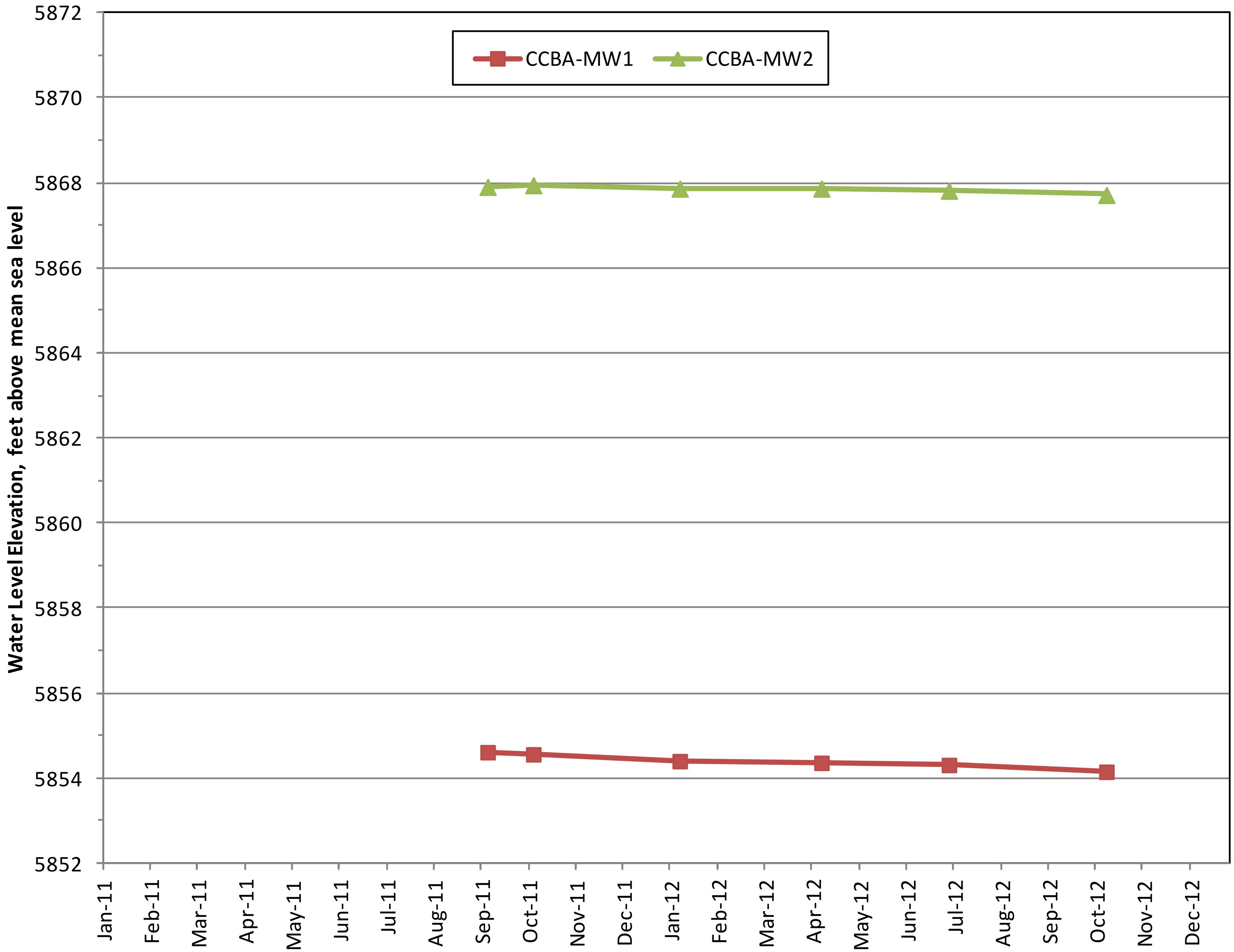

Figure 8C-1. SWMUs 8/58 Study Area Wells

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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). The SNL/NM facility is a government-owned, contractor-operated, multi-program laboratory overseen by the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) through the Sandia Field Office in Albuquerque, New Mexico. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM under Contract DE-AC04-94AL85000.

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 DOE. 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 (SWMU 49A) is located on the west side of the building where a former trailer was used as a darkroom. Photo-processing chemicals may have been discharge there. The second area (SWMU 49B) 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 northwest 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.

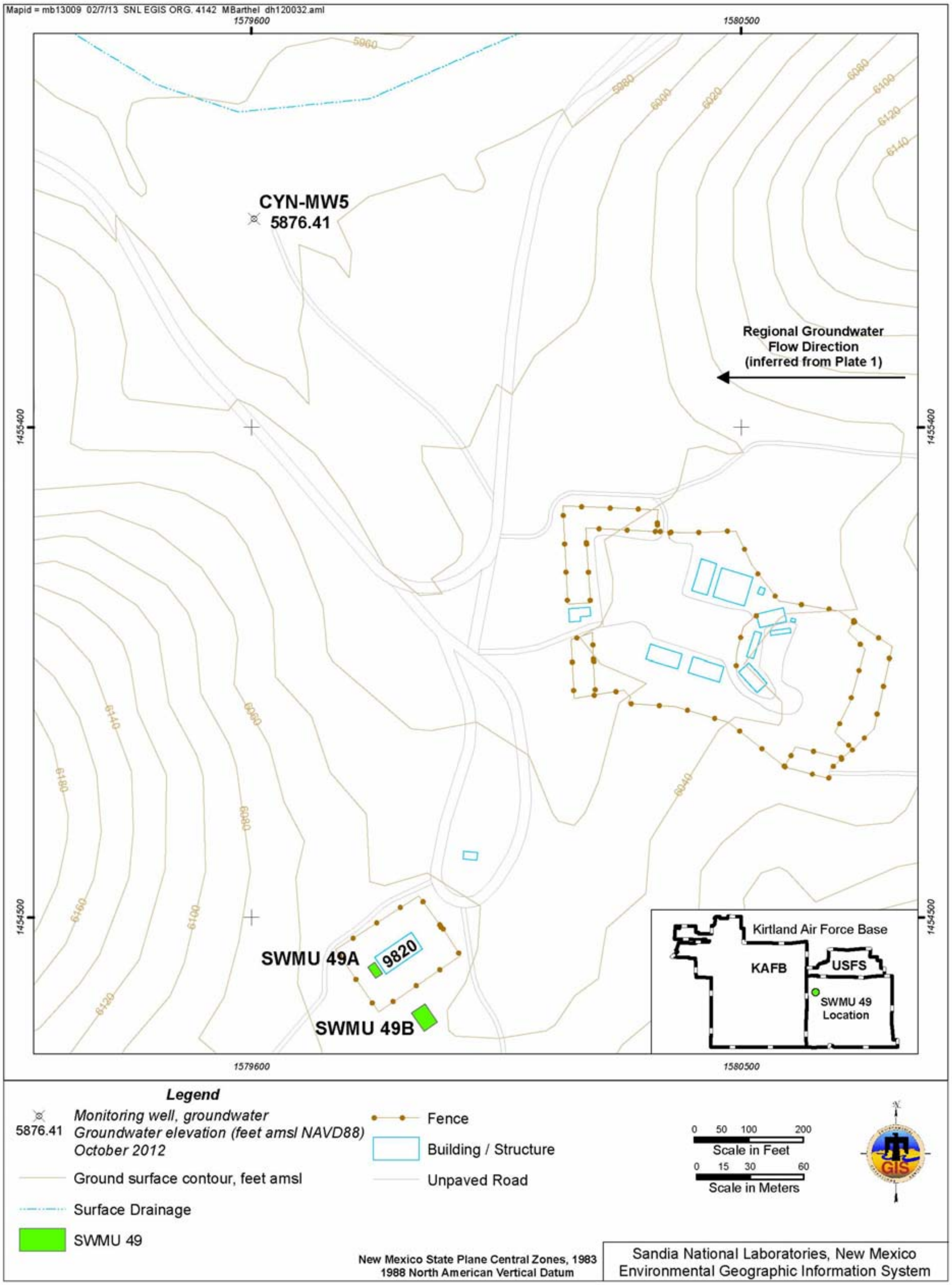

Figure 9-1. Location and Groundwater Elevation at SWMU 49

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

Table 9-1. Historical Timeline of SWMU 49 *(Concluded)*

Month	Year	Event	Reference
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

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/NM = Sandia National Laboratories, New Mexico.
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 up to 1 gallon of 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 (VOC; 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 storm water 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). 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 April 2004) and the results were submitted to the New Mexico Environment Department (NMED) in the SNL/NM Environmental Restoration (ER) Project's response to the third Request for Supplemental Information (SNL June 2005). The well has been sampled sporadically since then.

Following the April 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 2012 Activities

The following activities took place for the SWMU 49 investigation during Calendar Year (CY) 2012 (January through December 2012):

- Annual groundwater sampling was conducted at monitoring well CYN-MW5 in January 2012.
- 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

The following activities are planned for SWMU 49 during CY 2013:

- Annual groundwater sampling will be conducted at monitoring well CYN-MW5.
- Periodic groundwater elevation data will be obtained from monitoring well CYN-MW5.

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 1915 through 2005 was 8.67 inches per year (in/yr) (WRCC-DRI 2012). 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 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).

In 2001, a location downslope of SWMU 49 was selected 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

Monitoring Well	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2012 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Approximate Pressure Head (ft[a])
CYN-MW5	5981.30	135 – 155	5846.30	5876.41	5836.30	40

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level
bgs = Below ground surface.
CYN = Canyons.
ft = Foot (feet).
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The October 2012 groundwater elevation at monitoring well CYN-MW5 was 5,876.41 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 (ft/ft).

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.

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. The potentiometric surface at monitoring well CYN-MW5 in October 2012 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) shows that significant water level increases only occurred twice in the last 10 years. During 2002 through 2012, the overall trend has been downward. For the last five years, the water level in monitoring well CYN-MW5 has declined at approximately 0.5 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 ft/ft near the well. No potable water-supply wells are located within 5 miles of the site.

9.1.7.3 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.

9.1.7.4 Contaminant Distribution and Transport in Groundwater

No COCs exceed the applicable U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) (EPA 2009) in the CY 2012 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 federal regulations mandated by the Resource Conservation and Recovery Act (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 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 and AOCs are contained in the Compliance Order on Consent (the Order) (NMED April 2004) between the DOE, Sandia, and NMED.

The DOE/NNSA and Sandia received a letter from the NMED 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 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 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 Order, as specified in Section III.A of the 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.

Table 9-3. Groundwater Monitoring Well Network and Sampling Date for SWMU 49, Calendar Year 2012

Date of Sampling Event	Wells Sampled	SAP
January 2012	CYN-MW5	*SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2012* Annual Sampling (SNL January 2012)

NOTES:
CYN = Canyons.
MW = Monitoring Well.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
SWMU = Solid Waste Management Unit.

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 include duplicate environmental, split, equipment blank (EB), and trip blank (TB) samples. (No duplicate environmental or EB sample was collected at monitoring well CYN-MW5 during the CY 2012 sampling event. Chapter 11.0, Section 11.3 discusses the results for these QC sample analyses performed for the associated sampling at monitoring well CTF-MW1.)

Table 9-4. Parameters Sampled at SWMU 49

Parameter	January 2012
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 (reported as nitrogen).
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 2012 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. The analytical results of the groundwater sampling at SWMU 49 can be summarized as follows:

- 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). NPN results did not exceed the MCL of 10 milligrams per liter (mg/L) and was detected at a concentration of 1.77 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). Currently, no MCL is established for perchlorate. Perchlorate results do not exceed the NMED-specified screening level/MDL of 4 micrograms per liter (µg/L) (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 screening tool and according to 40 Code of Federal Regulations Parts 9, 141, and 142, Table I-4, does not include uranium, which is measured independently. Therefore, the gross alpha activity measurement is corrected by subtracting out the uranium activity. 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. The 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-1 through 9A-8 (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.

A duplicate environmental sample was not collected at monitoring well CYN-MW5 during this sampling event. (See discussion in Chapter 11.0, Section 11.7 for the results for the duplicate environmental sample collected for the associated sampling at monitoring well CTF-MW1.)

An EB sample was not collected at monitoring well CYN-MW5 during the CY 2012 sampling event. (See discussion in Chapter 11.0, Sections 11.3 and 11.7 for the results for the EB sample collected for the associated sampling at monitoring well CTF-MW1.)

No VOCs were detected above laboratory MDLs in any TB sample.

Laboratory data qualifiers are provided with the analytical results in Tables 9A-1 through 9A-8 (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 2012) occurred during CY 2012 sampling activities.

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, the current conceptual site model, and plans for studies to be completed during CY 2013 at SWMU 49.

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 February 2012. 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 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 sampling will be conducted at monitoring well CYN-MW5 during the first quarter of CY 2013. Periodic monitoring of groundwater elevations will also be completed during the year.

9.10 References

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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] 8260), Solid Waste Management Unit 49 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.325
1,1,2,2-Tetrachloroethane	0.250
1,1,2-Trichloroethane	0.250
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.250
1,2-Dichloropropane	0.250
2-Butanone	1.25
2-Hexanone	1.25
4-methyl-, 2-Pentanone	1.25
Acetone	3.50
Benzene	0.300
Bromodichloromethane	0.250
Bromoform	0.250
Bromomethane	0.300
Carbon disulfide	1.25
Carbon tetrachloride	0.300
Chlorobenzene	0.250
Chloroethane	0.300
Chloroform	0.250
Chloromethane	0.300
Dibromochloromethane	0.300
Ethyl benzene	0.250
Methylene chloride	3.00
Styrene	0.250
Tetrachloroethene	0.300
Toluene	0.250
Trichloroethene	0.250
Vinyl acetate	1.50
Vinyl chloride	0.500
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.250
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.250

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 2012

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.080
1,3-Dinitrobenzene	0.080
2,4,6-Trinitrotoluene	0.080
2,4-Dinitrotoluene	0.080
2,6-Dinitrotoluene	0.080
2-Amino-4,6-dinitrotoluene	0.080
2-Nitrotoluene	0.082
3-Nitrotoluene	0.080
4-Amino-2,6-dinitrotoluene	0.080
4-Nitrotoluene	0.150
HMX	0.080
Nitro-benzene	0.080
Pentaerythritol tetranitrate	0.100
RDX	0.080
Tetryl	0.080

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 2012

Well ID	Analyte	Result[a] (mg/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 31-Jan-12	Nitrate plus nitrite as N	1.77	0.100	0.500	10.0			091692-018	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 2012

Well ID	Analyte	Result[a] (mg/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	155	0.725	1.00	NE			091692-022	SM2320B
31-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091692-022	SM2320B
	Bromide	0.206	0.066	0.200	NE			091692-016	SW846 9056
	Chloride	18.6	0.066	0.200	NE			091692-016	SW846 9056
	Fluoride	0.318	0.033	0.100	4.0			091692-016	SW846 9056
	Sulfate	25.1	0.100	0.400	NE			091692-016	SW846 9056
	Calcium	57.8	0.300	1.00	NE	B		091692-017	SW846 6020
	Magnesium	9.68	0.010	0.030	NE			091692-017	SW846 6020
	Potassium	2.24	0.080	0.300	NE			091692-017	SW846 6020
	Sodium	14.2	0.080	0.250	NE		J	091692-017	SW846 6020
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091692-027	SW846 9012A

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 2012

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 31-Jan-12	ND	0.004	0.012	NE	U		091692-020	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 2012

Well ID	Analyte	Result[a] (mg/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	ND	0.015	0.050	NE	U		091692-009	SW846 6020
31-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091692-009	SW846 6020
	Arsenic	0.0061	0.0017	0.005	0.010			091692-009	SW846 6020
	Barium	0.192	0.0006	0.002	2.00		J	091692-009	SW846 6020
	Beryllium	0.000264	0.0002	0.0005	0.004	J		091692-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091692-009	SW846 6020
	Calcium	61.3	0.300	1.00	NE	B		091692-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091692-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091692-009	SW846 6020
	Copper	0.000689	0.00035	0.001	NE	J		091692-009	SW846 6020
	Iron	0.157	0.033	0.100	NE	B	0.17U	091692-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091692-009	SW846 6020
	Magnesium	10.5	0.010	0.030	NE			091692-009	SW846 6020
	Manganese	0.00143	0.001	0.005	NE	J		091692-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091692-009	SW846 7470
	Nickel	0.00192	0.0005	0.002	NE	J		091692-009	SW846 6020
	Potassium	2.41	0.080	0.300	NE			091692-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091692-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091692-009	SW846 6020
	Sodium	15.6	0.080	0.250	NE		J	091692-009	SW846 6020
	Thallium	0.000785	0.00045	0.002	0.002	J		091692-009	SW846 6020
	Uranium	0.000831	0.000067	0.0002	0.03			091692-009	SW846 6020
	Vanadium	0.00129	0.001	0.005	NE	J		091692-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091692-009	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 2012

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	3.69 ± 17.8	26.1	12.8	NE	U	BD	091692-033	EPA 901.1
31-Jan-12	Cesium-137	-1.15 ± 2.00	3.32	1.60	NE	U	BD	091692-033	EPA 901.1
	Cobalt-60	-0.582 ± 2.04	3.53	1.66	NE	U	BD	091692-033	EPA 901.1
	Potassium-40	-6.77 ± 43.1	45.0	21.5	NE	U	BD	091692-033	EPA 901.1
	Gross Alpha	2.12	NA	NA	15 pCi/L	NA	None	091692-034	EPA 900.0
	Gross Beta	3.11 ± 0.835	0.905	0.430	4 mrem/yr			091692-034	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 2012

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-MW5	31-Jan-12	15.23	418	460.2	5.71	0.38	49.5	4.96

Refer to footnotes on page 9A-13.

Footnotes for Solid Waste Management Unit 49 Groundwater Monitoring Tables

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
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).
- 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 I-4)
- µg/L = micrograms per liter.
- mg/L = milligrams per liter.
- pCi/L = picocuries per liter.

[b]**MDL or MDA**

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.

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.

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**

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.

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.

[d]**MCL**

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards, EPA, May 2009.
- NE = not established.
- 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 9A- 1-4).
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

[e]**Laboratory Qualifier**

B = The analyte was detected in the blank above the effective method detection limit (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 = The associated value is an estimated quantity.
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.

Footnotes for Solid Waste Management Unit 49 Groundwater Monitoring Tables
(Concluded)

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[g]**Analytical Method**

- 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, Cincinnati, Ohio

[h]**Field Water Quality Measurements**

°C	= degrees Celsius.
% Sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 9B
Solid Waste Management Unit 49
Hydrographs

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Attachment 9B Hydrographs

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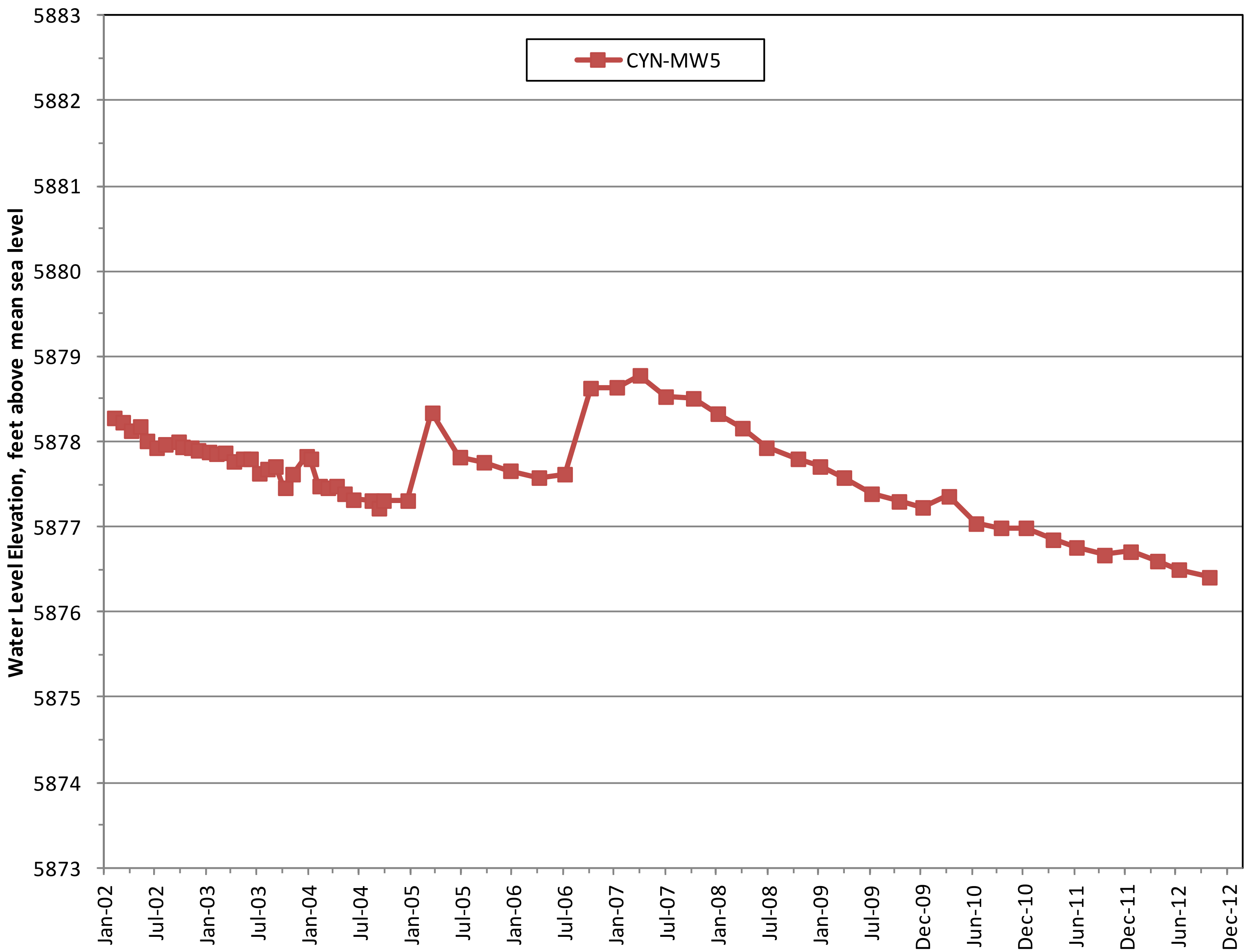

Figure 9B-1. SWMU 49 Study Area Well

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10.0 Solid Waste Management Unit 68

10.1 Introduction

This chapter summarizes the Calendar Year (CY) 2012 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). The SNL/NM facility is a government-owned, contractor-operated, multi-program laboratory overseen by the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) through the Sandia Field Office (SFO) in Albuquerque, New Mexico. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM under Contract DE-AC04-94AL85000.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were installed at SWMU 68 in August 2011. 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 Order) (NMED April 2004) between the New Mexico Environment Department (NMED), DOE, and Sandia and the NMED letter dated April 8, 2010, from the NMED Hazardous Waste Bureau requiring additional corrective action at SWMU 68 (NMED April 2010). In April 2012, NMED approved the SWMU 68 well installation report (NMED April 2012).

Monitoring well OBS-MW1 was sampled on January 9, 2012; April 18, 2012; July 17, 2012; and October 16, 2012. Monitoring well OBS-MW2 was sampled on January 10, 2012; April 19, 2012; July 18, 2012; and October 17, 2012. Monitoring well OBS-MW3 was sampled on January 11, 2012; April 17, 2012; July 19, 2012; and October 18, 2012. 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 2011, March 2012, June 2012a, and September 2012a). 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 2012 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). No parameters were detected above established MCLs.

During CY 2013, quarterly groundwater sampling and reporting will continue for the SWMU 68 groundwater monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3.

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).

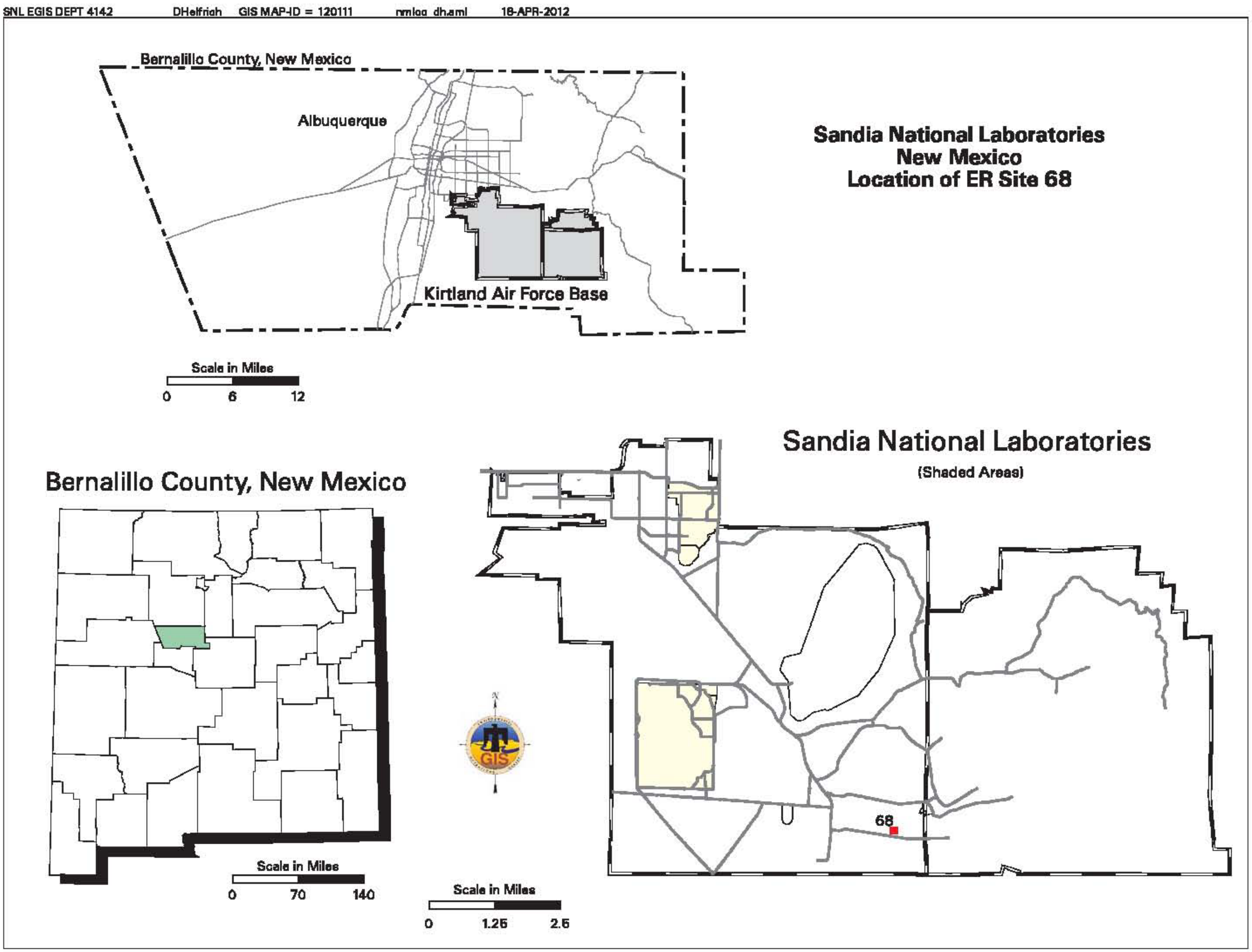

Figure 10-1. Location of SWMU 68

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 (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) and 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, and these sample analyses were used in the final risk assessment for SWMU 68. 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.

In April 2004, the Order (NMED April 2004) specifically identified SWMU 68 as requiring additional investigation. All corrective action requirements pertaining to SWMUs are contained in the Order (NMED April 2004). Additional soil samples were collected in January 2005.

In September 2005, DOE/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/Sandia submitted a letter to the NMED justifying a Class III Permit Modification Request for SWMU 68 (SNL March 2006). In April 2010, the NMED responded to the SNL/NM Permit Modification Request, stating that SWMU 68 required additional site characterization work, including the installation of three groundwater monitoring wells near the previous location of the burn pan and associated ditch/surface impoundment. The NMED also required the submittal of a well installation work plan (NMED April 2010).

DOE/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 of eight quarterly groundwater sampling events 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	Los Alamos National Laboratory conducts alpha radiation survey at SWMU 68. 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/NNSA and SNL/NM ER responded 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/NNSA and SNL/NM ER performed a Housekeeping VCM and removed steel test stands and piping from the site and conducted screening of 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/NNSA and SNL/NM ER conducted RFI sampling. A buried concrete slab is discovered while trenching across the overflow basin. No elevated readings are measured on its surface. A large mound (68A Mound) is discovered.	Field logs

Table 10-1. Historical Timeline of SWMU 68 *(Continued)*

Month	Year	Event	Reference
August	1997	NMED issues RSI on the Work Plan. Additional soil sampling for VOCs, SVOCs, total metals, gross alpha/beta, and gamma spectroscopy needed at and below various features including below a shallow arroyo channel sediment samples. The newly discovered mound, 68A, was administratively added as a sub-site 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 submitted to NMED.	SNL February 1998
March	1998	NMED issues 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 are 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 discovered; this 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. 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
October	2005	Letter received approving CAC without controls for SWMU 68.	NMED October 2005

Table 10-1. Historical Timeline of SWMU 68 *(Concluded)*

Month	Year	Event	Reference
March	2006	Request for Class III Permit Modification submitted.	SNL March 2006
June	2009	NMED decision to remove SWMU 68 from the CAC process.	SNL June 2009
April	2010	Letter from NMED formally stating 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 approves SWMU 68 Work Plan.	NMED January 2011
June	2011	Request for Extension to Complete the Final Well Installation Report for Five Groundwater Monitoring Wells at SWMU 68 submitted.	SNL June 2011
August	2011	Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 installed.	SNL November 2011
August	2011	NMED approves the Request for Extension to complete Well Installation Report for Groundwater Monitoring Wells at SWMU 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 2012b
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 2012b
April	2012	NMED approved the Well Installation Report for SWMUs 8/58 and SWMU 68	NMED April 2012
June	2012	Hydraulic conductivity calculated for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3.	SNL June 2012b

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.
KAFB = Kirtland Air Force Base.
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.

10.1.3 Monitoring History

In 2011, SNL/NM personnel installed three groundwater monitoring wells at SWMU 68 (SNL November 2011) as shown on Figure 10-2. These three monitoring wells were sampled for the first time in October 2011 and were sampled for four quarters in CY 2012 as described in Section 10.1.

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 2012 Activities

The following activities occurred for SWMU 68 in CY 2012:

- Quarterly groundwater sampling was conducted at monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 in January, April, July and October, 2012 (SNL December 2011, March 2012, June 2012a, and September 2012a).

- Tables of analytical results (Attachment 10A) and hydrographs (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 2013:

- Quarterly groundwater sampling will be conducted at monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 during the first three quarters of CY 2013 to complete the required eight quarters of sampling.

- Quarterly and annual reporting of chemical analyses for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 groundwater samples will be performed.

10.1.7 Current Conceptual Model

With the installation of the three monitoring wells at the site in 2011 (Figure 10-2), understanding of the hydrogeologic regime has improved significantly. The following sections present 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.

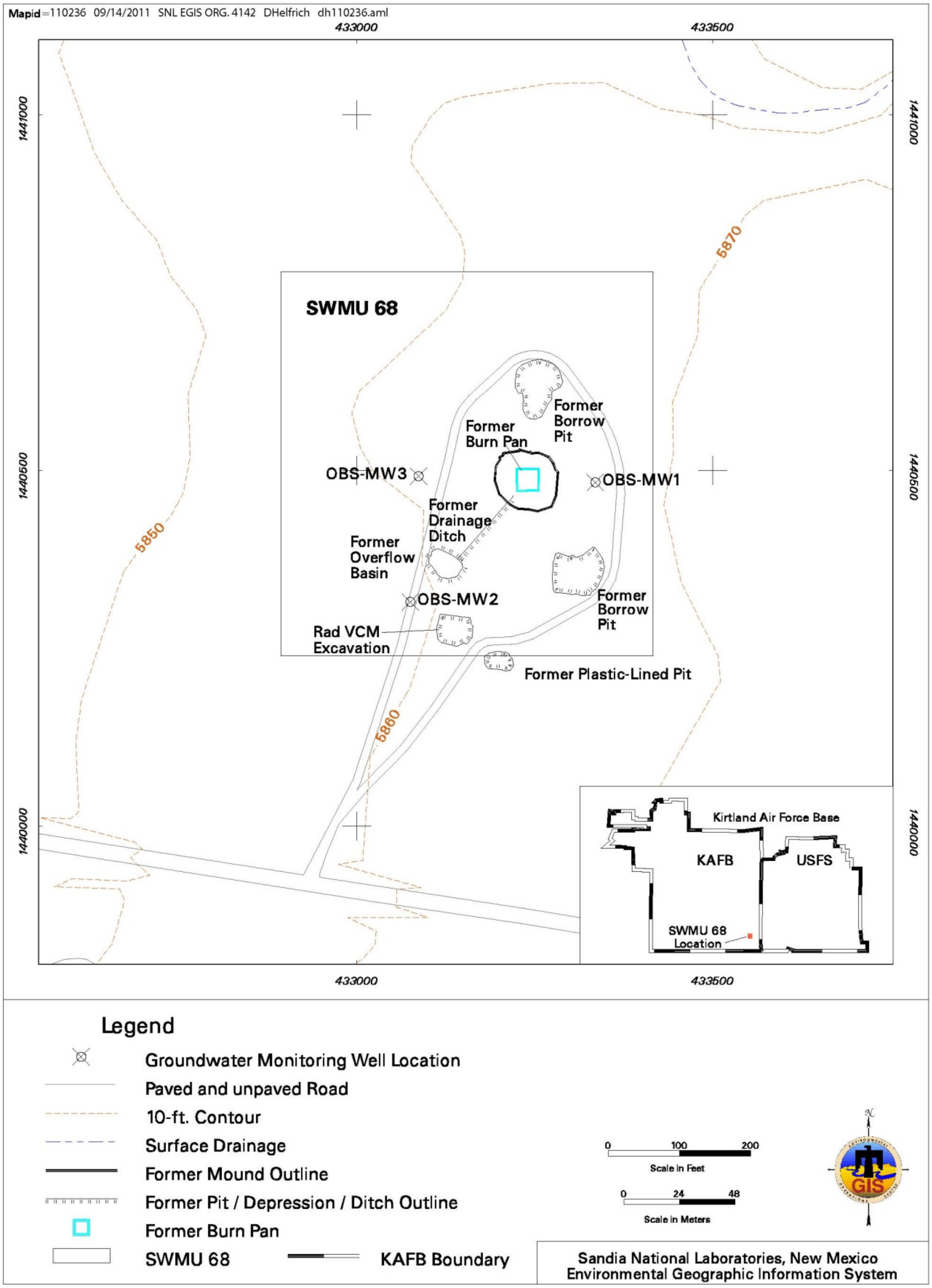

Figure 10-2. Groundwater Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 Installed at SWMU 68

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

Monitoring Well	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 2012 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Pressure Head (ft[b])
OBS-MW1	5869.08	18	5851	135	5734	135 - 155	5798.74	5724.10	75
OBS-MW2	5860.75	230	5631	240	5621	234 - 254	5689.36	5616.80	72
OBS-MW3	5863.31	120	5743	190	5673	190 - 210	5795.84	5663.30	133

NOTES:
[a]Observed during drilling.
[b]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
ft = Foot (feet).
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 2012. 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 2012 Piper diagram and interpretation of a single water source is consistent with the data and interpretation provided in the Calendar Year 2011 Annual Groundwater Report (SNL September 2012b) Because the completion zones are well known for monitoring wells OBS-MW1 and OBS-MW3, 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. Typically, a monitoring well of similar design would 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 on Figure 10-4 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 map for SWMU 68 is shown on Figure 10-4. The water-level elevation in monitoring well OBS-MW1 was 2.90 ft higher than monitoring well OBS-MW3 in October 2012. 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 (ft/ft) 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 semiconfined or confined conditions for 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 low-flow sampling purposes. 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 minute (ft/min) (SNL June 2012b). It should be noted that the slug test analyses were developed for use in

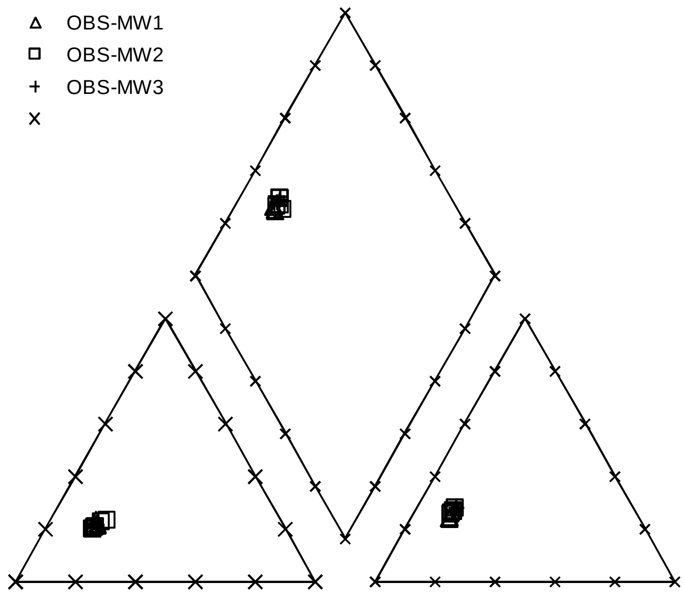

Figure 10-3. Piper Trilinear Diagram of Major Ion Chemistry for Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 at SWMU 68, CY 2012

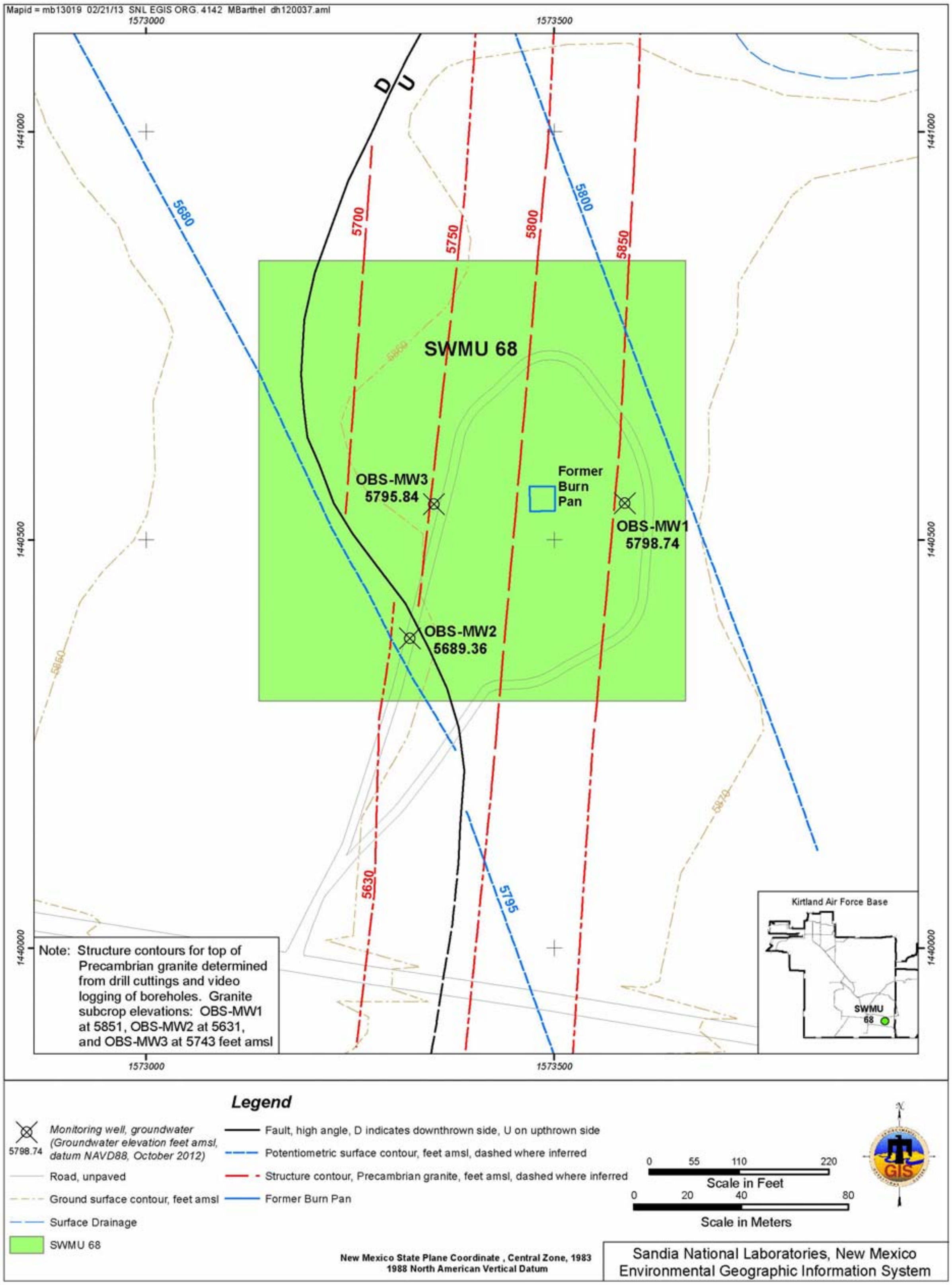

Figure 10-4. SWMU 68 Potentiometric Surface Map (October 2012)

unconsolidated deposits and analyses of bedrock aquifers is 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} 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 SWMUs 8/58 wells are 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 storm water 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 semiconfined or confined conditions. The geochemical signature is of the bicarbonate type dominated by calcium.

Naturally filled fractures in the overlying bedrock probably serve as a confining unit. 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 ft/ft 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 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 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. Human health and ecological risk assessments show that remaining constituent 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 2012 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 federal 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 Order (NMED April 2004) specifically identified SWMU 68 as requiring investigation. All corrective action requirements pertaining to SWMU 68 are contained in the 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 III 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 location 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).

Eight consecutive quarters of groundwater monitoring are required at the newly installed wells. The first sampling event occurred in October 2011 and four additional quarters of sampling CY 2012. 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 Order, as specified in Section III.A of the Order (NMED April 2004).

10.3 Scope of Activities

The field activity discussed in this section is groundwater monitoring sampling and analysis during CY 2012 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.

10.4 Field Methods and Measurements

According to the requirements of the Order (NMED April 2004) addressing Section VII.D.6 and the NMED letter of April 8, 2010 (NMED April 2010), SNL/NM personnel performed groundwater sampling at SWMU 68. The CY 2012 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures for groundwater sampling activities and the SWMU 68 site-specific Mini-SAPs (SNL December 2011, March 2012, June 2012a, and September 2012a).

Table 10-3. Groundwater Monitoring Well Network and Sampling Dates for SWMU 68, Calendar Year 2012

Date of Sampling Event	Monitoring Wells Sampled	SAP
January 2012	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2012* (SNL December 2011)
April 2012	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2012* (SNL March 2012)
July 2012	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2012* (SNL June 2012a)
October 2012	OBS-MW1 OBS-MW2 OBS-MW3	*SWMU 68 Groundwater Monitoring Mini-SAP for First Quarter Fiscal Year 2013* (SNL September 2012a)

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 2012

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 2012** OBS-MW1 OBS-MW2 OBS-MW2 (dup) OBS-MW3 **July 2012** OBS-MW1 OBS-MW2 OBS-MW3 OBS-MW3 (dup)	**April 2012** OBS-MW1 OBS-MW1 (dup) OBS-MW2 OBS-MW3 **October 2012** 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.
NPN = Nitrate plus nitrate (reported as nitrogen).
SVOC = Semivolatile organic compound.
TAL = Target Analyte List.
VOC = Volatile organic compound.

Groundwater samples were collected from monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 in January, April, July, and October 2012. 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.

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), trip blank (TB), and field blank (FB) 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. TB samples are used to determine whether VOCs contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory. FB samples provide a check for potential ambient sources of sample contamination during the sampling process and/or sampling error.

The NMED DOE Oversight Bureau (OB) collected split samples with Sandia during April and July 2012 sampling events. The NMED DOE OB analytical results are not reported in this document but are available through the DOE NNSA SFO.

The monitoring procedures, as conducted by Long-Term Stewardship/ER Operations personnel, for SWMU 68 are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986) and are described in detail in Section 1.3.

10.4.1 Groundwater Elevation

During the quarterly CY 2012 sampling water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in potentiometric surface elevations. CY 2012 water level information was used to create the potentiometric surface map presented on Figure 10-4 and the hydrographs presented on Figures 10B-1 and 10B-2 (Attachment 10B).

10.5 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).

10.6 Summary of Analytical Results

This section discusses analytical results and field measurements for the CY 2012 SWMU 68 sampling event. Data are presented in Tables 10A-1 through 10A-11 (Attachment 10A). Data qualifiers are explained in the footnotes following Table 10A-11.

The analytical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure 00-03 (SNL May 2011). 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.

With the exception of trace amounts of toluene (Table 10A-1) in the July 2012 samples, no VOCs, SVOCs, or HE compounds were detected in any SWMU 68 groundwater samples above laboratory method detection limits (MDLs). Table 10A-2 lists the MDLs for associated VOCs and SVOCs, and the MDLs for HE compounds are presented in Table 10A-3. Trace amounts of toluene were detected for all three wells in samples collected in July 2012 with concentrations from 0.390 to 0.480 milligrams per liter (mg/L). The amount detected is far below the MCL for toluene (1,000 mg/L).

Table 10A-4 (Attachment 10A) summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN concentrations range from 0.540 to 1.86 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.

Perchlorate was not detected above the 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.

All SWMU 68 groundwater samples were screened for gamma-emitting radionuclides and gross alpha/beta activity. An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. The results for gamma spectroscopy, gross alpha, gross beta, and isotopic uranium are presented in Table 10A-10 (Attachment 10A). 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.

10.7 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. 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.

10.7.1 Field Quality Control Samples

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

10.7.1.1 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 2012 and the results are as follows:

- **January 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well OBS-MW2. The results show good agreement (RPD values less than 20 percent for organic compounds and less than 35 for inorganic analyses) for all calculated parameters, except NPN. The RPD for NPN was calculated at 94, but is an estimated value since the samples were diluted greater than five times and matrix specific accuracy and precision data were not provided by the analytical laboratory.

- **April 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well OBS-MW1. The duplicate sample results show good agreement (RPD values less than 20 percent for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

- **July 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well OBS-MW3. The duplicate sample results show good agreement (RPD values less than 20 percent for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

- **October 2012 Sampling Event—**A duplicate environmental sample was collected from monitoring well OBS-MW2. The duplicate sample results show good agreement (RPD values less than 20 percent for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

10.7.1.2 Equipment Blank Samples

EB or rinsate samples are collected to verify the equipment decontamination process. The results for EB analyses are as follows:

- **January 2012 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW2 and submitted for all analyses. Bromodichloromethane, chloroform, and copper were detected above the laboratory MDLs. No corrective action was necessary for bromodichloromethane or chloroform since these compounds were not detected in environmental samples. Copper was detected in monitoring well OBS-MW2 environmental samples at concentrations less than five times the associated EB, and qualified as not detected during data validation.

- **April 2012 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW1 and submitted for all analyses. Antimony, bromodichloromethane, chloroform, copper, dibromochloromethane, and chloride were detected above laboratory MDLs. No corrective action was necessary for bromodichloromethane, chloroform, dibromochloromethane, or chloride since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result. Antimony in the monitoring well OBS-MW1 duplicate environmental sample and copper in both the monitoring well OBS-MW1 environmental and duplicate environmental samples were detected at concentrations less than five times the associated EB result, and qualified as not detected during data validation.

- **July 2012 Sampling Event—**An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW3 and submitted for all analyses. Alkalinity, bromodichloromethane, chloroform, copper, dibromochloromethane, and toluene were detected above laboratory MDLs. No corrective action was necessary for alkalinity, bromodichloromethane, chloroform, or dibromochloromethane since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result. Copper and toluene in monitoring well OBS-MW3 environmental samples were detected at concentrations less than five times and ten times, respectively, the associated EB result; therefore, qualified as not detected during data validation.

- **October 2012 Sampling Event**—An EB or rinsate sample was collected prior to sampling monitoring well OBS-MW2 and submitted for all analyses. Bromodichloromethane, bromoform, chloroform, chloride, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

10.7.1.3 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 15 TB samples were submitted in CY 2012. Three were submitted in January and four in April, July, and October. No VOCs were detected above the associated laboratory MDLs in any TB sample.

10.7.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions.

- **January 2012 Sampling Event—**The monitoring well OBS-MW3 FB sample detected the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane above laboratory MDL. No corrective action was necessary, since these compounds were not detected in the associated environmental samples.

- **April 2012 Sampling Event—**The monitoring well OBS-MW2 FB sample detected the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDL. No corrective action was necessary, since these compounds were not detected in the associated environmental samples.

- **July 2012 Sampling Event—**The monitoring well OBS-MW2 FB sample detected the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDL. No corrective action was necessary, since these compounds were not detected in the associated environmental samples.

- **October 2012 Sampling Event**—The monitoring well OBS-MW3FB sample detected the VOC compounds bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary, since these compounds were not detected in the associated environmental samples.

10.7.2 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 2012**.**

10.8 Variances and Nonconformances

No variances or nonconformances from requirements specified in the SWMU 68 Groundwater Monitoring Mini-SAPs (SNL December 2011, March 2012, June 2012a, and September 2012a) were noted during sampling activities. However, project-specific issues identified during CY 2012 sampling activities are noted as follows:

- **January 2012 Sampling Event—**The sample pump did not operate smoothly at low pressure; therefore, flow rates during purging and sampling activities were higher than rates from the previous sampling event.

- **July 2012 Sampling Event—**Toluene was detected at low-level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new groundwater sample truck and equipment. Modifications to the groundwater sampling truck and equipment have been completed (moving the sample collection point forward, and moving the flow meter back to the purge point in the sampling line) and additional decontaminations have been performed since this sampling event.

10.9 Summary and Conclusions

Three new groundwater monitoring wells were installed at SWMU 68 in August 2011. In January, April, July, and October 2012, 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.

During CY 2013, quarterly groundwater sampling and reporting will continue at the SWMU 68 groundwater monitoring wells (OBS-MW1, OBS-MW2, and OBS-MW3). The eighth and final quarterly groundwater sampling event is scheduled for the fourth quarter of Fiscal Year 2013.

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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
Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 17-Jul-12	Toluene	0.400	0.300	1.00	1000	J		092618-001	SW846-8260
OBS-MW2 18-Jul-12	Toluene	0.390	0.300	1.00	1000	J		092620-001	SW846-8260
OBS-MW3 19-Jul-12	Toluene	0.480	0.300	1.00	1000	J	1.0U	092625-001	SW846-8260
OBS-MW3 (Duplicate) 19-Jul-12	Toluene	0.480	0.300	1.00	1000	J	1.0U	092626-001	SW846-8260

Refer to footnotes on page 10A-41.

Table 10A-2
Method Detection Limits for Volatile Organic and Semivolatile Organic Compounds, Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]
1,1,1-Trichloroethane	0.300 - 0.325	8260B	1,2,4-Trichlorobenzene	2.83 - 3.30	8270C	Di-n-butyl phthalate	2.83 - 3.30	8270C
1,1,2,2-Tetrachloroethane	0.250 - 0.300	8260B	1,2-Dichlorobenzene	2.83 - 3.30	8270C	Di-n-octyl phthalate	2.83 - 3.30	8270C
1,1,2-Trichloroethane	0.250 - 0.300	8260B	1,3-Dichlorobenzene	2.83 - 3.30	8270C	Dibenz[a,h]anthracene	0.283 - 0.330	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	2.83 - 3.30	8270C	Dibenzofuran	2.83 - 3.30	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	2.83 - 3.30	8270C	Diethylphthalate	2.83 - 3.30	8270C
1,2-Dichloroethane	0.250 - 0.300	8260B	2,4,6-Trichlorophenol	2.83 - 3.30	8270C	Dimethylphthalate	2.83 - 3.30	8270C
1,2-Dichloropropane	0.250 - 0.300	8260B	2,4-Dichlorophenol	2.83 - 3.30	8270C	Dinitro-o-cresol	2.83 - 3.30	8270C
2-Butanone	1.25 - 2.00	8260B	2,4-Dimethylphenol	2.83 - 3.30	8270C	Diphenyl amine	2.83 - 3.30	8270C
2-Hexanone	1.25 - 2.22	8260B	2,4-Dinitrophenol	4.72 - 5.49	8270C	Fluoranthene	0.283 - 0.330	8270C
4-methyl-, 2-Pentanone	1.25 - 1.50	8260B	2,4-Dinitrotoluene	2.83 - 3.30	8270C	Fluorene	0.283 - 0.330	8270C
Acetone	3.00 - 3.50	8260B	2,6-Dinitrotoluene	2.83 - 3.30	8270C	Hexachlorobenzene	2.83 - 3.30	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.283 - 0.330	8270C	Hexachlorobutadiene	2.83 - 3.30	8270C
Bromodichloromethane	0.250 - 0.300	8260B	2-Chlorophenol	2.83 - 3.30	8270C	Hexachlorocyclopentadiene	2.83 - 3.30	8270C
Bromoform	0.250 - 0.300	8260B	2-Methylnaphthalene	0.283 - 0.330	8270C	Hexachloroethane	2.83 - 3.30	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	2.83 - 3.30	8270C	Indeno(1,2,3-c,d)pyrene	0.283 - 0.330	8270C
Carbon disulfide	1.25 - 1.50	8260B	2-Nitrophenol	2.83 - 3.30	8270C	Isophorone	2.83 - 3.30	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	2.83 - 3.30	8270C	Naphthalene	0.283 - 0.330	8270C
Chlorobenzene	0.250 - 0.300	8260B	3-Nitroaniline	2.83 - 3.30	8270C	Nitro-benzene	2.83 - 3.30	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	2.83 - 3.30	8270C	Pentachlorophenol	2.83 - 3.30	8270C
Chloroform	0.250 - 0.300	8260B	4-Chloro-3-methylphenol	2.83 - 3.30	8270C	Phenanthrene	0.283 - 0.330	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	2.83 - 3.30	8270C	Phenol	2.83 - 3.30	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	2.83 - 3.30	8270C	Pyrene	0.283 - 0.330	8270C
Ethyl benzene	0.250 - 0.300	8260B	4-Nitroaniline	2.83 - 3.30	8270C	bis(2-Chloroethoxy) methane	2.83 - 3.30	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	2.83 - 3.30	8270C	bis(1-Chloroisopropyl)ether	2.83 - 3.30	8270C
Styrene	0.250 - 0.300	8260B	Acenaphthene	0.283 - 0.330	8270C	bis(2-Chloroethyl)ether	2.83 - 3.30	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.283 - 0.330	8270C	bis(2-Ethylhexyl)phthalate	2.83 - 3.30	8270C
Toluene	0.250 - 0.300	8260B	Anthracene	0.283 - 0.330	8270C	m,p-Cresol	2.83 - 3.30	8270C
Trichloroethene	0.250 - 0.300	8260B	Benzo(a)anthracene	0.283 - 0.330	8270C	n-Nitrosodipropylamine	2.83 - 3.30	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.283 - 0.484	8270C	o-Cresol	2.83 - 3.30	8270C
Vinyl chloride	0.300 - 0.500	8260B	Benzo(b)fluoranthene	0.283 - 0.330	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.283 - 0.330	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.283 - 0.330	8270C			
cis-1,3-Dichloropropene	0.250 - 0.300	8260B	Butylbenzyl phthalate	2.83 - 3.30	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.283 - 0.330	8270C			
trans-1,3-Dichloropropene	0.250 - 0.300	8260B	Chrysene	0.283 - 0.330	8270C			

Refer to footnotes on page 10A-41.

Table 10A-3
Method Detection Limits for High Explosive Compounds (EPA Method[g] SW846-8321A), Solid Waste Management Unit 68 Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0816 – 0.104
1,3-Dinitrobenzene	0.0816 – 0.104
2,4,6-Trinitrotoluene	0.0816 – 0.104
2,4-Dinitrotoluene	0.0816 – 0.104
2,6-Dinitrotoluene	0.0816 – 0.104
2-Amino-4,6-dinitrotoluene	0.0816 – 0.104
2-Nitrotoluene	0.0837 – 0.106
3-Nitrotoluene	0.0816 – 0.104
4-Amino-2,6-dinitrotoluene	0.0816 – 0.104
4-Nitrotoluene	0.153 – 0.195
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.0816 – 0.104
Nitro-benzene	0.0816 – 0.104
Pentaerythritol tetranitrate	0.102 – 0.130
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.0816 – 0.104
Tetryl	0.0816 – 0.104

Refer to footnotes on page 10A-41.

Table 10A-4
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 09-Jan-12	Nitrate plus nitrite as N	1.70	0.050	0.250	10.0		J	091600-018	EPA 353.2
OBS-MW2 10-Jan-12	Nitrate plus nitrite as N	1.49	0.050	0.250	10.0		J	091604-018	EPA 353.2
OBS-MW2 (Duplicate) 10-Jan-12	Nitrate plus nitrite as N	0.540	0.050	0.250	10.0		J	091605-018	EPA 353.2
OBS-MW3 11-Jan-12	Nitrate plus nitrite as N	1.33	0.050	0.250	10.0	B		091607-018	EPA 353.2
OBS-MW1 18-Apr-12	Nitrate plus nitrite as N	1.80	0.170	0.500	10.0			092022-018	EPA 353.2
OBS-MW1 (Duplicate) 18-Apr-12	Nitrate plus nitrite as N	1.85	0.170	0.500	10.0			092023-018	EPA 353.2
OBS-MW2 19-Apr-12	Nitrate plus nitrite as N	1.43	0.085	0.250	10.0			092025-018	EPA 353.2
OBS-MW3 17-Apr-12	Nitrate plus nitrite as N	1.61	0.170	0.500	10.0			092018-018	EPA 353.2
OBS-MW1 17-Jul-12	Nitrate plus nitrite as N	1.86	0.085	0.250	10.0			092618-018	EPA 353.2
OBS-MW2 18-Jul-12	Nitrate plus nitrite as N	1.47	0.085	0.250	10.0			092620-018	EPA 353.2
OBS-MW3 19-Jul-12	Nitrate plus nitrite as N	1.56	0.085	0.250	10.0			092625-018	EPA 353.2
OBS-MW3 (Duplicate) 19-Jul-12	Nitrate plus nitrite as N	1.59	0.085	0.250	10.0			092626-018	EPA 353.2
OBS-MW1 16-Oct-12	Nitrate plus nitrite as N	1.83	0.170	0.500	10.0			093003-018	EPA 353.2
OBS-MW2 17-Oct-12	Nitrate plus nitrite as N	1.56	0.085	0.250	10.0			093007-018	EPA 353.2
OBS-MW2 (Duplicate) 17-Oct-12	Nitrate plus nitrite as N	1.58	0.085	0.250	10.0			093008-018	EPA 353.2
OBS-MW3 18-Oct-12	Nitrate plus nitrite as N	1.70	0.170	0.500	10.0			093010-018	EPA 353.2

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	B		091600-022	SM2320B
09-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091600-022	SM2320B
	Bromide	0.372	0.066	0.200	NE			091600-016	SW846 9056
	Chloride	21.8	0.330	1.00	NE			091600-016	SW846 9056
	Fluoride	2.04	0.033	0.100	4.00			091600-016	SW846 9056
	Sulfate	75.8	0.500	2.00	NE			091600-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091600-027	SW846 9012
OBS-MW2	Bicarbonate Alkalinity	176	0.725	1.00	NE			091604-022	SM2320B
10-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091604-022	SM2320B
	Bromide	0.406	0.066	0.200	NE			091604-016	SW846 9056
	Chloride	21.5	0.330	1.00	NE			091604-016	SW846 9056
	Fluoride	2.11	0.033	0.100	4.00			091604-016	SW846 9056
	Sulfate	87.2	0.500	2.00	NE			091604-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091604-027	SW846 9012
OBS-MW2 (Duplicate)	Bicarbonate Alkalinity	175	0.725	1.00	NE			091605-022	SM2320B
10-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091605-022	SM2320B
	Bromide	0.349	0.066	0.200	NE			091605-016	SW846 9056
	Chloride	21.4	0.330	1.00	NE			091605-016	SW846 9056
	Fluoride	2.12	0.033	0.100	4.00			091605-016	SW846 9056
	Sulfate	87.0	0.500	2.00	NE			091605-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091605-027	SW846 9012
OBS-MW3	Bicarbonate Alkalinity	174	0.725	1.00	NE			091607-022	SM2320B
11-Jan-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091607-022	SM2320B
	Bromide	0.363	0.066	0.200	NE			091607-016	SW846 9056
	Chloride	22.4	0.330	1.00	NE			091607-016	SW846 9056
	Fluoride	2.16	0.033	0.100	4.00			091607-016	SW846 9056
	Sulfate	86.8	0.500	2.00	NE			091607-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091607-027	SW846 9012

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	188	0.725	1.00	NE			092022-022	SM2320B
18-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092022-022	SM2320B
	Bromide	0.360	0.067	0.200	NE			092022-016	SW846 9056
	Chloride	21.8	0.335	1.00	NE			092022-016	SW846 9056
	Fluoride	1.99	0.033	0.100	4.00			092022-016	SW846 9056
	Sulfate	74.6	0.665	2.00	NE			092022-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092022-027	SW846 9012
OBS-MW1 (Duplicate)	Bicarbonate Alkalinity	188	0.725	1.00	NE			092023-022	SM2320B
18-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092023-022	SM2320B
	Bromide	0.336	0.067	0.200	NE			092023-016	SW846 9056
	Chloride	21.7	0.335	1.00	NE			092023-016	SW846 9056
	Fluoride	2.01	0.033	0.100	4.00			092023-016	SW846 9056
	Sulfate	74.7	0.665	2.00	NE			092023-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092023-027	SW846 9012
OBS-MW2	Bicarbonate Alkalinity	178	0.725	1.00	NE			092025-022	SM2320B
19-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092025-022	SM2320B
	Bromide	0.335	0.067	0.200	NE			092025-016	SW846 9056
	Chloride	21.1	0.335	1.00	NE			092025-016	SW846 9056
	Fluoride	2.06	0.033	0.100	4.00			092025-016	SW846 9056
	Sulfate	83.6	0.665	2.00	NE			092025-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092025-027	SW846 9012
OBS-MW3	Bicarbonate Alkalinity	178	0.725	1.00	NE			092018-022	SM2320B
17-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092018-022	SM2320B
	Bromide	0.335	0.067	0.200	NE			092018-016	SW846 9056
	Chloride	21.9	0.335	1.00	NE			092018-016	SW846 9056
	Fluoride	2.10	0.033	0.100	4.00			092018-016	SW846 9056
	Sulfate	83.4	0.665	2.00	NE			092018-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092018-027	SW846 9012

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	189	0.725	1.00	NE			092618-022	SM2320B
17-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092618-022	SM2320B
	Chloride	22.4	0.670	2.00	NE			092618-016	SW846 9056
	Sulfate	74.6	1.33	4.00	NE			092618-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092618-027	SW846 9012
OBS-MW2	Bicarbonate Alkalinity	183	0.725	1.00	NE			092620-022	SM2320B
18-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092620-022	SM2320B
	Chloride	20.9	0.335	1.00	NE	B		092620-016	SW846 9056
	Sulfate	81.8	0.665	2.00	NE			092620-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092620-027	SW846 9012
OBS-MW3	Bicarbonate Alkalinity	181	0.725	1.00	NE			092625-022	SM2320B
19-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092625-022	SM2320B
	Chloride	21.7	0.335	1.00	NE	B		092625-016	SW846 9056
	Sulfate	81.8	0.665	2.00	NE			092625-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092625-027	SW846 9012
OBS-MW3 (Duplicate)	Bicarbonate Alkalinity	181	0.725	1.00	NE			092626-022	SM2320B
19-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092626-022	SM2320B
	Chloride	21.7	0.335	1.00	NE	B		092626-016	SW846 9056
	Sulfate	81.8	0.665	2.00	NE			092626-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092626-027	SW846 9012

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	194	0.725	1.00	NE			093003-022	SM2320B
16-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093003-022	SM2320B
	Bromide	0.411	0.067	0.200	NE			093003-016	SW846 9056
	Chloride	22.3	0.670	2.00	NE			093003-016	SW846 9056
	Fluoride	2.19	0.033	0.100	4.00			093003-016	SW846 9056
	Sulfate	77.6	1.33	4.00	NE			093003-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093003-027	SW846 9012
OBS-MW2	Bicarbonate Alkalinity	183	0.725	1.00	NE			093007-022	SM2320B
17-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093007-022	SM2320B
	Bromide	0.329	0.067	0.200	NE			093007-016	SW846 9056
	Chloride	22.2	0.670	2.00	NE			093007-016	SW846 9056
	Fluoride	2.32	0.033	0.100	4.00			093007-016	SW846 9056
	Sulfate	85.0	1.33	4.00	NE			093007-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093007-027	SW846 9012
OBS-MW2 (Duplicate)	Bicarbonate Alkalinity	194	0.725	1.00	NE			093008-022	SM2320B
17-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093008-022	SM2320B
	Bromide	0.383	0.067	0.200	NE			093008-016	SW846 9056
	Chloride	22.1	0.670	2.00	NE			093008-016	SW846 9056
	Fluoride	2.34	0.033	0.100	4.00			093008-016	SW846 9056
	Sulfate	84.7	1.33	4.00	NE			093008-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093008-027	SW846 9012
OBS-MW3	Bicarbonate Alkalinity	181	0.725	1.00	NE			093010-022	SM2320B
18-Oct-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093010-022	SM2320B
	Bromide	0.386	0.067	0.200	NE			093010-016	SW846 9056
	Chloride	23.3	0.670	2.00	NE			093010-016	SW846 9056
	Fluoride	2.36	0.033	0.100	4.00			093010-016	SW846 9056
	Sulfate	86.2	1.33	4.00	NE			093010-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093010-027	SW846 9012

Refer to footnotes on page 10A-41.

Table 10A-6
Summary of Perchlorate Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 09-Jan-12	ND	0.004	0.012	NE	U		091600-020	EPA 314.0
OBS-MW2 10-Jan-12	ND	0.004	0.012	NE	U		091604-020	EPA 314.0
OBS-MW2 (Duplicate) 10-Jan-12	ND	0.004	0.012	NE	U		091605-020	EPA 314.0
OBS-MW3 11-Jan-12	ND	0.004	0.012	NE	U		091607-020	EPA 314.0
OBS-MW1 18-Apr-12	ND	0.004	0.012	NE	U		092022-020	EPA 314.0
OBS-MW1 (Duplicate) 18-Apr-12	ND	0.004	0.012	NE	U		092023-020	EPA 314.0
OBS-MW2 19-Apr-12	ND	0.004	0.012	NE	U		092025-020	EPA 314.0
OBS-MW3 17-Apr-12	ND	0.004	0.012	NE	U		092018-020	EPA 314.0
OBS-MW1 17-Jul-12	ND	0.004	0.012	NE	U		092618-020	EPA 314.0
OBS-MW2 18-Jul-12	ND	0.004	0.012	NE	U		092620-020	EPA 314.0
OBS-MW3 19-Jul-12	ND	0.004	0.012	NE	U		092625-020	EPA 314.0
OBS-MW3 (Duplicate) 19-Jul-12	ND	0.004	0.012	NE	U		092626-020	EPA 314.0
OBS-MW1 16-Oct-12	ND	0.004	0.012	NE	U		093003-020	EPA 314.0
OBS-MW2 17-Oct-12	ND	0.004	0.012	NE	U		093007-020	EPA 314.0
OBS-MW2 (Duplicate) 17-Oct-12	ND	0.004	0.012	NE	U		093008-020	EPA 314.0
OBS-MW3 18-Oct-12	ND	0.004	0.012	NE	U		093010-020	EPA 314.0

Refer to footnotes on page 10A-41.

Table 10A-7
Summary of Hexavalent Chromium Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 09-Jan-12	ND	0.003	0.010	NE	U		091600-014	SW846 7196A
OBS-MW2 10-Jan-12	ND	0.003	0.010	NE	U		091604-014	SW846 7196A
OBS-MW2 (Duplicate) 10-Jan-12	ND	0.003	0.010	NE	U		091605-014	SW846 7196A
OBS-MW3 11-Jan-12	ND	0.003	0.010	NE	U		091607-014	SW846 7196A
OBS-MW1 18-Apr-12	ND	0.0033	0.010	NE	U		092022-014	SW846 7196A
OBS-MW1 (Duplicate) 18-Apr-12	ND	0.0033	0.010	NE	U		092023-014	SW846 7196A
OBS-MW2 19-Apr-12	ND	0.0033	0.010	NE	U		092025-014	SW846 7196A
OBS-MW3 17-Apr-12	ND	0.0033	0.010	NE	U		092018-014	SW846 7196A
OBS-MW1 17-Jul-12	ND	0.0033	0.010	NE	U		092618-014	SW846 7196A
OBS-MW2 18-Jul-12	ND	0.0033	0.010	NE	U		092620-014	SW846 7196A
OBS-MW3 19-Jul-12	ND	0.0033	0.010	NE	U		092625-014	SW846 7196A
OBS-MW3 (Duplicate) 19-Jul-12	ND	0.0033	0.010	NE	U		092626-014	SW846 7196A
OBS-MW1 16-Oct-12	ND	0.0033	0.010	NE	U		093003-014	SW846 7196A
OBS-MW2 17-Oct-12	ND	0.0033	0.010	NE	U		093007-014	SW846 7196A
OBS-MW2 (Duplicate) 17-Oct-12	ND	0.0033	0.010	NE	U		093008-014	SW846 7196A
OBS-MW3 18-Oct-12	ND	0.0033	0.010	NE	U		093010-014	SW846 7196A

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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		091600-009	SW846 6020
09-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091600-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091600-009	SW846 6020
	Barium	0.0174	0.0006	0.002	2.00			091600-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091600-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091600-009	SW846 6020
	Calcium	77.9	0.300	1.00	NE	B		091600-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091600-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091600-009	SW846 6020
	Copper	0.000981	0.00035	0.001	NE	J		091600-009	SW846 6020
	Iron	0.143	0.033	0.100	NE			091600-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091600-009	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			091600-009	SW846 6020
	Manganese	0.00304	0.001	0.005	NE	J		091600-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091600-009	SW846 7470
	Nickel	0.00096	0.0005	0.002	NE	J		091600-009	SW846 6020
	Potassium	1.50	0.080	0.300	NE			091600-009	SW846 6020
	Selenium	0.00249	0.0015	0.005	0.050	J		091600-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091600-009	SW846 6020
	Sodium	20.7	0.080	0.250	NE			091600-009	SW846 6020
	Thallium	0.000472	0.00045	0.002	0.002	J		091600-009	SW846 6020
	Uranium	0.010	0.000067	0.0002	0.03			091600-009	SW846 6020
	Vanadium	0.0015	0.001	0.005	NE	J		091600-009	SW846 6010
	Zinc	0.00654	0.0035	0.010	NE	J		091600-009	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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		091604-009	SW846 6020
10-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091604-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091604-009	SW846 6020
	Barium	0.0203	0.0006	0.002	2.00			091604-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091604-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091604-009	SW846 6020
	Calcium	80.0	0.300	1.00	NE	B		091604-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091604-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091604-009	SW846 6020
	Copper	0.00065	0.00035	0.001	NE	J	0.0028U	091604-009	SW846 6020
	Iron	0.149	0.033	0.100	NE			091604-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091604-009	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			091604-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091604-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091604-009	SW846 7470
	Nickel	0.000924	0.0005	0.002	NE	J		091604-009	SW846 6020
	Potassium	1.60	0.080	0.300	NE			091604-009	SW846 6020
	Selenium	0.00431	0.0015	0.005	0.050	J		091604-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091604-009	SW846 6020
	Sodium	21.0	0.080	0.250	NE			091604-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091604-009	SW846 6020
	Uranium	0.0145	0.000067	0.0002	0.03			091604-009	SW846 6020
	Vanadium	0.00162	0.001	0.005	NE	J		091604-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091604-009	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.0183	0.015	0.050	NE	J		091605-009	SW846 6020
10-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091605-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091605-009	SW846 6020
	Barium	0.0205	0.0006	0.002	2.00			091605-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091605-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091605-009	SW846 6020
	Calcium	83.5	0.300	1.00	NE	B		091605-009	SW846 6020
	Chromium	0.00213	0.002	0.010	0.100	J		091605-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091605-009	SW846 6020
	Copper	0.000605	0.00035	0.001	NE	J	0.0028U	091605-009	SW846 6020
	Iron	0.156	0.033	0.100	NE			091605-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091605-009	SW846 6020
	Magnesium	15.8	0.010	0.030	NE			091605-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091605-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091605-009	SW846 7470
	Nickel	0.000961	0.0005	0.002	NE	J		091605-009	SW846 6020
	Potassium	1.76	0.080	0.300	NE			091605-009	SW846 6020
	Selenium	0.00488	0.0015	0.005	0.050	J		091605-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091605-009	SW846 6020
	Sodium	22.3	0.080	0.250	NE			091605-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091605-009	SW846 6020
	Uranium	0.0151	0.000067	0.0002	0.03			091605-009	SW846 6020
	Vanadium	0.00173	0.001	0.005	NE	J		091605-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091605-009	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.0162	0.015	0.050	NE	J		091607-009	SW846 6020
11-Jan-12	Antimony	ND	0.001	0.003	0.006	U		091607-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091607-009	SW846 6020
	Barium	0.0287	0.0006	0.002	2.00			091607-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091607-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091607-009	SW846 6020
	Calcium	76.0	0.300	1.00	NE	B		091607-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091607-009	SW846 6020
	Cobalt	0.000257	0.0001	0.001	NE	J		091607-009	SW846 6020
	Copper	0.0016	0.00035	0.001	NE			091607-009	SW846 6020
	Iron	0.248	0.033	0.100	NE			091607-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091607-009	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			091607-009	SW846 6020
	Manganese	0.00198	0.001	0.005	NE	J		091607-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091607-009	SW846 7470
	Nickel	0.00153	0.0005	0.002	NE	J		091607-009	SW846 6020
	Potassium	1.66	0.080	0.300	NE			091607-009	SW846 6020
	Selenium	0.00265	0.0015	0.005	0.050	J		091607-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091607-009	SW846 6020
	Sodium	21.0	0.080	0.250	NE			091607-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091607-009	SW846 6020
	Uranium	0.0111	0.000067	0.0002	0.03			091607-009	SW846 6020
	Vanadium	0.00112	0.001	0.005	NE	J		091607-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091607-009	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.028	0.015	0.050	NE	J		092022-009	SW846 6020
18-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092022-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092022-009	SW846 6020
	Barium	0.0202	0.0006	0.002	2.00			092022-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092022-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092022-009	SW846 6020
	Calcium	77.5	0.300	1.00	NE			092022-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092022-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092022-009	SW846 6020
	Copper	0.000517	0.00035	0.001	NE	J	0.0065U	092022-009	SW846 6020
	Iron	0.120	0.033	0.100	NE			092022-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092022-009	SW846 6020
	Magnesium	16.1	0.010	0.030	NE			092022-009	SW846 6020
	Manganese	0.00114	0.001	0.005	NE	J		092022-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092022-009	SW846 7470
	Nickel	0.000961	0.0005	0.002	NE	J		092022-009	SW846 6020
	Potassium	1.71	0.080	0.300	NE			092022-009	SW846 6020
	Selenium	0.00272	0.0015	0.005	0.050	J		092022-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092022-009	SW846 6020
	Sodium	22.9	0.080	0.250	NE			092022-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092022-009	SW846 6020
	Uranium	0.0104	0.000067	0.0002	0.03			092022-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092022-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092022-009	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 2012

Well ID	Analyte	Result[a] (mg/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	ND	0.015	0.050	NE	U		092023-009	SW846 6020
18-Apr-12	Antimony	0.0013	0.001	0.003	0.006	J	0.0064U	092023-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092023-009	SW846 6020
	Barium	0.0193	0.0006	0.002	2.00			092023-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092023-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092023-009	SW846 6020
	Calcium	78.7	0.300	1.00	NE			092023-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092023-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092023-009	SW846 6020
	Copper	0.000514	0.00035	0.001	NE	J	0.0065U	092023-009	SW846 6020
	Iron	0.132	0.033	0.100	NE			092023-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092023-009	SW846 6020
	Magnesium	16.6	0.010	0.030	NE			092023-009	SW846 6020
	Manganese	0.00111	0.001	0.005	NE	J		092023-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092023-009	SW846 7470
	Nickel	0.000945	0.0005	0.002	NE	J		092023-009	SW846 6020
	Potassium	1.85	0.080	0.300	NE			092023-009	SW846 6020
	Selenium	0.00278	0.0015	0.005	0.050	J		092023-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092023-009	SW846 6020
	Sodium	23.3	0.080	0.250	NE			092023-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092023-009	SW846 6020
	Uranium	0.0106	0.000067	0.0002	0.03			092023-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092023-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092023-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092025-009	SW846 6020
19-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092025-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092025-009	SW846 6020
	Barium	0.0222	0.0006	0.002	2.00			092025-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092025-009	SW846 6020
	Cadmium	0.000133	0.00011	0.001	0.005	B, J	U	092025-009	SW846 6020
	Calcium	81.5	0.600	2.00	NE			092025-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092025-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092025-009	SW846 6020
	Copper	0.000369	0.00035	0.001	NE	J		092025-009	SW846 6020
	Iron	0.138	0.033	0.100	NE			092025-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092025-009	SW846 6020
	Magnesium	20.0	0.100	0.300	NE			092025-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092025-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092025-009	SW846 7470
	Nickel	0.000929	0.0005	0.002	NE	J		092025-009	SW846 6020
	Potassium	1.78	0.080	0.300	NE			092025-009	SW846 6020
	Selenium	0.00324	0.0015	0.005	0.050	J		092025-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092025-009	SW846 6020
	Sodium	29.0	0.800	2.50	NE			092025-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092025-009	SW846 6020
	Uranium	0.0141	0.000067	0.0002	0.03			092025-009	SW846 6020
	Vanadium	0.00126	0.001	0.005	NE	J		092025-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092025-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092018-009	SW846 6020
17-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092018-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092018-009	SW846 6020
	Barium	0.0259	0.0006	0.002	2.00			092018-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092018-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092018-009	SW846 6020
	Calcium	78.7	0.300	1.00	NE	B		092018-009	SW846 6020
	Chromium	0.00219	0.002	0.010	0.100	B, J	0.0109U	092018-009	SW846 6020
	Cobalt	0.000154	0.0001	0.001	NE	J		092018-009	SW846 6020
	Copper	0.00101	0.00035	0.001	NE			092018-009	SW846 6020
	Iron	0.258	0.033	0.100	NE			092018-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092018-009	SW846 6020
	Magnesium	16.2	0.010	0.030	NE		J	092018-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092018-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092018-009	SW846 7470
	Nickel	0.00143	0.0005	0.002	NE	J		092018-009	SW846 6020
	Potassium	1.69	0.080	0.300	NE			092018-009	SW846 6020
	Selenium	0.00286	0.0015	0.005	0.050	J		092018-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092018-009	SW846 6020
	Sodium	22.4	0.080	0.250	NE			092018-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092018-009	SW846 6020
	Uranium	0.0116	0.000067	0.0002	0.03			092018-009	SW846 6020
	Vanadium	0.00128	0.001	0.005	NE	J		092018-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092018-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092618-009	SW846 6020
17-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092618-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092618-009	SW846 6020
	Barium	0.020	0.0006	0.002	2.00			092618-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092618-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092618-009	SW846 6020
	Calcium	75.3	0.300	1.00	NE			092618-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092618-009	SW846 6020
	Cobalt	0.00014	0.0001	0.001	NE	J		092618-009	SW846 6020
	Copper	0.000646	0.00035	0.001	NE	J	J+	092618-009	SW846 6020
	Iron	0.317	0.033	0.100	NE			092618-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092618-009	SW846 6020
	Magnesium	17.4	0.010	0.030	NE			092618-009	SW846 6020
	Manganese	0.00136	0.001	0.005	NE	J		092618-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092618-009	SW846 7470
	Nickel	0.00178	0.0005	0.002	NE	J		092618-009	SW846 6020
	Potassium	1.65	0.080	0.300	NE			092618-009	SW846 6020
	Selenium	0.00361	0.0015	0.005	0.050	J		092618-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092618-009	SW846 6020
	Sodium	20.3	0.400	1.25	NE			092618-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092618-009	SW846 6020
	Uranium	0.0107	0.000067	0.0002	0.03	B	J	092618-009	SW846 6020
	Vanadium	0.00111	0.001	0.005	NE	J		092618-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092618-009	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 2012

Well ID	Analyte	Result[a] (mg/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	0.0323	0.015	0.050	NE	J		092620-009	SW846 6020
18-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092620-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092620-009	SW846 6020
	Barium	0.0227	0.0006	0.002	2.00			092620-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092620-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092620-009	SW846 6020
	Calcium	84.5	0.300	1.00	NE		J	092620-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092620-009	SW846 6020
	Cobalt	0.000185	0.0001	0.001	NE	J	0.0005U	092620-009	SW846 6020
	Copper	0.00102	0.00035	0.001	NE			092620-009	SW846 6020
	Iron	0.208	0.033	0.100	NE			092620-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092620-009	SW846 6020
	Magnesium	16.9	0.010	0.030	NE			092620-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092620-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092620-009	SW846 7470
	Nickel	0.00171	0.0005	0.002	NE	J		092620-009	SW846 6020
	Potassium	1.67	0.080	0.300	NE			092620-009	SW846 6020
	Selenium	0.00305	0.0015	0.005	0.050	J		092620-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092620-009	SW846 6020
	Sodium	23.2	0.080	0.250	NE			092620-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092620-009	SW846 6020
	Uranium	0.0136	0.000067	0.0002	0.03		J	092620-009	SW846 6020
	Vanadium	0.00124	0.001	0.005	NE	J		092620-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092620-009	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 2012

Well ID	Analyte	Result[a] (mg/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		092625-009	SW846 6020
19-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092625-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092625-009	SW846 6020
	Barium	0.0249	0.0006	0.002	2.00			092625-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092625-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092625-009	SW846 6020
	Calcium	77.4	0.300	1.00	NE			092625-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092625-009	SW846 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		092625-009	SW846 6020
	Copper	0.000749	0.00035	0.001	NE	J	0.0061UJ	092625-009	SW846 6020
	Iron	0.224	0.033	0.100	NE			092625-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092625-009	SW846 6020
	Magnesium	16.3	0.010	0.030	NE			092625-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092625-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092625-009	SW846 7470
	Nickel	0.00112	0.0005	0.002	NE	J		092625-009	SW846 6020
	Potassium	1.51	0.080	0.300	NE			092625-009	SW846 6020
	Selenium	0.0037	0.0015	0.005	0.050	J		092625-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092625-009	SW846 6020
	Sodium	22.4	0.400	1.25	NE			092625-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092625-009	SW846 6020
	Uranium	0.012	0.000067	0.0002	0.03			092625-009	SW846 6020
	Vanadium	0.00187	0.001	0.005	NE	B, J	0.0059U	092625-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092625-009	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 2012

Well ID	Analyte	Result[a] (mg/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) 19-Jul-12	Aluminum	ND	0.015	0.050	NE	U		092626-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		092626-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092626-009	SW846 6020
	Barium	0.0282	0.0006	0.002	2.00			092626-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092626-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092626-009	SW846 6020
	Calcium	79.6	0.300	1.00	NE			092626-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092626-009	SW846 6020
	Cobalt	0.000105	0.0001	0.001	NE	J		092626-009	SW846 6020
	Copper	0.000844	0.00035	0.001	NE	J	0.0061UJ	092626-009	SW846 6020
	Iron	0.223	0.033	0.100	NE			092626-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092626-009	SW846 6020
	Magnesium	15.3	0.010	0.030	NE			092626-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092626-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092626-009	SW846 7470
	Nickel	0.00122	0.0005	0.002	NE	J		092626-009	SW846 6020
	Potassium	1.56	0.080	0.300	NE			092626-009	SW846 6020
	Selenium	0.00353	0.0015	0.005	0.050	J		092626-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092626-009	SW846 6020
	Sodium	21.3	0.400	1.25	NE			092626-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092626-009	SW846 6020
	Uranium	0.0124	0.000067	0.0002	0.03			092626-009	SW846 6020
	Vanadium	0.00156	0.001	0.005	NE	B, J	0.0059U	092626-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092626-009	SW846 6020

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Table 10A-8 *(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]
OBS-MW1	Aluminum	0.0337	0.015	0.050	NE	J		093003-009	SW846 6020
16-Oct-12	Antimony	ND	0.001	0.003	0.006	U		093003-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093003-009	SW846 6020
	Barium	0.0181	0.0006	0.002	2.00			093003-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093003-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093003-009	SW846 6020
	Calcium	87.1	0.600	2.00	NE			093003-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093003-009	SW846 6020
	Cobalt	0.000103	0.0001	0.001	NE	J		093003-009	SW846 6020
	Copper	0.00112	0.00035	0.001	NE	B	0.00386U	093003-009	SW846 6020
	Iron	0.216	0.033	0.100	NE			093003-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093003-009	SW846 6020
	Magnesium	18.7	0.010	0.030	NE			093003-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093003-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093003-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	J		093003-009	SW846 6020
	Potassium	1.64	0.080	0.300	NE			093003-009	SW846 6020
	Selenium	0.00273	0.0015	0.005	0.050	J		093003-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093003-009	SW846 6020
	Sodium	25.4	0.080	0.250	NE			093003-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093003-009	SW846 6020
	Uranium	0.0102	0.000067	0.0002	0.03			093003-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		093003-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		093003-009	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 2012

Well ID	Analyte	Result[a] (mg/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		093007-009	SW846 6020
17-Oct-12	Antimony	0.0011	0.001	0.003	0.006	B, J	0.01075U	093007-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093007-009	SW846 6020
	Barium	0.0198	0.0006	0.002	2.00			093007-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093007-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093007-009	SW846 6020
	Calcium	77.3	0.300	1.00	NE			093007-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093007-009	SW846 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		093007-009	SW846 6020
	Copper	0.00133	0.00035	0.001	NE	B	0.00437U	093007-009	SW846 6020
	Iron	0.193	0.033	0.100	NE			093007-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093007-009	SW846 6020
	Magnesium	17.8	0.010	0.030	NE			093007-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093007-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093007-009	SW846 7470
	Nickel	0.00148	0.0005	0.002	NE	J		093007-009	SW846 6020
	Potassium	1.64	0.080	0.300	NE			093007-009	SW846 6020
	Selenium	0.00369	0.0015	0.005	0.050	J		093007-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093007-009	SW846 6020
	Sodium	24.1	0.080	0.250	NE			093007-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093007-009	SW846 6020
	Uranium	0.0135	0.000067	0.0002	0.03			093007-009	SW846 6020
	Vanadium	0.00124	0.001	0.005	NE	J		093007-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		093007-009	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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		093008-009	SW846 6020
17-Oct-12	Antimony	ND	0.001	0.003	0.006	U		093008-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093008-009	SW846 6020
	Barium	0.019	0.0006	0.002	2.00			093008-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093008-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093008-009	SW846 6020
	Calcium	77.2	0.300	1.00	NE			093008-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093008-009	SW846 6020
	Cobalt	0.000109	0.0001	0.001	NE	J		093008-009	SW846 6020
	Copper	0.000718	0.00035	0.001	NE	B, J	0.00437U	093008-009	SW846 6020
	Iron	0.200	0.033	0.100	NE			093008-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093008-009	SW846 6020
	Magnesium	15.7	0.010	0.030	NE			093008-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093008-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093008-009	SW846 7470
	Nickel	0.00148	0.0005	0.002	NE	J		093008-009	SW846 6020
	Potassium	1.56	0.080	0.300	NE			093008-009	SW846 6020
	Selenium	0.00373	0.0015	0.005	0.050	J		093008-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093008-009	SW846 6020
	Sodium	21.6	0.080	0.250	NE			093008-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093008-009	SW846 6020
	Uranium	0.0129	0.000067	0.0002	0.03			093008-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		093008-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		093008-009	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

Well ID	Analyte	Result[a] (mg/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		093010-009	SW846 6020
18-Oct-12	Antimony	ND	0.001	0.003	0.006	U		093010-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093010-009	SW846 6020
	Barium	0.0246	0.0006	0.002	2.00			093010-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093010-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093010-009	SW846 6020
	Calcium	76.1	0.300	1.00	NE			093010-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093010-009	SW846 6020
	Cobalt	0.000116	0.0001	0.001	NE	J		093010-009	SW846 6020
	Copper	0.000871	0.00035	0.001	NE	B, J	0.00437U	093010-009	SW846 6020
	Iron	0.206	0.033	0.100	NE			093010-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093010-009	SW846 6020
	Magnesium	16.1	0.010	0.030	NE			093010-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093010-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093010-009	SW846 7470
	Nickel	0.0015	0.0005	0.002	NE	J		093010-009	SW846 6020
	Potassium	1.62	0.080	0.300	NE			093010-009	SW846 6020
	Selenium	0.00466	0.0015	0.005	0.050	J		093010-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093010-009	SW846 6020
	Sodium	21.5	0.080	0.250	NE			093010-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093010-009	SW846 6020
	Uranium	0.0117	0.000067	0.0002	0.03			093010-009	SW846 6020
	Vanadium	0.00117	0.001	0.005	NE	J		093010-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		093010-009	SW846 6020

Refer to footnotes on page 10A-41.

Table 10A-9
Summary of Cation Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	79.7	0.300	1.00	NE	B		091600-017	SW846 6020
09-Jan-12	Magnesium	15.1	0.010	0.030	NE			091600-017	SW846 6020
	Potassium	1.61	0.080	0.300	NE			091600-017	SW846 6020
	Sodium	21.0	0.080	0.250	NE			091600-017	SW846 6020
OBS-MW2	Calcium	74.9	0.300	1.00	NE	B		091604-017	SW846 6020
10-Jan-12	Magnesium	14.8	0.010	0.030	NE			091604-017	SW846 6020
	Potassium	1.53	0.080	0.300	NE			091604-017	SW846 6020
	Sodium	20.8	0.080	0.250	NE			091604-017	SW846 6020
OBS-MW2 (Duplicate)	Calcium	83.7	0.300	1.00	NE	B		091605-017	SW846 6020
10-Jan-12	Magnesium	16.3	0.010	0.030	NE			091605-017	SW846 6020
	Potassium	1.67	0.080	0.300	NE			091605-017	SW846 6020
	Sodium	21.0	0.080	0.250	NE			091605-017	SW846 6020
OBS-MW3	Calcium	75.6	0.300	1.00	NE	B		091607-017	SW846 6020
11-Jan-12	Magnesium	16.8	0.010	0.030	NE			091607-017	SW846 6020
	Potassium	1.59	0.080	0.300	NE			091607-017	SW846 6020
	Sodium	21.5	0.080	0.250	NE			091607-017	SW846 6020
OBS-MW1	Calcium	83.8	0.300	1.00	NE			092022-017	SW846 6020
18-Apr-12	Magnesium	17.1	0.010	0.030	NE			092022-017	SW846 6020
	Potassium	1.88	0.080	0.300	NE			092022-017	SW846 6020
	Sodium	24.4	0.080	0.250	NE			092022-017	SW846 6020
OBS-MW1 (Duplicate)	Calcium	80.0	0.300	1.00	NE			092023-017	SW846 6020
18-Apr-12	Magnesium	16.7	0.010	0.030	NE			092023-017	SW846 6020
	Potassium	1.75	0.080	0.300	NE			092023-017	SW846 6020
	Sodium	22.5	0.080	0.250	NE			092023-017	SW846 6020
OBS-MW2	Calcium	90.2	0.600	2.00	NE			092025-017	SW846 6020
19-Apr-12	Magnesium	20.6	0.100	0.300	NE			092025-017	SW846 6020
	Potassium	1.73	0.080	0.300	NE			092025-017	SW846 6020
	Sodium	28.4	0.800	2.50	NE			092025-017	SW846 6020
OBS-MW3	Calcium	79.5	0.300	1.00	NE	B		092018-017	SW846 6020
17-Apr-12	Magnesium	17.2	0.010	0.030	NE		J	092018-017	SW846 6020
	Potassium	1.69	0.080	0.300	NE			092018-017	SW846 6020
	Sodium	23.0	0.080	0.250	NE			092018-017	SW846 6020

Refer to footnotes on page 10A-41.

Table 10A-9 *(Concluded)*
Summary of Cation Results,
Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	79.0	0.300	1.00	NE			092618-017	SW846 6020
17-Jul-12	Magnesium	17.1	0.010	0.030	NE			092618-017	SW846 6020
	Potassium	1.67	0.080	0.300	NE			092618-017	SW846 6020
	Sodium	26.3	0.080	0.250	NE			092618-017	SW846 6020
OBS-MW2	Calcium	67.5	0.600	2.00	NE			092620-017	SW846 6020
18-Jul-12	Magnesium	16.3	0.010	0.030	NE			092620-017	SW846 6020
	Potassium	1.67	0.080	0.300	NE			092620-017	SW846 6020
	Sodium	22.8	0.080	0.250	NE			092620-017	SW846 6020
OBS-MW3	Calcium	76.7	0.300	1.00	NE			092625-017	SW846 6020
19-Jul-12	Magnesium	16.2	0.010	0.030	NE			092625-017	SW846 6020
	Potassium	1.63	0.080	0.300	NE			092625-017	SW846 6020
	Sodium	21.8	0.400	1.25	NE			092625-017	SW846 6020
OBS-MW3 (Duplicate)	Calcium	81.7	0.300	1.00	NE			092626-017	SW846 6020
19-Jul-12	Magnesium	16.0	0.010	0.030	NE			092626-017	SW846 6020
	Potassium	1.62	0.080	0.300	NE			092626-017	SW846 6020
	Sodium	22.6	0.400	1.25	NE			092626-017	SW846 6020
OBS-MW1	Calcium	82.4	0.600	2.00	NE			093003-017	SW846 6020
16-Oct-12	Magnesium	17.1	0.010	0.030	NE			093003-017	SW846 6020
	Potassium	1.70	0.080	0.300	NE			093003-017	SW846 6020
	Sodium	22.8	0.080	0.250	NE			093003-017	SW846 6020
OBS-MW2	Calcium	75.3	0.300	1.00	NE			093007-017	SW846 6020
17-Oct-12	Magnesium	15.6	0.010	0.030	NE			093007-017	SW846 6020
	Potassium	1.50	0.080	0.300	NE			093007-017	SW846 6020
	Sodium	21.1	0.080	0.250	NE			093007-017	SW846 6020
OBS-MW2 (Duplicate)	Calcium	75.8	0.300	1.00	NE			093008-017	SW846 6020
17-Oct-12	Magnesium	15.9	0.010	0.030	NE			093008-017	SW846 6020
	Potassium	1.51	0.080	0.300	NE			093008-017	SW846 6020
	Sodium	21.7	0.080	0.250	NE			093008-017	SW846 6020
OBS-MW3	Calcium	74.4	0.300	1.00	NE			093010-017	SW846 6020
18-Oct-12	Magnesium	16.6	0.010	0.030	NE			093010-017	SW846 6020
	Potassium	1.67	0.080	0.300	NE			093010-017	SW846 6020
	Sodium	22.7	0.080	0.250	NE			093010-017	SW846 6020

Refer to footnotes on page 10A-41.

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 2012

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	0.586 ± 8.39	12.7	6.18	NE	U	BD	091600-033	EPA 901.1
09-Jan-12	Cesium-137	-1.41 ± 1.78	2.72	1.30	NE	U	BD	091600-033	EPA 901.1
	Cobalt-60	-0.555 ± 1.78	3.00	1.41	NE	U	BD	091600-033	EPA 901.1
	Potassium-40	16.0 ± 40.6	27.9	13.0	NE	U	BD	091600-033	EPA 901.1
	Gross Alpha	7.28	NA	NA	15 pCi/L	NA	None	091600-034	EPA 900.0
	Gross Beta	6.74 ± 1.54	1.16	0.557	4 mrem/yr			091600-034	EPA 900.0
	Uranium-233/234	18.9 ± 2.61	0.117	0.0481	NE			091600-035	HASL-300
	Uranium-235/236	0.171 ± 0.0822	0.103	0.0386	NE		J	091600-035	HASL-300
	Uranium-238	3.35 ± 0.544	0.0991	0.0391	NE			091600-035	HASL-300
OBS-MW2	Americium-241	3.99 ± 7.23	10.6	5.20	NE	U	BD	091604-033	EPA 901.1
10-Jan-12	Cesium-137	-2.24 ± 1.91	2.68	1.28	NE	U	BD	091604-033	EPA 901.1
	Cobalt-60	2.63 ± 2.18	3.44	1.64	NE	U	BD	091604-033	EPA 901.1
	Potassium-40	14.7 ± 39.4	27.2	12.8	NE	U	BD	091604-033	EPA 901.1
	Gross Alpha	5.52	NA	NA	15 pCi/L	NA	None	091604-034	EPA 900.0
	Gross Beta	5.36 ± 1.38	1.43	0.690	4 mrem/yr			091604-034	EPA 900.0
	Uranium-233/234	22.3 ± 2.93	0.065	0.0267	NE			091604-035	HASL-300
	Uranium-235/236	0.269 ± 0.0829	0.0571	0.0214	NE			091604-035	HASL-300
	Uranium-238	4.31 ± 0.613	0.0551	0.0217	NE			091604-035	HASL-300
OBS-MW2 (Duplicate)	Americium-241	-10.6 ± 12.2	18.7	9.14	NE	U	BD	091605-033	EPA 901.1
10-Jan-12	Cesium-137	-0.901 ± 1.77	2.96	1.42	NE	U	BD	091605-033	EPA 901.1
	Cobalt-60	0.0469 ± 1.70	3.06	1.43	NE	U	BD	091605-033	EPA 901.1
	Potassium-40	-37.6 ± 37.4	42.8	20.4	NE	U	BD	091605-033	EPA 901.1
	Gross Alpha	-3.54	NA	NA	15 pCi/L	NA	None	091605-034	EPA 900.0
	Gross Beta	4.53 ± 1.27	1.44	0.695	4 mrem/yr			091605-034	EPA 900.0
	Uranium-233/234	22.9 ± 2.97	0.0608	0.025	NE			091605-035	HASL-300
	Uranium-235/236	0.375 ± 0.098	0.0535	0.020	NE			091605-035	HASL-300
	Uranium-238	4.66 ± 0.651	0.0515	0.0203	NE			091605-035	HASL-300

Refer to footnotes on page 10A-41.

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 2012

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-MW3	Americium-241	5.29 ± 3.69	5.30	2.22	NE	U	BD	091607-033	EPA 901.1
11-Jan-12	Cesium-137	-7.66 ± 6.51	5.84	2.85	NE	U	R	091607-033	EPA 901.1
	Cobalt-60	-0.964 ± 2.19	3.73	1.76	NE	U	BD	091607-033	EPA 901.1
	Potassium-40	92.0 ± 42.7	34.5	16.2	NE		J	091607-033	EPA 901.1
	Gross Alpha	2.25	NA	NA	15 pCi/L	NA	None	091607-034	EPA 900.0
	Gross Beta	5.96 ± 1.67	1.86	0.903	4 mrem/yr			091607-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.85	0.0731	0.0301	NE			091607-035	HASL-300
	Uranium-235/236	0.273 ± 0.0867	0.0643	0.0241	NE			091607-035	HASL-300
	Uranium-238	4.38 ± 0.639	0.062	0.0245	NE			091607-035	HASL-300
OBS-MW1	Americium-241	3.89 ± 14.8	21.8	10.7	NE	U	BD	092022-033	EPA 901.1
18-Apr-12	Cesium-137	1.73 ± 3.01	4.39	2.13	NE	U	BD	092022-033	EPA 901.1
	Cobalt-60	-1.1 ± 2.38	4.06	1.94	NE	U	BD	092022-033	EPA 901.1
	Potassium-40	59.5 ± 37.3	59.5	24.0	NE	U	BD	092022-033	EPA 901.1
	Gross Alpha	1.78	NA	NA	15 pCi/L	NA	None	092022-034	EPA 900.0
	Gross Beta	3.12 ± 1.15	1.49	0.713	4 mrem/yr		J	092022-034	EPA 900.0
	Uranium-233/234	17.9 ± 2.37	0.139	0.0618	NE			092022-035	HASL-300
	Uranium-235/236	0.226 ± 0.0879	0.0803	0.0306	NE		J	092022-035	HASL-300
	Uranium-238	3.29 ± 0.499	0.0893	0.0369	NE			092022-035	HASL-300
OBS-MW1 (Duplicate)	Americium-241	8.25 ± 9.66	14.1	6.93	NE	U	BD	092023-033	EPA 901.1
18-Apr-12	Cesium-137	1.17 ± 2.00	3.34	1.62	NE	U	BD	092023-033	EPA 901.1
	Cobalt-60	2.52 ± 2.34	3.77	1.80	NE	U	BD	092023-033	EPA 901.1
	Potassium-40	41.6 ± 42.3	32.0	15.1	NE	X	R	092023-033	EPA 901.1
	Gross Alpha	1.07	NA	NA	15 pCi/L	NA	None	092023-034	EPA 900.0
	Gross Beta	3.53 ± 1.32	1.75	0.844	4 mrem/yr		J	092023-034	EPA 900.0
	Uranium-233/234	16.6 ± 2.12	0.0792	0.0352	NE			092023-035	HASL-300
	Uranium-235/236	0.197 ± 0.0604	0.0457	0.0174	NE			092023-035	HASL-300
	Uranium-238	3.13 ± 0.438	0.0509	0.021	NE			092023-035	HASL-300

Refer to footnotes on page 10A-41.

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 2012

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-MW2	Americium-241	-1.31 ± 28.3	41.0	20.2	NE	U	BD	092025-033	EPA 901.1
19-Apr-12	Cesium-137	2.54 ± 3.20	4.68	2.28	NE	U	BD	092025-033	EPA 901.1
	Cobalt-60	-2.36 ± 3.21	5.09	2.45	NE	U	BD	092025-033	EPA 901.1
	Potassium-40	92.2 ± 49.6	50.4	24.2	NE	X	BD	092025-033	EPA 901.1
	Gross Alpha	-0.95	NA	NA	15 pCi/L	NA	None	092025-034	EPA 900.0
	Gross Beta	3.97 ± 1.57	2.16	1.05	4 mrem/yr		J	092025-034	EPA 900.0
	Uranium-233/234	20.1 ± 2.58	0.0825	0.0366	NE			092025-035	HASL-300
	Uranium-235/236	0.272 ± 0.0745	0.0476	0.0181	NE			092025-035	HASL-300
	Uranium-238	3.88 ± 0.536	0.053	0.0219	NE			092025-035	HASL-300
OBS-MW3	Americium-241	4.72 ± 11.0	17.9	8.84	NE	U	BD	092018-033	EPA 901.1
17-Apr-12	Cesium-137	0.685 ± 2.56	3.87	1.87	NE	U	BD	092018-033	EPA 901.1
	Cobalt-60	1.12 ± 2.45	4.32	2.06	NE	U	BD	092018-033	EPA 901.1
	Potassium-40	-27.2 ± 43.1	50.8	24.4	NE	U	BD	092018-033	EPA 901.1
	Gross Alpha	8.08	NA	NA	15 pCi/L	NA	None	092018-034	EPA 900.0
	Gross Beta	3.48 ± 1.15	1.34	0.639	4 mrem/yr		J	092018-034	EPA 900.0
	Uranium-233/234	20.6 ± 2.66	0.0908	0.0403	NE			092018-035	HASL-300
	Uranium-235/236	0.240 ± 0.073	0.0524	0.020	NE			092018-035	HASL-300
	Uranium-238	3.88 ± 0.545	0.0584	0.0241	NE			092018-035	HASL-300
OBS-MW1	Americium-241	0.201 ± 9.97	15.3	7.51	NE	U	BD	092618-033	EPA 901.1
17-Jul-12	Cesium-137	-0.393 ± 1.77	2.96	1.43	NE	U	BD	092618-033	EPA 901.1
	Cobalt-60	0.931 ± 1.81	3.18	1.51	NE	U	BD	092618-033	EPA 901.1
	Potassium-40	8.23 ± 38.3	30.8	14.6	NE	U	BD	092618-033	EPA 901.1
	Gross Alpha	4.52	NA	NA	15 pCi/L	NA	None	092618-034	EPA 900.0
	Gross Beta	4.60 ± 1.15	1.19	0.577	4 mrem/yr			092618-034	EPA 900.0
	Uranium-233/234	16.5 ± 2.22	0.160	0.0717	NE			092618-035	HASL-300
	Uranium-235/236	0.169 ± 0.0741	0.0586	0.0189	NE		J	092618-035	HASL-300
	Uranium-238	3.11 ± 0.484	0.102	0.0423	NE			092618-035	HASL-300

Refer to footnotes on page 10A-41.

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 2012

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-MW2	Americium-241	6.20 ± 8.72	13.0	6.37	NE	U	BD	092620-033	EPA 901.1
18-Jul-12	Cesium-137	2.76 ± 2.19	3.05	1.47	NE	U	BD	092620-033	EPA 901.1
	Cobalt-60	0.676 ± 1.94	3.39	1.61	NE	U	BD	092620-033	EPA 901.1
	Potassium-40	22.9 ± 40.6	31.5	14.9	NE	U	BD	092620-033	EPA 901.1
	Gross Alpha	2.46	NA	NA	15 pCi/L	NA	None	092620-034	EPA 900.0
	Gross Beta	6.85 ± 1.50	1.18	0.568	4 mrem/yr			092620-034	EPA 900.0
	Uranium-233/234	21.7 ± 2.93	0.126	0.0562	NE			092620-035	HASL-300
	Uranium-235/236	0.267 ± 0.0872	0.046	0.0148	NE			092620-035	HASL-300
	Uranium-238	4.17 ± 0.616	0.0796	0.0332	NE			092620-035	HASL-300
OBS-MW3	Americium-241	-1.18 ± 10.3	18.2	8.89	NE	U	BD	092625-033	EPA 901.1
19-Jul-12	Cesium-137	1.83 ± 2.21	3.70	1.79	NE	U	BD	092625-033	EPA 901.1
	Cobalt-60	-0.0387 ± 2.15	3.76	1.78	NE	U	BD	092625-033	EPA 901.1
	Potassium-40	25.5 ± 61.8	33.9	15.9	NE	U	BD	092625-033	EPA 901.1
	Gross Alpha	-2.66	NA	NA	15 pCi/L	NA	None	092625-034	EPA 900.0
	Gross Beta	5.65 ± 1.39	1.47	0.712	4 mrem/yr		NJ+	092625-034	EPA 900.0
	Uranium-233/234	21.1 ± 3.05	0.180	0.0806	NE			092625-035	HASL-300
	Uranium-235/236	0.297 ± 0.109	0.0659	0.0212	NE			092625-035	HASL-300
	Uranium-238	3.66 ± 0.601	0.114	0.0476	NE			092625-035	HASL-300
OBS-MW3 (Duplicate)	Americium-241	13.8 ± 9.71	13.8	5.80	NE	U	BD	092626-033	EPA 901.1
19-Jul-12	Cesium-137	1.96 ± 2.03	3.28	1.58	NE	U	BD	092626-033	EPA 901.1
	Cobalt-60	2.35 ± 2.25	3.73	1.77	NE	U	BD	092626-033	EPA 901.1
	Potassium-40	-17.2 ± 32.4	38.8	18.5	NE	U	BD	092626-033	EPA 901.1
	Gross Alpha	2.49	NA	NA	15 pCi/L	NA	None	092626-034	EPA 900.0
	Gross Beta	4.94 ± 1.39	1.62	0.789	4 mrem/yr		NJ+	092626-034	EPA 900.0
	Uranium-233/234	19.8 ± 2.70	0.135	0.0604	NE			092626-035	HASL-300
	Uranium-235/236	0.272 ± 0.090	0.0494	0.0159	NE			092626-035	HASL-300
	Uranium-238	3.64 ± 0.555	0.0855	0.0357	NE			092626-035	HASL-300

Refer to footnotes on page 10A-41.

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 2012

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	7.84 ± 9.60	14.3	7.00	NE	U	BD	093003-033	EPA 901.1
16-Oct-12	Cesium-137	-1.76 ± 2.92	4.82	2.30	NE	U	BD	093003-033	EPA 901.1
	Cobalt-60	2.16 ± 3.42	6.14	2.89	NE	U	BD	093003-033	EPA 901.1
	Potassium-40	6.81 ± 49.1	67.0	31.7	NE	U	BD	093003-033	EPA 901.1
	Gross Alpha	1.01	NA	NA	15 pCi/L		J	093003-034	EPA 900.0
	Gross Beta	5.18 ± 1.30	1.38	0.669	4 mrem/yr		J	093003-034	EPA 900.0
	Uranium-233/234	17.7 ± 2.31	0.0921	0.039	NE			093003-035	HASL-300
	Uranium-235/236	0.168 ± 0.0704	0.0669	0.0247	NE		J	093003-035	HASL-300
	Uranium-238	3.12 ± 0.468	0.0627	0.0242	NE			093003-035	HASL-300
OBS-MW2	Americium-241	4.20 ± 9.57	13.8	6.78	NE	U	BD	093007-033	EPA 901.1
17-Oct-12	Cesium-137	2.19 ± 2.64	3.73	1.81	NE	U	BD	093007-033	EPA 901.1
	Cobalt-60	-0.785 ± 2.14	3.69	1.77	NE	U	BD	093007-033	EPA 901.1
	Potassium-40	18.1 ± 46.9	37.0	17.7	NE	U	BD	093007-033	EPA 901.1
	Gross Alpha	5.32	NA	NA	15 pCi/L		J	093007-034	EPA 900.0
	Gross Beta	6.11 ± 1.44	1.42	0.687	4 mrem/yr		J	093007-034	EPA 900.0
	Uranium-233/234	21.8 ± 2.80	0.0601	0.0254	NE			093007-035	HASL-300
	Uranium-235/236	0.334 ± 0.0856	0.0437	0.0161	NE			093007-035	HASL-300
	Uranium-238	4.15 ± 0.573	0.0409	0.0158	NE			093007-035	HASL-300
OBS-MW2 (Duplicate)	Americium-241	11.2 ± 19.4	27.5	13.6	NE	U	BD	093008-033	EPA 901.1
17-Oct-12	Cesium-137	2.79 ± 3.01	4.30	2.09	NE	U	BD	093008-033	EPA 901.1
	Cobalt-60	1.34 ± 2.61	4.62	2.21	NE	U	BD	093008-033	EPA 901.1
	Potassium-40	-24.2 ± 51.7	53.0	25.5	NE	U	BD	093008-033	EPA 901.1
	Gross Alpha	3.81	NA	NA	15 pCi/L		J	093008-034	EPA 900.0
	Gross Beta	6.69 ± 1.51	1.40	0.677	4 mrem/yr		J	093008-034	EPA 900.0
	Uranium-233/234	22.0 ± 2.79	0.0539	0.0228	NE			093008-035	HASL-300
	Uranium-235/236	0.379 ± 0.0892	0.0391	0.0144	NE			093008-035	HASL-300
	Uranium-238	4.01 ± 0.545	0.0367	0.0142	NE			093008-035	HASL-300

Refer to footnotes on page 10A-41.

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 2012

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-MW3	Americium-241	-3.54 ± 11.8	19.3	9.47	NE	U	BD	093010-033	EPA 901.1
18-Oct-12	Cesium-137	-1.59 ± 2.69	3.75	1.82	NE	U	BD	093010-033	EPA 901.1
	Cobalt-60	1.39 ± 2.24	3.94	1.88	NE	U	BD	093010-033	EPA 901.1
	Potassium-40	23.5 ± 54.7	33.9	16.0	NE	U	BD	093010-033	EPA 901.1
	Gross Alpha	-2.86	NA	NA	15 pCi/L		J	093010-034	EPA 900.0
	Gross Beta	5.72 ± 1.33	1.26	0.612	4 mrem/yr		J	093010-034	EPA 900.0
	Uranium-233/234	19.9 ± 2.52	0.0529	0.0224	NE			093010-035	HASL-300
	Uranium-235/236	0.267 ± 0.0709	0.0384	0.0141	NE			093010-035	HASL-300
	Uranium-238	3.59 ± 0.490	0.036	0.0139	NE			093010-035	HASL-300

Refer to footnotes on page 10A-41.

Table 10A-11
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 68 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Sample Date	Temperature (˚C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
OBS-MW1	09-Jan-12	15.44	597	388.0	7.23	0.37	36.8	3.68
OBS-MW2	10-Jan-12	17.01	602	386.9	7.24	0.36	41.1	3.96
OBS-MW3	11-Jan-12	16.28	600	371.9	7.26	0.86	42.9	4.20
OBS-MW1	18-Apr-12	17.70	531	99.5	7.75	0.47	39.0	3.71
OBS-MW2	19-Apr-12	17.54	531	100.7	7.73	0.46	39.2	3.74
OBS-MW3	17-Apr-12	16.39	531	30.6	7.74	0.52	43.4	4.24
OBS-MW1	17-Jul-12	17.99	498	151.1	7.28	0.41	38.1	3.59
OBS-MW2	18-Jul-12	20.84	494	153.2	7.25	0.32	39.6	3.53
OBS-MW3	19-Jul-12	18.82	537	179.9	7.29	0.37	46.2	4.27
OBS-MW1	16-Oct-12	16.87	502	203.3	7.10	0.43	37.8	3.66
OBS-MW2	17-Oct-12	18.97	500	186.7	7.11	0.37	38.5	3.56
OBS-MW3	18-Oct-12	16.82	502	167.5	7.14	0.66	44.9	4.34

Refer to footnotes on page 10A-41.

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Footnotes for Solid Waste Management Unit 68 Groundwater Monitoring Tables

EPA	= U.S. Environmental Protection Agency.
ID	= identifier.
MW	= monitoring well.
OBS	= Old Burn Site = SWMU 68 and used with well identifiers.
Tetryl	= methyl-2,4,6-trinitrophenylnitramine.

[a]**Result**

- Values in bold exceed the established MCL.
- ND = not detected (at method detection limit).
- 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 10A- 2-4).
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- pCi/L = picocuries per liter

[b]**MDL or MDA**

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.

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.

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**

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.

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.

[d]**MCL**

- Maximum contaminant level. Established by the EPA Primary Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards (EPA May 2009).
- NE = not established.
- 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 10A- 2-4).
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

[e]**Laboratory Qualifier**

B	=	The analyte was detected in the blank above the effective method detection limit (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.
X	=	Data rejected due to peak not meeting identification criteria.

Footnotes for Solid Waste Management Unit 68 Groundwater Monitoring 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.
NJ+	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
None	=	No data validation for corrected gross alpha activity.
U	=	The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable, and resampling and reanalysis are necessary for verification.

[g]**Analytical Method**

- 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, Cincinnati, Ohio.
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual,* 27th ed., Vol. 1, Rev. 1992, HASL-300.

[h]**Field Water Quality Measurements**

- Field measurements collected prior to sampling.

°C	= degrees Celsius.
% Sat	= percent saturation.
µmho/cm	= micromhos per centimeter.
mg/L	= milligrams per liter.
mV	= millivolts.
NTU	= nephelometric turbidity units.
pH	= potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 10B
Solid Waste Management Unit 68
Hydrographs

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Attachment 10B Hydrographs

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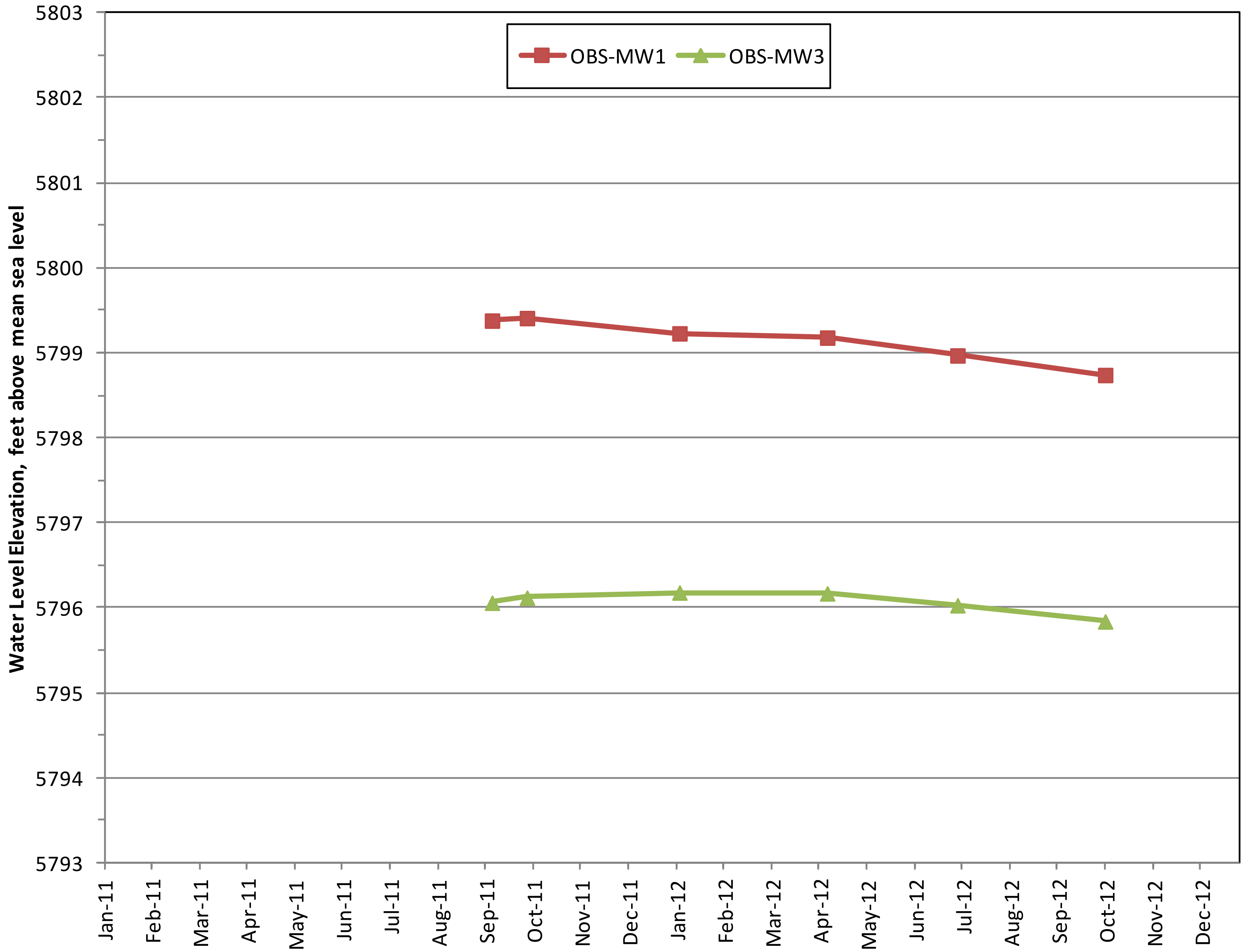

Figure 10B-1. SWMU 68 Study Area Wells (1 of 2)

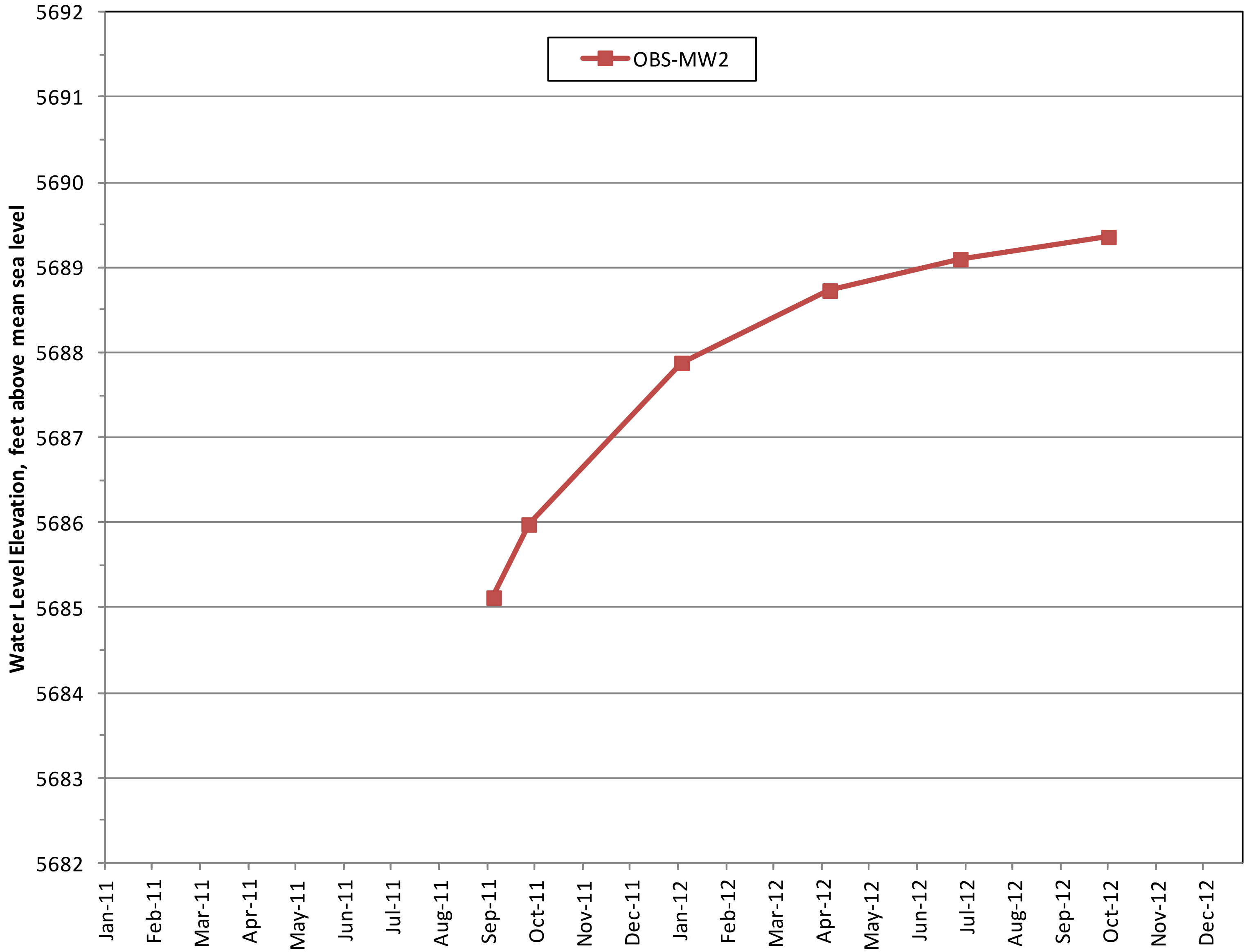

Figure 10B-2. SWMU 68 Study Area Wells (2 of 2)

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). The SNL/NM facility is a government-owned, contractor-operated, multi-program laboratory overseen by the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) through the Sandia Field Office in Albuquerque, New Mexico. Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM.

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 (e.g., cholla, pincushion, strawberry, and prickly pear), and bunch grasses (e.g., 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 there 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).

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 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 III 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 is sampled as part of LTS.	SNL September 2012
February	2012	Monitoring well CTF-MW1 is sampled as part of LTS.	SNL January 2012

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.
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/NM = Sandia National Laboratories, New Mexico.
SWMU = Solid Waste Management Unit.

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.

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 storm water 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).

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 2012 Activities

The following activities were conducted for the SWMU 116 monitoring effort during Calendar Year (CY) 2012 (January through December 2012):

- Annual groundwater sampling was conducted at monitoring well CTF-MW1 in February 2012.
- 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

The following activities are anticipated for SWMU 116 during CY 2013:

- Annual groundwater sampling will be conducted at monitoring well CTF-MW1.
- Periodic groundwater elevation data will be obtained from monitoring well CTF-MW1.

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.

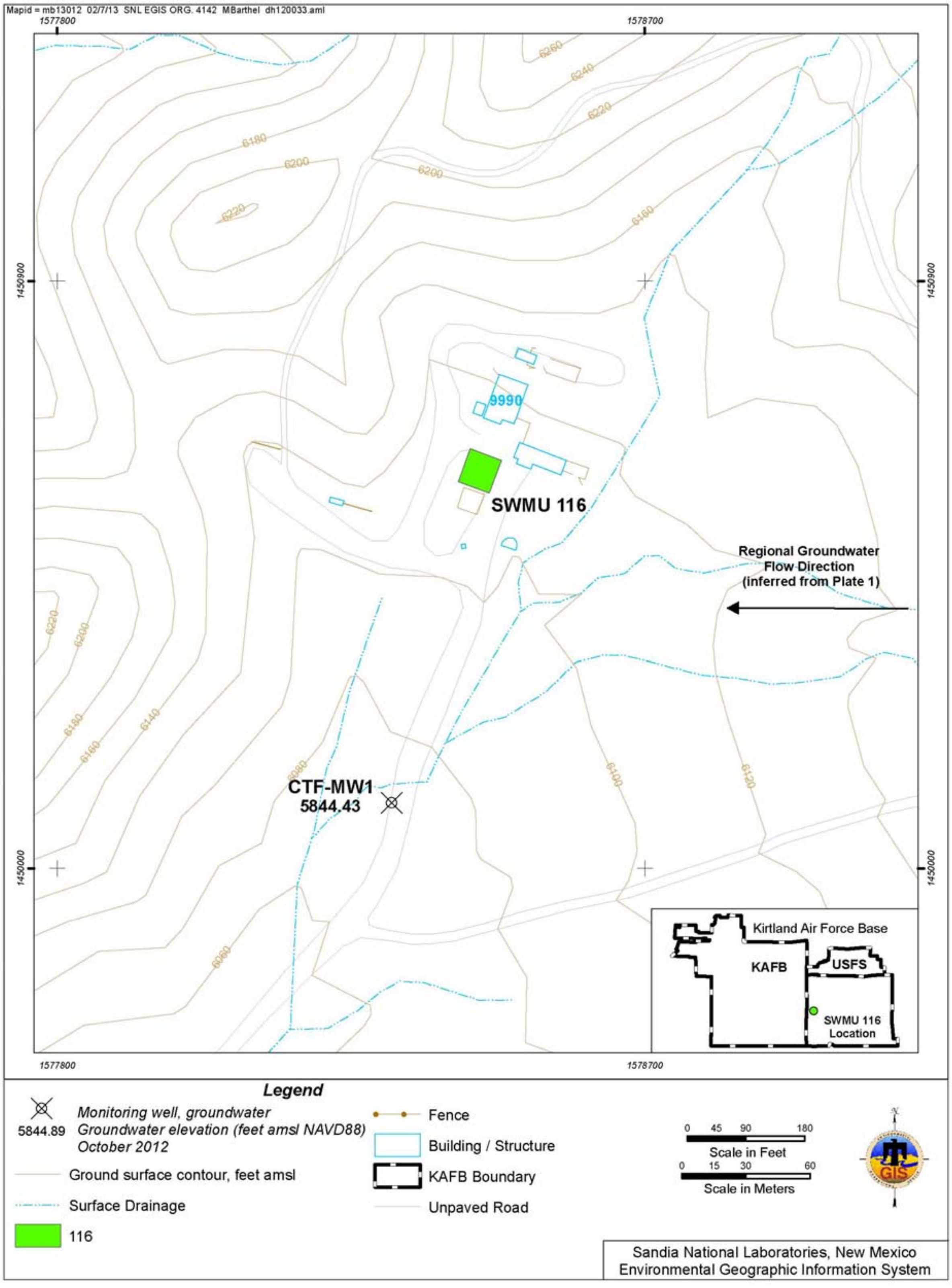

Figure 11-1. Location and Groundwater Elevation at SWMU 116

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 (e.g., 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.

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 1915 through 2005 was 8.67 inches per year (in/yr) (WRCC-DRI 2012). The station is located 10 miles northwest of the 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 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).

In 2001, a location downslope from SWMU 116 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

Monitoring Well	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2012 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Approximate Pressure Head (ft[a])
CTF-MW1	6079.70	240 – 260	5839.70	5844.43	5829.70	15

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CTF = Coyote Test Field.
ft = Foot (feet).
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The October 2012 groundwater elevation at monitoring well CTF-MW1 was 5,844.43 ft amsl. Compared to the mid-point elevation of the screen, the pressure head was approximately 15 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 (ft/ft) 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.

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 probably serves as a confining unit.

The potentiometric surface at monitoring well CTF-MW1 in October 2012 was approximately 5,844 ft amsl with approximately 15 ft of head. 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 2012, the overall trend was downward. For the last five years, the water level in monitoring well CTF-MW1 has declined at approximately 0.4 feet per year. Groundwater probably 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). The hydraulic gradient may be on the order of approximately 0.02 ft/ft near the monitoring well. No potable water-supply wells are located within 5 miles of the site (Plate 1).

11.1.7.3 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.

11.1.7.4 Contaminant Distribution and Transport in Groundwater

No COCs exceeded applicable U.S. Environmental Protection Agency (EPA) MCLs (EPA 2009) in the CY 2012 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 federal regulations mandated by the Resource Conservation and Recovery Act (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 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 and AOCs are contained in the Compliance Order on Consent (the Order) between the DOE, Sandia, and NMED (April 2004).

The DOE/NNSA and Sandia received a letter from the NMED 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 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 Order (NMED April 2004), SWMU 116 requires long-term monitoring of groundwater on an annual basis as a site control. The NMED specified that for SWMU 116 the following analytes are to be monitored general chemistry, 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 2012

Date of Sampling Event	Wells Sampled	SAP
February 2012	CTF-MW1	*SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2012 Annual Sampling* (SNL January 2012)

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 include duplicate environmental, split, equipment blank (EB), and trip blank (TB) samples.

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).

Table 11-4. Parameters Sampled at SWMU 116

Parameter	February 2012
Alkalinity (total, bicarbonate, carbonate) Anions Cations High Explosive Compounds NPN Perchlorate TAL Metals, plus Total Uranium Total Cyanide VOCs	CTF-MW1 CTF-MW1 (duplicate)

NOTES:
CTF = Coyote Test Field.
MW = Monitoring Well.
NPN = Nitrate plus nitrate (reported as nitrogen).
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.
VOC = Volatile organic compound.

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).

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 2012 SWMU 116 sampling event are presented in Tables 11A-1 through 11A-7 (Attachment 11A). Data qualifiers are explained in the footnotes following Table 11A-7.

No VOCs were detected in groundwater samples. The method detection limits (MDLs) for all analyzed VOCs are listed in Table 11A-1 (Attachment 11A). No HE compounds were detected. The MDLs for all analyzed HE compounds are listed in Table 11A-2.

The analytical result for NPN (reported as nitrogen) is presented in Table 11A-3 (Attachment 11A). No NPN results exceed the MCL of 10 milligrams per liter (mg/L) in either sample. For CY 2012, the maximum NPN concentration is 7.32 mg/L in the duplicate environmental sample, whereas the environmental sample had a reported NPN concentration of 7.27 mg/L.

The results for alkalinity, anion, cation, and total cyanide results are provided in Table 11A-4 (Attachment 11A). No detections of the constituents exceed applicable MCLs.

The analytical result for perchlorate is presented in Table 11A-5 (Attachment 11A). Currently, no MCL is established for perchlorate and perchlorate does not exceed the NMED-specified screening level/MDL of 4 micrograms per liter (NMED April 2004).

Total metal results are presented in Table 11A-6 (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-7 (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 Tables 11A-1 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.

Duplicate environmental sample results show good correlation (relative percent difference values less than 20 for organic compounds and less than 35 for inorganic analyses) for all calculated parameters.

The results for the EB sample analyses show that bromodichloromethane, chloroform, dibromochloromethane, chloride, and copper were detected in the EB sample. No corrective action was required for bromodichloromethane, chloroform, chloride, or dibromochloromethane since these parameters were either not detected in the associated environmental samples or detected in the environmental samples at concentrations greater than five times the blank result. Copper in the monitoring well CTF-MW1 environmental and duplicate samples were qualified as not detected during data validation, since associated results are less than five times the EB result.

No VOCs were detected above laboratory MDLs in any TB sample.

Laboratory data qualifiers are provided with the analytical results in Tables 11A-3 through 11A-6 (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 2012) 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. Data validation qualifiers are provided with the analytical results in Tables 11A-3 through 11A-6 (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, the current conceptual model, and plans for studies to be completed during CY 2013 at the SWMU 116.

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. The one monitoring well at SWMU 116 (CTF-MW1) was sampled in February 2012, 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 2009). No parameters were detected above established MCLs in the groundwater samples.

The analytical results for CY 2012 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.

During CY 2013, annual groundwater sampling will continue at monitoring well CTF-MW1 during the first quarter of CY 2013. Periodic monitoring of groundwater elevations will also be conducted.

11.10 References

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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
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] SW846-8260), Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.325
1,1,2,2-Tetrachloroethane	0.250
1,1,2-Trichloroethane	0.250
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.250
1,2-Dichloropropane	0.250
2-Butanone	1.25
2-Hexanone	1.25
4-methyl-, 2-Pentanone	1.25
Acetone	3.50
Benzene	0.300
Bromodichloromethane	0.250
Bromoform	0.250
Bromomethane	0.300
Carbon disulfide	1.25
Carbon tetrachloride	0.300
Chlorobenzene	0.250
Chloroethane	0.300
Chloroform	0.250
Chloromethane	0.300
Dibromochloromethane	0.300
Ethyl benzene	0.250
Methylene chloride	3.00
Styrene	0.250
Tetrachloroethene	0.300
Toluene	0.250
Trichloroethene	0.250
Vinyl acetate	1.50
Vinyl chloride	0.500
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.250
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.250

Refer to footnotes on page 11A-13

Table 11A-2
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 2012

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0856 – 0.087
1,3-Dinitrobenzene	0.0856 – 0.087
2,4,6-Trinitrotoluene	0.0856 – 0.087
2,4-Dinitrotoluene	0.0856 – 0.087
2,6-Dinitrotoluene	0.0856 – 0.087
2-Amino-4,6-dinitrotoluene	0.0856 – 0.087
2-Nitrotoluene	0.0877 – 0.0891
3-Nitrotoluene	0.0856 – 0.087
4-Amino-2,6-dinitrotoluene	0.0856 – 0.087
4-Nitrotoluene	0.160 – 0.163
HMX	0.0856 – 0.087
Nitro-benzene	0.0856 – 0.087
Pentaerythritol tetranitrate	0.107 – 0.109
RDX	0.0856 – 0.087
Tetryl	0.0856 – 0.087

Refer to footnotes on page 11A-13

Table 11A-3
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 01-Feb-12	Nitrate plus nitrite as N	7.27	0.100	0.500	10.0			091700-018	EPA 353.2
CTF-MW1 (Duplicate) 01-Feb-12	Nitrate plus nitrite as N	7.32	0.100	0.500	10.0			091701-018	EPA 353.2

Refer to footnotes on page 11A-13

Table 11A-4
Summary of Alkalinity, Anion, Cation, and Total Cyanide Results, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	197	0.725	1.00	NE			091700-022	SM2320B
01-Feb-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091700-022	SM2320B
	Bromide	0.628	0.066	0.200	NE			091700-016	SW846 9056
	Chloride	43.2	0.330	1.00	NE			091700-016	SW846 9056
	Fluoride	1.39	0.033	0.100	4.0			091700-016	SW846 9056
	Sulfate	82.2	0.500	2.00	NE			091700-016	SW846 9056
	Calcium	100	0.300	1.00	NE	B		091700-017	SW846 6020
	Magnesium	17.9	0.010	0.030	NE			091700-017	SW846 6020
	Potassium	1.80	0.080	0.300	NE			091700-017	SW846 6020
	Sodium	31.9	0.080	0.250	NE		J	091700-017	SW846 6020
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091700-027	SW846 9012A
CTF-MW1 (Duplicate)	Bicarbonate Alkalinity	197	0.725	1.00	NE			091701-022	SM2320B
01-Feb-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091701-022	SM2320B
	Bromide	0.645	0.066	0.200	NE			091701-016	SW846 9056
	Chloride	43.2	0.330	1.00	NE			091701-016	SW846 9056
	Fluoride	1.38	0.033	0.100	4.0			091701-016	SW846 9056
	Sulfate	82.6	0.500	2.00	NE			091701-016	SW846 9056
	Calcium	96.3	0.300	1.00	NE	B		091701-017	SW846 6020
	Magnesium	17.3	0.010	0.030	NE			091701-017	SW846 6020
	Potassium	1.68	0.080	0.300	NE			091701-017	SW846 6020
	Sodium	30.1	0.080	0.250	NE		J	091701-017	SW846 6020
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091701-027	SW846 9012A

Refer to footnotes on page 11A-13

Table 11A-5
Summary of Perchlorate Results,
Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 01-Feb-12	ND	0.004	0.012	NE	U		091700-020	EPA 314.0
CTF-MW1 (Duplicate) 01-Feb-12	ND	0.004	0.012	NE	U		091701-020	EPA 314.0

Refer to footnotes on page 11A-13

Table 11A-6
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091700-009	SW846 6020
01-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091700-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091700-009	SW846 6020
	Barium	0.0467	0.0006	0.002	2.00		J	091700-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091700-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091700-009	SW846 6020
	Calcium	98.6	0.300	1.00	NE	B		091700-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091700-009	SW846 6020
	Cobalt	0.000311	0.0001	0.001	NE	J		091700-009	SW846 6020
	Copper	0.00081	0.00035	0.001	NE	J	0.0040U	091700-009	SW846 6020
	Iron	0.213	0.033	0.100	NE	B		091700-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091700-009	SW846 6020
	Magnesium	17.7	0.010	0.030	NE			091700-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091700-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091700-009	SW846 7470
	Nickel	0.0016	0.0005	0.002	NE	J		091700-009	SW846 6020
	Potassium	1.79	0.080	0.300	NE			091700-009	SW846 6020
	Selenium	0.00456	0.0015	0.005	0.050	J		091700-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091700-009	SW846 6020
	Sodium	33.0	0.080	0.250	NE		J	091700-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091700-009	SW846 6020
	Uranium	0.0104	0.000067	0.0002	0.03			091700-009	SW846 6020
	Vanadium	0.0011	0.001	0.005	NE	J		091700-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091700-009	SW846 6020

Refer to footnotes on page 11A-13

Table 11A-6 *(Concluded)*
Summary of Target Analyte List Metals and Uranium Results, Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091701-009	SW846 6020
01-Feb-12	Antimony	ND	0.001	0.003	0.006	U		091701-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091701-009	SW846 6020
	Barium	0.0441	0.0006	0.002	2.00		J	091701-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091701-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091701-009	SW846 6020
	Calcium	93.9	0.300	1.00	NE	B		091701-009	SW846 6020
	Chromium	0.00215	0.002	0.010	0.100	J		091701-009	SW846 6020
	Cobalt	0.000285	0.0001	0.001	NE	J		091701-009	SW846 6020
	Copper	0.000862	0.00035	0.001	NE	J	0.0040U	091701-009	SW846 6020
	Iron	0.205	0.033	0.100	NE	B		091701-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091701-009	SW846 6020
	Magnesium	18.2	0.010	0.030	NE			091701-009	SW846 6020
	Manganese	0.00101	0.001	0.005	NE	J		091701-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091701-009	SW846 7470
	Nickel	0.00154	0.0005	0.002	NE	J		091701-009	SW846 6020
	Potassium	1.72	0.080	0.300	NE			091701-009	SW846 6020
	Selenium	0.00418	0.0015	0.005	0.050	J		091701-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091701-009	SW846 6020
	Sodium	28.4	0.080	0.250	NE		J	091701-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091701-009	SW846 6020
	Uranium	0.00983	0.000067	0.0002	0.03			091701-009	SW846 6020
	Vanadium	0.0011	0.001	0.005	NE	J		091701-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091701-009	SW846 6020

Refer to footnotes on page 11A-13

Table 11A-7
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 116 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CTF-MW1	01-Feb-12	16.25	735	396.7	7.01	0.19	72.2	7.06

Refer to footnotes on page 11A-13

Footnotes for Solid Waste Management Unit 116 Groundwater Monitoring Tables

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
N = nitrogen.
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
Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

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

[d]MCL
- Maximum contaminant level. Established by the U.S. Environmental Protection Agency (EPA) Primary Water Regulations (40 Code of Federal Regulations 141.11{b}), National Primary Drinking Water Standards (EPA May 2009).
- NE = not established.

[e]Laboratory Qualifier
B = The analyte was detected in the blank above the effective method detection limit (MDL).
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U = Analyte is absent or below the method detection limit.

[f]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
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 was not detected. The associated value is an estimate and may be inaccurate or imprecise.

[g]Analytical Method
- 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.

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

°C = degrees Celsius.
% Sat = percent saturation.
µmho/cm = micromhos per centimeter.
mg/L = milligrams per liter.
mV = millivolts.
NTU = nephelometric turbidity units.
pH = potential of hydrogen (negative logarithm of the hydrogen ion concentration).

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Attachment 11B
Solid Waste Management Unit 116
Hydrographs

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Attachment 11B Hydrographs

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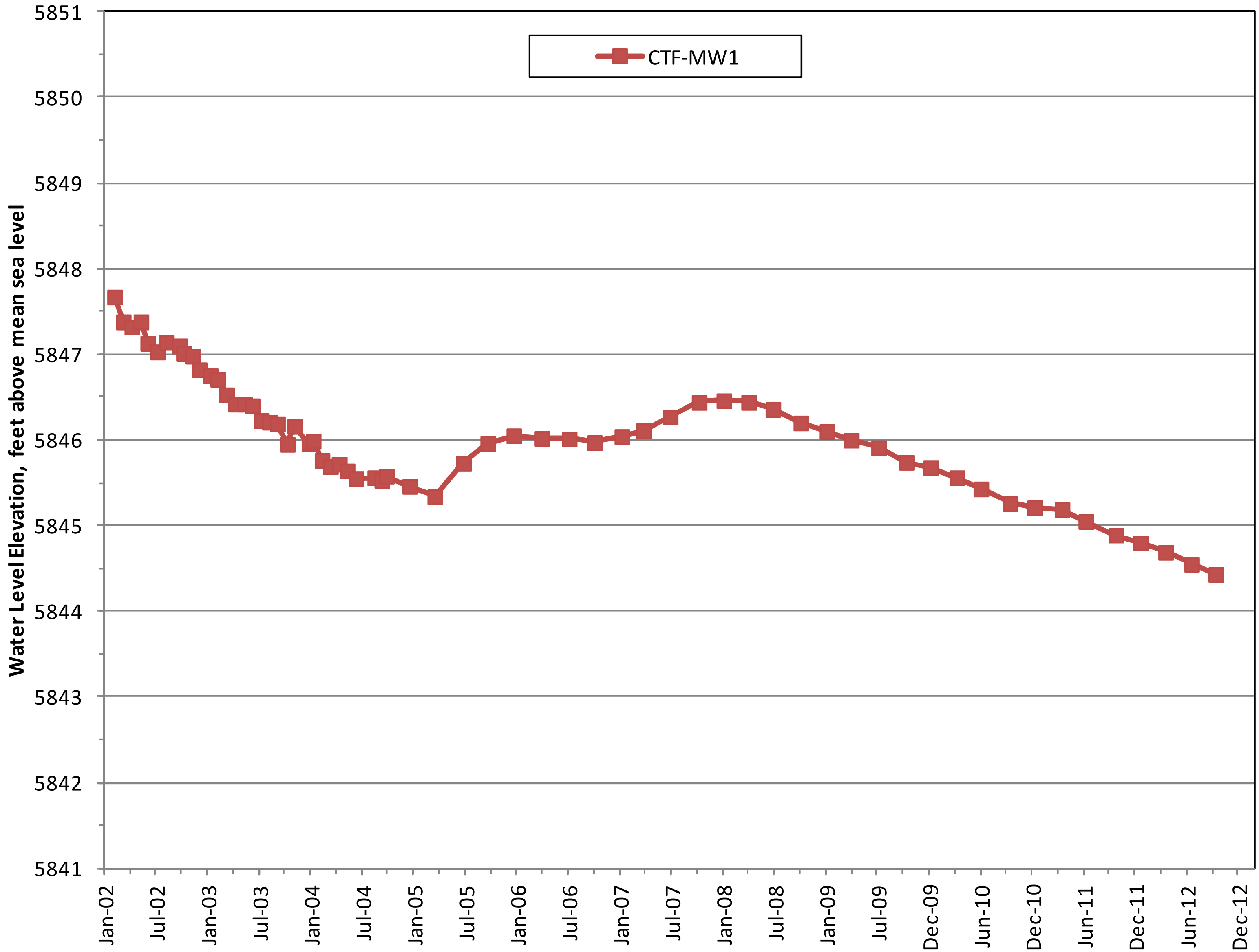

Figure 11B-1. SWMU 116 Study Area Well

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12.0 Solid Waste Management Unit 149

12.1 Introduction

This chapter summarizes Calendar Year (CY) 2012 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). The SNL/NM facility 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.

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 Order) (NMED April 2004) and the letter dated April 8, 2010, from the New Mexico Environment Department (NMED) Hazardous Waste Bureau (NMED April 2010).

Monitoring well CTF-MW3 was sampled on March 26, June 16, September 21, and December 14, 2012. The CY 2012 groundwater samples were collected in accordance with the NMED-approved Sampling and Analysis Plan (SAP) (SNL June 2010). 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 2012 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). No analytical results for the monitoring well CTF-MW3 groundwater samples exceed the corresponding MCLs. Detailed results for all quarterly sampling events are discussed in Section 12.6.

The eighth and final quarter of required groundwater sampling (NMED April 2010) was conducted on December 14, 2012.

12.1.1 Location

SWMU 149, the Building 9930 Septic System at SNL/NM, is located in the CTF on federally owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the DOE. 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).

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

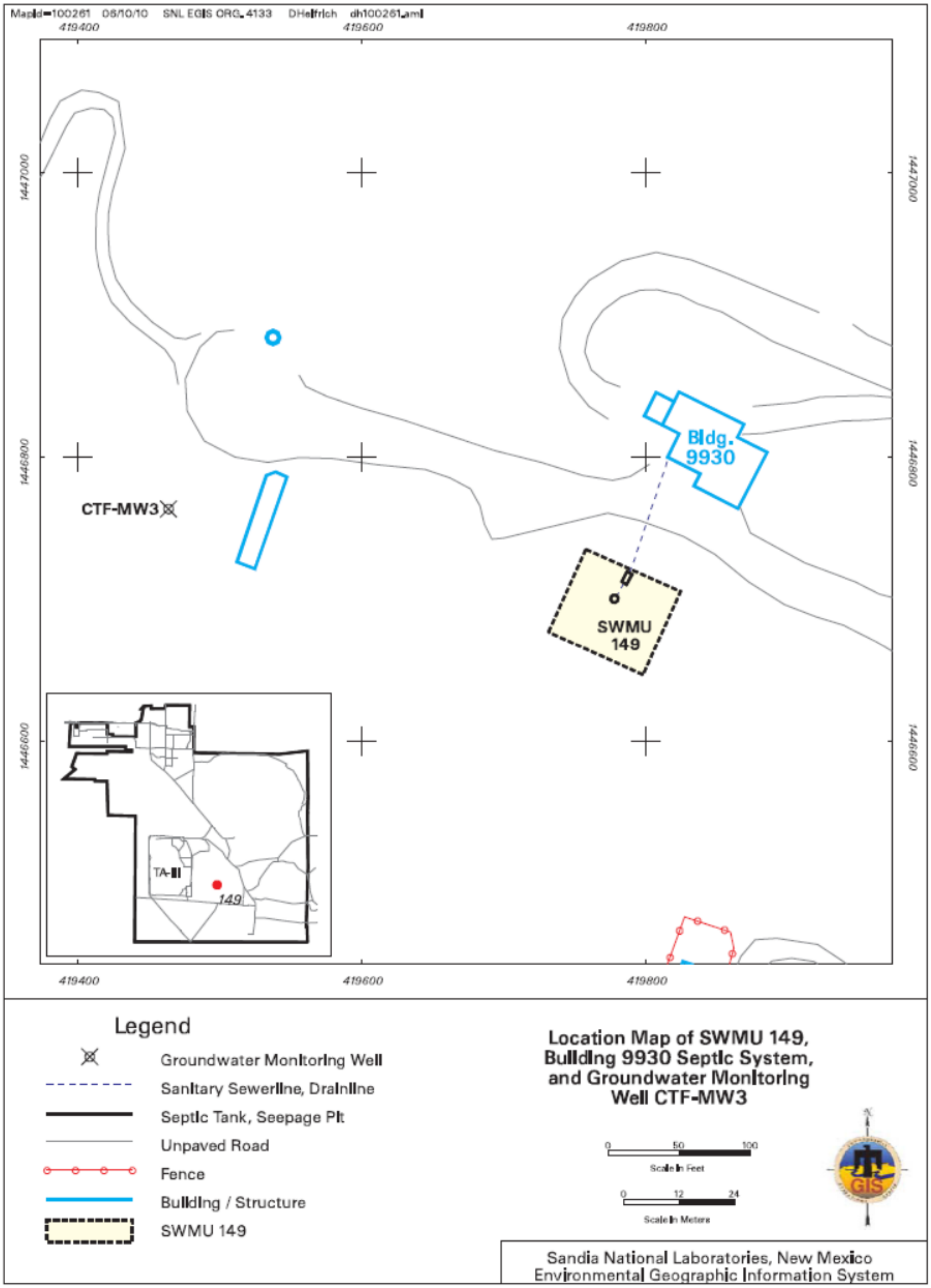

Figure 12-1. Location of Monitoring Well CTF-MW3 near SWMU 149

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).

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 an 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	Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report (SNL/NM December 1995) containing description of SWMU 149 hydrogeology submitted to NMED.	SNL February 1998
June	1998	NMED responded with RSI on the SWMU 149 NFA proposal.	NMED June 1998
November	1998	DOE/NNSA and SNL/NM ER Project submitted the first response to the first NMED RSI for SWMU 149.	SNL November 1998

Table 12-1. Historical Timeline of SSWMU 149 *(Concluded)*

Month	Year	Event	Reference
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
June	2005	Third RSI response to RSI and CAC Proposal submitted to NMED.	SNL June 2005
September	2005	NMED issues Certificate of Completion for CAC without Controls for SWMU 149.	NMED September 2005
March	2006	Request for Class III 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.	This report

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.
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.

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 plan 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 additional samples for high explosive (HE) compound analysis be collected. If these samples could not be collected as specified in the SAP (SNL October 1999), a downgradient groundwater monitoring well would be required. The DOE 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 III 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/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 CY 2012. The CY 2012 analytical results are presented in Section 12.6.

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. The fluoride detected is most likely naturally occurring. 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 is being monitored quarterly for VOCs, TAL metals, general chemistry parameters, perchlorate, and NPN. The eighth and final quarter required groundwater sampling (NMED April 2010) occurred on December 14, 2012.

12.1.5 Summary of Calendar Year 2012 Activities

The following activities occurred for monitoring well CTF-MW3 near SWMU 149 during CY 2012 (January through December 2012):

- Quarterly groundwater sampling was conducted at monitoring well CTF-MW3 in March, June, September, and December 2012. The eighth and final quarter of required groundwater sampling (NMED April 2010) occurred on December 14, 2012, in the fourth quarter of CY 2012.

- Quarterly reporting of analytical results for monitoring well CTF-MW3 groundwater samples was conducted.

- 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 2013:

- Analytical results will be summarized and additional analysis may be performed and submitted to NMED to support resumption of the regulatory process for designating the site as CAC with No Further Action.

12.1.7 Current Conceptual Model

For the resumption of quarterly groundwater sampling at monitoring well CTF-MW3, completed in December 2012, 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 (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 an approximately 12- to 16-ft-thick layer of soil and colluvium 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 (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 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 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).

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) 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 2012 groundwater elevation was 5,215.36 ft amsl. Compared to the mid-point elevation of the screen, the pressure head was approximately 46 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 (ft/ft) 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 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) Bennett™ piston pumps.

Table 12-2. Lithologic and Hydrogeologic Elevation Data for Monitoring Well CTF-MW3 near SWMU 149

Monitoring Well	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2012 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Pressure Head (ft[a])
CTF-MW3	5519.80	340 – 360	5179.80	5215.36	5169.80	46

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CTF = Coyote Test Field.
ft = Foot (feet).
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The conceptual hydrogeologic model for SWMU 149 is based on the findings for 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. Naturally filled fractures in the overlying granite probably serve as a confining unit. 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. 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. The steep hydraulic gradient, approximately 0.15 ft/ft, 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 have 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 2012, 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 federal 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 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 Order (NMED April 2004).

In September 2005, the NMED issued a Certificate of Completion for CAC without Controls for SWMU 149 (NMED September 2005). In response, DOE/NNSA and Sandia requested a Class III 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 groundwater monitoring at monitoring well CTF-MW3 (SNL June 2010), which the NMED approved (NMED December 2010). Quarterly groundwater sampling was reinitiated at monitoring well CTF-MW3 in CY 2011 and completed in December 2012 and the analytical results are presented in Section 12.6.

12.3 Scope of Activities

The field activity discussed in this section is groundwater monitoring sampling and analysis during CY 2012 sampling events (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 2012

Date of Sampling Event	SAP
March 26, 2012	*SWMU 149 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2012* (SNL February 2012)
June 16, 2012	*SWMU 149 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year 2012* (SNL May 2012)
September 21, 2012	*SWMU 149 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year 2012* (SNL August 2012)
December 14, 2012	*SWMU 149 Groundwater Monitoring Mini-SAP for First Quarter Fiscal Year 2013* (SNL November 2012)

NOTES:
CTF = Coyote Test Field.
MW = Monitoring Well.
SAP = Sampling and Analysis Plan.
SWMU = Solid Waste Management Unit.

Table 12-4. Parameters Sampled at SWMU 149 for Each Sampling Event, Calendar Year 2012

Parameter	Sampling Period	
Anions	**March 2012**	**June 2012**
Alkalinity	CTF-MW3	CTF-MW3
NPN	CTF-MW3 (dup)	
Perchlorate		
TAL Metals	**September 2012**	**December 2012**
VOCs	CTF-MW3	CTF-MW3

NOTES:
Dup = Duplicate sample.
NPN = Nitrate plus nitrate (reported as nitrogen).
TAL = Target Analyte List.
VOC = Volatile organic compound.

Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples include duplicate environmental, split, equipment blank (EB), TB, and field blank (FB) samples. Field QC samples are used to monitor the sampling process. 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. (No EB samples were required for monitoring well CTF-MW3 during the June, September, and December 2011 sampling events.) TB samples are used to determine whether VOCs inadvertently contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory. FB samples provide a check for potential ambient sources of sample contamination during the sampling process and/or sampling error.

12.4 Field Methods and Measurements

According to the requirements of the Order (NMED April 2004) and the NMED letter of April 8, 2010 (NMED April 2010), SNL/NM personnel performed groundwater sampling at SWMU 149. The CY 2012 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures (FOPs) for groundwater sampling activities, the SWMU 149 site-specific SAP (SNL June 2010), and Mini-SAPs (SNL February 2012, May 2012, August 2012, and November 2012).

Environmental groundwater samples were collected from monitoring well CTF-MW3. 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, as conducted by Long-Term Stewardship/ER Operations personnel, are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986) and are described in detail in Section 1.3.

12.4.1 Groundwater Elevation

Throughout CY 2012, 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 potentiometric surface map showing groundwater flow direction presented on Figure 12-2 and the hydrograph presented on Figure 12B-1 (Attachment 12B).

12.5 Analytical Methods

EPA analytical methods are presented in Table 12-4 and discussed in Section 1.3.2. Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results and field measurements for samples collected from monitoring well CTF-MW3 are shown in tabulated form in Tables 12A-1 through 12A-8 (Attachment 12A). Analytical reports, including certificates of analyses, analytical methods, method detection limits (MDLs), practical quantitation limits (PQLs), dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Records Center.

12.6 Summary of Analytical Results

This section discusses analytical results and field measurements for the CY 2012 SWMU 149 sampling events. Data are presented in Tables 12A-1 through 12A-8 (Attachment 12A). Data qualifiers are explained in the footnotes following Table 12A-8.

The analytical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure 00-03 (May 2011). 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.

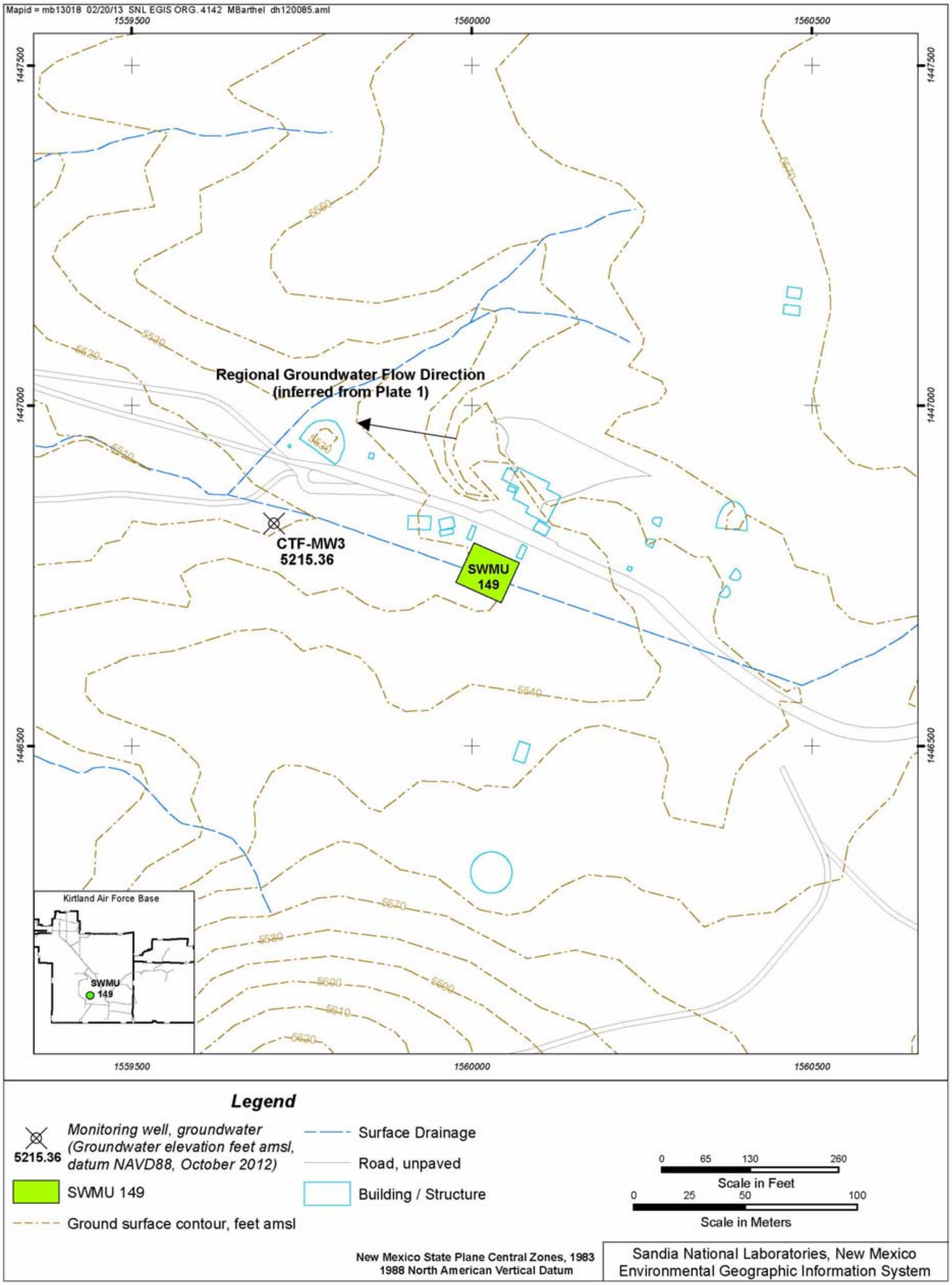

Figure 12-2. SWMU 149 Groundwater Flow Direction (October 2012)

No VOCs were detected at concentrations above established MCLs from any monitoring well CTF-MW3 groundwater sample. During CY 2012 the compounds bromodichloromethane, chloroform, dibromochloromethane, and toluene were detected at concentrations above the laboratory MDL. In June and September 2012 toluene was detected at concentrations above the laboratory MDL but at levels below the PQL. 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 (µg/L; 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. 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.

12.7 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. 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.

12.7.1 Field Quality Control Samples

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

12.7.1.1 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 2012 duplicate sample data results show good agreement (low RPD values < 20 percent for organic compounds and < 35 for inorganic analyses) for all calculated parameters.

12.7.1.2 Equipment Blank Samples

EB or rinsate samples are collected to verify the equipment decontamination process. The March 2012 EB or rinsate sample was collected prior to sampling monitoring well CTF-MW3 and submitted for all analyses. Acetone, aluminum, bromodichloromethane, calcium, chloride, chloroform, copper, dibromochloromethane, magnesium, and zinc were detected in the EB sample. No corrective action was required for acetone, aluminum, calcium, chloride, magnesium, or zinc since these parameters were not detected in environmental samples or reported values in environmental samples are greater than five times the EB concentration. Bromodichloromethane, chloroform, copper, and dibromochloromethane were qualified as not detected during data validation since sample results are less than five times the EB value.

12.7.1.3 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 2012. Two TBs were submitted for the March 2012 sampling event and one sample for June, September, and December 2012. No VOCs were detected above the associated laboratory MDLs in all TB samples.

12.7.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions. The March 2012 FB sample from the monitoring well CTF-MW3 detected the VOC compounds bromodichloromethane, chloroform, and dibromochloromethane. No correction action was applied during data validation, since these compounds were also reported in the EB sample. These compounds are common by-products of water disinfection associated with the DI water process.

12.7.2 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 2012 sampling events.

12.8 Variances and Nonconformances

No variances or nonconformances from requirements in the SWMU 149 Groundwater Monitoring SAP (SNL June 2010) or Mini-SAPs (SNL February 2012, May 2012, August 2012, and November 2012) were identified during any of the CY 2012 sampling events. However, project-specific issues identified during CY 2012 sampling activities are noted as follows:

- **June and September 2012 Sampling Events—**Toluene was detected at low-level concentrations in all groundwater samples. Toluene is not consistently detected in previous groundwater samples, but has been commonly detected since operation of a new groundwater sample truck and equipment. Modifications to the groundwater sampling truck and equipment have been completed and additional decontaminations have been performed since these sampling events.

12.9 Summary and Conclusions

Four quarterly sampling events occurred in CY 2012 at monitoring well CTF-MW3 near SWMU 149. Groundwater samples were collected in March, June, September, and December 2012. Analytical parameters included VOCs, NPN, major anions, alkalinity, TAL total metals, and perchlorate. Results were compared with EPA MCL guidelines for drinking water (EPA 2009). No parameters were detected above established MCLs. The analytical results for this reporting period are consistent with historical concentrations. The current conceptual model described in Section 12.1.7 does not require modification based on the analytical results for this reporting period. During CY 2013, analytical results will be summarized and additional analysis may be performed and submitted to NMED to support reinitiation of the regulatory process for designating the site as CAC with No Further Action for SWMU 149.

12.10 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 2012

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 26-Mar-12	Bromodichloromethane	0.540	0.300	1.00	NE	J	1.00U	091943-001	SW846-8260B
	Chloroform	0.720	0.300	1.00	NE	J	1.00U	091943-001	SW846-8260B
	Dibromochloromethane	0.360	0.300	1.00	NE	J	1.00U	091943-001	SW846-8260B
CTF-MW3 (Duplicate) 26-Mar-12	Bromodichloromethane	0.520	0.300	1.00	NE	J	1.00U	091944-001	SW846-8260B
	Chloroform	0.700	0.300	1.00	NE	J	1.00U	091944-001	SW846-8260B
	Dibromochloromethane	0.330	0.300	1.00	NE	J	1.00U	091944-001	SW846-8260B
CTF-MW3 16-Jun-12	Bromodichloromethane	0.500	0.300	1.00	NE	J		092535-001	SW846-8260B
	Chloroform	0.710	0.300	1.00	NE	J		092535-001	SW846-8260B
	Dibromochloromethane	1.12	0.300	1.00	NE		J+	092535-001	SW846-8260B
	Toluene	0.510	0.300	1.00	1000	J		092535-001	SW846-8260B
CTF-MW3 21-Sep-12	Bromodichloromethane	0.630	0.300	1.00	NE	J		092860-001	SW846-8260B
	Chloroform	0.850	0.300	1.00	NE	J		092860-001	SW846-8260B
	Dibromochloromethane	0.430	0.300	1.00	NE	J		092860-001	SW846-8260B
	Toluene	0.310	0.300	1.00	1000	J		092860-001	SW846-8260B
CTF-MW3 14-Dec-12	Bromodichloromethane	0.570	0.300	1.00	NE	J		093249-001	SW846-8260B
	Chloroform	0.780	0.300	1.00	NE	J		093249-001	SW846-8260B
	Dibromochloromethane	0.380	0.300	1.00	NE	J	J	093249-001	SW846-8260B

Refer to footnotes on page 12A-21.

Table 12A-2
Method Detection Limits for Volatile Organic Compounds (Method[g] SW846-8260), Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1,1,1-Trichloroethane	0.300 - 0.325	Chlorobenzene	0.250 - 0.300
1,1,2,2-Tetrachloroethane	0.250 - 0.300	Chloroethane	0.300
1,1,2-Trichloroethane	0.250 - 0.300	Chloroform	0.250 - 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	0.250 - 0.300
1,2-Dibromoethane	0.300	Isopropylbenzene	0.300
1,2-Dichlorobenzene	0.300	Methyl acetate	1.50
1,2-Dichloroethane	0.250 - 0.300	Methylcyclohexane	3.00
1,2-Dichloropropane	0.250 - 0.300	Methylene chloride	3.00
1,3-Dichlorobenzene	0.300	Styrene	0.250 - 0.300
1,4-Dichlorobenzene	0.300	Tert-butyl methyl ether	0.300
1,4-Dioxane	15.0	Tetrachloroethene	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	Toluene	0.250 - 0.300
2-Butanone	1.25 - 2.00	Trichloroethene	0.250 - 0.300
2-Hexanone	1.25 - 2.20	Trichlorofluoromethane	0.300
4-methyl-, 2-Pentanone	1.25 - 1.50	Vinyl acetate	1.5
Acetone	3.00 - 3.50	Vinyl chloride	0.300 - 0.500
Benzene	0.300	Xylene	0.300
Bromochloromethane	0.300	cis-1,2-Dichloroethene	0.300
Bromodichloromethane	0.250 - 0.300	cis-1,3-Dichloropropene	0.250 - 0.300
Bromoform	0.250 - 0.300	m-, p-Xylene	0.300
Bromomethane	0.300	o-Xylene	0.300
Carbon disulfide	1.25 - 1.50	trans-1,2-Dichloroethene	0.300
Carbon tetrachloride	0.300	trans-1,3-Dichloropropene	0.250 - 0.300

Refer to footnotes on page 12A-21.

Table 12A-3
Summary of Nitrate plus Nitrite Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 26-Mar-12	Nitrate plus nitrite as N	6.03	0.250	1.25	10.0	B		091943-018	EPA 353.2
CTF-MW3 (Duplicate) 26-Mar-12	Nitrate plus nitrite as N	6.05	0.250	1.25	10.0	B		091944-018	EPA 353.2
CTF-MW3 16-Jun-12	Nitrate plus nitrite as N	5.39	0.170	0.500	10.0			092535-018	EPA 353.2
CTF-MW3 21-Sep-12	Nitrate plus nitrite as N	5.90	0.425	1.25	10.0			092860-018	EPA 353.2
CTF-MW3 14-Dec-12	Nitrate plus nitrite as N	5.23	0.425	1.25	10.0			093249-018	EPA 353.2

Refer to footnotes on page 12A-21.

Table 12A-4
Summary of Anion and Alkalinity Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	336	0.725	1.00	NE	B		091943-022	SM2320B
26-Mar-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091943-022	SM2320B
	Bromide	1.15	0.066	0.200	NE			091943-016	SW846 9056
	Chloride	112	3.30	10.0	NE			091943-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			091943-016	SW846 9056
	Sulfate	448	5.00	20.0	NE			091943-016	SW846 9056
CTF-MW3 (Duplicate)	Bicarbonate Alkalinity	334	0.725	1.00	NE	B		091944-022	SM2320B
26-Mar-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091944-022	SM2320B
	Bromide	1.18	0.066	0.200	NE			091944-016	SW846 9056
	Chloride	115	3.30	10.0	NE			091944-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			091944-016	SW846 9056
	Sulfate	462	5.00	20.0	NE			091944-016	SW846 9056
CTF-MW3	Bicarbonate Alkalinity	329	0.725	1.00	NE			092535-022	SM2320B
16-Jun-12	Carbonate Alkalinity	ND	0.725	1.00	NE		U	092535-022	SM2320B
	Bromide	1.16	0.067	0.200	NE			092535-016	SW846 9056
	Chloride	115	1.34	4.00	NE			092535-016	SW846 9056
	Fluoride	2.28	0.033	0.100	4.0			092535-016	SW846 9056
	Sulfate	486	2.66	8.00	NE			092535-016	SW846 9056
CTF-MW3	Bicarbonate Alkalinity	339	0.725	1.00	NE			092860-022	SM2320B
21-Sep-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092860-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			092860-016	SW846 9056
	Chloride	116	1.34	4.00	NE			092860-016	SW846 9056
	Fluoride	2.36	0.033	0.100	4.0			092860-016	SW846 9056
	Sulfate	493	2.66	8.00	NE			092860-016	SW846 9056
CTF-MW3	Bicarbonate Alkalinity	338	0.725	1.00	NE	B		093249-022	SM2320B
14-Dec-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093249-022	SM2320B
	Bromide	1.26	0.067	0.200	NE			093249-016	SW846 9056
	Chloride	112	3.35	10.0	NE			093249-016	SW846 9056
	Fluoride	2.43	0.033	0.100	4.0			093249-016	SW846 9056
	Sulfate	463	6.65	20.0	NE			093249-016	SW846 9056

Refer to footnotes on page 12A-21.

Table 12A-5
Summary of Perchlorate Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 26-Mar-12	ND	0.004	0.012	NE	U		091943-020	EPA 314.0
CTF-MW3 (Duplicate) 26-Mar-12	ND	0.004	0.012	NE	U		091944-020	EPA 314.0
CTF-MW3 16-Jun-12	ND	0.004	0.012	NE	U		092535-020	EPA 314.0
CTF-MW3 21-Sep-12	ND	0.004	0.012	NE	U		092860-020	EPA 314.0
CTF-MW3 14-Dec-12	ND	0.004	0.012	NE	H, U	UJ	093249-020	EPA 314.0

Refer to footnotes on page 12A-21.

Table 12A-6
Summary of TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091943-009	SW846 6020
26-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091943-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091943-009	SW846 6020
	Barium	0.0326	0.0006	0.002	2.00			091943-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091943-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091943-009	SW846 6020
	Calcium	187	0.300	1.00	NE			091943-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091943-009	SW846 6020
	Cobalt	0.000367	0.0001	0.001	NE	B, J	0.00061U	091943-009	SW846 6020
	Copper	0.00223	0.00035	0.001	NE		0.0041U	091943-009	SW846 6020
	Iron	0.761	0.033	0.100	NE	B		091943-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091943-009	SW846 6020
	Magnesium	49.1	0.050	0.150	NE			091943-009	SW846 6020
	Manganese	0.00109	0.001	0.005	NE	J		091943-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091943-009	SW846 7470
	Nickel	0.00297	0.0005	0.002	NE			091943-009	SW846 6020
	Potassium	11.5	0.080	0.300	NE			091943-009	SW846 6020
	Selenium	0.0282	0.0015	0.005	0.050			091943-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091943-009	SW846 6020
	Sodium	171	0.400	1.25	NE			091943-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091943-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091943-009	SW846 6010
	Zinc	0.00654	0.0035	0.010	NE	J	0.0182U	091943-009	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-6 *(Continued)*
Summary of TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091944-009	SW846 6020
26-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091944-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091944-009	SW846 6020
	Barium	0.0321	0.0006	0.002	2.00			091944-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091944-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091944-009	SW846 6020
	Calcium	192	0.300	1.00	NE			091944-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091944-009	SW846 6020
	Cobalt	0.000354	0.0001	0.001	NE	B, J	0.00061U	091944-009	SW846 6020
	Copper	0.00233	0.00035	0.001	NE		0.0041U	091944-009	SW846 6020
	Iron	0.769	0.033	0.100	NE	B		091944-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091944-009	SW846 6020
	Magnesium	52.1	0.050	0.150	NE			091944-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091944-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091944-009	SW846 7470
	Nickel	0.003	0.0005	0.002	NE			091944-009	SW846 6020
	Potassium	10.7	0.080	0.300	NE			091944-009	SW846 6020
	Selenium	0.0289	0.0015	0.005	0.050			091944-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091944-009	SW846 6020
	Sodium	165	0.400	1.25	NE			091944-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091944-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091944-009	SW846 6010
	Zinc	0.00535	0.0035	0.010	NE	J	0.0182U	091944-009	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-6 *(Continued)*
Summary of TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092535-009	SW846 6020
16-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092535-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092535-009	SW846 6020
	Barium	0.029	0.0006	0.002	2.00			092535-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092535-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092535-009	SW846 6020
	Calcium	184	0.600	2.00	NE			092535-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092535-009	SW846 6020
	Cobalt	0.000346	0.0001	0.001	NE	J		092535-009	SW846 6020
	Copper	0.00186	0.00035	0.001	NE			092535-009	SW846 6020
	Iron	0.392	0.033	0.100	NE			092535-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092535-009	SW846 6020
	Magnesium	45.0	0.010	0.030	NE			092535-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092535-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092535-009	SW846 7470
	Nickel	0.00391	0.0005	0.002	NE			092535-009	SW846 6020
	Potassium	11.3	0.080	0.300	NE			092535-009	SW846 6020
	Selenium	0.0243	0.0015	0.005	0.050			092535-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092535-009	SW846 6020
	Sodium	161	0.800	2.50	NE			092535-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092535-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092535-009	SW846 6010
	Zinc	0.00525	0.0035	0.010	NE	J		092535-009	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-6 *(Continued)*
Summary of TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092860-009	SW846 6020
21-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092860-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092860-009	SW846 6020
	Barium	0.0312	0.0006	0.002	2.00			092860-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092860-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092860-009	SW846 6020
	Calcium	193	0.600	2.00	NE	B		092860-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092860-009	SW846 6020
	Cobalt	0.000342	0.0001	0.001	NE	J		092860-009	SW846 6020
	Copper	0.00247	0.00035	0.001	NE	B		092860-009	SW846 6020
	Iron	0.464	0.033	0.100	NE			092860-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092860-009	SW846 6020
	Magnesium	49.3	0.010	0.030	NE			092860-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092860-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092860-009	SW846 7470
	Nickel	0.00471	0.0005	0.002	NE			092860-009	SW846 6020
	Potassium	10.7	0.080	0.300	NE			092860-009	SW846 6020
	Selenium	0.0257	0.0015	0.005	0.050			092860-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092860-009	SW846 6020
	Sodium	173	0.800	2.50	NE		J	092860-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092860-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092860-009	SW846 6010
	Zinc	0.0044	0.0035	0.010	NE	J		092860-009	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-6 *(Concluded)*
Summary of TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		093249-009	SW846 6020
14-Dec-12	Antimony	ND	0.001	0.003	0.006	U	UJ	093249-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U	UJ	093249-009	SW846 6020
	Barium	0.0281	0.0006	0.002	2.00			093249-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004			093249-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093249-009	SW846 6020
	Calcium	189	0.600	2.00	NE			093249-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093249-009	SW846 6020
	Cobalt	0.000327	0.0001	0.001	NE	J		093249-009	SW846 6020
	Copper	0.00264	0.00035	0.001	NE			093249-009	SW846 6020
	Iron	0.374	0.033	0.100	NE			093249-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093249-009	SW846 6020
	Magnesium	45.3	0.100	0.300	NE			093249-009	SW846 6020
	Manganese	0.00108	0.001	0.005	NE	J		093249-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093249-009	SW846 7470
	Nickel	0.00483	0.0005	0.002	NE			093249-009	SW846 6020
	Potassium	11.3	0.800	3.00	NE			093249-009	SW846 6020
	Selenium	0.0261	0.0015	0.005	0.050		J+	093249-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093249-009	SW846 6020
	Sodium	150	0.800	2.50	NE			093249-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U	UJ	093249-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		093249-009	SW846 6010
	Zinc	0.00507	0.0035	0.010	NE	J		093249-009	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-7
Summary of Filtered TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091943-010	SW846 6020
26-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091943-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091943-010	SW846 6020
	Barium	0.0324	0.0006	0.002	2.00			091943-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091943-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091943-010	SW846 6020
	Calcium	179	0.300	1.00	NE			091943-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091943-010	SW846 6020
	Cobalt	0.000387	0.0001	0.001	NE	B, J	0.00051U	091943-010	SW846 6020
	Copper	0.00222	0.00035	0.001	NE		0.00351U	091943-010	SW846 6020
	Iron	0.776	0.033	0.100	NE	B		091943-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091943-010	SW846 6020
	Magnesium	46.9	0.050	0.150	NE			091943-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091943-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091943-010	SW846 7470
	Nickel	0.00293	0.0005	0.002	NE			091943-010	SW846 6020
	Potassium	11.5	0.080	0.300	NE			091943-010	SW846 6020
	Selenium	0.0288	0.0015	0.005	0.050			091943-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091943-010	SW846 6020
	Sodium	157	0.400	1.25	NE			091943-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091943-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091943-010	SW846 6010
	Zinc	0.00572	0.0035	0.010	NE	J		091943-010	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-7 *(Continued)*
Summary of Filtered TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		091944-010	SW846 6020
26-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091944-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091944-010	SW846 6020
	Barium	0.0322	0.0006	0.002	2.00			091944-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091944-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091944-010	SW846 6020
	Calcium	182	0.300	1.00	NE			091944-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091944-010	SW846 6020
	Cobalt	0.000405	0.0001	0.001	NE	B, J	0.00051U	091944-010	SW846 6020
	Copper	0.00224	0.00035	0.001	NE		0.00351U	091944-010	SW846 6020
	Iron	0.827	0.033	0.100	NE	B		091944-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091944-010	SW846 6020
	Magnesium	45.5	0.010	0.030	NE			091944-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091944-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091944-010	SW846 7470
	Nickel	0.00308	0.0005	0.002	NE			091944-010	SW846 6020
	Potassium	11.3	0.080	0.300	NE			091944-010	SW846 6020
	Selenium	0.0293	0.0015	0.005	0.050			091944-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091944-010	SW846 6020
	Sodium	155	0.400	1.25	NE			091944-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091944-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091944-010	SW846 6010
	Zinc	0.00509	0.0035	0.010	NE	J		091944-010	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-7 *(Continued)*
Summary of Filtered TAL Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092535-010	SW846 6020
16-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092535-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092535-010	SW846 6020
	Barium	0.0294	0.0006	0.002	2.00			092535-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092535-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092535-010	SW846 6020
	Calcium	193	0.600	2.00	NE			092535-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092535-010	SW846 6020
	Cobalt	0.000404	0.0001	0.001	NE	J		092535-010	SW846 6020
	Copper	0.00203	0.00035	0.001	NE			092535-010	SW846 6020
	Iron	0.396	0.033	0.100	NE			092535-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092535-010	SW846 6020
	Magnesium	47.1	0.010	0.030	NE			092535-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092535-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092535-010	SW846 7470
	Nickel	0.00377	0.0005	0.002	NE			092535-010	SW846 6020
	Potassium	11.2	0.080	0.300	NE			092535-010	SW846 6020
	Selenium	0.0245	0.0015	0.005	0.050			092535-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092535-010	SW846 6020
	Sodium	172	0.800	2.50	NE			092535-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092535-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092535-010	SW846 6010
	Zinc	0.00522	0.0035	0.010	NE	J		092535-010	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-7 *(Continued)*
Summary of Filtered TAL Metal Results,
Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		092860-010	SW846 6020
21-Sep-12	Antimony	0.00137	0.001	0.003	0.006	B, J	0.0058U	092860-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092860-010	SW846 6020
	Barium	0.0337	0.0006	0.002	2.00			092860-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092860-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092860-010	SW846 6020
	Calcium	207	0.600	2.00	NE	B		092860-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092860-010	SW846 6020
	Cobalt	0.000409	0.0001	0.001	NE	J		092860-010	SW846 6020
	Copper	0.00282	0.00035	0.001	NE	B		092860-010	SW846 6020
	Iron	0.519	0.033	0.100	NE			092860-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092860-010	SW846 6020
	Magnesium	48.4	0.010	0.030	NE			092860-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092860-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092860-010	SW846 7470
	Nickel	0.0051	0.0005	0.002	NE			092860-010	SW846 6020
	Potassium	11.3	0.080	0.300	NE			092860-010	SW846 6020
	Selenium	0.0252	0.0015	0.005	0.050			092860-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092860-010	SW846 6020
	Sodium	173	0.800	2.50	NE		J	092860-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092860-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092860-010	SW846 6010
	Zinc	0.00486	0.0035	0.010	NE	J		092860-010	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-7 *(Concluded)*
Summary of Filtered TAL Metal Results, Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		093249-010	SW846 6020
14-Dec-12	Antimony	ND	0.001	0.003	0.006	U		093249-010	SW846 6020
	Arsenic	0.00191	0.0017	0.005	0.010	J		093249-010	SW846 6020
	Barium	0.0305	0.0006	0.002	2.00			093249-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093249-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093249-010	SW846 6020
	Calcium	203	0.600	2.00	NE			093249-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093249-010	SW846 6020
	Cobalt	0.000263	0.0001	0.001	NE	J		093249-010	SW846 6020
	Copper	0.00252	0.00035	0.001	NE	B	0.00285U	093249-010	SW846 6020
	Iron	0.425	0.033	0.100	NE			093249-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093249-010	SW846 6020
	Magnesium	48.8	0.010	0.030	NE			093249-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		093249-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093249-010	SW846 7470
	Nickel	0.00403	0.0005	0.002	NE			093249-010	SW846 6020
	Potassium	11.2	0.080	0.300	NE			093249-010	SW846 6020
	Selenium	0.0309	0.0015	0.005	0.050			093249-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093249-010	SW846 6020
	Sodium	192	0.800	2.50	NE			093249-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		093249-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		093249-010	SW846 6010
	Zinc	0.00628	0.0035	0.010	NE	J		093249-010	SW846 6020

Refer to footnotes on page 12A-21.

Table 12A-8
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 149 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CTF-MW3	26-Mar-12	20.34	1632	120.0	7.21	0.32	79.3	7.14
CTF-MW3	16-Jun-12	20.09	1530	178.7	6.89	0.19	87.4	7.84
CTF-MW3	21-Sep-12	22.11	1653	193.9	6.89	0.34	88.9	7.72
CTF-MW3	14-Dec-12	16.41	1538	207.9	6.70	0.48	81.7	7.97

Refer to footnotes on page 12A-21.

Footnotes for Solid Waste Management Unit 149 Groundwater Monitoring Tables

ID = identifier.
N = nitrogen.
No. = number.

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

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

[d]**MCL**
- 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]**Laboratory Qualifier**
B = The analyte was detected in the blank above the effective method detection limit (MDL).
H = Analytical holding time was exceeded.
J = Amount detected is below the practical quantitation limit (PQL).
U = Analyte is absent or below the method detection limit.

[f]**Validation Qualifier**
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
J+ = The associated numerical value is an estimated quantity with a suspected positive 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**
- 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.

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

°C = degrees Celsius.
% Sat = percent saturation.
µmho/cm = micromhos per centimeter.
mg/L = milligrams per liter.
mV = millivolts.
NTU = nephelometric turbidity units.
pH = potential of hydrogen (negative logarithm of the hydrogen ion concentration).

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Attachment 12B
Solid Waste Management Unit 149
Hydrographs

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Attachment 12B Hydrographs

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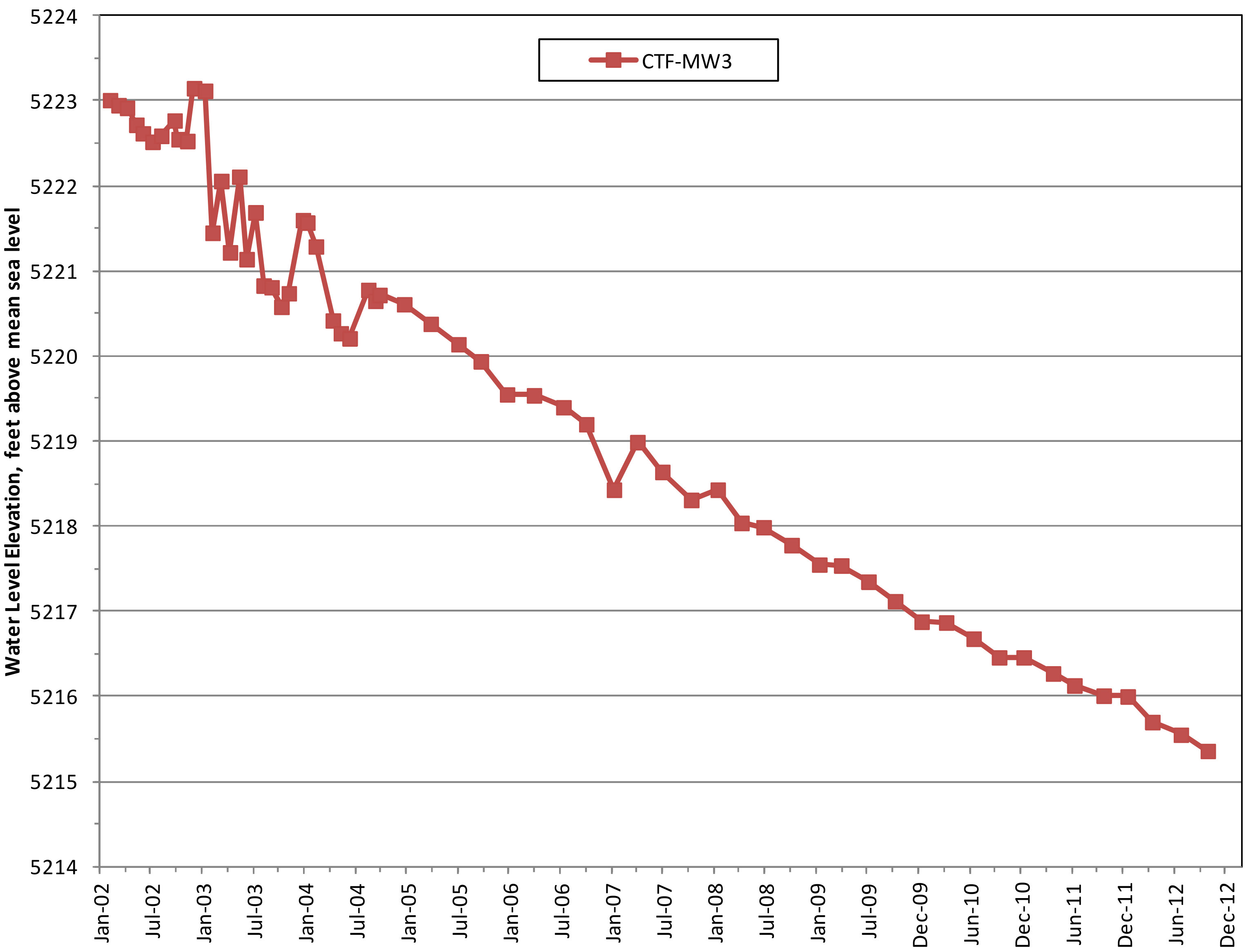

Figure 12B-1. SWMU 149 Study Area Well

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13.0 Solid Waste Management Unit 154

13.1 Introduction

This chapter summarizes Calendar Year (CY) 2012 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). The SNL/NM facility 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.

The supplemental groundwater monitoring at SWMU 154 is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the New Mexico Environment Department (NMED) Hazardous Waste Bureau (NMED April 2010).

During CY 2012 four quarterly groundwater samples were collected from monitoring well CTF-MW2 on March 30, June 19, September 25, and December 18, 2012. The groundwater samples were collected in accordance with the NMED-approved Sampling and Analysis Plan (SAP) (SNL June 2010). 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 2009). During all four quarters, arsenic was detected above the established MCL and is most likely attributable to background as 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 and final quarter of required groundwater sampling (NMED April 2010) was conducted on December 18, 2012.

13.1.1 Location

SWMU 154, the Building 9960 Septic Systems at SNL/NM, is located in the CTF on federally owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the DOE. 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 systems. The east septic system (SWMU 154B) 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 154A) consists of a pair of HE seepage pits located southwest of Building 9960 (Figure 13-2).

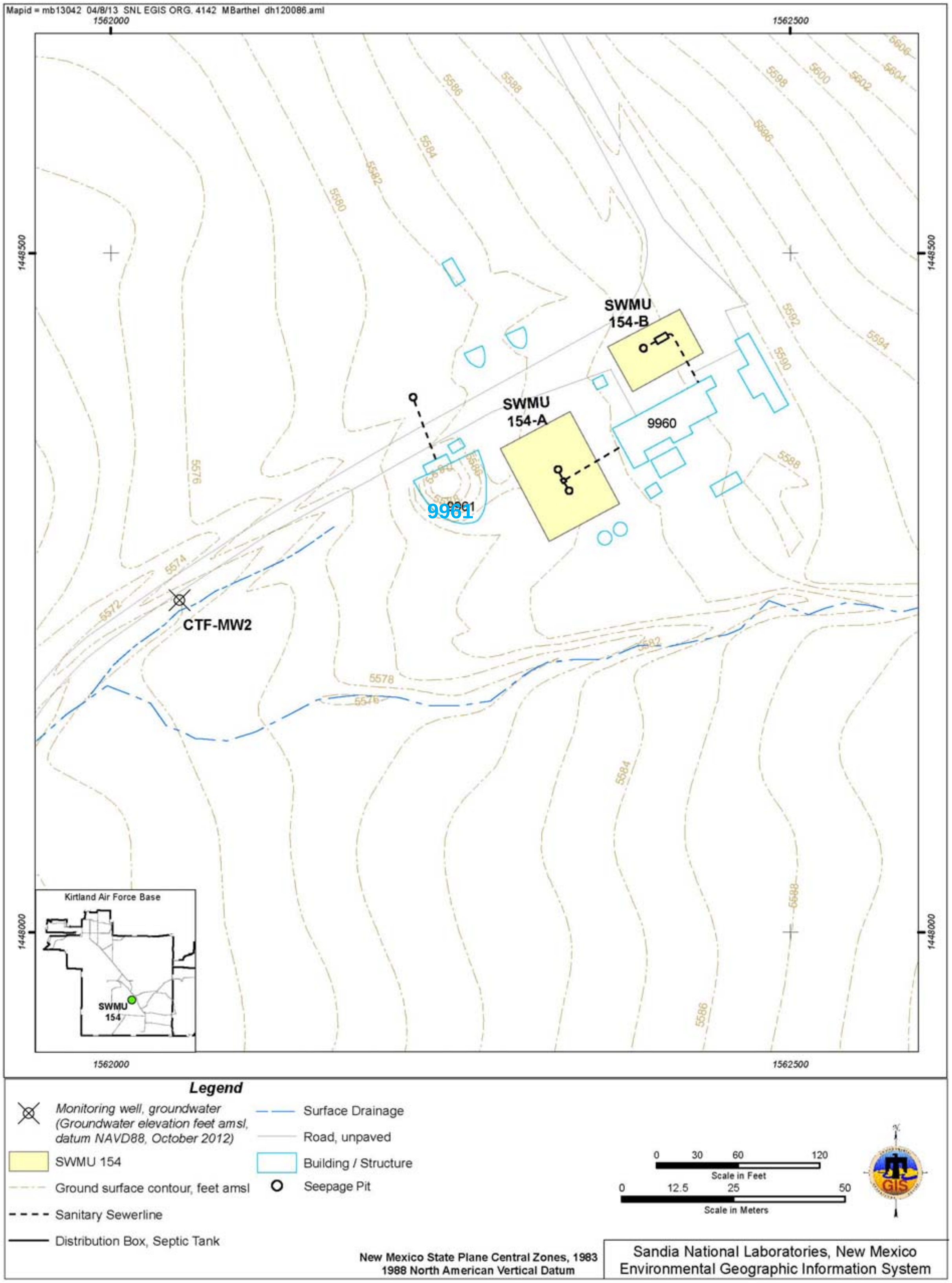

Figure 13-1. Location of Monitoring Well CTF-MW2 near SWMU 154

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
November	2001	A follow-up FIP documenting specific investigation procedure to be completed submitted to the NMED.	SNL November 2001

Table 13-1. Historical Timeline of SWMU 154 *(Concluded)*

Month	Year	Event	Reference
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 III 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.	This report

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 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.
SWMU = Solid Waste Management Unit.

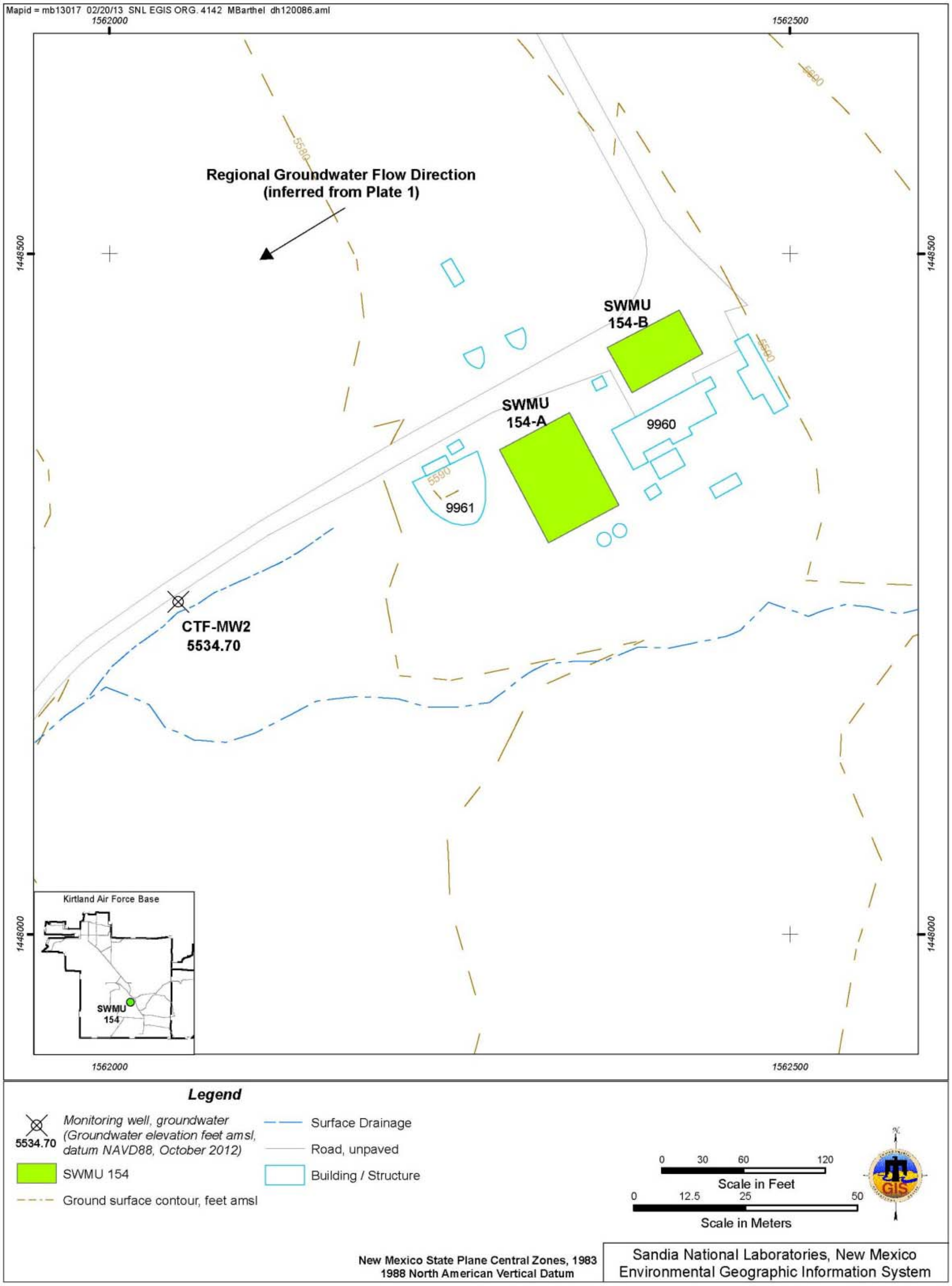

Figure 13-2. SWMU 154 Groundwater Flow Direction (October 2012)

The two HE compound seepage pits are 5 ft in diameter and were installed to approximately 23 ft below ground surface (bgs). These 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. By 1993, the septic system discharges were connected to the City of Albuquerque sanitary sewer system (Jones July 1993). The old septic system line was disconnected and 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 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 HE seepage pits are inactive and have not been backfilled. Rinse water from HE compound machining operations at the facility are currently directed to large polypropylene tanks that are routinely tested and the contents properly disposed of.

Environmental concern about SWMU 154 is based upon the potential for the release of 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 septic system 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 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 was 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 III 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 2012. The analytical results for CY 2012 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. The result for hexahydro-trinitro-triazine (RDX) was rejected during data validation for the October 2002 groundwater sample because the second column confirmation relative percent difference exceeded acceptance criteria. No RDX was detected during reanalysis of this sample. 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.

13.1.4 Current Monitoring Network

Currently one monitoring well (CTF-MW2) is located west of SWMU 154 (Figure 13-2). Monitoring well CTF-MW2 is 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 2012 Activities

The following activities took place for monitoring well CTF-MW2 near SWMU 154 during CY 2012 (January through December 2012):

- Quarterly groundwater sampling was conducted at monitoring well CTF-MW2 in March, June, September, and December 2012. The eighth and final quarter of required groundwater sampling (NMED April 2010) was conducted on December 18, 2012.

- Quarterly reporting of analytical results for monitoring well CTF-MW2 was conducted.

13.1.6 Summary of Future Activities

The following activities are anticipated for monitoring well CTF-MW2 near SWMU 154 during CY 2013:

- Analytical results will be summarized and additional analysis may be performed and submitted to NMED to support reinitiation of the regulatory process for designating the site as CAC with NFA.

13.1.7 Current 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 (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 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

Monitoring Well	Ground Surface Elevation (ft amsl)	Depth of Screened Interval (ft bgs)	Elevation for Top of Screen (ft amsl)	Potentiometric Surface, October 2012 (ft amsl)	Mid-Point Screen Elevation (ft amsl)	Pressure Head (ft[a])
CTF-MW2	5575.60	110 – 130	5465.60	5534.70	5455.60	79

NOTES:
[a]From mid-point of screen.
amsl = Above mean sea level.
bgs = Below ground surface.
CTF = Coyote Test Field.
ft = Foot (feet).
MW = Monitoring Well.
SWMU = Solid Waste Management Unit.

The October 2012 groundwater elevation was 5,534.70 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 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.

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 a confining unit. The borehole possibly intercepted a splay of 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 of the first-phase groundwater samples and was attributed to the natural occurrence of arsenic in bedrock, and not to research activities conducted at Building 9960.

The second phase of quarterly groundwater sampling began in March 2011. During CY 2012 four 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, no constituents exceed the respective MCLs. The occurrence of arsenic in groundwater samples from monitoring well CTF-MW2 is mostly likely attributable to naturally occurring arsenic in the bedrock where the well is screened.

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 federal 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 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 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 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 proposal would be approved without groundwater characterization unless the NMED gained confidence 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 CAC proposal to the NMED (SNL June 2005). In September 2005, the NMED issued a NOD (NMED September 2005) requiring DOE/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 III 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 was resumed at monitoring well CTF-MW2 in CY 2011 and the eighth and final quarter of required sampling (NMED April 2010) was conducted on December 18, 2012, and the analytical results are presented in Section 13.6. 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 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 (NMED April 2004).

13.3 Scope of Activities

The field activity discussed in this section is groundwater monitoring sampling and analysis during CY 2012 sampling events (Table 13-3). The analytical parameters for monitoring well CTF-MW2 for each sampling event are listed in Table 13-4

Quality control (QC) samples are collected in the field at the time of environmental sample collection. QC samples are 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. Field QC samples include duplicate environmental, split, EB, TB, and field blank (FB) 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. TB samples are used to determine whether VOCs contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory. FB samples provide a check for potential ambient sources of sample contamination during the sampling process and/or sampling error.

13.4 Field Methods and Measurements

According to the requirements of the Order (NMED April 2004) addressing Section VII.D.6 and the NMED letter of April 8, 2010 (NMED April 2010), SNL/NM personnel performed groundwater sampling at SWMU 154. The CY 2012 sampling events were conducted in conformance with appropriate SNL/NM Field Operating Procedures (FOPs) for groundwater sampling activities, the SWMU 154 site-specific SAP (SNL June 2010), and Mini-SAP (SNL February 2012, May 2012, September 2012, and November 2012).

Environmental groundwater samples were collected from monitoring well CTF-MW2. 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, as conducted by Long-Term Stewardship/ER Operations personnel, are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986) and are described in detail in Section 1.3.

Table 13-3. Sampling Dates and SAPs for Monitoring Well CTF-MW2 near SWMU 154, Calendar Year 2012

Date of Sampling Event	SAP
March 30, 2012	*SWMU 154 Groundwater Monitoring Mini-SAP for Second Quarter Fiscal Year 2012* (SNL February 2012)
June 19, 2012	*SWMU 154 Groundwater Monitoring Mini-SAP for Third Quarter Fiscal Year* 2012 (SNL May 2012)
September 25, 2012	*SWMU 154 Groundwater Monitoring Mini-SAP for Fourth Quarter Fiscal Year* 2012 (SNL August 2012)
December 18, 2012	*SWMU 154 Groundwater Monitoring Mini-SAP for First Quarter Fiscal Year 2013* (SNL November 2012)

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 2012

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 30, 2012** CTF-MW2 CTF-MW2 (dup) **September 25, 2012** CTF-MW2	**June 19, 2012** CTF-MW2 **December 18, 2012** CTF-MW2

NOTES:
Dup = Duplicate sample.
Gamma Spec* = Gamma spectroscopy short list (Americium-241, Cesium-137, Cobalt-60, and Potassium-40).
HE = High explosive.
NPN = Nitrate plus nitrate (reported as nitrogen).
SVOC = Semivolatile organic compound.
TAL = Target Analyte List.
VOC = Volatile organic compound.

13.4.1 Groundwater Elevation

Throughout CY 2012, 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 hydrograph presented on Figure 13C-1 (Attachment 13C).

13.5 Analytical Methods

EPA and DOE analytical methods are presented in Table 13-4 and discussed in Section 1.3.2. Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results and field measurements for samples collected from monitoring well CTF-MW2 are shown in tabulated form in Tables 13A-1 through 13A-11 (Attachment 13A). Analytical reports, including certificates of analyses, analytical methods, method detection limits (MDLs), minimum detectable activity, critical level, practical quantitation limits (PQLs), dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Records Center.

13.6 Summary of Analytical Results

This section discusses analytical results, exceedances of standards, and field measurements for the CY 2012 SWMU 154 sampling events. Data are presented in Tables 13A-1 through 13A-11 (Attachment 13A). Concentration trend plots for parameters that exceed the MCLs are presented in Attachments 13B, Figure 13B-1, and Figure 13B-2. Data qualifiers are explained in the footnotes following Table 13A-11.

The analytical data were reviewed and qualified in accordance with SNL/NM AOP 00-03 (SNL May 2011). 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 monitoring well CTF-MW2 groundwater sample. 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 13-A3 lists the MDLs for associated SVOCs. The MDLs for HE compounds are presented in Table 13A-4. Detected compounds for the CY 2012 sampling events are summarized as follows:

- **March 2012 Sampling Event—**The HE compound RDX was detected in monitoring well CTF-MW2 environmental and duplicate environmental samples at concentrations of 0.147 and 0.179 micrograms per liter (µg/L), respectively.

- **June 2012 Sampling Event—**The VOC toluene was detected at a concentration of 0.580 µg/L. This concentration is above the laboratory MDL but below the PQL. The HE compound RDX was detected at a concentration of 0.199 µg/L.

- **September 2012 Sampling Event—**The HE compound RDX was detected at a concentration of 0.295 µg/L.

- **December 2012 Sampling Event—**The HE compound RDX was detected at a concentration of 0.170 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 2012. NPN was detected at a concentration of 0.278 mg/L in the June 2012 sampling event.

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 2012.

Perchlorate was not detected above the NMED screening level/MDL of 4 µg/L in CY 2012 monitoring well CTF-MW2 samples. Table 13A-7 presents the perchlorate results (Attachment 13A).

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 2012 groundwater samples is arsenic, discussed as follows:

- **March 2012 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 0.0498 and 0.0559 mg/L, and filtered arsenic at 0.0498 and 0.0521 mg/L.

- **June 2012 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 0.0433 mg/L, and filtered arsenic at 0.0276 mg/L.

- **September 2012 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 0.0535 mg/L, and filtered arsenic at 0.0494 mg/L. Copper results for both unfiltered and filtered samples were qualified as not detected during data validation, since copper was reported at concentrations less than five times the associated laboratory method blank sample result.

- **December 2011 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 0.0516 mg/L, and filtered arsenic at 0.0536 mg/L.

Arsenic concentrations since March 2002 are plotted on Figure 13B-1 (Attachment 13B).

Monitoring well CTF-MW2 groundwater samples were screened for gamma-emitting radionuclides, gross alpha, and gross beta activity. Additional samples for isotopic uranium were collected to support evaluation of gross alpha activity results. 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 according to 40 Code of Federal Regulations Parts 9, 141, and 142. Table I-4 does not include uranium, which is measured independently. Therefore, gross alpha activity measurements were corrected by subtracting out the uranium activity. All radionuclide activity results are below the MCLs, where established, except for gross alpha, discussed as follows:

- **December 2012 Sampling Event—**Initially, the corrected gross alpha activity for the initial analysis was reported above the MCL of 15 pCi/L at an activity of 25.96 pCi/L. The laboratory recounted the gross alpha and beta sample due to high recovery, and the isotopic uranium sample due to low carrier/tracer yield. Both original results and reanalysis are reported. Corrected gross alpha activities are plotted on Figure 13B-2 (Attachment 13B.)

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.

13.7 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. 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.

13.7.1 Field Quality Control Samples

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

13.7.1.1 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 2012 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.

13.7.1.2 Equipment Blank Samples

EB or rinsate samples are collected to verify the equipment decontamination process. The March 2012 EB or rinsate sample was collected prior to sampling monitoring well CTF-MW3 and submitted for all analyses. Bromodichloromethane, chloride, chloroform, copper, and dibromochloromethane were detected in the EB sample. No corrective action was required for bromodichloromethane, chloride, chloroform, or dibromochloromethane since these parameters were not detected in environmental samples or reported values in environmental samples are greater than five times the EB concentration. Copper was qualified as not detected during data validation since sample results are less than five times the EB value.

13.7.1.3 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 2012. Two TBs were submitted for the March 2012 sampling event and one sample for June, September, and December 2012. No VOCs were detected above the associated laboratory MDLs in all TB samples.

13.7.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions. The March 2012 FB sample from the monitoring well CTF-MW3 detected the VOCs bromodichloromethane, chloroform, and dibromochloromethane. No correction action was applied during data validation, since these compounds were not detected in the environmental samples. These compounds are common by-products of water disinfection associated with the deionized water process.

13.7.2 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 2012 sampling event no significant data quality problems were noted during the data validation process. In June, September, and December 2012 some analytical results were qualified during the data validation process; however, no significant data quality problems were noted for project contaminant of concerns (COCs). All analytical data are acceptable and reported QC measures appear adequate.

13.8 Variances and Nonconformances

No variances or nonconformances from requirements in the SWMU 154 SAP (SNL June 2010) occurred during the CY 2012 sampling activities. Project-specific issues associated with CY 2012 sampling events are identified as follows:

- **September 2012 Sampling Event—**The field team added weight to the bottom of the sampling system, a second unpowered Bennett™ pump, to overcome buoyancy factors caused by to the height of the water column. Upon completion of sampling, the sampling system was removed from the well, and as the pump reached the top of casing the weight separated from the system and dropped down the well. A camera survey of the well was performed and no visible damage of the well was discovered. On October 5, 2012, the field team successfully removed the weight from the well.

13.9 Summary and Conclusions

During CY 2012 four quarterly groundwater samples were collected from monitoring well CTF-MW2. 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 compared with MCL guidelines for drinking water (EPA 2009) and are summarized as follows:

- **March 2012 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 0.0498 to 0.0559 mg/L in unfiltered samples and ranging from 0.0498 to 0.0521 mg/L in filtered samples, respectively.

- **May 2012 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 0.0433 mg/L, and 0.0276 mg/L, respectively.

- **September 2012 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 0.0535 mg/L, and filtered arsenic at 0.0494 mg/L.

- **December 2012 Sampling Event—**No parameters were detected above established MCLs, except for arsenic and gross alpha. 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 0.0516 mg/L, and filtered arsenic at 0.0536 mg/L. The original gross alpha analyses reported corrected activity above the MCL of 15 pCi/L at 25.96 pCi/L, respectively. The laboratory recounted the gross alpha sample due to high recovery, and the isotopic uranium sample due to low carrier/tracer yield. The corrected gross alpha activity for the reanalysis was reported below the MCL and is comparable to previous values.

The analytical results for this reporting period are consistent with historical concentrations. The current conceptual model described in Section 13.1.7 does not require modification based on the analytical results for this reporting period.

During CY 2013, analytical results will be summarized and additional analysis may be performed and submitted to NMED to support reinitiation of the regulatory process for designating the site as CAC with NFA for SWMU 154.

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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 2012

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 30-Mar-12	RDX	0.147	0.087	0.272	NE	J		091949-024	SW846-8321A
CTF-MW2 (Duplicate) 30-Mar-12	RDX	0.179	0.0874	0.273	NE	J		091950-024	SW846-8321A
CTF-MW2 19-Jun-12	Toluene	0.580	0.300	1.00	1000	J		092538-001	SW846-8260B
	RDX	0.199	0.0821	0.256	NE	J		092538-024	SW846-8321A
CTF-MW2 25-Sep-12	RDX	0.295	0.0847	0.265	NE			092862-024	SW846-8321A
CTF-MW2 18-Dec-12	RDX	0.170	0.0879	0.275	NE	J		093251-024	SW846-8321A

Refer to footnotes on page 13A-25.

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 2012

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
1,4-Dioxane	15.0	Tetrachloroethene	0.300
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	Toluene	0.300
2-Butanone	2.00	Trichloroethene	0.300
2-Hexanone	2.20	Trichlorofluoromethane	0.300
4-methyl-, 2-Pentanone	1.50	Vinyl acetate	1.50
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 13A-25.

Table 13A-3
Method Detection Limits for Semivolatile Organic Compounds (EPA Method[g] SW846-8270C), Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Analyte	MDL[b] (µg/L)	Analyte	MDL[b] (µg/L)
1'-Biphenyl 1	3.00	Butylbenzyl phthalate	2.94 - 6.38
1,2,4-Trichlorobenzene	2.94 - 6.38	Caprolactam	3.00
2,4,5-Trichlorophenol	2.94 - 6.38	Carbazole	0.294 - 0.638
2,4,6-Trichlorophenol	2.94 - 6.38	Chrysene	0.294 - 0.638
2,4-Dichlorophenol	2.94 - 6.38	Di-n-butyl phthalate	2.94 - 6.38
2,4-Dimethylphenol	2.94 - 6.38	Di-n-octyl phthalate	2.94 - 6.38
2,4-Dinitrophenol	4.90 - 10.6	Dibenz[a,h]anthracene	0.294 - 0.638
2,4-Dinitrotoluene	2.94 - 6.38	Dibenzofuran	2.94 - 6.38
2,6-Dinitrotoluene	2.94 - 6.38	Diethylphthalate	2.94 - 6.38
2-Chloronaphthalene	0.294 - 0.638	Dimethylphthalate	2.94 - 6.38
2-Chlorophenol	2.94 - 6.38	Dinitro-o-cresol	2.94 - 6.38
2-Methylnaphthalene	0.294 - 0.638	Diphenyl amine	2.94 - 6.38
2-Nitroaniline	2.94 - 6.38	Fluoranthene	0.294 - 0.638
2-Nitrophenol	2.94 - 6.38	Fluorene	0.294 - 0.638
3,3'-Dichlorobenzidine	2.94 - 6.38	Hexachlorobenzene	2.94 - 6.38
3-Nitroaniline	2.94 - 6.38	Hexachlorobutadiene	2.94 - 6.38
4-Bromophenyl phenyl ether	2.94 - 6.38	Hexachlorocyclopentadiene	2.94 - 6.38
4-Chloro-3-methylphenol	2.94 - 6.38	Hexachloroethane	2.94 - 6.38
4-Chlorobenzenamine	3.24 - 6.38	Indeno(1,2,3-c,d)pyrene	0.294 - 0.638
4-Chlorophenyl phenyl ether	2.94 - 6.38	Isophorone	2.94 - 6.38
4-Nitroaniline	2.94 - 6.38	Naphthalene	0.294 - 0.638
4-Nitrophenol	2.94 - 6.38	Nitro-benzene	2.94 - 6.38
Acenaphthene	0.294 - 0.638	Pentachlorophenol	2.94 - 6.38
Acenaphthylene	0.294 - 0.638	Phenanthrene	0.294 - 0.638
Acetophenone	3.00	Phenol	2.94 - 6.38
Anthracene	0.294 - 0.638	Pyrene	0.294 - 0.638
Atrazine	3.00	bis(2-Chloroethoxy)methane	2.94 - 6.38
Benzaldehyde	5.00	bis(2-Chloroethyl)ether	2.94 - 6.38
Benzo(a)anthracene	0.294 - 0.638	bis(2-Chloroisopropyl)ether	6.00 - 6.38
Benzo(a)pyrene	0.431 - 0.638	bis(2-Ethylhexyl)phthalate	2.94 - 3.00
Benzo(b)fluoranthene	0.294 - 0.638	m,p-Cresol	2.94 - 6.38
Benzo(ghi)perylene	0.294 - 0.638	n-Nitrosodipropylamine	2.94 - 6.38
Benzo(k)fluoranthene	0.294 - 0.638	o-Cresol	2.94 - 6.38

Refer to footnotes on page 13A-25.

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 2012

Analyte	MDL[b] (µg/L)
1,3,5-Trinitrobenzene	0.0821 - 0.0879
1,3-Dinitrobenzene	0.0821 - 0.0879
2,4,6-Trinitrotoluene	0.0821 - 0.0879
2,4-Dinitrotoluene	0.0821 - 0.0879
2,6-Dinitrotoluene	0.0821 - 0.0879
2-Amino-4,6-dinitrotoluene	0.0821 - 0.0879
2-Nitrotoluene	0.0841 - 0.0901
3-Nitrotoluene	0.0821 - 0.0879
4-Amino-2,6-dinitrotoluene	0.0821 - 0.0879
4-Nitrotoluene	0.154 - 0.165
HMX	0.0821 - 0.0879
Nitro-benzene	0.0821 - 0.0879
Pentaerythritol tetranitrate	0.103 - 0.110
RDX	0.0821 - 0.0879
Tetryl	0.0821 - 0.0879

Refer to footnotes on page 13A-25.

Table 13A-5
Summary of Nitrate plus Nitrate Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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 30-Mar-12	Nitrate plus nitrite as N	ND	0.425	1.25	10.0	U		091949-018	EPA 353.2
CTF-MW2 (Duplicate) 30-Mar-12	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		091950-018	EPA 353.2
CTF-MW2 19-Jun-12	Nitrate plus nitrite as N	0.278	0.085	0.250	10.0			092538-018	EPA 353.2
CTF-MW2 25-Sep-12	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		092862-018	EPA 353.2
CTF-MW2 18-Dec-12	Nitrate plus nitrite as N	ND	0.017	0.050	10.0	U		093251-018	EPA 353.2

Refer to footnotes on page 13A-25.

Table 13A-6
Summary of Anion and Alkalinity Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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	Total Alkalinity	1580	0.725	1.00	NE			091949-022	SM2320B
30-Mar-12	Bromide	1.77	0.670	2.00	NE	J		091949-016	SW846 9056
	Chloride	435	6.70	20.0	NE			091949-016	SW846 9056
	Fluoride	2.27	0.033	0.100	4.0			091949-016	SW846 9056
	Sulfate	162	13.3	40.0	NE			091949-016	SW846 9056
CTF-MW2 (Duplicate)	Total Alkalinity	1600	0.725	1.00	NE			091950-022	SM2320B
30-Mar-12	Bromide	1.75	0.670	2.00	NE	J		091950-016	SW846 9056
	Chloride	433	6.70	20.0	NE			091950-016	SW846 9056
	Fluoride	2.25	0.033	0.100	4.0			091950-016	SW846 9056
	Sulfate	162	13.3	40.0	NE			091950-016	SW846 9056
CTF-MW2	Total Alkalinity	1600	0.725	1.00	NE			092538-022	SM2320B
19-Jun-12	Bromide	ND	0.067	0.200	NE	U		092538-016	SW846 9056
	Chloride	432	3.35	10.0	NE			092538-016	SW846 9056
	Fluoride	2.23	0.033	0.100	4.0			092538-016	SW846 9056
	Sulfate	148	6.65	20.0	NE			092538-016	SW846 9056
CTF-MW2	Bicarbonate Alkalinity	1560	0.725	1.00	NE			092862-022	SM2320B
25-Sep-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092862-022	SM2320B
	Bromide	ND	0.067	0.200	NE	U		092862-016	SW846 9056
	Chloride	468	2.68	8.00	NE			092862-016	SW846 9056
	Fluoride	2.15	0.033	0.100	4.0			092862-016	SW846 9056
	Sulfate	145	5.32	16.0	NE			092862-016	SW846 9056
CTF-MW2	Bicarbonate Alkalinity	1580	1.45	2.00	NE	B		093251-022	SM2320B
18-Dec-12	Carbonate Alkalinity	ND	1.45	2.00	NE	U		093251-022	SM2320B
	Bromide	1.57	0.670	2.00	NE	J		093251-016	SW846 9056
	Chloride	406	3.35	10.0	NE			093251-016	SW846 9056
	Fluoride	2.51	0.033	0.100	4.0			093251-016	SW846 9056
	Sulfate	150	6.65	20.0	NE			093251-016	SW846 9056

Refer to footnotes on page 13A-25.

Table 13A-7
Summary of Perchlorate Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

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 30-Mar-12	ND	0.004	0.012	NE	U		091949-020	EPA 314.0
CTF-MW2 (Duplicate) 30-Mar-12	ND	0.004	0.012	NE	U		091950-020	EPA 314.0
CTF-MW2 19-Jun-12	ND	0.004	0.012	NE	U		092538-020	EPA 314.0
CTF-MW2 25-Sep-12	ND	0.004	0.012	NE	U		092862-020	EPA 314.0
CTF-MW2 18-Dec-12	ND	0.004	0.012	NE	U		093251-020	EPA 314.0

Refer to footnotes on page 13A-25.

Table 13A-8
Summary of Target Analyte List Metal Results,
Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Analyte	Result[a] (mg/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		J-	091949-009	SW846 6020
30-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091949-009	SW846 6020
	Arsenic	**0.0498**	0.0017	0.005	0.010			091949-009	SW846 6020
	Barium	0.0805	0.0006	0.002	2.00			091949-009	SW846 6020
	Beryllium	0.00294	0.0002	0.0005	0.004			091949-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091949-009	SW846 6020
	Calcium	384	1.20	4.00	NE			091949-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091949-009	SW846 6020
	Cobalt	0.00954	0.0001	0.001	NE			091949-009	SW846 6020
	Copper	0.00189	0.00035	0.001	NE		0.00316U	091949-009	SW846 6020
	Iron	2.63	0.033	0.100	NE			091949-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091949-009	SW846 6020
	Magnesium	84.4	0.200	0.600	NE			091949-009	SW846 6020
	Manganese	3.07	0.020	0.100	NE			091949-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091949-009	SW846 7470
	Nickel	0.0175	0.0005	0.002	NE			091949-009	SW846 6020
	Potassium	51.4	1.60	6.00	NE			091949-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091949-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091949-009	SW846 6020
	Sodium	479	1.60	5.00	NE			091949-009	SW846 6020
	Thallium	0.00123	0.00045	0.002	0.002	J		091949-009	SW846 6020
	Uranium	0.0257	0.000067	0.0002	0.03			091949-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091949-009	SW846 6010
	Zinc	0.267	0.0035	0.010	NE	B		091949-009	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.120	0.015	0.050	NE		J-	091950-009	SW846 6020
30-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091950-009	SW846 6020
	Arsenic	**0.0559**	0.0017	0.005	0.010			091950-009	SW846 6020
	Barium	0.0811	0.0006	0.002	2.00			091950-009	SW846 6020
	Beryllium	0.0031	0.0002	0.0005	0.004			091950-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091950-009	SW846 6020
	Calcium	391	1.20	4.00	NE			091950-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091950-009	SW846 6020
	Cobalt	0.00986	0.0001	0.001	NE			091950-009	SW846 6020
	Copper	0.0017	0.00035	0.001	NE		0.00316U	091950-009	SW846 6020
	Iron	2.71	0.033	0.100	NE			091950-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091950-009	SW846 6020
	Magnesium	86.0	0.200	0.600	NE			091950-009	SW846 6020
	Manganese	3.10	0.020	0.100	NE			091950-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091950-009	SW846 7470
	Nickel	0.0183	0.0005	0.002	NE			091950-009	SW846 6020
	Potassium	52.3	1.60	6.00	NE			091950-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091950-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091950-009	SW846 6020
	Sodium	487	1.60	5.00	NE			091950-009	SW846 6020
	Thallium	0.00126	0.00045	0.002	0.002	J		091950-009	SW846 6020
	Uranium	0.0257	0.000067	0.0002	0.03			091950-009	SW846 6020
	Vanadium	0.00109	0.001	0.005	NE	J		091950-009	SW846 6010
	Zinc	0.268	0.0035	0.010	NE	B		091950-009	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.122	0.015	0.050	NE			092538-009	SW846 6020
19-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092538-009	SW846 6020
	Arsenic	**0.0433**	0.0017	0.005	0.010			092538-009	SW846 6020
	Barium	0.0756	0.0006	0.002	2.00			092538-009	SW846 6020
	Beryllium	0.00266	0.0002	0.0005	0.004			092538-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092538-009	SW846 6020
	Calcium	383	1.20	4.00	NE			092538-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092538-009	SW846 6020
	Cobalt	0.00883	0.0001	0.001	NE			092538-009	SW846 6020
	Copper	0.00156	0.00035	0.001	NE			092538-009	SW846 6020
	Iron	2.17	0.033	0.100	NE			092538-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092538-009	SW846 6020
	Magnesium	83.6	0.200	0.600	NE			092538-009	SW846 6020
	Manganese	2.93	0.020	0.100	NE			092538-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092538-009	SW846 7470
	Nickel	0.0162	0.0005	0.002	NE		J-	092538-009	SW846 6020
	Potassium	40.2	0.080	0.300	NE			092538-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092538-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092538-009	SW846 6020
	Sodium	492	1.60	5.00	NE			092538-009	SW846 6020
	Thallium	0.00126	0.00045	0.002	0.002	J		092538-009	SW846 6020
	Uranium	0.0278	0.000067	0.0002	0.03			092538-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092538-009	SW846 6010
	Zinc	0.208	0.0035	0.010	NE			092538-009	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.118	0.015	0.050	NE			092862-009	SW846 6020
25-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092862-009	SW846 6020
	Arsenic	**0.0535**	0.0017	0.005	0.010			092862-009	SW846 6020
	Barium	0.081	0.0006	0.002	2.00			092862-009	SW846 6020
	Beryllium	0.00267	0.0002	0.0005	0.004			092862-009	SW846 6020
	Cadmium	0.000274	0.00011	0.001	0.005	J		092862-009	SW846 6020
	Calcium	390	1.20	4.00	NE			092862-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092862-009	SW846 6020
	Cobalt	0.00963	0.0001	0.001	NE		J	092862-009	SW846 6020
	Copper	0.00185	0.00035	0.001	NE	B	0.0019UJ	092862-009	SW846 6020
	Iron	2.78	0.033	0.100	NE			092862-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092862-009	SW846 6020
	Magnesium	88.7	0.200	0.600	NE		J	092862-009	SW846 6020
	Manganese	3.16	0.005	0.025	NE			092862-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092862-009	SW846 7470
	Nickel	0.0222	0.0005	0.002	NE			092862-009	SW846 6020
	Potassium	56.6	0.400	1.50	NE			092862-009	SW846 6020
	Selenium	0.00741	0.0015	0.005	0.050			092862-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092862-009	SW846 6020
	Sodium	538	1.60	5.00	NE			092862-009	SW846 6020
	Thallium	0.00115	0.00045	0.002	0.002	J		092862-009	SW846 6020
	Uranium	0.0281	0.000067	0.0002	0.03	B		092862-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092862-009	SW846 6010
	Zinc	0.0649	0.0035	0.010	NE		J	092862-009	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.133	0.015	0.050	NE			093251-009	SW846 6020
18-Dec-12	Antimony	0.00109	0.001	0.003	0.006	B, J	0.0086UJ	093251-009	SW846 6020
	Arsenic	**0.0516**	0.0017	0.005	0.010		J-	093251-009	SW846 6020
	Barium	0.0718	0.0006	0.002	2.00			093251-009	SW846 6020
	Beryllium	0.00219	0.0002	0.0005	0.004			093251-009	SW846 6020
	Cadmium	0.000145	0.00011	0.001	0.005	J	J+	093251-009	SW846 6020
	Calcium	386	0.600	2.00	NE			093251-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093251-009	SW846 6020
	Cobalt	0.00992	0.0001	0.001	NE			093251-009	SW846 6020
	Copper	0.00202	0.00035	0.001	NE			093251-009	SW846 6020
	Iron	2.82	0.033	0.100	NE			093251-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093251-009	SW846 6020
	Magnesium	84.5	0.100	0.300	NE			093251-009	SW846 6020
	Manganese	2.83	0.040	0.200	NE			093251-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093251-009	SW846 7470
	Nickel	0.0251	0.0005	0.002	NE			093251-009	SW846 6020
	Potassium	50.2	0.800	3.00	NE			093251-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		093251-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093251-009	SW846 6020
	Sodium	487	0.800	2.50	NE			093251-009	SW846 6020
	Thallium	0.00126	0.00045	0.002	0.002	J	J-	093251-009	SW846 6020
	Uranium	0.0274	0.000067	0.0002	0.03			093251-009	SW846 6020
	Vanadium	0.00121	0.001	0.005	NE	J		093251-009	SW846 6010
	Zinc	0.183	0.0035	0.010	NE			093251-009	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.115	0.015	0.050	NE		J-	091949-010	SW846 6020
30-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091949-010	SW846 6020
	Arsenic	**0.0498**	0.0017	0.005	0.010			091949-010	SW846 6020
	Barium	0.0818	0.0006	0.002	2.00			091949-010	SW846 6020
	Beryllium	0.00327	0.0002	0.0005	0.004			091949-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091949-010	SW846 6020
	Calcium	385	1.20	4.00	NE			091949-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091949-010	SW846 6020
	Cobalt	0.00989	0.0001	0.001	NE			091949-010	SW846 6020
	Copper	0.00176	0.00035	0.001	NE			091949-010	SW846 6020
	Iron	2.70	0.033	0.100	NE			091949-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091949-010	SW846 6020
	Magnesium	84.6	0.200	0.600	NE			091949-010	SW846 6020
	Manganese	3.05	0.020	0.100	NE			091949-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091949-010	SW846 7470
	Nickel	0.0185	0.0005	0.002	NE			091949-010	SW846 6020
	Potassium	51.8	1.60	6.00	NE			091949-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091949-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091949-010	SW846 6020
	Sodium	482	1.60	5.00	NE			091949-010	SW846 6020
	Thallium	0.00124	0.00045	0.002	0.002	J		091949-010	SW846 6020
	Uranium	0.0262	0.000067	0.0002	0.03			091949-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091949-010	SW846 6010
	Zinc	0.317	0.0035	0.010	NE	B		091949-010	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.103	0.015	0.050	NE		J-	091950-010	SW846 6020
30-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091950-010	SW846 6020
	Arsenic	**0.0521**	0.0017	0.005	0.010			091950-010	SW846 6020
	Barium	0.0843	0.0006	0.002	2.00			091950-010	SW846 6020
	Beryllium	0.00321	0.0002	0.0005	0.004			091950-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091950-010	SW846 6020
	Calcium	396	1.20	4.00	NE			091950-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091950-010	SW846 6020
	Cobalt	0.010	0.0001	0.001	NE			091950-010	SW846 6020
	Copper	0.00213	0.00035	0.001	NE			091950-010	SW846 6020
	Iron	2.78	0.033	0.100	NE			091950-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091950-010	SW846 6020
	Magnesium	87.6	0.200	0.600	NE			091950-010	SW846 6020
	Manganese	3.14	0.020	0.100	NE			091950-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091950-010	SW846 7470
	Nickel	0.0187	0.0005	0.002	NE			091950-010	SW846 6020
	Potassium	53.2	1.60	6.00	NE			091950-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091950-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091950-010	SW846 6020
	Sodium	495	1.60	5.00	NE			091950-010	SW846 6020
	Thallium	0.00123	0.00045	0.002	0.002	J		091950-010	SW846 6020
	Uranium	0.0266	0.000067	0.0002	0.03			091950-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091950-010	SW846 6010
	Zinc	0.348	0.0035	0.010	NE	B		091950-010	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.0663	0.015	0.050	NE			092538-010	SW846 6020
19-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092538-010	SW846 6020
	Arsenic	**0.0276**	0.0017	0.005	0.010			092538-010	SW846 6020
	Barium	0.0769	0.0006	0.002	2.00			092538-010	SW846 6020
	Beryllium	0.00147	0.0002	0.0005	0.004			092538-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092538-010	SW846 6020
	Calcium	389	1.20	4.00	NE			092538-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092538-010	SW846 6020
	Cobalt	0.00791	0.0001	0.001	NE			092538-010	SW846 6020
	Copper	0.0794	0.00035	0.001	NE			092538-010	SW846 6020
	Iron	1.84	0.033	0.100	NE			092538-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092538-010	SW846 6020
	Magnesium	84.7	0.200	0.600	NE			092538-010	SW846 6020
	Manganese	2.85	0.020	0.100	NE			092538-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092538-010	SW846 7470
	Nickel	0.0166	0.0005	0.002	NE		J-	092538-010	SW846 6020
	Potassium	39.9	0.080	0.300	NE			092538-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092538-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092538-010	SW846 6020
	Sodium	500	1.60	5.00	NE			092538-010	SW846 6020
	Thallium	0.00123	0.00045	0.002	0.002	J		092538-010	SW846 6020
	Uranium	0.00692	0.000067	0.0002	0.03			092538-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092538-010	SW846 6010
	Zinc	1.71	0.0035	0.010	NE			092538-010	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.088	0.015	0.050	NE			092862-010	SW846 6020
25-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092862-010	SW846 6020
	Arsenic	**0.0494**	0.0017	0.005	0.010			092862-010	SW846 6020
	Barium	0.0774	0.0006	0.002	2.00			092862-010	SW846 6020
	Beryllium	0.00248	0.0002	0.0005	0.004			092862-010	SW846 6020
	Cadmium	0.000415	0.00011	0.001	0.005	J		092862-010	SW846 6020
	Calcium	373	1.20	4.00	NE			092862-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092862-010	SW846 6020
	Cobalt	0.00886	0.0001	0.001	NE		J	092862-010	SW846 6020
	Copper	0.00166	0.00035	0.001	NE	B	0.0019UJ	092862-010	SW846 6020
	Iron	2.58	0.033	0.100	NE			092862-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092862-010	SW846 6020
	Magnesium	77.4	0.200	0.600	NE		J	092862-010	SW846 6020
	Manganese	2.98	0.005	0.025	NE			092862-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092862-010	SW846 7470
	Nickel	0.0211	0.0005	0.002	NE			092862-010	SW846 6020
	Potassium	47.6	0.080	0.300	NE			092862-010	SW846 6020
	Selenium	0.0084	0.0015	0.005	0.050			092862-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092862-010	SW846 6020
	Sodium	503	1.60	5.00	NE			092862-010	SW846 6020
	Thallium	0.00114	0.00045	0.002	0.002	J		092862-010	SW846 6020
	Uranium	0.0271	0.000067	0.0002	0.03	B		092862-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092862-010	SW846 6010
	Zinc	0.259	0.0035	0.010	NE		J	092862-010	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

Well ID	Analyte	Result[a] (mg/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	0.115	0.015	0.050	NE			093251-010	SW846 6020
18-Dec-12	Antimony	ND	0.001	0.003	0.006	U	UJ	093251-010	SW846 6020
	Arsenic	**0.0536**	0.0017	0.005	0.010		J-	093251-010	SW846 6020
	Barium	0.0706	0.0006	0.002	2.00			093251-010	SW846 6020
	Beryllium	0.00211	0.0002	0.0005	0.004			093251-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093251-010	SW846 6020
	Calcium	375	0.600	2.00	NE			093251-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		093251-010	SW846 6020
	Cobalt	0.00964	0.0001	0.001	NE			093251-010	SW846 6020
	Copper	0.00159	0.00035	0.001	NE			093251-010	SW846 6020
	Iron	2.72	0.033	0.100	NE			093251-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		093251-010	SW846 6020
	Magnesium	84.3	0.100	0.300	NE			093251-010	SW846 6020
	Manganese	2.65	0.040	0.200	NE			093251-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093251-010	SW846 7470
	Nickel	0.0244	0.0005	0.002	NE			093251-010	SW846 6020
	Potassium	50.1	0.800	3.00	NE			093251-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		093251-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		093251-010	SW846 6020
	Sodium	485	0.800	2.50	NE			093251-010	SW846 6020
	Thallium	0.00121	0.00045	0.002	0.002	J	J-	093251-010	SW846 6020
	Uranium	0.0284	0.000067	0.0002	0.03			093251-010	SW846 6020
	Vanadium	0.00102	0.001	0.005	NE	J		093251-010	SW846 6010
	Zinc	0.182	0.0035	0.010	NE			093251-010	SW846 6020

Refer to footnotes on page 13A-25.

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 2012

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	-21.7 ± 14.6	16.7	8.19	NE	U	BD	091949-033	EPA 901.1
30-Mar-12	Cesium-137	0.00687 ± 1.90	3.26	1.58	NE	U	BD	091949-033	EPA 901.1
	Cobalt-60	0.274 ± 1.80	3.19	1.51	NE	U	BD	091949-033	EPA 901.1
	Potassium-40	27.8 ± 41.6	29.5	13.9	NE	U	BD	091949-033	EPA 901.1
	Gross Alpha	6.73	NA	NA	15 pCi/L	NA	None	091949-034	EPA 900.0
	Gross Beta	60.3 ± 20.1	17.8	7.54	4 mrem/yr			091949-034	EPA 900.0
	Uranium-233/234	60.7 ± 8.48	0.205	0.0896	NE			091949-035	HASL-300
	Uranium-235/236	0.502 ± 0.169	0.121	0.0443	NE			091949-035	HASL-300
	Uranium-238	9.37 ± 1.42	0.133	0.0536	NE			091949-035	HASL-300
CTF-MW2 (Duplicate)	Americium-241	2.39 ± 6.50	10.1	4.95	NE	U	BD	091950-033	EPA 901.1
30-Mar-12	Cesium-137	-0.892 ± 1.67	2.68	1.29	NE	U	BD	091950-033	EPA 901.1
	Cobalt-60	-3.41 ± 3.08	2.99	1.41	NE	U	BD	091950-033	EPA 901.1
	Potassium-40	48.5 ± 41.6	27.1	12.7	NE		J	091950-033	EPA 901.1
	Gross Alpha	1.49	NA	NA	15 pCi/L	NA	None	091950-034	EPA 900.0
	Gross Beta	59.5 ± 11.9	8.16	3.95	4 mrem/yr			091950-034	EPA 900.0
	Uranium-233/234	61.3 ± 8.72	0.154	0.0672	NE			091950-035	HASL-300
	Uranium-235/236	0.686 ± 0.183	0.0905	0.0333	NE			091950-035	HASL-300
	Uranium-238	8.62 ± 1.31	0.0998	0.0402	NE			091950-035	HASL-300
CTF-MW2	Americium-241	-39.2 ± 21.8	19.1	9.30	NE	U	BD	092538-033	EPA 901.1
19-Jun-12	Cesium-137	-0.819 ± 1.94	3.31	1.58	NE	U	BD	092538-033	EPA 901.1
	Cobalt-60	-1.07 ± 2.08	3.51	1.64	NE	U	BD	092538-033	EPA 901.1
	Potassium-40	36.7 ± 56.5	33.1	15.3	NE	X	R	092538-033	EPA 901.1
	Gross Alpha	12.72	NA	NA	15 pCi/L	NA	None	092538-034	EPA 900.0
	Gross Beta	74.0 ± 15.7	13.0	6.30	4 mrem/yr			092538-034	EPA 900.0
	Uranium-233/234	56.9 ± 7.48	0.710	0.320	NE			092538-035	HASL-300
	Uranium-235/236	1.02 ± 0.376	0.396	0.155	NE		J	092538-035	HASL-300
	Uranium-238	8.96 ± 1.47	0.368	0.149	NE			092538-035	HASL-300

Refer to footnotes on page 13A-25.

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 2012

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	6.89 ± 8.26	11.9	5.84	NE	U	BD	092862-033	EPA 901.1
25-Sep-12	Cesium-137	1.29 ± 1.83	3.07	1.48	NE	U	BD	092862-033	EPA 901.1
	Cobalt-60	0.0659 ± 1.69	2.99	1.40	NE	U	BD	092862-033	EPA 901.1
	Potassium-40	30.0 ± 44.6	29.5	13.8	NE	X	R	092862-033	EPA 901.1
	Gross Alpha	7.21	NA	NA	15 pCi/L	NA	None	092862-034	EPA 900.0
	Gross Beta	45.2 ± 9.90	7.78	3.73	4 mrem/yr		J	092862-034	EPA 900.0
	Uranium-233/234	59.5 ± 7.79	0.112	0.0473	NE			092862-035	HASL-300
	Uranium-235/236	0.684 ± 0.173	0.0812	0.0299	NE			092862-035	HASL-300
	Uranium-238	8.51 ± 1.19	0.0761	0.0294	NE			092862-035	HASL-300
CTF-MW2	Americium-241	-3.52 ± 10.5	15.2	7.42	NE	U	BD	093251-033	EPA 901.1
18-Dec-12	Cesium-137	4.05 ± 4.03	3.32	1.60	NE	X	R	093251-033	EPA 901.1
	Cobalt-60	0.769 ± 1.99	3.56	1.69	NE	U	BD	093251-033	EPA 901.1
	Potassium-40	19.2 ± 34.9	30.6	14.4	NE	U	BD	093251-033	EPA 901.1
	Gross Alpha	**25.96**	NA	NA	15 pCi/L	NA	None	093251-034	EPA 900.0
	Gross Alpha	-3.83	NA	NA	15 pCi/L	NA	None	093251-R34	EPA 900.0
	Gross Beta	68.5 ± 16.4	16.8	8.15	4 mrem/yr			093251-034	EPA 900.0
	Gross Beta	61.3 ± 12.9	9.26	4.42	4 mrem/yr			093251-R34	EPA 900.0
	Uranium-233/234	51.8 ± 7.79	0.270	0.118	NE			093251-035	HASL-300
	Uranium-235/236	0.438 ± 0.190	0.201	0.0792	NE			093251-035	HASL-300
	Uranium-238	7.50 ± 1.26	0.210	0.0881	NE			093251-035	HASL-300
	Uranium-233/234	56.8 ± 7.98	0.199	0.0866	NE			093251-R35	HASL-300
	Uranium-235/236	1.07 ± 0.267	0.115	0.0417	NE			093251-R35	HASL-300
	Uranium-238	8.86 ± 1.35	0.0856	0.030	NE			093251-R35	HASL-300

Refer to footnotes on page 13A-25.

Table 13A-11
Summary of Field Water Quality Measurements[h], Solid Waste Management Unit 154 Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CTF-MW2	30-Mar-12	17.40	3540	10.4	6.17	2.36	1.4	0.14
CTF-MW2	19-Jun-12	19.58	3310	34.1	6.03	0.83	1.3	0.12
CTF-MW2	25-Sep-12	18.61	3551	58.6	5.90	0.68	2.0	0.19
CTF-MW2	18-Dec-12	14.62	3340	59.0	5.75	3.44	2.1	0.21

Refer to footnotes on page 13A-25.

Footnotes for Solid Waste Management Unit 154 Groundwater Monitoring Tables

HMX	=	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
ID	=	identifier.
N	=	nitrogen.
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).
- 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 Code of Federal Regulations [CFR] Parts 9, 141, and 142, Table 13A-1-4)
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- pCi/L = picocuries per liter

[b]**MDL or MDA**

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.

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.

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**

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.

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.

[d]**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.
- 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 13A-1-4).
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

[e]**Laboratory Qualifier**

B	=	The analyte was detected in the blank above the effective method detection limit (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.
X	=	Data rejected due to peak not meeting identification criteria.

Footnotes for Solid Waste Management Unit 154 Groundwater Monitoring 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.
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**

- 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.
- Clesceri, L.S., A.E. Greenburg, and A.D. 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.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, Cincinnati, Ohio
- U.S. Department of Energy, Environmental Measurements Laboratory, 1990, *EML Procedures Manual*, 27th ed., Vol. 1, Rev. 1992, HASL-300.
- Standard Methods for the Examination of Water and Wastewater, 7500-Rn B Method, 20th Edition, 1998. Beckman LS5000TD Liquid Scintillation System Operation Manual. May 1988.

[h]**Field Water Quality Measurements**

- Field measurements collected prior to sampling.

°C = degrees Celsius.

% Sat= percent saturation.

µmho/cm = micromhos per centimeter.

mg/L = milligrams per liter.

mV = millivolts.

NTU = nephelometric turbidity units.

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

Attachment 13B
Solid Waste Management Unit 154
Plots

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Attachment 13B Plots

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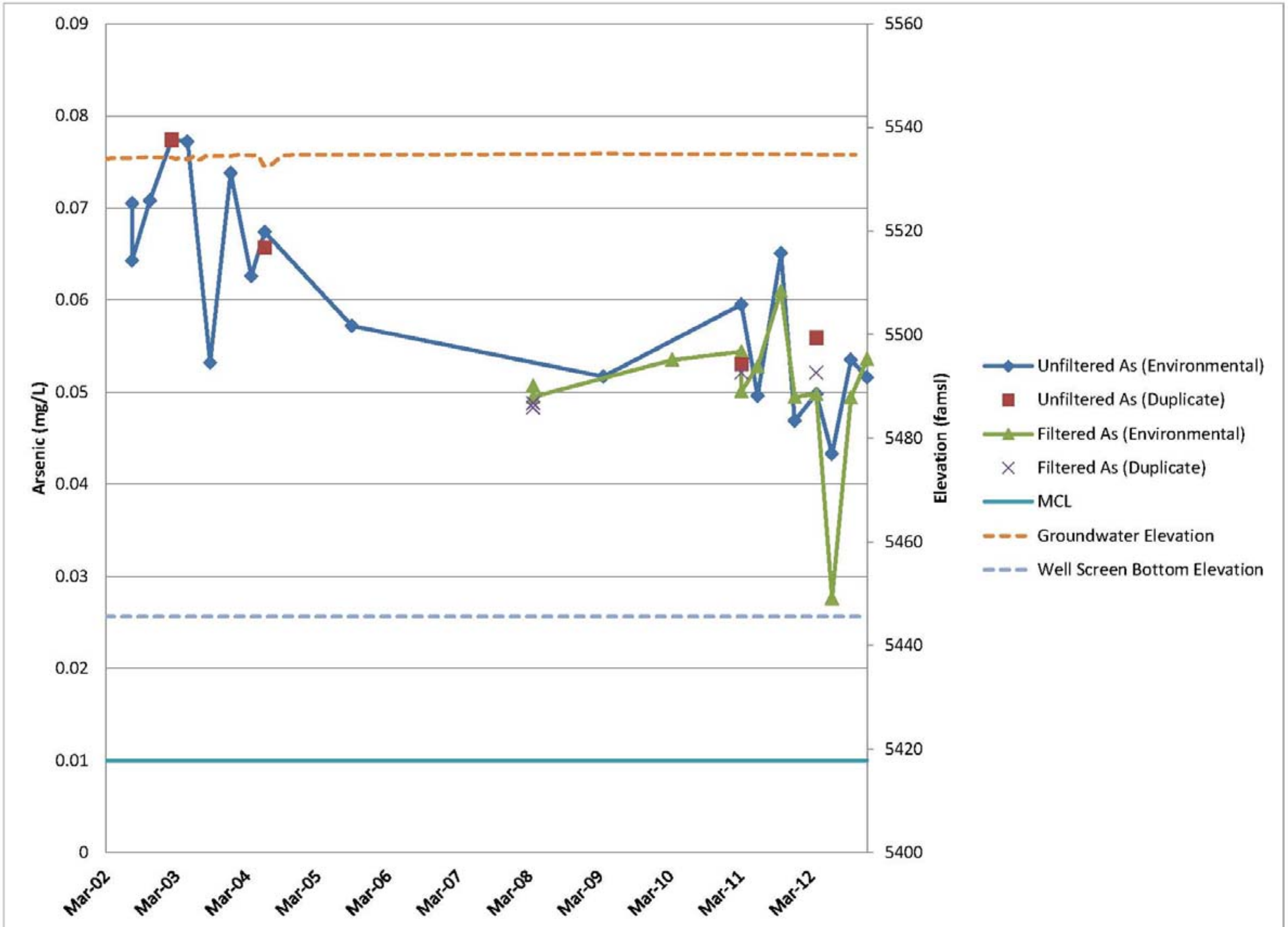

Figure 13B-1. Arsenic Concentrations, CTF-MW2

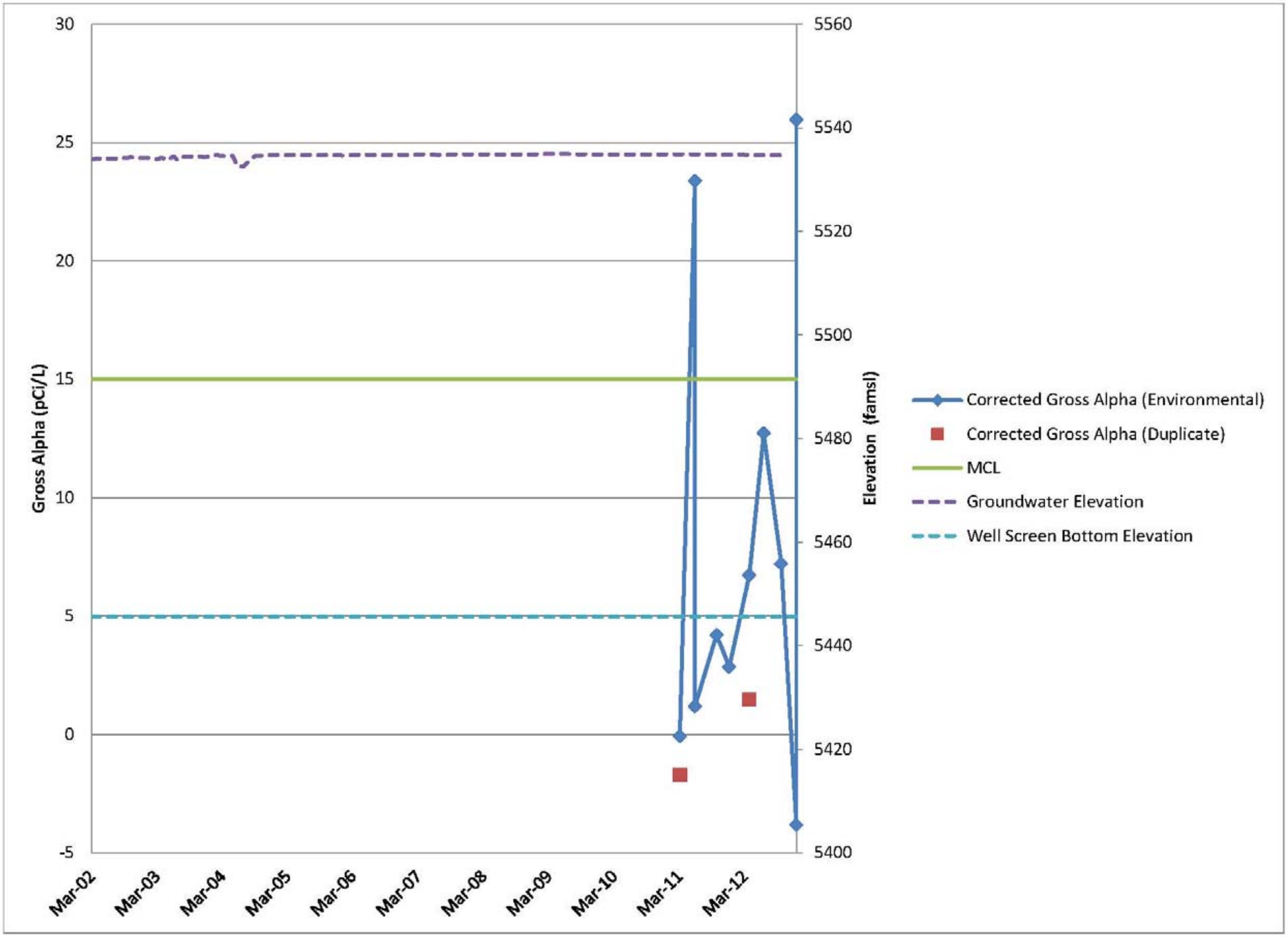

Figure 13B-2. Gross Alpha Activities, CTF-MW2

Attachment 13C
Solid Waste Management Unit 154
Hydrographs

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Attachment 13C Hydrographs

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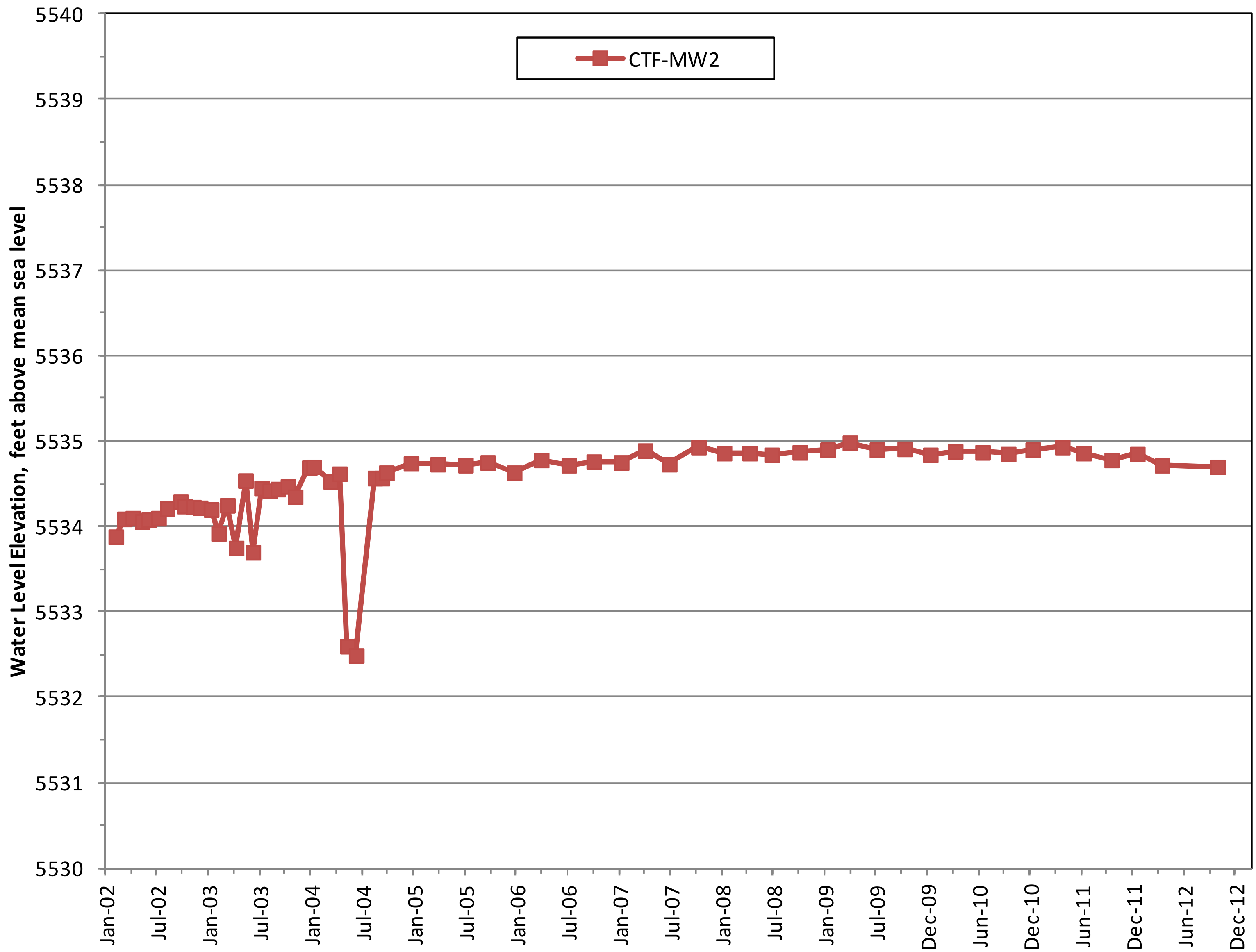

Figure 13C-1. SWMU 154 Study Area Well

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Table 1. Inventory of Groundwater Monitoring Wells Located at SNL/NM and Surrounding Areas

Well	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	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	5436.21	5434.3	490.0	980.0	4944.3	4454.3	980.0	5.6	S/SS	Santa Fe Group sediments	17-Sep-85	2003
CWL-BW3	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		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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	5939.28	5937.0	98.0	118.0	5839.0	5819.0	123.0	4.7	PVC	Bedrock (granite)	31-Aug-11	
Burn Site Well	6374.52	6373.7**	231.0	341.0	6142.7	6032.7	341.0	4.0	PVC	Bedrock (schist and granite)	20-Feb-86	
CYN-MW1D	6239.59	6236.7	372.0	382.0	5864.7	5854.7	392.0	5.1	S	Bedrock (granite)	22-Dec-97	15-Nov-02
CYN-MW2S	6239.41	6236.7	23.6	28.6	6213.1	6208.1	34.2	4.0	PVC	Alluvium and bedrock (granite)	22-Dec-97	15-Nov-02
CYN-MW3	6313.26	6311.9	120.0	130.0	6191.9	6181.9	135.0	5.0	PVC	Bedrock (metamorphics)	18-Jun-99	
CYN-MW4	6455.48	6454.7	260.0	280.0	6194.7	6174.7	290.0	5.0	PVC	Bedrock (metamorphics)	18-Jun-99	
CYN-MW5	5984.23	5981.3	135.0	155.0	5846.3	5826.3	160.0	5.0	PVC	Bedrock (quartzite)	15-Aug-01	
CYN-MW6	6343.37	6340.5	141.5	161.3	6199.0	6179.2	161.7	5.0	PVC	Bedrock (metamorphics)	9-Dec-05	
CYN-MW7	6216.35	6213.7	315.0	334.2	5898.7	5879.5	339.9	5.0	PVC	Bedrock (granite)	6-Dec-05	
CYN-MW8	6230.11	6227.8	338.5	358.3	5889.3	5869.5	363.4	5.0	PVC	Bedrock (granite)	12-Jan-06	
CYN-MW9	6360.67	6358.5	175.8	195.8	6182.7	6162.7	200.8	4.8	PVC	Bedrock (metamorphics)	27-Jul-10	
CYN-MW10	6345.45	6342.8	150.4	170.4	6192.4	6172.4	175.4	4.8	PVC	Bedrock (metamorphics)	28-Jul-10	
CYN-MW11	6374.41	6371.9	229.8	249.8	6142.1	6122.1	254.8	4.8	PVC	Bedrock (metamorphics)	29-Jul-10	
CYN-MW12	6345.16	6342.9	252.5	272.5	6090.4	6070.4	277.5	4.8	PVC	Bedrock (metamorphics)	29-Jul-10	
CYN-MW13	6237.79	6236.03	376.8	396.8	5859.2	5839.2	402.2	4.8	PVC	Bedrock (granitic gneiss)	5-Dec-2012	
Greystone Well	5822.87	5820.8	44.0	54.0	5776.8	5766.8	54.0	4.0	PVC/S	Alluvium	1-Jan-02	12-Sep-02
Greystone-MW2	5814.20	5811.4	60.0	80.0	5751.4	5731.4	85.0	4.8	PVC	Alluvium	25-Apr-02	
HERTF		6229.7	449.0*	500.0*	5780.7*	5729.7*	449.0?*	5.0	OH?	Bedrock (granite)	13-Jul-1990	
TSA-1	6063.68	6060.2	190.0	210.0	5870.2	5850.2	300.0	6.0	S	Bedrock (metamorphics)	10-Nov-87	Aug-01

Table 1. Inventory of Groundwater Monitoring Wells Located at SNL/NM and Surrounding Areas *(Continued)*

Well	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
Mixed Waste Landfill and Vicinity												
MWL-BW1	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	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	5384.21	5381.8	456.0	476.0	4925.8	4905.8	478.0	5.0	PVC/S	Santa Fe Group sediments	1-Oct-88	Jul-08
MWL-MW2	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	5871.42	5869.1	135.0	155.0	5734.1	5714.1	160.0	4.7	PVC	Bedrock (granite)	31-Aug-11	
OBS-MW2	5863.16	5860.8	234.0	254.0	5626.8	5606.8	259.0	4.7	PVC	Bedrock (granite)	30-Aug-11	
OBS-MW3	5865.50	5863.3	190.0	210.0	5673.3	5653.3	215.0	4.7	PVC	Bedrock (granite)	30-Aug-11	
CTF-MW1	6082.63	6079.7	240.0	260.0	5839.7	5819.7	265.0	5.0	PVC	Bedrock (granite)	16-Aug-01	
CTF-MW2	5578.60	5575.6	110.0	130.0	5465.6	5445.6	135.0	5.0	PVC	Bedrock (granite)	18-Aug-01	
CTF-MW3	5522.82	5519.8	340.0	360.0	5179.8	5159.8	365.0	5.0	PVC	Bedrock (granite)	21-Aug-01	
LMF-1	5628.60	5626.5	310.0	350.0	5316.5	5276.5	360.0	4.1	PVC	Bedrock (limestone)	11-Aug-95	Yes
Schoolhouse Well	5796.33	5799.0	103.0*	107.0*	5696.0*	5692.0*	103.0*	6.0	S	Bedrock (Sandia Formation)		
SFR-1D	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	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	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	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	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	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	5498.66	5496.9	713.0	733.0	4783.9	4763.9	753.0	5.4	SS	Bedrock (sandstone)	23-Sep-93	
SFR-4P	5573.33	5571.3	344.0	354.0	5227.3	5217.3	364.0	1.9	PVC	Bedrock (sandstone)	29-Jul-93	
SFR-4T	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	5535.53	5533.3	149.8	169.8	5383.5	5363.5	179.8	4.3	PVC	Santa Fe Group sediments	18-Jun-95	Yes
TRE-1	5497.25	5495.2	255.0	295.0	5240.2	5200.2	305.0	4.3	PVC	Santa Fe Group sediments	31-Jul-95	
TRE-2	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	5735.62	5733.6	320.0	340.0	5413.6	5393.6	350.0	3.8	PVC	Bedrock (sandstone)	12-Oct-94	
TRS-1	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	5779.80	5777.5	266.4	306.4	5511.1	5471.1	316.4	1.9	PVC	Bedrock (limestone)	6-Sep-95	
TRS-1S	5780.07	5777.5	164.0	204.0	5613.5	5573.5	214.8	1.9	PVC	Bedrock (limestone)	6-Sep-95	
TRS-2	5780.76	5778.3	165.0	205.0	5613.3	5573.3	210.0	4.5	S	Bedrock (limestone)	9-Sep-95	

Table 1. Inventory of Groundwater Monitoring Wells Located at SNL/NM and Surrounding Areas *(Continued)*

Well	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
Tijeras Arroyo Groundwater												
TA1-W-01	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	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	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	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	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	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	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	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	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	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	5411.85	5410.1	299.6	319.6	5110.5	5090.5	324.6	3.8	PVC	Santa Fe Group sediments	30-Nov-92	
TA2-W-01	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	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	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	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	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	5362.85	5360.8	275.0	295.0	5085.8	5065.8	300.6	5.0	PVC	Santa Fe Group sediments	9-Feb-98	
TJA-2	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	5408.71	5406.6	487.0	507.0	4919.6	4899.6	512.7	4.8	PVC	Santa Fe Group sediments	26-Apr-97	
TAV-MW6	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	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	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	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	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	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	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	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	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	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	5412.41	5411.5	506.0	526.0	4905.5	4885.5	531.0	3.9	PVC	Santa Fe Group sediments	30-Oct-92	

Table 1. Inventory of Groundwater Monitoring Wells Located at SNL/NM and Surrounding Areas *(Continued)*

Well	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
Inhalation Toxicology Research Institute												
ITRI MW-4	5624.47	5622.7	100.0	110.0	5522.7	5512.7	110.0	4.0	SS	Santa Fe Group sediments	1-May-88	
ITRI MW-16	5668.84	5667.6	100.0	120.0	5567.6	5547.6	120.0	4.0	PVC	Bedrock (sandstone)	13-Jan-93	
ITRI MW-17	5615.11	5613.7	88.6	108.6	5525.1	5505.1	109.0	4.0	PVC	Santa Fe Group sediments	28-Jul-94	
ITRI MW-19	5652.08	5648.9	115.1	125.1	5533.8	5523.8	125.5	4.0	PVC	Santa Fe Group sediments	2-Aug-94	
IP-1	5622.18	5620.7	78.0	98.0	5542.7	5422.7	98.0	2.0	PVC	Santa Fe Group Sediments	18-Jul-94	
NMED-1	5623.44	5620.7	90.0	110.0	5530.7	5510.7	115.0	4.0	PVC	Santa Fe Group Sediments	13-Jul-95	
City of Albuquerque / Albuquerque Bernalillo County Water Utility Authority												
MESA DEL SOL - S	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	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	5271.06		382.0	422.0			427.0	4.0	PVC	Santa Fe Group sediments	19-May-97	
EUBANK-2	5474.39		552.0	592.0			597.0	4.0	PVC	Santa Fe Group sediments	15-Nov-96	
EUBANK-3	5498.73		590.0	650.0			655.0	4.0	PVC	Santa Fe Group sediments	15-Nov-96	
EUBANK-4			454.0	514.0			519.0	4.0	PVC	Santa Fe Group sediments	15-Nov-96	
EUBANK-5	5507.40		605.0	665.0			670.0	4.0	PVC	Santa Fe Group sediments		
MVMWJ	5118.04	5118.6	200.0	220.0	4918.6	4898.6	225.0	2.0	PVC	Santa Fe Group sediments	1-Oct-88	
Kirtland Air Force Base												
EOD	5829.70	5828.7	206.0*	247.0*	5622.7*	5581.7*	206.0*	6.0	OH	Bedrock (limestone and granite)	1970?	
KAFB-0119							482.0			Santa Fe Group sediments		
KAFB-0120	5292.29	5288.7	429.0	459.0	4859.7	4829.7	461.5	4.0	PVC	Santa Fe Group sediments		
KAFB-0213	5282.00	5297.3	378.0	428.0	4919.3	4869.3	438.0		PVC	Santa Fe Group sediments		
KAFB-0307	5364.53	5362.7	405.0	450.0	4957.7	4912.7	460.0	3.8	PVC	Santa Fe Group sediments		
KAFB-0308	5381.65	5380.7	463.0	488.0	4917.7	4892.7	498.0	3.8	PVC	Santa Fe Group sediments		
KAFB-0309	5411.80	5410.7	500.0	525.0	4910.7	4885.7	535.0	3.8	PVC	Santa Fe Group sediments		
KAFB-0311	5353.29	5351.7	433.0	458.0	4918.7	4893.7	468.0	3.8	PVC	Santa Fe Group sediments		
KAFB-0312	5432.17	5430.2	503.0	528.0	4927.2	4902.2	533.0	4.5	PVC	Santa Fe Group sediments		
KAFB-0314	5455.75	5453.9	428.0	448.0	5025.9	5005.9	453.0	4.5	PVC	Santa Fe Group sediments		
KAFB-0315	5466.11	5464.1	447.0	472.0	5017.1	4992.1	477.0	4.5	PVC	Santa Fe Group sediments		
KAFB-0417	5313.07		430.0	455.0			465.0	3.8	PVC	Santa Fe Group sediments		
KAFB-0505	5362.81	5360.8	495.4	520.5	4865.4	4840.3	521.3	4.5	PVC	Santa Fe Group sediments		
KAFB-0507	5358.82		482.3	507.3			512.3	3.5	PVC	Santa Fe Group sediments		
KAFB-0508	5351.88		481.0	506.0			507.0	3.5	PVC	Santa Fe Group sediments		
KAFB-0510	5367.10		511.0	536.0			537.0	3.5	PVC	Santa Fe Group sediments		
KAFB-0512	5304.07	5301.1	424.0	449.0	4877.1	4852.1	450.0	3.5	PVC	Santa Fe Group sediments		
KAFB-0514	5206.41		340.0	365.0			366.0	3.5	PVC	Santa Fe Group sediments		
KAFB-0516	5205.64		332.0	357.0			358.0	3.5	PVC	Santa Fe Group sediments		
KAFB-0517	5197.10		325.0	350.0			352.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0520	5247.90	5246.2	379.5	404.5	4866.7	4841.7	410.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0522	5267.48	5265.7	405.0	430.0	4860.7	4835.7	432.5	4.0	PVC	Santa Fe Group sediments		
KAFB-0523	5352.62	5350.5					625.0			Santa Fe Group sediments		
KAFB-0608	5361.17	5359.9	307.0	327.0	5052.9	5032.9	338.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0609	5365.87	5364.7	316.0	336.0	5048.7	5028.7	345.0	4.0	PVC/SS	Santa Fe Group sediments		
KAFB-0610	5359.47	5357.3	333.0	353.0	5024.3	5004.3	363.0	4.0	PVC/SS	Santa Fe Group sediments		
KAFB-0611	5386.09		498.0	508.0			513.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0615	5638.43		300.0	325.0			327.0	4.0	PVC	Bedrock (granite)		
KAFB-0616	5481.07		472.0	497.0			499.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0617	5505.78	5503.3	565.0	590.0	4938.3	4913.3	592.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0619	5410.78	5409.0	389.0	404.0	5020.0	5005.0	406.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0620	5334.64	5332.0	447.0	472.0	4885.0	4860.0	474.5		PVC	Santa Fe Group sediments		
KAFB-0622	5488.64	5486.2	529.0	554.0	4957.2	4932.2	555.0	4.0	PVC	Santa Fe Group sediments		
KAFB-0624	5676.45	5671.1	765.0	790.0	4906.1	4881.1	792.5	3.8	PVC	Santa Fe Group sediments		
KAFB-0901	5390.07	5389.8	465.0	527.0	4924.8	4862.8	537.0	4.0	PVC	Santa Fe Group sediments		
KAFB-1006	5257.01	5257.0	363.0	383.0	4894.0	4874.0	383.0	4.0	SS	Santa Fe Group sediments		

Table 1. Inventory of Groundwater Monitoring Wells Located at SNL/NM and Surrounding Areas *(Concluded)*

Well	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-1007	5260.11	5260.1	362.0	382.0	4898.1	4878.1	382.0	4.0	SS	Santa Fe Group sediments		
KAFB-1063	5339.52						501.0			Santa Fe Group sediments		
KAFB-2005	5624.27	5624.6	126.0	156.0	5498.6	5468.6	158.5	4.0	PVC	Santa Fe Group sediments		
KAFB-2007	5567.18	5564.8	273.0	303.0	5291.8	5261.8	305.5	4.0	PVC	Santa Fe Group sediments		
KAFB-3392	5394.51	5393.4	536.0	561.0	4857.4	4832.4	562.0	4.0	PVC	Santa Fe Group sediments		
KAFB-3411	5342.81	5340.5	477.0	502.0	4863.5	4838.5	503.0		PVC	Santa Fe Group sediments		
KAFB-6301	5459.64	5457.3	535.0	560.0	4922.3	4897.3	561.0	3.5	PVC	Santa Fe Group sediments		
KAFB-8351	5325.51		474.0	499.0			500.0	4.0	PVC	Santa Fe Group sediments		
Optical Range Well		5965.7	160.0	320.0	5805.7	5645.7	320.0	5.0	PVC	Bedrock (metarhyolite)	19-Aug-87	

Acronyms for Wells Numbers

AVN	Area V (North)
CCBA	Coyote Canyon Blast Area
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CYN	Lurance Canyon
EOD	Explosive Ordnance Disposal
HERTF	High Energy Research Test Facility
IP	Iselta Pueblo
ITRI	Inhalation Toxicology Research Institute
KAFB	Kirtland Air Force Base
LMF	Large Melt Facility
LWDS	Liquid Waste Disposal System
MRN	Magazine Road North
MVMW	Mountain View Monitoring Well
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 of TA-III
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

Notes:

A blank cell indicates that the corresponding data were either not available or not applicable.
Measuring point is the top of casing elevation used for calculating groundwater elevations.
Yes indicates that the well was plugged and abandoned, but the date is not known.
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 ft.

Acronyms for Well Features

*indicates that depth or elevation corresponds to open-hole completion, no screen is present
**indicates elevation of concrete pad
amsl = elevation above mean sea level
bgs = below ground surface
ft = feet
L = lower
OH = open hole completion (no well screen)
P&A = plugged and abandoned
PVC = polyvinyl chloride
PCV/SS = composition of blank well casing is PVC and composition of well screen is stainless steel.
S = Steel (carbon steel)
SS = Stainless steel
S/SS = composition of blank well casing is carbon steel and composition of well screen is stainless steel
U = upper

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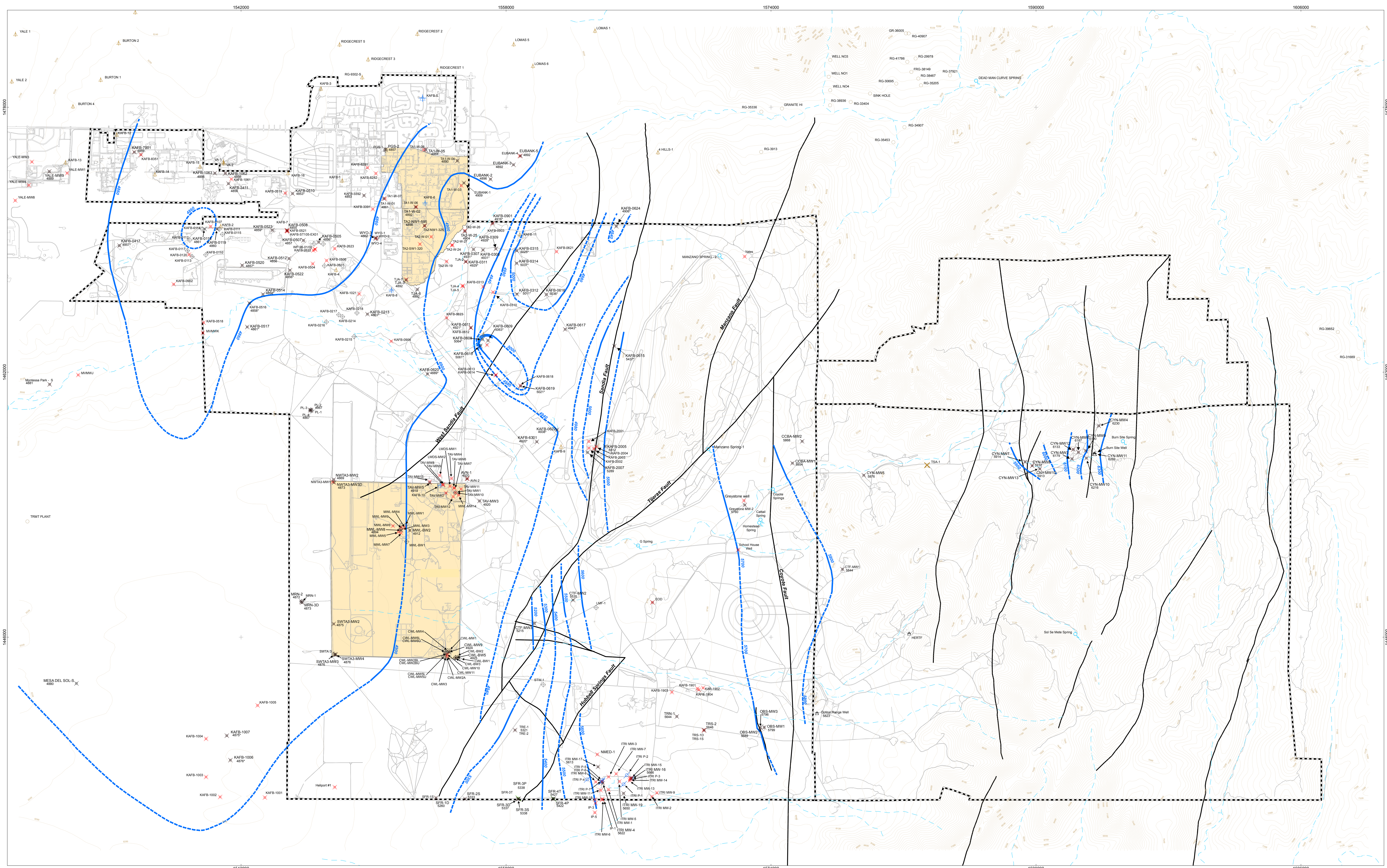


Legend

	KAFB Boundary		Monitoring Well - contoured		Production Well (Abandoned)
	Topographic Contour, feet (above mean sea level), contour interval equals 40 ft.		Monitoring Well - not contoured		Production Well (Non-Potable)
	Road		Observation Well		Plugged and Abandoned Monitoring Well
	Drainage Feature		Test Well		Spring
	Fault (exposed and concealed)		Production Well		Well with Unknown Use
	SNL/NM Technical Areas		Production Well (Out of commission)		
	Potentiometric Surface Contour, feet amsl (dashed where inferred)				

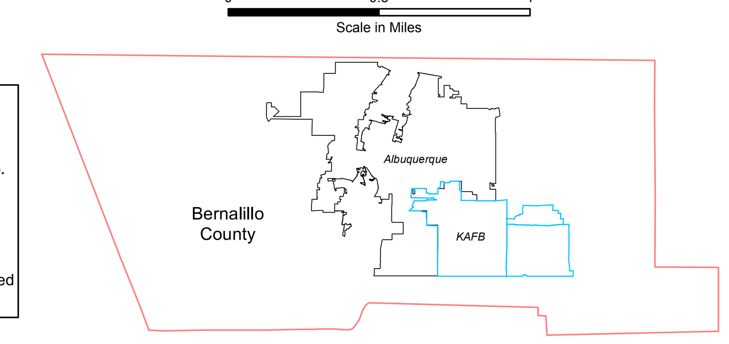
NOTE:
1. Contours for the potentiometric surface are shown using two intervals: below 5000 feet amsl the contour interval is 40 feet, and above 5000 feet amsl the contour interval is 100 feet.
2. Fault locations are from GRAM and Lettis (1995), Karlstrom et al., (2000), and Van Hart (2003). The West 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 in SNL/NM, USGS, COA, and ITRI wells were measured in October 2012. Water levels in KAFB wells were measured in October 2012 except for some well values marked with an asterisk denoting February 2012 data.

0 2,000 4,000
Scale in Feet

0 480 960
Scale in Meters

0 0.5 1
Scale in Kilometers

0 0.5 1
Scale in Miles



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Plate 1
SNL/NM Monitoring Well Locations and Base-Wide Potentiometric Surface Map for the Kirtland Air Force Base Vicinity, October 2012

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone, 1983 North American Horizontal Datum
1988 North American Vertical Datum

Mapid = mb13055 06/1/13 SNL EGIS ORG. 4142 MBarthel

06/1/13

APPENDIX C

2012 TERRESTRIAL SURVEILLANCE RESULTS

TABLE C-1. Radiological Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
Community	Americium-241	9	pCi/g	0.0298	0.0374	U	0.0301	0.0608
Community	Americium-241	10	pCi/g	0.0367	0.0287	U	0.0193	0.0389
Community	Americium-241	25	pCi/g	0.0164	0.0222	U	0.0173	0.0349
Community	Americium-241	62	pCi/g	0.0248	0.0869	U	0.0681	0.138
Community	Cesium-137	9	pCi/g	0.186	0.0221		0.00753	0.0153
Community	Cesium-137	10	pCi/g	0.223	0.033		0.0128	0.026
Community	Cesium-137	25	pCi/g	0.0418	0.018		0.012	0.0245
Community	Cesium-137	62	pCi/g	0.358	0.0396		0.00962	0.0198
Community	Tritium	9	pCi/L	52	95.7	U	74.8	167
Community	Tritium	10	pCi/L	11.6	90.6	U	74.8	167
Community	Tritium	25	pCi/L	116	106	U	77	172
Community	Tritium	62	pCi/L	46	94.5	U	74.5	166
Community	Uranium	9	mg/kg	0.469			0.0118	0.0357
Community	Uranium	10	mg/kg	0.457			0.0116	0.0351
Community	Uranium	25	mg/kg	0.53			0.0112	0.034
Community	Uranium	62	mg/kg	0.935			0.0122	0.0371
On-Site	Americium-241	1	pCi/g	0.0343	0.031	U	0.0222	0.0448
On-Site	Americium-241	02NE	pCi/g	-0.0185	0.0552	U	0.0474	0.0964
On-Site	Americium-241	02NW	pCi/g	0.0166	0.0382	U	0.0323	0.0656
On-Site	Americium-241	02SE	pCi/g	0.0443	0.0403	U	0.0284	0.0575
On-Site	Americium-241	02SW	pCi/g	-0.059	0.0649	U	0.0451	0.092
On-Site	Americium-241	3	pCi/g	0.0225	0.0258	U	0.0188	0.038
On-Site	Americium-241	6	pCi/g	0.0296	0.0566	U	0.0437	0.0889
On-Site	Americium-241	7	pCi/g	0.0144	0.0816	U	0.0658	0.133
On-Site	Americium-241	33	pCi/g	-0.0363	0.0516	U	0.0405	0.082
On-Site	Americium-241	34	pCi/g	0.00514	0.0627	U	0.0483	0.0981
On-Site	Americium-241	35	pCi/g	-0.00304	0.0138	U	0.0112	0.0227
On-Site	Americium-241	41	pCi/g	0.0258	0.0363	U	0.0303	0.0613
On-Site	Americium-241	42	pCi/g	0.0432	0.0508	U	0.0388	0.0789
On-Site	Americium-241	43	pCi/g	0.0194	0.0673	U	0.0533	0.108
On-Site	Americium-241	45	pCi/g	0.00796	0.027	U	0.0235	0.0475
On-Site	Americium-241	46	pCi/g	0.0344	0.0672	U	0.0537	0.109
On-Site	Americium-241	49	pCi/g	0.0355	0.0616	U	0.0493	0.0997
On-Site	Americium-241	51	pCi/g	0.0271	0.0331	U	0.0265	0.0536
On-Site	Americium-241	52	pCi/g	0.0136	0.0221	U	0.0172	0.0347
On-Site	Americium-241	53	pCi/g	0.0174	0.0634	U	0.0512	0.104
On-Site	Americium-241	54	pCi/g	0.0524	0.0537	U	0.0385	0.078

TABLE C-1. Radiological Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
On-Site	Americium-241	55	pCi/g	0.024	0.0195	U	0.0137	0.0278
On-Site	Americium-241	56	pCi/g	0.0364	0.0441	U	0.0355	0.072
On-Site	Americium-241	57	pCi/g	0.0119	0.0249	U	0.0204	0.0413
On-Site	Americium-241	66	pCi/g	0.0445	0.036	U	0.0244	0.0493
On-Site	Americium-241	76	pCi/g	0.00339	0.019	U	0.0154	0.0313
On-Site	Americium-241	77	pCi/g	-0.00783	0.0709	U	0.0579	0.118
On-Site	Americium-241	78	pCi/g	0.0304	0.0688	U	0.0598	0.121
On-Site	Americium-241	86	pCi/g	0.0327	0.0497	U	0.0377	0.0761
On-Site	Americium-241	92	pCi/g	0.0324	0.0267	U	0.0182	0.0367
On-Site	Cesium-137	1	pCi/g	0.159	0.0343		0.0153	0.0313
On-Site	Cesium-137	02NE	pCi/g	0.103	0.0203		0.0086	0.0177
On-Site	Cesium-137	02NW	pCi/g	0.0652	0.0171		0.00799	0.0163
On-Site	Cesium-137	02SE	pCi/g	0.138	0.0208		0.00891	0.0183
On-Site	Cesium-137	02SW	pCi/g	0.00977	0.0127	U	0.0106	0.0219
On-Site	Cesium-137	3	pCi/g	0.185	0.0297		0.0135	0.0275
On-Site	Cesium-137	6	pCi/g	0.141	0.0232		0.00989	0.0203
On-Site	Cesium-137	7	pCi/g	0.292	0.0335		0.00957	0.0197
On-Site	Cesium-137	33	pCi/g	0.203	0.022		0.0073	0.0149
On-Site	Cesium-137	34	pCi/g	0.0973	0.0217		0.0107	0.0219
On-Site	Cesium-137	35	pCi/g	0.168	0.0304		0.00907	0.0187
On-Site	Cesium-137	41	pCi/g	0.275	0.0283		0.00771	0.0158
On-Site	Cesium-137	42	pCi/g	0.0431	0.0133		0.00795	0.0163
On-Site	Cesium-137	43	pCi/g	0.0467	0.013		0.00822	0.0168
On-Site	Cesium-137	45	pCi/g	0.0407	0.0249		0.014	0.0288
On-Site	Cesium-137	46	pCi/g	0.0803	0.0155		0.00826	0.017
On-Site	Cesium-137	49	pCi/g	0.103	0.021		0.00929	0.019
On-Site	Cesium-137	51	pCi/g	0.0599	0.0186		0.00739	0.0152
On-Site	Cesium-137	52	pCi/g	0.0154	0.0155	U	0.0125	0.0254
On-Site	Cesium-137	53	pCi/g	0.0519	0.0137		0.00765	0.0158
On-Site	Cesium-137	54	pCi/g	0.0612	0.0169		0.00862	0.0177
On-Site	Cesium-137	55	pCi/g	0.754	0.0382		0.0114	0.0235
On-Site	Cesium-137	56	pCi/g	0.0327	0.0112		0.00636	0.013
On-Site	Cesium-137	57	pCi/g	0.0174	0.0109		0.00682	0.014
On-Site	Cesium-137	66	pCi/g	0.0622	0.014		0.00744	0.0153
On-Site	Cesium-137	76	pCi/g	0.06	0.025		0.0114	0.0236
On-Site	Cesium-137	77	pCi/g	0.424	0.0431		0.00857	0.0176
On-Site	Cesium-137	78	pCi/g	0.25	0.0287		0.00836	0.0172

TABLE C-1. Radiological Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
On-Site	Cesium-137	86	pCi/g	0.00256	0.0103	U	0.00883	0.018
On-Site	Cesium-137	92	pCi/g	0.268	0.0362		0.0122	0.0248
On-Site	Tritium	1	pCi/L	112	64.3		46.9	99.2
On-Site	Tritium	02NE	pCi/L	388	91.9		45.8	97
On-Site	Tritium	02NW	pCi/L	61.3	60.8	U	47.4	100
On-Site	Tritium	02SE	pCi/L	71.8	60.7	U	46.6	98.7
On-Site	Tritium	02SW	pCi/L	38.2	67.6	U	54.6	116
On-Site	Tritium	3	pCi/L	77.9	90.4	U	68.3	151
On-Site	Tritium	6	pCi/L	-8.58	84.7	U	71.9	158
On-Site	Tritium	7	pCi/L	6.8	58.3	U	48.6	103
On-Site	Tritium	33	pCi/L	13.3	57.5	U	47.6	101
On-Site	Tritium	34	pCi/L	23.4	107	U	87.6	193
On-Site	Tritium	35	pCi/L	86.3	63.9	U	48.4	102
On-Site	Tritium	41	pCi/L	31.6	98.2	U	79.3	176
On-Site	Tritium	42	pCi/L	353	140		81.2	180
On-Site	Tritium	43	pCi/L	132	117	U	85.9	189
On-Site	Tritium	45	pCi/L	54.1	59.6	U	46.9	99.2
On-Site	Tritium	46	pCi/L	97.2	113	U	85.7	189
On-Site	Tritium	49	pCi/L	133	118	U	86.4	190
On-Site	Tritium	51	pCi/L	122	117	U	87.2	192
On-Site	Tritium	52	pCi/L	34.1	88.8	U	71.5	157
On-Site	Tritium	53	pCi/L	48.4	90.5	U	71.6	157
On-Site	Tritium	54	pCi/L	5.74	86.6	U	72.2	159
On-Site	Tritium	55	pCi/L	17.9	56.6	U	46.6	98.5
On-Site	Tritium	56	pCi/L	82.8	115	U	88.6	195
On-Site	Tritium	57	pCi/L	32	110	U	89.4	194
On-Site	Tritium	66	pCi/L	22.7	104	U	84.8	187
On-Site	Tritium	76	pCi/L	1.7	58	U	48.6	103
On-Site	Tritium	77	pCi/L	-46.3	53.4	U	47.3	100
On-Site	Tritium	78	pCi/L	63.1	92.7	U	72	158
On-Site	Tritium	86	pCi/L	109	115	U	86	189
On-Site	Tritium	92	pCi/L	45.9	90.9	U	72.1	159
On-Site	Uranium	1	mg/kg	0.782			0.0126	0.0381
On-Site	Uranium	02NE	mg/kg	0.325			0.0113	0.0343
On-Site	Uranium	02NW	mg/kg	0.509			0.0129	0.039
On-Site	Uranium	02SE	mg/kg	0.29			0.0119	0.0361
On-Site	Uranium	02SW	mg/kg	0.37			0.0132	0.0399

TABLE C-1. Radiological Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
On-Site	Uranium	3	mg/kg	0.359			0.013	0.0395
On-Site	Uranium	6	mg/kg	0.313			0.0122	0.037
On-Site	Uranium	7	mg/kg	0.354			0.013	0.0395
On-Site	Uranium	33	mg/kg	0.753			0.012	0.0365
On-Site	Uranium	34	mg/kg	0.438			0.0132	0.0399
On-Site	Uranium	45	mg/kg	0.887			0.0114	0.0344
On-Site	Uranium	51	mg/kg	0.324			0.0125	0.0378
On-Site	Uranium	52	mg/kg	0.345			0.0131	0.0397
On-Site	Uranium	53	mg/kg	0.192			0.0119	0.0362
On-Site	Uranium	54	mg/kg	0.208			0.0122	0.037
On-Site	Uranium	55	mg/kg	0.38			0.0127	0.0384
On-Site	Uranium	56	mg/kg	0.273			0.0122	0.037
On-Site	Uranium	57	mg/kg	1.21			0.0129	0.0392
On-Site	Uranium	76	mg/kg	0.432			0.012	0.0364
On-Site	Uranium	77	mg/kg	0.349			0.0128	0.0388
On-Site	Uranium	78	mg/kg	0.232			0.0132	0.0399
On-Site	Uranium	86	mg/kg	0.51			0.0117	0.0356
On-Site	Uranium	90	mg/kg	0.378			0.0122	0.0368
On-Site	Uranium	91	mg/kg	0.36			0.0122	0.0371
On-Site	Uranium	92	mg/kg	0.197			0.0116	0.035
Perimeter	Americium-241	4	pCi/g	0.0171	0.0227	U	0.0174	0.0352
Perimeter	Americium-241	5	pCi/g	0.02	0.0459	U	0.0373	0.0758
Perimeter	Americium-241	12	pCi/g	0.028	0.0646	U	0.0503	0.102
Perimeter	Americium-241	16	pCi/g	0.0324	0.0312	U	0.0237	0.0478
Perimeter	Americium-241	19	pCi/g	-0.000338	0.0152	U	0.0121	0.0245
Perimeter	Americium-241	58	pCi/g	0.0139	0.0383	U	0.0314	0.0635
Perimeter	Americium-241	59	pCi/g	-0.0446	0.0548	U	0.043	0.0872
Perimeter	Americium-241	61	pCi/g	0.027	0.0257	U	0.0199	0.0401
Perimeter	Americium-241	63	pCi/g	0.0155	0.0521	U	0.0428	0.0867
Perimeter	Americium-241	64	pCi/g	0.0565	0.0495	U	0.0351	0.0709
Perimeter	Americium-241	80	pCi/g	-0.00733	0.0614	U	0.0464	0.0944
Perimeter	Americium-241	81	pCi/g	0.0224	0.0506	U	0.0414	0.084
Perimeter	Americium-241	82	pCi/g	0.00412	0.0274	U	0.0229	0.0464
Perimeter	Americium-241	88	pCi/g	-0.0486	0.0637	U	0.0471	0.0959
Perimeter	Americium-241	89	pCi/g	0.0174	0.0292	U	0.0243	0.0493
Perimeter	Cesium-137	4	pCi/g	0.0883	0.0227		0.0126	0.0257
Perimeter	Cesium-137	5	pCi/g	0.173	0.0236		0.00748	0.0154

TABLE C-1. Radiological Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
Perimeter	Cesium-137	12	pCi/g	0.882	0.0783		0.00987	0.0203
Perimeter	Cesium-137	16	pCi/g	0.07	0.0232		0.0153	0.0313
Perimeter	Cesium-137	19	pCi/g	0.242	0.031		0.0108	0.0223
Perimeter	Cesium-137	58	pCi/g	0.0709	0.0152		0.00803	0.0163
Perimeter	Cesium-137	59	pCi/g	0.282	0.0298		0.00737	0.0151
Perimeter	Cesium-137	61	pCi/g	0.0364	0.0206		0.0113	0.0232
Perimeter	Cesium-137	63	pCi/g	0.586	0.0521		0.00822	0.0167
Perimeter	Cesium-137	64	pCi/g	0.24	0.0321		0.0143	0.0293
Perimeter	Cesium-137	80	pCi/g	0.128	0.019		0.00966	0.0199
Perimeter	Cesium-137	81	pCi/g	0.259	0.0288		0.0081	0.0166
Perimeter	Cesium-137	82	pCi/g	0.0248	0.0154		0.00842	0.0172
Perimeter	Cesium-137	88	pCi/g	0.0486	0.0164		0.00748	0.0154
Perimeter	Cesium-137	89	pCi/g	0.058	0.0234		0.00919	0.0189
Perimeter	Tritium	4	pCi/L	24.8	58.1	U	47.4	100
Perimeter	Tritium	5	pCi/L	88.4	62.2	U	46.8	99
Perimeter	Tritium	12	pCi/L	153	103	U	72.4	159
Perimeter	Tritium	16	pCi/L	5.56	83.8	U	69.8	153
Perimeter	Tritium	19	pCi/L	84	95.9	U	72.8	160
Perimeter	Tritium	58	pCi/L	121	106	U	78	171
Perimeter	Tritium	59	pCi/L	185	124	U	86.6	190
Perimeter	Tritium	61	pCi/L	93.9	99.6	U	73.7	164
Perimeter	Tritium	63	pCi/L	-14.6	54.2	U	46.3	97.9
Perimeter	Tritium	64	pCi/L	69.8	94.7	U	73.1	161
Perimeter	Tritium	80	pCi/L	25.6	87.8	U	71.4	157
Perimeter	Tritium	81	pCi/L	99.5	116	U	87.7	193
Perimeter	Tritium	82	pCi/L	29.1	107	U	87.2	192
Perimeter	Tritium	88	pCi/L	22.9	105	U	85.9	189
Perimeter	Tritium	89	pCi/L	67.6	99.2	U	76.2	170
Perimeter	Uranium	4	mg/kg	0.424			0.0116	0.035
Perimeter	Uranium	5	mg/kg	0.193			0.013	0.0393
Perimeter	Uranium	12	mg/kg	0.371			0.0125	0.0377
Perimeter	Uranium	16	mg/kg	0.527			0.0127	0.0384
Perimeter	Uranium	19	mg/kg	0.277			0.012	0.0365
Perimeter	Uranium	58	mg/kg	0.467			0.0117	0.0354
Perimeter	Uranium	59	mg/kg	0.3			0.0115	0.0347
Perimeter	Uranium	61	mg/kg	0.354			0.0127	0.0385
Perimeter	Uranium	63	mg/kg	0.343			0.0131	0.0396

TABLE C-1. Radiological Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
Perimeter	Uranium	64	mg/kg	0.683			0.0126	0.0382
Perimeter	Uranium	80	mg/kg	0.581			0.0119	0.036
Perimeter	Uranium	81	mg/kg	0.312			0.0127	0.0385
Perimeter	Uranium	82	mg/kg	0.552			0.0128	0.0389
Perimeter	Uranium	88	mg/kg	0.163			0.0124	0.0376
Perimeter	Uranium	89	mg/kg	0.409			0.0128	0.0388

NOTES:

MDA = minimum detectable amount
mg/kg = milligram per kilogram
n/a = not applicable
pCi/g = picocurie per gram
pCi/L = picocurie per liter
U = The analyte was analyzed for, but not detected above the MDA.

TABLE C-2. Radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
Community	Americium-241	8	pCi/g	0.0488	0.0606	U	0.0453	0.092
Community	Americium-241	11	pCi/g	0.0715	0.0655	U	0.0449	0.0914
Community	Americium-241	11	pCi/g	0.0458	0.097	U	0.0778	0.159
Community	Americium-241	11	pCi/g	0.0144	0.0201	U	0.016	0.0323
Community	Americium-241	68	pCi/g	-0.0105	0.0457	U	0.037	0.0752
Community	Cesium-137	8	pCi/g	0.22	0.0291		0.00862	0.0177
Community	Cesium-137	11	pCi/g	0.0429	0.0154		0.00978	0.02
Community	Cesium-137	11	pCi/g	0.105	0.0358		0.0145	0.0302
Community	Cesium-137	11	pCi/g	0.288	0.0382		0.0142	0.0293
Community	Cesium-137	68	pCi/g	0.0177	0.0125		0.00717	0.0148
Community	Tritium	8	pCi/L	11.6	90.9	U	75.1	168
Community	Tritium	11	pCi/L	178	127	U	86.1	194
Community	Tritium	11	pCi/L	506	140		61.8	138
Community	Tritium	11	pCi/L	1190	243		120	248
Community	Tritium	68	pCi/L	78	98.9	U	74.8	167
Community	Uranium	8	mg/kg	0.457			0.0123	0.0373
Community	Uranium	11	mg/kg	0.378			0.0132	0.0399
Community	Uranium	11	mg/kg	0.377			0.0128	0.0389
Community	Uranium	68	mg/kg	0.805			0.0115	0.035
On-Site	Americium-241	72	pCi/g	0.0316	0.0301	U	0.0229	0.0462
On-Site	Americium-241	74N	pCi/g	0.042	0.0662	U	0.0535	0.108
On-Site	Americium-241	75	pCi/g	-0.0276	0.0365	U	0.0301	0.0607
On-Site	Americium-241	79	pCi/g	0.0504	0.0677	U	0.0531	0.108
On-Site	Americium-241	83	pCi/g	-0.00196	0.0181	U	0.0143	0.0289
On-Site	Americium-241	84	pCi/g	0.0246	0.0743	U	0.0599	0.121
On-Site	Americium-241	85	pCi/g	0.0483	0.0751	U	0.0577	0.117
On-Site	Cesium-137	72	pCi/g	0.0636	0.0193		0.013	0.0268
On-Site	Cesium-137	74N	pCi/g	-0.00788	0.0118	U	0.00937	0.0192
On-Site	Cesium-137	75	pCi/g	0.0196	0.0112		0.00733	0.0149
On-Site	Cesium-137	79	pCi/g	0.247	0.0301		0.00855	0.0176
On-Site	Cesium-137	83	pCi/g	0.283	0.0329		0.0116	0.0237
On-Site	Cesium-137	84	pCi/g	0.314	0.0334		0.00976	0.02
On-Site	Cesium-137	85	pCi/g	0.509	0.0507		0.0104	0.0214
On-Site	Tritium	72	pCi/L	-16.5	86.4	U	74.2	165
On-Site	Tritium	79	pCi/L	161	110	U	76.1	169
On-Site	Tritium	83	pCi/L	12.9	99.9	U	82.5	183
On-Site	Tritium	84	pCi/L	46.4	109	U	86.9	191

TABLE C-2. Radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Analyte	Location	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
On-Site	Tritium	85	pCi/L	-23.7	56.1	U	48.3	102
On-Site	Uranium	72	mg/kg	1.2			0.0122	0.037
On-Site	Uranium	74N	mg/kg	5.5			0.0115	0.0348
On-Site	Uranium	75	mg/kg	1.31			0.0132	0.0399
On-Site	Uranium	79	mg/kg	1.13			0.0119	0.0361
On-Site	Uranium	83	mg/kg	0.629			0.0127	0.0385
On-Site	Uranium	84	mg/kg	0.757			0.013	0.0394
On-Site	Uranium	85	mg/kg	0.757			0.0122	0.0368
Perimeter	Americium-241	60	pCi/g	0.00148	0.0153	U	0.012	0.0244
Perimeter	Americium-241	60	pCi/g	0.0258	0.0238	U	0.0171	0.0345
Perimeter	Americium-241	65	pCi/g	0.00509	0.0365	U	0.0311	0.0629
Perimeter	Americium-241	73	pCi/g	0.0185	0.0531	U	0.0457	0.0925
Perimeter	Cesium-137	60	pCi/g	0.0415	0.017		0.0102	0.021
Perimeter	Cesium-137	60	pCi/g	-0.00294	0.0136	U	0.0119	0.0243
Perimeter	Cesium-137	65	pCi/g	0.0073	0.0094	U	0.00784	0.0159
Perimeter	Cesium-137	73	pCi/g	0.0264	0.0137		0.00781	0.016
Perimeter	Tritium	60	pCi/L	2700	437		62.2	139
Perimeter	Tritium	60	pCi/L	60.1	95.9	U	74.1	165
Perimeter	Tritium	60	pCi/L	63.2	106	U	87.4	180
Perimeter	Tritium	65	pCi/L	144	104	U	73.9	162
Perimeter	Uranium	60	mg/kg	0.566			0.013	0.0395
Perimeter	Uranium	65	mg/kg	0.94			0.0118	0.0357
Perimeter	Uranium	73	mg/kg	1.11			0.0118	0.0359

NOTES:

MDA = minimum detectale amount
mg/kg = milligram per kilogram
n/a = not applicale
pCi/g = picocurie per gram
pCi/L = picocurie per liter
U = The analyte was analyzed for, ut not detected aove the MDA.

TABLE C-3. Radiological Replicate Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Sample ID	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
On-Site	Americium-241	02NE	092112-001	pCi/g	-0.0185	0.0552	U	0.0474	0.0964
On-Site	Americium-241	02NE	092113-001	pCi/g	0.00286	0.0458	U	0.0405	0.0821
On-Site	Americium-241	02NE	092114-001	pCi/g	0.0248	0.0365	U	0.0297	0.0603
			Average		**0.00**				
			Std Dev		**0.02**				
			CV (%)		**709.08**				
On-Site	Americium-241	33	092148-001	pCi/g	-0.0363	0.0516	U	0.0405	0.082
On-Site	Americium-241	33	092149-001	pCi/g	0.0198	0.0554	U	0.0448	0.0907
On-Site	Americium-241	33	092150-001	pCi/g	0.0127	0.0485	U	0.0408	0.0825
			Average		**0.00**				
			Std Dev		**0.03**				
			CV (%)		**-2411.58**				
On-Site	Americium-241	53	092105-001	pCi/g	0.0174	0.0634	U	0.0512	0.104
On-Site	Americium-241	53	092106-001	pCi/g	0.0288	0.0422	U	0.0347	0.0704
On-Site	Americium-241	53	092107-001	pCi/g	0.0249	0.0225	U	0.0162	0.0328
			Average		**0.02**				
			Std Dev		**0.01**				
			CV (%)		**24.45**				
On-Site	Cesium-137	02NE	092112-001	pCi/g	0.103	0.0203		0.0086	0.0177
On-Site	Cesium-137	02NE	092113-001	pCi/g	0.132	0.0184		0.00717	0.0147
On-Site	Cesium-137	02NE	092114-001	pCi/g	0.076	0.0173		0.00817	0.0168
			Average		**0.10**				
			Std Dev		**0.03**				
			CV (%)		**27.02**				
On-Site	Cesium-137	33	092148-001	pCi/g	0.203	0.022		0.0073	0.0149
On-Site	Cesium-137	33	092149-001	pCi/g	0.18	0.0234		0.00924	0.0189
On-Site	Cesium-137	33	092150-001	pCi/g	0.195	0.0206		0.00694	0.0142
			Average		**0.19**				
			Std Dev		**0.01**				
			CV (%)		**6.06**				
On-Site	Cesium-137	53	092105-001	pCi/g	0.0519	0.0137		0.00765	0.0158
On-Site	Cesium-137	53	092106-001	pCi/g	0.049	0.014		0.00614	0.0125
On-Site	Cesium-137	53	092107-001	pCi/g	0.043	0.0185		0.0112	0.0229
			Average		**0.05**				
			Std Dev		**0.00**				
			CV (%)		**9.46**				

TABLE C-3. Radiological Replicate Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Sample ID	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
On-Site	Tritium	02NE	092112-003	pCi/L	388	91.9		45.8	97
On-Site	Tritium	02NE	092113-003	pCi/L	362	88.6		45.6	96.5
On-Site	Tritium	02NE	092114-003	pCi/L	492	106		47.4	100
			Average		**414.00**				
			Std Dev		**68.79**				
			CV (%)		**16.62**				
On-Site	Tritium	33	092148-003	pCi/L	13.3	57.5	U	47.6	101
On-Site	Tritium	33	092149-003	pCi/L	-24.4	53.8	U	46.5	98.4
On-Site	Tritium	33	092150-003	pCi/L	0	56.3	U	47.3	100
			Average		**-3.70**				
			Std Dev		**19.12**				
			CV (%)		**-516.77**				
On-Site	Tritium	53	092105-003	pCi/L	48.4	90.5	U	71.6	157
On-Site	Tritium	53	092106-003	pCi/L	46.1	91.3	U	72.4	159
On-Site	Tritium	53	092107-003	pCi/L	14	85.5	U	70.5	155
			Average		**36.17**				
			Std Dev		**19.23**				
			CV (%)		**53.17**				
On-Site	Uranium	02NE	092112-002	mg/kg	0.325			0.0113	0.0343
On-Site	Uranium	02NE	092113-002	mg/kg	0.258			0.0129	0.0391
On-Site	Uranium	02NE	092114-002	mg/kg	0.265			0.0127	0.0386
			Average		**0.28**				
			Std Dev		**0.04**				
			CV (%)		**13.03**				
On-Site	Uranium	33	092148-002	mg/kg	0.753			0.012	0.0365
On-Site	Uranium	33	092149-002	mg/kg	0.736			0.0127	0.0385
On-Site	Uranium	33	092150-002	mg/kg	0.881			0.013	0.0393
			Average		**0.79**				
			Std Dev		**0.08**				
			CV (%)		**10.03**				
On-Site	Uranium	53	092105-002	mg/kg	0.192			0.0119	0.0362
On-Site	Uranium	53	092106-002	mg/kg	0.159			0.012	0.0365
On-Site	Uranium	53	092107-002	mg/kg	0.181			0.0112	0.0338
			Average		**0.18**				
			Std Dev		**0.02**				
			CV (%)		**9.48**				

TABLE C-3. Radiological Replicate Results Sorted by Location for Calendar Year 2012, Soil

Location Type	Analyte	Location	Sample ID	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	MDA
Perimeter	Americium-241	64	092163-001	pCi/g	0.0565	0.0495	U	0.0351	0.0709
Perimeter	Americium-241	64	092164-001	pCi/g	-0.00582	0.0182	U	0.0141	0.0284
Perimeter	Americium-241	64	092165-001	pCi/g	0.0215	0.0661	U	0.0518	0.105
			Average		**0.02**				
			Std Dev		**0.03**				
			CV (%)		**129.84**				
Perimeter	Cesium-137	64	092163-001	pCi/g	0.24	0.0321		0.0143	0.0293
Perimeter	Cesium-137	64	092164-001	pCi/g	0.25	0.0302		0.0119	0.0244
Perimeter	Cesium-137	64	092165-001	pCi/g	0.232	0.0295		0.0113	0.0231
			Average		**0.24**				
			Std Dev		**0.01**				
			CV (%)		**3.75**				
Perimeter	Tritium	64	092163-003	pCi/L	69.8	94.7	U	73.1	161
Perimeter	Tritium	64	092164-003	pCi/L	28.6	88.6	U	71.8	158
Perimeter	Tritium	64	092165-003	pCi/L	34.5	89.7	U	72.1	159
			Average		**44.30**				
			Std Dev		**22.28**				
			CV (%)		**50.29**				
Perimeter	Uranium	64	092163-002	mg/kg	0.683			0.0126	0.0382
Perimeter	Uranium	64	092164-002	mg/kg	0.729			0.0123	0.0372
Perimeter	Uranium	64	092165-002	mg/kg	0.606			0.0131	0.0398
			Average		**0.67**				
			Std Dev		**0.06**				
			CV (%)		**9.24**				

NOTES:

CV = coefficient of variation. Only meaningful if data contains non-zero values.
mg/kg = milligram per kilogram
n/a = not applicable
MDA = minimum detectable amount.
pCi/g = picocurie per gram
pCi/L = picocurie per liter
Std Dev = standard deviation
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the method detection limit.
For radiochemical analytes the result is less than the MDA.

TABLE C-4. Radiological Replicate Results Sorted by Location for Calendar Year 2012, Sediment

Location Type	Analyte	Location	Sample ID	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	Detection Limit
Community	Americium-241	11	092201-001	pCi/g	0.0144	0.0201	U	0.016	0.0323
Community	Americium-241	11	092202-001	pCi/g	0.0108	0.0591	U	0.0492	0.0999
Community	Americium-241	11	092203-001	pCi/g	0.0431	0.0433	U	0.0345	0.0699
Community	Americium-241	11	092207-001	pCi/g	0.0458	0.097	U	0.0778	0.159
Community	Americium-241	11	092208-001	pCi/g	0.041	0.0602	U	0.0486	0.0988
Community	Americium-241	11	092209-001	pCi/g	0.0192	0.0465	U	0.0402	0.0815
	Average				**0.03**				
	Std Dev				**0.02**				
	CV (%)				**54.76**				
Community	Cesium-137	11	092201-001	pCi/g	0.0429	0.0154		0.00978	0.02
Community	Cesium-137	11	092202-001	pCi/g	0.0409	0.0147		0.00692	0.0143
Community	Cesium-137	11	092203-001	pCi/g	0.039	0.0106		0.00569	0.0116
Community	Cesium-137	11	092207-001	pCi/g	0.288	0.0382		0.0142	0.0293
Community	Cesium-137	11	092208-001	pCi/g	0.0406	0.0115		0.00728	0.015
Community	Cesium-137	11	092209-001	pCi/g	0.0567	0.0129		0.00706	0.0145
	Average				**0.08**				
	Std Dev				**0.10**				
	CV (%)				**117.87**				
Community	Tritium	11	092201-003	pCi/L	178	127	U	86.1	194
Community	Tritium	11	092207-003	pCi/L	506	140		61.8	138
Community	Tritium	11	092208-003	pCi/L	980	204		61.6	138
Community	Tritium	11	092209-003	pCi/L	214	101		61.5	137
	Average				**469.50**				
	Std Dev				**370.67**				
	CV (%)				**78.95**				
Community	Uranium	11	092201-002	mg/kg	0.377			0.0128	0.0389
Community	Uranium	11	092202-002	mg/kg	0.249			0.0132	0.04
Community	Uranium	11	092203-002	mg/kg	0.212			0.0128	0.0389
Community	Uranium	11	092207-002	mg/kg	0.378			0.0132	0.0399
Community	Uranium	11	092208-002	mg/kg	0.4			0.013	0.0395
Community	Uranium	11	092209-002	mg/kg	0.548			0.0131	0.0396
	Average				**0.36**				
	Std Dev				**0.12**				
	CV (%)				**33.22**				

TABLE C-4. Radiological Replicate Results Sorted by Location for Calendar Year 2012, Sediment

Location Type	Analyte	Location	Sample ID	Units	Activity and/or Concentration	Two Sigma Error	Lab Data Qualifiers	Decision Level	Detection Limit
On-Site	Americium-241	74N	092170-001	pCi/g	0.042	0.0662	U	0.0535	0.108
On-Site	Americium-241	74N	092171-001	pCi/g	0.0616	0.0414	U	0.0259	0.0616
On-Site	Americium-241	74N	092172-001	pCi/g	0.00812	0.0323	U	0.0286	0.058
	Average				**0.04**				
	Std Dev				**0.03**				
	CV (%)				**72.65**				
On-Site	Cesium-137	74N	092170-001	pCi/g	-0.00788	0.0118	U	0.00937	0.0192
On-Site	Cesium-137	74N	092171-001	pCi/g	-0.00179	0.00873	U	0.00759	0.0155
On-Site	Cesium-137	74N	092172-001	pCi/g	-0.00316	0.00845	U	0.00701	0.0144
	Average				**0.00**				
	Std Dev				**0.00**				
	CV (%)				**-74.70**				
On-Site	Uranium	74N	092170-002	mg/kg	5.5			0.0115	0.0348
On-Site	Uranium	74N	092171-002	mg/kg	0.658			0.0125	0.0379
On-Site	Uranium	74N	092172-002	mg/kg	1.05			0.0115	0.035
	Average				**2.40**				
	Std Dev				**2.69**				
	CV (%)				**111.94**				

NOTES:

CV = coefficient of variation. Only meaningful if data contains non-zero values.
mg/kg = milligram per kilogram
n/a = not applicable
MDA = minimum detectable amount.
pCi/g = picocurie per gram
pCi/L = picocurie per liter
Std Dev = standard deviation
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the method detection limit.
For radiochemical analytes the result is less than the MDA.

TABLE C-5. TLD Measurements by Quarter and Location Class for Calendar Year 2012

Location Class	Location Number	1st Quarter (85 Days) Exposure (mR)	1st Quarter Error	2nd Quarter (98 Days) Exposure (mR)	2nd Quarter Error	3rd Quarter (91 Days) Exposure (mR)	3rd Quarter Error	4th Quarter (96 Days) Exposure (mR)	4th Quarter Error
Community	10	26.5	0.7	29.5	0.8	26.2	0.7	25.3	2.7
Community	11	23.2	0.7	21.3	0.6	17.1	1	22.7	3.2
Community	21	27.5	0.7	28.1	0.9	24.7	0.6	37.7	9.1
Community	22	25.2	1	25.2	0.7	21.3	0.6	24.4	2.7
Community	23	25.9	1.5	23.5	0.6	19.3	0.7	21.7	2.6
Community	24	23.3	1.6	20.8	0.9	18.3	1.4	17.9	2.6
Community	25	25	1.4	24	0.6	19.9	0.6	31.8	16.3
Community	26	28.7	0.7	30.7	3.1	25.3	0.6	26.5	2.6
Community	27	25.4	1.1	25.7	0.8	20.6	1.1	25.7	3.6
Community	28	24.2	0.9	23.1	0.7	18.7	0.9	19	2.6
Community	29	20.8	1.1	20.1	0.6	17	0.7	18.4	2.7
Community	30	23.6		26.5	0.7	23.1	1.2	21.3	2.6
On-Site	1	26.2	1.5	26.6	0.9	21.6	0.6	27.8	1.3
On-Site	2NW	23.8	0.9	23.6	1	21.2	0.5	23.9	1.3
On-Site	3	31.5	6.3	25.5	1.5	26.7	1	26.6	1.3
On-Site	6	25.5	0.8	24	1	26	0.8	24.3	1.5
On-Site	7	26.2	1.1	24.1	1.5	22	0.6	25.5	1.3
On-Site	20	27	1.6	26.8	0.9	26.4	1.2	26.9	2.6
On-Site	31	26.5	1.3	26.5	0.9	21.7	0.6	26.6	1.3
On-Site	41	24.1	0.8	23.2	0.9	25.4	9.6	24.8	1.3
On-Site	42	24.7	1	25.5	2.6	25.4	0.7	25.8	1.5
On-Site	43	24.5	1.7	23.1	0.9	26.1	1.3	24.2	2
On-Site	45	27.1	1.2	26	0.9	23.3	0.5	26.6	1.4
On-Site	45E	26.5	0.8	25.3	0.9	22.2	0.7	26	1.7
On-Site	46	26.8	0.9	26.3	1	28.3	1.3	26.2	1.3
On-Site	47	27.7	2	27	1	27	1.3	27.7	1.3
On-Site	48	26.4	0.8	25.7	1.2	22.3	0.7	26.3	1.5
On-Site	66	24.8	1	24.6	0.9	22.8	0.8	25.7	1.3
On-Site	E1003	26.5	1.2	25.3	1.1	24	0.6	18.8	1.3
On-Site	E1004	22	1.7	24.6	1.1	24.1	0.6	17.5	1.3
Perimeter	4	25.9	2.2	24.7	0.9	26.1	1	25.1	1.3
Perimeter	5	23.7	2.1	21.9	0.9	24.4	0.8	22.5	1.3
Perimeter	16	30	0.8	29.4	1	24.8	0.6	31.8	1.3
Perimeter	18	26.8	1.4	25.7	0.9	26.2	0.8	25.9	2.1
Perimeter	19	27.3	1.1	26.5	0.9	22.9	0.8	27.7	1.3

TABLE C-5. TLD Measurements by Quarter and Location Class for Calendar Year 2012

Location Class	Location Number	1st Quarter (85 Days) Exposure (mR)	Error	2nd Quarter (98 Days) Exposure (mR)	Error	3rd Quarter (91 Days) Exposure (mR)	Error	4th Quarter (96 Days) Exposure (mR)	Error
Perimeter	39	25	0.9	24	1.5	23.5	1.7	25.6	1.5
Perimeter	40	25.5	1.2	24	1	29.8	4.8	23.4	1.3
Perimeter	81	25	1.2	26.4	1.1	22.7	0.8	27.8	3.6

NOTES:
mR = Milliroentgen (10E-3 roentgen)

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	9	Aluminum	mg/kg	12800		26.8	89.3
Community	9	Antimony	mg/kg	0.318	U	0.318	0.963
Community	9	Arsenic	mg/kg	4.47		0.179	0.893
Community	9	Barium	mg/kg	175		0.0893	0.357
Community	9	Beryllium	mg/kg	0.577		0.0179	0.0893
Community	9	Cadmium	mg/kg	0.281		0.0179	0.179
Community	9	Calcium	mg/kg	46100		58.9	179
Community	9	Chromium	mg/kg	11.9		0.179	0.536
Community	9	Cobalt	mg/kg	5.85		0.0536	0.179
Community	9	Copper	mg/kg	10.3		0.0589	0.179
Community	9	Iron	mg/kg	15400		58.9	179
Community	9	Lead	mg/kg	16.7		0.0893	0.357
Community	9	Magnesium	mg/kg	3980		1.79	5.36
Community	9	Manganese	mg/kg	382		1.79	8.93
Community	9	Nickel	mg/kg	11.3		0.0893	0.357
Community	9	Potassium	mg/kg	1980		14.3	53.6
Community	9	Selenium	mg/kg	0.295	U	0.295	0.893
Community	9	Silver	mg/kg	0.0963	U	0.0963	0.482
Community	9	Sodium	mg/kg	39.2	J	14.3	44.6
Community	9	Thallium	mg/kg	0.097	J	0.0536	0.357
Community	9	Vanadium	mg/kg	31.9		0.0963	0.482
Community	9	Zinc	mg/kg	38.7		0.357	1.79
Community	10	Aluminum	mg/kg	15000		13.2	43.9
Community	10	Antimony	mg/kg	0.283	U	0.283	0.858
Community	10	Arsenic	mg/kg	2.63		0.176	0.879
Community	10	Barium	mg/kg	123		0.0879	0.351
Community	10	Beryllium	mg/kg	0.786		0.0879	0.439
Community	10	Cadmium	mg/kg	0.321		0.0176	0.176
Community	10	Calcium	mg/kg	5840		29	87.9
Community	10	Chromium	mg/kg	12.6		0.879	2.64
Community	10	Cobalt	mg/kg	5.87		0.264	0.879
Community	10	Copper	mg/kg	7.98		0.29	0.879
Community	10	Iron	mg/kg	13700		29	87.9
Community	10	Lead	mg/kg	10.6		0.0879	0.351
Community	10	Magnesium	mg/kg	3100		8.79	26.4
Community	10	Manganese	mg/kg	488		1.76	8.79
Community	10	Nickel	mg/kg	11.4		0.439	1.76
Community	10	Potassium	mg/kg	2800		70.3	264

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	10	Selenium	mg/kg	0.29	U	0.29	0.879
Community	10	Silver	mg/kg	0.124	J	0.0858	0.429
Community	10	Sodium	mg/kg	70.3	U	70.3	220
Community	10	Thallium	mg/kg	0.124	J	0.0527	0.351
Community	10	Vanadium	mg/kg	30.3		0.0858	0.429
Community	10	Zinc	mg/kg	33.3		0.351	1.76
Community	25	Aluminum	mg/kg	5450		2.55	8.49
Community	25	Antimony	mg/kg	0.28	U	0.28	0.847
Community	25	Arsenic	mg/kg	3.53		0.17	0.849
Community	25	Barium	mg/kg	105		0.0849	0.34
Community	25	Beryllium	mg/kg	0.343		0.017	0.0849
Community	25	Cadmium	mg/kg	0.398		0.017	0.17
Community	25	Calcium	mg/kg	53800		56	170
Community	25	Chromium	mg/kg	5.66		0.17	0.509
Community	25	Cobalt	mg/kg	2.82		0.0509	0.17
Community	25	Copper	mg/kg	5.22		0.056	0.17
Community	25	Iron	mg/kg	6640		5.6	17
Community	25	Lead	mg/kg	13		0.0849	0.34
Community	25	Magnesium	mg/kg	2340		1.7	5.09
Community	25	Manganese	mg/kg	201		1.7	8.49
Community	25	Nickel	mg/kg	6.95		0.0849	0.34
Community	25	Potassium	mg/kg	1450		13.6	50.9
Community	25	Selenium	mg/kg	0.28	U	0.28	0.849
Community	25	Silver	mg/kg	0.0847	U	0.0847	0.424
Community	25	Sodium	mg/kg	57.8		13.6	42.4
Community	25	Thallium	mg/kg	0.0871	J	0.0509	0.34
Community	25	Vanadium	mg/kg	20.2		0.0847	0.424
Community	25	Zinc	mg/kg	24.7		0.34	1.7
Community	62	Aluminum	mg/kg	18500		13.9	46.4
Community	62	Antimony	mg/kg	0.313	U	0.313	0.947
Community	62	Arsenic	mg/kg	3.43		0.186	0.928
Community	62	Barium	mg/kg	201		0.928	3.71
Community	62	Beryllium	mg/kg	0.998		0.0928	0.464
Community	62	Cadmium	mg/kg	0.425		0.0186	0.186
Community	62	Calcium	mg/kg	24500		61.2	186
Community	62	Chromium	mg/kg	19.6		0.928	2.78
Community	62	Cobalt	mg/kg	10.1		0.278	0.928
Community	62	Copper	mg/kg	13.9		0.306	0.928

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	62	Iron	mg/kg	17100		30.6	92.8
Community	62	Lead	mg/kg	12.6		0.0928	0.371
Community	62	Magnesium	mg/kg	4970		9.28	27.8
Community	62	Manganese	mg/kg	624		1.86	9.28
Community	62	Nickel	mg/kg	20.5		0.464	1.86
Community	62	Potassium	mg/kg	3960		74.2	278
Community	62	Selenium	mg/kg	0.306	U	0.306	0.928
Community	62	Silver	mg/kg	0.0947	U	0.0947	0.473
Community	62	Sodium	mg/kg	74.2	U	74.2	232
Community	62	Thallium	mg/kg	0.175	J	0.0557	0.371
Community	62	Vanadium	mg/kg	32.9		0.0947	0.473
Community	62	Zinc	mg/kg	48.4		0.371	1.86
On-Site	1	Aluminum	mg/kg	16000		28.6	95.2
On-Site	1	Antimony	mg/kg	0.304	U	0.304	0.921
On-Site	1	Arsenic	mg/kg	2.67		0.19	0.952
On-Site	1	Barium	mg/kg	160		0.0952	0.381
On-Site	1	Beryllium	mg/kg	0.605		0.019	0.0952
On-Site	1	Cadmium	mg/kg	0.401		0.019	0.19
On-Site	1	Calcium	mg/kg	31200		62.9	190
On-Site	1	Chromium	mg/kg	10.4		0.19	0.571
On-Site	1	Cobalt	mg/kg	6.69		0.0571	0.19
On-Site	1	Copper	mg/kg	12.8		0.0629	0.19
On-Site	1	Iron	mg/kg	17100		62.9	190
On-Site	1	Lead	mg/kg	14		0.0952	0.381
On-Site	1	Magnesium	mg/kg	5030		1.9	5.71
On-Site	1	Manganese	mg/kg	507		1.9	9.52
On-Site	1	Nickel	mg/kg	11.9		0.0952	0.381
On-Site	1	Potassium	mg/kg	4510		15.2	57.1
On-Site	1	Selenium	mg/kg	0.353	J	0.314	0.952
On-Site	1	Silver	mg/kg	0.0921	U	0.0921	0.46
On-Site	1	Sodium	mg/kg	52.3		15.2	47.6
On-Site	1	Thallium	mg/kg	0.198	J	0.0571	0.381
On-Site	1	Vanadium	mg/kg	30.9		0.0921	0.46
On-Site	1	Zinc	mg/kg	58.3		0.381	1.9
On-Site	02NE	Aluminum	mg/kg	7450		2.57	8.58
On-Site	02NE	Antimony	mg/kg	0.308	U	0.308	0.933
On-Site	02NE	Arsenic	mg/kg	1.41		0.172	0.858
On-Site	02NE	Barium	mg/kg	58		0.0858	0.343

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02NE	Beryllium	mg/kg	0.34		0.0172	0.0858
On-Site	02NE	Cadmium	mg/kg	0.257		0.0172	0.172
On-Site	02NE	Calcium	mg/kg	3470		5.66	17.2
On-Site	02NE	Chromium	mg/kg	6.19		0.172	0.515
On-Site	02NE	Cobalt	mg/kg	2.45		0.0515	0.172
On-Site	02NE	Copper	mg/kg	4.71		0.0566	0.172
On-Site	02NE	Iron	mg/kg	6060		5.66	17.2
On-Site	02NE	Lead	mg/kg	6.14		0.0858	0.343
On-Site	02NE	Magnesium	mg/kg	1680		1.72	5.15
On-Site	02NE	Manganese	mg/kg	106		0.172	0.858
On-Site	02NE	Nickel	mg/kg	5.44		0.0858	0.343
On-Site	02NE	Potassium	mg/kg	1660		13.7	51.5
On-Site	02NE	Selenium	mg/kg	0.283	U	0.283	0.858
On-Site	02NE	Silver	mg/kg	0.152	J	0.0933	0.466
On-Site	02NE	Sodium	mg/kg	24.8	J	13.7	42.9
On-Site	02NE	Thallium	mg/kg	0.0616	J	0.0515	0.343
On-Site	02NE	Vanadium	mg/kg	15.2		0.0933	0.466
On-Site	02NE	Zinc	mg/kg	20.9		0.343	1.72
On-Site	02NW	Aluminum	mg/kg	8670		2.92	9.75
On-Site	02NW	Antimony	mg/kg	0.304	U	0.304	0.921
On-Site	02NW	Arsenic	mg/kg	2.08		0.195	0.975
On-Site	02NW	Barium	mg/kg	107		0.0975	0.39
On-Site	02NW	Beryllium	mg/kg	0.445		0.0195	0.0975
On-Site	02NW	Cadmium	mg/kg	0.2		0.0195	0.195
On-Site	02NW	Calcium	mg/kg	23300		64.3	195
On-Site	02NW	Chromium	mg/kg	7.23		0.195	0.585
On-Site	02NW	Cobalt	mg/kg	3.52		0.0585	0.195
On-Site	02NW	Copper	mg/kg	6.49		0.0643	0.195
On-Site	02NW	Iron	mg/kg	7860		6.43	19.5
On-Site	02NW	Lead	mg/kg	8.53		0.0975	0.39
On-Site	02NW	Magnesium	mg/kg	2930		1.95	5.85
On-Site	02NW	Manganese	mg/kg	171		0.195	0.975
On-Site	02NW	Nickel	mg/kg	7.31		0.0975	0.39
On-Site	02NW	Potassium	mg/kg	2220		15.6	58.5
On-Site	02NW	Selenium	mg/kg	0.322	U	0.322	0.975
On-Site	02NW	Silver	mg/kg	0.0921	U	0.0921	0.46
On-Site	02NW	Sodium	mg/kg	99.8		15.6	48.7
On-Site	02NW	Thallium	mg/kg	0.0903	J	0.0585	0.39

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02NW	Vanadium	mg/kg	16.1		0.0921	0.46
On-Site	02NW	Zinc	mg/kg	28.1		0.39	1.95
On-Site	02SE	Aluminum	mg/kg	10300		13.5	45.1
On-Site	02SE	Antimony	mg/kg	0.306	U	0.306	0.926
On-Site	02SE	Arsenic	mg/kg	2.18		0.181	0.903
On-Site	02SE	Barium	mg/kg	79.9		0.0903	0.361
On-Site	02SE	Beryllium	mg/kg	0.421		0.0181	0.0903
On-Site	02SE	Cadmium	mg/kg	0.283		0.0181	0.181
On-Site	02SE	Calcium	mg/kg	18000		29.8	90.3
On-Site	02SE	Chromium	mg/kg	6.19		0.181	0.542
On-Site	02SE	Cobalt	mg/kg	2.63		0.0542	0.181
On-Site	02SE	Copper	mg/kg	5.66		0.0596	0.181
On-Site	02SE	Iron	mg/kg	6510		5.96	18.1
On-Site	02SE	Lead	mg/kg	5.82		0.0903	0.361
On-Site	02SE	Magnesium	mg/kg	2330		1.81	5.42
On-Site	02SE	Manganese	mg/kg	96.2		0.181	0.903
On-Site	02SE	Nickel	mg/kg	6.48		0.0903	0.361
On-Site	02SE	Potassium	mg/kg	1840		14.4	54.2
On-Site	02SE	Selenium	mg/kg	0.298	U	0.298	0.903
On-Site	02SE	Silver	mg/kg	0.146	J	0.0926	0.463
On-Site	02SE	Sodium	mg/kg	25.6	J	14.4	45.1
On-Site	02SE	Thallium	mg/kg	0.0787	J	0.0542	0.361
On-Site	02SE	Vanadium	mg/kg	16.8		0.0926	0.463
On-Site	02SE	Zinc	mg/kg	21		0.361	1.81
On-Site	02SW	Aluminum	mg/kg	9150		2.99	9.98
On-Site	02SW	Antimony	mg/kg	0.29	U	0.29	0.88
On-Site	02SW	Arsenic	mg/kg	2.52		0.2	0.998
On-Site	02SW	Barium	mg/kg	120		0.0998	0.399
On-Site	02SW	Beryllium	mg/kg	0.375		0.02	0.0998
On-Site	02SW	Cadmium	mg/kg	0.121	J	0.02	0.2
On-Site	02SW	Calcium	mg/kg	35800		65.9	200
On-Site	02SW	Chromium	mg/kg	6.46		0.2	0.599
On-Site	02SW	Cobalt	mg/kg	2.63		0.0599	0.2
On-Site	02SW	Copper	mg/kg	4.64		0.0659	0.2
On-Site	02SW	Iron	mg/kg	6530		6.59	20
On-Site	02SW	Lead	mg/kg	5.39		0.0998	0.399
On-Site	02SW	Magnesium	mg/kg	2880		2	5.99
On-Site	02SW	Manganese	mg/kg	87.3		0.2	0.998

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02SW	Nickel	mg/kg	6.44		0.0998	0.399
On-Site	02SW	Potassium	mg/kg	1490		16	59.9
On-Site	02SW	Selenium	mg/kg	0.329	U	0.329	0.998
On-Site	02SW	Silver	mg/kg	0.088	U	0.088	0.44
On-Site	02SW	Sodium	mg/kg	53.1		16	49.9
On-Site	02SW	Thallium	mg/kg	0.0778	J	0.0599	0.399
On-Site	02SW	Vanadium	mg/kg	15.7		0.088	0.44
On-Site	02SW	Zinc	mg/kg	20.3		0.399	2
On-Site	3	Aluminum	mg/kg	7170		2.96	9.88
On-Site	3	Antimony	mg/kg	0.302	U	0.302	0.916
On-Site	3	Arsenic	mg/kg	2.78		0.198	0.988
On-Site	3	Barium	mg/kg	218		0.988	3.95
On-Site	3	Beryllium	mg/kg	0.309		0.0198	0.0988
On-Site	3	Cadmium	mg/kg	0.234		0.0198	0.198
On-Site	3	Calcium	mg/kg	52900		59.4	180
On-Site	3	Chromium	mg/kg	5.71		0.198	0.593
On-Site	3	Cobalt	mg/kg	2.84		0.0593	0.198
On-Site	3	Copper	mg/kg	5.86		0.0652	0.198
On-Site	3	Iron	mg/kg	5520		6.52	19.8
On-Site	3	Lead	mg/kg	10.1		0.0988	0.395
On-Site	3	Magnesium	mg/kg	3840		1.98	5.93
On-Site	3	Manganese	mg/kg	107		0.198	0.988
On-Site	3	Nickel	mg/kg	6.84		0.0988	0.395
On-Site	3	Potassium	mg/kg	1460		15.8	59.3
On-Site	3	Selenium	mg/kg	0.297	U	0.297	0.899
On-Site	3	Silver	mg/kg	0.0916	U	0.0916	0.458
On-Site	3	Sodium	mg/kg	62.2		15.8	49.4
On-Site	3	Thallium	mg/kg	0.0759	J	0.0593	0.395
On-Site	3	Vanadium	mg/kg	24.9		0.0916	0.458
On-Site	3	Zinc	mg/kg	26.1		0.395	1.98
On-Site	6	Aluminum	mg/kg	11200		13.9	46.3
On-Site	6	Antimony	mg/kg	0.327	U	0.327	0.992
On-Site	6	Arsenic	mg/kg	1.71		0.185	0.926
On-Site	6	Barium	mg/kg	87.9		0.0926	0.37
On-Site	6	Beryllium	mg/kg	0.459		0.0185	0.0926
On-Site	6	Cadmium	mg/kg	0.264		0.0185	0.185
On-Site	6	Calcium	mg/kg	6080		6.6	20
On-Site	6	Chromium	mg/kg	8.07		0.185	0.556

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	6	Cobalt	mg/kg	3.48		0.0556	0.185
On-Site	6	Copper	mg/kg	52.9		0.0611	0.185
On-Site	6	Iron	mg/kg	7350		6.11	18.5
On-Site	6	Lead	mg/kg	10.7		0.0926	0.37
On-Site	6	Magnesium	mg/kg	2290		1.85	5.56
On-Site	6	Manganese	mg/kg	142		0.185	0.926
On-Site	6	Nickel	mg/kg	13.7		0.0926	0.37
On-Site	6	Potassium	mg/kg	2060		74.1	278
On-Site	6	Selenium	mg/kg	0.33	U	0.33	1
On-Site	6	Silver	mg/kg	0.551		0.0992	0.496
On-Site	6	Sodium	mg/kg	30.3	J	14.8	46.3
On-Site	6	Thallium	mg/kg	0.0957	J	0.0556	0.37
On-Site	6	Vanadium	mg/kg	22.7		0.0992	0.496
On-Site	6	Zinc	mg/kg	64		0.37	1.85
On-Site	7	Aluminum	mg/kg	8020		2.96	9.88
On-Site	7	Antimony	mg/kg	0.302	U	0.302	0.914
On-Site	7	Arsenic	mg/kg	1.38		0.198	0.988
On-Site	7	Barium	mg/kg	65		0.0988	0.395
On-Site	7	Beryllium	mg/kg	0.415		0.0198	0.0988
On-Site	7	Cadmium	mg/kg	0.208		0.0198	0.198
On-Site	7	Calcium	mg/kg	4700		6.52	19.8
On-Site	7	Chromium	mg/kg	7.77		0.198	0.593
On-Site	7	Cobalt	mg/kg	2.99		0.0593	0.198
On-Site	7	Copper	mg/kg	6.14		0.0652	0.198
On-Site	7	Iron	mg/kg	7960		6.52	19.8
On-Site	7	Lead	mg/kg	10.3		0.0988	0.395
On-Site	7	Magnesium	mg/kg	2490		1.98	5.93
On-Site	7	Manganese	mg/kg	179		0.198	0.988
On-Site	7	Nickel	mg/kg	6.21		0.0988	0.395
On-Site	7	Potassium	mg/kg	3340		15.8	59.3
On-Site	7	Selenium	mg/kg	0.326	U	0.326	0.988
On-Site	7	Silver	mg/kg	0.137	J	0.0914	0.457
On-Site	7	Sodium	mg/kg	40.1	J	15.8	49.4
On-Site	7	Thallium	mg/kg	0.0731	J	0.0593	0.395
On-Site	7	Vanadium	mg/kg	17.4		0.0914	0.457
On-Site	7	Zinc	mg/kg	31.3		0.395	1.98
On-Site	33	Aluminum	mg/kg	12300		27.4	91.2
On-Site	33	Antimony	mg/kg	0.305	U	0.305	0.924

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	33	Arsenic	mg/kg	4.99		0.182	0.912
On-Site	33	Barium	mg/kg	120		0.0912	0.365
On-Site	33	Beryllium	mg/kg	0.799		0.0182	0.0912
On-Site	33	Cadmium	mg/kg	0.389		0.0182	0.182
On-Site	33	Calcium	mg/kg	50500		60.2	182
On-Site	33	Chromium	mg/kg	10.6		0.182	0.547
On-Site	33	Cobalt	mg/kg	5.26		0.0547	0.182
On-Site	33	Copper	mg/kg	10.2		0.0602	0.182
On-Site	33	Iron	mg/kg	13500		60.2	182
On-Site	33	Lead	mg/kg	12.6		0.0912	0.365
On-Site	33	Magnesium	mg/kg	4650		1.82	5.47
On-Site	33	Manganese	mg/kg	375		1.82	9.12
On-Site	33	Nickel	mg/kg	11.5		0.0912	0.365
On-Site	33	Potassium	mg/kg	2880		14.6	54.7
On-Site	33	Selenium	mg/kg	0.354	J	0.301	0.912
On-Site	33	Silver	mg/kg	0.0924	U	0.0924	0.462
On-Site	33	Sodium	mg/kg	86.4		14.6	45.6
On-Site	33	Thallium	mg/kg	0.131	J	0.0547	0.365
On-Site	33	Vanadium	mg/kg	27.2		0.0924	0.462
On-Site	33	Zinc	mg/kg	59.7		0.365	1.82
On-Site	34	Aluminum	mg/kg	12200		15	49.9
On-Site	34	Antimony	mg/kg	0.328	U	0.328	0.994
On-Site	34	Arsenic	mg/kg	4.51		0.2	0.998
On-Site	34	Barium	mg/kg	152		0.0998	0.399
On-Site	34	Beryllium	mg/kg	0.614		0.02	0.0998
On-Site	34	Cadmium	mg/kg	0.25		0.02	0.2
On-Site	34	Calcium	mg/kg	15000		32.9	99.8
On-Site	34	Chromium	mg/kg	11.6		0.2	0.599
On-Site	34	Cobalt	mg/kg	5.15		0.0599	0.2
On-Site	34	Copper	mg/kg	8.83		0.0659	0.2
On-Site	34	Iron	mg/kg	12600		32.9	99.8
On-Site	34	Lead	mg/kg	15.2		0.0998	0.399
On-Site	34	Magnesium	mg/kg	3320		2	5.99
On-Site	34	Manganese	mg/kg	270		0.998	4.99
On-Site	34	Nickel	mg/kg	12.2		0.0998	0.399
On-Site	34	Potassium	mg/kg	2940		79.8	299
On-Site	34	Selenium	mg/kg	0.329	U	0.329	0.998
On-Site	34	Silver	mg/kg	0.0994	U	0.0994	0.497

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	34	Sodium	mg/kg	36.9	J	16	49.9
On-Site	34	Thallium	mg/kg	0.125	J	0.0599	0.399
On-Site	34	Vanadium	mg/kg	31.2		0.0994	0.497
On-Site	34	Zinc	mg/kg	40.3		0.399	2
On-Site	45	Aluminum	mg/kg	7310		2.58	8.61
On-Site	45	Antimony	mg/kg	0.313	U	0.313	0.947
On-Site	45	Arsenic	mg/kg	2.27		0.172	0.861
On-Site	45	Barium	mg/kg	66.9		0.0861	0.344
On-Site	45	Beryllium	mg/kg	0.347		0.0172	0.0861
On-Site	45	Cadmium	mg/kg	0.171	J	0.0172	0.172
On-Site	45	Calcium	mg/kg	8510		5.68	17.2
On-Site	45	Chromium	mg/kg	5.96		0.172	0.516
On-Site	45	Cobalt	mg/kg	2.33		0.0516	0.172
On-Site	45	Copper	mg/kg	5.1		0.0568	0.172
On-Site	45	Iron	mg/kg	5740		5.68	17.2
On-Site	45	Lead	mg/kg	6.25		0.0861	0.344
On-Site	45	Magnesium	mg/kg	2060		1.72	5.16
On-Site	45	Manganese	mg/kg	108		0.172	0.861
On-Site	45	Nickel	mg/kg	5.13		0.0861	0.344
On-Site	45	Potassium	mg/kg	1900		13.8	51.6
On-Site	45	Selenium	mg/kg	0.284	U	0.284	0.861
On-Site	45	Silver	mg/kg	0.0947	J	0.0947	0.473
On-Site	45	Sodium	mg/kg	35.3	J	13.8	43
On-Site	45	Thallium	mg/kg	0.0699	J	0.0516	0.344
On-Site	45	Vanadium	mg/kg	16.8		0.0947	0.473
On-Site	45	Zinc	mg/kg	22.6		0.344	1.72
On-Site	51	Aluminum	mg/kg	6510		2.84	9.45
On-Site	51	Antimony	mg/kg	0.325	U	0.325	0.984
On-Site	51	Arsenic	mg/kg	1.39		0.189	0.945
On-Site	51	Barium	mg/kg	106		0.0945	0.378
On-Site	51	Beryllium	mg/kg	0.42		0.0189	0.0945
On-Site	51	Cadmium	mg/kg	0.148	J	0.0189	0.189
On-Site	51	Calcium	mg/kg	21800		31.2	94.5
On-Site	51	Chromium	mg/kg	44.7		0.189	0.567
On-Site	51	Cobalt	mg/kg	2.93		0.0567	0.189
On-Site	51	Copper	mg/kg	8.28		0.0624	0.189
On-Site	51	Iron	mg/kg	5350		6.24	18.9
On-Site	51	Lead	mg/kg	9.12		0.0945	0.378

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	51	Magnesium	mg/kg	2410		1.89	5.67
On-Site	51	Manganese	mg/kg	117		0.189	0.945
On-Site	51	Nickel	mg/kg	6.76		0.0945	0.378
On-Site	51	Potassium	mg/kg	1870		15.1	56.7
On-Site	51	Selenium	mg/kg	0.329	U	0.329	0.998
On-Site	51	Silver	mg/kg	0.104	J	0.0984	0.492
On-Site	51	Sodium	mg/kg	28.8	J	15.1	47.3
On-Site	51	Thallium	mg/kg	0.082	J	0.0567	0.378
On-Site	51	Vanadium	mg/kg	23.5		0.0984	0.492
On-Site	51	Zinc	mg/kg	97.4		0.378	1.89
On-Site	52	Aluminum	mg/kg	5320		2.98	9.92
On-Site	52	Antimony	mg/kg	0.308	U	0.308	0.935
On-Site	52	Arsenic	mg/kg	1.83		0.198	0.992
On-Site	52	Barium	mg/kg	103		0.0992	0.397
On-Site	52	Beryllium	mg/kg	0.336		0.0198	0.0992
On-Site	52	Cadmium	mg/kg	0.101	J	0.0198	0.198
On-Site	52	Calcium	mg/kg	42500		31.5	95.4
On-Site	52	Chromium	mg/kg	4.63		0.198	0.595
On-Site	52	Cobalt	mg/kg	2.55		0.0595	0.198
On-Site	52	Copper	mg/kg	4.08		0.0655	0.198
On-Site	52	Iron	mg/kg	4960		6.55	19.8
On-Site	52	Lead	mg/kg	4.98		0.0992	0.397
On-Site	52	Magnesium	mg/kg	2500		1.98	5.95
On-Site	52	Manganese	mg/kg	115		0.198	0.992
On-Site	52	Nickel	mg/kg	5.87		0.0992	0.397
On-Site	52	Potassium	mg/kg	942		15.9	59.5
On-Site	52	Selenium	mg/kg	0.315	U	0.315	0.954
On-Site	52	Silver	mg/kg	0.102	J	0.0935	0.467
On-Site	52	Sodium	mg/kg	37.8	J	15.9	49.6
On-Site	52	Thallium	mg/kg	0.0595	U	0.0595	0.397
On-Site	52	Vanadium	mg/kg	19.9		0.0935	0.467
On-Site	52	Zinc	mg/kg	18.6		0.397	1.98
On-Site	53	Aluminum	mg/kg	5570		2.71	9.04
On-Site	53	Antimony	mg/kg	0.322	U	0.322	0.977
On-Site	53	Arsenic	mg/kg	0.95		0.181	0.904
On-Site	53	Barium	mg/kg	61.1		0.0904	0.362
On-Site	53	Beryllium	mg/kg	0.299		0.0181	0.0904
On-Site	53	Cadmium	mg/kg	0.116	J	0.0181	0.181

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	53	Calcium	mg/kg	3700		6.21	18.8
On-Site	53	Chromium	mg/kg	4.73		0.181	0.542
On-Site	53	Cobalt	mg/kg	2.52		0.0542	0.181
On-Site	53	Copper	mg/kg	4.76		0.0597	0.181
On-Site	53	Iron	mg/kg	4710		5.97	18.1
On-Site	53	Lead	mg/kg	7.6		0.0904	0.362
On-Site	53	Magnesium	mg/kg	1540		1.81	5.42
On-Site	53	Manganese	mg/kg	107		0.181	0.904
On-Site	53	Nickel	mg/kg	4.73		0.0904	0.362
On-Site	53	Potassium	mg/kg	1210		14.5	54.2
On-Site	53	Selenium	mg/kg	0.375	J	0.311	0.942
On-Site	53	Silver	mg/kg	0.159	J	0.0977	0.488
On-Site	53	Sodium	mg/kg	20.2	J	14.5	45.2
On-Site	53	Thallium	mg/kg	0.0542	U	0.0542	0.362
On-Site	53	Vanadium	mg/kg	16.9		0.0977	0.488
On-Site	53	Zinc	mg/kg	17.4		0.362	1.81
On-Site	54	Aluminum	mg/kg	5840		2.78	9.26
On-Site	54	Antimony	mg/kg	0.329	U	0.329	0.996
On-Site	54	Arsenic	mg/kg	0.892	J	0.185	0.926
On-Site	54	Barium	mg/kg	72.2		0.0926	0.37
On-Site	54	Beryllium	mg/kg	0.329		0.0185	0.0926
On-Site	54	Cadmium	mg/kg	0.518		0.0185	0.185
On-Site	54	Calcium	mg/kg	4230		5.87	17.8
On-Site	54	Chromium	mg/kg	5.53		0.185	0.556
On-Site	54	Cobalt	mg/kg	2.9		0.0556	0.185
On-Site	54	Copper	mg/kg	5.93		0.0611	0.185
On-Site	54	Iron	mg/kg	5250		6.11	18.5
On-Site	54	Lead	mg/kg	8.15		0.0926	0.37
On-Site	54	Magnesium	mg/kg	1640		1.85	5.56
On-Site	54	Manganese	mg/kg	146		0.185	0.926
On-Site	54	Nickel	mg/kg	6.58		0.0926	0.37
On-Site	54	Potassium	mg/kg	1240		14.8	55.6
On-Site	54	Selenium	mg/kg	0.294	U	0.294	0.89
On-Site	54	Silver	mg/kg	0.161	J	0.0996	0.498
On-Site	54	Sodium	mg/kg	30.6	J	14.8	46.3
On-Site	54	Thallium	mg/kg	0.0628	J	0.0556	0.37
On-Site	54	Vanadium	mg/kg	20.2		0.0996	0.498
On-Site	54	Zinc	mg/kg	33.2		0.37	1.85

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	55	Aluminum	mg/kg	7640		2.88	9.6
On-Site	55	Antimony	mg/kg	0.307	U	0.307	0.929
On-Site	55	Arsenic	mg/kg	1.72		0.192	0.96
On-Site	55	Barium	mg/kg	73.2		0.096	0.384
On-Site	55	Beryllium	mg/kg	0.374		0.0192	0.096
On-Site	55	Cadmium	mg/kg	0.218		0.0192	0.192
On-Site	55	Calcium	mg/kg	9520		6.33	19.2
On-Site	55	Chromium	mg/kg	7		0.192	0.576
On-Site	55	Cobalt	mg/kg	2.68		0.0576	0.192
On-Site	55	Copper	mg/kg	5.3		0.0633	0.192
On-Site	55	Iron	mg/kg	7350		6.33	19.2
On-Site	55	Lead	mg/kg	8.61		0.096	0.384
On-Site	55	Magnesium	mg/kg	2530		1.92	5.76
On-Site	55	Manganese	mg/kg	147		0.192	0.96
On-Site	55	Nickel	mg/kg	5.86		0.096	0.384
On-Site	55	Potassium	mg/kg	2120		15.4	57.6
On-Site	55	Selenium	mg/kg	0.317	U	0.317	0.96
On-Site	55	Silver	mg/kg	0.0929	U	0.0929	0.465
On-Site	55	Sodium	mg/kg	54.1		15.4	48
On-Site	55	Thallium	mg/kg	0.0676	J	0.0576	0.384
On-Site	55	Vanadium	mg/kg	15.2		0.0929	0.465
On-Site	55	Zinc	mg/kg	26		0.384	1.92
On-Site	56	Aluminum	mg/kg	4550		2.78	9.26
On-Site	56	Antimony	mg/kg	0.31	U	0.31	0.94
On-Site	56	Arsenic	mg/kg	1.18		0.185	0.926
On-Site	56	Barium	mg/kg	66.9		0.0926	0.37
On-Site	56	Beryllium	mg/kg	0.244		0.0185	0.0926
On-Site	56	Cadmium	mg/kg	0.118	J	0.0185	0.185
On-Site	56	Calcium	mg/kg	13500		30.6	92.6
On-Site	56	Chromium	mg/kg	4.4		0.185	0.556
On-Site	56	Cobalt	mg/kg	2.18		0.0556	0.185
On-Site	56	Copper	mg/kg	4.57		0.0611	0.185
On-Site	56	Iron	mg/kg	4660		6.11	18.5
On-Site	56	Lead	mg/kg	4.7		0.0926	0.37
On-Site	56	Magnesium	mg/kg	1590		1.85	5.56
On-Site	56	Manganese	mg/kg	115		0.185	0.926
On-Site	56	Nickel	mg/kg	4.64		0.0926	0.37
On-Site	56	Potassium	mg/kg	959		14.8	55.6

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	56	Selenium	mg/kg	0.502	J	0.309	0.936
On-Site	56	Silver	mg/kg	0.193	J	0.094	0.47
On-Site	56	Sodium	mg/kg	42.9	J	14.8	46.3
On-Site	56	Thallium	mg/kg	0.0691	J	0.0556	0.37
On-Site	56	Vanadium	mg/kg	25.4		0.094	0.47
On-Site	56	Zinc	mg/kg	36.1		0.37	1.85
On-Site	57	Aluminum	mg/kg	5560		2.94	9.8
On-Site	57	Antimony	mg/kg	0.282	U	0.282	0.853
On-Site	57	Arsenic	mg/kg	2.47		0.196	0.98
On-Site	57	Barium	mg/kg	224		0.98	3.92
On-Site	57	Beryllium	mg/kg	0.301		0.0196	0.098
On-Site	57	Cadmium	mg/kg	0.147	J	0.0196	0.196
On-Site	57	Calcium	mg/kg	63300		64.7	196
On-Site	57	Chromium	mg/kg	4.66		0.196	0.588
On-Site	57	Cobalt	mg/kg	3.54		0.0588	0.196
On-Site	57	Copper	mg/kg	5.32		0.0647	0.196
On-Site	57	Iron	mg/kg	6540		6.47	19.6
On-Site	57	Lead	mg/kg	5.53		0.098	0.392
On-Site	57	Magnesium	mg/kg	4510		1.96	5.88
On-Site	57	Manganese	mg/kg	168		0.196	0.98
On-Site	57	Nickel	mg/kg	6.82		0.098	0.392
On-Site	57	Potassium	mg/kg	1480		15.7	58.8
On-Site	57	Selenium	mg/kg	0.325	U	0.325	0.984
On-Site	57	Silver	mg/kg	0.0853	U	0.0853	0.427
On-Site	57	Sodium	mg/kg	83.8		15.7	49
On-Site	57	Thallium	mg/kg	0.0841	J	0.0588	0.392
On-Site	57	Vanadium	mg/kg	45.8		0.0853	0.427
On-Site	57	Zinc	mg/kg	30.7		0.392	1.96
On-Site	76	Aluminum	mg/kg	10300		13.6	45.5
On-Site	76	Antimony	mg/kg	0.296	U	0.296	0.896
On-Site	76	Arsenic	mg/kg	1.88		0.182	0.909
On-Site	76	Barium	mg/kg	66.2		0.0909	0.364
On-Site	76	Beryllium	mg/kg	0.455		0.0182	0.0909
On-Site	76	Cadmium	mg/kg	0.21		0.0182	0.182
On-Site	76	Calcium	mg/kg	1690		6	18.2
On-Site	76	Chromium	mg/kg	8.2		0.182	0.545
On-Site	76	Cobalt	mg/kg	3.26		0.0545	0.182
On-Site	76	Copper	mg/kg	7.27		0.06	0.182

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	76	Iron	mg/kg	8820		6	18.2
On-Site	76	Lead	mg/kg	8.6		0.0909	0.364
On-Site	76	Magnesium	mg/kg	2330		1.82	5.45
On-Site	76	Manganese	mg/kg	151		0.182	0.909
On-Site	76	Nickel	mg/kg	6.71		0.0909	0.364
On-Site	76	Potassium	mg/kg	2470		14.5	54.5
On-Site	76	Selenium	mg/kg	0.3	U	0.3	0.909
On-Site	76	Silver	mg/kg	0.145	J	0.0896	0.448
On-Site	76	Sodium	mg/kg	34.7	J	14.5	45.5
On-Site	76	Thallium	mg/kg	0.0816	J	0.0545	0.364
On-Site	76	Vanadium	mg/kg	18.7		0.0896	0.448
On-Site	76	Zinc	mg/kg	29.6		0.364	1.82
On-Site	77	Aluminum	mg/kg	9450		2.91	9.71
On-Site	77	Antimony	mg/kg	0.327	U	0.327	0.99
On-Site	77	Arsenic	mg/kg	2.04		0.194	0.971
On-Site	77	Barium	mg/kg	88.5		0.0971	0.388
On-Site	77	Beryllium	mg/kg	0.419		0.0194	0.0971
On-Site	77	Cadmium	mg/kg	0.226		0.0194	0.194
On-Site	77	Calcium	mg/kg	11300		32	97.1
On-Site	77	Chromium	mg/kg	8.22		0.194	0.583
On-Site	77	Cobalt	mg/kg	3.28		0.0583	0.194
On-Site	77	Copper	mg/kg	6.81		0.0641	0.194
On-Site	77	Iron	mg/kg	8500		6.41	19.4
On-Site	77	Lead	mg/kg	10.3		0.0971	0.388
On-Site	77	Magnesium	mg/kg	2740		1.94	5.83
On-Site	77	Manganese	mg/kg	181		0.194	0.971
On-Site	77	Nickel	mg/kg	7.23		0.0971	0.388
On-Site	77	Potassium	mg/kg	2500		15.5	58.3
On-Site	77	Selenium	mg/kg	0.32	U	0.32	0.971
On-Site	77	Silver	mg/kg	0.099	U	0.099	0.495
On-Site	77	Sodium	mg/kg	93.9		15.5	48.5
On-Site	77	Thallium	mg/kg	0.0856	J	0.0583	0.388
On-Site	77	Vanadium	mg/kg	18		0.099	0.495
On-Site	77	Zinc	mg/kg	28.7		0.388	1.94
On-Site	78	Aluminum	mg/kg	6230		2.99	9.98
On-Site	78	Antimony	mg/kg	0.299	U	0.299	0.906
On-Site	78	Arsenic	mg/kg	1.07		0.2	0.998
On-Site	78	Barium	mg/kg	76		0.0998	0.399

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	78	Beryllium	mg/kg	0.321		0.02	0.0998
On-Site	78	Cadmium	mg/kg	0.146	J	0.02	0.2
On-Site	78	Calcium	mg/kg	4800		6.26	19
On-Site	78	Chromium	mg/kg	5.53		0.2	0.599
On-Site	78	Cobalt	mg/kg	3.79		0.0599	0.2
On-Site	78	Copper	mg/kg	9.17		0.0659	0.2
On-Site	78	Iron	mg/kg	6960		6.59	20
On-Site	78	Lead	mg/kg	7.54		0.0998	0.399
On-Site	78	Magnesium	mg/kg	2430		2	5.99
On-Site	78	Manganese	mg/kg	221		2	9.98
On-Site	78	Nickel	mg/kg	7.15		0.0998	0.399
On-Site	78	Potassium	mg/kg	1510		16	59.9
On-Site	78	Selenium	mg/kg	0.313	U	0.313	0.949
On-Site	78	Silver	mg/kg	0.217	J	0.0906	0.453
On-Site	78	Sodium	mg/kg	34.4	J	16	49.9
On-Site	78	Thallium	mg/kg	0.0908	J	0.0599	0.399
On-Site	78	Vanadium	mg/kg	23.3		0.0906	0.453
On-Site	78	Zinc	mg/kg	28.8		0.399	2
On-Site	86	Aluminum	mg/kg	7720		2.67	8.9
On-Site	86	Antimony	mg/kg	0.325	U	0.325	0.984
On-Site	86	Arsenic	mg/kg	2.01		0.178	0.89
On-Site	86	Barium	mg/kg	135		0.089	0.356
On-Site	86	Beryllium	mg/kg	0.382		0.0178	0.089
On-Site	86	Cadmium	mg/kg	0.147	J	0.0178	0.178
On-Site	86	Calcium	mg/kg	40500		58.7	178
On-Site	86	Chromium	mg/kg	5.9		0.178	0.534
On-Site	86	Cobalt	mg/kg	3.69		0.0534	0.178
On-Site	86	Copper	mg/kg	6.88		0.0587	0.178
On-Site	86	Iron	mg/kg	7550		5.87	17.8
On-Site	86	Lead	mg/kg	6.56		0.089	0.356
On-Site	86	Magnesium	mg/kg	3360		1.78	5.34
On-Site	86	Manganese	mg/kg	168		0.178	0.89
On-Site	86	Nickel	mg/kg	7.22		0.089	0.356
On-Site	86	Potassium	mg/kg	1670		14.2	53.4
On-Site	86	Selenium	mg/kg	0.289	U	0.289	0.877
On-Site	86	Silver	mg/kg	0.0984	U	0.0984	0.492
On-Site	86	Sodium	mg/kg	41.7	J	14.2	44.5
On-Site	86	Thallium	mg/kg	0.1	J	0.0534	0.356

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	86	Vanadium	mg/kg	31		0.0984	0.492
On-Site	86	Zinc	mg/kg	26.9		0.356	1.78
On-Site	90	Aluminum	mg/kg	4930		2.76	9.21
On-Site	90	Antimony	mg/kg	0.304	U	0.304	0.921
On-Site	90	Arsenic	mg/kg	0.659	J	0.184	0.921
On-Site	90	Barium	mg/kg	50.9		0.0921	0.368
On-Site	90	Beryllium	mg/kg	0.259		0.0184	0.0921
On-Site	90	Cadmium	mg/kg	0.148	J	0.0184	0.184
On-Site	90	Calcium	mg/kg	984		6.41	19.4
On-Site	90	Chromium	mg/kg	4.7		0.184	0.552
On-Site	90	Cobalt	mg/kg	2.19		0.0552	0.184
On-Site	90	Copper	mg/kg	4.2		0.0608	0.184
On-Site	90	Iron	mg/kg	4560		6.08	18.4
On-Site	90	Lead	mg/kg	7.19		0.0921	0.368
On-Site	90	Magnesium	mg/kg	1370		1.84	5.52
On-Site	90	Manganese	mg/kg	130		0.184	0.921
On-Site	90	Nickel	mg/kg	4.28		0.0921	0.368
On-Site	90	Potassium	mg/kg	1360		14.7	55.2
On-Site	90	Selenium	mg/kg	0.321	J	0.32	0.971
On-Site	90	Silver	mg/kg	0.191	J	0.0921	0.46
On-Site	90	Sodium	mg/kg	28	J	14.7	46
On-Site	90	Thallium	mg/kg	0.0552	U	0.0552	0.368
On-Site	90	Vanadium	mg/kg	19.9		0.0921	0.46
On-Site	90	Zinc	mg/kg	21.1		0.368	1.84
On-Site	91	Aluminum	mg/kg	5240		2.78	9.28
On-Site	91	Antimony	mg/kg	0.304	U	0.304	0.921
On-Site	91	Arsenic	mg/kg	2.04		0.186	0.928
On-Site	91	Barium	mg/kg	83.8		0.0928	0.371
On-Site	91	Beryllium	mg/kg	0.38		0.0186	0.0928
On-Site	91	Cadmium	mg/kg	0.207		0.0186	0.186
On-Site	91	Calcium	mg/kg	15000		30.6	92.8
On-Site	91	Chromium	mg/kg	5.41		0.186	0.557
On-Site	91	Cobalt	mg/kg	4.94		0.0557	0.186
On-Site	91	Copper	mg/kg	6.63		0.0612	0.186
On-Site	91	Iron	mg/kg	11200		30.6	92.8
On-Site	91	Lead	mg/kg	14.1		0.0928	0.371
On-Site	91	Magnesium	mg/kg	2820		1.86	5.57
On-Site	91	Manganese	mg/kg	523		0.928	4.64

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	91	Nickel	mg/kg	9.23		0.0928	0.371
On-Site	91	Potassium	mg/kg	1120		14.8	55.7
On-Site	91	Selenium	mg/kg	0.298	U	0.298	0.903
On-Site	91	Silver	mg/kg	0.0921	U	0.0921	0.46
On-Site	91	Sodium	mg/kg	20.5	J	14.8	46.4
On-Site	91	Thallium	mg/kg	0.371		0.0557	0.371
On-Site	91	Vanadium	mg/kg	37.4		0.0921	0.46
On-Site	91	Zinc	mg/kg	39.7		0.371	1.86
On-Site	92	Aluminum	mg/kg	4610		2.63	8.76
On-Site	92	Antimony	mg/kg	0.298	U	0.298	0.904
On-Site	92	Arsenic	mg/kg	0.554	J	0.175	0.876
On-Site	92	Barium	mg/kg	52		0.0876	0.35
On-Site	92	Beryllium	mg/kg	0.294		0.0175	0.0876
On-Site	92	Cadmium	mg/kg	0.159	J	0.0175	0.175
On-Site	92	Calcium	mg/kg	1130		6.29	19
On-Site	92	Chromium	mg/kg	4.48		0.175	0.525
On-Site	92	Cobalt	mg/kg	2.25		0.0525	0.175
On-Site	92	Copper	mg/kg	4.55		0.0578	0.175
On-Site	92	Iron	mg/kg	4250		5.78	17.5
On-Site	92	Lead	mg/kg	7.63		0.0876	0.35
On-Site	92	Magnesium	mg/kg	1330		1.75	5.25
On-Site	92	Manganese	mg/kg	131		0.175	0.876
On-Site	92	Nickel	mg/kg	4.12		0.0876	0.35
On-Site	92	Potassium	mg/kg	1070		14	52.5
On-Site	92	Selenium	mg/kg	0.398	J	0.314	0.952
On-Site	92	Silver	mg/kg	0.155	J	0.0904	0.452
On-Site	92	Sodium	mg/kg	26.4	J	14	43.8
On-Site	92	Thallium	mg/kg	0.0525	U	0.0525	0.35
On-Site	92	Vanadium	mg/kg	19.9		0.0904	0.452
On-Site	92	Zinc	mg/kg	21.5		0.35	1.75
Perimeter	4	Aluminum	mg/kg	8510		2.63	8.76
Perimeter	4	Antimony	mg/kg	0.279	U	0.279	0.845
Perimeter	4	Arsenic	mg/kg	3.47		0.175	0.876
Perimeter	4	Barium	mg/kg	172		0.0876	0.35
Perimeter	4	Beryllium	mg/kg	0.315		0.0175	0.0876
Perimeter	4	Cadmium	mg/kg	0.12	J	0.0175	0.175
Perimeter	4	Calcium	mg/kg	43200		57.8	175
Perimeter	4	Chromium	mg/kg	6.83		0.175	0.525

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	4	Cobalt	mg/kg	2.69		0.0525	0.175
Perimeter	4	Copper	mg/kg	5.44		0.0578	0.175
Perimeter	4	Iron	mg/kg	6320		5.78	17.5
Perimeter	4	Lead	mg/kg	5.58		0.0876	0.35
Perimeter	4	Magnesium	mg/kg	4280		1.75	5.25
Perimeter	4	Manganese	mg/kg	90.5		0.175	0.876
Perimeter	4	Nickel	mg/kg	6.16		0.0876	0.35
Perimeter	4	Potassium	mg/kg	2070		14	52.5
Perimeter	4	Selenium	mg/kg	0.289	U	0.289	0.876
Perimeter	4	Silver	mg/kg	0.0845	U	0.0845	0.422
Perimeter	4	Sodium	mg/kg	57.6		14	43.8
Perimeter	4	Thallium	mg/kg	0.0625	J	0.0525	0.35
Perimeter	4	Vanadium	mg/kg	13		0.0845	0.422
Perimeter	4	Zinc	mg/kg	20.7		0.35	1.75
Perimeter	5	Aluminum	mg/kg	5580		2.95	9.82
Perimeter	5	Antimony	mg/kg	0.308	U	0.308	0.935
Perimeter	5	Arsenic	mg/kg	0.842	J	0.196	0.982
Perimeter	5	Barium	mg/kg	40.6		0.0982	0.393
Perimeter	5	Beryllium	mg/kg	0.231		0.0196	0.0982
Perimeter	5	Cadmium	mg/kg	0.109	J	0.0196	0.196
Perimeter	5	Calcium	mg/kg	871		6.48	19.6
Perimeter	5	Chromium	mg/kg	4.55		0.196	0.589
Perimeter	5	Cobalt	mg/kg	1.73		0.0589	0.196
Perimeter	5	Copper	mg/kg	3.72		0.0648	0.196
Perimeter	5	Iron	mg/kg	4540		6.48	19.6
Perimeter	5	Lead	mg/kg	5.54		0.0982	0.393
Perimeter	5	Magnesium	mg/kg	1260		1.96	5.89
Perimeter	5	Manganese	mg/kg	96.1		0.196	0.982
Perimeter	5	Nickel	mg/kg	3.43		0.0982	0.393
Perimeter	5	Potassium	mg/kg	1320		15.7	58.9
Perimeter	5	Selenium	mg/kg	0.324	U	0.324	0.982
Perimeter	5	Silver	mg/kg	0.0935	U	0.0935	0.467
Perimeter	5	Sodium	mg/kg	15.7	U	15.7	49.1
Perimeter	5	Thallium	mg/kg	0.0589	U	0.0589	0.393
Perimeter	5	Vanadium	mg/kg	5.66		0.0935	0.467
Perimeter	5	Zinc	mg/kg	16.9		0.393	1.96
Perimeter	12	Aluminum	mg/kg	7510		2.83	9.43
Perimeter	12	Antimony	mg/kg	0.328	U	0.328	0.994

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	12	Arsenic	mg/kg	1.31		0.189	0.943
Perimeter	12	Barium	mg/kg	117		0.0943	0.377
Perimeter	12	Beryllium	mg/kg	0.431		0.0189	0.0943
Perimeter	12	Cadmium	mg/kg	0.267		0.0189	0.189
Perimeter	12	Calcium	mg/kg	6030		6.36	19.3
Perimeter	12	Chromium	mg/kg	6.24		0.189	0.566
Perimeter	12	Cobalt	mg/kg	4.42		0.0566	0.189
Perimeter	12	Copper	mg/kg	10.8		0.0623	0.189
Perimeter	12	Iron	mg/kg	6610		6.23	18.9
Perimeter	12	Lead	mg/kg	14.1		0.0943	0.377
Perimeter	12	Magnesium	mg/kg	2740		1.89	5.66
Perimeter	12	Manganese	mg/kg	320		0.943	4.72
Perimeter	12	Nickel	mg/kg	7.04		0.0943	0.377
Perimeter	12	Potassium	mg/kg	1640		15.1	56.6
Perimeter	12	Selenium	mg/kg	0.318	U	0.318	0.963
Perimeter	12	Silver	mg/kg	0.25	J	0.0994	0.497
Perimeter	12	Sodium	mg/kg	44.9	J	15.1	47.2
Perimeter	12	Thallium	mg/kg	0.0877	J	0.0566	0.377
Perimeter	12	Vanadium	mg/kg	30.2		0.0994	0.497
Perimeter	12	Zinc	mg/kg	48.2		0.377	1.89
Perimeter	16	Aluminum	mg/kg	10800		14.4	48
Perimeter	16	Antimony	mg/kg	0.316	U	0.316	0.958
Perimeter	16	Arsenic	mg/kg	1.29		0.192	0.96
Perimeter	16	Barium	mg/kg	96.8		0.096	0.384
Perimeter	16	Beryllium	mg/kg	0.643		0.096	0.48
Perimeter	16	Cadmium	mg/kg	0.196		0.0192	0.192
Perimeter	16	Calcium	mg/kg	8080		6.23	18.9
Perimeter	16	Chromium	mg/kg	6.42		0.192	0.576
Perimeter	16	Cobalt	mg/kg	5.63		0.0576	0.192
Perimeter	16	Copper	mg/kg	9.94		0.0633	0.192
Perimeter	16	Iron	mg/kg	12500		31.7	96
Perimeter	16	Lead	mg/kg	9.55		0.096	0.384
Perimeter	16	Magnesium	mg/kg	5680		9.6	28.8
Perimeter	16	Manganese	mg/kg	365		0.96	4.8
Perimeter	16	Nickel	mg/kg	8.49		0.096	0.384
Perimeter	16	Potassium	mg/kg	2650		15.4	57.6
Perimeter	16	Selenium	mg/kg	0.311	U	0.311	0.943
Perimeter	16	Silver	mg/kg	0.0959	J	0.0958	0.479

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	16	Sodium	mg/kg	43.2	J	15.4	48
Perimeter	16	Thallium	mg/kg	0.141	J	0.0576	0.384
Perimeter	16	Vanadium	mg/kg	40.3		0.0958	0.479
Perimeter	16	Zinc	mg/kg	49.2		0.384	1.92
Perimeter	19	Aluminum	mg/kg	7010		2.74	9.12
Perimeter	19	Antimony	mg/kg	0.33	U	0.33	1
Perimeter	19	Arsenic	mg/kg	1.16		0.182	0.912
Perimeter	19	Barium	mg/kg	80.9		0.0912	0.365
Perimeter	19	Beryllium	mg/kg	0.334		0.0182	0.0912
Perimeter	19	Cadmium	mg/kg	0.229		0.0182	0.182
Perimeter	19	Calcium	mg/kg	2700		6.06	18.3
Perimeter	19	Chromium	mg/kg	10.7		0.182	0.547
Perimeter	19	Cobalt	mg/kg	4.37		0.0547	0.182
Perimeter	19	Copper	mg/kg	9.26		0.0602	0.182
Perimeter	19	Iron	mg/kg	7300		6.02	18.2
Perimeter	19	Lead	mg/kg	15.9		0.0912	0.365
Perimeter	19	Magnesium	mg/kg	3080		1.82	5.47
Perimeter	19	Manganese	mg/kg	246		0.912	4.56
Perimeter	19	Nickel	mg/kg	10.1		0.0912	0.365
Perimeter	19	Potassium	mg/kg	1550		14.6	54.7
Perimeter	19	Selenium	mg/kg	0.567	J	0.303	0.917
Perimeter	19	Silver	mg/kg	0.269	J	0.1	0.5
Perimeter	19	Sodium	mg/kg	76.8		14.6	45.6
Perimeter	19	Thallium	mg/kg	0.101	J	0.0547	0.365
Perimeter	19	Vanadium	mg/kg	25.9		0.1	0.5
Perimeter	19	Zinc	mg/kg	35.9		0.365	1.82
Perimeter	58	Aluminum	mg/kg	10600		13.3	44.2
Perimeter	58	Antimony	mg/kg	0.5	J	0.319	0.967
Perimeter	58	Arsenic	mg/kg	2.99		0.177	0.885
Perimeter	58	Barium	mg/kg	129		0.0885	0.354
Perimeter	58	Beryllium	mg/kg	0.465		0.0177	0.0885
Perimeter	58	Cadmium	mg/kg	0.206		0.0177	0.177
Perimeter	58	Calcium	mg/kg	35400		29.6	89.8
Perimeter	58	Chromium	mg/kg	7.02		0.177	0.531
Perimeter	58	Cobalt	mg/kg	4.46		0.0531	0.177
Perimeter	58	Copper	mg/kg	11.5		0.0584	0.177
Perimeter	58	Iron	mg/kg	10200		29.2	88.5
Perimeter	58	Lead	mg/kg	5890		0.885	3.54

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	58	Magnesium	mg/kg	5160		8.85	26.5
Perimeter	58	Manganese	mg/kg	217		0.885	4.42
Perimeter	58	Nickel	mg/kg	8.16		0.0885	0.354
Perimeter	58	Potassium	mg/kg	2740		14.2	53.1
Perimeter	58	Selenium	mg/kg	0.296	U	0.296	0.898
Perimeter	58	Silver	mg/kg	0.0967	U	0.0967	0.484
Perimeter	58	Sodium	mg/kg	49.4		14.2	44.2
Perimeter	58	Thallium	mg/kg	0.13	J	0.0531	0.354
Perimeter	58	Vanadium	mg/kg	34.8		0.0967	0.484
Perimeter	58	Zinc	mg/kg	44		0.354	1.77
Perimeter	59	Aluminum	mg/kg	4670		2.6	8.68
Perimeter	59	Antimony	mg/kg	0.293	U	0.293	0.887
Perimeter	59	Arsenic	mg/kg	0.938		0.174	0.868
Perimeter	59	Barium	mg/kg	99.3		0.0868	0.347
Perimeter	59	Beryllium	mg/kg	0.263		0.0174	0.0868
Perimeter	59	Cadmium	mg/kg	0.352		0.0174	0.174
Perimeter	59	Calcium	mg/kg	32000		57.3	174
Perimeter	59	Chromium	mg/kg	4.11		0.174	0.521
Perimeter	59	Cobalt	mg/kg	2.42		0.0521	0.174
Perimeter	59	Copper	mg/kg	6.88		0.0573	0.174
Perimeter	59	Iron	mg/kg	4210		5.73	17.4
Perimeter	59	Lead	mg/kg	16.4		0.0868	0.347
Perimeter	59	Magnesium	mg/kg	2310		1.74	5.21
Perimeter	59	Manganese	mg/kg	140		0.174	0.868
Perimeter	59	Nickel	mg/kg	4.69		0.0868	0.347
Perimeter	59	Potassium	mg/kg	1360		13.9	52.1
Perimeter	59	Selenium	mg/kg	0.302	U	0.302	0.914
Perimeter	59	Silver	mg/kg	0.163	J	0.0887	0.443
Perimeter	59	Sodium	mg/kg	35.2	J	13.9	43.4
Perimeter	59	Thallium	mg/kg	0.0609	J	0.0521	0.347
Perimeter	59	Vanadium	mg/kg	27		0.0887	0.443
Perimeter	59	Zinc	mg/kg	29.2		0.347	1.74
Perimeter	61	Aluminum	mg/kg	4470		2.88	9.62
Perimeter	61	Antimony	mg/kg	0.297	U	0.297	0.899
Perimeter	61	Arsenic	mg/kg	2.38		0.192	0.962
Perimeter	61	Barium	mg/kg	121		0.0962	0.385
Perimeter	61	Beryllium	mg/kg	0.246		0.0192	0.0962
Perimeter	61	Cadmium	mg/kg	0.215		0.0192	0.192

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	61	Calcium	mg/kg	22700		63.5	192
Perimeter	61	Chromium	mg/kg	4.22		0.192	0.577
Perimeter	61	Cobalt	mg/kg	1.95		0.0577	0.192
Perimeter	61	Copper	mg/kg	6.8		0.0635	0.192
Perimeter	61	Iron	mg/kg	4560		6.35	19.2
Perimeter	61	Lead	mg/kg	8.04		0.0962	0.385
Perimeter	61	Magnesium	mg/kg	2240		1.92	5.77
Perimeter	61	Manganese	mg/kg	94.5		0.192	0.962
Perimeter	61	Nickel	mg/kg	3.8		0.0962	0.385
Perimeter	61	Potassium	mg/kg	1090		15.4	57.7
Perimeter	61	Selenium	mg/kg	0.317	U	0.317	0.962
Perimeter	61	Silver	mg/kg	0.0899	U	0.0899	0.45
Perimeter	61	Sodium	mg/kg	53.9		15.4	48.1
Perimeter	61	Thallium	mg/kg	0.0577	U	0.0577	0.385
Perimeter	61	Vanadium	mg/kg	18.7		0.0899	0.45
Perimeter	61	Zinc	mg/kg	22.2		0.385	1.92
Perimeter	63	Aluminum	mg/kg	7120		2.97	9.9
Perimeter	63	Antimony	mg/kg	0.317	U	0.317	0.96
Perimeter	63	Arsenic	mg/kg	1.59		0.198	0.99
Perimeter	63	Barium	mg/kg	117		0.099	0.396
Perimeter	63	Beryllium	mg/kg	0.445		0.0198	0.099
Perimeter	63	Cadmium	mg/kg	0.211		0.0198	0.198
Perimeter	63	Calcium	mg/kg	23500		60.1	182
Perimeter	63	Chromium	mg/kg	7.83		0.198	0.594
Perimeter	63	Cobalt	mg/kg	4.31		0.0594	0.198
Perimeter	63	Copper	mg/kg	6.79		0.0653	0.198
Perimeter	63	Iron	mg/kg	7280		6.53	19.8
Perimeter	63	Lead	mg/kg	8.74		0.099	0.396
Perimeter	63	Magnesium	mg/kg	2670		1.98	5.94
Perimeter	63	Manganese	mg/kg	283		1.98	9.9
Perimeter	63	Nickel	mg/kg	8.83		0.099	0.396
Perimeter	63	Potassium	mg/kg	1340		15.8	59.4
Perimeter	63	Selenium	mg/kg	0.301	U	0.301	0.911
Perimeter	63	Silver	mg/kg	0.096	U	0.096	0.48
Perimeter	63	Sodium	mg/kg	44.3	J	15.8	49.5
Perimeter	63	Thallium	mg/kg	0.0661	J	0.0594	0.396
Perimeter	63	Vanadium	mg/kg	25.8		0.096	0.48
Perimeter	63	Zinc	mg/kg	27.2		0.396	1.98

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	64	Aluminum	mg/kg	14700		14.3	47.8
Perimeter	64	Antimony	mg/kg	0.312	U	0.312	0.945
Perimeter	64	Arsenic	mg/kg	1.69		0.191	0.956
Perimeter	64	Barium	mg/kg	113		0.0956	0.382
Perimeter	64	Beryllium	mg/kg	0.476		0.0191	0.0956
Perimeter	64	Cadmium	mg/kg	0.379		0.0191	0.191
Perimeter	64	Calcium	mg/kg	9510		29.6	89.8
Perimeter	64	Chromium	mg/kg	7.01		0.191	0.574
Perimeter	64	Cobalt	mg/kg	8.01		0.0574	0.191
Perimeter	64	Copper	mg/kg	12.4		0.0631	0.191
Perimeter	64	Iron	mg/kg	25200		31.5	95.6
Perimeter	64	Lead	mg/kg	10.5		0.0956	0.382
Perimeter	64	Magnesium	mg/kg	7380		1.91	5.74
Perimeter	64	Manganese	mg/kg	905		0.956	4.78
Perimeter	64	Nickel	mg/kg	10.9		0.0956	0.382
Perimeter	64	Potassium	mg/kg	3360		76.5	287
Perimeter	64	Selenium	mg/kg	0.296	U	0.296	0.898
Perimeter	64	Silver	mg/kg	0.0945	U	0.0945	0.473
Perimeter	64	Sodium	mg/kg	47.2	J	15.3	47.8
Perimeter	64	Thallium	mg/kg	0.101	J	0.0574	0.382
Perimeter	64	Vanadium	mg/kg	43.9		0.0945	0.473
Perimeter	64	Zinc	mg/kg	85.1		0.382	1.91
Perimeter	80	Aluminum	mg/kg	7490		2.7	9.01
Perimeter	80	Antimony	mg/kg	0.3	U	0.3	0.909
Perimeter	80	Arsenic	mg/kg	1.5		0.18	0.901
Perimeter	80	Barium	mg/kg	115		0.0901	0.36
Perimeter	80	Beryllium	mg/kg	0.398		0.018	0.0901
Perimeter	80	Cadmium	mg/kg	0.321		0.018	0.18
Perimeter	80	Calcium	mg/kg	75700		161	487
Perimeter	80	Chromium	mg/kg	8.93		0.18	0.541
Perimeter	80	Cobalt	mg/kg	3.86		0.0541	0.18
Perimeter	80	Copper	mg/kg	6.57		0.0595	0.18
Perimeter	80	Iron	mg/kg	7510		5.95	18
Perimeter	80	Lead	mg/kg	7.54		0.0901	0.36
Perimeter	80	Magnesium	mg/kg	3270		1.8	5.41
Perimeter	80	Manganese	mg/kg	297		1.8	9.01
Perimeter	80	Nickel	mg/kg	9.95		0.0901	0.36
Perimeter	80	Potassium	mg/kg	1510		14.4	54.1

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	80	Selenium	mg/kg	0.322	U	0.322	0.975
Perimeter	80	Silver	mg/kg	0.0909	U	0.0909	0.455
Perimeter	80	Sodium	mg/kg	48.5		14.4	45
Perimeter	80	Thallium	mg/kg	0.0641	J	0.0541	0.36
Perimeter	80	Vanadium	mg/kg	21.8		0.0909	0.455
Perimeter	80	Zinc	mg/kg	31.6		0.36	1.8
Perimeter	81	Aluminum	mg/kg	6630		2.89	9.63
Perimeter	81	Antimony	mg/kg	0.327	U	0.327	0.992
Perimeter	81	Arsenic	mg/kg	1.13		0.193	0.963
Perimeter	81	Barium	mg/kg	57.4		0.0963	0.385
Perimeter	81	Beryllium	mg/kg	0.338		0.0193	0.0963
Perimeter	81	Cadmium	mg/kg	0.189	J	0.0193	0.193
Perimeter	81	Calcium	mg/kg	1260		6.36	19.3
Perimeter	81	Chromium	mg/kg	5.85		0.193	0.578
Perimeter	81	Cobalt	mg/kg	2.85		0.0578	0.193
Perimeter	81	Copper	mg/kg	5.55		0.0636	0.193
Perimeter	81	Iron	mg/kg	6090		6.36	19.3
Perimeter	81	Lead	mg/kg	8.68		0.0963	0.385
Perimeter	81	Magnesium	mg/kg	1870		1.93	5.78
Perimeter	81	Manganese	mg/kg	175		0.193	0.963
Perimeter	81	Nickel	mg/kg	5.36		0.0963	0.385
Perimeter	81	Potassium	mg/kg	1930		15.4	57.8
Perimeter	81	Selenium	mg/kg	0.471	J	0.301	0.912
Perimeter	81	Silver	mg/kg	0.239	J	0.0992	0.496
Perimeter	81	Sodium	mg/kg	25	J	15.4	48.2
Perimeter	81	Thallium	mg/kg	0.0881	J	0.0578	0.385
Perimeter	81	Vanadium	mg/kg	17.8		0.0992	0.496
Perimeter	81	Zinc	mg/kg	22.3		0.385	1.93
Perimeter	82	Aluminum	mg/kg	6840		2.92	9.73
Perimeter	82	Antimony	mg/kg	0.32	U	0.32	0.969
Perimeter	82	Arsenic	mg/kg	2.2		0.195	0.973
Perimeter	82	Barium	mg/kg	159		0.0973	0.389
Perimeter	82	Beryllium	mg/kg	0.337		0.0195	0.0973
Perimeter	82	Cadmium	mg/kg	0.162	J	0.0195	0.195
Perimeter	82	Calcium	mg/kg	52200		64.2	195
Perimeter	82	Chromium	mg/kg	5.25		0.195	0.584
Perimeter	82	Cobalt	mg/kg	3.77		0.0584	0.195
Perimeter	82	Copper	mg/kg	6.6		0.0642	0.195

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	82	Iron	mg/kg	6710		6.42	19.5
Perimeter	82	Lead	mg/kg	7.22		0.0973	0.389
Perimeter	82	Magnesium	mg/kg	3550		1.95	5.84
Perimeter	82	Manganese	mg/kg	173		0.195	0.973
Perimeter	82	Nickel	mg/kg	7.61		0.0973	0.389
Perimeter	82	Potassium	mg/kg	1720		15.6	58.4
Perimeter	82	Selenium	mg/kg	0.322	U	0.322	0.975
Perimeter	82	Silver	mg/kg	0.0969	U	0.0969	0.484
Perimeter	82	Sodium	mg/kg	79.4		15.6	48.6
Perimeter	82	Thallium	mg/kg	0.101	J	0.0584	0.389
Perimeter	82	Vanadium	mg/kg	33.7		0.0969	0.484
Perimeter	82	Zinc	mg/kg	32.7		0.389	1.95
Perimeter	88	Aluminum	mg/kg	3240		2.82	9.4
Perimeter	88	Antimony	mg/kg	0.329	U	0.329	0.996
Perimeter	88	Arsenic	mg/kg	0.905	J	0.188	0.94
Perimeter	88	Barium	mg/kg	30		0.094	0.376
Perimeter	88	Beryllium	mg/kg	0.154		0.0188	0.094
Perimeter	88	Cadmium	mg/kg	0.0594	J	0.0188	0.188
Perimeter	88	Calcium	mg/kg	588		6.2	18.8
Perimeter	88	Chromium	mg/kg	3.17		0.188	0.564
Perimeter	88	Cobalt	mg/kg	1.36		0.0564	0.188
Perimeter	88	Copper	mg/kg	2.01		0.062	0.188
Perimeter	88	Iron	mg/kg	3600		6.2	18.8
Perimeter	88	Lead	mg/kg	3.44		0.094	0.376
Perimeter	88	Magnesium	mg/kg	768		1.88	5.64
Perimeter	88	Manganese	mg/kg	72.5		0.188	0.94
Perimeter	88	Nickel	mg/kg	2.34		0.094	0.376
Perimeter	88	Potassium	mg/kg	704		15	56.4
Perimeter	88	Selenium	mg/kg	0.31	U	0.31	0.94
Perimeter	88	Silver	mg/kg	0.124	J	0.0996	0.498
Perimeter	88	Sodium	mg/kg	15	U	15	47
Perimeter	88	Thallium	mg/kg	0.059	J	0.0564	0.376
Perimeter	88	Vanadium	mg/kg	11.6		0.0996	0.498
Perimeter	88	Zinc	mg/kg	10.7		0.376	1.88
Perimeter	89	Aluminum	mg/kg	6010		2.91	9.69
Perimeter	89	Antimony	mg/kg	0.308	U	0.308	0.933
Perimeter	89	Arsenic	mg/kg	1.41		0.194	0.969
Perimeter	89	Barium	mg/kg	102		0.0969	0.388

TABLE C-6. Non-radiological Results by Location for Calendar Year 2012, Soil

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	89	Beryllium	mg/kg	0.281		0.0194	0.0969
Perimeter	89	Cadmium	mg/kg	0.147	J	0.0194	0.194
Perimeter	89	Calcium	mg/kg	15400		64	194
Perimeter	89	Chromium	mg/kg	4.95		0.194	0.581
Perimeter	89	Cobalt	mg/kg	2.3		0.0581	0.194
Perimeter	89	Copper	mg/kg	4.24		0.064	0.194
Perimeter	89	Iron	mg/kg	5940		6.4	19.4
Perimeter	89	Lead	mg/kg	5.67		0.0969	0.388
Perimeter	89	Magnesium	mg/kg	2340		1.94	5.81
Perimeter	89	Manganese	mg/kg	118		0.194	0.969
Perimeter	89	Nickel	mg/kg	4.23		0.0969	0.388
Perimeter	89	Potassium	mg/kg	1400		15.5	58.1
Perimeter	89	Selenium	mg/kg	0.32	U	0.32	0.969
Perimeter	89	Silver	mg/kg	0.0933	U	0.0933	0.466
Perimeter	89	Sodium	mg/kg	116		15.5	48.4
Perimeter	89	Thallium	mg/kg	0.0609	J	0.0581	0.388
Perimeter	89	Vanadium	mg/kg	18.8		0.0933	0.466
Perimeter	89	Zinc	mg/kg	49.8		0.388	1.94

NOTES:

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
MDL = Method detection limit.
mg/kg = milligram per kilogram
PQL = Practical quantitation limit.
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	8	Aluminum	mg/kg	4040		2.8	9.33
Community	8	Antimony	mg/kg	0.304	U	0.304	0.921
Community	8	Arsenic	mg/kg	2.36		0.187	0.933
Community	8	Barium	mg/kg	119		0.0933	0.373
Community	8	Beryllium	mg/kg	0.286		0.0187	0.0933
Community	8	Cadmium	mg/kg	0.14	J	0.0187	0.187
Community	8	Calcium	mg/kg	12600		61.6	187
Community	8	Chromium	mg/kg	3.25		0.187	0.56
Community	8	Cobalt	mg/kg	2.28		0.056	0.187
Community	8	Copper	mg/kg	4.13		0.0616	0.187
Community	8	Iron	mg/kg	4570		6.16	18.7
Community	8	Lead	mg/kg	4.74		0.0933	0.373
Community	8	Magnesium	mg/kg	2200		1.87	5.6
Community	8	Manganese	mg/kg	197		1.87	9.33
Community	8	Nickel	mg/kg	4.08		0.0933	0.373
Community	8	Potassium	mg/kg	947		14.9	56
Community	8	Selenium	mg/kg	0.308	U	0.308	0.933
Community	8	Silver	mg/kg	0.0921	U	0.0921	0.46
Community	8	Sodium	mg/kg	156		14.9	46.6
Community	8	Thallium	mg/kg	0.064	J	0.056	0.373
Community	8	Vanadium	mg/kg	9.88		0.0921	0.46
Community	8	Zinc	mg/kg	15.3		0.373	1.87
Community	11	Aluminum	mg/kg	3180		2.92	9.73
Community	11	Aluminum	mg/kg	5020		2.99	9.98
Community	11	Aluminum	mg/kg	5210		2.66	8.87
Community	11	Antimony	mg/kg	0.303	U	0.303	0.919
Community	11	Antimony	mg/kg	0.307	U	0.307	0.929
Community	11	Antimony	mg/kg	0.325	U	0.325	0.984
Community	11	Arsenic	mg/kg	1.06		0.2	0.998
Community	11	Arsenic	mg/kg	1.26		0.195	0.973
Community	11	Arsenic	mg/kg	1.38		0.177	0.887
Community	11	Barium	mg/kg	75.8		0.0998	0.399
Community	11	Barium	mg/kg	94.6		0.0887	0.355
Community	11	Barium	mg/kg	109		0.0973	0.389
Community	11	Beryllium	mg/kg	0.185		0.0195	0.0973
Community	11	Beryllium	mg/kg	0.242		0.02	0.0998
Community	11	Beryllium	mg/kg	0.26		0.0177	0.0887
Community	11	Cadmium	mg/kg	0.095	J	0.02	0.2

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Cadmium	mg/kg	0.102	J	0.0195	0.195
Community	11	Cadmium	mg/kg	0.116	J	0.0177	0.177
Community	11	Calcium	mg/kg	7410		6.42	19.5
Community	11	Calcium	mg/kg	11000		32.9	99.8
Community	11	Calcium	mg/kg	15200		58.5	177
Community	11	Chromium	mg/kg	3.29		0.195	0.584
Community	11	Chromium	mg/kg	3.57		0.2	0.599
Community	11	Chromium	mg/kg	4.12		0.177	0.532
Community	11	Cobalt	mg/kg	1.97		0.0584	0.195
Community	11	Cobalt	mg/kg	2.1		0.0599	0.2
Community	11	Cobalt	mg/kg	2.27		0.0532	0.177
Community	11	Copper	mg/kg	3.11		0.0642	0.195
Community	11	Copper	mg/kg	4.3		0.0659	0.2
Community	11	Copper	mg/kg	5.43		0.0585	0.177
Community	11	Iron	mg/kg	4420		6.42	19.5
Community	11	Iron	mg/kg	4660		6.59	20
Community	11	Iron	mg/kg	4690		5.85	17.7
Community	11	Lead	mg/kg	3.99		0.0973	0.389
Community	11	Lead	mg/kg	6.02		0.0998	0.399
Community	11	Lead	mg/kg	10.8		0.0887	0.355
Community	11	Magnesium	mg/kg	1680		1.95	5.84
Community	11	Magnesium	mg/kg	2000		2	5.99
Community	11	Magnesium	mg/kg	2350		1.77	5.32
Community	11	Manganese	mg/kg	117		0.2	0.998
Community	11	Manganese	mg/kg	127		0.177	0.887
Community	11	Manganese	mg/kg	153		0.195	0.973
Community	11	Nickel	mg/kg	3.21		0.0973	0.389
Community	11	Nickel	mg/kg	4.15		0.0998	0.399
Community	11	Nickel	mg/kg	4.65		0.0887	0.355
Community	11	Potassium	mg/kg	918		15.6	58.4
Community	11	Potassium	mg/kg	980		16	59.9
Community	11	Potassium	mg/kg	1120		14.2	53.2
Community	11	Selenium	mg/kg	0.293	U	0.293	0.887
Community	11	Selenium	mg/kg	0.321	U	0.321	0.973
Community	11	Selenium	mg/kg	0.329	U	0.329	0.998
Community	11	Silver	mg/kg	0.0919	U	0.0919	0.46
Community	11	Silver	mg/kg	0.0929	U	0.0929	0.465
Community	11	Silver	mg/kg	0.0985	J	0.0984	0.492

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Sodium	mg/kg	102		15.6	48.6
Community	11	Sodium	mg/kg	142		14.2	44.3
Community	11	Sodium	mg/kg	394		39.9	125
Community	11	Thallium	mg/kg	0.0584	U	0.0584	0.389
Community	11	Thallium	mg/kg	0.0667	J	0.0599	0.399
Community	11	Thallium	mg/kg	0.0801	J	0.0532	0.355
Community	11	Vanadium	mg/kg	14.7		0.0929	0.465
Community	11	Vanadium	mg/kg	14.9		0.0984	0.492
Community	11	Vanadium	mg/kg	20.3		0.0919	0.46
Community	11	Zinc	mg/kg	13.3		0.389	1.95
Community	11	Zinc	mg/kg	14.9		0.399	2
Community	11	Zinc	mg/kg	19.2		0.355	1.77
Community	68	Aluminum	mg/kg	6310		2.62	8.74
Community	68	Antimony	mg/kg	0.307	U	0.307	0.931
Community	68	Arsenic	mg/kg	5.77		0.175	0.874
Community	68	Barium	mg/kg	152		0.0874	0.35
Community	68	Beryllium	mg/kg	0.399		0.0175	0.0874
Community	68	Cadmium	mg/kg	0.271		0.0175	0.175
Community	68	Calcium	mg/kg	74700		57.7	175
Community	68	Chromium	mg/kg	8		0.175	0.524
Community	68	Cobalt	mg/kg	3.92		0.0524	0.175
Community	68	Copper	mg/kg	5.22		0.0577	0.175
Community	68	Iron	mg/kg	8150		5.77	17.5
Community	68	Lead	mg/kg	11.3		0.0874	0.35
Community	68	Magnesium	mg/kg	3050		1.75	5.24
Community	68	Manganese	mg/kg	356		1.75	8.74
Community	68	Nickel	mg/kg	9.03		0.0874	0.35
Community	68	Potassium	mg/kg	1210		14	52.4
Community	68	Selenium	mg/kg	0.288	U	0.288	0.874
Community	68	Silver	mg/kg	0.0931	U	0.0931	0.466
Community	68	Sodium	mg/kg	41.7	J	14	43.7
Community	68	Thallium	mg/kg	0.0914	J	0.0524	0.35
Community	68	Vanadium	mg/kg	23.3		0.0931	0.466
Community	68	Zinc	mg/kg	23		0.35	1.75
On-Site	72	Aluminum	mg/kg	38300		27.7	92.4
On-Site	72	Antimony	mg/kg	0.322	U	0.322	0.975
On-Site	72	Arsenic	mg/kg	11		0.185	0.924
On-Site	72	Barium	mg/kg	331		0.924	3.7

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	72	Beryllium	mg/kg	1.97		0.0924	0.462
On-Site	72	Cadmium	mg/kg	0.448		0.0185	0.185
On-Site	72	Calcium	mg/kg	79700		61	185
On-Site	72	Chromium	mg/kg	19.2		0.185	0.555
On-Site	72	Cobalt	mg/kg	7.67		0.0555	0.185
On-Site	72	Copper	mg/kg	16.8		0.061	0.185
On-Site	72	Iron	mg/kg	24900		61	185
On-Site	72	Lead	mg/kg	19.9		0.0924	0.37
On-Site	72	Magnesium	mg/kg	13000		18.5	55.5
On-Site	72	Manganese	mg/kg	447		1.85	9.24
On-Site	72	Nickel	mg/kg	17.7		0.0924	0.37
On-Site	72	Potassium	mg/kg	5280		14.8	55.5
On-Site	72	Selenium	mg/kg	0.305	U	0.305	0.924
On-Site	72	Silver	mg/kg	0.0975	U	0.0975	0.487
On-Site	72	Sodium	mg/kg	340		73.9	231
On-Site	72	Thallium	mg/kg	0.284	J	0.0555	0.37
On-Site	72	Vanadium	mg/kg	39.6		0.0975	0.487
On-Site	72	Zinc	mg/kg	76		0.37	1.85
On-Site	74N	Aluminum	mg/kg	3370		2.61	8.71
On-Site	74N	Antimony	mg/kg	0.29	U	0.29	0.879
On-Site	74N	Arsenic	mg/kg	0.99		0.174	0.871
On-Site	74N	Barium	mg/kg	42.2		0.0871	0.348
On-Site	74N	Beryllium	mg/kg	0.186		0.0174	0.0871
On-Site	74N	Cadmium	mg/kg	0.155	J	0.0174	0.174
On-Site	74N	Calcium	mg/kg	25700		57.5	174
On-Site	74N	Chromium	mg/kg	5.78		0.174	0.523
On-Site	74N	Cobalt	mg/kg	3.81		0.0523	0.174
On-Site	74N	Copper	mg/kg	9.74		0.0575	0.174
On-Site	74N	Iron	mg/kg	15100		57.5	174
On-Site	74N	Lead	mg/kg	6.54		0.0871	0.348
On-Site	74N	Magnesium	mg/kg	2110		1.74	5.23
On-Site	74N	Manganese	mg/kg	168		0.174	0.871
On-Site	74N	Nickel	mg/kg	4.95		0.0871	0.348
On-Site	74N	Potassium	mg/kg	728		13.9	52.3
On-Site	74N	Selenium	mg/kg	0.287	U	0.287	0.871
On-Site	74N	Silver	mg/kg	0.709		0.0879	0.439
On-Site	74N	Sodium	mg/kg	41.1	J	13.9	43.6
On-Site	74N	Thallium	mg/kg	0.0523	U	0.0523	0.348

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	74N	Vanadium	mg/kg	78.9		0.0879	0.439
On-Site	74N	Zinc	mg/kg	21.6		0.348	1.74
On-Site	75	Aluminum	mg/kg	4600		2.99	9.98
On-Site	75	Antimony	mg/kg	0.316	U	0.316	0.958
On-Site	75	Arsenic	mg/kg	3.28		0.2	0.998
On-Site	75	Barium	mg/kg	89.4		0.0998	0.399
On-Site	75	Beryllium	mg/kg	0.349		0.02	0.0998
On-Site	75	Cadmium	mg/kg	0.197	J	0.02	0.2
On-Site	75	Calcium	mg/kg	34300		65.9	200
On-Site	75	Chromium	mg/kg	9.39		0.2	0.599
On-Site	75	Cobalt	mg/kg	5.87		0.0599	0.2
On-Site	75	Copper	mg/kg	10.5		0.0659	0.2
On-Site	75	Iron	mg/kg	16400		65.9	200
On-Site	75	Lead	mg/kg	15.7		0.0998	0.399
On-Site	75	Magnesium	mg/kg	2790		2	5.99
On-Site	75	Manganese	mg/kg	471		2	9.98
On-Site	75	Nickel	mg/kg	8.76		0.0998	0.399
On-Site	75	Potassium	mg/kg	791		16	59.9
On-Site	75	Selenium	mg/kg	0.329	U	0.329	0.998
On-Site	75	Silver	mg/kg	1.58	J	0.479	2.39
On-Site	75	Sodium	mg/kg	49.2	J	16	49.9
On-Site	75	Thallium	mg/kg	0.0854	J	0.0599	0.399
On-Site	75	Vanadium	mg/kg	219		0.479	2.39
On-Site	75	Zinc	mg/kg	26.8		0.399	2
On-Site	79	Aluminum	mg/kg	5810		2.71	9.03
On-Site	79	Antimony	mg/kg	0.721	J	0.284	0.862
On-Site	79	Arsenic	mg/kg	1.86		0.181	0.903
On-Site	79	Barium	mg/kg	74.1		0.0903	0.361
On-Site	79	Beryllium	mg/kg	0.298		0.0181	0.0903
On-Site	79	Cadmium	mg/kg	0.377		0.0181	0.181
On-Site	79	Calcium	mg/kg	179000		149	451
On-Site	79	Chromium	mg/kg	10.7		0.181	0.542
On-Site	79	Cobalt	mg/kg	2.52		0.0542	0.181
On-Site	79	Copper	mg/kg	5.33		0.0596	0.181
On-Site	79	Iron	mg/kg	6830		5.96	18.1
On-Site	79	Lead	mg/kg	5.5		0.0903	0.361
On-Site	79	Magnesium	mg/kg	4850		1.81	5.42
On-Site	79	Manganese	mg/kg	287		4.51	22.6

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	79	Nickel	mg/kg	12.3		0.0903	0.361
On-Site	79	Potassium	mg/kg	915		14.4	54.2
On-Site	79	Selenium	mg/kg	0.298	U	0.298	0.903
On-Site	79	Silver	mg/kg	0.0862	U	0.0862	0.431
On-Site	79	Sodium	mg/kg	53.9		14.4	45.1
On-Site	79	Thallium	mg/kg	0.0735	J	0.0542	0.361
On-Site	79	Vanadium	mg/kg	14		0.0862	0.431
On-Site	79	Zinc	mg/kg	20.2		0.361	1.81
On-Site	83	Aluminum	mg/kg	9480		2.88	9.62
On-Site	83	Antimony	mg/kg	0.315	U	0.315	0.956
On-Site	83	Arsenic	mg/kg	2.26		0.192	0.962
On-Site	83	Barium	mg/kg	158		0.0962	0.385
On-Site	83	Beryllium	mg/kg	0.403		0.0192	0.0962
On-Site	83	Cadmium	mg/kg	0.288		0.0192	0.192
On-Site	83	Calcium	mg/kg	33300		63.5	192
On-Site	83	Chromium	mg/kg	8.92		0.192	0.577
On-Site	83	Cobalt	mg/kg	5.37		0.0577	0.192
On-Site	83	Copper	mg/kg	11		0.0635	0.192
On-Site	83	Iron	mg/kg	14000		63.5	192
On-Site	83	Lead	mg/kg	13.5		0.0962	0.385
On-Site	83	Magnesium	mg/kg	4900		1.92	5.77
On-Site	83	Manganese	mg/kg	358		1.92	9.62
On-Site	83	Nickel	mg/kg	9.77		0.0962	0.385
On-Site	83	Potassium	mg/kg	4550		15.4	57.7
On-Site	83	Selenium	mg/kg	0.317	U	0.317	0.962
On-Site	83	Silver	mg/kg	0.545		0.0956	0.478
On-Site	83	Sodium	mg/kg	57.2		15.4	48.1
On-Site	83	Thallium	mg/kg	0.197	J	0.0577	0.385
On-Site	83	Vanadium	mg/kg	24.9		0.0956	0.478
On-Site	83	Zinc	mg/kg	45.5		0.385	1.92
On-Site	84	Aluminum	mg/kg	17700		29.6	98.6
On-Site	84	Antimony	mg/kg	0.32	U	0.32	0.971
On-Site	84	Arsenic	mg/kg	3.22		0.197	0.986
On-Site	84	Barium	mg/kg	229		0.986	3.94
On-Site	84	Beryllium	mg/kg	0.796		0.0197	0.0986
On-Site	84	Cadmium	mg/kg	0.394		0.0197	0.197
On-Site	84	Calcium	mg/kg	57800		65.1	197
On-Site	84	Chromium	mg/kg	13.7		0.197	0.592

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	84	Cobalt	mg/kg	7.99		0.0592	0.197
On-Site	84	Copper	mg/kg	17.6		0.0651	0.197
On-Site	84	Iron	mg/kg	16800		65.1	197
On-Site	84	Lead	mg/kg	20.5		0.0986	0.394
On-Site	84	Magnesium	mg/kg	6360		1.97	5.92
On-Site	84	Manganese	mg/kg	519		1.97	9.86
On-Site	84	Nickel	mg/kg	15.1		0.0986	0.394
On-Site	84	Potassium	mg/kg	3250		15.8	59.2
On-Site	84	Selenium	mg/kg	1.04		0.297	0.901
On-Site	84	Silver	mg/kg	0.0971	U	0.0971	0.485
On-Site	84	Sodium	mg/kg	87.8		15.8	49.3
On-Site	84	Thallium	mg/kg	0.21	J	0.0592	0.394
On-Site	84	Vanadium	mg/kg	35.7		0.0971	0.485
On-Site	84	Zinc	mg/kg	60.7		0.394	1.97
On-Site	85	Aluminum	mg/kg	14600		27.6	92.1
On-Site	85	Antimony	mg/kg	0.328	U	0.328	0.994
On-Site	85	Arsenic	mg/kg	3.12		0.184	0.921
On-Site	85	Barium	mg/kg	158		0.0921	0.368
On-Site	85	Beryllium	mg/kg	0.531		0.0184	0.0921
On-Site	85	Cadmium	mg/kg	0.341		0.0184	0.184
On-Site	85	Calcium	mg/kg	59400		60.8	184
On-Site	85	Chromium	mg/kg	12.6		0.184	0.552
On-Site	85	Cobalt	mg/kg	5.09		0.0552	0.184
On-Site	85	Copper	mg/kg	10.7		0.0608	0.184
On-Site	85	Iron	mg/kg	13000		60.8	184
On-Site	85	Lead	mg/kg	11.6		0.0921	0.368
On-Site	85	Magnesium	mg/kg	4180		1.84	5.52
On-Site	85	Manganese	mg/kg	308		1.84	9.21
On-Site	85	Nickel	mg/kg	12.1		0.0921	0.368
On-Site	85	Potassium	mg/kg	2280		14.7	55.2
On-Site	85	Selenium	mg/kg	0.304	U	0.304	0.921
On-Site	85	Silver	mg/kg	0.0994	U	0.0994	0.497
On-Site	85	Sodium	mg/kg	55.8		14.7	46
On-Site	85	Thallium	mg/kg	0.103	J	0.0552	0.368
On-Site	85	Vanadium	mg/kg	20.3		0.0994	0.497
On-Site	85	Zinc	mg/kg	41.7		0.368	1.84
Perimeter	60	Aluminum	mg/kg	5570		2.91	9.69
Perimeter	60	Aluminum	mg/kg	9010		2.96	9.88

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	60	Antimony	mg/kg	0.31	U	0.31	0.938
Perimeter	60	Antimony	mg/kg	0.321	U	0.321	0.973
Perimeter	60	Arsenic	mg/kg	1.03		0.194	0.969
Perimeter	60	Arsenic	mg/kg	2.54		0.198	0.988
Perimeter	60	Barium	mg/kg	85.9		0.0969	0.388
Perimeter	60	Barium	mg/kg	122		0.0988	0.395
Perimeter	60	Beryllium	mg/kg	0.262		0.0194	0.0969
Perimeter	60	Beryllium	mg/kg	0.477		0.0198	0.0988
Perimeter	60	Cadmium	mg/kg	0.103	J	0.0194	0.194
Perimeter	60	Cadmium	mg/kg	0.241		0.0198	0.198
Perimeter	60	Calcium	mg/kg	18000		32	96.9
Perimeter	60	Calcium	mg/kg	29700		65.2	198
Perimeter	60	Chromium	mg/kg	4.74		0.194	0.581
Perimeter	60	Chromium	mg/kg	8.15		0.198	0.593
Perimeter	60	Cobalt	mg/kg	2.92		0.0581	0.194
Perimeter	60	Cobalt	mg/kg	4.52		0.0593	0.198
Perimeter	60	Copper	mg/kg	5.15		0.064	0.194
Perimeter	60	Copper	mg/kg	7.85		0.0652	0.198
Perimeter	60	Iron	mg/kg	7790		6.4	19.4
Perimeter	60	Iron	mg/kg	12100		65.2	198
Perimeter	60	Lead	mg/kg	4.18		0.0969	0.388
Perimeter	60	Lead	mg/kg	7.82		0.0988	0.395
Perimeter	60	Magnesium	mg/kg	2710		9.69	29.1
Perimeter	60	Magnesium	mg/kg	3790		1.98	5.93
Perimeter	60	Manganese	mg/kg	164		0.194	0.969
Perimeter	60	Manganese	mg/kg	266		1.98	9.88
Perimeter	60	Nickel	mg/kg	4.93		0.0969	0.388
Perimeter	60	Nickel	mg/kg	8.43		0.0988	0.395
Perimeter	60	Potassium	mg/kg	1420		15.5	58.1
Perimeter	60	Potassium	mg/kg	3030		15.8	59.3
Perimeter	60	Selenium	mg/kg	0.32	U	0.32	0.969
Perimeter	60	Selenium	mg/kg	0.326	U	0.326	0.988
Perimeter	60	Silver	mg/kg	0.0938	U	0.0938	0.469
Perimeter	60	Silver	mg/kg	0.257	J	0.0973	0.486
Perimeter	60	Sodium	mg/kg	44	J	15.8	49.4
Perimeter	60	Sodium	mg/kg	76.4		15.5	48.4
Perimeter	60	Thallium	mg/kg	0.0913	J	0.0581	0.388
Perimeter	60	Thallium	mg/kg	0.119	J	0.0593	0.395

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	60	Vanadium	mg/kg	24.2		0.0938	0.469
Perimeter	60	Vanadium	mg/kg	25.1		0.0973	0.486
Perimeter	60	Zinc	mg/kg	22.4		0.388	1.94
Perimeter	60	Zinc	mg/kg	31.8		0.395	1.98
Perimeter	65	Aluminum	mg/kg	3840		2.68	8.93
Perimeter	65	Antimony	mg/kg	0.296	U	0.296	0.898
Perimeter	65	Arsenic	mg/kg	0.623	J	0.179	0.893
Perimeter	65	Barium	mg/kg	50.5		0.0893	0.357
Perimeter	65	Beryllium	mg/kg	0.222		0.0179	0.0893
Perimeter	65	Cadmium	mg/kg	0.12	J	0.0179	0.179
Perimeter	65	Calcium	mg/kg	6060		6.08	18.4
Perimeter	65	Chromium	mg/kg	2.84		0.179	0.536
Perimeter	65	Cobalt	mg/kg	2.91		0.0536	0.179
Perimeter	65	Copper	mg/kg	8.15		0.0589	0.179
Perimeter	65	Iron	mg/kg	5690		5.89	17.9
Perimeter	65	Lead	mg/kg	3.99		0.0893	0.357
Perimeter	65	Magnesium	mg/kg	2620		1.79	5.36
Perimeter	65	Manganese	mg/kg	161		0.179	0.893
Perimeter	65	Nickel	mg/kg	4.21		0.0893	0.357
Perimeter	65	Potassium	mg/kg	879		14.3	53.6
Perimeter	65	Selenium	mg/kg	0.304	U	0.304	0.921
Perimeter	65	Silver	mg/kg	0.0898	U	0.0898	0.449
Perimeter	65	Sodium	mg/kg	118		14.3	44.6
Perimeter	65	Thallium	mg/kg	0.0584	J	0.0536	0.357
Perimeter	65	Vanadium	mg/kg	15		0.0898	0.449
Perimeter	65	Zinc	mg/kg	23.6		0.357	1.79
Perimeter	73	Aluminum	mg/kg	5210		2.69	8.98
Perimeter	73	Antimony	mg/kg	0.307	U	0.307	0.931
Perimeter	73	Arsenic	mg/kg	0.885	J	0.18	0.898
Perimeter	73	Barium	mg/kg	68.2		0.0898	0.359
Perimeter	73	Beryllium	mg/kg	0.25		0.018	0.0898
Perimeter	73	Cadmium	mg/kg	0.151	J	0.018	0.18
Perimeter	73	Calcium	mg/kg	32800		148	449
Perimeter	73	Chromium	mg/kg	4.25		0.18	0.539
Perimeter	73	Cobalt	mg/kg	3.79		0.0539	0.18
Perimeter	73	Copper	mg/kg	6.29		0.0592	0.18
Perimeter	73	Iron	mg/kg	8630		5.92	18
Perimeter	73	Lead	mg/kg	5.64		0.0898	0.359

TABLE C-7. Non-radiological Results by Location for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	73	Magnesium	mg/kg	3520		1.8	5.39
Perimeter	73	Manganese	mg/kg	305		4.49	22.4
Perimeter	73	Nickel	mg/kg	5.93		0.0898	0.359
Perimeter	73	Potassium	mg/kg	1740		14.4	53.9
Perimeter	73	Selenium	mg/kg	0.296	U	0.296	0.898
Perimeter	73	Silver	mg/kg	0.173	J	0.0931	0.466
Perimeter	73	Sodium	mg/kg	39.1	J	14.4	44.9
Perimeter	73	Thallium	mg/kg	0.127	J	0.0539	0.359
Perimeter	73	Vanadium	mg/kg	17.6		0.0931	0.466
Perimeter	73	Zinc	mg/kg	30.7		0.359	1.8

NOTES:

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
MDL = Method detection limit.
mg/kg = milligram per kilogram
PQL = Practical quantitation limit.
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02NE	Aluminum	092112-002	mg/kg	7450.00		2.57	8.58
On-Site	02NE	Aluminum	092113-002	mg/kg	7030.00		2.94	9.78
On-Site	02NE	Aluminum	092114-002	mg/kg	7480.00		2.9	9.65
		Aluminum Average			7320.00			
		Aluminum StdDev			251.59			
		CV (%)			3.44			
On-Site	02NE	Antimony	092112-002	mg/kg	0.31	U	0.308	0.933
On-Site	02NE	Antimony	092113-002	mg/kg	0.31	U	0.307	0.929
On-Site	02NE	Antimony	092114-002	mg/kg	0.31	U	0.313	0.949
		Antimony Average			0.31			
		Antimony StdDev			0.00			
		CV (%)			1.04			
On-Site	02NE	Arsenic	092113-002	mg/kg	1.37		0.196	0.978
On-Site	02NE	Arsenic	092114-002	mg/kg	1.59		0.193	0.965
		Arsenic Average			1.33			
		Arsenic StdDev			0.28			
		CV (%)			20.80			
On-Site	02NE	Barium	092112-002	mg/kg	58.00		0.0858	0.343
On-Site	02NE	Barium	092113-002	mg/kg	58.50		0.0978	0.391
On-Site	02NE	Barium	092114-002	mg/kg	67.10		0.0965	0.386
		Barium Average			61.20			
		Barium StdDev			5.12			
		CV (%)			8.36			
On-Site	02NE	Beryllium	092112-002	mg/kg	0.34		0.0172	0.0858
On-Site	02NE	Beryllium	092113-002	mg/kg	0.32		0.0196	0.0978
On-Site	02NE	Beryllium	092114-002	mg/kg	0.34		0.0193	0.0965
		Beryllium Average			0.33			
		Beryllium StdDev			0.01			
		CV (%)			3.42			
On-Site	02NE	Cadmium	092112-002	mg/kg	0.26		0.0172	0.172
On-Site	02NE	Cadmium	092113-002	mg/kg	0.24		0.0196	0.196
On-Site	02NE	Cadmium	092114-002	mg/kg	0.22		0.0193	0.193
		Cadmium Average			0.24			
		Cadmium StdDev			0.02			
		CV (%)			8.70			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02NE	Calcium	092112-002	mg/kg	3470.00		5.66	17.2
On-Site	02NE	Calcium	092113-002	mg/kg	3540.00		6.46	19.6
On-Site	02NE	Calcium	092114-002	mg/kg	4780.00		6.37	19.3
		Calcium Average			3930.00			
		Calcium StdDev			736.95			
		CV (%)			18.75			
On-Site	02NE	Chromium	092112-002	mg/kg	6.19		0.172	0.515
On-Site	02NE	Chromium	092113-002	mg/kg	6.08		0.196	0.587
On-Site	02NE	Chromium	092114-002	mg/kg	6.05		0.193	0.579
		Chromium Average			6.11			
		Chromium StdDev			0.07			
		CV (%)			1.21			
On-Site	02NE	Cobalt	092112-002	mg/kg	2.45		0.0515	0.172
On-Site	02NE	Cobalt	092113-002	mg/kg	2.44		0.0587	0.196
On-Site	02NE	Cobalt	092114-002	mg/kg	2.72		0.0579	0.193
		Cobalt Average			2.54			
		Cobalt StdDev			0.16			
		CV (%)			6.26			
On-Site	02NE	Copper	092112-002	mg/kg	4.71		0.0566	0.172
On-Site	02NE	Copper	092113-002	mg/kg	4.80		0.0646	0.196
On-Site	02NE	Copper	092114-002	mg/kg	5.25		0.0637	0.193
		Copper Average			4.92			
		Copper StdDev			0.29			
		CV (%)			5.88			
On-Site	02NE	Iron	092112-002	mg/kg	6060.00		5.66	17.2
On-Site	02NE	Iron	092113-002	mg/kg	6190.00		6.46	19.6
On-Site	02NE	Iron	092114-002	mg/kg	6360.00		6.37	19.3
		Iron Average			6203.33			
		Iron StdDev			150.44			
		CV (%)			2.43			
On-Site	02NE	Lead	092112-002	mg/kg	6.14		0.0858	0.343
On-Site	02NE	Lead	092113-002	mg/kg	6.89		0.0978	0.391
On-Site	02NE	Lead	092114-002	mg/kg	6.45		0.0965	0.386
		Lead Average			6.49			
		Lead StdDev			0.38			
		CV (%)			5.80			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02NE	Magnesium	092112-002	mg/kg	1680.00		1.72	5.15
On-Site	02NE	Magnesium	092113-002	mg/kg	1660.00		1.96	5.87
On-Site	02NE	Magnesium	092114-002	mg/kg	1940.00		1.93	5.79
		Magnesium Average			1760.00			
		Magnesium StdDev			156.20			
		CV (%)			8.88			
On-Site	02NE	Manganese	092112-002	mg/kg	106.00		0.172	0.858
On-Site	02NE	Manganese	092113-002	mg/kg	114.00		0.196	0.978
On-Site	02NE	Manganese	092114-002	mg/kg	118.00		0.193	0.965
		Manganese Average			112.67			
		Manganese StdDev			6.11			
		CV (%)			5.42			
On-Site	02NE	Nickel	092112-002	mg/kg	5.44		0.0858	0.343
On-Site	02NE	Nickel	092113-002	mg/kg	5.15		0.0978	0.391
On-Site	02NE	Nickel	092114-002	mg/kg	5.39		0.0965	0.386
		Nickel Average			5.33			
		Nickel StdDev			0.16			
		CV (%)			2.91			
On-Site	02NE	Potassium	092112-002	mg/kg	1660.00		13.7	51.5
On-Site	02NE	Potassium	092113-002	mg/kg	1560.00		15.7	58.7
On-Site	02NE	Potassium	092114-002	mg/kg	1490.00		15.4	57.9
		Potassium Average			1570.00			
		Potassium StdDev			85.44			
		CV (%)			5.44			
On-Site	02NE	Selenium	092112-002	mg/kg	0.28	U	0.283	0.858
On-Site	02NE	Selenium	092113-002	mg/kg	0.32	U	0.323	0.978
On-Site	02NE	Selenium	092114-002	mg/kg	0.32	U	0.319	0.965
		Selenium Average			0.31			
		Selenium StdDev			0.02			
		CV (%)			7.14			
On-Site	02NE	Silver	092112-002	mg/kg	0.15	J	0.0933	0.466
On-Site	02NE	Silver	092113-002	mg/kg	0.17	J	0.0929	0.465
On-Site	02NE	Silver	092114-002	mg/kg	0.18	J	0.0949	0.474
		Silver Average			0.17			
		Silver StdDev			0.02			
		CV (%)			9.59			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	02NE	Sodium	092112-002	mg/kg	24.80	J	13.7	42.9
On-Site	02NE	Sodium	092113-002	mg/kg	36.70	J	15.7	48.9
On-Site	02NE	Sodium	092114-002	mg/kg	22.70	J	15.4	48.3
		Sodium Average			28.07			
		Sodium StdDev			7.55			
		CV (%)			26.90			
On-Site	02NE	Thallium	092112-002	mg/kg	0.06	J	0.0515	0.343
On-Site	02NE	Thallium	092113-002	mg/kg	0.06	J	0.0587	0.391
On-Site	02NE	Thallium	092114-002	mg/kg	0.06	J	0.0579	0.386
		Thallium Average			0.06			
		Thallium StdDev			0.00			
		CV (%)			2.01			
On-Site	02NE	Vanadium	092112-002	mg/kg	15.20		0.0933	0.466
On-Site	02NE	Vanadium	092113-002	mg/kg	18.10		0.0929	0.465
On-Site	02NE	Vanadium	092114-002	mg/kg	17.60		0.0949	0.474
		Vanadium Average			16.97			
		Vanadium StdDev			1.55			
		CV (%)			9.14			
On-Site	02NE	Zinc	092112-002	mg/kg	20.90		0.343	1.72
On-Site	02NE	Zinc	092113-002	mg/kg	21.30		0.391	1.96
On-Site	02NE	Zinc	092114-002	mg/kg	21.60		0.386	1.93
		Zinc Average			21.27			
		Zinc StdDev			0.35			
		CV (%)			1.65			
On-Site	33	Aluminum	092148-002	mg/kg	12300.00		27.4	91.2
On-Site	33	Aluminum	092149-002	mg/kg	9560.00		2.89	9.63
On-Site	33	Aluminum	092150-002	mg/kg	9570.00		2.95	9.82
		Aluminum Average			10476.67			
		Aluminum StdDev			1579.06			
		CV (%)			15.07			
On-Site	33	Antimony	092148-002	mg/kg	0.31	U	0.305	0.924
On-Site	33	Antimony	092149-002	mg/kg	0.30	U	0.302	0.916
On-Site	33	Antimony	092150-002	mg/kg	0.30	U	0.303	0.919
		Antimony Average			0.30			
		Antimony StdDev			0.00			
		CV (%)			0.50			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	33	Arsenic	092148-002	mg/kg	4.99		0.182	0.912
On-Site	33	Arsenic	092149-002	mg/kg	5.02		0.193	0.963
On-Site	33	Arsenic	092150-002	mg/kg	6.10		0.196	0.982
		Arsenic Average			5.37			
		Arsenic StdDev			0.63			
		CV (%)			11.78			
On-Site	33	Barium	092148-002	mg/kg	120.00		0.0912	0.365
On-Site	33	Barium	092149-002	mg/kg	113.00		0.0963	0.385
On-Site	33	Barium	092150-002	mg/kg	104.00		0.0982	0.393
		Barium Average			112.33			
		Barium StdDev			8.02			
		CV (%)			7.14			
On-Site	33	Beryllium	092148-002	mg/kg	0.80		0.0182	0.0912
On-Site	33	Beryllium	092149-002	mg/kg	0.79		0.0193	0.0963
On-Site	33	Beryllium	092150-002	mg/kg	1.03		0.0196	0.0982
		Beryllium Average			0.87			
		Beryllium StdDev			0.14			
		CV (%)			15.50			
On-Site	33	Cadmium	092148-002	mg/kg	0.39		0.0182	0.182
On-Site	33	Cadmium	092149-002	mg/kg	0.38		0.0193	0.193
On-Site	33	Cadmium	092150-002	mg/kg	0.35		0.0196	0.196
		Cadmium Average			0.37			
		Cadmium StdDev			0.02			
		CV (%)			5.61			
On-Site	33	Calcium	092148-002	mg/kg	50500.00		60.2	182
On-Site	33	Calcium	092149-002	mg/kg	52000.00		63.6	193
On-Site	33	Calcium	092150-002	mg/kg	46000.00		64.8	196
		Calcium Average			49500.00			
		Calcium StdDev			3122.50			
		CV (%)			6.31			
On-Site	33	Chromium	092148-002	mg/kg	10.60		0.182	0.547
On-Site	33	Chromium	092149-002	mg/kg	10.10		0.193	0.578
On-Site	33	Chromium	092150-002	mg/kg	8.97		0.196	0.589
		Chromium Average			9.89			
		Chromium StdDev			0.84			
		CV (%)			8.44			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	33	Cobalt	092148-002	mg/kg	5.26		0.0547	0.182
On-Site	33	Cobalt	092149-002	mg/kg	4.97		0.0578	0.193
On-Site	33	Cobalt	092150-002	mg/kg	6.05		0.0589	0.196
		Cobalt Average			5.43			
		Cobalt StdDev			0.56			
		CV (%)			10.30			
On-Site	33	Copper	092148-002	mg/kg	10.20		0.0602	0.182
On-Site	33	Copper	092149-002	mg/kg	9.47		0.0636	0.193
On-Site	33	Copper	092150-002	mg/kg	9.06		0.0648	0.196
		Copper Average			9.58			
		Copper StdDev			0.58			
		CV (%)			6.03			
On-Site	33	Iron	092148-002	mg/kg	13500.00		60.2	182
On-Site	33	Iron	092149-002	mg/kg	12600.00		63.6	193
On-Site	33	Iron	092150-002	mg/kg	12300.00		64.8	196
		Iron Average			12800.00			
		Iron StdDev			624.50			
		CV (%)			4.88			
On-Site	33	Lead	092148-002	mg/kg	12.60		0.0912	0.365
On-Site	33	Lead	092149-002	mg/kg	12.10		0.0963	0.385
On-Site	33	Lead	092150-002	mg/kg	12.10		0.0982	0.393
		Lead Average			12.27			
		Lead StdDev			0.29			
		CV (%)			2.35			
On-Site	33	Magnesium	092148-002	mg/kg	4650.00		1.82	5.47
On-Site	33	Magnesium	092149-002	mg/kg	4480.00		1.93	5.78
On-Site	33	Magnesium	092150-002	mg/kg	4310.00		1.96	5.89
		Magnesium Average			4480.00			
		Magnesium StdDev			170.00			
		CV (%)			3.79			
On-Site	33	Manganese	092148-002	mg/kg	375.00		1.82	9.12
On-Site	33	Manganese	092149-002	mg/kg	328.00		1.93	9.63
On-Site	33	Manganese	092150-002	mg/kg	397.00		1.96	9.82
		Manganese Average			366.67			
		Manganese StdDev			35.25			
		CV (%)			9.61			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	33	Nickel	092148-002	mg/kg	11.50		0.0912	0.365
On-Site	33	Nickel	092149-002	mg/kg	10.80		0.0963	0.385
On-Site	33	Nickel	092150-002	mg/kg	11.20		0.0982	0.393
		Nickel Average			11.17			
		Nickel StdDev			0.35			
		CV (%)			3.14			
On-Site	33	Potassium	092148-002	mg/kg	2880.00		14.6	54.7
On-Site	33	Potassium	092149-002	mg/kg	2740.00		15.4	57.8
On-Site	33	Potassium	092150-002	mg/kg	2640.00		15.7	58.9
		Potassium Average			2753.33			
		Potassium StdDev			120.55			
		CV (%)			4.38			
On-Site	33	Selenium	092148-002	mg/kg	0.35	J	0.301	0.912
On-Site	33	Selenium	092149-002	mg/kg	0.32	U	0.318	0.963
On-Site	33	Selenium	092150-002	mg/kg	0.32	U	0.324	0.982
		Selenium Average			0.33			
		Selenium StdDev			0.02			
		CV (%)			5.81			
On-Site	33	Silver	092148-002	mg/kg	0.09	U	0.0924	0.462
On-Site	33	Silver	092149-002	mg/kg	0.09	U	0.0916	0.458
On-Site	33	Silver	092150-002	mg/kg	0.09	U	0.0919	0.46
		Silver Average			0.09			
		Silver StdDev			0.00			
		CV (%)			0.44			
On-Site	33	Sodium	092148-002	mg/kg	86.40		14.6	45.6
On-Site	33	Sodium	092149-002	mg/kg	105.00		15.4	48.2
On-Site	33	Sodium	092150-002	mg/kg	98.30		15.7	49.1
		Sodium Average			96.57			
		Sodium StdDev			9.42			
		CV (%)			9.76			
On-Site	33	Thallium	092148-002	mg/kg	0.13	J	0.0547	0.365
On-Site	33	Thallium	092149-002	mg/kg	0.13	J	0.0578	0.385
On-Site	33	Thallium	092150-002	mg/kg	0.15	J	0.0589	0.393
		Thallium Average			0.14			
		Thallium StdDev			0.01			
		CV (%)			5.79			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	33	Vanadium	092148-002	mg/kg	27.20		0.0924	0.462
On-Site	33	Vanadium	092149-002	mg/kg	19.00		0.0916	0.458
On-Site	33	Vanadium	092150-002	mg/kg	25.50		0.0919	0.46
		Vanadium Average			23.90			
		Vanadium StdDev			4.33			
		CV (%)			18.11			
On-Site	33	Zinc	092148-002	mg/kg	59.70		0.365	1.82
On-Site	33	Zinc	092149-002	mg/kg	57.50		0.385	1.93
On-Site	33	Zinc	092150-002	mg/kg	56.50		0.393	1.96
		Zinc Average			57.90			
		Zinc StdDev			1.64			
		CV (%)			2.83			
On-Site	53	Aluminum	092105-002	mg/kg	5570.00		2.71	9.04
On-Site	53	Aluminum	092106-002	mg/kg	5240.00		2.74	9.12
On-Site	53	Aluminum	092107-002	mg/kg	5050.00		2.54	8.46
		Aluminum Average			5286.67			
		Aluminum StdDev			263.12			
		CV (%)			4.98			
On-Site	53	Antimony	092105-002	mg/kg	0.32	U	0.322	0.977
On-Site	53	Antimony	092106-002	mg/kg	0.30	U	0.301	0.912
On-Site	53	Antimony	092107-002	mg/kg	0.32	U	0.316	0.958
		Antimony Average			0.31			
		Antimony StdDev			0.01			
		CV (%)			3.46			
On-Site	53	Arsenic	092105-002	mg/kg	0.95		0.181	0.904
On-Site	53	Arsenic	092106-002	mg/kg	0.64	J	0.182	0.912
On-Site	53	Arsenic	092107-002	mg/kg	0.80	J	0.169	0.846
		Arsenic Average			0.79			
		Arsenic StdDev			0.16			
		CV (%)			19.83			
On-Site	53	Barium	092105-002	mg/kg	61.10		0.0904	0.362
On-Site	53	Barium	092106-002	mg/kg	53.40		0.0912	0.365
On-Site	53	Barium	092107-002	mg/kg	63.90		0.0846	0.338
		Barium Average			59.47			
		Barium StdDev			5.44			
		CV (%)			9.14			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	53	Beryllium	092105-002	mg/kg	0.30		0.0181	0.0904
On-Site	53	Beryllium	092106-002	mg/kg	0.25		0.0182	0.0912
On-Site	53	Beryllium	092107-002	mg/kg	0.31		0.0169	0.0846
		Beryllium Average			0.29			
		Beryllium StdDev			0.04			
		CV (%)			12.57			
On-Site	53	Cadmium	092105-002	mg/kg	0.12	J	0.0181	0.181
On-Site	53	Cadmium	092106-002	mg/kg	0.32		0.0182	0.182
On-Site	53	Cadmium	092107-002	mg/kg	0.12	J	0.0169	0.169
		Cadmium Average			0.19			
		Cadmium StdDev			0.11			
		CV (%)			61.55			
On-Site	53	Calcium	092105-002	mg/kg	3700.00		6.21	18.8
On-Site	53	Calcium	092106-002	mg/kg	2920.00		6.4	19.4
On-Site	53	Calcium	092107-002	mg/kg	3260.00		6.37	19.3
		Calcium Average			3293.33			
		Calcium StdDev			391.07			
		CV (%)			11.87			
On-Site	53	Chromium	092105-002	mg/kg	4.73		0.181	0.542
On-Site	53	Chromium	092106-002	mg/kg	4.28		0.182	0.547
On-Site	53	Chromium	092107-002	mg/kg	4.36		0.169	0.508
		Chromium Average			4.46			
		Chromium StdDev			0.24			
		CV (%)			5.39			
On-Site	53	Cobalt	092105-002	mg/kg	2.52		0.0542	0.181
On-Site	53	Cobalt	092106-002	mg/kg	2.38		0.0547	0.182
On-Site	53	Cobalt	092107-002	mg/kg	2.42		0.0508	0.169
		Cobalt Average			2.44			
		Cobalt StdDev			0.07			
		CV (%)			2.96			
On-Site	53	Copper	092105-002	mg/kg	4.76		0.0597	0.181
On-Site	53	Copper	092106-002	mg/kg	4.22		0.0602	0.182
On-Site	53	Copper	092107-002	mg/kg	4.61		0.0558	0.169
		Copper Average			4.53			
		Copper StdDev			0.28			
		CV (%)			6.15			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	53	Iron	092105-002	mg/kg	4710.00		5.97	18.1
On-Site	53	Iron	092106-002	mg/kg	4230.00		6.02	18.2
On-Site	53	Iron	092107-002	mg/kg	4240.00		5.58	16.9
		Iron Average			4393.33			
		Iron StdDev			274.29			
		CV (%)			6.24			
On-Site	53	Lead	092105-002	mg/kg	7.60		0.0904	0.362
On-Site	53	Lead	092106-002	mg/kg	6.40		0.0912	0.365
On-Site	53	Lead	092107-002	mg/kg	8.99		0.0846	0.338
		Lead Average			7.66			
		Lead StdDev			1.30			
		CV (%)			16.91			
On-Site	53	Magnesium	092105-002	mg/kg	1540.00		1.81	5.42
On-Site	53	Magnesium	092106-002	mg/kg	1490.00		1.82	5.47
On-Site	53	Magnesium	092107-002	mg/kg	1440.00		1.69	5.08
		Magnesium Average			1490.00			
		Magnesium StdDev			50.00			
		CV (%)			3.36			
On-Site	53	Manganese	092105-002	mg/kg	107.00		0.181	0.904
On-Site	53	Manganese	092106-002	mg/kg	96.00		0.182	0.912
On-Site	53	Manganese	092107-002	mg/kg	102.00		0.169	0.846
		Manganese Average			101.67			
		Manganese StdDev			5.51			
		CV (%)			5.42			
On-Site	53	Nickel	092105-002	mg/kg	4.73		0.0904	0.362
On-Site	53	Nickel	092106-002	mg/kg	4.32		0.0912	0.365
On-Site	53	Nickel	092107-002	mg/kg	4.58		0.0846	0.338
		Nickel Average			4.54			
		Nickel StdDev			0.21			
		CV (%)			4.57			
On-Site	53	Potassium	092105-002	mg/kg	1210.00		14.5	54.2
On-Site	53	Potassium	092106-002	mg/kg	1070.00		14.6	54.7
On-Site	53	Potassium	092107-002	mg/kg	1120.00		13.5	50.8
		Potassium Average			1133.33			
		Potassium StdDev			70.95			
		CV (%)			6.26			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	53	Selenium	092105-002	mg/kg	0.38	J	0.311	0.942
On-Site	53	Selenium	092106-002	mg/kg	0.32	U	0.32	0.969
On-Site	53	Selenium	092107-002	mg/kg	0.32	U	0.319	0.965
		Selenium Average			0.34			
		Selenium StdDev			0.03			
		CV (%)			9.48			
On-Site	53	Silver	092105-002	mg/kg	0.16	J	0.0977	0.488
On-Site	53	Silver	092106-002	mg/kg	0.18	J	0.0912	0.456
On-Site	53	Silver	092107-002	mg/kg	0.15	J	0.0958	0.479
		Silver Average			0.16			
		Silver StdDev			0.01			
		CV (%)			7.99			
On-Site	53	Sodium	092105-002	mg/kg	20.20	J	14.5	45.2
On-Site	53	Sodium	092106-002	mg/kg	25.50	J	14.6	45.6
On-Site	53	Sodium	092107-002	mg/kg	23.20	J	13.5	42.3
		Sodium Average			22.97			
		Sodium StdDev			2.66			
		CV (%)			11.57			
On-Site	53	Thallium	092105-002	mg/kg	0.05	U	0.0542	0.362
On-Site	53	Thallium	092106-002	mg/kg	0.05	U	0.0547	0.365
On-Site	53	Thallium	092107-002	mg/kg	0.05	J	0.0508	0.338
		Thallium Average			0.05			
		Thallium StdDev			0.00			
		CV (%)			3.66			
On-Site	53	Vanadium	092105-002	mg/kg	16.90		0.0977	0.488
On-Site	53	Vanadium	092106-002	mg/kg	18.10		0.0912	0.456
On-Site	53	Vanadium	092107-002	mg/kg	18.30		0.0958	0.479
		Vanadium Average			17.77			
		Vanadium StdDev			0.76			
		CV (%)			4.26			
On-Site	53	Zinc	092105-002	mg/kg	17.40		0.362	1.81
On-Site	53	Zinc	092106-002	mg/kg	17.50		0.365	1.82
On-Site	53	Zinc	092107-002	mg/kg	17.10		0.338	1.69
		Zinc Average			17.33			
		Zinc StdDev			0.21			
		CV (%)			1.20			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	64	Aluminum	092163-002	mg/kg	14700.00		14.3	47.8
Perimeter	64	Aluminum	092164-002	mg/kg	12300.00		14	46.6
Perimeter	64	Aluminum	092165-002	mg/kg	12300.00		14.9	49.8
		Aluminum Average			13100.00			
		Aluminum StdDev			1385.64			
		CV (%)			10.58			
Perimeter	64	Antimony	092163-002	mg/kg	0.31	U	0.312	0.945
Perimeter	64	Antimony	092164-002	mg/kg	0.31	U	0.309	0.936
Perimeter	64	Antimony	092165-002	mg/kg	0.31	U	0.308	0.933
		Antimony Average			0.31			
		Antimony StdDev			0.00			
		CV (%)			0.67			
Perimeter	64	Arsenic	092163-002	mg/kg	1.69		0.191	0.956
Perimeter	64	Arsenic	092164-002	mg/kg	1.95		0.186	0.931
Perimeter	64	Arsenic	092165-002	mg/kg	1.79		0.199	0.996
		Arsenic Average			1.81			
		Arsenic StdDev			0.13			
		CV (%)			7.25			
Perimeter	64	Barium	092163-002	mg/kg	113.00		0.0956	0.382
Perimeter	64	Barium	092164-002	mg/kg	113.00		0.0931	0.372
Perimeter	64	Barium	092165-002	mg/kg	100.00		0.0996	0.398
		Barium Average			108.67			
		Barium StdDev			7.51			
		CV (%)			6.91			
Perimeter	64	Beryllium	092163-002	mg/kg	0.48		0.0191	0.0956
Perimeter	64	Beryllium	092164-002	mg/kg	0.49		0.0186	0.0931
Perimeter	64	Beryllium	092165-002	mg/kg	0.52		0.0199	0.0996
		Beryllium Average			0.50			
		Beryllium StdDev			0.02			
		CV (%)			4.71			
Perimeter	64	Cadmium	092163-002	mg/kg	0.38		0.0191	0.191
Perimeter	64	Cadmium	092164-002	mg/kg	0.36		0.0186	0.186
Perimeter	64	Cadmium	092165-002	mg/kg	0.36		0.0199	0.199
		Cadmium Average			0.37			
		Cadmium StdDev			0.01			
		CV (%)			2.75			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	64	Calcium	092163-002	mg/kg	9510.00		29.6	89.8
Perimeter	64	Calcium	092164-002	mg/kg	18000.00		32.3	97.8
Perimeter	64	Calcium	092165-002	mg/kg	104000.00		160	484
		Calcium Average			43836.67			
		Calcium StdDev			52275.62			
		CV (%)			119.25			
Perimeter	64	Chromium	092163-002	mg/kg	7.01		0.191	0.574
Perimeter	64	Chromium	092164-002	mg/kg	5.62		0.186	0.559
Perimeter	64	Chromium	092165-002	mg/kg	5.80		0.199	0.598
		Chromium Average			6.14			
		Chromium StdDev			0.76			
		CV (%)			12.30			
Perimeter	64	Cobalt	092163-002	mg/kg	8.01		0.0574	0.191
Perimeter	64	Cobalt	092164-002	mg/kg	8.34		0.0559	0.186
Perimeter	64	Cobalt	092165-002	mg/kg	7.83		0.0598	0.199
		Cobalt Average			8.06			
		Cobalt StdDev			0.26			
		CV (%)			3.21			
Perimeter	64	Copper	092163-002	mg/kg	12.40		0.0631	0.191
Perimeter	64	Copper	092164-002	mg/kg	12.40		0.0615	0.186
Perimeter	64	Copper	092165-002	mg/kg	12.20		0.0657	0.199
		Copper Average			12.33			
		Copper StdDev			0.12			
		CV (%)			0.94			
Perimeter	64	Iron	092163-002	mg/kg	25200.00		31.5	95.6
Perimeter	64	Iron	092164-002	mg/kg	20200.00		30.7	93.1
Perimeter	64	Iron	092165-002	mg/kg	19700.00		32.9	99.6
		Iron Average			21700.00			
		Iron StdDev			3041.38			
		CV (%)			14.02			
Perimeter	64	Lead	092163-002	mg/kg	10.50		0.0956	0.382
Perimeter	64	Lead	092164-002	mg/kg	9.10		0.0931	0.372
Perimeter	64	Lead	092165-002	mg/kg	10.70		0.0996	0.398
		Lead Average			10.10			
		Lead StdDev			0.87			
		CV (%)			8.63			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	64	Magnesium	092163-002	mg/kg	7380.00		1.91	5.74
Perimeter	64	Magnesium	092164-002	mg/kg	7220.00		1.86	5.59
Perimeter	64	Magnesium	092165-002	mg/kg	9860.00		19.9	59.8
		Magnesium Average			8153.33			
		Magnesium StdDev			1480.18			
		CV (%)			18.15			
Perimeter	64	Manganese	092163-002	mg/kg	905.00		0.956	4.78
Perimeter	64	Manganese	092164-002	mg/kg	701.00		0.931	4.66
Perimeter	64	Manganese	092165-002	mg/kg	704.00		0.996	4.98
		Manganese Average			770.00			
		Manganese StdDev			116.92			
		CV (%)			15.18			
Perimeter	64	Nickel	092163-002	mg/kg	10.90		0.0956	0.382
Perimeter	64	Nickel	092164-002	mg/kg	9.19		0.0931	0.372
Perimeter	64	Nickel	092165-002	mg/kg	9.17		0.0996	0.398
		Nickel Average			9.75			
		Nickel StdDev			0.99			
		CV (%)			10.18			
Perimeter	64	Potassium	092163-002	mg/kg	3360.00		76.5	287
Perimeter	64	Potassium	092164-002	mg/kg	2630.00		74.5	279
Perimeter	64	Potassium	092165-002	mg/kg	2230.00		15.9	59.8
		Potassium Average			2740.00			
		Potassium StdDev			572.97			
		CV (%)			20.91			
Perimeter	64	Selenium	092163-002	mg/kg	0.30	U	0.296	0.898
Perimeter	64	Selenium	092164-002	mg/kg	0.32	U	0.323	0.978
Perimeter	64	Selenium	092165-002	mg/kg	0.32	U	0.319	0.967
		Selenium Average			0.31			
		Selenium StdDev			0.01			
		CV (%)			4.66			
Perimeter	64	Silver	092163-002	mg/kg	0.09	U	0.0945	0.473
Perimeter	64	Silver	092164-002	mg/kg	0.09	U	0.0936	0.468
Perimeter	64	Silver	092165-002	mg/kg	0.09	U	0.0933	0.466
		Silver Average			0.09			
		Silver StdDev			0.00			
		CV (%)			0.67			

TABLE C-8. Non-radiological Replicate Results for Calendar Year 2012, Soil

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Perimeter	64	Sodium	092163-002	mg/kg	47.20	J	15.3	47.8
Perimeter	64	Sodium	092164-002	mg/kg	48.90		14.9	46.6
Perimeter	64	Sodium	092165-002	mg/kg	63.60		15.9	49.8
		Sodium Average			53.23			
		Sodium StdDev			9.02			
		CV (%)			16.94			
Perimeter	64	Thallium	092163-002	mg/kg	0.10	J	0.0574	0.382
Perimeter	64	Thallium	092164-002	mg/kg	0.10	J	0.0559	0.372
Perimeter	64	Thallium	092165-002	mg/kg	0.16	J	0.0598	0.398
		Thallium Average			0.12			
		Thallium StdDev			0.03			
		CV (%)			28.44			
Perimeter	64	Vanadium	092163-002	mg/kg	43.90		0.0945	0.473
Perimeter	64	Vanadium	092164-002	mg/kg	48.70		0.0936	0.468
Perimeter	64	Vanadium	092165-002	mg/kg	59.30		0.0933	0.466
		Vanadium Average			50.63			
		Vanadium StdDev			7.88			
		CV (%)			15.56			
Perimeter	64	Zinc	092163-002	mg/kg	85.10		0.382	1.91
Perimeter	64	Zinc	092164-002	mg/kg	79.30		0.372	1.86
Perimeter	64	Zinc	092165-002	mg/kg	82.90		0.398	1.99
		Zinc Average			82.43			
		Zinc StdDev			2.93			
		CV (%)			3.55			

NOTES:

CV = coefficient of variation
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
MDL = Method detection limit.
mg/kg = milligram per kilogram
PQL = Practical quantitation limit.
Std Dev = standard deviation
U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Aluminum	092201-002	mg/kg	3180.00		2.92	9.73
Community	11	Aluminum	092202-002	mg/kg	2050.00		3	10
Community	11	Aluminum	092203-002	mg/kg	1880.00		2.92	9.73
Community	11	Aluminum	092207-002	mg/kg	5020.00		2.99	9.98
Community	11	Aluminum	092208-002	mg/kg	3720.00		2.96	9.88
Community	11	Aluminum	092209-002	mg/kg	9060.00		2.97	9.9
		Aluminum Average			4151.67			
		Aluminum StdDev			2666.60			
		CV (%)			64.23			
Community	11	Antimony	092201-002	mg/kg	0.31	U	0.307	0.929
Community	11	Antimony	092202-002	mg/kg	0.31	U	0.313	0.947
Community	11	Antimony	092203-002	mg/kg	0.30	U	0.301	0.911
Community	11	Antimony	092207-002	mg/kg	0.33	U	0.325	0.984
Community	11	Antimony	092208-002	mg/kg	0.31	U	0.307	0.929
Community	11	Antimony	092209-002	mg/kg	0.33	U	0.326	0.988
		Antimony Average			0.31			
		Antimony StdDev			0.01			
		CV (%)			3.28			
Community	11	Arsenic	092201-002	mg/kg	1.26		0.195	0.973
Community	11	Arsenic	092202-002	mg/kg	0.99	J	0.2	1
Community	11	Arsenic	092203-002	mg/kg	4.25		0.195	0.973
Community	11	Arsenic	092207-002	mg/kg	1.06		0.2	0.998
Community	11	Arsenic	092208-002	mg/kg	1.10		0.198	0.988
Community	11	Arsenic	092209-002	mg/kg	1.75		0.198	0.99
		Arsenic Average			1.74			
		Arsenic StdDev			1.26			
		CV (%)			72.72			
Community	11	Barium	092201-002	mg/kg	109.00		0.0973	0.389
Community	11	Barium	092202-002	mg/kg	47.90		0.1	0.4
Community	11	Barium	092203-002	mg/kg	45.70		0.0973	0.389
Community	11	Barium	092207-002	mg/kg	75.80		0.0998	0.399
Community	11	Barium	092208-002	mg/kg	59.00		0.0988	0.395
Community	11	Barium	092209-002	mg/kg	112.00		0.099	0.396
		Barium Average			74.90			
		Barium StdDev			29.58			
		CV (%)			39.49			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Beryllium	092201-002	mg/kg	0.19		0.0195	0.0973
Community	11	Beryllium	092202-002	mg/kg	0.13		0.02	0.1
Community	11	Beryllium	092203-002	mg/kg	0.12		0.0195	0.0973
Community	11	Beryllium	092207-002	mg/kg	0.24		0.02	0.0998
Community	11	Beryllium	092208-002	mg/kg	0.21		0.0198	0.0988
Community	11	Beryllium	092209-002	mg/kg	0.45		0.0198	0.099
		Beryllium Average			0.22			
		Beryllium StdDev			0.12			
		CV (%)			55.01			
Community	11	Cadmium	092201-002	mg/kg	0.10	J	0.0195	0.195
Community	11	Cadmium	092202-002	mg/kg	0.06	J	0.02	0.2
Community	11	Cadmium	092203-002	mg/kg	0.06	J	0.0195	0.195
Community	11	Cadmium	092207-002	mg/kg	0.10	J	0.02	0.2
Community	11	Cadmium	092208-002	mg/kg	0.10	J	0.0198	0.198
Community	11	Cadmium	092209-002	mg/kg	0.18	J	0.0198	0.198
		Cadmium Average			0.10			
		Cadmium StdDev			0.04			
		CV (%)			45.54			
Community	11	Calcium	092201-002	mg/kg	7410.00		6.42	19.5
Community	11	Calcium	092202-002	mg/kg	3990.00		6.6	20
Community	11	Calcium	092203-002	mg/kg	3170.00		6.42	19.5
Community	11	Calcium	092207-002	mg/kg	11000.00		32.9	99.8
Community	11	Calcium	092208-002	mg/kg	10900.00		32.6	98.8
Community	11	Calcium	092209-002	mg/kg	18700.00		32.7	99
		Calcium Average			9195.00			
		Calcium StdDev			5711.20			
		CV (%)			62.11			
Community	11	Chromium	092201-002	mg/kg	3.29		0.195	0.584
Community	11	Chromium	092202-002	mg/kg	1.76		0.2	0.6
Community	11	Chromium	092203-002	mg/kg	2.92		0.195	0.584
Community	11	Chromium	092207-002	mg/kg	3.57		0.2	0.599
Community	11	Chromium	092208-002	mg/kg	3.10		0.198	0.593
Community	11	Chromium	092209-002	mg/kg	6.17		0.198	0.594
		Chromium Average			3.47			
		Chromium StdDev			1.46			
		CV (%)			42.17			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Cobalt	092201-002	mg/kg	1.97		0.0584	0.195
Community	11	Cobalt	092202-002	mg/kg	1.40		0.06	0.2
Community	11	Cobalt	092203-002	mg/kg	1.55		0.0584	0.195
Community	11	Cobalt	092207-002	mg/kg	2.10		0.0599	0.2
Community	11	Cobalt	092208-002	mg/kg	1.88		0.0593	0.198
Community	11	Cobalt	092209-002	mg/kg	3.45		0.0594	0.198
		Cobalt Average			2.06			
		Cobalt StdDev			0.73			
		CV (%)			35.50			
Community	11	Copper	092201-002	mg/kg	3.11		0.0642	0.195
Community	11	Copper	092202-002	mg/kg	1.88		0.066	0.2
Community	11	Copper	092203-002	mg/kg	2.01		0.0642	0.195
Community	11	Copper	092207-002	mg/kg	4.30		0.0659	0.2
Community	11	Copper	092208-002	mg/kg	4.63		0.0652	0.198
Community	11	Copper	092209-002	mg/kg	8.17		0.0653	0.198
		Copper Average			4.02			
		Copper StdDev			2.33			
		CV (%)			57.98			
Community	11	Iron	092201-002	mg/kg	4420.00		6.42	19.5
Community	11	Iron	092202-002	mg/kg	3090.00		6.6	20
Community	11	Iron	092203-002	mg/kg	3870.00		6.42	19.5
Community	11	Iron	092207-002	mg/kg	4660.00		6.59	20
Community	11	Iron	092208-002	mg/kg	4430.00		6.52	19.8
Community	11	Iron	092209-002	mg/kg	7170.00		6.53	19.8
		Iron Average			4606.67			
		Iron StdDev			1377.14			
		CV (%)			29.89			
Community	11	Lead	092201-002	mg/kg	3.99		0.0973	0.389
Community	11	Lead	092202-002	mg/kg	2.64		0.1	0.4
Community	11	Lead	092203-002	mg/kg	2.42		0.0973	0.389
Community	11	Lead	092207-002	mg/kg	6.02		0.0998	0.399
Community	11	Lead	092208-002	mg/kg	6.22		0.0988	0.395
Community	11	Lead	092209-002	mg/kg	8.35		0.099	0.396
		Lead Average			4.94			
		Lead StdDev			2.32			
		CV (%)			47.02			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Magnesium	092201-002	mg/kg	1680.00		1.95	5.84
Community	11	Magnesium	092202-002	mg/kg	928.00		2	6
Community	11	Magnesium	092203-002	mg/kg	1100.00		1.95	5.84
Community	11	Magnesium	092207-002	mg/kg	2000.00		2	5.99
Community	11	Magnesium	092208-002	mg/kg	1590.00		1.98	5.93
Community	11	Magnesium	092209-002	mg/kg	2980.00		1.98	5.94
		Magnesium Average			1713.00			
		Magnesium StdDev			734.28			
		CV (%)			42.87			
Community	11	Manganese	092201-002	mg/kg	153.00		0.195	0.973
Community	11	Manganese	092202-002	mg/kg	106.00		0.2	1
Community	11	Manganese	092203-002	mg/kg	103.00		0.195	0.973
Community	11	Manganese	092207-002	mg/kg	117.00		0.2	0.998
Community	11	Manganese	092208-002	mg/kg	117.00		0.198	0.988
Community	11	Manganese	092209-002	mg/kg	262.00		0.99	4.95
		Manganese Average			143.00			
		Manganese StdDev			60.96			
		CV (%)			42.63			
Community	11	Nickel	092201-002	mg/kg	3.21		0.0973	0.389
Community	11	Nickel	092202-002	mg/kg	1.99		0.1	0.4
Community	11	Nickel	092203-002	mg/kg	2.17		0.0973	0.389
Community	11	Nickel	092207-002	mg/kg	4.15		0.0998	0.399
Community	11	Nickel	092208-002	mg/kg	3.62		0.0988	0.395
Community	11	Nickel	092209-002	mg/kg	6.66		0.099	0.396
		Nickel Average			3.63			
		Nickel StdDev			1.70			
		CV (%)			46.79			
Community	11	Potassium	092201-002	mg/kg	918.00		15.6	58.4
Community	11	Potassium	092202-002	mg/kg	592.00		16	60
Community	11	Potassium	092203-002	mg/kg	569.00		15.6	58.4
Community	11	Potassium	092207-002	mg/kg	980.00		16	59.9
Community	11	Potassium	092208-002	mg/kg	846.00		15.8	59.3
Community	11	Potassium	092209-002	mg/kg	1800.00		15.8	59.4
		Potassium Average			950.83			
		Potassium StdDev			449.12			
		CV (%)			47.23			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Selenium	092201-002	mg/kg	0.32	U	0.321	0.973
Community	11	Selenium	092202-002	mg/kg	0.33	U	0.33	1
Community	11	Selenium	092203-002	mg/kg	0.32	U	0.321	0.973
Community	11	Selenium	092207-002	mg/kg	0.33	U	0.329	0.998
Community	11	Selenium	092208-002	mg/kg	0.33	U	0.326	0.988
Community	11	Selenium	092209-002	mg/kg	0.33	U	0.327	0.99
		Selenium Average			0.33			
		Selenium StdDev			0.00			
		CV (%)			1.19			
Community	11	Silver	092201-002	mg/kg	0.09	U	0.0929	0.465
Community	11	Silver	092202-002	mg/kg	0.09	U	0.0947	0.473
Community	11	Silver	092203-002	mg/kg	0.09	U	0.0911	0.455
Community	11	Silver	092207-002	mg/kg	0.10	J	0.0984	0.492
Community	11	Silver	092208-002	mg/kg	0.09	U	0.0929	0.465
Community	11	Silver	092209-002	mg/kg	0.10	U	0.0988	0.494
		Silver Average			0.09			
		Silver StdDev			0.00			
		CV (%)			3.36			
Community	11	Sodium	092201-002	mg/kg	102.00		15.6	48.6
Community	11	Sodium	092202-002	mg/kg	67.80		16	50
Community	11	Sodium	092203-002	mg/kg	66.50		15.6	48.6
Community	11	Sodium	092207-002	mg/kg	394.00		39.9	125
Community	11	Sodium	092208-002	mg/kg	235.00		39.5	124
Community	11	Sodium	092209-002	mg/kg	131.00		39.6	124
		Sodium Average			166.05			
		Sodium StdDev			127.76			
		CV (%)			76.94			
Community	11	Thallium	092201-002	mg/kg	0.06	U	0.0584	0.389
Community	11	Thallium	092202-002	mg/kg	0.06	U	0.06	0.4
Community	11	Thallium	092203-002	mg/kg	0.06	U	0.0584	0.389
Community	11	Thallium	092207-002	mg/kg	0.07	J	0.0599	0.399
Community	11	Thallium	092208-002	mg/kg	0.07	J	0.0593	0.395
Community	11	Thallium	092209-002	mg/kg	0.11	J	0.0594	0.396
		Thallium Average			0.07			
		Thallium StdDev			0.02			
		CV (%)			25.71			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
Community	11	Vanadium	092201-002	mg/kg	14.70		0.0929	0.465
Community	11	Vanadium	092202-002	mg/kg	12.00		0.0947	0.473
Community	11	Vanadium	092203-002	mg/kg	7.66		0.0911	0.455
Community	11	Vanadium	092207-002	mg/kg	14.90		0.0984	0.492
Community	11	Vanadium	092208-002	mg/kg	12.80		0.0929	0.465
Community	11	Vanadium	092209-002	mg/kg	14.00		0.0988	0.494
		Vanadium Average			12.68			
		Vanadium StdDev			2.70			
		CV (%)			21.29			
Community	11	Zinc	092201-002	mg/kg	13.30		0.389	1.95
Community	11	Zinc	092202-002	mg/kg	9.20		0.4	2
Community	11	Zinc	092203-002	mg/kg	8.65		0.389	1.95
Community	11	Zinc	092207-002	mg/kg	14.90		0.399	2
Community	11	Zinc	092208-002	mg/kg	14.90		0.395	1.98
Community	11	Zinc	092209-002	mg/kg	27.10		0.396	1.98
		Zinc Average			14.68			
		Zinc StdDev			6.67			
		CV (%)			45.47			
On-Site	74N	Aluminum	092170-002	mg/kg	3370.00		2.61	8.71
On-Site	74N	Aluminum	092171-002	mg/kg	2720.00		2.84	9.47
On-Site	74N	Aluminum	092172-002	mg/kg	2910.00		2.62	8.74
		Aluminum Average			3000.00			
		Aluminum StdDev			334.22			
		CV (%)			11.14			
On-Site	74N	Antimony	092170-002	mg/kg	0.29	U	0.29	0.879
On-Site	74N	Antimony	092171-002	mg/kg	0.33	U	0.329	0.996
On-Site	74N	Antimony	092172-002	mg/kg	0.29	U	0.292	0.883
		Antimony Average			0.30			
		Antimony StdDev			0.02			
		CV (%)			7.23			
On-Site	74N	Arsenic	092170-002	mg/kg	0.99		0.174	0.871
On-Site	74N	Arsenic	092171-002	mg/kg	0.28	J	0.189	0.947
On-Site	74N	Arsenic	092172-002	mg/kg	0.46	J	0.175	0.874
		Arsenic Average			0.57			
		Arsenic StdDev			0.37			
		CV (%)			64.76			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	74N	Barium	092170-002	mg/kg	42.20		0.0871	0.348
On-Site	74N	Barium	092171-002	mg/kg	42.40		0.0947	0.379
On-Site	74N	Barium	092172-002	mg/kg	28.90		0.0874	0.35
		Barium Average			37.83			
		Barium StdDev			7.74			
		CV (%)			20.45			
On-Site	74N	Beryllium	092170-002	mg/kg	0.19		0.0174	0.0871
On-Site	74N	Beryllium	092171-002	mg/kg	0.18		0.0189	0.0947
On-Site	74N	Beryllium	092172-002	mg/kg	0.20		0.0175	0.0874
		Beryllium Average			0.19			
		Beryllium StdDev			0.01			
		CV (%)			4.35			
On-Site	74N	Cadmium	092170-002	mg/kg	0.16	J	0.0174	0.174
On-Site	74N	Cadmium	092171-002	mg/kg	0.09	J	0.0189	0.189
On-Site	74N	Cadmium	092172-002	mg/kg	0.16	J	0.0175	0.175
		Cadmium Average			0.13			
		Cadmium StdDev			0.04			
		CV (%)			83.73			
On-Site	74N	Calcium	092170-002	mg/kg	25700.00		57.5	174
On-Site	74N	Calcium	092171-002	mg/kg	15500.00		31.3	94.7
On-Site	74N	Calcium	092172-002	mg/kg	27700.00		57.7	175
		Calcium Average			22966.67			
		Calcium StdDev			6543.19			
		CV (%)			82.91			
On-Site	74N	Chromium	092170-002	mg/kg	5.78		0.174	0.523
On-Site	74N	Chromium	092171-002	mg/kg	1.99		0.189	0.568
On-Site	74N	Chromium	092172-002	mg/kg	1.89		0.175	0.524
		Chromium Average			3.22			
		Chromium StdDev			2.22			
		CV (%)			170.37			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	74N	Cobalt	092170-002	mg/kg	3.81		0.0523	0.174
On-Site	74N	Cobalt	092171-002	mg/kg	1.78		0.0568	0.189
On-Site	74N	Cobalt	092172-002	mg/kg	2.13		0.0524	0.175
		Cobalt Average			2.57			
		Cobalt StdDev			1.09			
		CV (%)			120.81			
On-Site	74N	Copper	092170-002	mg/kg	9.74		0.0575	0.174
On-Site	74N	Copper	092171-002	mg/kg	3.18		0.0625	0.189
On-Site	74N	Copper	092172-002	mg/kg	4.16		0.0577	0.175
		Copper Average			5.69			
		Copper StdDev			3.54			
		CV (%)			136.86			
On-Site	74N	Iron	092170-002	mg/kg	15100.00		57.5	174
On-Site	74N	Iron	092171-002	mg/kg	4090.00		6.25	18.9
On-Site	74N	Iron	092172-002	mg/kg	5160.00		5.77	17.5
		Iron Average			8116.67			
		Iron StdDev			6071.36			
		CV (%)			157.30			
On-Site	74N	Lead	092170-002	mg/kg	6.54		0.0871	0.348
On-Site	74N	Lead	092171-002	mg/kg	2.65		0.0947	0.379
On-Site	74N	Lead	092172-002	mg/kg	2.93		0.0874	0.35
		Lead Average			4.04			
		Lead StdDev			2.17			
		CV (%)			137.88			
On-Site	74N	Magnesium	092170-002	mg/kg	2110.00		1.74	5.23
On-Site	74N	Magnesium	092171-002	mg/kg	1620.00		1.89	5.68
On-Site	74N	Magnesium	092172-002	mg/kg	1900.00		1.75	5.24
		Magnesium Average			1876.67			
		Magnesium StdDev			245.83			
		CV (%)			98.77			
On-Site	74N	Manganese	092170-002	mg/kg	168.00		0.174	0.871
On-Site	74N	Manganese	092171-002	mg/kg	137.00		0.189	0.947
On-Site	74N	Manganese	092172-002	mg/kg	220.00		1.75	8.74
		Manganese Average			175.00			
		Manganese StdDev			41.94			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
		CV (%)			79.55			
On-Site	74N	Nickel	092170-002	mg/kg	4.95		0.0871	0.348
On-Site	74N	Nickel	092171-002	mg/kg	2.81		0.0947	0.379
On-Site	74N	Nickel	092172-002	mg/kg	3.40		0.0874	0.35
		Nickel Average			3.72			
		Nickel StdDev			1.11			
		CV (%)			109.41			
On-Site	74N	Potassium	092170-002	mg/kg	728.00		13.9	52.3
On-Site	74N	Potassium	092171-002	mg/kg	682.00		15.2	56.8
On-Site	74N	Potassium	092172-002	mg/kg	617.00		14	52.4
		Potassium Average			675.67			
		Potassium StdDev			55.77			
		CV (%)			109.51			
On-Site	74N	Selenium	092170-002	mg/kg	0.29	U	0.287	0.871
On-Site	74N	Selenium	092171-002	mg/kg	0.31	U	0.313	0.947
On-Site	74N	Selenium	092172-002	mg/kg	0.29	U	0.288	0.874
		Selenium Average			0.30			
		Selenium StdDev			0.01			
		CV (%)			102.78			
On-Site	74N	Silver	092170-002	mg/kg	0.71		0.0879	0.439
On-Site	74N	Silver	092171-002	mg/kg	0.17	J	0.0996	0.498
On-Site	74N	Silver	092172-002	mg/kg	0.09	U	0.0883	0.442
		Silver Average			0.32			
		Silver StdDev			0.34			
		CV (%)			364.40			
On-Site	74N	Sodium	092170-002	mg/kg	41.10	J	13.9	43.6
On-Site	74N	Sodium	092171-002	mg/kg	42.40	J	15.2	47.3
On-Site	74N	Sodium	092172-002	mg/kg	34.70	J	14	43.7
		Sodium Average			39.40			
		Sodium StdDev			4.12			
		CV (%)			113.54			

TABLE C-9. Non-radiological Replicate Results for Calendar Year 2012, Sediment

Location Type	Location	Analyte	Sample ID	Units	Result	Lab Data Qualifiers	Decision Level (MDL)	Detection Limit (PQL)
On-Site	74N	Thallium	092170-002	mg/kg	0.05	U	0.0523	0.348
On-Site	74N	Thallium	092171-002	mg/kg	0.06	U	0.0568	0.379
On-Site	74N	Thallium	092172-002	mg/kg	0.05	U	0.0524	0.35
		Thallium Average			0.05			
		Thallium StdDev			0.00			
		CV (%)			102.74			
On-Site	74N	Vanadium	092170-002	mg/kg	78.90		0.0879	0.439
On-Site	74N	Vanadium	092171-002	mg/kg	12.30		0.0996	0.498
On-Site	74N	Vanadium	092172-002	mg/kg	8.60		0.0883	0.442
		Vanadium Average			33.27			
		Vanadium StdDev			39.56			
		CV (%)			386.82			
On-Site	74N	Zinc	092170-002	mg/kg	21.60		0.348	1.74
On-Site	74N	Zinc	092171-002	mg/kg	16.60		0.379	1.89
On-Site	74N	Zinc	092172-002	mg/kg	18.50		0.35	1.75
		Zinc Average			18.90			
		Zinc StdDev			2.52			
		CV (%)			102.16			

NOTES:

CV = coefficient of variation

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

MDL = Method detection limit.

PQL = Practical quantitation limit.

Std Dev = standard deviation

U = The analyte was analyzed for, but not detected. For organic and inorganic analytes the result is less than the effective MDL concentration.

APPENDIX D

2012 STORM WATER SAMPLING RESULTS

TABLE D-1. Environmental Surveillance Storm Water Monitoring for Calendar Year 2012

Monitoring Point	Sample Date	Analayte	Amount Detected	Error	Method Detection Limit	Units	Sample Preparation	NMWQCC Surface Water Standard - Drinking Water Supply*
SWMP-25	26-Jun-2012	Aluminum	<.015		0.015	mg/L	FILTERED	5.0 mg/L
SWMP-25	26-Jun-2012	Antimony	0.00401		0.001	mg/L	FILTERED	0.006 mg/L
SWMP-25	26-Jun-2012	Arsenic	0.0043		0.0017	mg/L	FILTERED	0.010 mg/L
SWMP-25	26-Jun-2012	Barium	0.145		0.0006	mg/L	FILTERED	2 mg/L
SWMP-25	26-Jun-2012	Beryllium	<.0002		0.0002	mg/L	FILTERED	2 mg/L
SWMP-25	26-Jun-2012	Cadmium	<.00011		0.00011	mg/L	FILTERED	0.005 mg/L
SWMP-25	26-Jun-2012	Chromium	0.00252		0.002	mg/L	FILTERED	0.011 mg/L
SWMP-25	26-Jun-2012	Cobalt	0.000407		0.0001	mg/L	FILTERED	0.05 mg/L
SWMP-25	26-Jun-2012	Copper	0.00797		0.00035	mg/L	FILTERED	0.200 mg/L
SWMP-25	26-Jun-2012	Lead	<.0005		0.0005	mg/L	FILTERED	0.015 mg/L
SWMP-25	26-Jun-2012	Manganese	0.0671		0.001	mg/L	FILTERED	1.650 mg/L
SWMP-25	26-Jun-2012	Mercury	<.000067		0.000067	mg/L	FILTERED	0.00077 mg/L
SWMP-25	26-Jun-2012	Nickel	0.00295		0.0005	mg/L	FILTERED	0.700 mg/L
SWMP-25	26-Jun-2012	Selenium	0.00358		0.0015	mg/L	FILTERED	0.005 mg/L
SWMP-25	26-Jun-2012	Silver	<.0002		0.0002	mg/L	FILTERED	0.0032 mg/L
SWMP-25	26-Jun-2012	Thallium	0.000532		0.00045	mg/L	FILTERED	0.002 mg/L
SWMP-25	26-Jun-2012	Vanadium	0.00775		0.001	mg/L	FILTERED	0.100 mg/L
SWMP-25	26-Jun-2012	Zinc	0.0314		0.0035	mg/L	FILTERED	10.5 mg/L
SWMP-25	3-Jul-2012	Aluminum	0.844		0.015	mg/L	FILTERED	5.0 mg/L
SWMP-25	3-Jul-2012	Antimony	0.00521		0.001	mg/L	FILTERED	0.006 mg/L
SWMP-25	3-Jul-2012	Arsenic	<.0017		0.0017	mg/L	FILTERED	0.010 mg/L
SWMP-25	3-Jul-2012	Barium	0.11		0.0006	mg/L	FILTERED	2 mg/L
SWMP-25	3-Jul-2012	Beryllium	<.0002		0.0002	mg/L	FILTERED	2 mg/L
SWMP-25	3-Jul-2012	Cadmium	0.000258		0.00011	mg/L	FILTERED	0.005 mg/L
SWMP-25	3-Jul-2012	Chromium	<.002		0.002	mg/L	FILTERED	0.011 mg/L
SWMP-25	3-Jul-2012	Cobalt	0.00195		0.0001	mg/L	FILTERED	0.05 mg/L
SWMP-25	3-Jul-2012	Copper	0.0262		0.00035	mg/L	FILTERED	0.200 mg/L
SWMP-25	3-Jul-2012	Lead	0.00134		0.0005	mg/L	FILTERED	0.015 mg/L
SWMP-25	3-Jul-2012	Manganese	0.0939		0.001	mg/L	FILTERED	1.650 mg/L
SWMP-25	3-Jul-2012	Mercury	<.000067		0.000067	mg/L	FILTERED	0.00077 mg/L
SWMP-25	3-Jul-2012	Nickel	0.00592		0.0005	mg/L	FILTERED	0.700 mg/L

TABLE D-1. Environmental Surveillance Storm Water Monitoring for Calendar Year 2012

Monitoring Point	Sample Date	Analayte	Amount Detected	Error	Method Detection Limit	Units	Sample Preparation	NMWQCC Surface Water Standard - Drinking Water Supply*
SWMP-25	3-Jul-2012	Selenium	<.0015		0.0015	mg/L	FILTERED	0.005 mg/L
SWMP-25	3-Jul-2012	Silver	<.0002		0.0002	mg/L	FILTERED	0.0032 mg/L
SWMP-25	3-Jul-2012	Thallium	<.00045		0.00045	mg/L	FILTERED	0.002 mg/L
SWMP-25	3-Jul-2012	Vanadium	0.00964		0.001	mg/L	FILTERED	0.100 mg/L
SWMP-25	3-Jul-2012	Zinc	0.0564		0.0035	mg/L	FILTERED	10.5 mg/L
SWMP-26	3-Jul-2012	Aluminum	0.0547		0.015	mg/L	FILTERED	5.0 mg/L
SWMP-26	3-Jul-2012	Antimony	0.0602		0.001	mg/L	FILTERED	0.006 mg/L
SWMP-26	3-Jul-2012	Arsenic	0.0383		0.0017	mg/L	FILTERED	0.010 mg/L
SWMP-26	3-Jul-2012	Barium	0.0832		0.0006	mg/L	FILTERED	2 mg/L
SWMP-26	3-Jul-2012	Beryllium	<.0002		0.0002	mg/L	FILTERED	2 mg/L
SWMP-26	3-Jul-2012	Cadmium	0.00174		0.00011	mg/L	FILTERED	0.005 mg/L
SWMP-26	3-Jul-2012	Chromium	<.002		0.002	mg/L	FILTERED	0.011 mg/L
SWMP-26	3-Jul-2012	Cobalt	0.00157		0.0001	mg/L	FILTERED	0.05 mg/L
SWMP-26	3-Jul-2012	Copper	0.0274		0.00035	mg/L	FILTERED	0.200 mg/L
SWMP-26	3-Jul-2012	Lead	0.000658		0.0005	mg/L	FILTERED	0.015 mg/L
SWMP-26	3-Jul-2012	Manganese	0.0808		0.001	mg/L	FILTERED	1.650 mg/L
SWMP-26	3-Jul-2012	Mercury	<.000067		0.000067	mg/L	FILTERED	0.00077 mg/L
SWMP-26	3-Jul-2012	Nickel	0.00402		0.0005	mg/L	FILTERED	0.700 mg/L
SWMP-26	3-Jul-2012	Selenium	<.0015		0.0015	mg/L	FILTERED	0.005 mg/L
SWMP-26	3-Jul-2012	Silver	<.0002		0.0002	mg/L	FILTERED	0.0032 mg/L
SWMP-26	3-Jul-2012	Thallium	<.00045		0.00045	mg/L	FILTERED	0.002 mg/L
SWMP-26	3-Jul-2012	Vanadium	0.00515		0.001	mg/L	FILTERED	0.100 mg/L
SWMP-26	3-Jul-2012	Zinc	0.0596		0.0035	mg/L	FILTERED	10.5 mg/L
SWMP-09	9-Jul-2012	Alpha, gross	17.1	3.6	0.503	pCi/L	UNFILTERED	15 pCi/L
SWMP-09	9-Jul-2012	Aluminum	0.135		0.068	mg/L	FILTERED	5.0 mg/L
SWMP-09	9-Jul-2012	Antimony	0.00701		0.0035	mg/L	FILTERED	0.006 mg/L
SWMP-09	9-Jul-2012	Arsenic	0.00529		0.005	mg/L	FILTERED	0.010 mg/L
SWMP-09	9-Jul-2012	Barium	0.101		0.001	mg/L	FILTERED	2 mg/L
SWMP-09	9-Jul-2012	Beryllium	<.001		0.001	mg/L	FILTERED	2 mg/L
SWMP-09	9-Jul-2012	Beta, gross	21.3	3.82	0.715	pCi/L	UNFILTERED	NE, < MDL
SWMP-09	9-Jul-2012	Cadmium	<.001		0.001	mg/L	FILTERED	0.005 mg/L

TABLE D-1. Environmental Surveillance Storm Water Monitoring for Calendar Year 2012

Monitoring Point	Sample Date	Analayte	Amount Detected	Error	Method Detection Limit	Units	Sample Preparation	NMWQCC Surface Water Standard - Drinking Water Supply*
SWMP-09	9-Jul-2012	Chromium	<.001		0.001	mg/L	FILTERED	0.011 mg/L
SWMP-09	9-Jul-2012	Cobalt	0.00217		0.001	mg/L	FILTERED	0.05 mg/L
SWMP-09	9-Jul-2012	Copper	0.0064		0.003	mg/L	FILTERED	0.200 mg/L
SWMP-09	9-Jul-2012	Lead	<.0033		0.0033	mg/L	FILTERED	0.015 mg/L
SWMP-09	9-Jul-2012	Manganese	0.107		0.002	mg/L	FILTERED	1.650 mg/L
SWMP-09	9-Jul-2012	Mercury	<.000067		0.000067	mg/L	FILTERED	0.00077 mg/L
SWMP-09	9-Jul-2012	Nickel	0.00414		0.0015	mg/L	FILTERED	0.700 mg/L
SWMP-09	9-Jul-2012	Selenium	<.006		0.006	mg/L	FILTERED	0.005 mg/L
SWMP-09	9-Jul-2012	Silver	<.001		0.001	mg/L	FILTERED	0.0032 mg/L
SWMP-09	9-Jul-2012	Thallium	0.00647		0.005	mg/L	FILTERED	0.002 mg/L
SWMP-09	9-Jul-2012	Vanadium	0.00899		0.001	mg/L	FILTERED	0.100 mg/L
SWMP-09	9-Jul-2012	Zinc	0.00511		0.0033	mg/L	FILTERED	10.5 mg/L
SWMP-25	3-Aug-2012	Aluminum	0.0275		0.015	mg/L	FILTERED	5.0 mg/L
SWMP-25	3-Aug-2012	Antimony	0.00229		0.001	mg/L	FILTERED	0.006 mg/L
SWMP-25	3-Aug-2012	Arsenic	0.00726		0.0017	mg/L	FILTERED	0.010 mg/L
SWMP-25	3-Aug-2012	Barium	0.0918		0.0006	mg/L	FILTERED	2 mg/L
SWMP-25	3-Aug-2012	Beryllium	<.0002		0.0002	mg/L	FILTERED	2 mg/L
SWMP-25	3-Aug-2012	Cadmium	<.00011		0.00011	mg/L	FILTERED	0.005 mg/L
SWMP-25	3-Aug-2012	Chromium	0.00279		0.002	mg/L	FILTERED	0.011 mg/L
SWMP-25	3-Aug-2012	Cobalt	0.000162		0.0001	mg/L	FILTERED	0.05 mg/L
SWMP-25	3-Aug-2012	Copper	0.00862		0.00035	mg/L	FILTERED	0.200 mg/L
SWMP-25	3-Aug-2012	Lead	<.0005		0.0005	mg/L	FILTERED	0.015 mg/L
SWMP-25	3-Aug-2012	Manganese	0.00135		0.001	mg/L	FILTERED	1.650 mg/L
SWMP-25	3-Aug-2012	Mercury	<.000067		0.000067	mg/L	FILTERED	0.00077 mg/L
SWMP-25	3-Aug-2012	Nickel	0.00157		0.0005	mg/L	FILTERED	0.700 mg/L
SWMP-25	3-Aug-2012	Selenium	<.0015		0.0015	mg/L	FILTERED	0.005 mg/L
SWMP-25	3-Aug-2012	Silver	<.0002		0.0002	mg/L	FILTERED	0.0032 mg/L
SWMP-25	3-Aug-2012	Thallium	<.00045		0.00045	mg/L	FILTERED	0.002 mg/L
SWMP-25	3-Aug-2012	Vanadium	0.00755		0.001	mg/L	FILTERED	0.100 mg/L
SWMP-25	3-Aug-2012	Zinc	0.00742		0.0035	mg/L	FILTERED	10.5 mg/L
SWMP-26	3-Aug-2012	Aluminum	<.015		0.015	mg/L	FILTERED	5.0 mg/L

TABLE D-1. Environmental Surveillance Storm Water Monitoring for Calendar Year 2012

Monitoring Point	Sample Date	Analayte	Amount Detected	Error	Method Detection Limit	Units	Sample Preparation	NMWQCC Surface Water Standard - Drinking Water Supply*
SWMP-26	3-Aug-2012	Antimony	0.0176		0.001	mg/L	FILTERED	0.006 mg/L
SWMP-26	3-Aug-2012	Arsenic	0.0117		0.0017	mg/L	FILTERED	0.010 mg/L
SWMP-26	3-Aug-2012	Barium	0.046		0.0006	mg/L	FILTERED	2 mg/L
SWMP-26	3-Aug-2012	Beryllium	<.0002		0.0002	mg/L	FILTERED	2 mg/L
SWMP-26	3-Aug-2012	Cadmium	0.00141		0.00011	mg/L	FILTERED	0.005 mg/L
SWMP-26	3-Aug-2012	Chromium	<.002		0.002	mg/L	FILTERED	0.011 mg/L
SWMP-26	3-Aug-2012	Cobalt	0.000359		0.0001	mg/L	FILTERED	0.05 mg/L
SWMP-26	3-Aug-2012	Copper	0.0151		0.00035	mg/L	FILTERED	0.200 mg/L
SWMP-26	3-Aug-2012	Lead	0.000639		0.0005	mg/L	FILTERED	0.015 mg/L
SWMP-26	3-Aug-2012	Manganese	0.0214		0.001	mg/L	FILTERED	1.650 mg/L
SWMP-26	3-Aug-2012	Mercury	<.000067		0.000067	mg/L	FILTERED	0.00077 mg/L
SWMP-26	3-Aug-2012	Nickel	0.00151		0.0005	mg/L	FILTERED	0.700 mg/L
SWMP-26	3-Aug-2012	Selenium	<.0015		0.0015	mg/L	FILTERED	0.005 mg/L
SWMP-26	3-Aug-2012	Silver	<.0002		0.0002	mg/L	FILTERED	0.0032 mg/L
SWMP-26	3-Aug-2012	Thallium	<.00045		0.00045	mg/L	FILTERED	0.002 mg/L
SWMP-26	3-Aug-2012	Vanadium	0.00238		0.001	mg/L	FILTERED	0.100 mg/L
SWMP-26	3-Aug-2012	Zinc	0.0438		0.0035	mg/L	FILTERED	10.5 mg/L
SWMP-09	17-Aug-2012	Alpha, gross	58	11.5	1.36	pCi/L	UNFILTERED	15 pCi/L
SWMP-09	17-Aug-2012	Beta, gross	66	12	2.88	pCi/L	UNFILTERED	NE, < MDL
SWMP-20	17-Aug-2012	Alpha, gross	30.5	6.03	1.05	pCi/L	UNFILTERED	15 pCi/L
SWMP-20	17-Aug-2012	Beta, gross	41.6	7.45	1.1	pCi/L	UNFILTERED	NE, < MDL

NOTES:

* Where there was no drinking water supply standard the lowest numeric criteria was used.
MDL = Method Detection Limit
mg/L = milligram per liter
NE = Not Established
NMWQCC = New Mexico Water Quality Control Comission
pCi/L = picocurie per liter

TABLE D-2. Storm Water Monitoring Results for Calendar Year 2012

Monitoring Point	Analyte	Sample Date	Results	Units
SWMP-16	Aluminum, Total Recoverable	06/16/12	35.4	mg/L
SWMP-16	Ammonia	06/16/12	1.42	mg/L
SWMP-16	Arsenic, Total Recoverable	06/16/12	0.00793	mg/L
SWMP-16	Cadmium, Total Recoverable	06/16/12	0.000916	mg/L
SWMP-16	Chemical Oxygen Demand	06/16/12	151	mg/L
SWMP-16	Copper, Total Recoverable	06/16/12	0.0257	mg/L
SWMP-16	Cyanide, total	06/16/12	<.00167	mg/L
SWMP-16	Iron, Total Recoverable	06/16/12	16.5	mg/L
SWMP-16	Lead, Total Recoverable	06/16/12	0.0234	mg/L
SWMP-16	Magnesium, Total Recoverable	06/16/12	8.9	mg/L
SWMP-16	Mercury, Total Recoverable	06/16/12	0.000151	mg/L
SWMP-16	Selenium, Total Recoverable	06/16/12	<.0015	mg/L
SWMP-16	Silver, Total Recoverable	06/16/12	<.0002	mg/L
SWMP-16	Zinc, Total Recoverable, Total Rec	06/16/12	0.0973	mg/L
SWMP-25	Aluminum, Total Recoverable	06/26/12	<.015	mg/L
SWMP-25	Arsenic, Total Recoverable	06/26/12	0.0043	mg/L
SWMP-25	Cadmium, Total Recoverable	06/26/12	<.00011	mg/L
SWMP-25	Copper, Total Recoverable	06/26/12	0.00797	mg/L
SWMP-25	Iron, Total Recoverable	06/26/12	0.178	mg/L
SWMP-25	Lead, Total Recoverable	06/26/12	<.0005	mg/L
SWMP-25	Magnesium, Total Recoverable	06/26/12	6.72	mg/L
SWMP-25	Mercury, Total Recoverable	06/26/12	<.000067	mg/L
SWMP-25	Selenium, Total Recoverable	06/26/12	0.00358	mg/L
SWMP-25	Silver, Total Recoverable	06/26/12	<.0002	mg/L
SWMP-25	Solids, total suspended	06/26/12	74.7	mg/L
SWMP-25	Zinc, Total Recoverable	06/26/12	0.0314	mg/L
SWMP-04	Aluminum, Total Recoverable	07/03/12	3.03	mg/L
SWMP-04	Arsenic, Total Recoverable	07/03/12	<.0017	mg/L
SWMP-04	Cadmium, Total Recoverable	07/03/12	0.000506	mg/L
SWMP-04	Chemical Oxygen Demand	07/03/12	245	mg/L
SWMP-04	Copper, Total Recoverable	07/03/12	0.0189	mg/L
SWMP-04	Iron, Total Recoverable	07/03/12	2.26	mg/L
SWMP-04	Lead, Total Recoverable	07/03/12	0.00605	mg/L
SWMP-04	Magnesium, Total Recoverable	07/03/12	3.14	mg/L
SWMP-04	Mercury, Total Recoverable	07/03/12	<.000067	mg/L
SWMP-04	Selenium, Total Recoverable	07/03/12	<.0015	mg/L
SWMP-04	Silver, Total Recoverable	07/03/12	0.0002	mg/L
SWMP-04	Solids, total suspended	07/03/12	49.5	mg/L
SWMP-04	Zinc, Total Recoverable	07/03/12	0.0673	mg/L
SWMP-05	Aluminum, Total Recoverable	07/03/12	4.07	mg/L
SWMP-05	Ammonia	07/03/12	1.75	mg/L
SWMP-05	Arsenic, Total Recoverable	07/03/12	<.0017	mg/L
SWMP-05	Cadmium, Total Recoverable	07/03/12	0.000329	mg/L
SWMP-05	Chemical Oxygen Demand	07/03/12	186	mg/L
SWMP-05	Copper, Total Recoverable	07/03/12	0.0253	mg/L
SWMP-05	Cyanide, total	07/03/12	0.00346	mg/L
SWMP-05	Iron, Total Recoverable	07/03/12	3.16	mg/L

TABLE D-2. Storm Water Monitoring Results for Calendar Year 2012

Monitoring Point	Analyte	Sample Date	Results	Units
SWMP-05	Lead, Total Recoverable	07/03/12	0.0124	mg/L
SWMP-05	Magnesium, Total Recoverable	07/03/12	2.56	mg/L
SWMP-05	Mercury, Total Recoverable	07/03/12	<.000067	mg/L
SWMP-05	Selenium, Total Recoverable	07/03/12	<.0015	mg/L
SWMP-05	Silver, Total Recoverable	07/03/12	<.0002	mg/L
SWMP-05	Solids, total suspended	07/03/12	95.5	mg/L
SWMP-05	Solids, total suspended	07/03/12	126	mg/L
SWMP-05	Solids, total suspended	07/03/12	132	mg/L
SWMP-05	Zinc, Total Recoverable	07/03/12	0.209	mg/L
SWMP-15	Aluminum, Total Recoverable	07/03/12	4.62	mg/L
SWMP-15	Ammonia	07/03/12	1.77	mg/L
SWMP-15	Arsenic, Total Recoverable	07/03/12	<.0017	mg/L
SWMP-15	Cadmium, Total Recoverable	07/03/12	0.000152	mg/L
SWMP-15	Chemical Oxygen Demand	07/03/12	199	mg/L
SWMP-15	Copper, Total Recoverable	07/03/12	0.0148	mg/L
SWMP-15	Cyanide, total	07/03/12	0.0031	mg/L
SWMP-15	Iron, Total Recoverable	07/03/12	3.56	mg/L
SWMP-15	Lead, Total Recoverable	07/03/12	0.00528	mg/L
SWMP-15	Magnesium, Total Recoverable	07/03/12	2.8	mg/L
SWMP-15	Mercury, Total Recoverable	07/03/12	<.000067	mg/L
SWMP-15	Selenium, Total Recoverable	07/03/12	<.0015	mg/L
SWMP-15	Silver, Total Recoverable	07/03/12	<.0002	mg/L
SWMP-15	Zinc, Total Recoverable	07/03/12	0.0993	mg/L
SWMP-25	Aluminum, Total Recoverable	07/03/12	0.844	mg/L
SWMP-25	Arsenic, Total Recoverable	07/03/12	<.0017	mg/L
SWMP-25	Cadmium, Total Recoverable	07/03/12	0.000258	mg/L
SWMP-25	Copper, Total Recoverable	07/03/12	0.0262	mg/L
SWMP-25	Iron, Total Recoverable	07/03/12	0.699	mg/L
SWMP-25	Lead, Total Recoverable	07/03/12	0.00134	mg/L
SWMP-25	Magnesium, Total Recoverable	07/03/12	5.64	mg/L
SWMP-25	Mercury, Total Recoverable	07/03/12	<.000067	mg/L
SWMP-25	Selenium, Total Recoverable	07/03/12	<.0015	mg/L
SWMP-25	Silver, Total Recoverable	07/03/12	<.0002	mg/L
SWMP-25	Solids, total suspended	07/03/12	216	mg/L
SWMP-25	Zinc, Total Recoverable	07/03/12	0.0564	mg/L
SWMP-26	Aluminum, Total Recoverable	07/03/12	0.0547	mg/L
SWMP-26	Arsenic, Total Recoverable	07/03/12	0.0383	mg/L
SWMP-26	Cadmium, Total Recoverable	07/03/12	0.00174	mg/L
SWMP-26	Copper, Total Recoverable	07/03/12	0.0274	mg/L
SWMP-26	Iron, Total Recoverable	07/03/12	0.148	mg/L
SWMP-26	Lead, Total Recoverable	07/03/12	0.000658	mg/L
SWMP-26	Magnesium, Total Recoverable	07/03/12	3.64	mg/L
SWMP-26	Mercury, Total Recoverable	07/03/12	<.000067	mg/L
SWMP-26	Selenium, Total Recoverable	07/03/12	<.0015	mg/L
SWMP-26	Silver, Total Recoverable	07/03/12	<.0002	mg/L
SWMP-26	Solids, total suspended	07/03/12	130	mg/L
SWMP-26	Zinc, Total Recoverable	07/03/12	0.0596	mg/L

TABLE D-2. Storm Water Monitoring Results for Calendar Year 2012

Monitoring Point	Analyte	Sample Date	Results	Units
SWMP-09	Aluminum, Total Recoverable	07/09/12	0.135	mg/L
SWMP-09	Arsenic, Total Recoverable	07/09/12	0.00529	mg/L
SWMP-09	Cadmium, Total Recoverable	07/09/12	<.001	mg/L
SWMP-09	Copper, Total Recoverable	07/09/12	0.0064	mg/L
SWMP-09	Iron, Total Recoverable	07/09/12	0.105	mg/L
SWMP-09	Lead, Total Recoverable	07/09/12	<.0033	mg/L
SWMP-09	Magnesium, Total Recoverable	07/09/12	2.46	mg/L
SWMP-09	Mercury, Total Recoverable	07/09/12	<.000067	mg/L
SWMP-09	Selenium, Total Recoverable	07/09/12	<.006	mg/L
SWMP-09	Silver, Total Recoverable	07/09/12	<.001	mg/L
SWMP-09	Zinc, Total Recoverable	07/09/12	0.00511	mg/L
SWMP-25	Aluminum, Total Recoverable	08/03/12	0.0275	mg/L
SWMP-25	Arsenic, Total Recoverable	08/03/12	0.00726	mg/L
SWMP-25	Cadmium, Total Recoverable	08/03/12	<.00011	mg/L
SWMP-25	Copper, Total Recoverable	08/03/12	0.00862	mg/L
SWMP-25	Iron, Total Recoverable	08/03/12	0.129	mg/L
SWMP-25	Lead, Total Recoverable	08/03/12	<.0005	mg/L
SWMP-25	Magnesium, Total Recoverable	08/03/12	4.12	mg/L
SWMP-25	Mercury, Total Recoverable	08/03/12	<.000067	mg/L
SWMP-25	Selenium, Total Recoverable	08/03/12	<.0015	mg/L
SWMP-25	Silver, Total Recoverable	08/03/12	<.0002	mg/L
SWMP-25	Solids, total suspended	08/03/12	16.4	mg/L
SWMP-25	Solids, total suspended	08/03/12	943	mg/L
SWMP-25	Zinc, Total Recoverable	08/03/12	0.00742	mg/L
SWMP-26	Aluminum, Total Recoverable	08/03/12	<.015	mg/L
SWMP-26	Arsenic, Total Recoverable	08/03/12	0.0117	mg/L
SWMP-26	Cadmium, Total Recoverable	08/03/12	0.00141	mg/L
SWMP-26	Copper, Total Recoverable	08/03/12	0.0151	mg/L
SWMP-26	Iron, Total Recoverable	08/03/12	0.0767	mg/L
SWMP-26	Lead, Total Recoverable	08/03/12	0.000639	mg/L
SWMP-26	Magnesium, Total Recoverable	08/03/12	1.55	mg/L
SWMP-26	Mercury, Total Recoverable	08/03/12	<.000067	mg/L
SWMP-26	Selenium, Total Recoverable	08/03/12	<.0015	mg/L
SWMP-26	Silver, Total Recoverable	08/03/12	<.0002	mg/L
SWMP-26	Zinc, Total Recoverable	08/03/12	0.0438	mg/L
SWMP-09	Aluminum, Total Recoverable	08/17/12	0.448	mg/L
SWMP-09	Arsenic, Total Recoverable	08/17/12	0.00561	mg/L
SWMP-09	Cadmium, Total Recoverable	08/17/12	<.00011	mg/L
SWMP-09	Copper, Total Recoverable	08/17/12	0.0051	mg/L
SWMP-09	Iron, Total Recoverable	08/17/12	0.325	mg/L
SWMP-09	Lead, Total Recoverable	08/17/12	<.0005	mg/L
SWMP-09	Magnesium, Total Recoverable	08/17/12	1.64	mg/L
SWMP-09	Mercury, Total Recoverable	08/17/12	<.000067	mg/L
SWMP-09	Selenium, Total Recoverable	08/17/12	<.0015	mg/L
SWMP-09	Silver, Total Recoverable	08/17/12	<.0002	mg/L
SWMP-09	Zinc, Total Recoverable	08/17/12	0.00493	mg/L
SWMP-11	Aluminum, Total Recoverable	08/17/12	12.4	mg/L

TABLE D-2. Storm Water Monitoring Results for Calendar Year 2012

Monitoring Point	Analyte	Sample Date	Results	Units
SWMP-11	Aluminum, Total Recoverable	08/17/12	30.1	mg/L
SWMP-11	Ammonia	08/17/12	7.35	mg/L
SWMP-11	Arsenic, Total Recoverable	08/17/12	0.00667	mg/L
SWMP-11	Arsenic, Total Recoverable	08/17/12	0.0108	mg/L
SWMP-11	Cadmium, Total Recoverable	08/17/12	0.00158	mg/L
SWMP-11	Cadmium, Total Recoverable	08/17/12	0.00464	mg/L
SWMP-11	Chemical Oxygen Demand	08/17/12	74.3	mg/L
SWMP-11	Copper, Total Recoverable	08/17/12	0.0495	mg/L
SWMP-11	Copper, Total Recoverable	08/17/12	0.11	mg/L
SWMP-11	Cyanide, total	08/17/12	0.0206	mg/L
SWMP-11	Iron, Total Recoverable	08/17/12	8.8	mg/L
SWMP-11	Iron, Total Recoverable	08/17/12	21.2	mg/L
SWMP-11	Lead, Total Recoverable	08/17/12	0.0107	mg/L
SWMP-11	Lead, Total Recoverable	08/17/12	0.0346	mg/L
SWMP-11	Magnesium, Total Recoverable	08/17/12	5.54	mg/L
SWMP-11	Magnesium, Total Recoverable	08/17/12	12.4	mg/L
SWMP-11	Mercury, Total Recoverable	08/17/12	<.000067	mg/L
SWMP-11	Selenium, Total Recoverable	08/17/12	0.00234	mg/L
SWMP-11	Selenium, Total Recoverable	08/17/12	<.0015	mg/L
SWMP-11	Silver, Total Recoverable	08/17/12	0.00336	mg/L
SWMP-11	Silver, Total Recoverable	08/17/12	0.00946	mg/L
SWMP-11	Zinc, Total Recoverable	08/17/12	0.0767	mg/L
SWMP-11	Zinc, Total Recoverable	08/17/12	0.212	mg/L
SWMP-20	Aluminum, Total Recoverable	08/17/12	5.28	mg/L
SWMP-20	Arsenic, Total Recoverable	08/17/12	0.00415	mg/L
SWMP-20	Cadmium, Total Recoverable	08/17/12	<.00011	mg/L
SWMP-20	Copper, Total Recoverable	08/17/12	0.0196	mg/L
SWMP-20	Iron, Total Recoverable	08/17/12	3.43	mg/L
SWMP-20	Lead, Total Recoverable	08/17/12	0.00539	mg/L
SWMP-20	Magnesium, Total Recoverable	08/17/12	2.73	mg/L
SWMP-20	Mercury, Total Recoverable	08/17/12	<.000067	mg/L
SWMP-20	Selenium, Total Recoverable	08/17/12	<.0015	mg/L
SWMP-20	Silver, Total Recoverable	08/17/12	<.0002	mg/L
SWMP-20	Zinc, Total Recoverable	08/17/12	0.0195	mg/L
SWMP-25	Aluminum, Total Recoverable	09/10/12	0.0543	mg/L
SWMP-25	Arsenic, Total Recoverable	09/10/12	0.00216	mg/L
SWMP-25	Cadmium, Total Recoverable	09/10/12	<.00011	mg/L
SWMP-25	Copper, Total Recoverable	09/10/12	0.0164	mg/L
SWMP-25	Iron, Total Recoverable	09/10/12	0.084	mg/L
SWMP-25	Lead, Total Recoverable	09/10/12	<.0005	mg/L
SWMP-25	Magnesium, Total Recoverable	09/10/12	2.05	mg/L
SWMP-25	Mercury, Total Recoverable	09/10/12	<.000067	mg/L
SWMP-25	Selenium, Total Recoverable	09/10/12	<.0015	mg/L
SWMP-25	Silver, Total Recoverable	09/10/12	<.0002	mg/L
SWMP-25	Solids, total suspended	09/10/12	13	mg/L
SWMP-25	Zinc, Total Recoverable	09/10/12	0.0234	mg/L
SWMP-26	Aluminum, Total Recoverable	09/10/12	<.015	mg/L

TABLE D-2. Storm Water Monitoring Results for Calendar Year 2012

Monitoring Point	Analyte	Sample Date	Results	Units
SWMP-26	Arsenic, Total Recoverable	09/10/12	0.0156	mg/L
SWMP-26	Cadmium, Total Recoverable	09/10/12	0.0011	mg/L
SWMP-26	Copper, Total Recoverable	09/10/12	0.0242	mg/L
SWMP-26	Iron, Total Recoverable	09/10/12	0.0588	mg/L
SWMP-26	Lead, Total Recoverable	09/10/12	<.0005	mg/L
SWMP-26	Magnesium, Total Recoverable	09/10/12	2.36	mg/L
SWMP-26	Mercury, Total Recoverable	09/10/12	<.000067	mg/L
SWMP-26	Selenium, Total Recoverable	09/10/12	<.0015	mg/L
SWMP-26	Silver, Total Recoverable	09/10/12	<.0002	mg/L
SWMP-26	Zinc, Total Recoverable	09/10/12	0.0783	mg/L
SWMP-25	Solids, total suspended	09/13/12	14	mg/L

NOTES:
mg/L = milligram per liter