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Annual Groundwater Monitoring Report

Prepared by
Sandia National Laboratories, Albuquerque, New Mexico

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National Nuclear Security Administration

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Groundwater Protection Program
Sandia National Laboratories, New Mexico
October 2010

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The production of this document is a joint effort between the Sandia National Laboratories, New Mexico (SNL/NM) Groundwater Protection Program (GWPP), and the Environmental Restoration (ER) Project.

Subject Areas

GWPP, SNL/NM site and hydrogeological setting

Chemical Waste Landfill (CWL)

Mixed Waste Landfill (MWL)

Technical Area V (TA-V), Tijeras Arroyo Groundwater (TAG) Investigation, and Burn Site Groundwater Area

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 Site Office administers the contract and oversees contractor operations at the site. This annual report summarizes data and the compliance status of the Sandia groundwater surveillance and monitoring programs through December 31, 2009. Programs include the SNL/NM Groundwater Protection Program and the Environmental Restoration Program. Groundwater monitoring and surveillance programs are required by DOE Order 450.1A, *Environmental Protection Program* (DOE 2008), the Compliance Order on Consent, between the New Mexico Environment Department, DOE, and Sandia (NMED April 2004), 40 CFR 265 Subpart G and the Chemical Waste Landfill Closure Plan (SNL, December 1992, as amended).

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Chapter Tables

Chapter Tables (continued)

Chapter Figures

Chapter Figures (continued)

Abbreviations and Acronyms

Airport	Albuquerque International Sunport
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
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
CMS	Corrective Measures Study
COA	City of Albuquerque
COC	constituent of concern
CWL	Chemical Waste Landfill
CY	Calendar Year
CY08	Calendar Year 2008
CY09	Calendar Year 2009
CY10	Calendar Year 2010
DO	dissolved oxygen
DOE	U.S. Department of Energy
DRO	diesel range organics
DSS	Drain and Septic Systems
EB	equipment blank
EDMS	Environmental Data Management System
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ET	evapotranspirative
FB	field blank
FOP	field operating procedure
FSO	Field Support Operations
FY	Fiscal Year
FY05	Fiscal Year 2005
GEL	General Engineering Laboratories, Inc.
GRO	gasoline range organics
GWPP	Groundwater Protection Program
HE	high explosive(s)
HPT	High Performance Team
HSWA	Hazardous and Solid Waste Amendments
IMWP	Interim Measures Work Plan
IRP	Installation Restoration Program (U.S. Air Force)
"J"	data qualifier (indicating an estimated constituent concentration that was detected but is below the laboratory practical quantitation limit)
KAFB	Kirtland Air Force Base
LCS	laboratory control sample
LE	Landfill Excavation

Abbreviations and Acronyms (continued)

LWDS	Liquid Waste Disposal System
Ma	Mega Annum
MAC	maximum allowable concentration (established by the NMED)
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
MWL	Mixed Waste Landfill
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
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PGWS	perched groundwater system
PQL	practical quantitation limit
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
QED™	MicroPurge, low-flow sampling method
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-trinitro-triazine
RFI	RCRA Facility Investigation
RPD	relative percent difference
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SMO	Sample Management Office
SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SWDA	Safe Water Drinking Act
SWMU	Solid Waste Management Unit
TA	Technical Area
TAG	Tijeras Arroyo Groundwater (Investigation)
TAL	Target Analyte List
TB	trip blank
TCE	trichloroethene (equivalent to trichlorethylene)
TOX	total organic halogens
TPH	total petroleum hydrocarbons
USAF	U.S. Air Force

Abbreviations and Acronyms (concluded)

USGS	U.S. Geological Survey
VA	Veterans Administration
VCM	Voluntary Corrective Measure
VE	Vapor Extraction
VOC	volatile organic compound

Monitoring Well Location Descriptions

AVN-#	Area V (North)	STW-#	Solar Tower (West)
CTF-#	Coyote Test Field	SWTA-#	Southwest Technical Area III
CWL-#	Chemical Waste Landfill	TA1-W-#	Technical Area I (Well)
CYN-#	Lurance Canyon	TA2-NW-#	Technical Area II (Northwest)
LWDS-#	Liquid Waste Disposal	TA2-SW-#	Technical Area II (Southwest)
MP-#	Montessa Park	TA2-W-#	Technical Area II (Well)
MRN-#	Magazine Road North	TAV-#	Technical Area V
MVMWJ	Mountain View Monitoring Well J	TJA-#	Tijeras Arroyo
MVMWK	Mountain View Monitoring Well K	TRE-#	Thunder Road East
MWL-#	Mixed Waste Landfill	TRN-#	Target Road North
NMED-#	New Mexico Environment Department	TRS-#	Target Road South
NWTA3-#	Northwest Technical Area III	TSA-#	Transportation Safeguards Academy
PGS-#	Parade Ground South	WYO-#	Wyoming
PL-#	Power Line Road	12AUP-#	ER Site 12A Underflow Piezometer
SFR-#	South Fence Road		

**** Meteorological Towers***

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

Units

°C	degree Celsius	in./yr	inches per year
µg/L	microgram(s) per liter	m	meter(s)
µmhos/cm	microhm(s) per centimeter (unit of specific conductance)	mg/L	milligram(s) per liter
		mL	milliliter(s)
ac-ft	acre feet	mrem/yr	millirem per year
Ci	Curie	mV	millivolt(s)
Ci/yr	curies per year	NTU	nephelometric turbidity units
fbtoc	feet below top of casing	pCi/g	picocuries per gram
ft	foot (feet)	pCi/L	picocuries per liter
ft^3	cubic feet	pH	potential of hydrogen
ft/ft	feet/foot	ppb	part(s) per billion, equivalent to µg/L in water
ft/yr	feet per year		
gal.	gallon(s)	ppbv	part(s) per billion by volume
gpm	gallons per minute	sq km	square kilometer(s)
in.	inches	sq mi	square mile(s)

Annual Groundwater Monitoring Report

Executive Summary

Sandia Corporation (Sandia) conducts general groundwater surveillance monitoring 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 Environmental Restoration (ER) Project sites with an ongoing groundwater investigation. The SNL/NM facility is located on Kirtland Air Force Base (KAFB).

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This Annual Groundwater Monitoring Report documents the results of Sandia's groundwater monitoring activities for Calendar Year 2009 (CY09). 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 by Sandia: 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); and the Burn Site Groundwater (BSG) (Chapter 7.0).

Chapter 1.0 provides the general site description for the SNL/NM facility and describes the regulatory criteria for SNL/NM groundwater monitoring tasks. The regional aquifer supplying the City of Albuquerque (COA) and KAFB 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 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).

Currently there are five ER Project groundwater monitoring networks: (1) TA-V; (2) TAG; (3) CWL; (4) MWL; and (5) the BSG Study Area. At SNL/NM, solid waste management units (SWMUs) are regulated under the Hazardous and Solid Waste Amendment (HSWA) module of the Resource Conservation and Recovery (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. Monitoring performed at the CWL and MWL falls into this category. The remaining three ER Project groundwater investigations (TA-V, TAG, and BSG Study Areas) are subject to the direction provided by the Compliance Order on Consent (the Order) between the New Mexico Environment Department (NMED), the DOE, and Sandia (NMED April 2004).

Groundwater Quality Monitoring Activities and Results

During CY09, groundwater samples were collected from GWPP, CWL, MWL, TA-V, TAG, and BSG monitoring wells. 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 results are summarized in the following sections, and the data are presented in the attachments following each chapter.

Groundwater Protection Program

Chapter 2.0 documents the results of the CY09 groundwater surveillance monitoring activities conducted as part of the SNL/NM GWPP. The surveillance activities include the annual collection and analysis of groundwater samples from 14 monitoring wells and 1 surface water sample from a spring. Water levels were measured at 73 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. Annual sampling of groundwater was conducted during March 2009. Samples collected from all locations were analyzed for 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-235 and uranium-238; mercury; high explosives (HE); gamma spectroscopy; gross alpha/beta activity; radium-226; and radium-228.

The analytical results for the groundwater samples are similar to the results reported for previous years. No VOCs or HE compounds were detected above established MCLs or MACs. The HE compound RDX [hexahydro-trinitro-triazine] was detected in the groundwater sample from monitoring well CTF-MW2 at a concentration of 0.243 micrograms per liter (µg/L).

Fluoride was detected above the NMWQCC groundwater protection standard of 1.6 milligrams per liter (mg/L). The concentrations range from 1.68 to 2.69 mg/L. The EPA MCL for fluoride is 4.0 mg/L. Arsenic was detected above the MCL of 0.01 mg/L in the groundwater sample from CTF-MW2 at a concentration of 0.0517 mg/L. Beryllium was detected in the surface water sample from Coyote Springs at a concentration of 0.00733 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.

Gross alpha activity results for samples from wells CTF-MW1, CTF-MW2, CTF-MW3, SFR-2S, and TRE-1 exceed the MCL of 15 picocuries per liter (pCi/L). Uncorrected activity results range from 30.2 to 106 pCi/L. When these activity results are adjusted to subtract uranium and radium activity, the values range from 19.14 to 88.39 pCi/L. The wells with elevated gross alpha activity levels are located west of the Tijeras fault zone in an area of shallow bedrock with naturally high uranium values.

Water level elevation measurements obtained from 36 representative monitoring wells west of the Tijeras fault zone and west of the Sandia fault at KAFB and vicinity were used to construct contours of water table elevation. 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 COA wells north of the base. A contour map of the differences in the regional water table between the same periods in CY09 and the previous year indicate the areas of greatest decline in the vicinity of TA-V and southwest of TA-III. A slight increase in the regional water table was observed in the northeastern portion of KAFB. Hydrographs for wells in the TA-V area show an annual decline in water level elevations of 0.88 feet per year (ft/yr) based on a three-year trend. For the southwestern region, the decline is 0.95 ft/yr. The slight increase of 0.15 ft/yr in the elevation of the water table in the northeastern sector may be attributed to recharge from the Tijeras Arroyo.

Water level elevations were also obtained in wells completed in the perched groundwater system (PGWS). Fourteen wells were used to construct a water level elevation contour map. The contours indicate that groundwater flow in the PGWS is from the northwest to the southeast. Water levels are declining in the northwest and increasing slightly in the east presumably due to both 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 April and October 2009. Groundwater samples were collected from six monitoring wells (CWL-MW2BL, CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, and CWL-MW6U) and analyzed for Title 40, Code of Federal Regulations (CFR), Section 264, Appendix IX VOCs, semivolatile organic compounds (SVOCs), chlorinated herbicides, polychlorinated biphenyls (PCBs), total cyanide, sulfides, total metals plus iron, and dissolved chromium metals. The NMED DOE Oversight Bureau (OB) participated in both April and October 2009 sampling events and collected split samples from five CWL monitoring wells (CWL-MW2BL, CWL-MW4, CWL-MW5L, CWL-MW5U, and CWL-MW6L).

Additional samples were collected for total uranium and PCB congeners at selected well locations to duplicate the NMED DOE OB analyses. No analytes were detected at concentrations exceeding the associated EPA MCLs in any CWL groundwater samples. The analytical results are comparable to historical values.

The negotiations on the NMED Draft Post-Closure Care Permit for the CWL were completed on October 15, 2009, and documented in the settlement agreement and *Final Order In the Matter of Application for a Post-Closure Care Hazardous Waste Permit for the Chemical Waste Landfill, Sandia National Laboratories No. NM5890110518* (Final Order). On October 16, 2009, the NMED issued a *Notice of Approval, Final Remedy and Closure Plan Amendment, Chemical Waste Landfill* (NMED October 2009). The NMED approval covers the CWL Closure Plan amendment that addresses the replacement of four groundwater monitoring wells, the CWL Post-Closure Care Permit, and the CWL Final Remedy.

Upon NMED approval of the Final CWL RCRA Closure Report, to be submitted for NMED approval after installation of the four new groundwater monitoring wells addressed in the CWL Closure Plan amendment, the Permit will supersede the CWL Closure Plan (SNL December 1992), and the Closure Plan will no longer be effective. Under the CWL Post-Closure Care Permit, groundwater sampling requirements for the four new monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11) will be reduced. As required by Title 20.4.1.500, New Mexico Administrative Code (NMAC), incorporating 40 CFR 264.117(a)(1), the post-closure care period is 30 years. The NMED may shorten or extend this period under 20.4.1.500 NMAC, incorporating 40 CFR 264.117(a)(2).

As agreed to in recent negotiations and documented in the NMED-approved CWL Closure Plan amendment, monitoring wells CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, CWL-MW6U, and CWL-BW4A will be decommissioned and new monitoring wells CWL-MW9, CWL-MW10, CWL-MW11, and CWL-BW5 will be installed in 2010.

Mixed Waste Landfill

Chapter 4.0 addresses the groundwater sampling activities conducted during CY09 at the MWL, located in TA-III at SNL/NM on KAFB, 4 miles south of TA-I facilities, and 5 miles southeast of Albuquerque International Sunport (Figure 1-2). The MWL is a 2.6-acre site in the north-central portion of TA-III that was operated from March 1959 through December 1988. Approximately 100,000 cubic feet of low-level radioactive and mixed waste containing approximately 6,300 curies (at the time of disposal) of activity were disposed of in the MWL.

The MWL consists of two distinct disposal areas: the classified area (occupying 0.6 acres) and the unclassified area (occupying 2.0 acres). Low-level radioactive and mixed waste were disposed of in each of these areas. Classified wastes were buried in cylindrical pits in the classified area. Unclassified wastes were buried in shallow trenches in the unclassified area. The MWL remains in place with a biointrusion barrier and an evapotranspirative cover installed during Fiscal Year 2009.

Groundwater sampling and analysis were conducted at the MWL during four quarters in 2009 according to the Mini-Sampling and Analysis Plans (SNL January 2009, April 2009, July 2009, and October 2009). One sample, collected from MWL-MW7 during the July sampling period, showed one detection of the SVOC bis(2-ethylhexyl)phthalate at a concentration of 9.82 µg/L, which exceeds the MCL (6.0 µg/L) but is below the practical quantitation limit (PQL) (10 µg/L). No other inorganic or organic constituents were detected at concentrations that exceed the respective MCLs (where applicable) in the groundwater samples from MWL monitoring wells. Toluene was detected at concentrations less than the MCL (1,000 µg/L) and PQL (1.0 µg/L) but greater than the method detection limit (MDL) (0.250 µg/L) in several samples.

During April 2009, groundwater samples were collected from seven MWL monitoring wells. The gross alpha activity result (not corrected by subtracting naturally occurring uranium activity) for the sample from MWL-MW5 exceeded the MCL of 15 pCi/L at an activity of 15.9 ± 4.12 pCi/L, but gross alpha activity is lowered to 9.26 pCi/L when uranium activity is subtracted. The remaining total uranium results from the CY09 samples are consistent with data from previous sampling events and are well within the range of historic MWL groundwater data.

During the July 2009 sampling period, bis(2-ethylhexyl)phthalate was detected in the sample from MWL-MW7 at a concentration of 9.82 µg/L, which exceeds the MCL of 6.0 µg/L. Detections of this SVOC have not been consistently reported for historical MWL groundwater samples. This constituent is a common laboratory contaminant and was not detected during subsequent sampling and analysis events performed during CY09.

No general chemistry parameters exceed the established MCLs in any of the MWL groundwater samples. Based on the results of the groundwater monitoring events conducted at the MWL during CY09, constituent concentration results remain within historical ranges for the site.

The results for the laboratory quality control samples and data validation indicate that the CY09 groundwater sampling results for the MWL are defensible as representative of the uppermost portion of the regional aquifer.

Technical Area V Study Area

Chapter 5.0 discusses the TA-V groundwater monitoring activities conducted during CY09. Trichloroethene (TCE) and nitrate have been identified as constituents of concern (COCs) in groundwater at the TA-V Groundwater Investigation study area based on detections above the EPA MCL in samples collected from monitoring wells. Currently 13 wells in the TA-V study area are being 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 ft/yr) is responsible for the present distribution of TCE in the aquifer.

Nitrate concentrations in groundwater at TA-V are primarily derived from unknown upgradient sources. These concentrations have exceeded MCLs in the two upgradient AVN wells, LWDS-MW1, and TAV-MW5. The distribution of nitrate above the background level is laterally widespread in the study area. However, concentrations of nitrate above the MCL are limited.

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 CY09.

The following activities took place for the TA-V study area during CY09:

- Monthly water level measurements were obtained for all TA-V wells.
- Quarterly groundwater sampling events were conducted at 12 wells in February 2009, May/June 2009, August/September 2009, and November/December 2009.
- Quarterly perchlorate screening groundwater sampling and reporting were performed at LWDS-MW1 in May/June 2009, August/September 2009, and November/December 2009.

Tijeras Arroyo Groundwater Study Area

Chapter 6.0 addresses groundwater monitoring activities conducted from January 2009 through November 2009 at the TAG study area. Currently, 21 wells in the TAG study area are being monitored for water quality, and 27 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 either in the PGWS or regional aquifer. Both TCE and nitrate have been identified as COCs in groundwater at the TAG study area based on historical groundwater monitoring results. Detections of these COCs exceed the EPA MCLs of 5 μg/L for TCE and 10 mg/L for nitrate (as nitrogen) in samples collected from TAG study area monitoring wells. Unique features of the TAG 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 CY09, wells were sampled in January, May, July/August, and November. The samples were analyzed for VOCs, NPN, anions, perchlorate, 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.

Only NPN and TCE were detected above MCLs in TAG study area wells. NPN concentrations exceeded the MCL of 10 mg/L in samples from TA2-SW1-320, TJA-2, TJA-4, and TJA-7 during all sampling events, with a maximum concentration of 29.4 mg/L in the sample from TJA-4 collected during the August 2009 sampling event. NPN concentrations occasionally exceeded the MCL in TA2-W-19.

During CY09, TCE exceeded the MCL of 5 μg/L in two PGWS wells, TA2-W-19 and WYO-4. The maximum concentration of TCE detected during this reporting period was 8.55 μg/L in the sample from WYO-4 collected during the May 2009 sampling event. TCE concentrations in samples from TA2-W-19 and WYO-4 have slightly exceeded the MCL, and trends are level to slightly increasing over time.

The following activities took place for the TAG Study Area during CY09:

- Monthly 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 January 2009, May 2009, July/August 2009, and October/November 2009 (SNL December 2008, April 2009, June 2009b, and October 2009).
- Semiannual groundwater sampling was conducted at four wells (TA2-W-01, TA2-W-27, TJA-3, and TJA-6) in January 2009 and July/August 2009 (SNL December 2008 and June 2009b).
- Annual groundwater sampling was conducted at nine wells (PGS-2, TA1-W-01, TA1-W-02, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, and WYO-3) in July/August 2009 (SNL June 2009b).
- Quarterly perchlorate screening groundwater sampling was conducted at four wells (TA1-W-06, TA1-W-08, TA2-W-01, and TA2-W-27) in July/August 2009 and October/November 2009 (SNL June 2009b and SNL October 2009).

Burn Site Groundwater Study Area

Chapter 7.0 discusses the groundwater monitoring activities conducted at the BSG Study Area during CY09, 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 six monitoring wells. Wells were sampled during February/March 2009 and September 2009. The samples were analyzed for VOCs, total petroleum hydrocarbons (TPH)-diesel range organics, TPH-gasoline range organics, anions, 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 CYN-MW6.

Only NPN and gross alpha activity were detected above MCLs in study area wells. NPN results exceeded the MCL of 10 mg/L in samples from CYN-MW3 and CYN-MW6 during both sampling events, with a maximum concentration of 39.9 mg/L in the sample from CYN-MW6 collected during the September 2009 sampling event. Nitrate concentrations in CYN-MW6 have consistently exceeded the MCL. NPN concentrations in CYN-MW3 showed a maximum concentration of 11.0 mg/L during the February 2009 sampling event. Nitrate concentrations are relatively stable over time in CYN-MW3.

Uncorrected gross alpha activity results for samples from CYN-MW4, CYN-MW7, and CYN-MW8 exceed the MCL of 15 pCi/L at activity levels ranging from 26.4 ± 9.48 to 49.6 ± 15.5 pCi/L. In this region, groundwater contacts Precambrian bedrock that contains materials high in naturally occurring uranium. Gross alpha activity results are consistent with historical activity levels reported for BSG monitoring wells and are reported as uncorrected gross alpha activity (i.e., not corrected by subtracting naturally occurring uranium or radium activity).

Perchlorate was detected above the MDL of 0.004 mg/L only in samples collected from CYN-MW6. Perchlorate concentrations range from 4.12 to 7.24 mg/L, with all results qualified with “J” by the laboratory as estimated concentrations. Currently, no MCL is established for perchlorate but it is considered a COC because it exceeds the specified screening level/MDL of 4 μg/L in CYN-MW6 (NMED April 2004)

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 CY09.

From January through December 2009, semiannual groundwater sampling at the BSG Study Area was conducted for six wells (CYN-MW1D, CYN-MW3, CYN-MW4, CYN-MW6, CYN-MW7, and CYN-MW8) in February/March 2009 and September 2009.

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 ER Project sites will continue on a quarterly, semiannually, annually, and biannually basis during Calendar Year 2010 (CY10), as specified by regulatory guidance. The results for these monitoring events will be presented in the Annual Groundwater Monitoring Report for CY10.

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1.0 Introduction

Sandia Corporation (Sandia) conducts general groundwater surveillance monitoring 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 Environmental Restoration (ER) Project sites with an ongoing groundwater investigation. The purpose of this document is to report to regulators and other stakeholders the results of Sandia's groundwater monitoring activities for Calendar Year 2009. Separate chapters focus on the investigation activities at each of the following monitoring networks maintained by Sandia: 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), and the Burn Site Groundwater (BSG) (Chapter 7.0).

1.1 Site Description

The SNL/NM facility is located on Kirtland Air Force Base (KAFB), New Mexico. KAFB is a 51,559-acre 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 (COA), which borders KAFB on its north, northeast, west, and southwest boundaries. (Figure 1-1)

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's (DOE) National Nuclear Security Administration (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 square miles (sq mi) in area. 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 southern 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. As shown in Figure 1-1, the structural boundaries of the Albuquerque Basin are as follows:

- 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

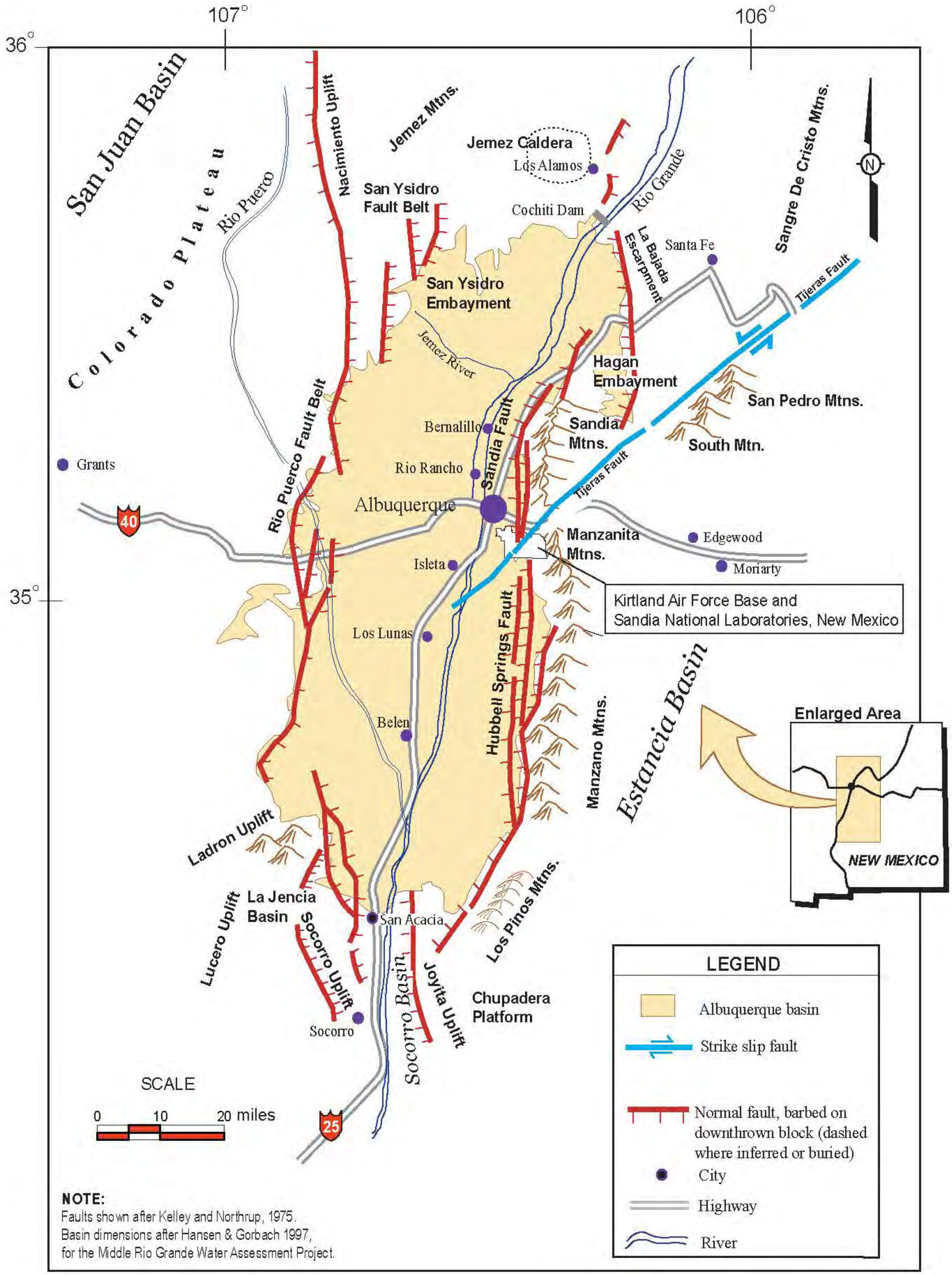

Figure 1-1. Albuquerque Basin, North-Central New Mexico

- Ladron and Lucero uplifts to the southwest
- Rio Puerco Fault Belt to the west

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 eolian 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 14,500 ft (4,420 meters [m]) at the deepest part of the basin. The entire sequence consists of unconsolidated sediments, which thin toward the edge of the basin and are truncated by normal faults at the 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 in 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, 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 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 three different 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 the map are somewhat arbitrary but identify the approximate hydrologic settings. A deep aquifer is present within the Albuquerque Basin where the regional water table lies at approximately 500 ft (152 m) below ground surface (bgs). A perched groundwater system (perched system) 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 perched system extends south to the KAFB Golf Course area, north to portions of TA-I, west of TA-II, and east of the KAFB Landfill. Possible explanations for the existence of a perched system are inter-arroyo recharge, irrigation of the golf course and other vegetated areas, water leakage from utility distribution lines, and infiltration from an unlined sewage lagoon system (SNL 1998).

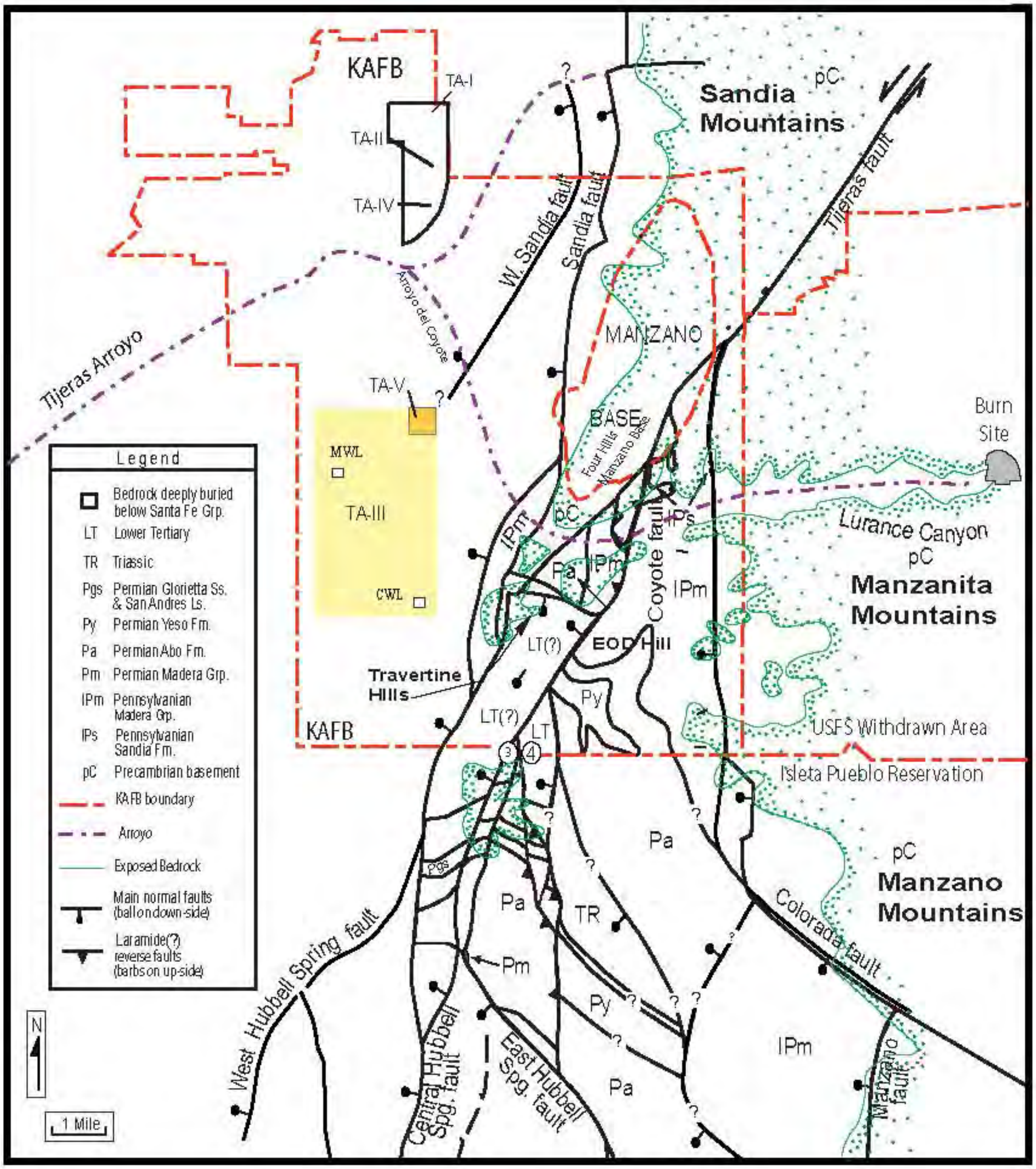

Figure 1-2. Generalized Geology in the Vicinity of SNL/NM and KAFB (Van Hart 2003)

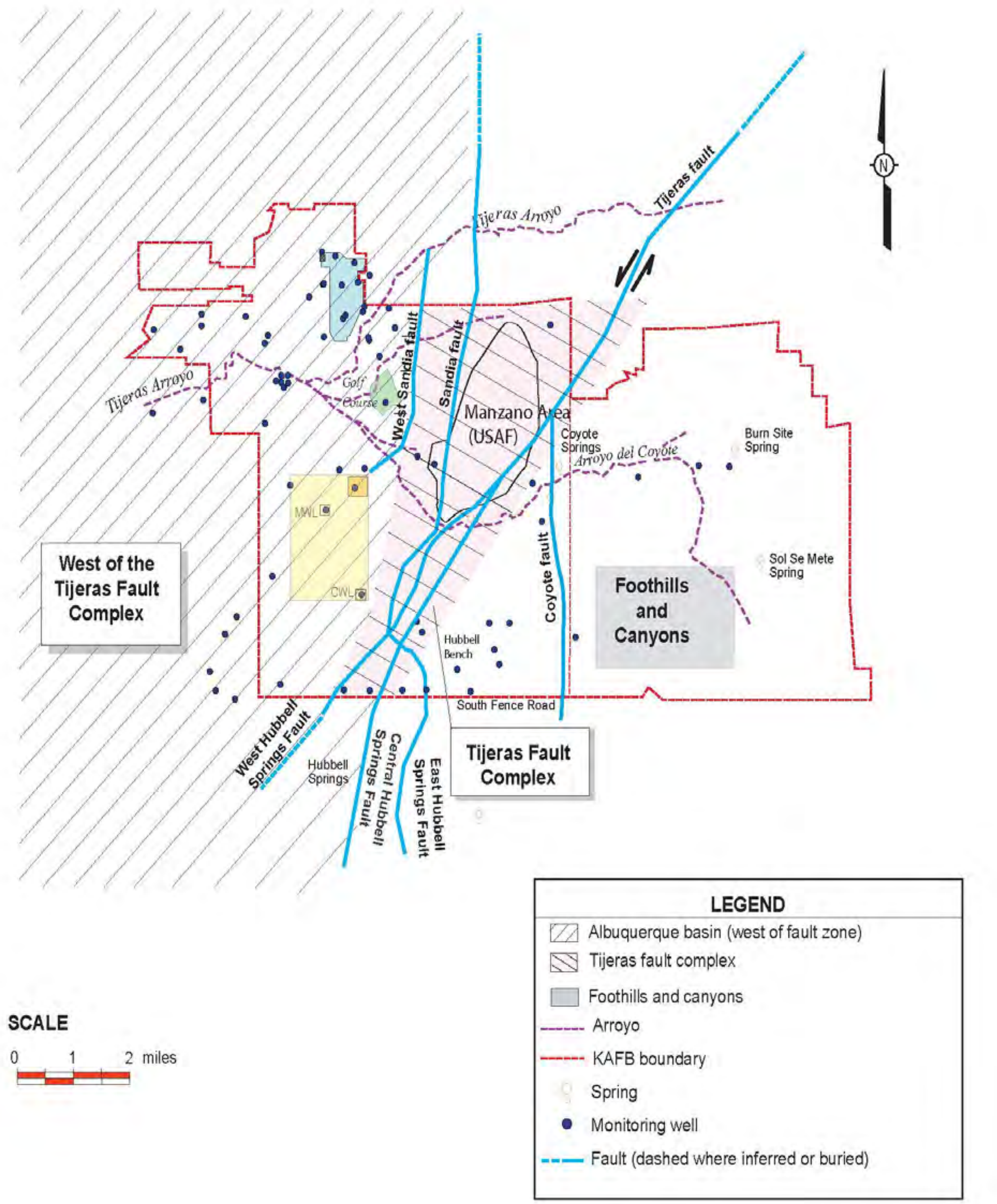

Figure 1-3. Hydrogeologically Distinct Areas Primarily Controlled by Faults (Modified from SNL 1995)

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 (14 to 99 m) bgs. Most of the 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. The groundwater gradient is relatively steep, 0.03 ft/ft, in crossing the Tijeras fault complex from east to west. The elevation change in the water levels is 350 ft (106 m) over 15,840 ft (4,828 m). 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 by KAFB and COA, a depression in the water table has created a broad trough originating at the well fields in the northwest end of KAFB. The impact of the seasonal variation in water production by both KAFB and COA wells can be observed as fluctuations in the water levels of some SNL/NM and KAFB monitoring wells as far east and south as TA-III.

1.1.4 Surface Water Hydrology

The Rio Grande, located approximately 8 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 (2,832 kilometers) 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 that flow for short periods from runoff after storm events or during the spring melt of mountain snow packs. 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 storms that usually occur from June through August. The Tijeras Arroyo, above the confluence with Arroyo del Coyote, drains about 80 sq mi (207 square kilometer [sq km]), while Arroyo del Coyote drains about 39 sq mi (101 sq km) (USACE 1979). The total watershed for the Tijeras Arroyo, which includes the Sandia and Manzanita Mountains and portions of KAFB, is approximately 126 sq mi (336 sq km). All active SNL/NM facilities are located outside the 100-year floodplain of both Tijeras Arroyo and Arroyo del Coyote (USACE 1979).

Several springs on KAFB are associated with the uplifts on the east side of the basin: (1) Coyote 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 within 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 (ft^3)/year (yr) (50 acre ft [ac-ft]/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 due to the high rate of evapotranspiration for most other areas on KAFB, generally alluvial slopes and flat areas within the basin (SNL 1998).

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 jet fuel/aviation gasoline plume on the base. Sandia monitors groundwater on KAFB at locations associated with DOE-owned facilities and sites permitted by the USAF for DOE use. Groundwater monitoring by Sandia is conducted by the ER Project and the GWPP. Figure 1-4 illustrates the extensive monitoring well network at KAFB.

1.2.1 Environmental Restoration Project Monitoring

The SNL/NM ER Project 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 five ER Project groundwater monitoring networks: (1) TAG; (2) TA-V; (3) CWL; (4) MWL; and (5) the BSG Study Area. The ER Project groundwater monitoring wells are located upgradient and downgradient of known legacy surface contamination sites with associated groundwater contamination.

1.2.2 Groundwater Protection Program Monitoring

The SNL/NM 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 SNL/NM operations on groundwater.

1.2.3 Groundwater Monitoring Regulatory Criteria and DOE Orders

Groundwater monitoring performed by the GWPP and ER Project are directed by three different sets of regulations and requirements. Groundwater surveillance conducted by the GWPP is directed by DOE Order 450.1A, *Environmental Protection Program* (DOE 2008) and DOE Manual 231.1A, *Environment, Safety, and Health Reporting* (DOE 2004). Groundwater monitoring results from both the GWPP and ER Project are compared with federal and state water quality standards and DOE drinking water guidelines, where established.

In addition to the DOE Directives, ER Project 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 solid waste management units (SWMUs).

At SNL/NM, SWMUs are regulated under the HSWA module of the 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. Monitoring performed at the MWL falls into this category. Some groundwater monitoring activities (e.g., TA-V, TAG, and BSG investigations) are more broadly based and have historically been conducted by the ER Project as Voluntary Corrective Measures.

The CWL is being closed as a regulated unit that operated under an interim RCRA permit. Groundwater monitoring at the CWL is being conducted per the requirements of the NMED approved closure plan for the unit.

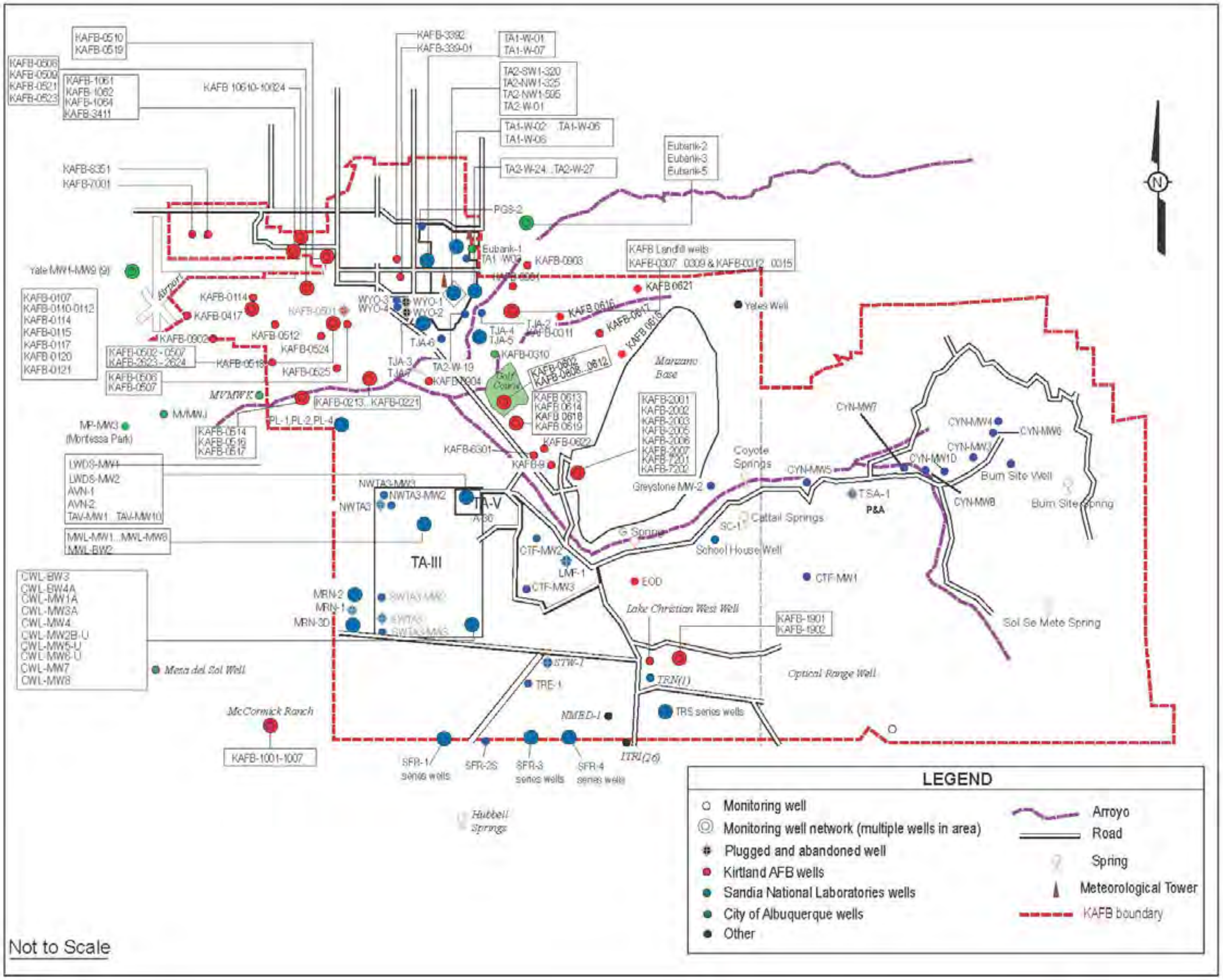

Figure 1-4. Wells and Springs on SNL/NM and KAFB

Three of the ER Project groundwater investigations are under the direction of the Compliance Order on Consent (the Order) between the New Mexico Environment Department (NMED), Sandia, and the DOE (NMED 2004). These three AOCs (TA-V, TAG, and BSG) must comply with requirements set forth in the Order for site characterization and the development of a Corrective Measures Evaluation (CME) for each of these sites. The Order also contains schedules that define dates for the delivery of plans and reports related to the TA-V, TAG, and BSG AOCs, and, accordingly, the DOE/NNSA and Sandia were required to complete CME Reports for the TA-V, TAG, and BSG AOCs by September 30, 2005. The NMED is the regulatory agency responsible for enforcing the requirements identified in the Order for each of the three CMEs. During Fiscal Year 2004, CME Work Plans were submitted to the NMED for each of these three sites that summarize prior work, identify potential source areas, and conduct screening of technologies that result in identification of remedial alternatives that will undergo a full evaluation during the CME process (SNL 2004a, 2004b, and 2004c).

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2.0 Groundwater Protection Program

2.1 Introduction

This chapter documents the results of the Calendar Year 2009 (CY09) groundwater surveillance monitoring activities conducted as part of the Sandia National Laboratories, New Mexico (SNL/NM) Groundwater Protection Program (GWPP). The surveillance activities include the annual collection and analysis of groundwater samples from 14 monitoring wells and 1 surface water sample from a spring. Water levels were measured at 73 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 purpose of the GWPP 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, the GWPP performs the following tasks:

- Determines the effects of SNL/NM operations on groundwater through groundwater quality sampling and water level measurement and analysis.
- Records groundwater data in a database.
- Maintains GWPP documents and records and ensures that all necessary reports are submitted to the appropriate agencies in a timely manner.
- 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 Discharge Program to prevent groundwater contamination.
- Develops groundwater education and community outreach programs.
- Provides stakeholders an annual update of groundwater data at SNL/NM through the *Annual Groundwater Monitoring Report*.

The groundwater surveillance monitoring involves completing the following objectives:

- Establish baseline water quality and groundwater flow information for the groundwater system at SNL/NM.
- Determine the impact, if any, of SNL/NM's operations on the quality and quantity of groundwater.
- Demonstrate compliance with all federal, state, and local groundwater requirements.

The GWPP is responsible for tracking information on all wells operated by Sandia Corporation (Sandia), including Environmental Restoration (ER) Project monitoring wells and characterization boreholes. The GWPP Well Registry and Oversight Task were established to ensure that all wells operated by Sandia are properly constructed and maintained to protect groundwater resources (NMOSE 2005). The GWPP Project Lead works with well owners to review new well installation plans, record construction information, track well ownership and maintenance records, perform annual well inspections, and consult with owners when plugging and abandonment or replacement of a well or borehole 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 2009 GWPP Plan (SNL 2009a)

2.2 Regulatory Criteria

Sandia is required by U.S. Department of Energy (DOE) Order 450.1A to develop and implement a site-wide Groundwater Protection Management Program (DOE 2008). Groundwater surveillance is one element within DOE's overall Environmental Protection Program. The implementation of a successful GWPP includes all elements of the Integrated Safety Management System and relevant elements of the facilities Environmental Management System to ensure that:

- 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 ambient groundwater and vadose zone conditions at the site are documented.
- Environmental monitoring with surveillance program elements for the groundwater and the vadose zone, including ambient subsurface conditions, is described.
- The way the monitoring program provides the information needed to predict and respond to potential contamination associated with significant site aspects and to achieve groundwater protection goals is prescribed.

In April 2004, the DOE and Sandia agreed to the Compliance Order on Consent (the Consent Order) (NMED 2004) issued by the New Mexico Environment Department (NMED). Among other requirements primarily affecting ER Project sites, the Consent Order mandates 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 is 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 of the noncompliant well will continue on a quarterly basis until at least four consecutive nondetections are obtained (NMED 2004). 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
NMWQCC[1] Standards for Groundwater (20 6.2.3103A NMAC Human Health Standards) (NMED 2001)	MAC	NMWQCC
DOE Drinking Water Guidelines for Radioisotopes[2] (DOE Order 5400.5)	DCG	DOE (1993)

Notes: [1] 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.

[2] 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 than EPA's 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.

2.3 Scope of Activities

2.3.1 Groundwater Surveillance Quality Monitoring

Annual sampling of groundwater was conducted during the period from March 4 to March 26, 2009. Samples were collected from 14 wells and 1 spring. Groundwater surveillance samples were collected from the following monitoring wells: CTF-MW1, CTF-MW2, CTF-MW3, Eubank-1, Greystone-MW2, MRN-2, NWTA3-MW3D, PL-2, SFR-2S, SFR-4T, SWTA3-MW2, SWTA3-MW3, SWTA3-MW4, and TRE-1. A surface water sample was collected from Coyote Springs. The analytical results for the groundwater samples are presented in Attachment 2A. Well locations are shown in Figure 2B-1 (Attachment 2B).

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

- Safe Water Drinking Act (SWDA) list volatile organic compounds (VOCs)
- Total organic halogens (TOX)
- Total phenols
- Total alkalinity
- Nitrate plus nitrite (NPN)
- Total cyanide
- Major anions
- Target Analyte List (TAL) metals plus uranium-235 and uranium-238
- Mercury
- Gamma spectroscopy
- Gross alpha and beta activity
- Radium-226 and radium-228

Analysis for high explosive (HE) compounds was conducted on groundwater samples collected from wells CTF-MW2, CTF-MW3, SFR-2S, SWTA3-MW3, SWTA3-MW4, and TRE-1. These wells 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 VOCs, HE, and mercury fractions. Two duplicate samples were submitted for all analyses from CTF-MW3 and Eubank-1.

2.3.2 Groundwater Level Monitoring

Water levels are a means to assess the physical changes of the groundwater system over time. This includes changes in the local water table, the quantity of water available, as well as the direction and speed of groundwater movement. The GWPP gathers groundwater level measurements from a large network of wells on and around Kirtland Air Force Base (KAFB). In addition to wells owned by the DOE, data is solicited for U.S. Air Force (USAF) Installation Restoration Program (IRP), City of Albuquerque (COA), and U.S. Geological Service (USGS) wells (Figure 1-4). Water levels in wells were measured quarterly or monthly, depending on the data source and well characteristics.

The water table elevation provides a direct measure of the amount of water in storage in the aquifer. Changing water table elevations reflect the difference between recharge and withdrawal from the aquifer. In addition, the rate of change of water levels at a monitoring well screened across the water table provides a reliable measure of the useful lifetime of the well.

Groundwater recharge is difficult to measure directly. Precipitation can be used as an indirect measure of recharge potential. Available precipitation also impacts demand on groundwater withdrawal. Water quantities pumped by the KAFB and COA water supply wells represent the primary groundwater withdrawal from the regional aquifer at this location. Water level elevation data collected during a common time period at a group of representative wells are analyzed, and the data are interpolated and plotted as groundwater elevation contours. From this water table map, groundwater flow directions can be identified and horizontal gradients can be determined. Specific results for annual precipitation, water production, and the impact on the water table are discussed in Section 2.6.2.

2.3.3 Monitoring Well Installation

During CY09, the GWPP installed one new monitoring well, PL-4, as a replacement for PL-3 in the same location. The local water table in PL-3 had dropped below the bottom of the screen rendering the well ineffective as a groundwater monitoring well for sample collection and water level measurements. Monitoring well PL-3 and an adjacent 2-inch-diameter well, PL-1, were plugged and abandoned in September 2009 (SNL 2009c). PL-4 was not sampled during this reporting period.

2.4 Field Methods and Measurements

2.4.1 Groundwater Sampling

The GWPP monitoring procedures, as required by the Groundwater Surveillance Task, are consistent with procedures identified in the U.S. Environmental Protection Agency (EPA) technical enforcement guidance document (EPA 1986). The EPA procedures are included in the GWPP Sampling and Analysis Plan (SAP) (SNL 2006), which provides general requirements for data quality objectives, field operations, sample documentation and custody, quality control (QC), reporting, and data management. Specific sampling instructions for the annual surveillance monitoring event are conveyed to SNL/NM Field Support Operations (FSO) and Sample Management Office (SMO) as provided in a mini-SAP (SNL 2009b). The min-SAP is prepared by the Sampling Coordinator at the request of the GWPP Project Lead. The mini-SAP provides detailed information on the wells to be sampled, the analyses to be conducted, the methods to be used, and any special conditions that may apply.

2.4.2 Sample Collection and Analysis

Groundwater samples are collected using a nitrogen gas-powered, portable, piston pump (Bennett™). Surface water samples from Coyote Springs are collected using a peristaltic pump. With the exception of samples collected for HE compound, VOC, and mercury analyses, samples are filtered through a 0.45-micron cartridge filter inserted into the pump discharge line. Samples are filtered to determine dissolved constituents in the groundwater to compare with New Mexico Water Quality Control Commission (NMWQCC) groundwater standards, which are based on dissolved contaminants (Section 20.6.2, New Mexico Administrative Code). Sampling is conducted annually. Sample collection is conducted according to the instructions and requirements specified in Field Operating Procedure (FOP) 05-01, *Long-Term Environmental Stewardship Groundwater Monitoring Well Sampling and Field Analytical Measurements* (SNL 2007a).

2.4.3 Field Water Quality Measurements

Field water quality measurements are obtained at the time of sample collection. Groundwater is pumped to the surface and through a flow-through cell containing measurement probes for various field instruments. Table 2-2 lists the field parameters. Consecutive measurements of temperature, pH, turbidity, and specific conductance (SC) are collected until these values are within the acceptance range of the stabilization parameters shown in Table 2-2. Stability of the measured parameters indicates sufficient water has been removed from the well to replace stagnant well bore water with formation water, and a representative groundwater sample can be collected. In addition to groundwater stability measurements, other field parameters measured include alkalinity, dissolved oxygen (DO), and oxidation-reduction potential (ORP). All purge water is placed into 55-gallon containers and stored at the FSO facility waste accumulation area pending analysis of groundwater samples and subsequent determination of the appropriate disposal path for the water.

Table 2-2. Field Water Quality Parameters Measured at GWPP 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%.
Turbidity (NTU)	Stability measure: Four consecutive measurements within 10% or < 5 NTU.
Alkalinity(1)	Measured in mL $CaCO_3$. Alkalinity titrations are performed in the field at the time of sample collection.
Sample Flow Rate	Measured in gpm
Dissolved Oxygen	Percentage of saturation value and/or measured in mg/L
Oxidation-Reduction Potential	Measured in mV

Note: (1)Alkalinity results for field measurements are provided in Attachment 2A, Table 2A-8, and laboratory-derived alkalinity values are reported in Table 2A-3 for comparison.

°C = Degree(s) Celsius.
$CaCO_3$ = Calcium carbonate.
gpm = Gallon(s) per minute.
GWPP = Groundwater Protection Program.
µmhos/cm = Microhm(s) per centimeter.
mg/L = Milligram(s) per liter.
mL = Milliliter(s).
mV = Millivolt(s).
NTU = Nephelometric turbidity units.

2.4.4 Water Level Measurements

Water level measurements are conducted at a frequency of monthly or quarterly for a network of 73 SNL/NM monitoring wells located on DOE property and on permitted land from KAFB. Sampling frequency for each well is determined by the response of the local water table to well pumping or other temporal stresses. Where seasonal pumping stresses impose a periodic response on the local water table, the measurement frequency is monthly. If the water table is relatively stable, the measurement frequency for wells is quarterly. Water level measurements are conducted according to the instructions and requirements specified in FOP 03-02, *Groundwater Level Data Acquisition and Management*, Rev. 02 (SNL 2007b)

2.5 Analytical Methods

Analytical methods for groundwater samples are identified in the mini-SAP for the specific analytes for each sampling event (SNL 2009b). The methods are defined in EPA SW846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* Update IV of the 3rd Edition (EPA 2008). Other analyses are conducted using methods developed by the EPA Office of Groundwater and Drinking Water. The SMO provides oversight of the contract laboratories to ensure that proper methods are applied within SMO-specified performance criteria (SNL 2007c).

2.6 Summary of Monitoring Results

2.6.1 Analytical Results

Groundwater and surface water samples were submitted to General Engineering Laboratories, Inc. (GEL) for both chemical and radiological analysis. In addition, SNL/NM FSO personnel performed field alkalinity measurements. 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 and NMED maximum allowable concentrations (MACs) for human health standards of groundwater as promulgated by the NMWQCC (NMED 2001). Analytical reports from GEL, including certificates of analyses, analytical methods, MDLs, practical quantitation limits (PQLs), minimal detectable activity (MDA) values, critical levels, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Customer Funded Records Center. Analytical results, laboratory QC qualifiers, and third-party validation qualifiers are posted to 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 March 2009. No VOCs or HE compounds were detected at concentrations above established MCLs or MACs in any groundwater sample. Chloroform, toluene, vinyl chloride, and 1,2,4-trimethylbenzene were the only VOCs 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. Chloroform was detected at a concentration of 0.762 μg/L in the sample from TRE-1; toluene was detected in samples from Eubank-1 and SWTA3-MW2 at concentrations of 0.292 and 0.251 μg/L respectively; and vinyl chloride and 1.2.4-trimethylbenzene were detected in the sample from CTF-MW2 at concentrations of 0.582 and 0.538 μg/L respectively. In addition, bromodichloromethane, chloroform, dibromochloromethane, and naphthalene were reported as detected by the laboratory; however, subsequent validation review of the data resulted in qualifying the data with “U,” indicating that the data are not usable because contaminants were detected in the associated blank samples. The only HE compound detected was hexahydro-trinitro-triazine (RDX). The concentration of RDX detected in the sample from CTF-MW2 was reported at 0.243 μg/L; however, this value was also qualified as estimated with “J” as detected but not reliably quantifiable. Table 2A-2 (Attachment 2A) lists the laboratory MDLs for VOC and HE compounds identifiable with the applied analytical methods.

Table 2A-3 (Attachment 2A) summarizes alkalinity, major anions (as bromide, chloride, fluoride, and sulfate), NPN, TOX, total phenols, and total cyanide results. None of the analytes listed were detected above established MCLs or MACs, except fluoride. Fluoride was detected above the MAC of 1.6 milligrams per liter (mg/L) in samples from Coyote Springs, CTF-MW2, CTF-MW3 (primary and duplicate), SFR-4T, and SWTA3-MW4 at concentrations ranging from 1.68 to 2.69 mg/L. Elevated fluoride concentrations are routinely observed in monitoring wells in the eastern half of KAFB. This is an area of shallow groundwater and elevated bedrock containing fluoride-bearing minerals. The time trend plots for wells exceeding the MCL for fluoride concentrations are presented in Figures 2B-2 through 2B-6 (Attachment 2B). The results for TOX were qualified during data validation as not detected in various samples due to contamination in initial calibration and continuing calibration blank samples. NPN results for the Coyote Springs samples and total phenols results for both SFT-4T and SWTA3-MW2 samples were qualified as not detected during the data validation process due to associated laboratory method blank contamination.

Samples from GWPP monitoring wells were analyzed for TAL metals plus uranium. No metal parameters, other than arsenic and beryllium, were detected above established regulatory limits in any groundwater sample. Arsenic was detected above the MCL of 0.01 mg/L in the sample from CTF-MW2 at a concentration of 0.0517 mg/L. The time trend plot for arsenic concentrations in well CTF-MW2 is shown in Figure 2B-7 (Attachment 2B). Beryllium was detected above the MCL of 0.004 mg/L in the sample from Coyote Springs at a concentration of 0.00733 mg/L. The time trend plot for beryllium concentrations in Coyote Springs is shown in Figure 2B-8 (Attachment 2B). Dissolved TAL metal results are summarized in Table 2A-4 (Attachment 2A).

Mercury was analyzed from 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).

Gamma spectroscopy results for short-list radionuclides are summarized in Table 2A-6 (Attachment 2A). All isotope activities are less than associated MDA values, except for potassium-40. Potassium-40 was reported above the MDA in the sample from CTF-MW3 at an activity of 53.4 ± 48.8 picocuries/liter (pCi/L). Potassium-40 results for the sample from Coyote Springs and samples from SFT-4T and SWTA3-MW3 were qualified as unusable during data validation due to the gamma spectrum peak not meeting identification criteria for the isotope.

Radioisotopic analyses included gross alpha and gross beta activity, radium-226, and radium-228. Gross alpha activity results for samples from Coyote Springs, CTF-MW1, CTF-MW2, CTF-MW3, Greystone-MW2, SFR-2S, SFR-4T, and TRE-1 exceeded the MCL of 15 pCi/L at activity levels ranging from 15.1 to 35.8 pCi/L. A reanalysis of the results for Greystone-MW2 and SFR-4T was conducted because the original results differed significantly from the historical gross-alpha data available for these locations. On reanalysis, the gross alpha activity results for these wells were below 15 pCi/L. In the general location of these wells in the eastern portion of KAFB, groundwater is in contact with bedrock that contains minerals high in naturally occurring uranium and other naturally occurring radionuclides. Gross alpha activity results are reported as uncorrected gross alpha activity (not corrected by subtracting naturally occurring uranium and radon activity). When the correction for the gross-alpha contribution from uranium is subtracted using a specific activity of 670 picocuries per milligram, the results for samples from CTF-MW1, CTF-MW2, SFR-2S, and TRE-1 are 27.0, 17.2, 21.9, and 21.9 pCi/L, respectively.

Additional corrections for radon activity can be applied to these numbers; however, radon is not one of the analytes available for groundwater samples from these wells. Trend plots for those wells in which corrected alpha activity results exceed the MCL are shown in Figures 2B-9 and 2B-10 (Attachment 2B). Combined radium-226 and radium-228 activity results from the CTF-MW2 sample exceed the MCL of

5.0 pCi/L. Radium-226 was reported in the sample from CTF-MW2 at 2.99 pCi/L, and radium-228 at 7.68 pCi/L. Gross beta activity results do not exceed established limits. Radioisotopic results are summarized in Table 2A-7 (Attachment 2A).

Table 2A-8 (Attachment 2A) summarizes field water quality measurements collected prior to sampling and field alkalinity titration results. Field water quality measurements include water level, turbidity, pH, temperature, SC, ORP, and DO. The water level was measured with a Solinst® water level indicator. Groundwater temperature, SC, ORP, DO, and pH were measured using an YSI™ Model 620 Water Quality Meter. Turbidity was measured with a HACH™ Model 2100P portable turbidity meter.

2.6.2 Water Level Measurements

During Calendar Year 2008 (CY08), water levels were measured in 156 monitoring wells. Data were provided by the USAF IRP, the COA, the USGS, and SNL/NM. Data are available in the EDMS. The number of wells represented in the database is provided by the respective organization listed in Table 2-3.

Table 2-3. Water Levels Measured by SNL/NM and Other Organizations

Total Wells	Measuring Agency	Well Owner	Location
73	SNL/NM GWPP	DOE/NNSA	Site-wide surveillance network wells, CWL, MWL, TA-V, TAG Investigation, and Burn Site Groundwater Area
69	USAF IRP Program	KAFB	IRP Long-term Monitoring Program
11	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	New Mexico State Engineers Office	Mesa del Sol well
1	USGS	COA	MP-MW3 (Montessa Park) well

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.
MWL = Mixed Waste Landfill.
NNSA = National Nuclear Security Administration.
SNL/NM = Sandia National Laboratories, New Mexico.
TAG = Tijeras Arroyo Groundwater.
TA-V = Technical Area V.
USAF = U.S. Air Force.
USGS = U.S. Geological Survey.

2.6.2.1 Groundwater Recharge and Withdrawal

Factors influencing water level 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 9.47 inches per year (in./yr) (30-year norm) at Albuquerque International Sunport (Airport) 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 CY09 the wettest months were June through October. Precipitation data relevant to KAFB hydrogeology are available from four locations. Three meteorological towers are used to measure on-site precipitation at

KAFB: the A21 tower in 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 source is the National Weather Service station at the Airport, adjacent to KAFB. Annual precipitation during CY09 at the four sites is shown in Table 2-4. Data for CY08 is also presented for comparison. The 6.67 inches (in.) of precipitation measured at the Airport during CY09 is 1.68 in. less than the corresponding period for the previous year and is 2.8 in. below the 30-year norm of 9.47 in. Monthly distribution of precipitation during CY09 at the four locations is shown in Figure 2C-1 (Attachment 2C). Figure 2C-2 shows the annual distribution of precipitation at these four locations for the period from January 2001 to December 2009.

Table 2-4. CY08–CY09 Precipitation Data at KAFB

Site	A21	A36	SC1	Airport
CY08	6.01	7.13	8.35	8.35
CY09	6.83	7.97	9.24	6.67

Notes: Data are in inches of rainfall.
Airport = Albuquerque International Sunport.
CY08 = Calendar Year 2008.
CY09 = Calendar Year 2009.
KAFB = Kirtland Air Force Base.

Groundwater Withdrawal

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 CY09, 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 CY09 monthly production for KAFB water supply wells. The highest level of production was in August at 118,922,000 gallons (gal.); the lowest occurred in December at 33,798,000 gal. The variability production in response to demand is reflected in the cyclic fluctuation of water levels in monitoring wells within the region of influence of these pumping wells and is evident when shown in hydrographs. Figure 2C-4 shows the CY09 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 2000. Reductions in water demand have been achieved through conservation. In addition, in 2007, a portion of the base housing was switched to the COA drinking water supply, reducing demand on the KAFB system. Table 2-5 provides a comparison of water pumped in CY09 to the previous year.

Table 2-5. Total KAFB Groundwater Well Production

Units	CY08	CY09
Million gal.	896	890
ac-ft	2,748	2,731

ac-ft = 325,851 gal.
CY08 = Calendar Year 2008.
CY09 = Calendar Year 2009.
gal. = gallon(s).
KAFB = Kirtland Air Force Base.

2.6.2.2 Water Table Elevations

Construction of Regional Water Table Elevation Contour Map

Water level data from monitoring wells installed by the DOE and Sandia, USAF IRP, COA, and the State of New Mexico were used to construct the CY09 regional water table elevation contour map shown in Figure 2C-6 (Attachment 2C). The extent of the contoured area was constructed using September through

November 2009 static water level elevation data from 33 wells completed in the regional aquifer underlying the western portion of KAFB. These wells are screened across the regional water table in the upper unit of the Santa Fe Group. The West Sandia Fault and the Tijeras fault complex (Figures 1-2 and 1-3) comprise the eastern boundary of the area in Figure 2C-6. These bounding faults are assumed to act as barriers to groundwater flow into the central basin from foothills to the east. The contours are developed using Surfer software (Golden 2002).

Hydrographs for the wells used to construct the contours are shown in Attachment 2C. The hydrographs represent data only for the most recent three years of water level measurements.

Regional Groundwater Flow System

In general, the open-to-the-north, U-shaped contour lines depicted in Figure 2C-6 (Attachment 2C) define an elongated depression in the water table with a north-south orientation. This depression or trough extends as far south as Isleta Pueblo Reservation. The KAFB and COA Ridgecrest production well fields are located near the northern boundary of KAFB. The depression of the water table is the result of the withdrawal of groundwater by the water supply wells. The contour line gradient indicates groundwater flow towards these supply wells. 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 this area. The contours define the collective zones of influence of these large well fields. The direction of groundwater flow in the vicinity of KAFB (west of the Tijeras fault complex), as inferred from the contour lines, is toward the center of the trough and then to the north.

The relatively steep gradients in the water table along the eastern edge of the map are partially due to increased ground surface elevation defining the eastern extent of the Albuquerque Basin and the presence of faults, shown in Figures 1-2 and 1-3. The faults also present a hydrologic barrier to the westward movement of groundwater. The dashed contour lines in the southeast corner of Figure 2C-6 are inferred contours of groundwater elevations impacted by the Tijeras fault zone, which intersects the map at this location.

Figure 2C-7 (Attachment 2C) maps contours of changes in water level elevations observed in CY09 from the same period of measurement in CY08. Areas of greatest declines in the water table are in the area southwest of TA-III. The trend for the area is approximately 0.95 ft/year (ft/yr) as determined from the hydrograph for monitoring well SWTA3-MW2 presented in Figure 2C-8. The wells in the northeast corner of Figure 2C-7 show an increase in groundwater elevation. The water level in well Eubank-5 is up 1.89 ft from the corresponding period in CY08 (Figure 2C-9). This increase may be attributed to recharge from Tijeras Arroyo or recharge resulting from the draining of the perched groundwater system (PGWS) described in the following section. Figures 2C-8 through 2C-10 present the hydrographs of SNL/NM monitoring wells used to construct the water table maps shown in Figure 2C-6.

Perched Groundwater System

During monitoring well installation 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 water table at this location. The installation of additional wells completed in this shallow water-bearing zone defined the boundaries of the extent of the PGWS, which is approximately 3.5 square miles. The western extent is to the west side of the former KAFB sewage lagoons. The northern limits coincide with the northern edge of TA-I. To the east, the PGWS has been confirmed in the USAF IRP monitoring wells east of the KAFB Landfill. The southern extent appears to be south of the golf course along the north side of Pennsylvania Avenue.

The elevation data to the first water level of the PGWS are contoured in Figure 2C-11 (Attachment 2C). The contour map was constructed using data from 19 monitoring wells completed in the defined area. The contours indicate a gradient in the PGWS to the east-southeast. Correlation of lithologic information obtained from boreholes drilled during monitoring well installations indicates a layer of fine sediments that dips to the southeast (Van Hart 2001) and may serve as the perching horizon.

Figure 2C-12 (Attachment 2C) illustrates the change in water level elevations in the PGWS during the period of CY09. In general, the elevation of the water table of the uppermost layer is decreasing in the northwest as illustrated by the hydrographs shown in Figure 2C-13. The water levels in wells located in the eastern portion of the PGWS demonstrate an increasing trend in water levels. The dashed contours in the southeast half of the map represent increasing water levels.

The decreasing water levels in the west shown in Figure 2C-12 (Attachment 2C) are dominated by monitoring well WYO-4. The annual decline in water level elevations during CY09 was 0.95 ft at this location. The four-year trend in the hydrograph for WYO-4 is approximately 1.57 ft/yr (Figure 2C-13). One possible explanation for the rapid decline of water levels at this location is that the perching horizon has greater vertical conductivity in the vicinity of WYO-4. This would allow water to drain to the regional water table. A similar situation appears to apply to TA1-W-03, which had an annual decline of 1.18 ft. The anomalous decrease in water levels in monitoring well KAFB-0608, which is located in the eastern portion of the PWGS in an area of generally increasing water levels, is due to limited pumping from wells installed in the PGWS at the KAFB golf course. The pumping is part of a nitrate abatement activity that uses nitrate-contaminated groundwater in the perched zone to irrigate the golf course turf.

Monitoring Well Hydrographs

This section discusses recent trends in water levels in the vicinity of SNL/NM, as demonstrated in the hydrographs for wells used to construct the regional water table contours in Figure 2C-6 and the PGWS contours in Figure 2C-11 (Attachment 2C). The water level data for these wells are representative of water levels at KAFB west of the Tijeras fault zone and the Sandia fault. Hydrographs are graphical plots of water levels at a monitoring location over time. Data from quarterly and monthly water level measurements are used to construct the hydrographs. These hydrographs illustrate water level changes over the time period from 2006 through 2009. Figures 2C-8 through 2C-10 depicts the hydrographs of wells representing the regional aquifer, and Figure 2C-13 shows the hydrographs for the PGWS.

Each figure contains hydrographs for representative monitoring wells located in the section of KAFB identified in the figure title. One or more representative hydrographs were selected in each group to demonstrate the characteristic trends of groundwater levels in the particular area. A trend line was constructed for the representative hydrographs using a linear regression of data for the recent 48-month period. The trend lines are superimposed on the individual water levels in the hydrograph and are defined by the linear equation $y = ax + y$ intercept, where the coefficient of x is the slope of the line and represents water level changes in ft/day. The slope value multiplied by 365 days is the annual change in ft/yr based on a four-year water level data trend.

The hydrograph trend lines generally exhibit relatively good correlation with the linear models as demonstrated by R^2 coefficient values near one. The R^2 values near zero indicate a poor linear model representation. On some hydrographs for regional wells, periodic oscillations in water level are prominent. These oscillations correlate with changes in the rate of groundwater pumping at the supply wells in response to seasonal water demand, i.e., elevated water levels in winter and spring and depressed water levels in summer and fall. Generally wells closer to the water supply wells demonstrate the greatest response.

2.7 Quality Control Results

The SNL/NM SMO processes environmental samples collected by both the GWPP and ER Project. The SMO reviews the SAP, orders sample containers, issues sample control and tracking numbers, tracks the chain-of-custody, and reviews analytical results returned from the laboratories for laboratory contract compliance (SNL 2007c). All groundwater samples are analyzed by off-site laboratories using EPA-specified protocols.

The QC samples are collected in the field at the time of environmental sample collection. Field QC samples include equipment blanks, duplicate samples, field blanks, and trip blanks. Field QC samples are used to monitor the sampling process. Equipment blanks are used to verify sampling equipment decontamination procedures. Duplicate samples are used to measure the precision of the sampling process. Field blanks are used to assess whether contamination of the samples resulted from ambient field conditions. Trip blanks are used to determine whether VOCs contaminated the sample during preparation, transportation, and handling prior to receipt by the analytical laboratory.

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. Table 2-6 shows the types of QC samples that accompany groundwater quality samples in the sampling and analysis process. Reported laboratory analytical and QC data are reviewed against quality assurance requirements specified in the data validation procedure (SNL 2007d).

Table 2-6. QC Sample Types for Groundwater Sampling and Analysis

QC Sample Type	Description
Field QC	
Equipment blanks(1)	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 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 effects of chemical spikes added to an existing sample to determine the sample matrix effect. (The matrix is groundwater.)

Note: (1)Equipment blanks are collected for selected wells only.
LCS = Laboratory control sample.
QC = Quality control.
VOC = Volatile organic compound.

Quality assurance validation is conducted on all laboratory-reported data by a third-party consultant. The validation process evaluates the laboratory analytical processes and laboratory QC results for consistency with the specified analytical methods and contract requirements.

2.8 Variances and Nonconformances

No variances occurred during the CY09 annual groundwater surveillance monitoring event.

2.9 Summary and Conclusions

The annual groundwater surveillance monitoring sampling event was conducted during March 2009. Groundwater samples were collected from 14 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 above established MCLs or MACs. The HE compound RDX was detected in the groundwater sample from monitoring well CTF-MW2 at a concentration of 0.243 μg/L.

Fluoride was detected above the NMWQCC groundwater protection standard of 1.6 mg/L (NMED 2001). The elevated fluoride concentrations were detected in samples from wells CTF-MW2, CTF-MW3, SFR-4T, and SWTA3-MW4. The surface water sample from Coyote Springs also contained elevated fluoride levels. The concentrations range from 1.68 to 2.69 mg/L. The EPA SWDA-regulated MCL for fluoride is 4.0 mg/L.

Arsenic was detected above the MCL of 0.01 mg/L in the groundwater sample from CTF-MW2 at a concentration of 0.0517 mg/L. Beryllium was detected in the surface water sample from Coyote Springs at a concentration of 0.00733 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.

Gross alpha activity values in water samples from Coyote Springs, CTF-MW1, CTF-MW2, CTF-MW3, Greystone-MW2, SFR-2S, SFR-4T, and TRE-1 exceed the MCL of 15 pCi/L. Uncorrected activity results range from 15.1 to 35.8 pCi/L. Upon reanalysis of the samples from Greystone-MW2 and SFR-4T, the gross alpha activity results for these wells were reported below the MCL. When the activity results for the remaining locations are adjusted to subtract uranium activity only, the activity results for CTF-MW1, CTF-MW2, SFR-2S, and TRE-1 exceed the MCL. The corrected values for these wells range from 17.2 to 27.0 pCi/L. The wells with elevated gross alpha activity levels are located west of the Tijeras fault zone in an area of shallow bedrock with naturally high uranium values.

Water table elevation measurements were obtained throughout CY09 at 73 locations on a monthly and quarterly basis. Water level elevation measurements obtained from 33 representative monitoring wells west of the Tijeras fault zone and west of the Sandia fault at KAFB and vicinity were used to construct contours of water table elevation. 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 COA wells north of the base. A contour map of the differences in the regional water table between the same periods in CY09 and CY08 indicate the area of greatest decline is in the area and southwest of TA-III. The hydrograph analysis for well SWTA3-MW2 indicates a decline of 0.95 ft/yr. A slight increase in the regional water table was observed in the northeast portion of base. The slight increase of 0.22 ft/yr in the elevation of the water table in the northeast sector as determined from the hydrograph in Attachment 2C for well TA2-W-25 (Figure 2C-9) may be attributed to recharge from the Tijeras Arroyo.

Water level elevations were also obtained for wells completed in the PGWS. Nineteen wells were used to construct a water level elevation contour map for the perched system. The contours indicate groundwater flow in the PGWS is from the northwest to 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.

2.10 References

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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 2009

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]
CTF-MW2	1,2,4-Trimethylbenzene	0.538	0.250	1.00	NE	NE	J		087107-001	SW846-8260
23-Mar-09	Vinyl chloride	0.582	0.500	1.00	2.00	1.00	J		087107-001	SW846-8260
	RDX	0.243	0.130	0.325	NE	NE	J		087107-024	SW846-8321A
CTF-MW3	Bromodichloromethane	0.450	0.250	1.00	NE	NE	J	1.0U	087087-001	SW846-8260
13-Mar-09	Chloroform	0.579	0.250	1.00	NE	100	J	1.0U	087087-001	SW846-8260
	Dibromochloromethane	1.81	0.260	1.00	NE	NE		1.81U	087087-001	SW846-8260
CTF-MW3 (Duplicate)	Bromodichloromethane	0.477	0.250	1.00	NE	NE	J	1.0U	087088-001	SW846-8260
13-Mar-09	Chloroform	0.619	0.250	1.00	NE	100	J	1.0U	087088-001	SW846-8260
	Dibromochloromethane	1.81	0.260	1.00	NE	NE		1.81U	087088-001	SW846-8260
Eubank-1 18-Mar-09	Naphthalene	0.350	0.250	1.00	NE	NE	B, J	1.0U	087100-001	SW846-8260
Eubank-1 (Duplicate)	Naphthalene	0.603	0.250	1.00	NE	NE	B, J	1.0U	087101-001	SW846-8260
18-Mar-09	Toluene	0.292	0.250	1.00	1000	750	J		087101-001	SW846-8260
Greystone-MW2 19-Mar-09	Naphthalene	0.291	0.250	1.00	NE	NE	B, J	1.0U	087103-001	SW846-8260
SWTA3-MW2	Naphthalene	0.457	0.250	1.00	NE	NE	B, J	1.0U	087096-001	SW846-8260
17-Mar-09	Toluene	0.251	0.250	1.00	1000	750	J		087096-001	SW846-8260
TRE-1 04-Mar-09	Chloroform	0.762	0.250	1.00	NE	100	J		087074-001	SW846-8260

Refer to footnotes on page 2A-37.

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

Calendar Year 2009

Analyte	Method Detection Limit ($\mu g/L$)	Analytical Method[g]	Analyte	Method Detection Limit ($\mu g/L$)	Analytical Method[g]
1,1,1,2-Tetrachloroethane	0.300	SW846-8260	Ethylbenzene	0.250	SW846-8260
1,1,1-Trichloroethane	0.325	SW846-8260	Hexachlorobutadiene	0.440	SW846-8260
1,1,2,2-Tetrachloroethane	0.250	SW846-8260	Isopropylbenzene	0.250	SW846-8260
1,1,2-Trichloroethane	0.250	SW846-8260	Methylene chloride	3.00	SW846-8260
1,1-Dichloroethane	0.300	SW846-8260	Naphthalene	0.250	SW846-8260
1,1-Dichloroethene	0.300	SW846-8260	Styrene	0.250	SW846-8260
1,1-Dichloropropene	0.250	SW846-8260	Tert-butyl methyl ether	0.250	SW846-8260
1,2,3-Trichlorobenzene	0.332	SW846-8260	Tetrachloroethene	0.450	SW846-8260
1,2,3-Trichloropropane	0.300	SW846-8260	Toluene	0.250	SW846-8260
1,2,4-Trichlorobenzene	0.300	SW846-8260	Trichloroethene	0.250	SW846-8260
1,2,4-Trimethylbenzene	0.250	SW846-8260	Trichlorofluoromethane	0.310	SW846-8260
1,2-Dibromo-3-chloropropane	0.500	SW846-8260	Vinyl chloride	0.500	SW846-8260
1,2-Dibromoethane	0.250	SW846-8260	cis-1,2-Dichloroethene	0.300	SW846-8260
1,2-Dichlorobenzene	0.250	SW846-8260	cis-1,3-Dichloropropene	0.250	SW846-8260
1,2-Dichloroethane	0.250	SW846-8260	m-, p-Xylene	0.430	SW846-8260
1,2-Dichloropropane	0.250	SW846-8260	n-Butylbenzene	0.250	SW846-8260
1,3,5-Trimethylbenzene	0.250	SW846-8260	n-Propylbenzene	0.250	SW846-8260
1,3-Dichlorobenzene	0.250	SW846-8260	o-Xylene	0.250	SW846-8260
1,3-Dichloropropane	0.250	SW846-8260	sec-Butylbenzene	0.250	SW846-8260
1,4-Dichlorobenzene	0.250	SW846-8260	tert-Butylbenzene	0.250	SW846-8260
2,2-Dichloropropane	0.300	SW846-8260	trans-1,2-Dichloroethene	0.300	SW846-8260
2-Chlorotoluene	0.250	SW846-8260	trans-1,3-Dichloropropene	0.250	SW846-8260
4-Chlorotoluene	0.250	SW846-8260	1,3,5-Trinitrobenzene	0.104	SW846-8321A
4-Isopropyltoluene	0.250	SW846-8260	1,3-Dinitrobenzene	0.117	SW846-8321A
Benzene	0.300	SW846-8260	2,4,6-Trinitrotoluene	0.0779	SW846-8321A
Bromobenzene	0.250	SW846-8260	2,4-Dinitrotoluene	0.130	SW846-8321A
Bromochloromethane	0.360	SW846-8260	2,6-Dinitrotoluene	0.0779	SW846-8321A
Bromodichloromethane	0.250	SW846-8260	2-Amino-4,6-dinitrotoluene	0.117	SW846-8321A
Bromoform	0.250	SW846-8260	2-Nitrotoluene	0.143	SW846-8321A
Carbon tetrachloride	0.260	SW846-8260	3-Nitrotoluene	0.143	SW846-8321A
Chlorobenzene	0.250	SW846-8260	4-Amino-2,6-dinitrotoluene	0.130	SW846-8321A
Chloroethane	0.300	SW846-8260	4-Nitrotoluene	0.182	SW846-8321A
Chloroform	0.250	SW846-8260	HMX	0.104	SW846-8321A
Chloromethane	0.300	SW846-8260	Nitro-benzene	0.156	SW846-8321A
Dibromochloromethane	0.260	SW846-8260	RDX	0.130	SW846-8321A
Dibromomethane	0.300	SW846-8260	Tetryl	0.130	SW846-8321A
Dichlorodifluoromethane	0.500	SW846-8260			

Refer to footnotes on page 2A-37.

Table 2A-3
Summary of Alkalinity, Anions, Nitrate plus Nitrate, Total Organic Halogens, Total Phenols, and Total Cyanide Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs	Alkalinity as CACO3	1,050	0.725	1.00	NE	NE	B		087092-016	SM 2320B
12-Mar-09	Bromide	1.88	0.067	0.200	NE	NE			087092-016	SW846 9056
	Chloride	447	6.60	20.0	NE	NE			087092-016	SW846 9056
	Fluoride	**1.68**	0.033	0.100	4.00	1.60			087092-016	SW846 9056
	Sulfate	132	10.0	40.0	NE	NE			087092-016	SW846 9056
	Nitrate plus nitrite as N	0.0492	0.010	0.050	10.0	10.0	B, J	0.071U	087092-018	EPA 353.2
	Total Organic Halogens	0.0422	0.00252	0.010	NE	NE			087092-003	SW846 9020
	Total Phenols	ND	0.0017	0.005	NE	NE	U	UJ	087092-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087092-027	SW846 9012
CTF-MW1	Alkalinity as CACO3	195	0.725	1.00	NE	NE			087090-016	SM 2320B
11-Mar-09	Bromide	0.541	0.067	0.200	NE	NE			087090-016	SW846 9056
	Chloride	40.2	0.660	2.00	NE	NE			087090-016	SW846 9056
	Fluoride	1.51	0.033	0.100	4.00	1.60			087090-016	SW846 9056
	Sulfate	80.7	1.00	4.00	NE	NE			087090-016	SW846 9056
	Nitrate plus nitrite as N	8.58	0.250	1.25	10.0	10.0	B		087090-018	EPA 353.2
	Total Organic Halogens	0.0105	0.00252	0.010	NE	NE			087090-003	SW846 9020
	Total Phenols	ND	0.00274	0.00806	NE	NE	U, H, h	UJ	087090-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087090-027	SW846 9012
CTF-MW2	Alkalinity as CACO3	1,500	0.725	1.00	NE	NE	B		087107-016	SM 2320B
23-Mar-09	Bromide	1.87	0.066	0.200	NE	NE			087107-016	SW846 9056
	Chloride	420	3.30	10.0	NE	NE			087107-016	SW846 9056
	Fluoride	**1.99**	0.033	0.100	4.00	1.60			087107-016	SW846 9056
	Sulfate	153	5.00	20.0	NE	NE			087107-016	SW846 9056
	Nitrate plus nitrite as N	ND	0.050	0.250	10.0	10.0	U		087107-018	EPA 353.2
	Total Organic Halogens	0.0265	0.00252	0.010	NE	NE		0.039U	087107-003	SW846 9020
	Total Phenols	ND	0.0017	0.005	NE	NE	U	UJ	087107-026	SW846 9066
	Total Cyanide	ND	0.00166	0.005	0.200	0.200	U		087107-027	SW846 9012
CTF-MW3	Alkalinity as CACO3	331	0.725	1.00	NE	NE	B		087087-016	SM 2320B
13-Mar-09	Bromide	1.06	0.067	0.200	NE	NE			087087-016	SW846 9056
	Chloride	110	6.60	20.0	NE	NE			087087-016	SW846 9056
	Fluoride	**2.52**	0.033	0.100	4.00	1.60			087087-016	SW846 9056
	Sulfate	471	10.0	40.0	NE	NE			087087-016	SW846 9056
	Nitrate plus nitrite as N	6.56	0.100	0.500	10.0	10.0	B		087087-018	EPA 353.2
	Total Organic Halogens	0.0147	0.00252	0.010	NE	NE		0.035U	087087-003	SW846 9020
	Total Phenols	ND	0.0017	0.005	NE	NE	U	UJ	087087-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087087-027	SW846 9012

Refer to footnotes on page 2A-37.

Table 2A-3 *(Continued)*
Summary of Alkalinity, Anions, Nitrate plus Nitrate,
Total Organic Halogens, Total Phenols, and Total Cyanide Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW3 (Duplicate) 13-Mar-09	Alkalinity as CACO3	333	0.725	1.00	NE	NE	B		087088-016	SM 2320B
	Bromide	1.09	0.067	0.200	NE	NE			087088-016	SW846 9056
	Chloride	107	6.60	20.0	NE	NE			087088-016	SW846 9056
	Fluoride	**2.52**	0.033	0.100	4.00	1.60			087088-016	SW846 9056
	Sulfate	469	10.0	40.0	NE	NE			087088-016	SW846 9056
	Nitrate plus nitrite as N	6.46	0.100	0.500	10.0	10.0	B		087088-018	EPA 353.2
	Total Organic Halogens	0.0138	0.00252	0.010	NE	NE		0.035U	087088-003	SW846 9020
	Total Phenols	ND	0.0017	0.005	NE	NE	U	UJ	087088-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087088-027	SW846 9012
Eubank-1 18-Mar-09	Alkalinity as CACO3	172	0.725	1.00	NE	NE	B		087100-016	SM 2320B
	Bromide	0.161	0.067	0.200	NE	NE	J		087100-016	SW846 9056
	Chloride	12.2	0.066	0.200	NE	NE			087100-016	SW846 9056
	Fluoride	0.375	0.033	0.100	4.00	1.60			087100-016	SW846 9056
	Sulfate	74.0	1.00	4.00	NE	NE			087100-016	SW846 9056
	Nitrate plus nitrite as N	2.33	0.100	0.500	10.0	10.0			087100-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087100-003	SW846 9020
	Total Phenols	ND	0.00165	0.005	NE	NE	U		087100-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087100-027	SW846 9012
Eubank-1 (Duplicate) 18-Mar-09	Alkalinity as CACO3	172	0.725	1.00	NE	NE	B		087101-016	SM 2320B
	Bromide	ND	0.067	0.200	NE	NE	U		087101-016	SW846 9056
	Chloride	12.4	0.066	0.200	NE	NE			087101-016	SW846 9056
	Fluoride	0.368	0.033	0.100	4.00	1.60			087101-016	SW846 9056
	Sulfate	73.6	1.00	4.00	NE	NE			087101-016	SW846 9056
	Nitrate plus nitrite as N	2.71	0.050	0.250	10.0	10.0			087101-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087101-003	SW846 9020
	Total Phenols	ND	0.00165	0.005	NE	NE	U		087101-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087101-027	SW846 9012
Greystone-MW2 19-Mar-09	Alkalinity as CACO3	436	0.725	1.00	NE	NE	B		087103-016	SM 2320B
	Bromide	0.600	0.067	0.200	NE	NE			087103-016	SW846 9056
	Chloride	109	0.660	2.00	NE	NE			087103-016	SW846 9056
	Fluoride	0.774	0.033	0.100	4.00	1.60			087103-016	SW846 9056
	Sulfate	48.9	1.00	4.00	NE	NE			087103-016	SW846 9056
	Nitrate plus nitrite as N	4.64	0.100	0.500	10.0	10.0			087103-018	EPA 353.2
	Total Organic Halogens	0.00426	0.00252	0.010	NE	NE	J	0.029U	087103-003	SW846 9020
	Total Phenols	ND	0.00165	0.005	NE	NE	U		087103-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U	UJ	087103-027	SW846 9012

Refer to footnotes on page 2A-37.

Table 2A-3 *(Continued)*
Summary of Alkalinity, Anions, Nitrate plus Nitrate, Total Organic Halogens, Total Phenols, and Total Cyanide Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	Alkalinity as CACO3	150	0.725	1.00	NE	NE	B		087110-016	SM 2320B
24-Mar-09	Bromide	0.200	0.066	0.200	NE	NE	J		087110-016	SW846 9056
	Chloride	14.7	0.066	0.200	NE	NE			087110-016	SW846 9056
	Fluoride	0.593	0.033	0.100	4.00	1.60			087110-016	SW846 9056
	Sulfate	54.6	0.200	0.800	NE	NE			087110-016	SW846 9056
	Nitrate plus nitrite as N	4.98	0.250	1.25	10.0	10.0			087110-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087110-003	SW846 9020
	Total Phenols	ND	0.0017	0.005	NE	NE	U	UJ	087110-026	SW846 9066
	Total Cyanide	ND	0.00166	0.005	0.200	0.200	U		087110-027	SW846 9012
NWTA3-MW3D	Alkalinity as CACO3	136	0.725	1.00	NE	NE	B		087105-016	SM 2320B
25-Mar-09	Bromide	0.160	0.066	0.200	NE	NE	J		087105-016	SW846 9056
	Chloride	11.1	0.066	0.200	NE	NE			087105-016	SW846 9056
	Fluoride	0.735	0.033	0.100	4.00	1.60			087105-016	SW846 9056
	Sulfate	51.6	0.200	0.800	NE	NE			087105-016	SW846 9056
	Nitrate plus nitrite as N	1.10	0.050	0.250	10.0	10.0			087105-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087105-003	SW846 9020
	Total Phenols	ND	0.0017	0.005	NE	NE	U	UJ	087105-026	SW846 9066
	Total Cyanide	ND	0.00166	0.005	0.200	0.200	U		087105-027	SW846 9012
PL-2	Alkalinity as CACO3	145	0.725	1.00	NE	NE			087078-016	SM 2320B
10-Mar-09	Bromide	0.161	0.067	0.200	NE	NE	J		087078-016	SW846 9056
	Chloride	14.5	0.066	0.200	NE	NE			087078-016	SW846 9056
	Fluoride	0.497	0.033	0.100	4.00	1.60			087078-016	SW846 9056
	Sulfate	65.5	1.00	4.00	NE	NE			087078-016	SW846 9056
	Nitrate plus nitrite as N	2.86	0.050	0.250	10.0	10.0	B		087078-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087078-003	SW846 9020
	Total Phenols	0.00902	0.00386	0.0114	NE	NE	J, H, h	J	087078-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087078-027	SW846 9012
SFR-2S	Alkalinity as CACO3	385	0.725	1.00	NE	NE	B		087076-016	SM 2320B
05-Mar-09	Bromide	0.537	0.067	0.200	NE	NE			087076-016	SW846 9056
	Chloride	118	0.660	2.00	NE	NE			087076-016	SW846 9056
	Fluoride	1.49	0.033	0.100	4.00	1.60			087076-016	SW846 9056
	Sulfate	67.3	1.00	4.00	NE	NE			087076-016	SW846 9056
	Nitrate plus nitrite as N	1.05	0.050	0.250	10.0	10.0	B		087076-018	EPA 353.2
	Total Organic Halogens	0.0189	0.00252	0.010	NE	NE	B	0.025U	087076-003	SW846 9020
	Total Phenols	0.0164	0.00165	0.005	NE	NE			087076-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087076-027	SW846 9012

Refer to footnotes on page 2A-37.

Table 2A-3 *(Continued)*
Summary of Alkalinity, Anions, Nitrate plus Nitrate, Total Organic Halogens, Total Phenols, and Total Cyanide Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	Alkalinity as CACO3	105	0.725	1.00	NE	NE	B		087094-016	SM 2320B
16-Mar-09	Bromide	1.45	0.067	0.200	NE	NE			087094-016	SW846 9056
	Chloride	191	6.60	20.0	NE	NE			087094-016	SW846 9056
	Fluoride	**2.69**	0.033	0.100	4.00	1.60			087094-016	SW846 9056
	Sulfate	1,960	10.0	40.0	NE	NE			087094-016	SW846 9056
	Nitrate plus nitrite as N	0.291	0.050	0.250	10.0	10.0			087094-018	EPA 353.2
	Total Organic Halogens	0.0322	0.00252	0.010	NE	NE			087094-003	SW846 9020
	Total Phenols	0.00295	0.00165	0.005	NE	NE	B, J	0.024U	087094-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087094-027	SW846 9012
SWTA3-MW2	Alkalinity as CACO3	163	0.725	1.00	NE	NE	B		087096-016	SM 2320B
17-Mar-09	Bromide	0.159	0.067	0.200	NE	NE	J		087096-016	SW846 9056
	Chloride	13.3	0.066	0.200	NE	NE			087096-016	SW846 9056
	Fluoride	0.981	0.033	0.100	4.00	1.60			087096-016	SW846 9056
	Sulfate	55.5	1.00	4.00	NE	NE			087096-016	SW846 9056
	Nitrate plus nitrite as N	0.965	0.050	0.250	10.0	10.0			087096-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087096-003	SW846 9020
	Total Phenols	0.00371	0.00165	0.005	NE	NE	B, J	0.024U	087096-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087096-027	SW846 9012
SWTA3-MW3	Alkalinity as CACO3	157	0.725	1.00	NE	NE			087083-016	SM 2320B
09-Mar-09	Bromide	0.237	0.067	0.200	NE	NE			087083-016	SW846 9056
	Chloride	14.4	0.066	0.200	NE	NE			087083-016	SW846 9056
	Fluoride	1.31	0.033	0.100	4.00	1.60			087083-016	SW846 9056
	Sulfate	64.9	0.500	2.00	NE	NE			087083-016	SW846 9056
	Nitrate plus nitrite as N	0.590	0.050	0.250	10.0	10.0	B		087083-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087083-003	SW846 9020
	Total Phenols	0.0115	0.00165	0.005	NE	NE			087083-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U	UJ	087083-027	SW846 9012
SWTA3-MW4	Alkalinity as CACO3	177	0.725	1.00	NE	NE	B		087081-016	SM 2320B
06-Mar-09	Bromide	0.217	0.067	0.200	NE	NE			087081-016	SW846 9056
	Chloride	15.2	0.066	0.200	NE	NE			087081-016	SW846 9056
	Fluoride	**1.71**	0.033	0.100	4.00	1.60			087081-016	SW846 9056
	Sulfate	54.7	0.200	0.800	NE	NE			087081-016	SW846 9056
	Nitrate plus nitrite as N	0.870	0.050	0.250	10.0	10.0	B		087081-018	EPA 353.2
	Total Organic Halogens	ND	0.00252	0.010	NE	NE	U		087081-003	SW846 9020
	Total Phenols	0.00875	0.00165	0.005	NE	NE			087081-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U	UJ	087081-027	SW846 9012

Refer to footnotes on page 2A-37.

Table 2A-3 *(Concluded)*
Summary of Alkalinity, Anions, Nitrate plus Nitrate, Total Organic Halogens, Total Phenols, and Total Cyanide Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	Alkalinity as CACO3	470	1.45	2.00	NE	NE	B		087074-016	SM 2320B
04-Mar-09	Bromide	0.678	0.067	0.200	NE	NE			087074-016	SW846 9056
	Chloride	131	0.660	2.00	NE	NE			087074-016	SW846 9056
	Fluoride	1.46	0.033	0.100	4.00	1.60			087074-016	SW846 9056
	Sulfate	98.3	1.00	4.00	NE	NE			087074-016	SW846 9056
	Nitrate plus nitrite as N	2.45	0.050	0.250	10.0	10.0	B		087074-018	EPA 353.2
	Total Organic Halogens	0.0177	0.00252	0.010	NE	NE	B	0.025U	087074-003	SW846 9020
	Total Phenols	0.00781	0.00165	0.005	NE	NE		NJ-	087074-026	SW846 9066
	Total Cyanide	ND	0.0015	0.005	0.200	0.200	U		087074-027	SW846 9012

Refer to footnotes on page 2A-37.

Table 2A-4
Summary of Dissolved (Filtered) Metal Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs	Aluminum	0.180	0.025	0.075	NE	NE	B	0.037U	087092-009	SW846 6020
12-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087092-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U	UJ	087092-009	SW846 6020
	Barium	0.0417	0.0005	0.002	2.00	1.00			087092-009	SW846 6020
	Beryllium	**0.00733**	0.0005	0.0025	0.004	NE			087092-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087092-009	SW846 6020
	Calcium	296	2.00	10.0	NE	NE		J	087092-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087092-009	SW846 6020
	Cobalt	0.011	0.0001	0.001	NE	NE			087092-009	SW846 6020
	Copper	0.0013	0.0003	0.001	NE	NE		J+	087092-009	SW846 6020
	Iron	0.535	0.010	0.025	NE	NE			087092-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087092-009	SW846 6020
	Magnesium	64.4	0.520	1.50	NE	NE			087092-009	SW846 6020
	Manganese	1.62	0.025	0.125	NE	NE		J+	087092-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087092-009	SW846 7470
	Nickel	0.0299	0.0005	0.002	NE	NE		J+	087092-009	SW846 6020
	Potassium	31.9	0.080	0.300	NE	NE			087092-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U		087092-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087092-009	SW846 6020
	Sodium	455	8.00	25.0	NE	NE			087092-009	SW846 6020
	Thallium	0.00148	0.0003	0.001	0.002	NE			087092-009	SW846 6020
	Uranium	0.00666	0.00005	0.0002	0.030	5.00	B		087092-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087092-009	SW846 6020
	Zinc	0.0474	0.0026	0.010	NE	NE		J+	087092-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW1	Aluminum	0.0128	0.005	0.015	NE	NE	B, J	0.027U	087090-009	SW846 6020
11-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087090-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087090-009	SW846 6020
	Barium	0.0466	0.0005	0.002	2.00	1.00			087090-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087090-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087090-009	SW846 6020
	Calcium	99.2	0.040	0.200	NE	NE	B		087090-009	SW846 6020
	Chromium	0.0034	0.0015	0.003	0.100	0.050	B	0.012U	087090-009	SW846 6020
	Cobalt	0.000437	0.0001	0.001	NE	NE	J		087090-009	SW846 6020
	Copper	0.00191	0.0003	0.001	NE	NE			087090-009	SW846 6020
	Iron	0.410	0.010	0.025	NE	NE	B	0.75U	087090-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087090-009	SW846 6020
	Magnesium	22.6	0.0104	0.030	NE	NE			087090-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087090-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087090-009	SW846 7470
	Nickel	0.00295	0.0005	0.002	NE	NE			087090-009	SW846 6020
	Potassium	1.65	0.080	0.300	NE	NE			087090-009	SW846 6020
	Selenium	0.0043	0.001	0.005	0.050	0.050	J		087090-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087090-009	SW846 6020
	Sodium	34.8	0.160	0.500	NE	NE			087090-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087090-009	SW846 6020
	Uranium	0.0112	0.00005	0.0002	0.030	5.00			087090-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087090-009	SW846 6020
	Zinc	0.00728	0.0026	0.010	NE	NE	B, J	0.015U	087090-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW2	Aluminum	0.142	0.005	0.015	NE	NE	B		087107-009	SW846 6020
23-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087107-009	SW846 6020
	Arsenic	**0.0517**	0.0015	0.005	0.010	0.100			087107-009	SW846 6020
	Barium	0.0767	0.0005	0.002	2.00	1.00			087107-009	SW846 6020
	Beryllium	0.0021	0.0001	0.0005	0.004	NE			087107-009	SW846 6020
	Cadmium	0.000304	0.00011	0.001	0.005	0.010	B, J	0.0011U	087107-009	SW846 6020
	Calcium	384	2.00	10.0	NE	NE	B		087107-009	SW846 6020
	Chromium	0.00176	0.0015	0.003	0.100	0.050	J		087107-009	SW846 6020
	Cobalt	0.00769	0.0001	0.001	NE	NE		J+	087107-009	SW846 6020
	Copper	0.00205	0.0003	0.001	NE	NE		J+	087107-009	SW846 6020
	Iron	2.50	0.010	0.025	NE	NE	B		087107-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087107-009	SW846 6020
	Magnesium	69.2	0.026	0.075	NE	NE			087107-009	SW846 6020
	Manganese	2.45	0.005	0.025	NE	NE			087107-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087107-009	SW846 7470
	Nickel	0.0182	0.0005	0.002	NE	NE		J+	087107-009	SW846 6020
	Potassium	42.8	0.400	1.50	NE	NE			087107-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U	UJ	087107-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087107-009	SW846 6020
	Sodium	466	8.00	25.0	NE	NE			087107-009	SW846 6020
	Thallium	0.00162	0.0003	0.001	0.002	NE		0.0036U	087107-009	SW846 6020
	Uranium	0.0278	0.00005	0.0002	0.030	5.00			087107-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087107-009	SW846 6020
	Zinc	0.0139	0.0026	0.010	NE	NE		J+	087107-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW3	Aluminum	ND	0.025	0.075	NE	NE	U		087087-009	SW846 6020
13-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087087-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U	UJ	087087-009	SW846 6020
	Barium	0.0311	0.0005	0.002	2.00	1.00		J+	087087-009	SW846 6020
	Beryllium	ND	0.0005	0.0025	0.004	NE	U		087087-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087087-009	SW846 6020
	Calcium	184	2.00	10.0	NE	NE		J	087087-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087087-009	SW846 6020
	Cobalt	0.000258	0.0001	0.001	NE	NE	J	J+	087087-009	SW846 6020
	Copper	0.00206	0.0003	0.001	NE	NE		J+	087087-009	SW846 6020
	Iron	0.352	0.010	0.025	NE	NE			087087-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087087-009	SW846 6020
	Magnesium	49.0	0.520	1.50	NE	NE			087087-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087087-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087087-009	SW846 7470
	Nickel	0.00303	0.0005	0.002	NE	NE		J+	087087-009	SW846 6020
	Potassium	12.5	0.080	0.300	NE	NE			087087-009	SW846 6020
	Selenium	0.0188	0.001	0.005	0.050	0.050			087087-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087087-009	SW846 6020
	Sodium	157	8.00	25.0	NE	NE			087087-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087087-009	SW846 6020
	Uranium	0.00843	0.00005	0.0002	0.030	5.00	B		087087-009	SW846 6020
	Vanadium	0.0295	0.003	0.010	NE	NE	B	J+	087087-009	SW846 6020
	Zinc	0.00768	0.0026	0.010	NE	NE	J	J+	087087-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL / MAC[d] (mg/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CTF-MW3 (Duplicate) 13-Mar-09	Aluminum	ND	0.025	0.075	NE	NE	U		087088-009	SW846 6020
	Antimony	ND	0.0005	0.002	0.006	NE	U		087088-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U	UJ	087088-009	SW846 6020
	Barium	0.0331	0.0005	0.002	2.00	1.00			087088-009	SW846 6020
	Beryllium	ND	0.0005	0.0025	0.004	NE	U		087088-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087088-009	SW846 6020
	Calcium	191	2.00	10.0	NE	NE		J	087088-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087088-009	SW846 6020
	Cobalt	0.000287	0.0001	0.001	NE	NE	J	J+	087088-009	SW846 6020
	Copper	0.00232	0.0003	0.001	NE	NE		J+	087088-009	SW846 6020
	Iron	0.385	0.010	0.025	NE	NE			087088-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087088-009	SW846 6020
	Magnesium	51.1	0.520	1.50	NE	NE			087088-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087088-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087088-009	SW846 7470
	Nickel	0.00327	0.0005	0.002	NE	NE		J+	087088-009	SW846 6020
	Potassium	12.4	0.080	0.300	NE	NE			087088-009	SW846 6020
	Selenium	0.0195	0.001	0.005	0.050	0.050			087088-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087088-009	SW846 6020
	Sodium	159	8.00	25.0	NE	NE			087088-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087088-009	SW846 6020
	Uranium	0.0087	0.00005	0.0002	0.030	5.00	B		087088-009	SW846 6020
	Vanadium	0.0405	0.003	0.010	NE	NE	B	J+	087088-009	SW846 6020
	Zinc	0.00771	0.0026	0.010	NE	NE	J	J+	087088-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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]
Eubank-1	Aluminum	0.0196	0.005	0.015	NE	NE	B	0.04U	087100-009	SW846 6020
18-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087100-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087100-009	SW846 6020
	Barium	0.0492	0.0005	0.002	2.00	1.00			087100-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087100-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087100-009	SW846 6020
	Calcium	70.7	0.100	0.500	NE	NE	B		087100-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087100-009	SW846 6020
	Cobalt	0.000103	0.0001	0.001	NE	NE	J	0.0009U	087100-009	SW846 6020
	Copper	0.00236	0.0003	0.001	NE	NE		0.016UJ	087100-009	SW846 6020
	Iron	0.262	0.010	0.025	NE	NE			087100-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087100-009	SW846 6020
	Magnesium	9.97	0.0052	0.015	NE	NE			087100-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087100-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087100-009	SW846 7470
	Nickel	0.00444	0.0005	0.002	NE	NE			087100-009	SW846 6020
	Potassium	1.74	0.080	0.300	NE	NE			087100-009	SW846 6020
	Selenium	0.00166	0.001	0.005	0.050	0.050	J		087100-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087100-009	SW846 6020
	Sodium	24.3	0.080	0.250	NE	NE			087100-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087100-009	SW846 6020
	Uranium	0.00304	0.00005	0.0002	0.030	5.00			087100-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087100-009	SW846 6020
	Zinc	0.00584	0.0026	0.010	NE	NE	J	0.039U	087100-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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]
Eubank-1 (Duplicate) 18-Mar-09	Aluminum	0.0164	0.005	0.015	NE	NE	B	0.04U	087101-009	SW846 6020
	Antimony	ND	0.0005	0.002	0.006	NE	U		087101-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087101-009	SW846 6020
	Barium	0.0485	0.0005	0.002	2.00	1.00			087101-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087101-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087101-009	SW846 6020
	Calcium	69.4	0.100	0.500	NE	NE	B		087101-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087101-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		087101-009	SW846 6020
	Copper	0.00253	0.0003	0.001	NE	NE		0.016UJ	087101-009	SW846 6020
	Iron	0.263	0.010	0.025	NE	NE			087101-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087101-009	SW846 6020
	Magnesium	10.6	0.0052	0.015	NE	NE			087101-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087101-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087101-009	SW846 7470
	Nickel	0.00431	0.0005	0.002	NE	NE			087101-009	SW846 6020
	Potassium	1.65	0.080	0.300	NE	NE			087101-009	SW846 6020
	Selenium	0.00169	0.001	0.005	0.050	0.050	J		087101-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087101-009	SW846 6020
	Sodium	26.5	0.080	0.250	NE	NE			087101-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087101-009	SW846 6020
	Uranium	0.003	0.00005	0.0002	0.030	5.00			087101-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087101-009	SW846 6020
	Zinc	0.0059	0.0026	0.010	NE	NE	J	0.039U	087101-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.0157	0.005	0.015	NE	NE	B	0.04U	087103-009	SW846 6020
19-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087103-009	SW846 6020
	Arsenic	0.00239	0.0015	0.005	0.010	0.100	J		087103-009	SW846 6020
	Barium	0.153	0.0005	0.002	2.00	1.00			087103-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087103-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087103-009	SW846 6020
	Calcium	138	0.100	0.500	NE	NE	B		087103-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087103-009	SW846 6020
	Cobalt	0.000613	0.0001	0.001	NE	NE	J	0.0009U	087103-009	SW846 6020
	Copper	0.00138	0.0003	0.001	NE	NE			087103-009	SW846 6020
	Iron	0.494	0.010	0.025	NE	NE			087103-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087103-009	SW846 6020
	Magnesium	30.7	0.0052	0.015	NE	NE			087103-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087103-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087103-009	SW846 7470
	Nickel	0.00251	0.0005	0.002	NE	NE			087103-009	SW846 6020
	Potassium	5.02	0.080	0.300	NE	NE			087103-009	SW846 6020
	Selenium	0.0011	0.001	0.005	0.050	0.050	J		087103-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087103-009	SW846 6020
	Sodium	88.6	0.400	1.25	NE	NE			087103-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087103-009	SW846 6020
	Uranium	0.0081	0.00005	0.0002	0.030	5.00			087103-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087103-009	SW846 6020
	Zinc	0.00513	0.0026	0.010	NE	NE	J		087103-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.022	0.005	0.015	NE	NE	B	0.044U	087110-009	SW846 6020
24-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087110-009	SW846 6020
	Arsenic	0.00382	0.0015	0.005	0.010	0.100	J	0.0079U	087110-009	SW846 6020
	Barium	0.0562	0.0005	0.002	2.00	1.00			087110-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087110-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087110-009	SW846 6020
	Calcium	49.9	0.100	0.500	NE	NE	B		087110-009	SW846 6020
	Chromium	0.00371	0.0015	0.003	0.100	0.050			087110-009	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	NE	J		087110-009	SW846 6020
	Copper	0.00114	0.0003	0.001	NE	NE			087110-009	SW846 6020
	Iron	0.193	0.010	0.025	NE	NE	B		087110-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087110-009	SW846 6020
	Magnesium	14.6	0.026	0.075	NE	NE			087110-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087110-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087110-009	SW846 7470
	Nickel	0.00116	0.0005	0.002	NE	NE	J		087110-009	SW846 6020
	Potassium	3.39	0.080	0.300	NE	NE			087110-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U	UJ	087110-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087110-009	SW846 6020
	Sodium	26.7	0.400	1.25	NE	NE			087110-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087110-009	SW846 6020
	Uranium	0.00344	0.00005	0.0002	0.030	5.00			087110-009	SW846 6020
	Vanadium	0.0171	0.003	0.010	NE	NE		0.018U	087110-009	SW846 6020
	Zinc	0.00575	0.0026	0.010	NE	NE	J		087110-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.0313	0.005	0.015	NE	NE	B	0.044U	087105-009	SW846 6020
25-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087105-009	SW846 6020
	Arsenic	0.00404	0.0015	0.005	0.010	0.100	J	0.0079U	087105-009	SW846 6020
	Barium	0.0913	0.0005	0.002	2.00	1.00			087105-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087105-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087105-009	SW846 6020
	Calcium	39.1	0.100	0.500	NE	NE	B		087105-009	SW846 6020
	Chromium	0.00379	0.0015	0.003	0.100	0.050			087105-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		087105-009	SW846 6020
	Copper	0.00121	0.0003	0.001	NE	NE			087105-009	SW846 6020
	Iron	0.159	0.010	0.025	NE	NE	B		087105-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087105-009	SW846 6020
	Magnesium	7.81	0.026	0.075	NE	NE			087105-009	SW846 6020
	Manganese	0.00168	0.001	0.005	NE	NE	J		087105-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087105-009	SW846 7470
	Nickel	0.00107	0.0005	0.002	NE	NE	J		087105-009	SW846 6020
	Potassium	3.91	0.080	0.300	NE	NE			087105-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U	UJ	087105-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087105-009	SW846 6020
	Sodium	37.3	0.400	1.25	NE	NE			087105-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087105-009	SW846 6020
	Uranium	0.00372	0.00005	0.0002	0.030	5.00			087105-009	SW846 6020
	Vanadium	0.0185	0.003	0.010	NE	NE			087105-009	SW846 6020
	Zinc	0.0317	0.0026	0.010	NE	NE			087105-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.0121	0.005	0.015	NE	NE	B, J	0.027U	087078-009	SW846 6020
10-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087078-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087078-009	SW846 6020
	Barium	0.0786	0.0005	0.002	2.00	1.00			087078-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087078-009	SW846 6020
	Cadmium	0.000174	0.00011	0.001	0.005	0.010	J	J+	087078-009	SW846 6020
	Calcium	68.3	0.040	0.200	NE	NE	B		087078-009	SW846 6020
	Chromium	0.00501	0.0015	0.003	0.100	0.050	B	0.012U	087078-009	SW846 6020
	Cobalt	0.000181	0.0001	0.001	NE	NE	J		087078-009	SW846 6020
	Copper	0.00184	0.0003	0.001	NE	NE			087078-009	SW846 6020
	Iron	0.253	0.010	0.025	NE	NE	B	0.75U	087078-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087078-009	SW846 6020
	Magnesium	10.9	0.0104	0.030	NE	NE			087078-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087078-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087078-009	SW846 7470
	Nickel	0.00444	0.0005	0.002	NE	NE			087078-009	SW846 6020
	Potassium	3.44	0.080	0.300	NE	NE			087078-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U		087078-009	SW846 6020
	Silver	0.000479	0.0002	0.001	NE	0.050	J		087078-009	SW846 6020
	Sodium	32.3	0.160	0.500	NE	NE			087078-009	SW846 6020
	Thallium	0.000362	0.0003	0.001	0.002	NE	J		087078-009	SW846 6020
	Uranium	0.00369	0.00005	0.0002	0.030	5.00			087078-009	SW846 6020
	Vanadium	0.00788	0.003	0.010	NE	NE	J		087078-009	SW846 6020
	Zinc	0.0174	0.0026	0.010	NE	NE	B	0.015U	087078-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.00931	0.005	0.015	NE	NE	B, J	0.026U	087076-009	SW846 6020
05-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087076-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087076-009	SW846 6020
	Barium	0.0651	0.0005	0.002	2.00	1.00	B		087076-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087076-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087076-009	SW846 6020
	Calcium	128	0.200	1.00	NE	NE	B		087076-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087076-009	SW846 6020
	Cobalt	0.00061	0.0001	0.001	NE	NE	J		087076-009	SW846 6020
	Copper	0.00424	0.0003	0.001	NE	NE	B	0.005U	087076-009	SW846 6020
	Iron	0.223	0.010	0.025	NE	NE	B		087076-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087076-009	SW846 6020
	Magnesium	35.0	0.0052	0.015	NE	NE			087076-009	SW846 6020
	Manganese	0.0081	0.001	0.005	NE	NE			087076-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087076-009	SW846 7470
	Nickel	0.0441	0.0005	0.002	NE	NE			087076-009	SW846 6020
	Potassium	6.71	0.080	0.300	NE	NE			087076-009	SW846 6020
	Selenium	0.00135	0.001	0.005	0.050	0.050	J		087076-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087076-009	SW846 6020
	Sodium	80.2	0.800	2.50	NE	NE		J	087076-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087076-009	SW846 6020
	Uranium	0.0164	0.00005	0.0002	0.030	5.00	B		087076-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087076-009	SW846 6020
	Zinc	0.00858	0.0026	0.010	NE	NE	J		087076-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.022	0.005	0.015	NE	NE	B	0.04U	087094-009	SW846 6020
16-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087094-009	SW846 6020
	Arsenic	0.00205	0.0015	0.005	0.010	0.100	J		087094-009	SW846 6020
	Barium	0.0112	0.0005	0.002	2.00	1.00			087094-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087094-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087094-009	SW846 6020
	Calcium	57.0	0.100	0.500	NE	NE	B		087094-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087094-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		087094-009	SW846 6020
	Copper	0.0068	0.0003	0.001	NE	NE			087094-009	SW846 6020
	Iron	0.209	0.010	0.025	NE	NE			087094-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087094-009	SW846 6020
	Magnesium	3.56	0.0052	0.015	NE	NE			087094-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087094-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087094-009	SW846 7470
	Nickel	0.00385	0.0005	0.002	NE	NE			087094-009	SW846 6020
	Potassium	2.59	0.080	0.300	NE	NE			087094-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U		087094-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087094-009	SW846 6020
	Sodium	1070	4.00	12.5	NE	NE			087094-009	SW846 6020
	Thallium	0.000519	0.0003	0.001	0.002	NE	J	0.002U	087094-009	SW846 6020
	Uranium	0.000286	0.00005	0.0002	0.030	5.00			087094-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087094-009	SW846 6020
	Zinc	0.0263	0.0026	0.010	NE	NE			087094-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.021	0.005	0.015	NE	NE	B	0.04U	087096-009	SW846 6020
17-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087096-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087096-009	SW846 6020
	Barium	0.0784	0.0005	0.002	2.00	1.00			087096-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087096-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087096-009	SW846 6020
	Calcium	45.2	0.020	0.100	NE	NE	B		087096-009	SW846 6020
	Chromium	0.00226	0.0015	0.003	0.100	0.050	J		087096-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	NE	U		087096-009	SW846 6020
	Copper	0.00138	0.0003	0.001	NE	NE			087096-009	SW846 6020
	Iron	0.166	0.010	0.025	NE	NE			087096-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087096-009	SW846 6020
	Magnesium	14.2	0.0052	0.015	NE	NE			087096-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087096-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087096-009	SW846 7470
	Nickel	0.000855	0.0005	0.002	NE	NE	J		087096-009	SW846 6020
	Potassium	4.02	0.080	0.300	NE	NE			087096-009	SW846 6020
	Selenium	0.00105	0.001	0.005	0.050	0.050	J		087096-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087096-009	SW846 6020
	Sodium	34.6	0.080	0.250	NE	NE			087096-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087096-009	SW846 6020
	Uranium	0.00354	0.00005	0.0002	0.030	5.00			087096-009	SW846 6020
	Vanadium	0.00564	0.003	0.010	NE	NE	J		087096-009	SW846 6020
	Zinc	0.0079	0.0026	0.010	NE	NE	J		087096-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results, Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.0166	0.005	0.015	NE	NE	B	0.05U	087083-009	SW846 6020
09-Mar-09	Antimony	ND	0.0005	0.002	0.006	NE	U		087083-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087083-009	SW846 6020
	Barium	0.0517	0.0005	0.002	2.00	1.00			087083-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087083-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087083-009	SW846 6020
	Calcium	35.7	0.020	0.100	NE	NE	B	J	087083-009	SW846 6020
	Chromium	0.00485	0.0015	0.003	0.100	0.050	B	0.01U	087083-009	SW846 6020
	Cobalt	0.000165	0.0001	0.001	NE	NE	J		087083-009	SW846 6020
	Copper	0.00143	0.0003	0.001	NE	NE			087083-009	SW846 6020
	Iron	0.153	0.010	0.025	NE	NE			087083-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087083-009	SW846 6020
	Magnesium	11.4	0.0052	0.015	NE	NE		J	087083-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087083-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087083-009	SW846 7470
	Nickel	0.002	0.0005	0.002	NE	NE			087083-009	SW846 6020
	Potassium	4.33	0.080	0.300	NE	NE			087083-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U		087083-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087083-009	SW846 6020
	Sodium	50.2	0.160	0.500	NE	NE			087083-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087083-009	SW846 6020
	Uranium	0.00263	0.00005	0.0002	0.030	5.00			087083-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	NE	U		087083-009	SW846 6020
	Zinc	0.00483	0.0026	0.010	NE	NE	J		087083-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Continued)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.0201	0.005	0.015	NE	NE	B	0.05U	087081-009	SW846 6020
06-Mar-09	Antimony	0.000517	0.0005	0.002	0.006	NE	B, J	0.008U	087081-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.100	U		087081-009	SW846 6020
	Barium	0.047	0.0005	0.002	2.00	1.00			087081-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	NE	U		087081-009	SW846 6020
	Cadmium	0.000579	0.00011	0.001	0.005	0.010	J		087081-009	SW846 6020
	Calcium	33.3	0.020	0.100	NE	NE	B	J	087081-009	SW846 6020
	Chromium	0.004	0.0015	0.003	0.100	0.050	B	0.01U	087081-009	SW846 6020
	Cobalt	0.000124	0.0001	0.001	NE	NE	J		087081-009	SW846 6020
	Copper	0.0017	0.0003	0.001	NE	NE			087081-009	SW846 6020
	Iron	0.141	0.010	0.025	NE	NE			087081-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087081-009	SW846 6020
	Magnesium	10.3	0.0052	0.015	NE	NE		J	087081-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087081-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087081-009	SW846 7470
	Nickel	0.00188	0.0005	0.002	NE	NE	J		087081-009	SW846 6020
	Potassium	4.03	0.080	0.300	NE	NE			087081-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.050	U		087081-009	SW846 6020
	Silver	0.000201	0.0002	0.001	NE	0.050	J		087081-009	SW846 6020
	Sodium	52.5	0.160	0.500	NE	NE			087081-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087081-009	SW846 6020
	Uranium	0.00238	0.00005	0.0002	0.030	5.00			087081-009	SW846 6020
	Vanadium	0.00657	0.003	0.010	NE	NE	J		087081-009	SW846 6020
	Zinc	0.00838	0.0026	0.010	NE	NE	J		087081-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-4 *(Concluded)*
Summary of Dissolved (Filtered) Metal Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.0122	0.005	0.015	NE	NE	B, J	0.026U	087074-009	SW846 6020
04-Mar-09	Antimony	0.00052	0.0005	0.002	0.006	NE	B, J	0.005U	087074-009	SW846 6020
	Arsenic	0.00252	0.0015	0.005	0.010	0.100	J		087074-009	SW846 6020
	Barium	0.0474	0.0005	0.002	2.00	1.00	B		087074-009	SW846 6020
	Beryllium	0.000183	0.0001	0.0005	0.004	NE	J		087074-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.010	U		087074-009	SW846 6020
	Calcium	161	0.200	1.00	NE	NE	B		087074-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.050	U		087074-009	SW846 6020
	Cobalt	0.000192	0.0001	0.001	NE	NE	J		087074-009	SW846 6020
	Copper	0.00103	0.0003	0.001	NE	NE	B	0.005U	087074-009	SW846 6020
	Iron	0.257	0.010	0.025	NE	NE	B		087074-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.050	U		087074-009	SW846 6020
	Magnesium	33.2	0.0052	0.015	NE	NE			087074-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087074-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087074-009	SW846 7470
	Nickel	0.00216	0.0005	0.002	NE	NE			087074-009	SW846 6020
	Potassium	6.63	0.080	0.300	NE	NE			087074-009	SW846 6020
	Selenium	0.00123	0.001	0.005	0.050	0.050	J		087074-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	0.050	U		087074-009	SW846 6020
	Sodium	95.2	0.800	2.50	NE	NE		J	087074-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	NE	U		087074-009	SW846 6020
	Uranium	0.0179	0.00005	0.0002	0.030	5.00	B		087074-009	SW846 6020
	Vanadium	0.00381	0.003	0.010	NE	NE	J		087074-009	SW846 6020
	Zinc	0.0044	0.0026	0.010	NE	NE	J		087074-009	SW846 6020

Refer to footnotes on page 2A-37.

Table 2A-5
Summary of Total (Unfiltered) Mercury Results (EPA Method[g] SW846-7470), Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	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.
Coyote Springs	12-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087092-010
CTF-MW1	11-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087090-010
CTF-MW2	23-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087107-010
CTF-MW3	13-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087087-010
CTF-MW3 (Duplicate)	13-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087088-010
Eubank-1	18-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087100-010
Eubank-1 (Duplicate)	18-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087101-010
Greystone-MW2	19-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087103-010
MRN-2	24-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087110-010
NWTA3-MW3D	25-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087105-010
PL-2	10-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087078-010
SFR-2S	05-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087076-010
SFR-4T	16-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087094-010
SWTA3-MW2	17-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087096-010
SWTA3-MW3	09-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087083-010
SWTA3-MW4	06-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087081-010
TRE-1	04-Mar-09	ND	0.000067	0.0002	0.002	0.002	U		087074-010

Refer to footnotes on page 2A-37.

Table 2A-6
Summary of Gamma-Emitting Radionuclides/Short List (EPA Method[g] 901.0), Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/ MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.
Coyote Springs	Americium-241	-28.9 ± 7.88	11.8	5.92	NE	NE	U	BD	087092-033
12-Mar-09	Cesium-137	-1.14 ± 1.80	2.88	1.44	NE	NE	U	BD	087092-033
	Cobalt-60	2.00 ± 1.72	3.10	1.55	NE	NE	U	BD	087092-033
	Potassium-40	44.2 ± 43.9	28.5	14.3	NE	NE	X	R	087092-033
CTF-MW1	Americium-241	10.3 ± 13.1	20.2	10.1	NE	NE	U	BD	087090-033
11-Mar-09	Cesium-137	-2.48 ± 2.28	3.56	1.78	NE	NE	U	BD	087090-033
	Cobalt-60	1.10 ± 2.24	3.85	1.92	NE	NE	U	BD	087090-033
	Potassium-40	-31.1 ± 50.2	53.8	26.9	NE	NE	U	BD	087090-033
CTF-MW2	Americium-241	3.39 ± 9.19	14.8	7.42	NE	NE	U	BD	087107-033
23-Mar-09	Cesium-137	2.28 ± 1.74	3.06	1.53	NE	NE	U	BD	087107-033
	Cobalt-60	-0.427 ± 1.75	2.82	1.41	NE	NE	U	BD	087107-033
	Potassium-40	14.7 ± 42.9	29.3	14.7	NE	NE	U	BD	087107-033
CTF-MW3	Americium-241	-23.6 ± 10.3	16.3	8.17	NE	NE	U	BD	087087-033
13-Mar-09	Cesium-137	0.959 ± 1.83	3.09	1.55	NE	NE	U	BD	087087-033
	Cobalt-60	-0.601 ± 2.00	3.25	1.63	NE	NE	U	BD	087087-033
	Potassium-40	53.4 ± 48.8	33.2	16.6	NE	NE		J	087087-033
CTF-MW3 (Duplicate)	Americium-241	9.29 ± 13.0	20.3	10.2	NE	NE	U	BD	087088-033
13-Mar-09	Cesium-137	-1.22 ± 2.91	3.69	1.84	NE	NE	U	BD	087088-033
	Cobalt-60	-0.366 ± 2.16	3.58	1.79	NE	NE	U	BD	087088-033
	Potassium-40	9.53 ± 51.4	32.9	16.5	NE	NE	U	BD	087088-033
Eubank-1	Americium-241	-3.50 ± 7.57	12.6	6.30	NE	NE	U	BD	087100-033
18-Mar-09	Cesium-137	-0.615 ± 2.58	2.98	1.49	NE	NE	U	BD	087100-033
	Cobalt-60	0.594 ± 1.82	3.12	1.56	NE	NE	U	BD	087100-033
	Potassium-40	-10.7 ± 35.1	42.4	21.2	NE	NE	U	BD	087100-033
Eubank-1 (Duplicate)	Americium-241	3.66 ± 8.71	13.6	6.79	NE	NE	U	BD	087101-033
18-Mar-09	Cesium-137	-1.52 ± 2.77	3.13	1.56	NE	NE	U	BD	087101-033
	Cobalt-60	0.433 ± 1.91	3.26	1.63	NE	NE	U	BD	087101-033
	Potassium-40	15.6 ± 47.8	27.6	13.8	NE	NE	U	BD	087101-033
Greystone-MW2	Americium-241	3.01 ± 9.17	14.0	6.99	NE	NE	U	BD	087103-033
19-Mar-09	Cesium-137	0.695 ± 1.89	3.19	1.60	NE	NE	U	BD	087103-033
	Cobalt-60	2.71 ± 2.11	3.80	1.90	NE	NE	U	BD	087103-033
	Potassium-40	2.01 ± 43.0	33.4	16.7	NE	NE	U	BD	087103-033
MRN-2	Americium-241	1.70 ± 7.94	13.6	6.83	NE	NE	U	BD	087110-033
24-Mar-09	Cesium-137	2.43 ± 1.78	3.20	1.60	NE	NE	U	BD	087110-033
	Cobalt-60	0.941 ± 1.76	3.08	1.54	NE	NE	U	BD	087110-033
	Potassium-40	-53.7 ± 38.7	44.8	22.4	NE	NE	U	BD	087110-033

Refer to footnotes on page 2A-37.

Table 2A-6 *(Concluded)*
Summary of Gamma-Emitting Radionuclides/Short List (EPA Method[g] 901.0), Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/ MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.
NWTA3-MW3D	Americium-241	3.39 ± 8.34	12.8	6.38	NE	NE	U	BD	087105-033
25-Mar-09	Cesium-137	-1.69 ± 1.72	2.71	1.36	NE	NE	U	BD	087105-033
	Cobalt-60	0.902 ± 1.89	3.27	1.64	NE	NE	U	BD	087105-033
	Potassium-40	-0.873 ± 34.8	40.8	20.4	NE	NE	U	BD	087105-033
PL-2	Americium-241	-13.7 ± 4.64	7.05	3.53	NE	NE	U	BD	087078-033
10-Mar-09	Cesium-137	0.566 ± 3.00	5.01	2.51	NE	NE	U	BD	087078-033
	Cobalt-60	0.760 ± 2.93	4.98	2.49	NE	NE	U	BD	087078-033
	Potassium-40	-32.7 ± 50.1	57.9	29.0	NE	NE	U	BD	087078-033
SFR-2S	Americium-241	-20.7 ± 8.53	13.5	6.76	NE	NE	U	BD	087076-033
05-Mar-09	Cesium-137	-0.15 ± 1.80	2.98	1.49	NE	NE	U	BD	087076-033
	Cobalt-60	1.90 ± 2.04	3.61	1.81	NE	NE	U	BD	087076-033
	Potassium-40	1.28 ± 47.0	29.5	14.7	NE	NE	U	BD	087076-033
SFR-4T	Americium-241	-26.8 ± 12.3	19.5	9.77	NE	NE	U	BD	087094-033
16-Mar-09	Cesium-137	-0.666 ± 2.12	3.45	1.72	NE	NE	U	BD	087094-033
	Cobalt-60	-0.713 ± 2.36	3.82	1.91	NE	NE	U	BD	087094-033
	Potassium-40	48.1 ± 59.1	35.1	17.6	NE	NE	X	R	087094-033
SWTA3-MW2	Americium-241	7.85 ± 12.8	19.6	9.80	NE	NE	U	BD	087096-033
17-Mar-09	Cesium-137	-0.311 ± 2.12	3.74	1.74	NE	NE	U	BD	087096-033
	Cobalt-60	-1.92 ± 3.27	3.73	1.87	NE	NE	U	BD	087096-033
	Potassium-40	-40.5 ± 39.9	43.2	21.6	NE	NE	U	BD	087096-033
SWTA3-MW3	Americium-241	0.708 ± 11.1	16.6	8.28	NE	NE	U	BD	087083-033
09-Mar-09	Cesium-137	-0.129 ± 1.79	3.03	1.52	NE	NE	U	BD	087083-033
	Cobalt-60	-2.39 ± 3.41	3.58	1.79	NE	NE	U	BD	087083-033
	Potassium-40	77.3 ± 37.1	28.3	14.2	NE	NE	X	R	087083-033
SWTA3-MW4	Americium-241	-0.323 ± 12.4	19.1	9.56	NE	NE	U	BD	087081-033
06-Mar-09	Cesium-137	-0.791 ± 2.83	3.53	1.77	NE	NE	U	BD	087081-033
	Cobalt-60	-1.09 ± 2.00	3.21	1.61	NE	NE	U	BD	087081-033
	Potassium-40	3.76 ± 44.1	50.4	25.2	NE	NE	U	BD	087081-033
TRE-1	Americium-241	3.14 ± 7.76	11.7	5.86	NE	NE	U	BD	087074-034
04-Mar-09	Cesium-137	-0.323 ± 3.27	3.08	1.54	NE	NE	U	BD	087074-034
	Cobalt-60	0.976 ± 1.95	3.38	1.69	NE	NE	U	BD	087074-034
	Potassium-40	-40.0 ± 42.0	41.6	20.8	NE	NE	U	BD	087074-034

Refer to footnotes on page 2A-37.

Table 2A-7
Summary of Radioisotopic Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/ MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
Coyote Springs	Gross Alpha	**15.1 ± 5.74**	5.27	2.27	15	NE		J	087092-034	EPA 900.0
12-Mar-09	Gross Beta	31.5 ± 8.40	9.77	4.75	4mrem/yr	NE			087092-034	EPA 900.0
	Radium-226	0.0431 ± 0.348	0.696	0.283	5	30	U	BD	087092-038	EPA 903.1
	Radium-228	0.888 ± 0.418	0.430	0.183	5	30		J	087092-039	EPA 904.0
CTF-MW1	Gross Alpha	**35.5 ± 8.07**	2.87	1.34	15	NE			087090-034	EPA 900.0
11-Mar-09	Gross Beta	4.66 ± 1.73	2.44	1.19	4mrem/yr	NE		J	087090-034	EPA 900.0
	Radium-226	0.590 ± 0.450	0.602	0.242	5	30	U	BD	087090-038	EPA 903.1
	Radium-228	0.473 ± 0.307	0.416	0.180	5	30		J	087090-039	EPA 904.0
CTF-MW2	Gross Alpha	**35.8 ± 22.1**	22.6	7.33	15	NE		J	087107-034	EPA 900.0
23-Mar-09	Gross Beta	61.8 ± 14.0	13.7	6.68	4mrem/yr	NE			087107-034	EPA 900.0
	Radium-226	**2.99 ± 1.09**	0.637	0.256	5	30			087107-038	EPA 903.1
	Radium-228	**7.68 ± 2.07**	0.504	0.238	5	30		J	087107-039	EPA 904.0
CTF-MW3	Gross Alpha	**15.2 ± 4.46**	2.96	1.30	15	NE			087087-034	EPA 900.0
13-Mar-09	Gross Beta	8.40 ± 4.41	6.84	3.34	4mrem/yr	NE		J	087087-034	EPA 900.0
	Radium-226	0.374 ± 0.345	0.521	0.210	5	30	U	BD	087087-038	EPA 903.1
	Radium-228	0.894 ± 0.403	0.414	0.179	5	30		NJ+	087087-039	EPA 904.0
CTF-MW3 (Duplicate)	Gross Alpha	14.7 ± 4.16	2.11	0.883	15	NE			087088-034	EPA 900.0
13-Mar-09	Gross Beta	14.4 ± 4.33	5.52	2.69	4mrem/yr	NE		J	087088-034	EPA 900.0
	Radium-226	0.814 ± 0.546	0.731	0.298	5	30		J	087088-038	EPA 903.1
	Radium-228	1.51 ± 0.553	0.421	0.183	5	30		NJ+	087088-039	EPA 904.0
Eubank-1	Gross Alpha	5.27 ± 3.07	3.18	1.12	15	NE		J	087100-034	EPA 900.0
18-Mar-09	Gross Beta	1.84 ± 0.804	1.08	0.503	4mrem/yr	NE		J	087100-034	EPA 900.0
	Radium-226	0.209 ± 0.343	0.602	0.238	5	30	U	BD	087100-038	EPA 903.1
	Radium-228	0.404 ± 0.322	0.499	0.236	5	30	U	BD	087100-039	EPA 904.0
Eubank-1 (Duplicate)	Gross Alpha	4.82 ± 2.85	2.64	0.861	15	NE		J	087101-034	EPA 900.0
18-Mar-09	Gross Beta	2.59 ± 1.02	1.28	0.586	4mrem/yr	NE		J	087101-034	EPA 900.0
	Radium-226	0.0343 ± 0.178	0.380	0.138	5	30	U	BD	087101-038	EPA 903.1
	Radium-228	0.511 ± 0.343	0.498	0.230	5	30		J	087101-039	EPA 904.0
Greystone-MW2	Gross Alpha	**34.6 ± 12.9**	8.40	3.10	15	NE			087103-034	EPA 900.0
	Gross Alpha (Reanalysis)	12.1 ± 3.52	3.11	1.41	15	NE			087103-R34	EPA 900.0
19-Mar-09	Gross Beta	12.7 ± 3.87	4.46	2.10	4mrem/yr	NE		J	087103-034	EPA 900.0
	Radium-226	0.132 ± 0.261	0.476	0.188	5	30	U	BD	087103-038	EPA 903.1
	Radium-228	-0.359 ± 0.254	0.489	0.232	5	30	U	BD	087103-039	EPA 904.0

Refer to footnotes on page 2A-37.

Table 2A-7 *(Continued)*
Summary of Radioisotopic Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/ MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MRN-2	Gross Alpha	4.09 ± 1.31	1.25	0.560	15	NE			087110-034	EPA 900.0
24-Mar-09	Gross Beta	4.87 ± 1.36	1.66	0.805	4mrem/yr	NE		J	087110-034	EPA 900.0
	Radium-226	0.258 ± 0.315	0.520	0.212	5	30	U	BD	087110-038	EPA 903.1
	Radium-228	0.419 ± 0.323	0.499	0.237	5	30	U	BD	087110-039	EPA 904.0
NWTA3-MW3D	Gross Alpha	2.75 ± 1.96	2.46	0.871	15	NE		J	087105-034	EPA 900.0
25-Mar-09	Gross Beta	3.62 ± 1.06	1.31	0.639	4mrem/yr	NE		J	087105-034	EPA 900.0
	Radium-226	-0.0354 ± 0.250	0.542	0.218	5	30	U	BD	087105-038	EPA 903.1
	Radium-228	0.598 ± 0.365	0.504	0.229	5	30		J	087105-039	EPA 904.0
PL-2	Gross Alpha	4.53 ± 1.33	1.17	0.532	15	NE			087078-034	EPA 900.0
10-Mar-09	Gross Beta	3.92 ± 1.05	1.24	0.603	4mrem/yr	NE			087078-034	EPA 900.0
	Radium-226	0.739 ± 0.535	0.665	0.267	5	30		J	087078-038	EPA 903.1
	Radium-228	0.166 ± 0.247	0.421	0.184	5	30	U	BD	087078-039	EPA 904.0
SFR-2S	Gross Alpha	**32.9 ± 6.65**	2.07	0.901	15	NE			087076-034	EPA 900.0
05-Mar-09	Gross Beta	10.3 ± 2.33	1.90	0.909	4mrem/yr	NE			087076-034	EPA 900.0
	Radium-226	0.415 ± 0.359	0.530	0.213	5	30	U	BD	087076-038	EPA 903.1
	Radium-228	0.390 ± 0.259	0.351	0.151	5	30		J	087076-039	EPA 904.0
SFR-4T	Gross Alpha	**19.2 ± 14.5**	19.1	6.86	15	NE		J	087094-034	EPA 900.0
16-Mar-09	Gross Alpha (Reanalysis)	-5.05 ± 4.63	9.61	4.36	15	NE	U	BD	087094-R34	EPA 900.0
	Gross Beta	7.30 ± 4.72	7.21	3.45	4mrem/yr	NE		J	087094-034	EPA 900.0
	Radium-226	0.490 ± 0.412	0.542	0.197	5	30	U	BD	087094-038	EPA 903.1
	Radium-228	0.899 ± 0.400	0.421	0.185	5	30		J	087094-039	EPA 904.0
SWTA3-MW2	Gross Alpha	4.58 ± 2.57	2.47	0.823	15	NE		J	087096-034	EPA 900.0
17-Mar-09	Gross Beta	6.17 ± 1.51	1.15	0.528	4mrem/yr	NE			087096-034	EPA 900.0
	Radium-226	0.331 ± 0.267	0.317	0.109	5	30		J	087096-038	EPA 903.1
	Radium-228	0.188 ± 0.289	0.491	0.221	5	30	U	BD	087096-039	EPA 904.0
SWTA3-MW3	Gross Alpha	3.48 ± 1.09	0.983	0.435	15	NE			087083-034	EPA 900.0
09-Mar-09	Gross Beta	4.35 ± 1.13	0.992	0.456	4mrem/yr	NE			087083-034	EPA 900.0
	Radium-226	0.364 ± 0.412	0.654	0.266	5	30	U	BD	087083-038	EPA 903.1
	Radium-228	0.783 ± 0.370	0.412	0.181	5	30		J	087083-039	EPA 904.0

Refer to footnotes on page 2A-37.

Table 2A-7 *(Concluded)*
Summary of Radioisotopic Results,
Groundwater Protection Program Groundwater Surveillance Task, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL/ MAC[d] (pCi/L)		Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
SWTA3-MW4	Gross Alpha	2.15 ± 0.932	1.23	0.561	15	NE		J	087081-034	EPA 900.0
06-Mar-09	Gross Beta	3.55 ± 0.929	0.988	0.471	4mrem/yr	NE			087081-034	EPA 900.0
	Radium-226	0.296 ± 0.278	0.409	0.149	5	30	U	BD	087081-038	EPA 903.1
	Radium-228	0.431 ± 0.275	0.371	0.162	5	30		J	087081-039	EPA 904.0
TRE-1	Gross Alpha	**33.9 ± 7.64**	3.83	1.74	15	NE			087074-034	EPA 900.0
04-Mar-09	Gross Beta	13.1 ± 3.04	2.53	1.21	4mrem/yr	NE			087074-034	EPA 900.0
	Radium-226	0.759 ± 0.540	0.721	0.294	5	30		J	087074-038	EPA 903.1
	Radium-228	0.693 ± 0.342	0.404	0.179	5	30		J	087074-039	EPA 904.0

Refer to footnotes on page 2A-37.

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

Calendar Year 2009

Well ID	Sample Date	Sampling Type	Initial Depth to water (fbtoc)	Sampling Depth (fbtoc)	Purge Volume (gal.)	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (%Sat)	Alkalinity (mg/L $CaCO_3$ at 4.5 pH)
Coyote Springs	12-Mar-09	n/a	n/a	n/a	n/a	11.74	3,404	167.6	6.14	1.51	19.9	1,015
CTF-MW1	11-Mar-09	Bennett Pump	236.66	260	25	12.55	727	190.6	7.36	0.29	66.8	191
CTF-MW2	23-Mar-09	Bennett Pump	43.54	130	37	15.55	3,865	20.5	6.21	0.87	0.8	1,350
CTF-MW3	13-Mar-09	Bennett Pump	305.19	360	51	14.62	1,824	193.1	6.97	0.38	78.9	312
Eubank-1	18-Mar-09	Bennett Pump	552.27	605	72	19.87	529	134.9	7.52	0.52	85.0	174
Greystone-MW2	19-Mar-09	Bennett Pump	51.66	80	37	15.03	1,244	170.7	7.10	0.49	69.2	430
MRN-2	24-Mar-09	Bennett Pump	434.41	441	20	15.94	472	168.7	7.60	0.23	70.0	153
NWTA3-MW3D	25-Mar-09	Bennett Pump	466.75	673	41	18.89	404	138.6	7.74	3.33	46.3	147
PL-2	10-Mar-09	Bennett Pump	469.14	597	37	15.12	476	170.9	7.72	0.53	66.0	138
SFR-2S	05-Mar-09	Bennett Pump	99.57	117	28	18.51	1,219	119.9	6.91	11.5	83.4	368
SFR-4T	16-Mar-09	Bennett Pump	148.82	359	48	17.42	4,579	105.3	8.02	0.40	11.0	107
SWTA3-MW2	17-Mar-09	Bennett Pump	449.45	474	37	19.40	471	130.8	7.68	0.84	50.3	165
SWTA3-MW3	09-Mar-09	Bennett Pump	446.38	639	37	15.60	480	152.7	7.72	0.84	44.9	148
SWTA3-MW4	06-Mar-09	Bennett Pump	446.91	457	22	18.18	488	156.9	7.70	0.51	53.3	165
TRE-1	04-Mar-09	Bennett Pump	175.57	294	76	17.90	1,449	181.8	6.77	0.23	75.2	390

Refer to footnotes on page 2A-37.

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Footnotes for Groundwater Protection Program Groundwater Surveillance Task Tables

[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.
- 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

[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

[d]MCL/MAC

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11(b)), and subsequent amendments or the New Mexico Environmental Improvement Board in Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code (20 NMAC 7.1).
- Maximum Allowable Concentration in groundwater for the contaminants specified in 20 NMAC 6.2, Sec. 3103, Human Health Standards.
- CFR = Code of Federal Regulations.
- mrem/yr = millirem per year.
- NE = not established.
- 15 pCi/L = the maximum gross alpha activity, including radium-226, but excluding radon and total uranium.
- 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).
- 5 pCi/L = combined radium-226 and radium-228 activities.
- 30 pCi/L = combined radium-226 and radium-228 activities.

[e]Laboratory Qualifier

B	=	Analyte is detected in associated laboratory method blank.
h	=	Prep holding time exceeded.
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.
X	=	Used in radiochemistry to identify data rejected due to interference, low abundance, peak not meeting identification criteria, or uncertain identification for gamma spectroscopy.

[f]Validation Qualifier

If cell is blank, then all quality control samples meet 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 associate value is an estimated quantity.
J+	=	The associated numerical value is an estimated quantity with suspected positive bias.
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.

Footnotes for Groundwater Protection Program Groundwater Surveillance Task Tables (Concluded)

[f]Validation Qualifier (continued)

R	=	The data are unusable (compound may or may not be present). Re-sampling and 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

- U.S. Environmental Protection Agency (EPA), 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography–Method 300.0*, EPA-600/4-84-017, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- U.S. Department of Energy, 1990, *EML Procedures Manual*, 27th ed., Vol. 1, Rev. 1992, HASL-300, Environmental Measurements Laboratory, U.S. Department of Energy, New York.
- EPA 9310: EPA, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, 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.

[h]Field Water Quality Measurements

- Field measurements collected prior to sampling.

°C	=	degrees Celsius.
% Sat	=	percent saturation.
$CaCO_3$		Calcium carbonate.
fbtoc	=	feet below top of casing.
gal.	=	gallons.
μmhos/cm	=	micromhos per centimeter.
mg/L	=	milligrams per liter.
mV	=	millivolts.
NTU	=	nephelometric turbidity units.
pH	=	potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Attachment 2B
Groundwater Protection Program
Monitoring Network Map and Plots

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Attachment 2B Maps and Plots

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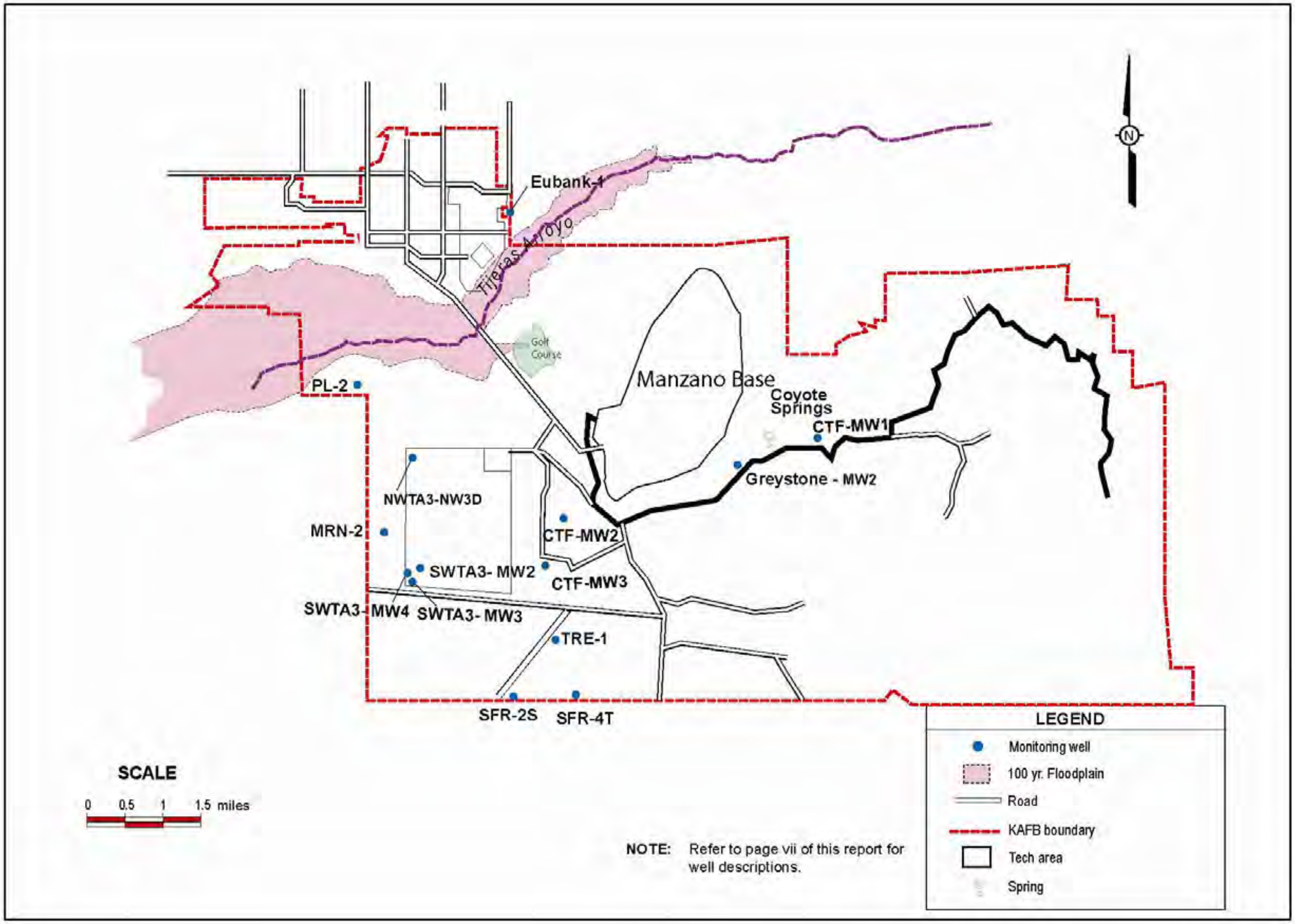

Figure 2B-1. Groundwater Protection Program (GWPP) Water Quality Monitoring Network

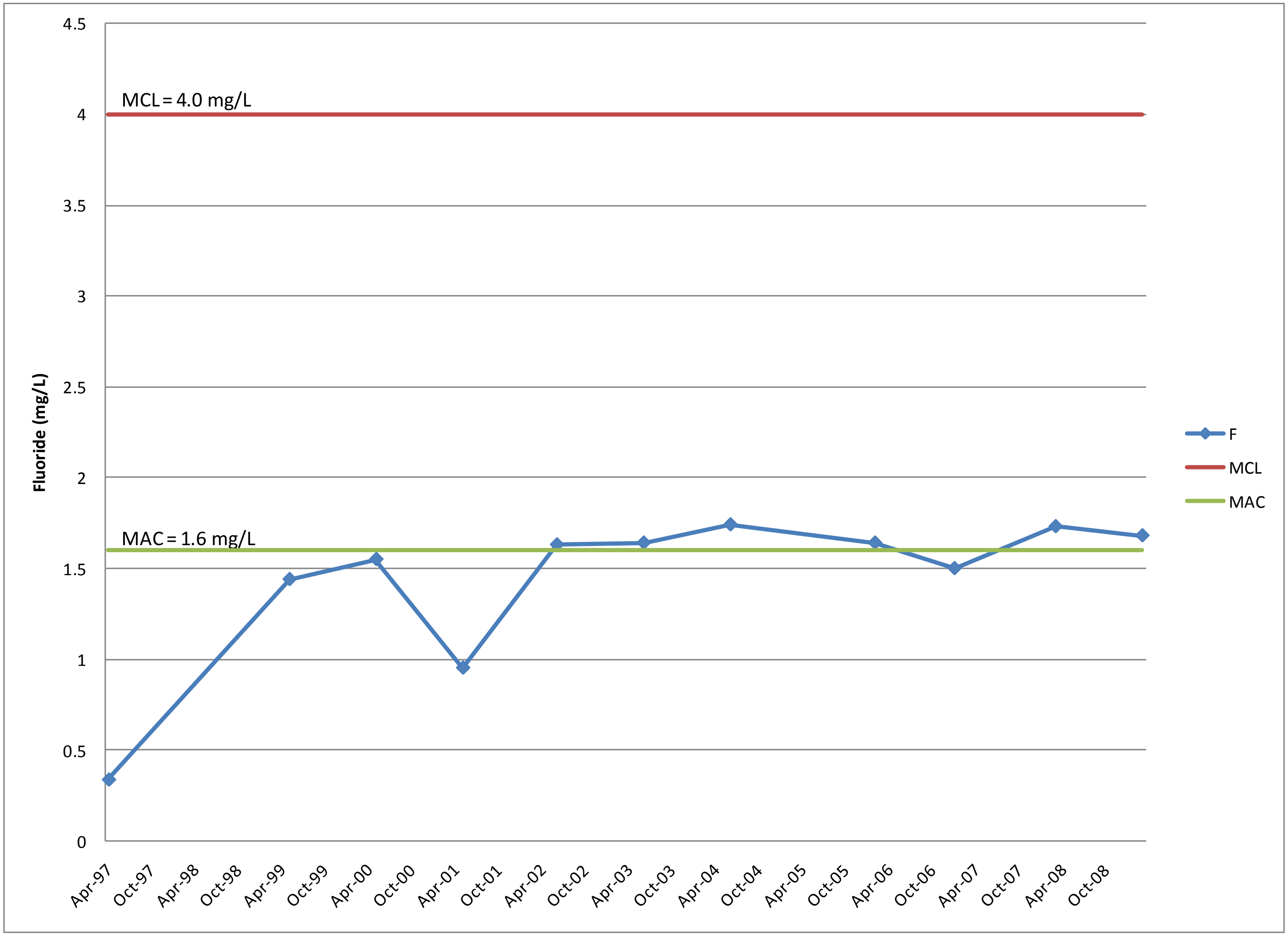

Figure 2B-2. Fluoride Concentrations, Coyote Springs

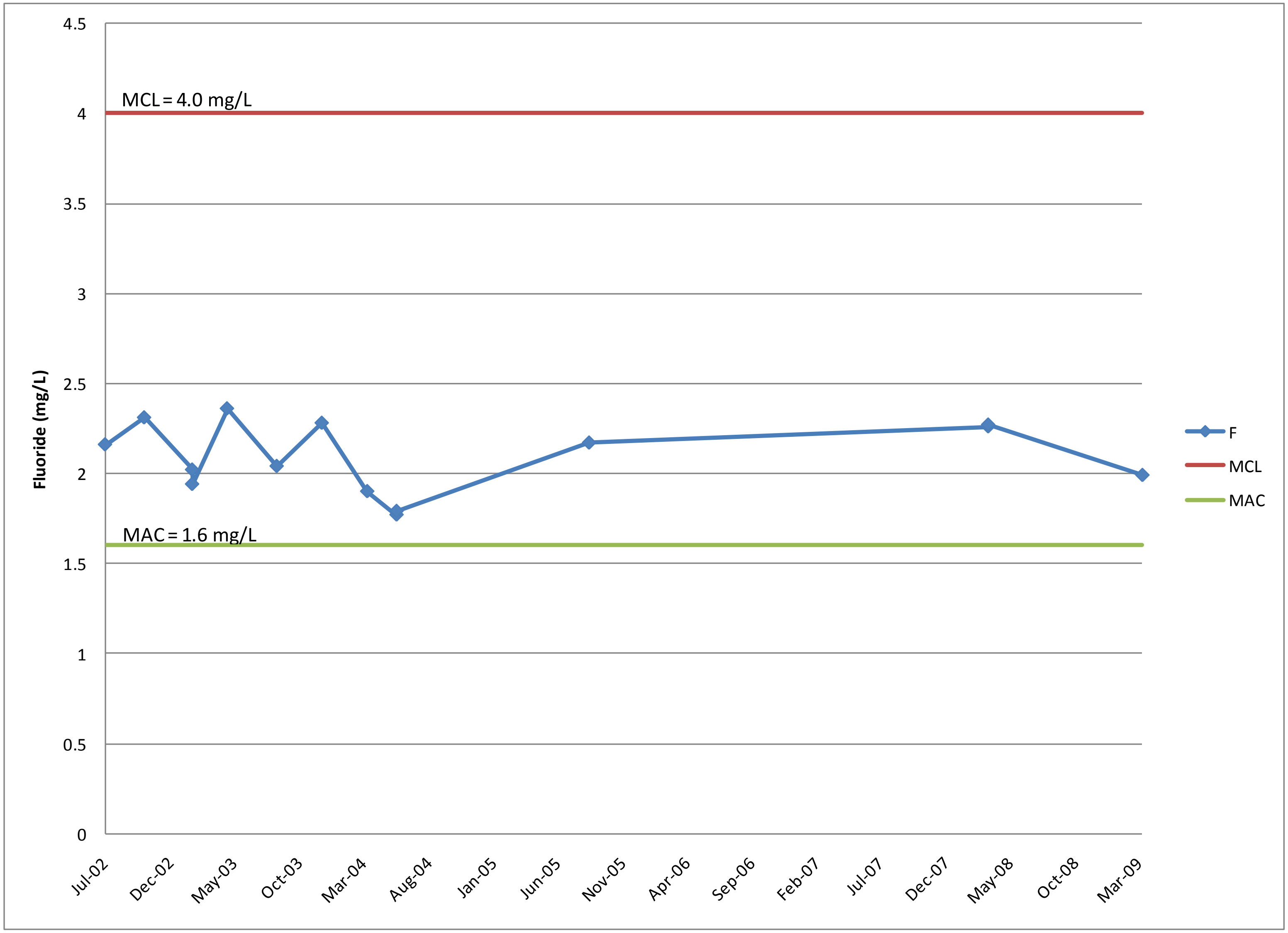

Figure 2B-3. Fluoride Concentrations, CTF-MW2

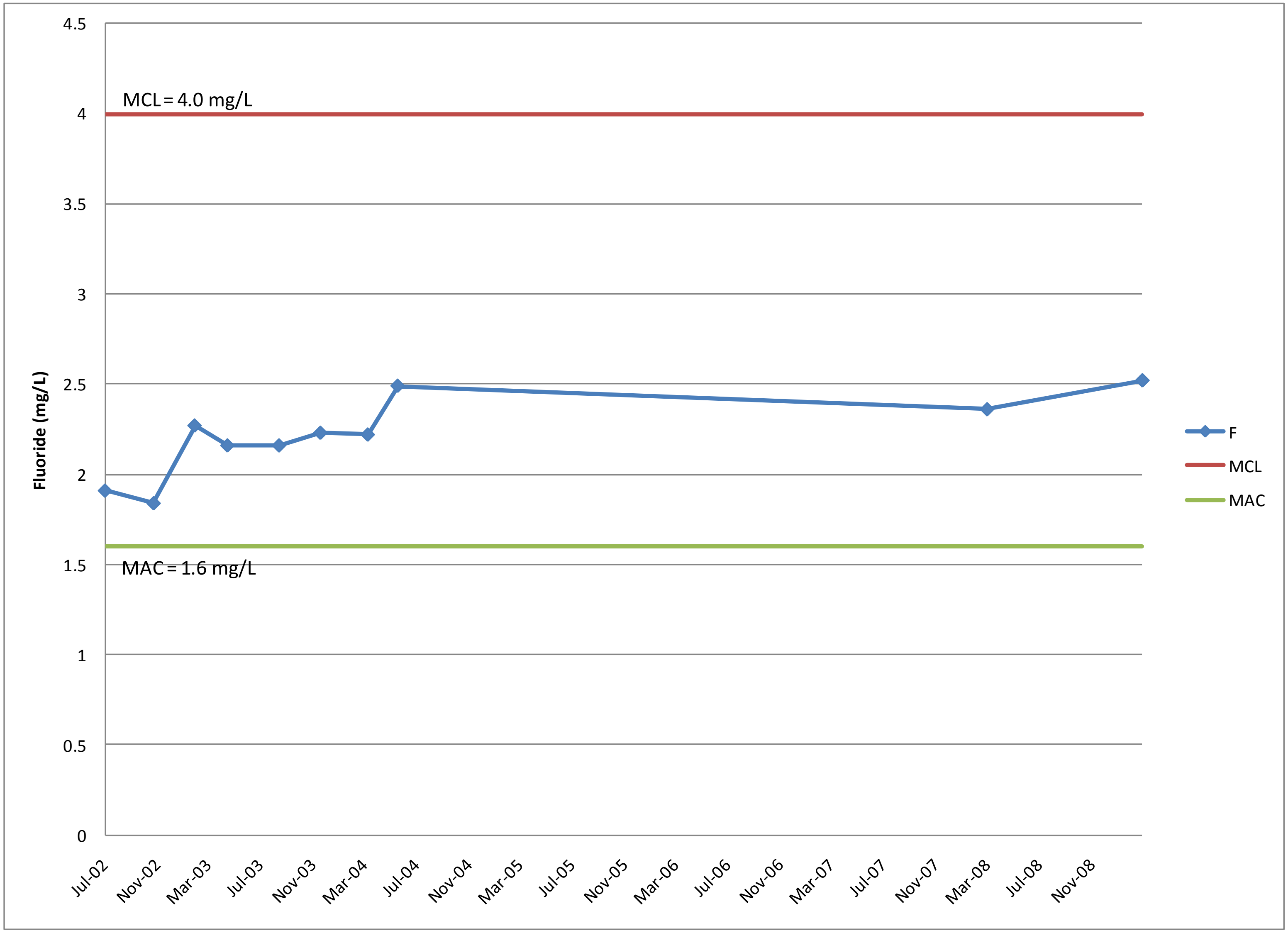

Figure 2B-4. Fluoride Concentrations, CTF-MW3

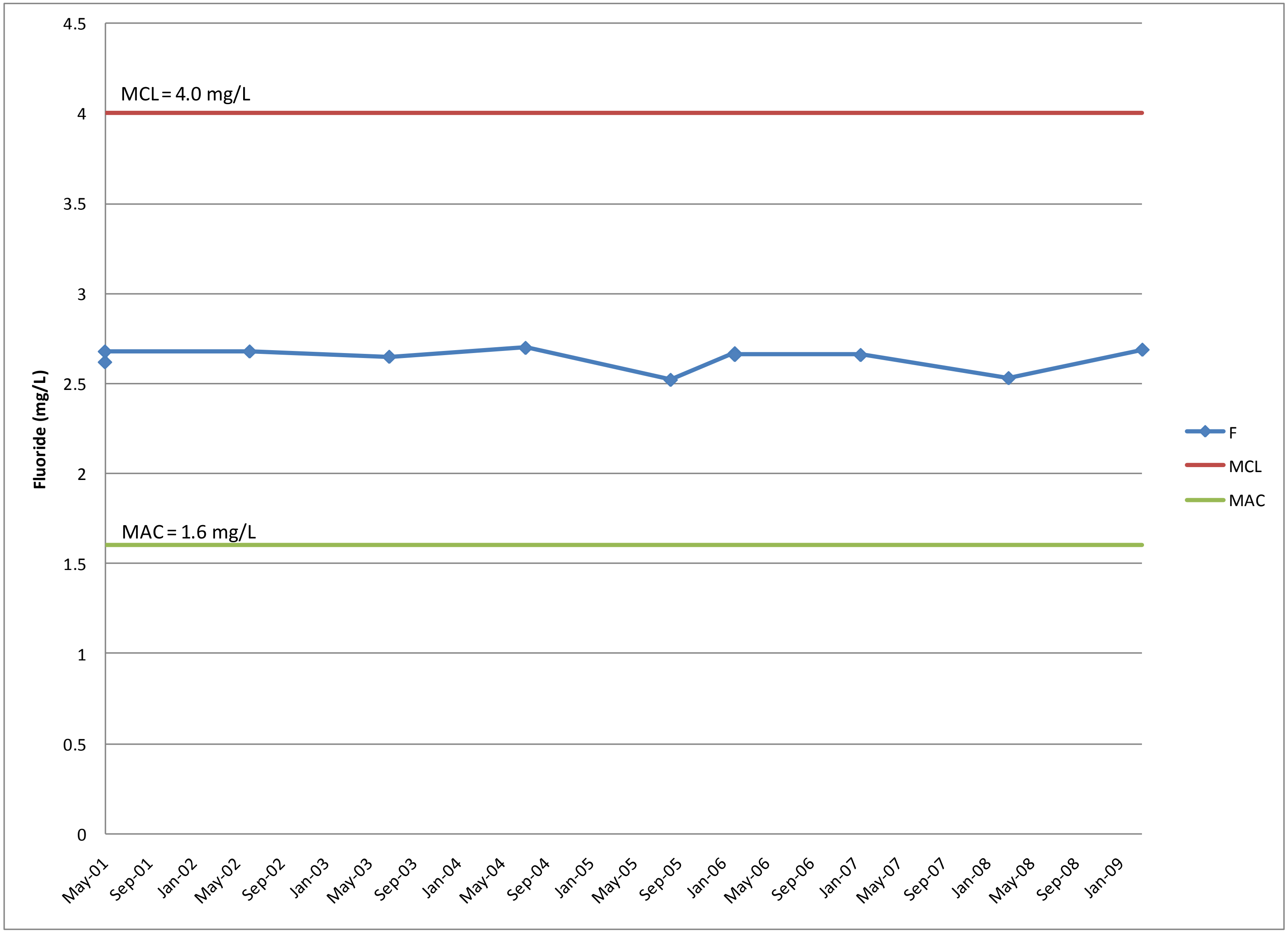

Figure 2B-5. Fluoride Concentrations, SFR-4T

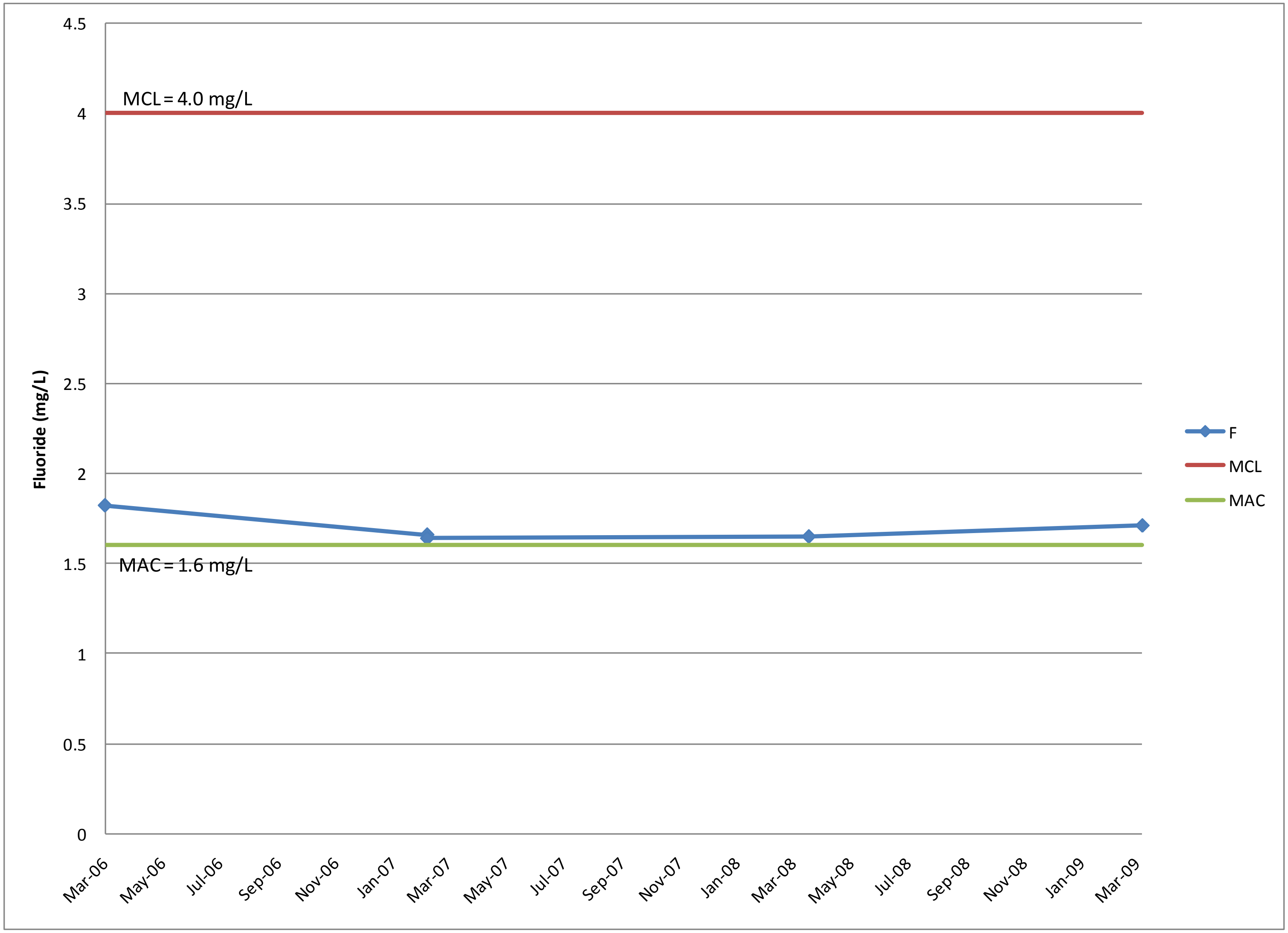

Figure 2B-6. Fluoride Concentrations, SWTA3-MW4

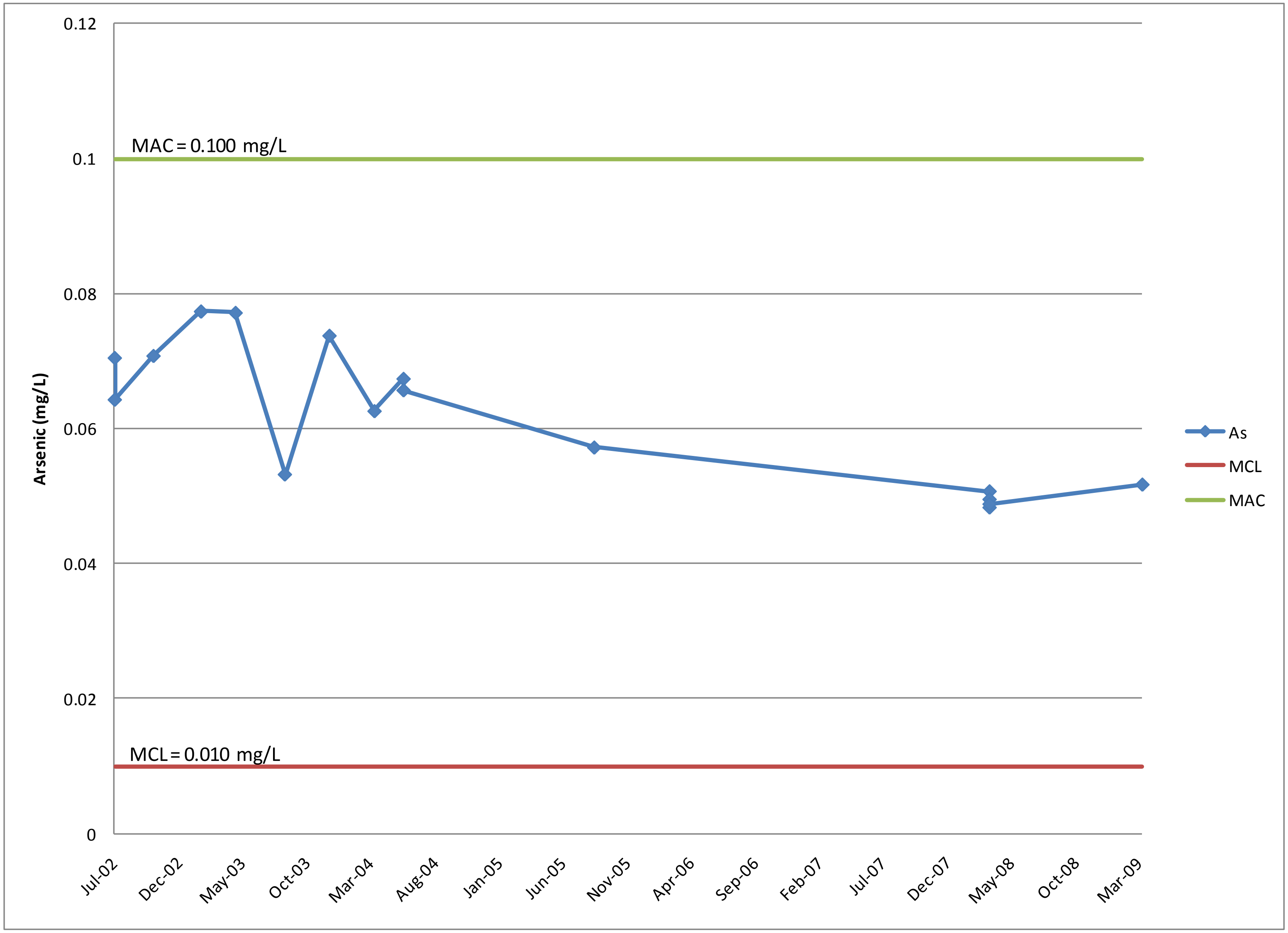

Figure 2B-7. Arsenic Concentrations, CTF-MW2

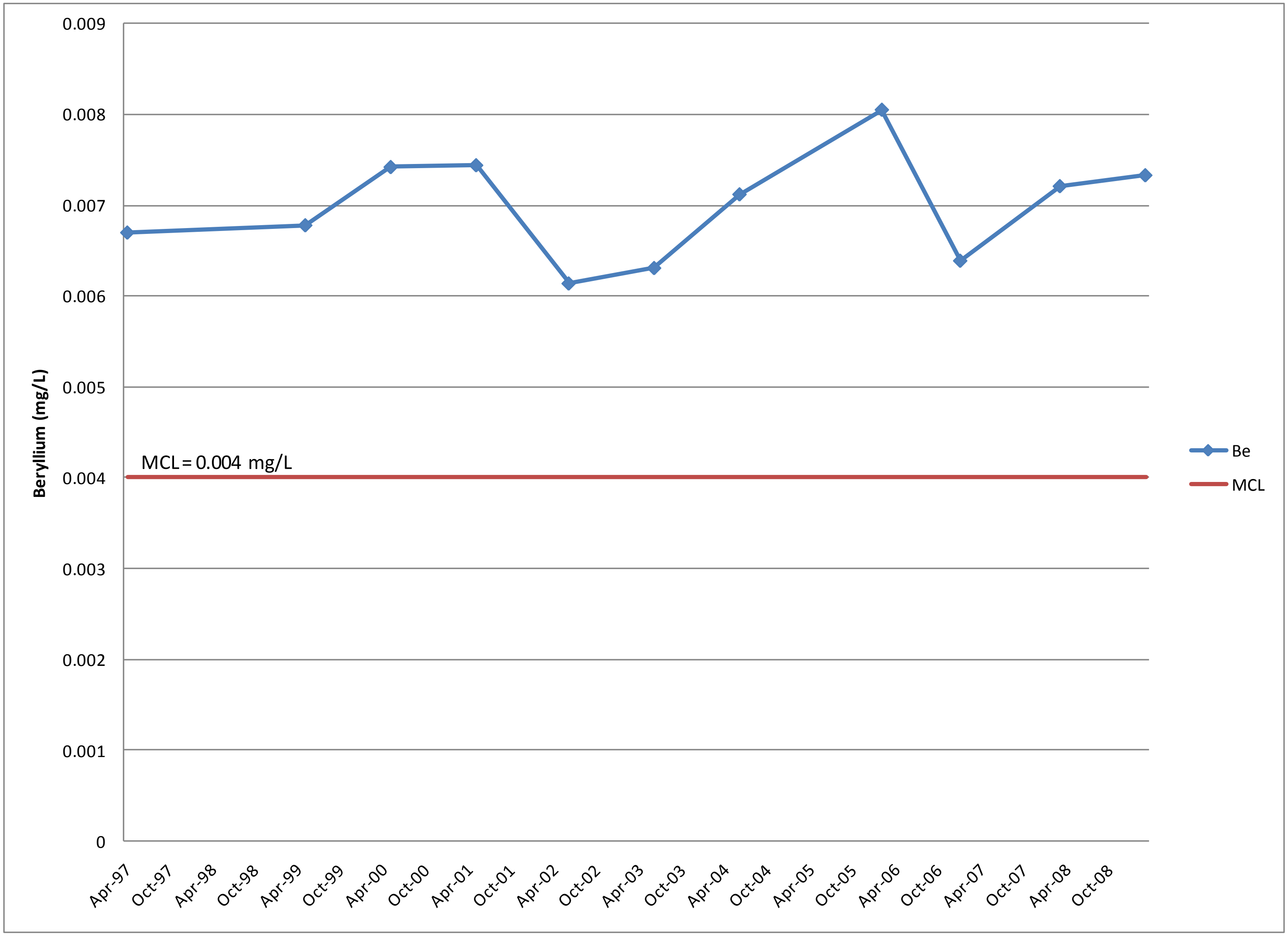

Figure 2B-8. Beryllium Concentrations, Coyote Springs

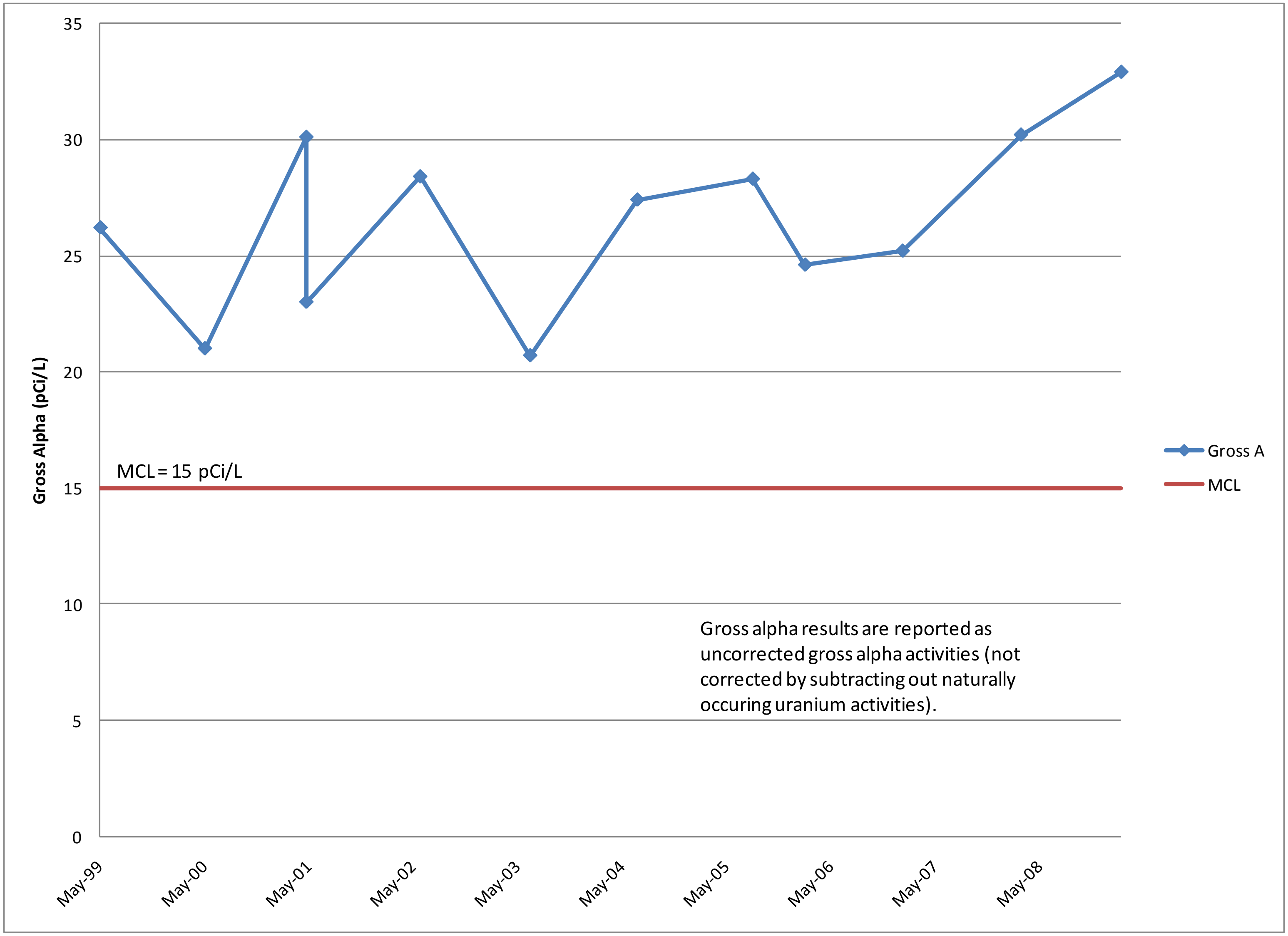

Figure 2B-9. Gross Alpha Activity Results, SFR-2S

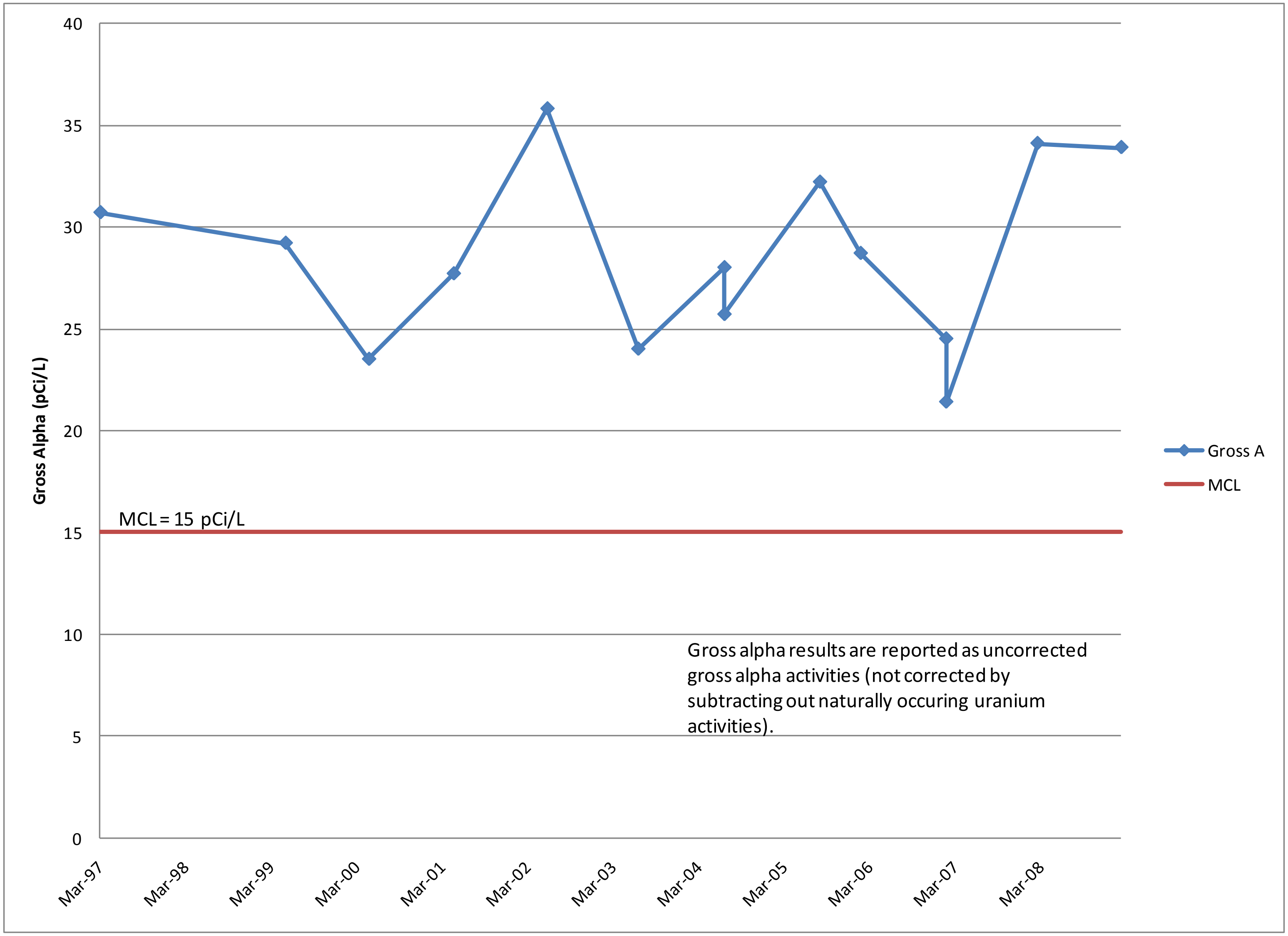

Figure 2B-10. Gross Alpha Activity Results, TRE-1

Attachment 2C
Groundwater Protection Program
Charts, Maps, and Hydrographs

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Attachment 2C Charts, Maps, and Hydrographs

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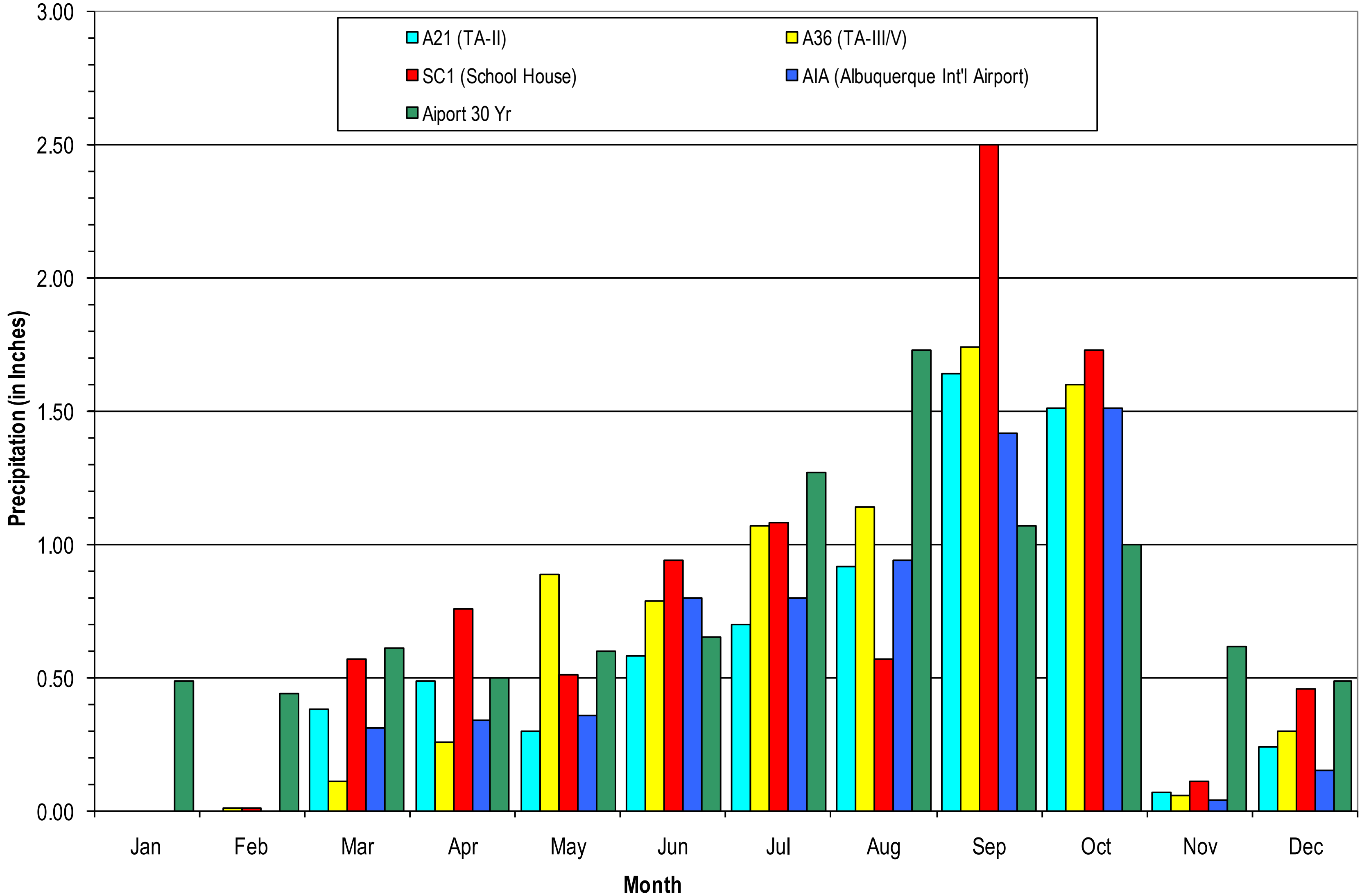

Figure 2C-1. Precipitation Data for SNL/NM, CY09

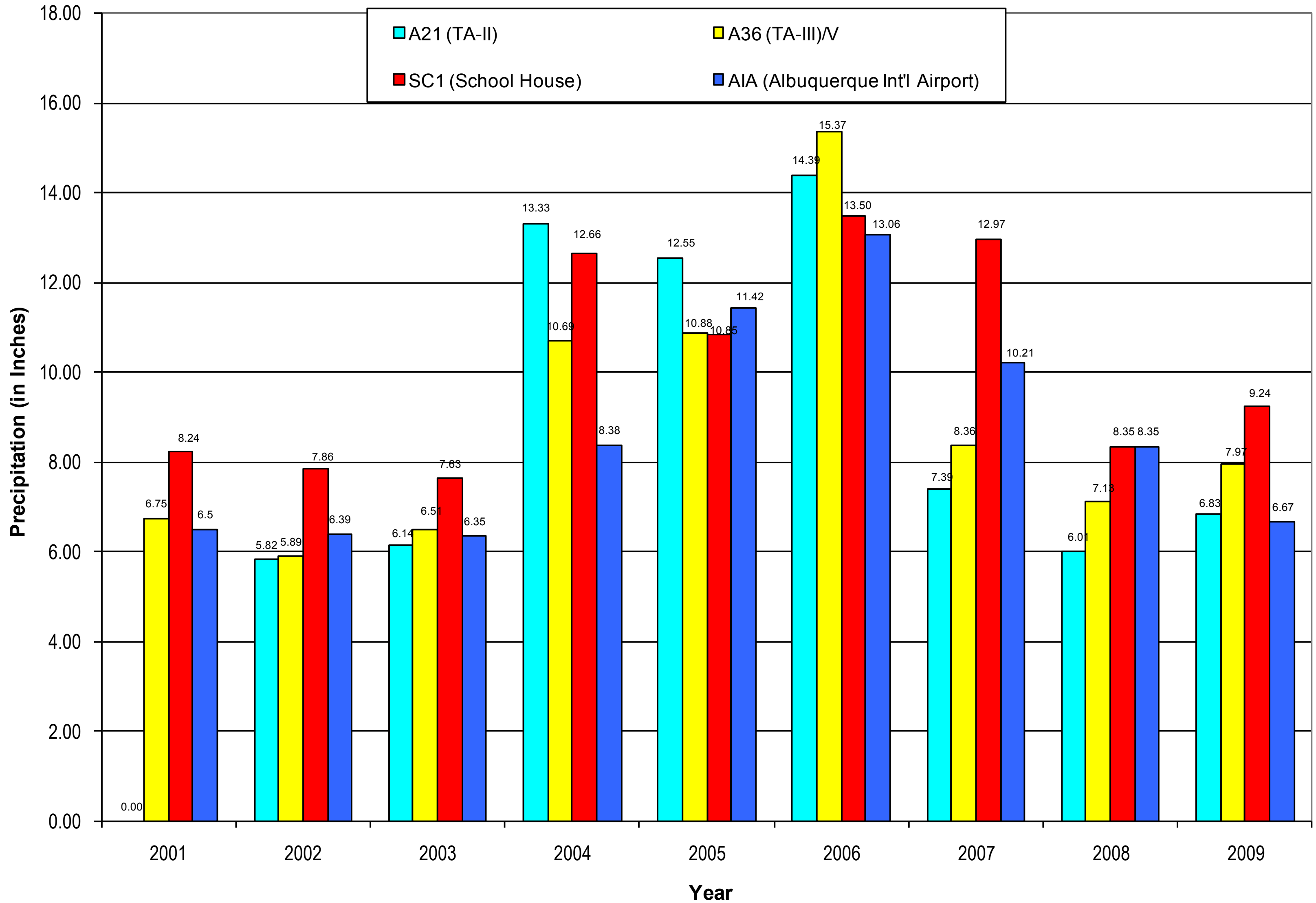

Figure 2C-2. Annual Precipitation Data for SNL/NM, January 2001 to December 2009

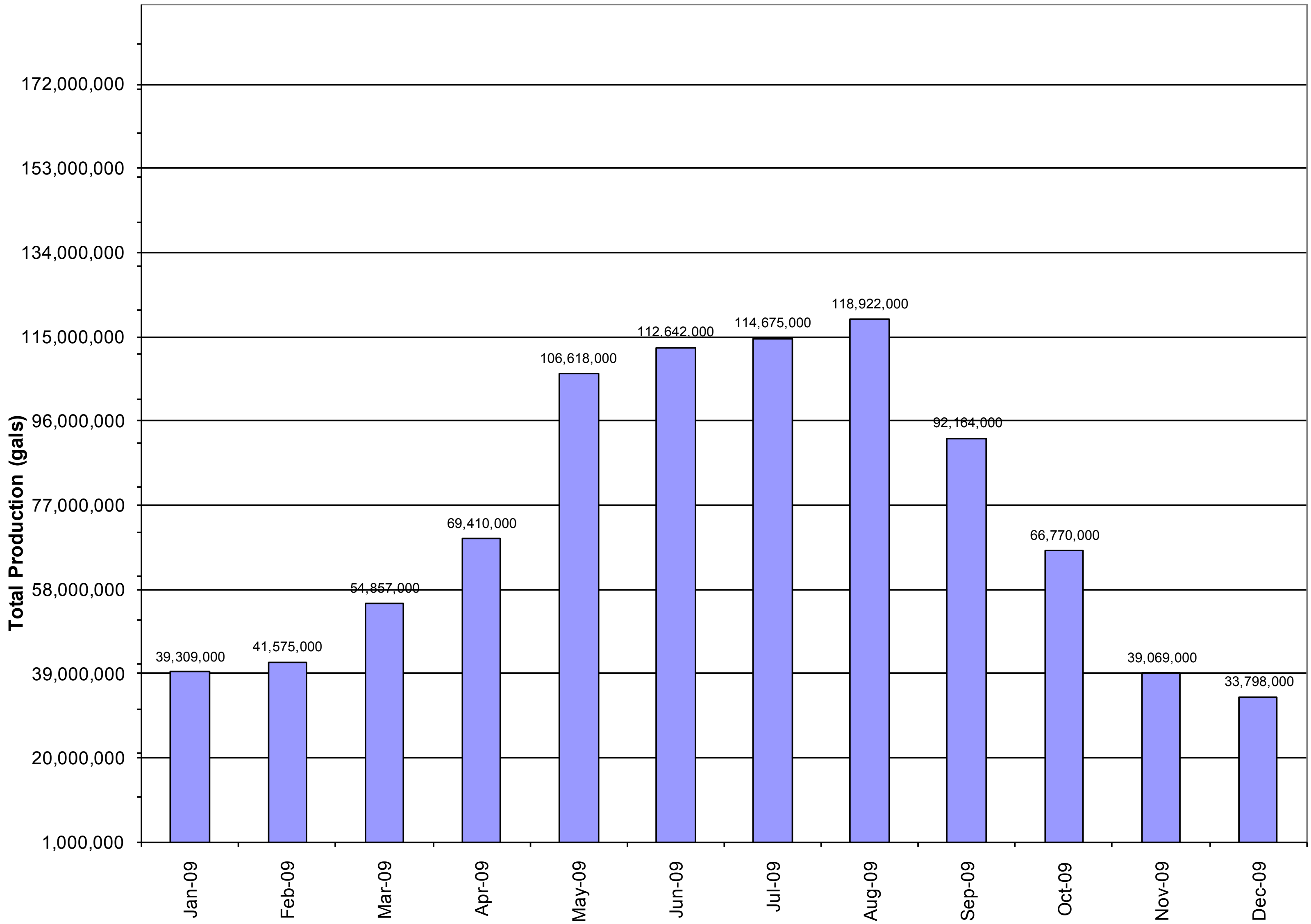

Figure 2C-3. Monthly Groundwater Pumped by KAFB Water Supply Wells, CY09

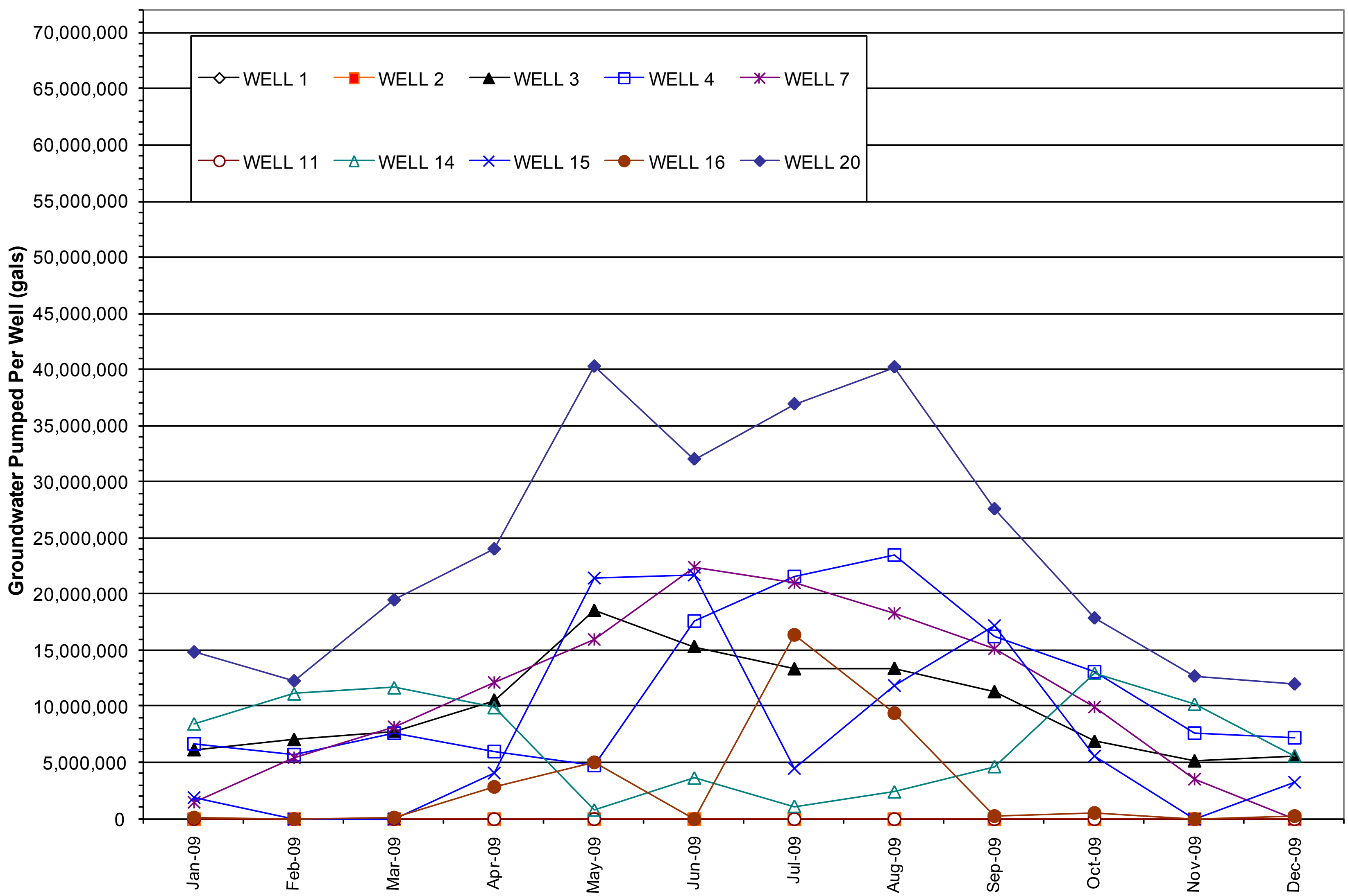

Figure 2C-4. Groundwater Pumped by KAFB Water Supply Wells, CY09

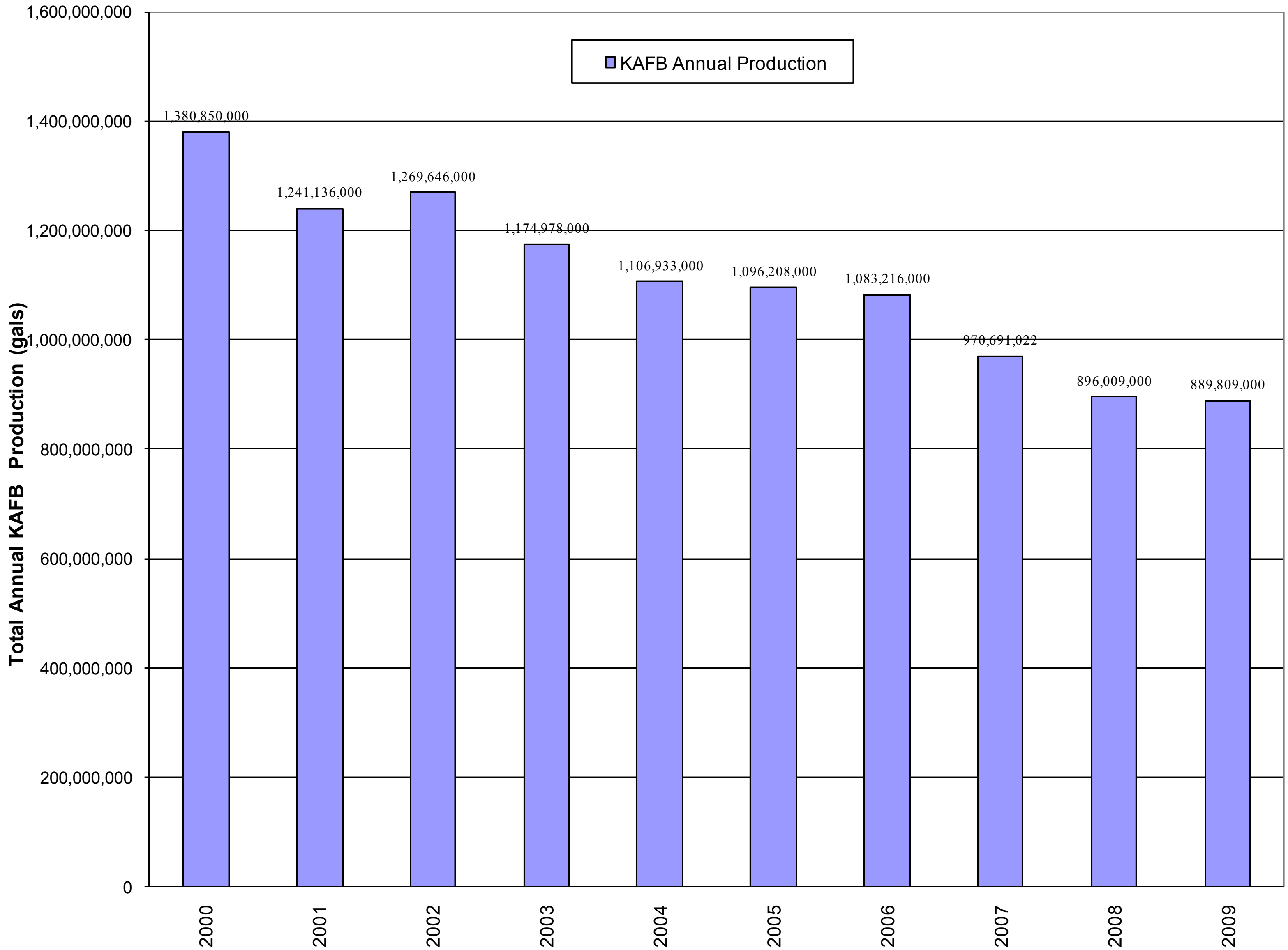

Figure 2C-5. Annual Groundwater Pumped by KAFB Water Supply Wells, 2000 to 2009

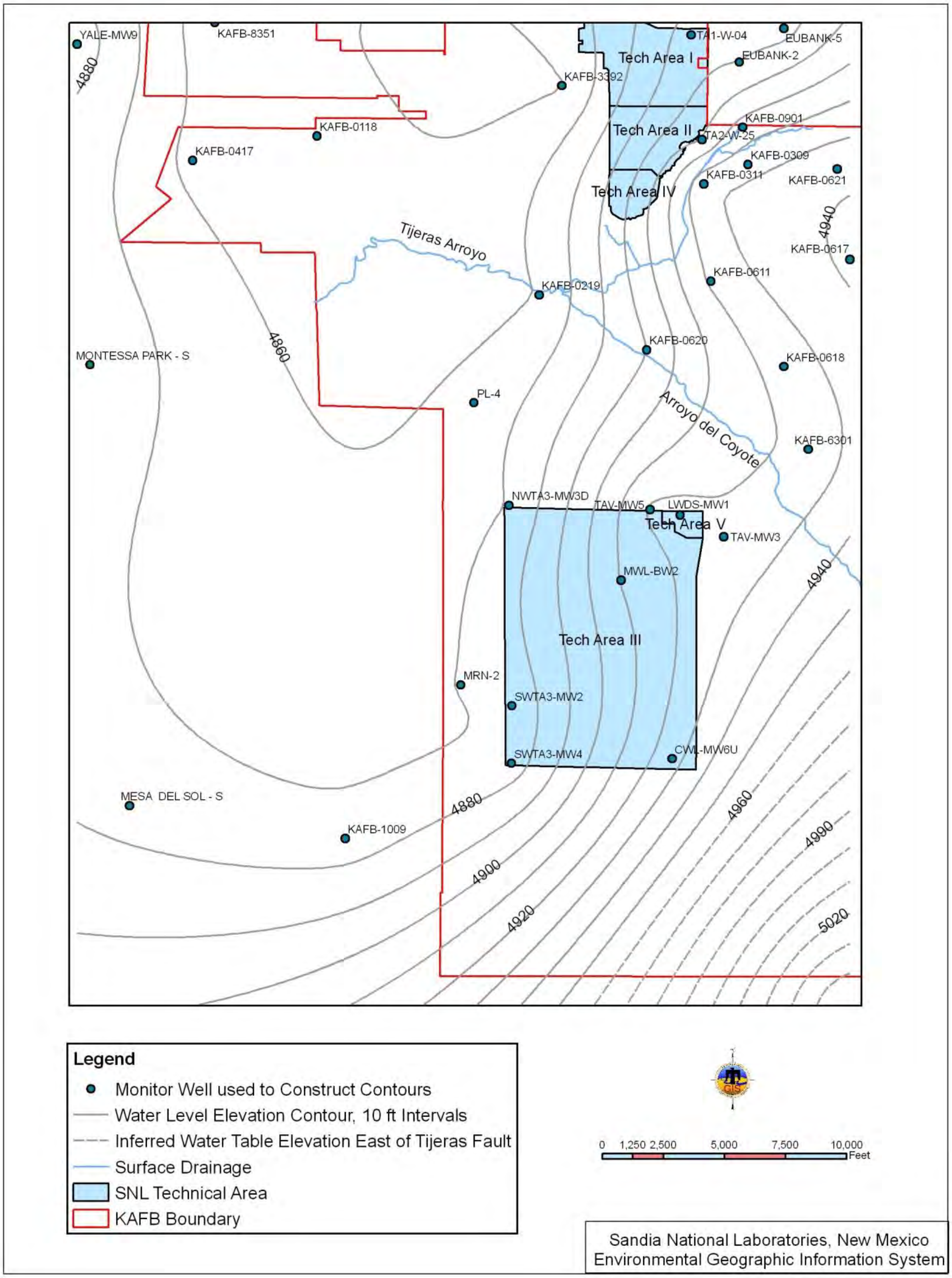

Figure 2C-6. CY09 Regional Groundwater Water Table Elevations

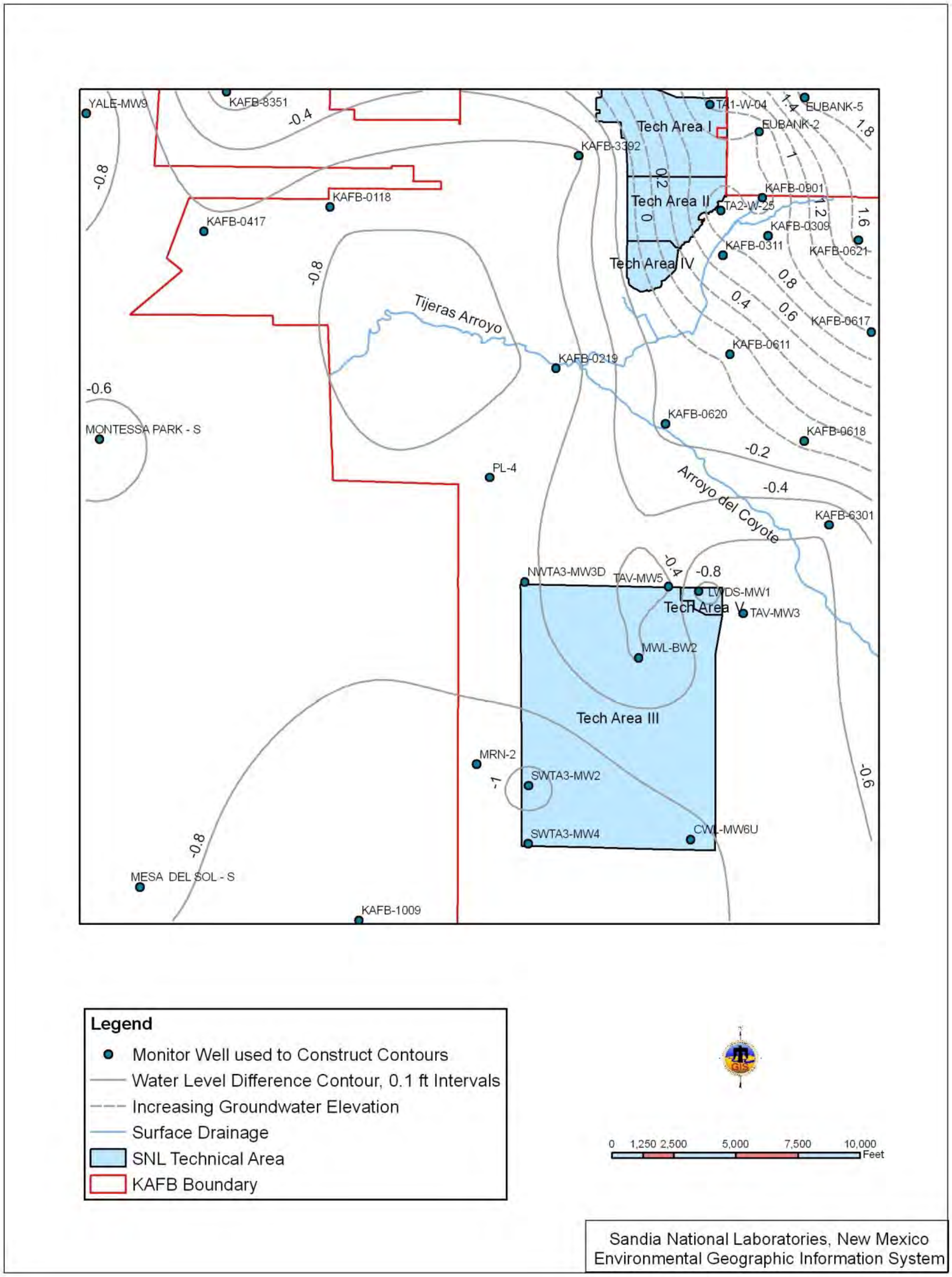

Figure 2C-7. Regional Groundwater Water Table Elevation Difference, CY09–CY08

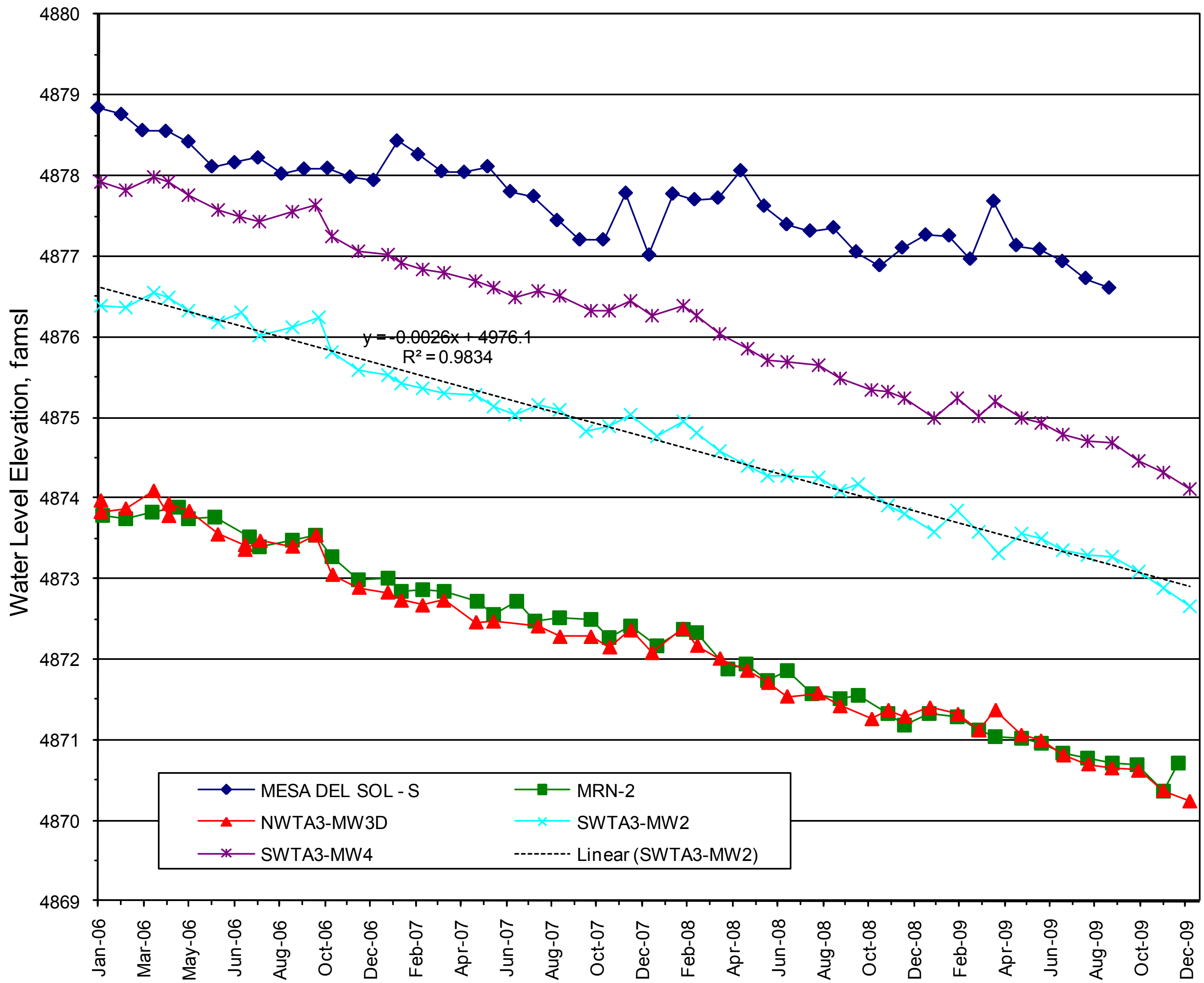

Figure 2C-8. Regional Water Table Hydrographs – Southwest Wells

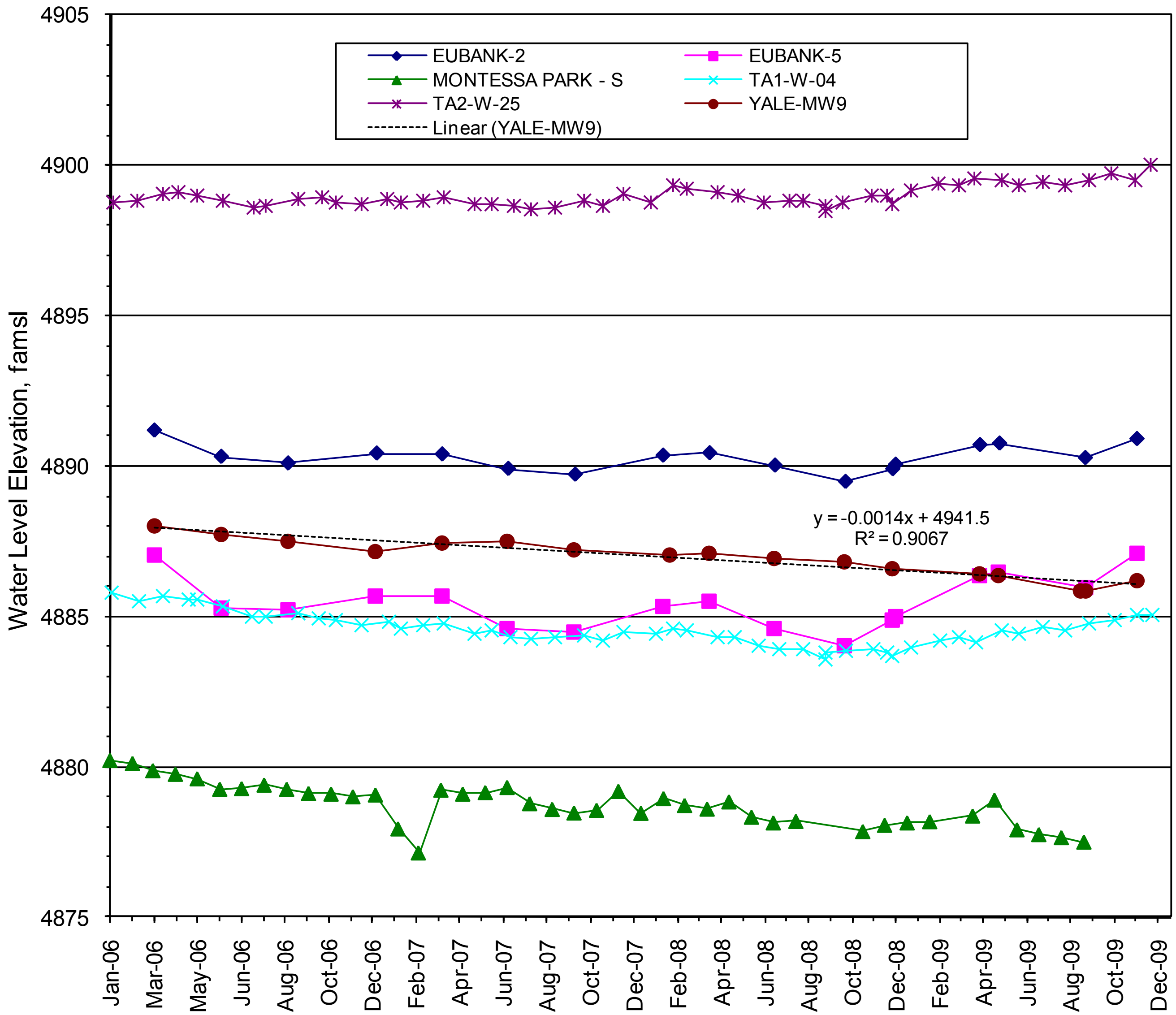

Figure 2C-9. Regional Water Table Hydrographs – North Wells

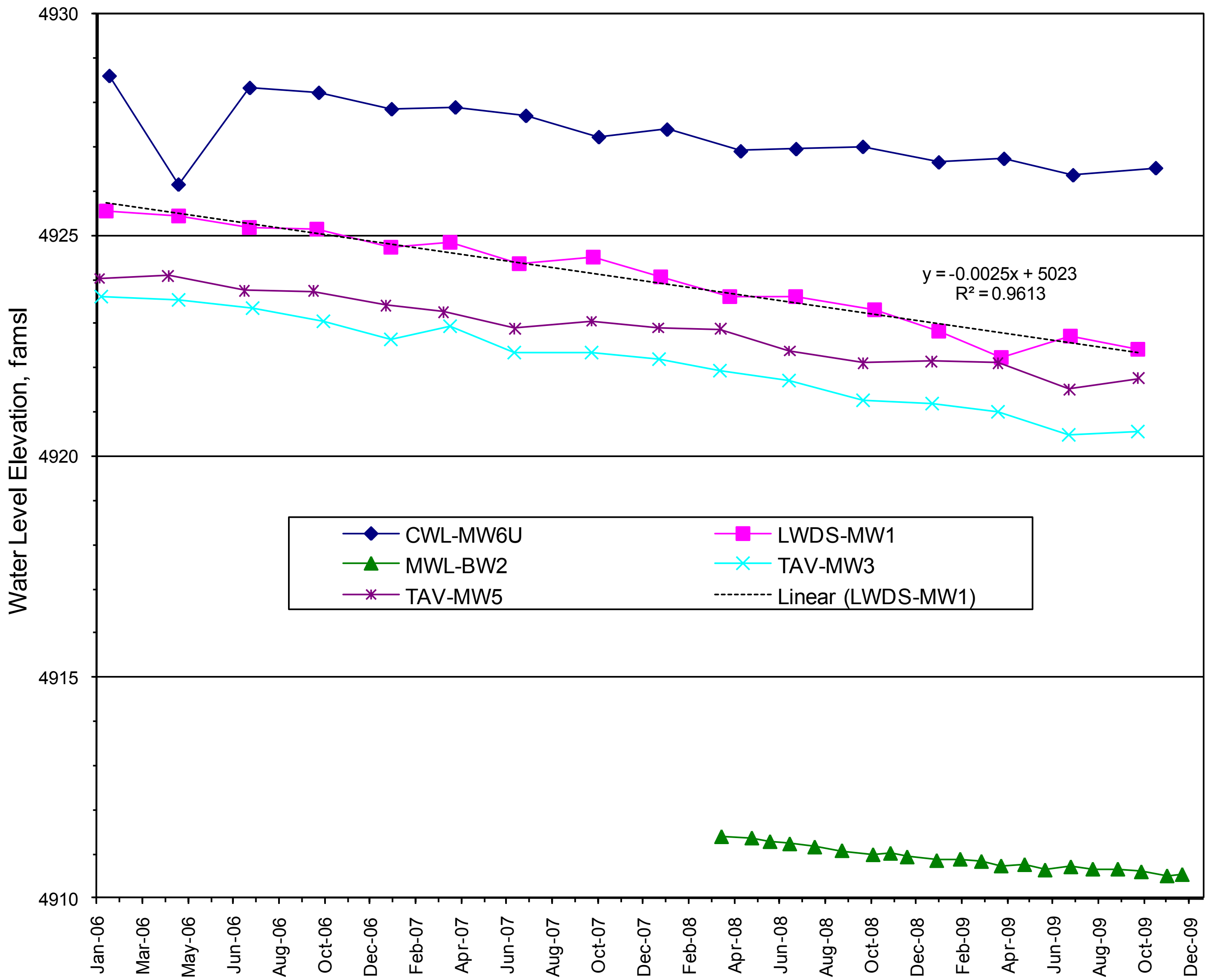

Figure 2C-10. Regional Water Table Hydrographs – Southeast Wells

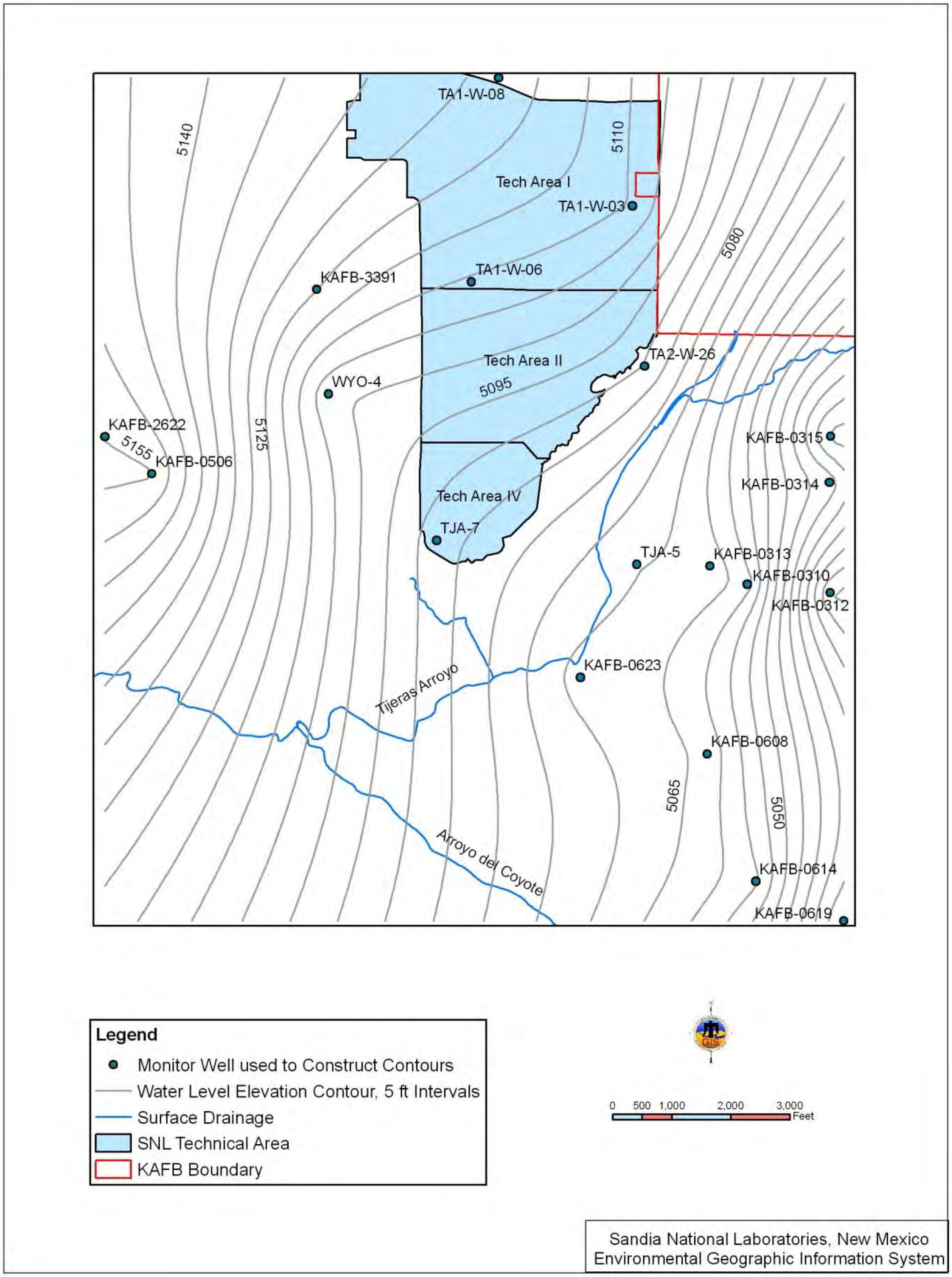

Figure 2C-11. CY09 Perched Groundwater System Water Table Elevation

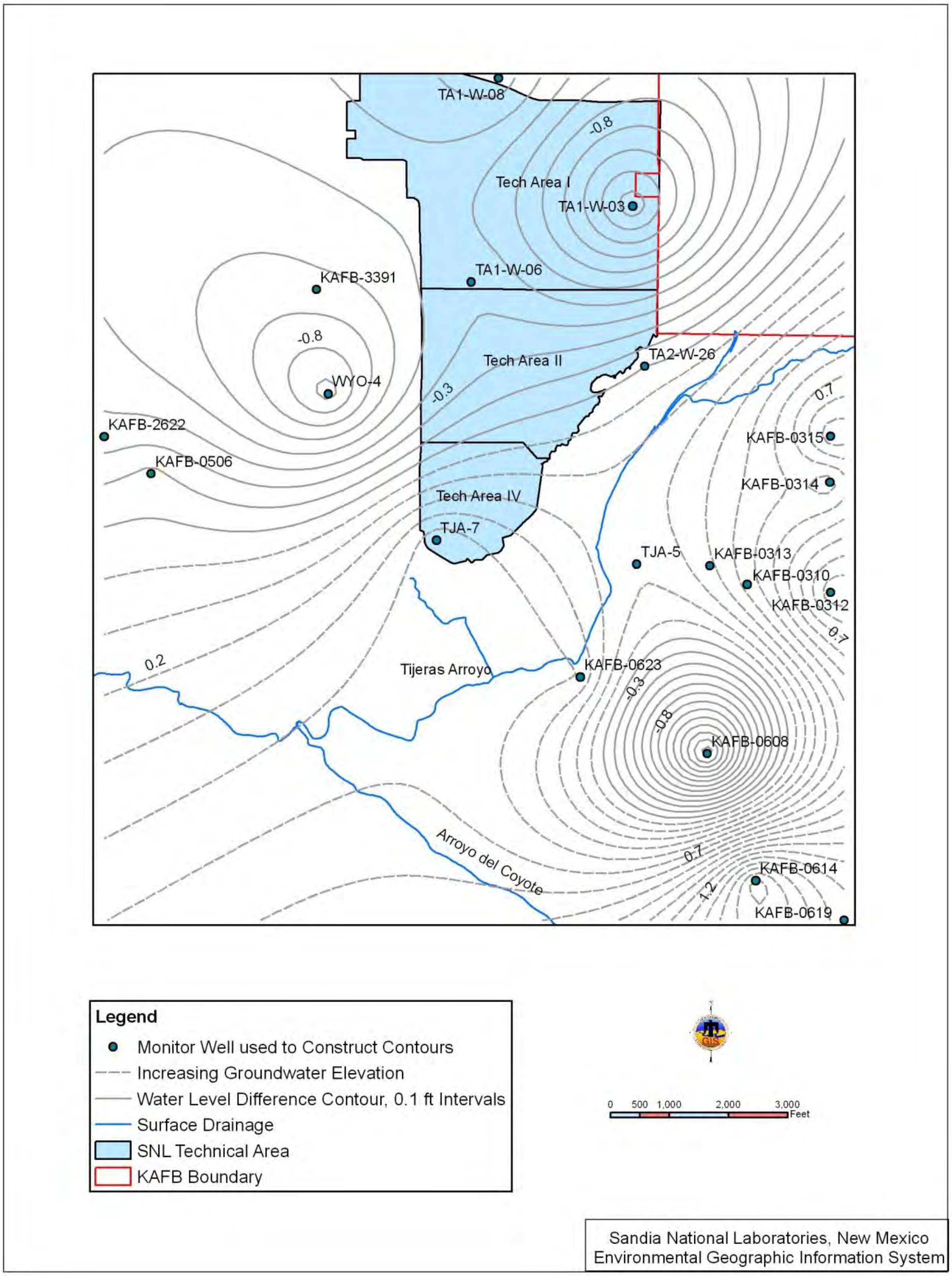

Figure 2C-12. Perched Groundwater System Water Table Elevation Difference, CY09-CY08

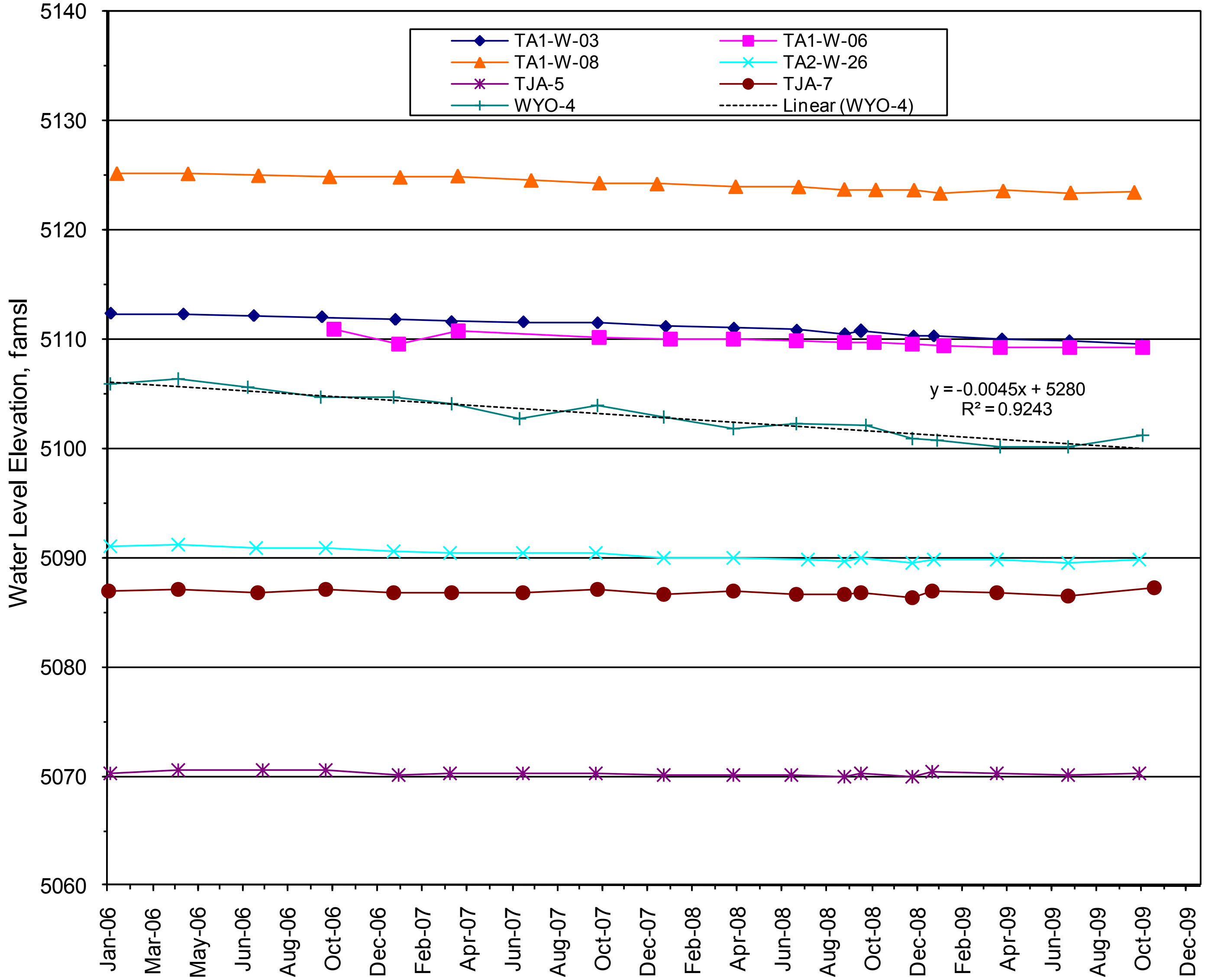

Figure 2C-13. Perched Groundwater Water Table Hydrographs

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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 CWL Closure Plan (SNL December 1992). The SNL/NM Environmental Restoration (ER) Project implemented two voluntary corrective measures (VCMs), the Vapor Extraction (VE) and Landfill Excavation (LE) VCMs. The VE VCM was designed to reduce and control the volatile organic compound (VOC) soil-gas plume, prevent further degradation of groundwater beneath the CWL, and reduce TCE concentrations in groundwater to levels below the regulatory limit. As part of the LE VCM, the CWL was excavated from September 1998 through February 2002, which resulted in the removal of more than 52,000 cubic yards of contaminated soil and debris.

3.1.1 Monitoring History

In 1985, groundwater monitoring began at the CWL (IT December 1985) as required in 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 New Mexico Environment Department (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 wells were installed in March and April 2003 with NMED direction regarding location, construction, and well screen placement in the regional aquifer. Monitoring well CWL-MW2A was plugged and abandoned in June 2004 due to well integrity issues (SNL July 2004).

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 any well. During the following sampling quarter in March 1990, TCE was detected above the drinking water standard of 5 µg/L in CWL-MW2A. Additionally, two indicator parameters (specific conductance [SC] and 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 have been resampled in accordance with 40 CFR 265.93(c)(2).

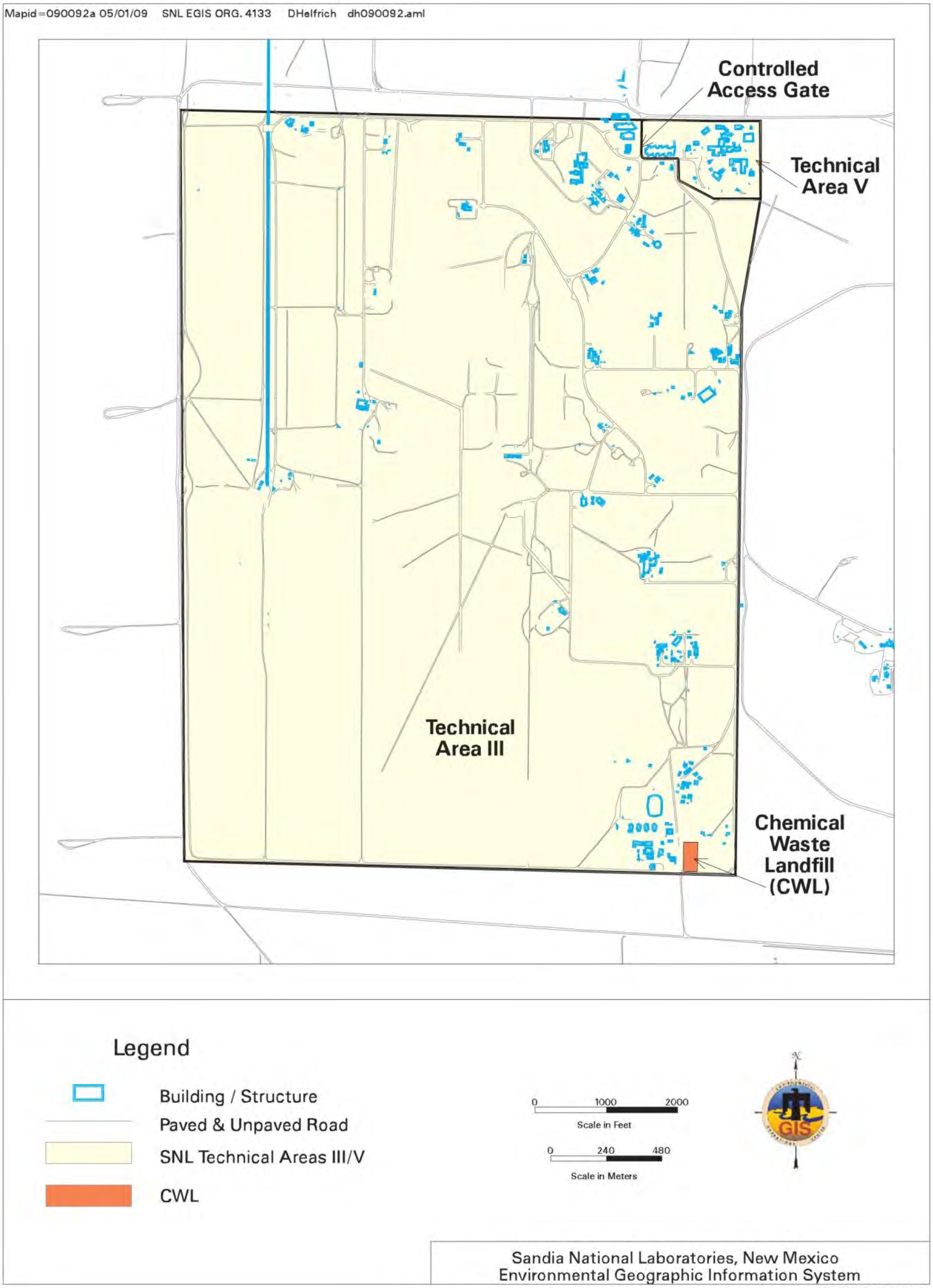

Figure 3-1. Location of the Chemical Waste Landfill within Technical Area III

In 1995, Appendix G of the CWL 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):

- Biannual frequency (every other year) for agreed upon Appendix IX constituents including VOCs, semivolatile organic compounds (SVOCs), chlorinated herbicides, polychlorinated biphenyls (PCBs), 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 CWL Corrective Measures Study (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 on all CWL monitoring wells with a large enough diameter 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 CWL CMS Comment Response Document (SNL October 2004) and in the revised CWL CMS Report (SNL December 2004).

3.1.2 Monitoring Network

The current monitoring network at the CWL consists of 13 wells, as shown in Figure 3-2 and listed in Table 3-1. Six wells were sampled during Calendar Year (CY) 2009.

Table 3-1. Monitoring Wells at the CWL

Well(1)	Installation Year	WQ	WL	Comments
CWL-MW1A	1988			Dry well (filled with sediment during VE VCM)
CWL-MW3A	1988			Dry well (filled with sediment during VE VCM)
CWL-BW3	1988		✓	Insufficient volume for representative sampling
CWL-MW4	1990		✓	Insufficient volume for representative sampling
CWL-MW2BU	1994		✓	Insufficient volume for representative sampling
CWL-MW2BL	1994	✓	✓	Lower section of nested well
CWL-MW5U	1994	✓	✓	Upper section of nested well
CWL-MW5L	1994	✓	✓	Lower section of nested well (2-inch-diameter well)
CWL-MW6U	1994	✓	✓	Upper section of nested well
CWL-MW6L	1994	✓	✓	Lower section of nested well (2-inch-diameter well)
CWL-BW4A	1994	✓	✓	Background well
CWL-MW7	2003		✓	Deep monitoring well
CWL-MW8	2003		✓	Deep monitoring well

NOTES: (1) Refer to page xvii of this report for well descriptions.
Check marks in the WQ and WL columns indicate WQ sampling and WL measurements during period from January 2009 to December 2009.
CWL = Chemical Waste Landfill.
VCM = Voluntary Corrective Measure.
VE = Vapor Extraction.
WL = Water level.
WQ = Water quality.

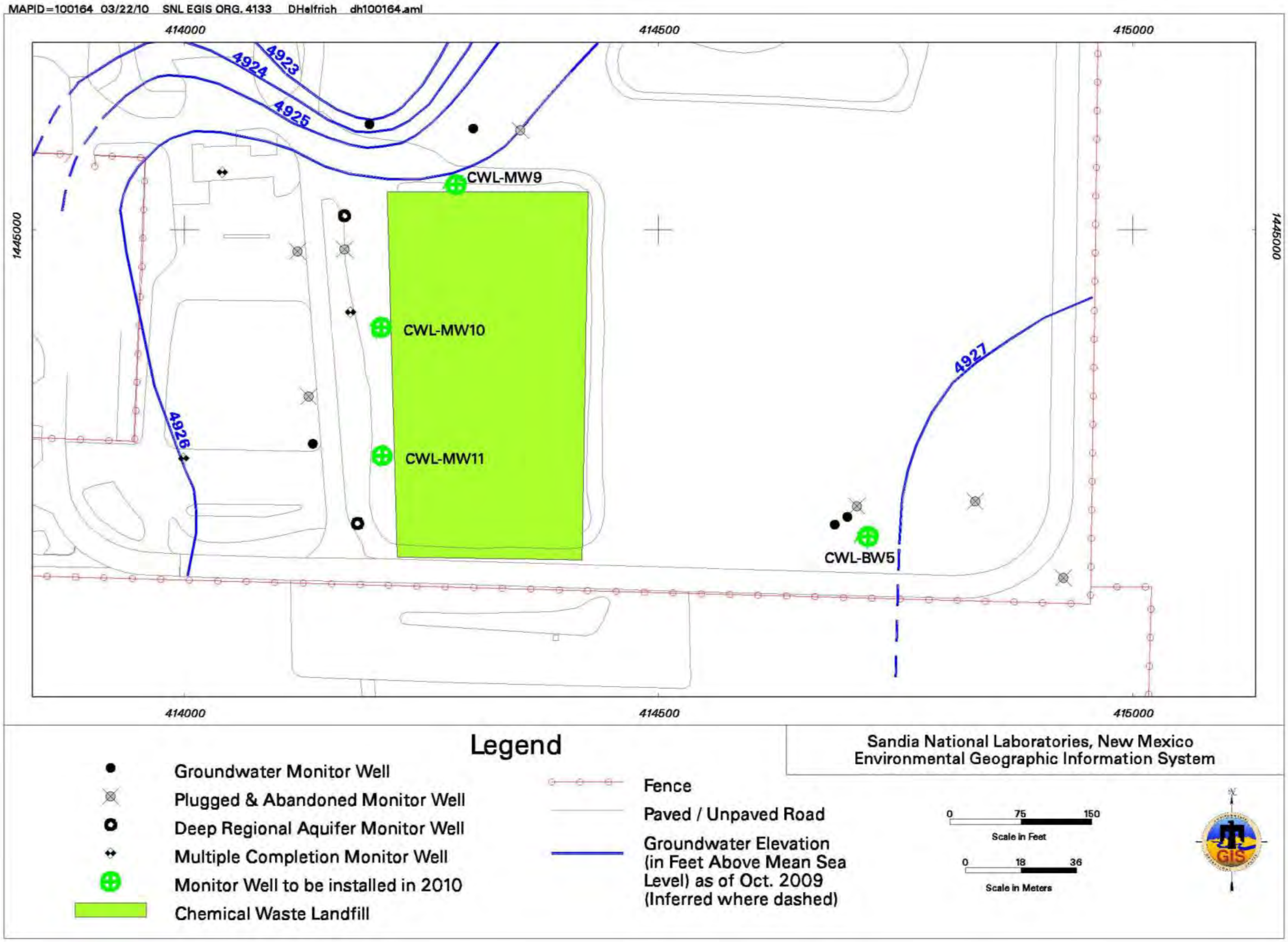

Figure 3-2. Chemical Waste Landfill Monitoring Well Locations and Potentiometric Surface Map

3.1.3 Summary of Activities

CWL semiannual groundwater monitoring activities were performed during April and October 2009. Groundwater samples were collected from six monitoring wells and analyzed for 40 CFR 264 (Appendix IX) VOCs and Appendix IX total metals plus iron. In October 2009, biannual analyses were collected for Appendix IX SVOCs, chlorinated herbicides, PCBs, total cyanide, sulfides, and dissolved chromium. Additional samples for total uranium and PCB congeners were collected from four CWL wells. The SNL/NM ER Project quarterly progress reports (SNL September 2009 and March 2010) provide full details of each sampling event. Attachment 3A presents tables showing the analytical results for CWL monitoring wells sampled during CY 2009.

3.1.4 Summary of Future Activities

On May 21, 2007, the NMED issued both the CWL CMS Report (SNL December 2004) and a Draft Post-Closure Care Permit (NMED 2007) for a 60-day public comment period that was completed on July 20, 2007. At the request of interested citizens, the NMED provided additional time for public comment from July 24 to August 20, 2007. The U.S. Department of Energy (DOE) and Sandia Corporation 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. The negotiations were completed on October 15, 2009, and documented in the settlement agreement and *Final Order In the Matter of Application for a Post-Closure Care Hazardous Waste Permit for the Chemical Waste Landfill, Sandia National Laboratories No. NM5890110518* (Final Order). On October 16, 2009, the NMED issued a *Notice of Approval Final Remedy and Closure Plan Amendment Chemical Waste Landfill* (NMED October 2009). The NMED approval covers the CWL Closure Plan amendment that addresses the replacement of four groundwater monitoring wells, the CWL Post-Closure Care Permit, and the CWL Final Remedy.

Upon NMED approval of the Final CWL Resource Conservation and Recovery Act Closure Report, to be submitted for NMED approval after installation of the four new groundwater monitoring wells addressed in the CWL Closure Plan amendment, the Permit will supersede the CWL Closure Plan (SNL December 1992), and the Closure Plan will no longer be effective. Under the CWL Post-Closure Care Permit, groundwater sampling requirements for the four new monitoring wells (CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11) will be reduced. As required by 20.4.1.500 NMAC, incorporating 40 CFR 264.117(a)(1), the post-closure care period is 30 years. The NMED may shorten or extend this period under 20.4.1.500 NMAC, incorporating 40 CFR 264.117(a)(2).

As agreed to in recent negotiations and documented in the NMED-approved CWL Closure Plan amendment, monitoring wells CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, CWL-MW6U, and CWL-BW4A will be decommissioned, and new monitoring wells CWL-MW9, CWL-MW10, CWL-MW11, and CWL-BW5 will be installed. The NMED-approved locations for the four new monitoring wells, which will be installed in 2010, are shown in Figure 3-2.

3.1.5 Conceptual Site Model

With respect to impacts on water resources and risk to human health and the environment, TCE, chromium, and nickel are identified as the constituents of concern at the CWL, as documented in the NMED-approved CWL Post-Closure Care Permit (NMED October 2009). A detailed conceptual site model is provided in Annex E of the CWL CMS Report (SNL December 2004).

The regional aquifer in the area of the CWL is located within the Santa Fe Group alluvial sediments at a depth of approximately 485 to 500 feet below ground surface. Water levels at the CWL have been declining since October 2004 at an approximate average rate of 0.76 feet per year. Detailed hydrographs of specific CWL wells are presented in Attachment 3B (Figures 3B-1 and 3B-2) and in the MW2A Class 2 Closure Plan Amendment Request (SNL July 2004).

Historically, water levels were measured quarterly at all CWL wells. However, since 2001, wells CWL-MW2BL, CWL-MW5U, and CWL-MW6U have been measured quarterly; since July 2008, wells CWL-MW4, CWL-BW3, and CWL-BW4A have been measured quarterly; and the other wells are measured during sampling. The potentiometric surface map of the CWL (Figure 3-2) using October 2009 water level measurements is consistent with the hydrogeologic conceptual model for the Kirtland Air Force Base (KAFB) area, which shows the local groundwater flow direction is to the northwest due to the influence of groundwater withdrawals by the City of Albuquerque and KAFB. Groundwater travel times from the CWL to these KAFB and municipal supply wells are on the order of hundreds to thousands of years (SNL February 2001).

Investigation results from 1992 through 1995 are documented in both the *Chemical Waste Landfill Unsaturated Zone Contaminant Characterization Report* (SNL November 1993) and the *CWL Groundwater Assessment Report* (SNL October 1995).

A comprehensive summary of the CWL disposal history is presented in the NMED-approved CWL Closure Plan (SNL December 1992) and the LE VCM Final Report (SNL April 2003). The investigation history of the CWL is presented and summarized in the CWL CMS Report (SNL December 2004), including post-VE VCM soil-gas and groundwater monitoring results that establish current conditions.

3.2 Regulatory Criteria

The CWL is an interim status landfill undergoing closure in accordance with 20.4.1.600 NMAC, incorporating 40 CFR 265 Subpart G and the CWL Closure Plan (SNL December 1992, as amended). Monitoring details, such as specific analytes and sampling frequencies, are defined in Appendix G of the Closure Plan. After NMED approval of CWL closure and the CWL Post-Closure Care Permit, all monitoring will be conducted following the requirements stipulated in the Permit.

3.3 Scope of Activities

Groundwater monitoring at the CWL was performed during April and October 2009. Environmental groundwater samples were collected from six monitoring wells and submitted for analysis of 40 CFR 264 (Appendix IX) VOCs, SVOCs, chlorinated herbicides, PCBs, total cyanide, sulfides, total metals plus iron, and dissolved chromium. The NMED DOE Oversight Bureau (OB) participated in both April and October 2009 sampling events and collected split samples from five CWL monitoring wells (CWL-MW2BL, CWL-MW4, CWL-MW5L, CWL-MW5U, and CWL-MW6L). The split samples were submitted to a different laboratory for analysis of various Appendix IX constituents as determined by the NMED DOE OB. Additional samples for total uranium and PCB congeners were requested by the NMED DOE OB at four CWL wells. To ensure a consistent level of quality assurance for these analyses, SNL/NM also collected samples for total uranium and PCB congeners at these five CWL monitoring wells. These additional analyses are not required by Appendix G of the CWL Closure Plan (SNL December 1992). The NMED DOE OB split sampling results are presented in a separate document and not included in this report. Table 3-2 lists the parameters and CWL wells sampled.

Groundwater samples collected for chemical analyses were submitted to General Engineering Laboratories, Inc. (GEL) in Charleston, South Carolina. All chemical analytical results are compared with EPA maximum contaminant levels (MCLs) for drinking water supplies. The analytical results are summarized in Attachment 3A, Tables 3A-1 through 3A-8.

Table 3-2. Analytical Parameters at CWL Wells for Each Sampling Period

Parameter	April 2009	October 2009
Appendix IX VOCs	CWL-MW2BL, CWL-MW4, CWL-MW5L, CWL-MW5L (dup), CWL-MW5U, CWL-MW6L, CWL-MW6U, CWL-MW6U (dup)	CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Appendix IX SVOCs		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Appendix IX Chlorinated Herbicides		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Appendix IX PCBs		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Total Cyanide		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Sulfides		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Appendix IX Total Metals plus Iron	CWL-MW2BL, CWL-MW4, CWL-MW5L, CWL-MW5L (dup), CWL-MW5U, CWL-MW6L, CWL-MW6U, CWL-MW6U (dup)	CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Dissolved Chromium		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW5U (dup), CWL-MW6L, CWL-MW6U
Total Uranium		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW6L
PCB Congeners		CWL-MW2BL, CWL-MW2BL (dup), CWL-MW4, CWL-MW5L, CWL-MW6L

NOTES: Refer to page xvii of this report for well descriptions. “U” and “L” denote upper and lower completions for nested wells in the same borehole.
CWL = Chemical Waste Landfill.
dup = Duplicate.
PCB = Polychlorinated biphenyl.
SVOC = Semivolatile organic compound.
VOC = Volatile organic compound.

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 environmental duplicate, equipment blank, 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 for groundwater temperature, SC, and pH were measured using a YSI™ Model 620 Water Quality Meter. Turbidity was measured with a Hach™ Model 2100P portable turbidity meter.

3.4 Field Methods and Measurements

Groundwater sampling was conducted in conformance with procedures outlined in the *Sampling and Analysis Plan [SAP] for Groundwater Assessment Monitoring at the Chemical Waste Landfill,* Appendix G, Revision 4 of the CWL Closure Plan (SNL December 1992).

A Bennett™ groundwater sampling system was used to collect groundwater samples from all wells, except small-diameter wells (2 inches or less). Wells CWL-MW5L and CWL-MW6L are small-diameter wells, and dedicated sampling systems manufactured by QED Environmental Systems, Inc. were used to collect samples from these wells. Prior to sample collection, each monitoring well was purged to remove stagnant well casing water. More than one day was required to complete purging and sampling at

CWL-MW5U and CWL-MW6U, due to the slow recharge rate of the monitoring wells. Monitoring wells purged to dryness were allowed to recover before sampling to ensure the most representative groundwater sample possible given the low yield of these wells. Wells CWL-MW2BL and CWL-MW4 were purged a minimum of three well-bore volumes prior to sampling. Wells CWL-MW5L and CWL-MW6L were purged a minimum of two tubing water volumes prior to sampling.

Collection of field analytical measurements and groundwater samples was performed in accordance with procedures described in Appendix G of the CWL Closure Plan (SNL December 1992). Groundwater temperature, SC, and pH were measured using a YSI™ Model 620 water quality meter. Turbidity was measured with a Hach™ Model 2100P portable turbidity meter. Groundwater stability is considered acceptable when measurements are within 5 nephelometric turbidity units, 0.2 pH units, and 0.2 degrees Celsius, and SC is within 1 percent or 10 microhms per centimeter (whichever is greater).

3.5 Analytical Methods

Groundwater samples collected for chemical analyses were submitted to GEL in Charleston, South Carolina. The analytical laboratory analyzed samples using EPA-approved analytical methods and specified performance criteria in accordance with the *SNL/NM Statement of Work for Analytical Laboratories* (SNL March 2003). The analytical laboratory provided appropriate sample containers prepared with the required sample preservative. Table 3-3 summarizes analytical requirements and EPA Methods (EPA 1986) applicable to groundwater sampling at the CWL during CY 2009.

3.6 Summary of Analytical Results

The analytical results and water quality parameters are presented in Attachment 3A, Tables 3A-1 through 3A-9. Groundwater samples were collected during April and October 2009 and submitted for analysis of VOCs, SVOCs, chlorinated herbicides, PCBs, PCB congeners, total cyanide, sulfide, total metals plus iron and uranium, and dissolved chromium. Analytical results for groundwater samples were compared with MCLs, where established.

3.6.1 VOCs, SVOCs, Chlorinated Herbicides, and PCBs

Detected VOCs, SVOCs, chlorinated herbicides, and PCBs are presented in Attachment 3A, Table 3A-1. No VOCs, SVOCs, chlorinated herbicides, or PCBs were detected above established MCLs during CY 2009. No VOCs were detected in any sample except for acetone, chloroform, toluene, and TCE. Acetone and chloroform were detected below the laboratory practical quantitation limits (PQLs). Toluene was detected below the MCL of 1,000 μg/L at concentrations ranging from 0.307 to 1.12 μg/L. TCE was detected below the MCL of 5.0 μg/L at concentrations ranging from 0.270 to 2.58 μg/L. No SVOCs were detected above laboratory method detection limits (MDLs), except bis(2-ethylhexyl)phthalate. This compound was detected below the MCL of 6.0 μg/L. No herbicides or PCBs were detected above laboratory MDLs. Additional samples were collected for PCB congeners from CWL-MW2BL, CWL-MW4, CWL-MW5L, and CWL-MW6L to duplicate the analyses performed by the NMED DOE OB. No PCB congeners were detected above laboratory PQLs in groundwater samples collected from these four CWL monitoring wells. Associated laboratory MDLs are presented in Attachment 3A, Tables 3A-2 through 3A-5.

3.6.2 Total Cyanide and Sulfide

Neither total cyanide nor sulfide was detected above the laboratory MDLs in any CWL groundwater sample. Sulfide and total cyanide results are summarized in Attachment 3A, Table 3A-6.

Table 3-3. CWL Analyses, Methods, Sample Containers, Preservatives, and Holding Times

Analysis	Method[a]	Container Type/ Volume/Preservative	Holding Time
Appendix IX Volatile Organic Compounds	SW846-8260B	Glass; 3 x 40 mL; HCl; 4°C	14 days
Appendix IX Semivolatile Organic Compounds	SW846-8270C	Amber Glass; 3 x 1 L; 4°C	7 days
Appendix IX Chlorinated Herbicides	SW846-8151A	Amber Glass; 3 x 1 L; 4°C	7 days
Appendix IX Polychlorinated Biphenyls	SW846-8082	Amber Glass; 3 x 1 L; 4°C	7 days
Total Cyanide	SW846-9012A	Polyethylene; 500 mL; NaOH; 4°C	28 days
Sulfides	SW846-9034	Nalgene; 1L; NaOH; 4°C	28 days
Appendix IX Total metals + iron and uranium	SW846-6020/7470A	Polyethylene; 500 mL; HNO_3; 4°C	28 days/180 days[b]
Polychlorinated Biphenyls Congeners	EPA 1668A	Amber Glass; 4 x 1 L; 4°C	1 year

NOTES:
[a]U.S. Environmental Protection Agency, November 1986. *Test Methods for Evaluating Solid, Physical/Chemical Methods,* 3rd ed., (and updates), SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
U.S. Environmental Protection Agency, August 2003. *Method 1668, Revision A, Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS*, EPA-821-R-07-004, (and updates), Office of Science and Technology Engineering and Analysis Division, U.S. Environmental Protection Agency, Washington, D.C.
[b]Holding time for mercury is 28 days; all other metals are 180 days.
°C = Degrees Celsius.
CWL = Chemical Waste Landfill.
EPA = U.S. Environmental Protection Agency.
HCl = Hydrochloric acid.
HNO_3 = Nitric acid.
L = Liter(s).
mL = Milliliter(s).
NaOH = Sodium Hydroxide.

3.6.3 Total Metals

As required by the NMED Hazardous Waste Bureau, all metal samples were analyzed for total metals. No total metal parameters were detected above established regulatory limits in any groundwater sample. Chromium was detected below the MCL of 0.10 milligrams per liter (mg/L) at concentrations ranging from 0.00211 to 0.0151 mg/L. Nickel was detected above the laboratory MDL in all environmental groundwater samples. Detected nickel concentrations range from 0.00147 to 0.456 mg/L. No MCL is established for nickel. Additional samples were collected for total uranium from CWL-MW2BL, CWL-MW4, CWL-MW5L, and CWL-MW6L to duplicate the analyses performed by the NMED DOE OB. Uranium was reported below the MCL of 0.03 mg/L, at concentrations ranging from 0.0131 mg/L at CWL-MW4 to 0.0163 mg/L at CWL-MW2BL. Metal results are presented in Attachment 3A, Table 3A-7.

3.6.4 Dissolved Chromium

Dissolved chromium results are presented in Attachment 3A, Table 3A-8. No dissolved chromium was detected above the laboratory MDL in any CWL groundwater sample.

3.6.5 Water Quality Parameters

Attachment 3A, Table 3A-9 summarizes field water quality measurements prior to sampling and includes 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. The following sections discuss each sample type.

3.7.1 Field QC Samples

Field QC samples included environmental duplicate, FB, and TB samples. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in Appendix G of the CWL Closure Plan (SNL December 1992).

3.7.1.1 Duplicate Environmental Samples

Duplicate environmental samples were collected and analyzed for all parameters in order to determine the overall reproducibility of the sampling and analysis process. Each duplicate sample was collected immediately after the original environmental sample in order to reduce variability caused by time and/or sampling mechanics. During CY 2009, a total of four duplicate environmental samples were collected.

Relative percent difference calculations between duplicate samples were performed for all analytes. The results show that sampling and analysis precision was in conformance with Appendix G of the CWL Closure Plan requirements for all measured parameters.

3.7.1.2 Field Blank Samples

A total of four FB samples were collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions. The FB samples were prepared by pouring deionized water into sample containers at the sample collection point to simulate the transfer of environmental samples from the sampling system into the sample container. The FB samples were collected from CWL-MW2BL, CWL-MW4, CWL-MW5U, and CWL-MW6L. No VOCs were detected above laboratory MDLs in the FB samples, except for acetone, bromodichloromethane, carbon disulfide, chloroform, and dibromochloromethane. No corrective action was necessary for acetone, carbon disulfide, bromodichloromethane, or dibromochloromethane, as these compounds were not detected in the associated environmental samples. Chloroform was detected at a concentration of 0.626 μg/L in the FB sample associated with CWL-MW2BL. Chloroform was qualified as not detected in CWL-MW2BL samples during data validation as this compound was detected at concentrations less than five times the blank concentration.

3.7.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analysis to assess whether contamination of the samples has occurred during shipment and storage. TB samples consist of laboratory reagent grade water with hydrochloric acid preservative contained in 40-milliliter volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. The TBs were brought to the field and accompanied each sample shipment. A total of 14 TBs were submitted with the samples discussed in this report.

No VOCs were detected above laboratory MDLs in any TB sample, except for carbon disulfide. Carbon disulfide was detected in TB samples associated with the April 2009 groundwater samples from CWL-MW2BL and CWL-MW6U. No corrective action was necessary, as this compound was not detected in the associated environmental samples.

3.7.2 Laboratory QC

Internal laboratory QC analyses performed included method blank, LCS, matrix spike, matrix spike duplicate, and surrogate spike analyses. All laboratory data were reviewed and qualified in accordance with AOP [Administrative Operating Procedure] 00-03, Revision 2, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). Although some analytical results were qualified as not detected or as estimated values during the data validation process, no significant data quality problems were noted for any CWL groundwater sample. Data validation reports and findings associated with CWL groundwater monitoring are filed in the SNL/NM Customer Funded Records Center.

3.8 Variances and Nonconformances

Variances and nonconformances from requirements in the CWL SAP (SNL December 1992) are identified as follows:

- CWL-MW1A and CWL-MW3A are no longer sampled. Since 1998 these wells have contained no water. During the VE VCM, the wells partially filled with sediment and have not recovered. However, SNL/NM personnel lowered a water level meter to verify that these wells remain dry.

- No samples were collected from CWL-BW3, CWL-BW4A, or CWL-MW2BU. SNL/NM personnel notified the NMED that these wells did not produce sufficient water to collect a representative sample during the CY 2009 sampling events.

- CWL-MW5U and CWL-MW6U 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.

- CWL-MW5L and CWL-MW6L were sampled using dedicated sampling systems manufactured by QED Environmental Systems, Inc.

- During the sampling conducted in April 2009, the NMED DOE OB was on site and collected sample splits from monitoring wells CWL-MW2BL, CWL-MW4, and CWL-MW5U. The results for sample splits are not included in this report.

- During the sampling conducted in October 2009, the NMED DOE OB was on site and collected sample splits for VOCs, SVOCs, total metals, dissolved chromium, and total cyanide from monitoring wells CWL-MW2BL, CWL-MW4, CWL-MW5L, and CWL-MW6L. The NMED DOE OB also collected additional samples for total uranium and PCB congeners at these four locations. The results for NMED DOE OB samples are not included in this report.

3.9 Summary and Conclusions

During CY 2009, samples were collected from six CWL monitoring wells (CWL-MW2BL, CWL-MW4, CWL-MW5L, CWL-MW5U, CWL-MW6L, and CWL-MW6U) and analyzed for 40 CFR 264 (Appendix IX) VOCs, SVOCs, chlorinated herbicides, PCBs, total metals plus iron, total cyanide, sulfides, and dissolved chromium. Additional samples were collected for total uranium and PCB congeners at selected well locations to duplicate NMED DOE OB analyses. No analytes were detected at concentrations exceeding the associated EPA MCLs in any CWL groundwater samples collected during CY 2009.

3.10 References

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EPA 1986	U.S. Environmental Protection Agency (EPA), 1986. *Test Methods for Evaluating Solid Waste,* 3rd ed., and all updates, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., November.
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Kieling December 2003	Kieling, J.E. (New Mexico Environment Department), December 2003. Letter to K.L. Boardman (U.S. Department of Energy) and P.B. Davies (Sandia Corporation), *Chemical Waste Landfill, Corrective Measures Study, May 2003, Sandia National Laboratories NM5890110518, HWB SNL-03-013*, December 12, 2003.
NMED October 2009	New Mexico Environment Department (NMED), October 2009. *Notice of Approval, Final Remedy and Closure Plan Amendment, Chemical Waste Landfill Sandia National Laboratories, EPA ID No. NM5890110518, NMED-HWB-05-016*, New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, October 16, 2009.
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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 Detected Volatile and Semivolatile Organic Compounds, Chlorinated Herbicides, and Polychlorinated Biphenyls, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

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-MW2BL 27-Apr-09	Chloroform	0.585	0.250	1.00	NE	J		087344-001	SW846 8260
CWL-MW5L	Chloroform	0.333	0.250	1.00	NE	J		087341-001	SW846 8260
16-Apr-09	Trichloroethene	0.795	0.250	1.00	5.00	J		087341-001	SW846 8260
CWL-MW5L (Duplicate)	Chloroform	0.337	0.250	1.00	NE	J		087342-001	SW846 8260
16-Apr-09	Trichloroethene	0.929	0.250	1.00	5.00	J		087342-001	SW846 8260
CWL-MW5U	Toluene	1.08	0.250	1.00	1,000			087346-001	SW846 8260
21-Apr-09	Trichloroethene	2.58	0.250	1.00	5.00			087346-001	SW846 8260
CWL-MW6U	Toluene	0.802	0.250	1.00	1,000	J		087353-001	SW846 8260
23-Apr-09	Trichloroethene	0.478	0.250	1.00	5.00	J		087353-001	SW846 8260
CWL-MW6U (Duplicate)	Toluene	0.808	0.250	1.00	1,000	J		087354-001	SW846 8260
23-Apr-09	Trichloroethene	0.460	0.250	1.00	5.00	J		087354-001	SW846 8260
CWL-MW2BL 14-Oct-09	Chloroform	0.545	0.250	1.00	NE	J	1.0U	087825-001	SW846 8260
CWL-MW2BL (Duplicate) 14-Oct-09	Chloroform	0.539	0.250	1.00	NE	J	1.0U	087826-001	SW846 8260
CWL-MW5L	Acetone	3.68	3.50	10.0	NE	J	J-	087829-001	SW846 8260
15-Oct-09	Chloroform	0.449	0.250	1.00	NE	J		087829-001	SW846 8260
	Trichloroethene	0.945	0.250	1.00	5.00	J		087829-001	SW846 8260
CWL-MW5U	Chloromethane	0.400	0.300	1.00	NE	J	J-	087833-001	SW846 8260
19-Oct-09	Toluene	1.06	0.250	1.00	1,000			087833-001	SW846 8260
	Trichloroethene	0.910	0.250	1.00	5.00	J		087833-001	SW846 8260
CWL-MW5U (Duplicate)	Toluene	1.12	0.250	1.00	1,000			087834-001	SW846 8260
19-Oct-09	Trichloroethene	0.930	0.250	1.00	5.00	J		087834-001	SW846 8260
CWL-MW6L	Trichloroethene	0.270	0.250	1.00	5.00	J		087837-001	SW846 8260
20-Oct-09	bis(2-Ethylhexyl)phthalate	2.46	2.11	10.5	6.00	J		087837-002	SW846 8270
CWL-MW6U	Toluene	0.307	0.250	1.00	1,000	J		087821-001	SW846 8260
13-Oct-09	Trichloroethene	0.305	0.250	1.00	5.00	J		087821-001	SW846 8260
	bis(2-Ethylhexyl)phthalate	2.05	1.96	9.80	6.00	J		087821-002	SW846 8270

Refer to footnotes on page 3A-23.

Table 3A-2
Method Detection Limits for Appendix IX Volatile Organic Compounds, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	Chloroform	0.250	SW846 8260
1,1,1-Trichloroethane	0.325	SW846 8260	Chloromethane	0.300	SW846 8260
1,1,2,2-Tetrachloroethane	0.250	SW846 8260	Chloroprene	0.300	SW846 8260
1,1,2-Trichloroethane	0.250	SW846 8260	Dibromochloromethane	0.260 - 0.300	SW846 8260
1,1-Dichloroethane	0.300	SW846 8260	Dibromomethane	0.300	SW846 8260
1,1-Dichloroethene	0.300	SW846 8260	Dichlorodifluoromethane	0.300 - 0.500	SW846 8260
1,2,3-Trichloropropane	0.300	SW846 8260	Ethyl benzene	0.250	SW846 8260
1,2,4-Trichlorobenzene	0.300	SW846 8260	Ethyl cyanide	1.50	SW846 8260
1,2-Dibromo-3-chloropropane	0.300 - 0.500	SW846 8260	Ethyl methacrylate	1.00	SW846 8260
1,2-Dibromoethane	0.250	SW846 8260	Iodomethane	1.25	SW846 8260
1,2-Dichloroethane	0.250	SW846 8260	Isobutanol	12.5	SW846 8260
1,2-Dichloropropane	0.250	SW846 8260	Methacrylonitrile	1.00	SW846 8260
2-Butanone	1.25	SW846 8260	Methyl methacrylate	1.00	SW846 8260
2-Hexanone	1.25	SW846 8260	Methylene chloride	3.00	SW846 8260
4-methyl-, 2-Pentanone	1.25	SW846 8260	Pentachloroethane	1.00	SW846 8260
Acetone	3.50	SW846 8260	Styrene	0.250	SW846 8260
Acetonitrile	6.25	SW846 8260	Tetrachloroethene	0.300 - 0.450	SW846 8260
Acrolein	1.25	SW846 8260	Toluene	0.250	SW846 8260
Acrylonitrile	1.00	SW846 8260	Trichloroethene	0.250	SW846 8260
Allyl chloride	1.50	SW846 8260	Trichlorofluoromethane	0.300 - 0.310	SW846 8260
Benzene	0.300	SW846 8260	Vinyl acetate	1.50	SW846 8260
Bromodichloromethane	0.250	SW846 8260	Vinyl chloride	0.500	SW846 8260
Bromoform	0.250	SW846 8260	Xylene	0.300 - 0.600	SW846 8260
Bromomethane	0.300 - 0.500	SW846 8260	bis-Chloroisopropyl ether	1.50	SW846 8260
Carbon disulfide	1.25	SW846 8260	cis-1,3-Dichloropropene	0.250	SW846 8260
Carbon tetrachloride	0.260 - 0.300	SW846 8260	trans-1,2-Dichloroethene	0.300	SW846 8260
Chlorobenzene	0.250	SW846 8260	trans-1,3-Dichloropropene	0.250	SW846 8260
Chloroethane	0.300	SW846 8260	trans-1,4-Dichloro-2-butene	1.00	SW846 8260

Refer to footnotes on page 3A-23.

Table 3A-3
Method Detection Limits for Appendix IX Semivolatile Organic Compounds, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]
1,2,4,5-Tetrachlorobenzene	2.94 - 3.33	SW846 8270	3-benzodioxole, 5-(2-Propenyl)-1	1.96 - 2.22	SW846 8270
1,2,4-Trichlorobenzene	1.96 - 2.22	SW846 8270	4-Aminobiphenyl	2.94 - 3.33	SW846 8270
1,2-Dichlorobenzene	1.96 - 2.22	SW846 8270	4-Bromophenyl phenyl ether	1.96 - 2.22	SW846 8270
1,2-Diphenylhydrazine	1.96 - 2.22	SW846 8270	4-Chloro-3-methylphenol	1.96 - 2.22	SW846 8270
1,3,5-Trinitrobenzene	2.94 - 3.33	SW846 8270	4-Chlorobenzenamine	1.96 - 2.22	SW846 8270
1,3-Dichlorobenzene	1.96 - 2.22	SW846 8270	4-Chlorophenyl phenyl ether	1.96 - 2.22	SW846 8270
1,3-Dinitrobenzene	1.96 - 2.22	SW846 8270	4-Dimethylaminoazobenzene	2.94 - 3.33	SW846 8270
1,4-Dichlorobenzene	1.96 - 2.22	SW846 8270	4-Nitroaniline	2.94 - 3.33	SW846 8270
1,4-Dioxane	1.96 - 2.22	SW846 8270	4-Nitrophenol	1.96 - 2.22	SW846 8270
1,4-Naphthoquinone	2.94 - 3.33	SW846 8270	4-Nitroquinoline-1-oxide	2.94 - 3.33	SW846 8270
1-Methylnaphthalene	0.294 - 0.333	SW846 8270	5-Nitro-o-toluidine	2.94 - 3.33	SW846 8270
1-Naphthylamine	2.94 - 3.33	SW846 8270	7,12-Dimethylbenz(a)anthracene	2.94 - 3.33	SW846 8270
2,3,4,6-Tetrachlorophenol	1.96 - 2.22	SW846 8270	Acenaphthene	0.304 - 0.344	SW846 8270
2,4,5-Trichlorophenol	1.96 - 2.22	SW846 8270	Acenaphthylene	0.196 - 0.222	SW846 8270
2,4,6-Trichlorophenol	1.96 - 2.22	SW846 8270	Acetophenone	1.96 - 2.22	SW846 8270
2,4-Dichlorophenol	1.96 - 2.22	SW846 8270	Aniline	2.45 - 2.78	SW846 8270
2,4-Dimethylphenol	1.96 - 2.22	SW846 8270	Anthracene	0.196 - 0.222	SW846 8270
2,4-Dinitrophenol	4.9 - 5.56	SW846 8270	Aramite	2.94 - 3.33	SW846 8270
2,4-Dinitrotoluene	1.96 - 2.22	SW846 8270	Benzidine	2.94 - 3.33	SW846 8270
2,6-Dichlorophenol	1.96 - 2.22	SW846 8270	Benzo(a)anthracene	0.196 - 0.222	SW846 8270
2,6-Dinitrotoluene	1.96 - 2.22	SW846 8270	Benzo(a)pyrene	0.196 - 0.222	SW846 8270
2-Acetylaminofluorene	2.94 - 3.33	SW846 8270	Benzo(b)fluoranthene	0.196 - 0.222	SW846 8270
2-Chloronaphthalene	0.294 - 0.333	SW846 8270	Benzo(ghi)perylene	0.196 - 0.222	SW846 8270
2-Chlorophenol	1.96 - 2.22	SW846 8270	Benzo(k)fluoranthene	0.196 - 0.222	SW846 8270
2-Methylnaphthalene	0.294 - 0.333	SW846 8270	Benzoic acid	5.88 - 6.67	SW846 8270
2-Methylpyridine	2.94 - 3.33	SW846 8270	Benzyl alcohol	1.96 - 2.22	SW846 8270
2-Naphthalenamine	2.94 - 3.33	SW846 8270	Butylbenzyl phthalate	1.96 - 2.22	SW846 8270
2-Nitroaniline	1.96 - 2.22	SW846 8270	Carbazole	0.196 - 0.222	SW846 8270
2-Nitrophenol	1.96 - 2.22	SW846 8270	Chlorobenzilate	2.94 - 3.33	SW846 8270
3,3'-Dichlorobenzidine	1.96 - 2.22	SW846 8270	Chrysene	0.196 - 0.222	SW846 8270
3,3'-Dimethylbenzidine	3.24 - 3.67	SW846 8270	Di-n-butyl phthalate	1.96 - 2.22	SW846 8270
3-Methylcholanthrene	1.96 - 2.22	SW846 8270	Di-n-octyl phthalate	2.94 - 3.33	SW846 8270
Diallate	2.94 - 3.33	SW846 8270	O,O,O-Triethylphosphorothioate	1.96 - 2.22	SW846 8270
Dibenz[a,h]anthracene	0.196 - 0.222	SW846 8270	Parathion	2.94 - 3.33	SW846 8270
Dibenzofuran	1.96 - 2.22	SW846 8270	Pentachlorobenzene	2.94 - 3.33	SW846 8270
Diethylphthalate	1.96 - 2.22	SW846 8270	Pentachloroethane	2.94 - 3.33	SW846 8270
Dimethoate	1.96 - 2.22	SW846 8270	Pentachloronitrobenzene	1.96 - 2.22	SW846 8270

Refer to footnotes on page 3A-23.

Table 3A-3 *(Concluded)*
Method Detection Limits for Appendix IX Semivolatile Organic Compounds, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Analyte	MDL[b] (µg/L)	Analytical Method[g]	Analyte	MDL[b] (µg/L)	Analytical Method[g]
Dimethylphenethylamine	2.94 - 3.33	SW846 8270	3-Nitroaniline	1.96 - 2.22	SW846 8270
Dimethylphthalate	1.96 - 2.22	SW846 8270	Pentachlorophenol	1.96 - 2.22	SW846 8270
Dinitro-o-cresol	2.94 - 3.33	SW846 8270	Phenacetin	1.96 - 2.22	SW846 8270
Dinoseb	1.96 - 2.22	SW846 8270	Phenanthrene	0.196 - 0.222	SW846 8270
Diphenyl amine	2.94 - 3.33	SW846 8270	Phenol	0.98 - 1.11	SW846 8270
Disulfoton	1.96 - 2.22	SW846 8270	Phorate	1.96 - 2.22	SW846 8270
Ethyl methacrylate	1.96 - 2.22	SW846 8270	Pronamide	2.94 - 3.33	SW846 8270
Ethyl methanesulfonate	1.96 - 2.22	SW846 8270	Pyrene	0.294 - 0.333	SW846 8270
Famphur	2.94 - 3.33	SW846 8270	Pyridine	2.94 - 3.33	SW846 8270
Fluoranthene	0.196 - 0.222	SW846 8270	Sulfotepp	1.96 - 2.22	SW846 8270
Fluorene	0.196 - 0.222	SW846 8270	Thionazin	1.96 - 2.22	SW846 8270
Hexachlorobenzene	1.96 - 2.22	SW846 8270	Tributylphosphate	2.94 - 3.33	SW846 8270
Hexachlorobutadiene	1.96 - 2.22	SW846 8270	bis(2-Chloroethoxy)methane	2.94 - 3.33	SW846 8270
Hexachlorocyclopentadiene	2.94 - 3.33	SW846 8270	bis(2-Chloroethyl)ether	1.96 - 2.22	SW846 8270
Hexachloroethane	1.96 - 2.22	SW846 8270	bis(2-Ethylhexyl)phthalate	1.96 - 2.22	SW846 8270
Hexachlorophene	181 - 206	SW846 8270	bis-Chloroisopropyl ether	1.96 - 2.22	SW846 8270
Hexachloropropene	2.94 - 3.33	SW846 8270	m,p-Cresol	2.94 - 3.33	SW846 8270
Indeno(1,2,3-c,d)pyrene	0.196 - 0.222	SW846 8270	n-Nitroso-di-n-butylamine	2.94 - 3.33	SW846 8270
Isodrin	2.94 - 3.33	SW846 8270	n-Nitrosodiethylamine	1.96 - 2.22	SW846 8270
Isophorone	2.94 - 3.33	SW846 8270	n-Nitrosodimethylamine	1.96 - 2.22	SW846 8270
Isosafrole	1.96 - 2.22	SW846 8270	n-Nitrosodipropylamine	1.96 - 2.22	SW846 8270
Kepone	2.94 - 3.33	SW846 8270	n-Nitrosomethylethylamine	1.96 - 2.22	SW846 8270
Methapyrilene	2.94 - 3.33	SW846 8270	n-Nitrosomorpholine	1.96 - 2.22	SW846 8270
Methoxychlor	1.96 - 2.22	SW846 8270	n-Nitrosopiperidine	1.96 - 2.22	SW846 8270
Methyl methacrylate	1.96 - 2.22	SW846 8270	n-Nitrosopyrrolidine	1.96 - 2.22	SW846 8270
Methyl methanesulfonate	1.96 - 2.22	SW846 8270	o-Cresol	1.96 - 2.22	SW846 8270
Methyl parathion	1.96 - 2.22	SW846 8270	o-Toluidine	2.94 - 3.33	SW846 8270
Naphthalene	0.294 - 0.333	SW846 8270	para-Phenylenediamine	1.96 - 2.22	SW846 8270
Nitro-benzene	2.94 - 3.33	SW846 8270			

Refer to footnotes on page 3A-23.

Table 3A-4
Method Detection Limits for Chlorinated Herbicides and Polychlorinated Biphenyls,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Analyte	MDL[b] (µg/L)	Analytical Method[g]
2,4,5-T	0.0865 - 0.0943	SW846-8151A
2,4,5-TP	0.0865 - 0.0943	SW846-8151A
2,4-D	0.0865 - 0.0943	SW846-8151A
Aroclor 1016	0.0351 - 0.0370	SW846-8082
Aroclor 1221	0.0351 - 0.0370	SW846-8082
Aroclor 1232	0.0351 - 0.0370	SW846-8082
Aroclor 1242	0.0351 - 0.0370	SW846-8082
Aroclor 1248	0.0351 - 0.0370	SW846-8082
Aroclor 1254	0.0351 - 0.0370	SW846-8082
Aroclor 1260	0.0351 - 0.0370	SW846-8082

Refer to footnotes on page 3A-23.

Table 3A-5
Method Detection Limits for Polychlorinated Biphenyls Congeners, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Analyte	MDL[b] (pg/L)	Analytical Method[g]	Analyte	MDL[b] (pg/L)	Analytical Method[g]	Analyte	MDL[b] (pg/L)	Analytical Method[g]
PCB-1	21.8 - 22.8	EPA 1668A	PCB-139/140	43.6 - 45.6	EPA 1668A	PCB-175	21.8 - 22.8	EPA 1668A
PCB-10	21.8 - 22.8	EPA 1668A	PCB-14	21.8 - 22.8	EPA 1668A	PCB-176	21.8 - 22.8	EPA 1668A
PCB-102/98	43.6 - 45.6	EPA 1668A	PCB-141	21.8 - 22.8	EPA 1668A	PCB-177	21.8 - 22.8	EPA 1668A
PCB-103	21.8 - 22.8	EPA 1668A	PCB-142	21.8 - 22.8	EPA 1668A	PCB-178	21.8 - 22.8	EPA 1668A
PCB-104	21.8 - 22.8	EPA 1668A	PCB-143	21.8 - 22.8	EPA 1668A	PCB-179	21.8 - 22.8	EPA 1668A
PCB-105	21.8 - 22.8	EPA 1668A	PCB-144	21.8 - 22.8	EPA 1668A	PCB-18/30	43.6 - 45.6	EPA 1668A
PCB-106	21.8 - 22.8	EPA 1668A	PCB-145	21.8 - 22.8	EPA 1668A	PCB-181	21.8 - 22.8	EPA 1668A
PCB-107	21.8 - 22.8	EPA 1668A	PCB-146	21.8 - 22.8	EPA 1668A	PCB-182	21.8 - 22.8	EPA 1668A
PCB-108/124	43.6 - 45.6	EPA 1668A	PCB-147/149	43.6 - 45.6	EPA 1668A	PCB-183/185	43.6 - 45.6	EPA 1668A
PCB-11	134 - 140	EPA 1668A	PCB-148	21.8 - 22.8	EPA 1668A	PCB-184	21.8 - 22.8	EPA 1668A
PCB-110/115	43.6 - 45.6	EPA 1668A	PCB-15	21.8 - 22.8	EPA 1668A	PCB-186	21.8 - 22.8	EPA 1668A
PCB-111	21.8 - 22.8	EPA 1668A	PCB-150	21.8 - 22.8	EPA 1668A	PCB-187	21.8 - 22.8	EPA 1668A
PCB-112	21.8 - 22.8	EPA 1668A	PCB-151/135	43.6 - 45.6	EPA 1668A	PCB-188	21.8 - 22.8	EPA 1668A
PCB-113/90/101	65.5 - 68.4	EPA 1668A	PCB-152	21.8 - 22.8	EPA 1668A	PCB-189	21.8 - 22.8	EPA 1668A
PCB-114	21.8 - 22.8	EPA 1668A	PCB-153/168	43.6 - 45.6	EPA 1668A	PCB-19	21.8 - 22.8	EPA 1668A
PCB-117/116/85	65.5 - 68.4	EPA 1668A	PCB-154	21.8 - 22.8	EPA 1668A	PCB-190	21.8 - 22.8	EPA 1668A
PCB-118	21.8 - 22.8	EPA 1668A	PCB-155	21.8 - 22.8	EPA 1668A	PCB-191	21.8 - 22.8	EPA 1668A
PCB-120	21.8 - 22.8	EPA 1668A	PCB-156/157	43.6 - 45.6	EPA 1668A	PCB-192	21.8 - 22.8	EPA 1668A
PCB-121	21.8 - 22.8	EPA 1668A	PCB-158	21.8 - 22.8	EPA 1668A	PCB-193/180	43.6 - 45.6	EPA 1668A
PCB-122	21.8 - 22.8	EPA 1668A	PCB-159	21.8 - 22.8	EPA 1668A	PCB-194	21.8 - 22.8	EPA 1668A
PCB-123	21.8 - 22.8	EPA 1668A	PCB-16	21.8 - 22.8	EPA 1668A	PCB-195	21.8 - 22.8	EPA 1668A
PCB-126	21.8 - 22.8	EPA 1668A	PCB-160	21.8 - 22.8	EPA 1668A	PCB-196	21.8 - 22.8	EPA 1668A
PCB-127	21.8 - 22.8	EPA 1668A	PCB-161	21.8 - 22.8	EPA 1668A	PCB-197/200	43.6 - 45.6	EPA 1668A
PCB-128/166	43.6 - 45.6	EPA 1668A	PCB-162	21.8 - 22.8	EPA 1668A	PCB-198/199	43.6 - 45.6	EPA 1668A
PCB-13/12	43.6 - 45.6	EPA 1668A	PCB-164	21.8 - 22.8	EPA 1668A	PCB-2	21.8 - 22.8	EPA 1668A
PCB-130	21.8 - 22.8	EPA 1668A	PCB-165	21.8 - 22.8	EPA 1668A	PCB-20/28	43.6 - 45.6	EPA 1668A
PCB-131	21.8 - 22.8	EPA 1668A	PCB-167	21.8 - 22.8	EPA 1668A	PCB-201	21.8 - 22.8	EPA 1668A
PCB-132	21.8 - 22.8	EPA 1668A	PCB-169	21.8 - 22.8	EPA 1668A	PCB-202	21.8 - 22.8	EPA 1668A
PCB-133	21.8 - 22.8	EPA 1668A	PCB-17	21.8 - 22.8	EPA 1668A	PCB-203	21.8 - 22.8	EPA 1668A
PCB-134	21.8 - 22.8	EPA 1668A	PCB-170	21.8 - 22.8	EPA 1668A	PCB-204	21.8 - 22.8	EPA 1668A
PCB-136	21.8 - 22.8	EPA 1668A	PCB-172	21.8 - 22.8	EPA 1668A	PCB-205	21.8 - 22.8	EPA 1668A
PCB-137	21.8 - 22.8	EPA 1668A	PCB-173/171	43.6 - 45.6	EPA 1668A	PCB-206	21.8 - 22.8	EPA 1668A
PCB-138/163/129	65.5 - 68.4	EPA 1668A	PCB-174	21.8 - 22.8	EPA 1668A	PCB-207	21.8 - 22.8	EPA 1668A
PCB-208	21.8 - 22.8	EPA 1668A	PCB-44/65/47	65.5 - 68.4	EPA 1668A	PCB-72	21.8 - 22.8	EPA 1668A
PCB-209	21.8 - 22.8	EPA 1668A	PCB-45/51	43.6 - 45.6	EPA 1668A	PCB-73	21.8 - 22.8	EPA 1668A
PCB-21/33	43.6 - 45.6	EPA 1668A	PCB-46	21.8 - 22.8	EPA 1668A	PCB-77	21.8 - 22.8	EPA 1668A
PCB-22	21.8 - 22.8	EPA 1668A	PCB-48	21.8 - 22.8	EPA 1668A	PCB-78	21.8 - 22.8	EPA 1668A
PCB-23	21.8 - 22.8	EPA 1668A	PCB-5	21.8 - 22.8	EPA 1668A	PCB-79	21.8 - 22.8	EPA 1668A

Refer to footnotes on page 3A-23.

Table 3A-5 *(Concluded)*
Method Detection Limits for Polychlorinated Biphenyls Congeners,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Analyte	MDL[b] (pg/L)	Analytical Method[g]	Analyte	MDL[b] (pg/L)	Analytical Method[g]	Analyte	MDL[b] (pg/L)	Analytical Method[g]
PCB-24	21.8 - 22.8	EPA 1668A	PCB-50/53	43.6 - 45.6	EPA 1668A	PCB-8	21.8 - 22.8	EPA 1668A
PCB-25	21.8 - 22.8	EPA 1668A	PCB-52	21.8 - 22.8	EPA 1668A	PCB-80	21.8 - 22.8	EPA 1668A
PCB-26/29	43.6 - 45.6	EPA 1668A	PCB-54	21.8 - 22.8	EPA 1668A	PCB-81	21.8 - 22.8	EPA 1668A
PCB-27	21.8 - 22.8	EPA 1668A	PCB-55	21.8 - 22.8	EPA 1668A	PCB-82	21.8 - 22.8	EPA 1668A
PCB-3	21.8 - 22.8	EPA 1668A	PCB-56	21.8 - 22.8	EPA 1668A	PCB-83	21.8 - 22.8	EPA 1668A
PCB-31	21.8 - 22.8	EPA 1668A	PCB-57	21.8 - 22.8	EPA 1668A	PCB-84	21.8 - 22.8	EPA 1668A
PCB-32	21.8 - 22.8	EPA 1668A	PCB-58	21.8 - 22.8	EPA 1668A	PCB-86/87/97/109/119/125	131 - 137	EPA 1668A
PCB-34	21.8 - 22.8	EPA 1668A	PCB-59/62/75	65.5 - 68.4	EPA 1668A	PCB-88/91	43.6 - 45.6	EPA 1668A
PCB-35	21.8 - 22.8	EPA 1668A	PCB-6	21.8 - 22.8	EPA 1668A	PCB-89	21.8 - 22.8	EPA 1668A
PCB-36	21.8 - 22.8	EPA 1668A	PCB-60	21.8 - 22.8	EPA 1668A	PCB-9	21.8 - 22.8	EPA 1668A
PCB-37	21.8 - 22.8	EPA 1668A	PCB-61/76/70/74	87.3 - 91.2	EPA 1668A	PCB-92	21.8 - 22.8	EPA 1668A
PCB-38	21.8 - 22.8	EPA 1668A	PCB-63	21.8 - 22.8	EPA 1668A	PCB-93/100	43.6 - 45.6	EPA 1668A
PCB-39	21.8 - 22.8	EPA 1668A	PCB-64	21.8 - 22.8	EPA 1668A	PCB-94	21.8 - 22.8	EPA 1668A
PCB-4	21.8 - 22.8	EPA 1668A	PCB-66	21.8 - 22.8	EPA 1668A	PCB-95	21.8 - 22.8	EPA 1668A
PCB-40/71	43.6 - 45.6	EPA 1668A	PCB-67	21.8 - 22.8	EPA 1668A	PCB-96	21.8 - 22.8	EPA 1668A
PCB-41	21.8 - 22.8	EPA 1668A	PCB-68	21.8 - 22.8	EPA 1668A			
PCB-42	21.8 - 22.8	EPA 1668A	PCB-69/49	43.6 - 45.6	EPA 1668A	PCB-99	21.8 - 22.8	EPA 1668A
PCB-43	21.8 - 22.8	EPA 1668A	PCB-7	21.8 - 22.8	EPA 1668A			

Refer to footnotes on page 3A-23.

Table 3A-6
Summary of Sulfide and Total Cyanide Results, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW2BL	Sulfides	ND	0.835	2.50	NE	U		087825-029	SW846 9034
14-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U	UJ	087825-027	SW846 9012
CWL-MW2BL (Duplicate)	Sulfides	ND	0.835	2.50	NE	U		087826-029	SW846 9034
14-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U	UJ	087826-027	SW846 9012
CWL-MW4	Sulfides	ND	0.835	2.50	NE	U		087839-029	SW846 9034
21-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U	UJ	087839-027	SW846 9012
CWL-MW5L	Sulfides	ND	0.835	2.50	NE	U		087829-029	SW846 9034
15-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U	UJ	087829-027	SW846 9012
CWL-MW5U	Sulfides	ND	0.835	2.50	NE	U		087833-029	SW846 9034
19-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U		087833-027	SW846 9012
CWL-MW5U (Duplicate)	Sulfides	ND	0.835	2.50	NE	U		087834-029	SW846 9034
19-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U		087834-027	SW846 9012
CWL-MW6L	Sulfides	ND	0.835	2.50	NE	U		087837-029	SW846 9034
20-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U		087837-027	SW846 9012
CWL-MW6U	Sulfides	ND	0.835	2.50	NE	U		087821-029	SW846 9034
13-Oct-09	Total Cyanide	ND	0.00166	0.005	0.200	U	UJ	087821-027	SW846 9012

Refer to footnotes on page 3A-23.

Table 3A-7
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW2BL	Antimony	ND	0.0005	0.002	0.006	U		087344-010	SW846 6020
27-Apr-09	Arsenic	ND	0.0015	0.005	0.010	U		087344-010	SW846 6020
	Barium	0.0567	0.0005	0.002	2.00			087344-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087344-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087344-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087344-010	SW846 6020
	Cobalt	0.00031	0.0001	0.001	NE	J		087344-010	SW846 6020
	Copper	0.000835	0.0003	0.001	NE	J		087344-010	SW846 6020
	Iron	0.406	0.010	0.025	NE			087344-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087344-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087344-010	SW846 7470
	Nickel	0.00247	0.0005	0.002	NE			087344-010	SW846 6020
	Selenium	0.00144	0.001	0.005	0.050	J		087344-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087344-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087344-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087344-010	SW846 6020
	Vanadium	0.0034	0.003	0.010	NE	J		087344-010	SW846 6020
	Zinc	0.00545	0.0026	0.010	NE	B, J	0.0146U	087344-010	SW846 6020
CWL-MW4	Antimony	ND	0.0005	0.002	0.006	U		087358-010	SW846 6020
24-Apr-09	Arsenic	ND	0.0015	0.005	0.010	U		087358-010	SW846 6020
	Barium	0.0583	0.0005	0.002	2.00			087358-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087358-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087358-010	SW846 6020
	Chromium	0.0151	0.0015	0.003	0.100			087358-010	SW846 6020
	Cobalt	0.00219	0.0001	0.001	NE			087358-010	SW846 6020
	Copper	0.00182	0.0003	0.001	NE		0.0054U	087358-010	SW846 6020
	Iron	0.842	0.010	0.025	NE			087358-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087358-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087358-010	SW846 7470
	Nickel	0.215	0.0025	0.010	NE			087358-010	SW846 6020
	Selenium	0.00168	0.001	0.005	0.050	J		087358-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087358-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087358-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087358-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087358-010	SW846 6020
	Zinc	0.00481	0.0026	0.010	NE	B, J	0.0146U	087358-010	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Continued)*
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW5L 16-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087341-010	SW846 6020
	Arsenic	0.00218	0.0015	0.005	0.010	B, J	0.014U	087341-010	SW846 6020
	Barium	0.0601	0.0005	0.002	2.00			087341-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087341-010	SW846 6020
	Cadmium	0.000278	0.00011	0.001	0.005	J	J+	087341-010	SW846 6020
	Chromium	0.00211	0.0015	0.003	0.100	B, J	0.010U	087341-010	SW846 6020
	Cobalt	0.000256	0.0001	0.001	NE	J	J+	087341-010	SW846 6020
	Copper	0.00107	0.0003	0.001	NE		J+	087341-010	SW846 6020
	Iron	0.383	0.010	0.025	NE	B		087341-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087341-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087341-010	SW846 7470
	Nickel	0.0022	0.0005	0.002	NE		J+	087341-010	SW846 6020
	Selenium	0.00122	0.001	0.005	0.050	J	J-	087341-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087341-010	SW846 6020
	Thallium	0.000595	0.0003	0.001	0.002	J	0.0016U	087341-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087341-010	SW846 6020
	Vanadium	0.00948	0.003	0.010	NE	B, J	0.042U	087341-010	SW846 6020
	Zinc	0.00424	0.0026	0.010	NE	B, J	0.014U	087341-010	SW846 6020
CWL-MW5L (Duplicate) 16-Apr-09	Antimony	0.000526	0.0005	0.002	0.006	J	0.0029U	087342-010	SW846 6020
	Arsenic	0.00379	0.0015	0.005	0.010	B, J	0.014U	087342-010	SW846 6020
	Barium	0.0566	0.0005	0.002	2.00			087342-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087342-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087342-010	SW846 6020
	Chromium	0.00259	0.0015	0.003	0.100	B, J	0.010U	087342-010	SW846 6020
	Cobalt	0.000254	0.0001	0.001	NE	J	J+	087342-010	SW846 6020
	Copper	0.00102	0.0003	0.001	NE		J+	087342-010	SW846 6020
	Iron	0.391	0.010	0.025	NE	B		087342-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087342-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087342-010	SW846 7470
	Nickel	0.00236	0.0005	0.002	NE		J+	087342-010	SW846 6020
	Selenium	0.001	0.001	0.005	0.050	J	J-	087342-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087342-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087342-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087342-010	SW846 6020
	Vanadium	0.0127	0.003	0.010	NE	B	0.042U	087342-010	SW846 6020
	Zinc	0.00376	0.0026	0.010	NE	B, J	0.014U	087342-010	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Continued)*
Summary of Total Metal Results, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW5U	Antimony	ND	0.0005	0.002	0.006	U		087346-010	SW846 6020
21-Apr-09	Arsenic	ND	0.0015	0.005	0.010	U		087346-010	SW846 6020
	Barium	0.0721	0.0005	0.002	2.00			087346-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087346-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087346-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087346-010	SW846 6020
	Cobalt	0.000279	0.0001	0.001	NE	J		087346-010	SW846 6020
	Copper	0.00148	0.0003	0.001	NE			087346-010	SW846 6020
	Iron	0.251	0.010	0.025	NE			087346-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087346-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087346-010	SW846 7470
	Nickel	0.00231	0.0005	0.002	NE			087346-010	SW846 6020
	Selenium	0.00179	0.001	0.005	0.050	J		087346-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087346-010	SW846 6020
	Thallium	0.000481	0.0003	0.001	0.002	J	0.0018U	087346-010	SW846 6020
	Tin	0.00944	0.001	0.005	NE			087346-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087346-010	SW846 6020
	Zinc	0.0295	0.0026	0.010	NE			087346-010	SW846 6020
CWL-MW6L	Antimony	ND	0.0005	0.002	0.006	U		087350-010	SW846 6020
17-Apr-09	Arsenic	0.00403	0.0015	0.005	0.010	B, J	0.014U	087350-010	SW846 6020
	Barium	0.0544	0.0005	0.002	2.00			087350-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087350-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087350-010	SW846 6020
	Chromium	0.00231	0.0015	0.003	0.100	B, J	0.010U	087350-010	SW846 6020
	Cobalt	0.000238	0.0001	0.001	NE	J	J+	087350-010	SW846 6020
	Copper	0.00112	0.0003	0.001	NE		J+	087350-010	SW846 6020
	Iron	0.395	0.010	0.025	NE	B		087350-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087350-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087350-010	SW846 7470
	Nickel	0.00237	0.0005	0.002	NE		J+	087350-010	SW846 6020
	Selenium	0.00152	0.001	0.005	0.050	J	J-	087350-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087350-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087350-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087350-010	SW846 6020
	Vanadium	0.0142	0.003	0.010	NE	B	0.042U	087350-010	SW846 6020
	Zinc	0.00303	0.0026	0.010	NE	B, J	0.014U	087350-010	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Continued)*
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW6U	Antimony	ND	0.0005	0.002	0.006	U		087353-010	SW846 6020
23-Apr-09	Arsenic	ND	0.0015	0.005	0.010	U		087353-010	SW846 6020
	Barium	0.0702	0.0005	0.002	2.00			087353-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087353-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087353-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087353-010	SW846 6020
	Cobalt	0.000198	0.0001	0.001	NE	J		087353-010	SW846 6020
	Copper	0.00113	0.0003	0.001	NE		0.0047U	087353-010	SW846 6020
	Iron	0.255	0.010	0.025	NE			087353-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087353-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087353-010	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	J		087353-010	SW846 6020
	Selenium	0.00172	0.001	0.005	0.050	J		087353-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087353-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087353-010	SW846 6020
	Tin	0.00263	0.001	0.005	NE	J		087353-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087353-010	SW846 6020
	Zinc	0.00494	0.0026	0.010	NE	J		087353-010	SW846 6020
CWL-MW6U (Duplicate)	Antimony	ND	0.0005	0.002	0.006	U		087354-010	SW846 6020
23-Apr-09	Arsenic	ND	0.0015	0.005	0.010	U		087354-010	SW846 6020
	Barium	0.0743	0.0005	0.002	2.00			087354-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087354-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087354-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087354-010	SW846 6020
	Cobalt	0.000196	0.0001	0.001	NE	J		087354-010	SW846 6020
	Copper	0.00107	0.0003	0.001	NE		0.0047U	087354-010	SW846 6020
	Iron	0.262	0.010	0.025	NE			087354-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087354-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087354-010	SW846 7470
	Nickel	0.00186	0.0005	0.002	NE	J		087354-010	SW846 6020
	Selenium	0.00174	0.001	0.005	0.050	J		087354-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087354-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087354-010	SW846 6020
	Tin	0.00233	0.001	0.005	NE	J		087354-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087354-010	SW846 6020
	Zinc	0.00526	0.0026	0.010	NE	J		087354-010	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Continued)*
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW2BL	Antimony	ND	0.0005	0.003	0.006	U		087825-010	SW846 6020
14-Oct-09	Arsenic	ND	0.0015	0.005	0.010	U		087825-010	SW846 6020
	Barium	0.0649	0.0005	0.002	2.00			087825-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087825-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087825-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087825-010	SW846 6020
	Cobalt	0.000214	0.0001	0.001	NE	J		087825-010	SW846 6020
	Copper	0.00104	0.0003	0.001	NE		0.0041U	087825-010	SW846 6020
	Iron	0.213	0.010	0.100	NE			087825-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087825-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087825-010	SW846 7470
	Nickel	0.00393	0.0005	0.002	NE			087825-010	SW846 6020
	Selenium	0.00224	0.001	0.005	0.050	J		087825-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087825-010	SW846 6020
	Thallium	0.000887	0.0003	0.001	0.002	J	0.0032U	087825-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087825-010	SW846 6020
	Uranium	0.0163	0.00005	0.0002	0.030			087825-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087825-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087825-010	SW846 6020
CWL-MW2BL (Duplicate)	Antimony	ND	0.0005	0.003	0.006	U		087826-010	SW846 6020
14-Oct-09	Arsenic	ND	0.0015	0.005	0.010	U		087826-010	SW846 6020
	Barium	0.0631	0.0005	0.002	2.00			087826-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087826-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087826-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087826-010	SW846 6020
	Cobalt	0.000241	0.0001	0.001	NE	J		087826-010	SW846 6020
	Copper	0.000734	0.0003	0.001	NE	J	0.0041U	087826-010	SW846 6020
	Iron	0.216	0.010	0.100	NE			087826-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087826-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087826-010	SW846 7470
	Nickel	0.00394	0.0005	0.002	NE			087826-010	SW846 6020
	Selenium	0.00186	0.001	0.005	0.050	J		087826-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087826-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087826-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087826-010	SW846 6020
	Uranium	0.016	0.00005	0.0002	0.030			087826-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087826-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087826-010	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Continued)*
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW4	Antimony	ND	0.0005	0.003	0.006	U		087839-009	SW846 6020
21-Oct-09	Arsenic	0.00481	0.0015	0.005	0.010	B, J	0.019U	087839-009	SW846 6020
	Barium	0.0595	0.0005	0.002	2.00			087839-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087839-009	SW846 6020
	Cadmium	0.000176	0.00011	0.001	0.005	J		087839-009	SW846 6020
	Chromium	0.0131	0.0025	0.010	0.100			087839-009	SW846 6020
	Cobalt	0.00385	0.0001	0.001	NE			087839-009	SW846 6020
	Copper	0.00149	0.0003	0.001	NE			087839-009	SW846 6020
	Iron	0.714	0.010	0.100	NE			087839-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087839-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087839-009	SW846 7470
	Nickel	0.456	0.0005	0.002	NE			087839-009	SW846 6020
	Selenium	0.00103	0.001	0.005	0.050	J	NJ-	087839-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087839-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087839-009	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087839-009	SW846 6020
	Uranium	0.0131	0.00005	0.0002	0.030	B		087839-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087839-009	SW846 6020
	Zinc	0.00282	0.0026	0.010	NE	J		087839-009	SW846 6020
CWL-MW5L	Antimony	ND	0.0005	0.003	0.006	U		087829-010	SW846 6020
15-Oct-09	Arsenic	ND	0.0015	0.005	0.010	U		087829-010	SW846 6020
	Barium	0.0705	0.0005	0.002	2.00			087829-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087829-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087829-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087829-010	SW846 6020
	Cobalt	0.000261	0.0001	0.001	NE	J		087829-010	SW846 6020
	Copper	0.000709	0.0003	0.001	NE	J		087829-010	SW846 6020
	Iron	0.235	0.010	0.100	NE			087829-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087829-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087829-010	SW846 7470
	Nickel	0.00402	0.0005	0.002	NE			087829-010	SW846 6020
	Selenium	0.002	0.001	0.005	0.050	J		087829-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087829-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087829-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087829-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087829-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087829-010	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Continued)*
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW5U	Antimony	0.000649	0.0005	0.003	0.006	B, J	0.011U	087833-009	SW846 6020
19-Oct-09	Arsenic	0.00579	0.0015	0.005	0.010	B	0.019U	087833-009	SW846 6020
	Barium	0.0705	0.0005	0.002	2.00			087833-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087833-009	SW846 6020
	Cadmium	0.000262	0.00011	0.001	0.005	J		087833-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087833-009	SW846 6020
	Cobalt	0.000206	0.0001	0.001	NE	J		087833-009	SW846 6020
	Copper	0.00121	0.0003	0.001	NE		0.0056UJ	087833-009	SW846 6020
	Iron	0.247	0.010	0.100	NE			087833-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087833-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087833-009	SW846 7470
	Nickel	0.00498	0.0005	0.002	NE			087833-009	SW846 6020
	Selenium	0.00175	0.001	0.005	0.050	J	NJ-	087833-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087833-009	SW846 6020
	Thallium	0.000408	0.0003	0.001	0.002	J		087833-009	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087833-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087833-009	SW846 6020
	Zinc	0.037	0.0026	0.010	NE			087833-009	SW846 6020
CWL-MW5U (Duplicate)	Antimony	0.000715	0.0005	0.003	0.006	B, J	0.011U	087834-009	SW846 6020
19-Oct-09	Arsenic	0.00482	0.0015	0.005	0.010	B, J	0.019U	087834-009	SW846 6020
	Barium	0.0687	0.0005	0.002	2.00			087834-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087834-009	SW846 6020
	Cadmium	0.000241	0.00011	0.001	0.005	J		087834-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087834-009	SW846 6020
	Cobalt	0.000164	0.0001	0.001	NE	J		087834-009	SW846 6020
	Copper	0.0013	0.0003	0.001	NE		0.0056UJ	087834-009	SW846 6020
	Iron	0.22	0.010	0.100	NE			087834-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087834-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087834-009	SW846 7470
	Nickel	0.00492	0.0005	0.002	NE			087834-009	SW846 6020
	Selenium	0.00189	0.001	0.005	0.050	J	NJ-	087834-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087834-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087834-009	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087834-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087834-009	SW846 6020
	Zinc	0.0371	0.0026	0.010	NE			087834-009	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-7 *(Concluded)*
Summary of Total Metal Results,
Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW6L	Antimony	ND	0.0005	0.003	0.006	U		087837-010	SW846 6020
20-Oct-09	Arsenic	0.00327	0.0015	0.005	0.010	B, J	0.019U	087837-010	SW846 6020
	Barium	0.0571	0.0005	0.002	2.00			087837-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087837-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087837-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087837-010	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		087837-010	SW846 6020
	Copper	0.000563	0.0003	0.001	NE	J		087837-010	SW846 6020
	Iron	0.266	0.010	0.100	NE			087837-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087837-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087837-010	SW846 7470
	Nickel	0.00147	0.0005	0.002	NE	J		087837-010	SW846 6020
	Selenium	0.00127	0.001	0.005	0.050	J	NJ-	087837-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087837-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087837-010	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087837-010	SW846 6020
	Uranium	0.0148	0.00005	0.0002	0.030	B		087837-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087837-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087837-010	SW846 6020
CWL-MW6U	Antimony	ND	0.0005	0.003	0.006	U		087821-009	SW846 6020
13-Oct-09	Arsenic	ND	0.0015	0.005	0.010	U		087821-009	SW846 6020
	Barium	0.0719	0.0005	0.002	2.00			087821-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087821-009	SW846 6020
	Cadmium	0.000111	0.00011	0.001	0.005	J		087821-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087821-009	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		087821-009	SW846 6020
	Copper	0.00176	0.0003	0.001	NE			087821-009	SW846 6020
	Iron	0.177	0.010	0.100	NE			087821-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087821-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087821-009	SW846 7470
	Nickel	0.00345	0.0005	0.002	NE			087821-009	SW846 6020
	Selenium	0.0018	0.001	0.005	0.050	J		087821-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087821-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087821-009	SW846 6020
	Tin	ND	0.001	0.005	NE	U		087821-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087821-009	SW846 6020
	Zinc	0.00283	0.0026	0.010	NE	J		087821-009	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-8
Summary of Dissolved Chromium Results, Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW2BL 14-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087825-013	SW846 6020
CWL-MW2BL (Duplicate) 14-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087826-013	SW846 6020
CWL-MW4 21-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087839-013	SW846 6020
CWL-MW5L 15-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087829-013	SW846 6020
CWL-MW5U 19-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087833-013	SW846 6020
CWL-MW5U (Duplicate) 19-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087834-013	SW846 6020
CWL-MW6L 20-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087837-013	SW846 6020
CWL-MW6U 13-Oct-09	Dissolved Chromium	ND	0.0025	0.010	0.100	U		087821-013	SW846 6020

Refer to footnotes on page 3A-23.

Table 3A-9
Summary of Field Water Quality Measurements[h], Chemical Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CWL-MW2BL	27-Apr-09	20.88	1,220	87.2	6.95	0.27	81.1	7.23
CWL-MW4	24-Apr-09	19.69	1,054	31.5	7.09	4.79	61.1	5.57
CWL-MW5L	16-Apr-09	14.11	1,182	116.6	7.00	0.20	71.9	7.44
CWL-MW5U	21-Apr-09	18.45	1,017	87.2	7.20	0.30	67.0	6.27
CWL-MW6L	17-Apr-09	12.43	1,150	130.2	7.01	0.31	41.5	4.41
CWL-MW6U	23-Apr-09	19.99	1,012	72.5	7.20	0.33	64.6	5.86
CWL-MW2BL	14-Oct-09	20.80	1,097	199.9	6.83	0.32	76.9	6.86
CWL-MW4	21-Oct-09	15.56	947	94.7	7.02	4.71	56.6	5.62
CWL-MW5L	15-Oct-09	18.26	1,083	210.2	6.89	0.26	81.1	7.61
CWL-MW5U	19-Oct-09	18.00	924	203.8	7.50	0.71	83.8	7.91
CWL-MW6L	20-Oct-09	19.77	1,027	205.6	6.95	0.48	62.2	5.66
CWL-MW6U	13-Oct-09	19.03	919	169.5	7.06	0.34	60.0	5.54

Refer to footnotes on page 3A-23.

Footnotes for Chemical Waste Landfill Groundwater Monitoring Tables

[a]Result

- Values in bold exceed the established MCL.
- MCL = maximum contaminant level.
- ND = not detected (at method detection limit).
- µg/L = micrograms per liter.
- mg/L = milligrams per liter.
- pg/L = picograms 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 Primary Water Regulations (40 CFR 141.11[b]), National Primary Drinking Water Standards, EPA, July 2002.
- NE = not established.

[e]Laboratory Qualifier

B	=	Analyte is detected in associated laboratory method blank.
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 numerical value is an estimated quantity with suspected positive bias.
J-	=	The associated numerical value is an estimated quantity with a suspected negative bias.
NJ-	=	Presumptive evidence of the presence of the material at an estimated quantity with a suspected negative bias.
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

- U.S. Environmental Protection Agency (EPA), November 1986. *Test Methods for Evaluating Solid, Physical/Chemical Methods*, 3rd ed., (and updates), *SW-846*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, August 2003. *Method 1668, Revision A, Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS*, EPA-821-R-07-004, (and updates), Office of Science and Technology Engineering and Analysis Division, U.S. Environmental Protection Agency, Washington, D.C.

[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).

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Attachment 3B
Chemical Waste Landfill
Hydrographs

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Attachment 3B Hydrographs

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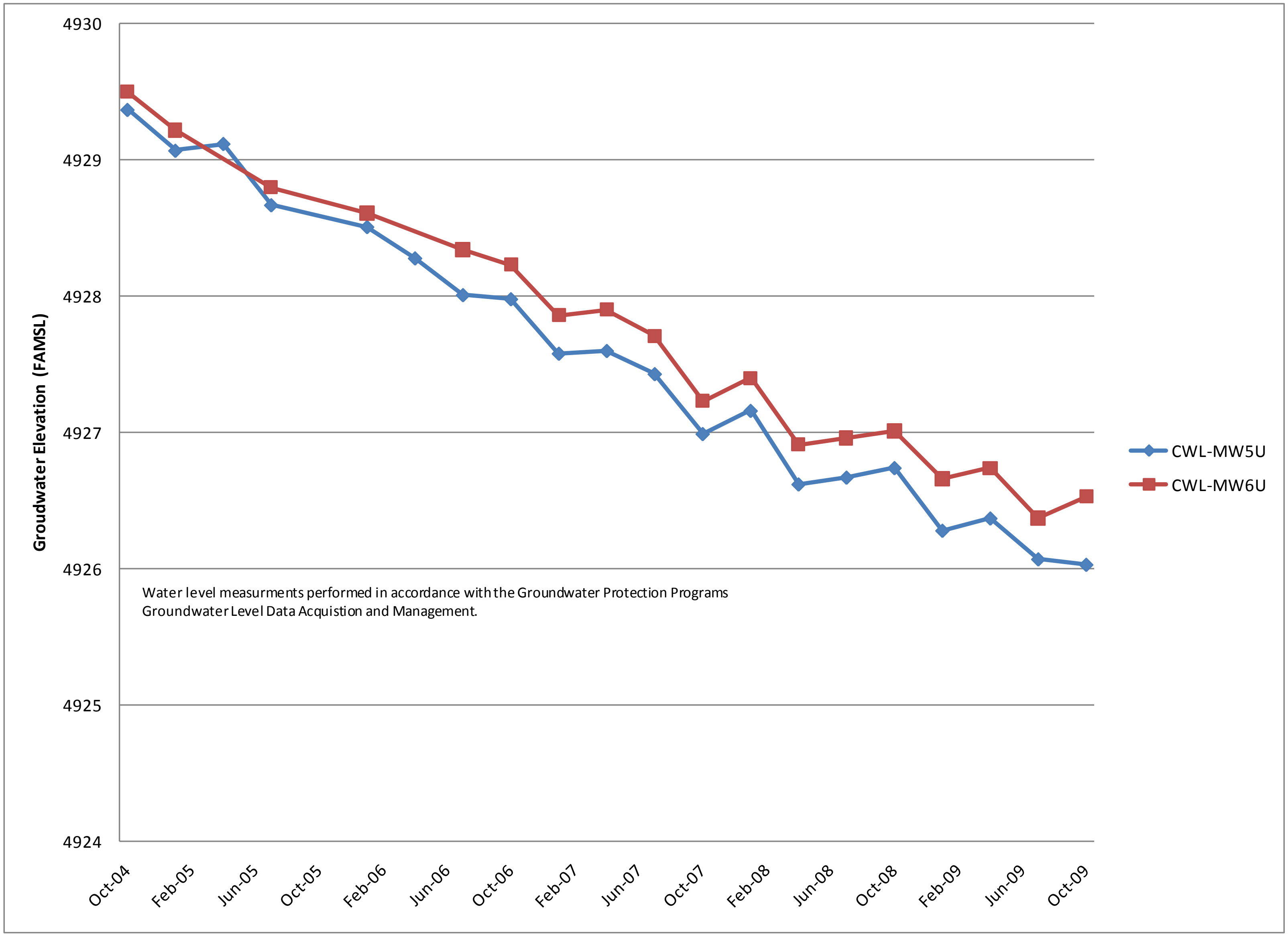

Figure 3B-1. CWL Water Table Hydrographs for Monitoring Wells CWL-MW5U and CWL-MW6U

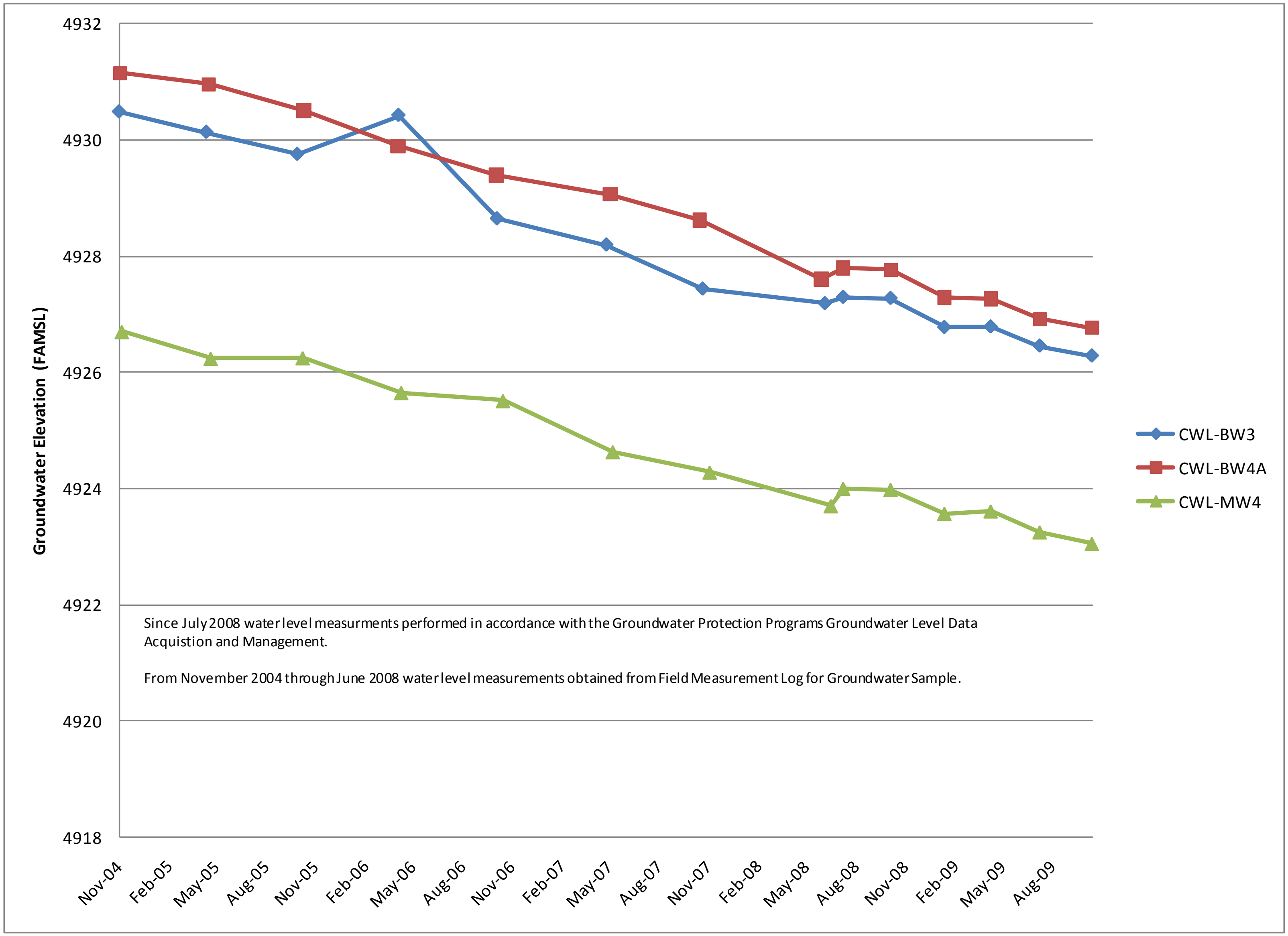

Figure 3B-2. CWL Water Table Hydrographs for Monitoring Wells CWL-BW3, CWL-BW4A, and CWL-MW4

4.0 Mixed Waste Landfill

4.1 Introduction

The Mixed Waste Landfill (MWL) is located on Kirtland Air Force Base 4 miles south of Sandia National Laboratories, New Mexico (SNL/NM) Technical Area (TA)-I facilities, and 5 miles southeast of Albuquerque International Sunport (Figure 1-2). The MWL is a 2.6-acre site in the north-central portion of TA-III that was operated from March 1959 through December 1988. Approximately 100,000 cubic feet of low-level radioactive and mixed waste containing approximately 6,300 curies (at the time of disposal) of activity were disposed of in the MWL.

The MWL consists of two distinct disposal areas: the classified area (occupying 0.6 acres) and the unclassified area (occupying 2.0 acres). Low-level radioactive and mixed waste were disposed of in each of these areas. Classified wastes were buried in cylindrical pits in the classified area. Unclassified wastes were buried in shallow trenches in the unclassified area. The MWL contents remain in place with a biointrusion barrier and an evapotranspirative (ET) cover. The ET cover was installed in the summer of 2009.

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 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.

Groundwater at the MWL has been extensively characterized since 1990 for major ion chemistry, volatile organic compounds (VOCs), nitrate, metals, radionuclides, and perchlorate. Twenty years of data indicate that groundwater has not been contaminated by releases from the MWL (Goering et al. 2002; SNL December 2001, January 2002, July 2002, October 2002, June 2003, September 2003, July 2004; Lyon and Goering January 2006; SNL November 2006, January 2008, May 2009, and 2010 [in preparation]).

4.2 Regulatory Criteria

Historically, the New Mexico Environment Department (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 facility 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, Section 4.1.50, incorporating Title 40, Code of Federal Regulations, 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 Compliance Order on Consent (the Order) in April 2004, which transferred the regulatory authority for groundwater sampling at the MWL to the Order (NMED 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 U.S. Department of Energy and Sandia Corporation. 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 2004).

4.3 Scope of Activities

Groundwater sampling was conducted during Calendar Year (CY) 2009 at the MWL located in TA-III at SNL/NM. Seven monitoring wells at the MWL were sampled, including one background well (MWL-BW2), one on-site monitoring well (MWL-MW4), and five downgradient monitoring wells (MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, and MWL-MW9). Table 4-1 describes the type and dates of sampling events conducted at the MWL during CY 2009. Attachments 4A, 4B, and 4C provide supplemental information for the CY 2009 monitoring events consisting of summary tables for analytical results, plots, and hydrographs, respectively.

Table 4-1. Calendar Year 2009 Groundwater Sampling Events, Mixed Waste Landfill

Well ID	Jan 2009	April 2009	July 2009	Oct 2009
MWL-BW2	4th quarter sampling	5th quarter sampling	6th quarter sampling	7th quarter sampling
MWL-MW4		Annual sampling		
MWL-MW5		Annual sampling		
MWL-MW6		Annual sampling		
MWL-MW7	3rd quarter sampling	4th quarter sampling	5th quarter sampling	6th quarter sampling
MWL-MW8	3rd quarter sampling	4th quarter sampling	5th quarter sampling	6th quarter sampling
MWL-MW9	3rd quarter sampling	4th quarter sampling	5th quarter sampling	6th quarter sampling

ID = Identification.

The analytical parameters selected for monitoring at the MWL groundwater wells during CY 2009 are listed in Table 4-2. The list includes target analyte list (TAL) metals, total uranium, VOCs, semivolatile organic compounds (SVOCs), nitrate plus nitrite (NPN), bromide, fluoride, chloride, sulfate, total alkalinity as calcium carbonate, perchlorate, and radionuclides. For newly installed wells, the Order requires perchlorate analysis for four quarters unless detected above the screening level of 4 micrograms per liter (µg/L), at which time a new sampling schedule is to be negotiated with the NMED (2004, Table XI-1). Alkalinity titrations were performed in the field on groundwater collected at each well. Radiochemical analysis included gamma-emitting radionuclides, gross alpha/beta radioactivity, and tritium. Section 4.6 discusses the analytical results for the CY 2009 groundwater sampling events. Attachment 4A provides summary tables (Tables 4A1 through 4A8) of the analytical results.

The MWL groundwater samples were submitted for analysis to General Engineering Laboratories, Inc. (GEL) in Charleston, South Carolina; Hall Analytical in Albuquerque, New Mexico; and Metrohm Peak in Houston, Texas. All groundwater samples were collected using a Bennett™ pump. Field quality control (QC) samples submitted to GEL included field duplicate, equipment blank (EB), trip blank (TB), and field blank (FB) samples. Section 4.7 discusses the QC results.

4.3.1 Monitoring History

The groundwater monitoring well network at the MWL was originally installed in 1989. The wells have been sampled at various intervals since that time. In 2008, four monitoring wells were plugged and abandoned (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3), and four new monitoring wells

Table 4-2. Analytical Parameters, Test Methods, and Target Quantitation Limits, Mixed Waste Landfill Groundwater Sampling, Calendar Year 2009

Analytical Parameter	Test Method[a]	Target Quantitation Limit[b]
Total Metals TAL and Uranium	SW846-6020 SW846-7470A	0.00007 – 2.50 mg/L
Volatile Organic Compounds	SW846-8260B	1.00 – 15.0 µg/L
Semivolatile Organic Compounds	SW846-8270C	1.00 – 24.1 µg/L
Nitrate plus Nitrite (as nitrogen)	EPA 353.2	0.250 – 0.500 mg/L
Major Anions Bromide, Fluoride, Chloride, and Sulfate	SW846-9056	0.100 – 4.0 mg/L
Total Alkalinity as Calcium Carbonate	SM 2320B[c]	1.00 mg/L
Perchlorate	EPA 314.0[d]	0.012 mg/L
Radionuclides Gamma-Emitting Radionuclides Gross Alpha Activity Gross Beta Activity Tritium	 EPA 901.1[e] EPA 900.0[e] EPA 900.0[e] EPA 906.0[e]	 MDA is isotope specific 0.954 – 15.5 pCi/L 1.16 – 5.28 pCi/L 131 – 176 pCi/L

[a]Analytical methods used are referenced to either U.S. Environmental Protection Agency, 1979. *Methods for Chemical Analysis of Water and Wastes,* EPA-600/4-79-020, U.S. Environmental Protection Agency, Cincinnati, Ohio, or U.S. Environmental Protection Agency, 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.
[b]For target compounds only. Reporting limits may be elevated if an interfering component is present or if sample dilution is required.
[c]Laboratory-specific analytical methods.
[d]U.S. Environmental Protection Agency, November 1999, *Perchlorate in Drinking Water Using Ion Chromatography*, EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C..
[e]U.S. Environmental Protection Agency, 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
EPA = U.S. Environmental Protection Agency.
µg/L = Microgram(s) per liter.
mg/L = Milligram(s) per liter.
MDA = Minimum detectable activity.
pCi/L = Picocurie(s) per liter.
TAL = Target analyte list.

were installed (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) (SNL April 2008 and September 2008). Figure 4-1 shows the current groundwater monitoring network consisting of seven wells completed within the interfingering, fine-grained, alluvial fan deposits and coarse-grained Ancestral Rio Grande (ARG) alluvial deposits.

4.3.2 Monitoring Network

Wells MWL-MW7, MWL-MW8, MWL-MW9, and MWL-BW2 are considered new wells and, as required by the Order (NMED 2004), will be sampled for eight consecutive quarters for a defined suite of parameters in addition to sampling for perchlorate for at least four consecutive quarters. Wells MWL-MW4, MWL-MW5, and MWL-MW6 are preexisting wells and will continue to be sampled on an annual basis.

Due to the timing of the installation of the new wells, the eight-quarter sampling requirement began at different times depending on which wells were completed and available for sampling. Table 4-1 shows the quarterly and annual monitoring periods for each of the MWL groundwater monitoring wells.

In 1993, MWL-MW4 was completed at an angle of 6 degrees from vertical and is screened at two discrete intervals 20 feet apart to evaluate vertical potentiometric gradients and changes in aquifer parameters with depth. An inflatable packer separates the screened intervals, and pressure is maintained in the packer to prevent combining water from the two screened sections of the aquifer. Although monitoring well MWL-MW4 is screened in two discrete intervals, only the upper interval was sampled in 2009, as this is

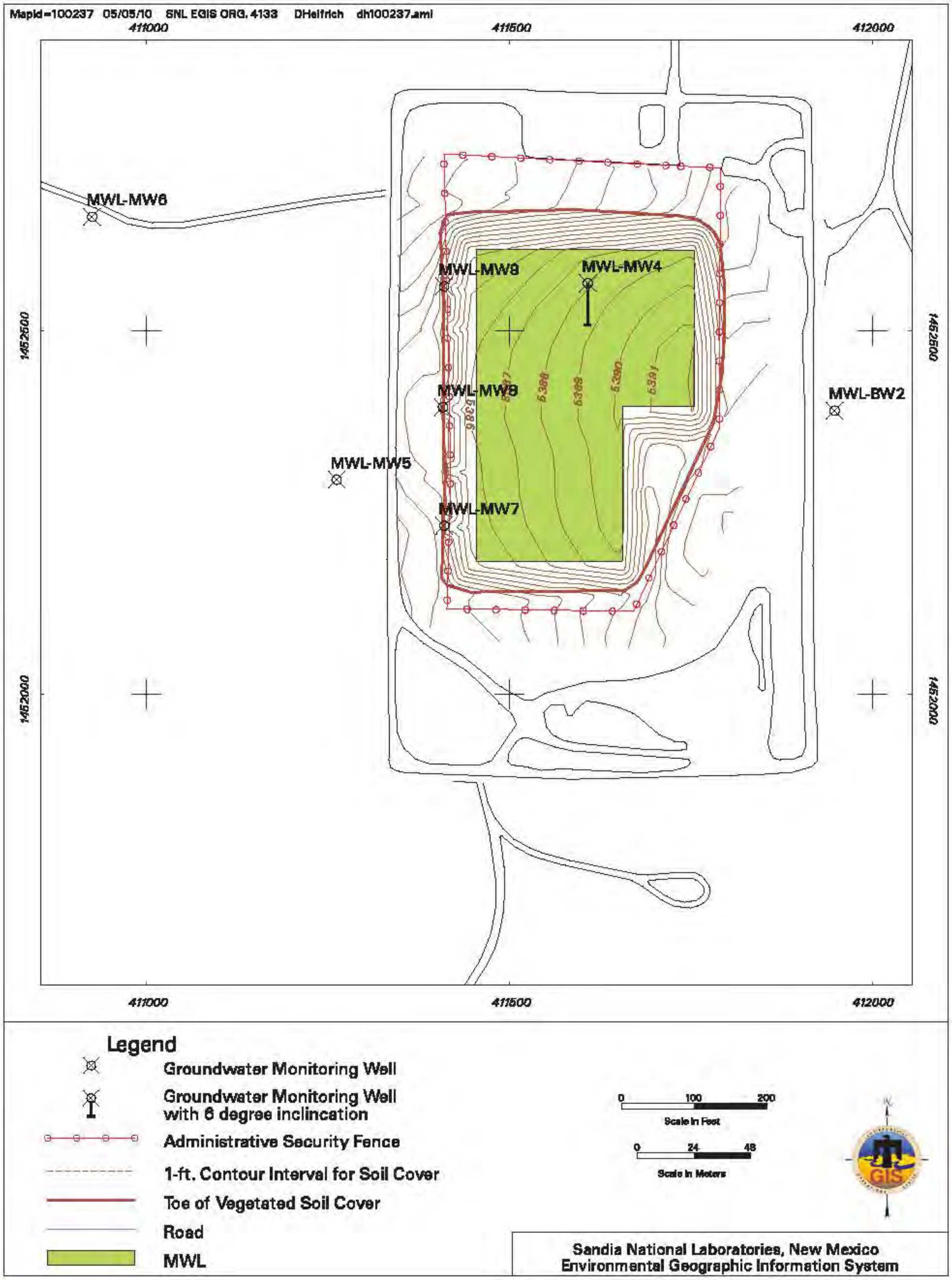

Figure 4-1. Location of Groundwater Monitoring Wells at the Mixed Waste Landfill

the uppermost water-bearing interval beneath the MWL. During construction of the ET cover in the summer of 2009, the packer at MWL-MW4 was replaced when the well casing was extended. References in this report to groundwater samples from MWL-MW4 refer to groundwater withdrawn from the upper interval, and references made to the bottom of this well means the depth to the top of the packer. All seven MWL wells are constructed of 5-inch, Schedule 80 polyvinyl chloride (PVC) casing and have screens composed of slotted Schedule 80 PVC.

4.4 Field Methods and Measurements

Field measurements performed during groundwater sampling activities included groundwater elevation and water quality. Field water quality parameters are presented in Table 4A-9 (Attachment 4A). Depth-to-groundwater measurements were obtained using a Solinst™ depth-to-water well sounder prior to purging activities. Depth-to-groundwater measurements were performed in accordance with the Field Operating Procedure (FOP) *Long-Term Environmental Stewardship (LTES) Groundwater Monitoring Well Sampling and Field Analytical Measurements,* FOP 05-01 (SNL August 2007). Water level measurements obtained during the CY 2009 sampling events are presented in Attachment 4C. The October 2009 water level information for MWL-MW4 was not collected due to ET cover installation and well packer replacement at this well.

A Bennett sampling system is used to collect the groundwater samples from all MWL monitoring wells. The pump intake is set near or at the bottom of the screened interval. The minimum flow rate, given limitations of equipment and well characteristics, is required for all purging and sampling activities.

In accordance with procedures described in SNL/NM FOP 05-01 (SNL August 2007), all wells were purged a minimum of one saturated casing volume (the volume of one length of the saturated screen plus the borehole annulus around the saturated screen interval). Purging continued until four stable water quality measurements for turbidity, pH, temperature, and specific conductance (SC) were obtained from the well prior to the collection of groundwater samples. Groundwater stability is considered acceptable when measurements are equal to or within 10 percent of 5 nephelometric turbidity units, pH is within 0.1 units, temperature is within 1.0 degree Celsius, and SC is within 5 percent.

Groundwater samples from MWL monitoring wells were collected and submitted to off-site laboratories using analysis request/chain of custody protocol.

Groundwater occurs at approximately 500 ft bgs within Santa Fe Group deposits (basin fill) in either fine-grained alluvial fan deposits or coarse-grained ARG deposits. Figure 4-2 shows the localized potentiometric surface of the basin fill aquifer at the MWL using CY 2009 water level measurements.

Wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9 were installed in 2008; therefore, sufficient data are not yet available to compile historic water level information for these wells as for the other wells. Additional water level information is presented in the MWL Groundwater Monitoring Reports dating back to 2001 (SNL December 2001, January 2002, October 2002, July 2002, June 2003, September 2003, July 2004, November 2006, January 2008, and May 2009).

Water level measurements in MWL-MW4 are obtained from the upper screened interval. Over the past four years, water levels have dropped in MWL-MW5 and MWL-MW6 by an average of 0.4 feet per year (ft/yr). Over the past three years, MWL-MW4 has also exhibited a trend of decline in water levels by an average of 0.4 ft/yr. The October 2009 water level information for MWL-MW4 was not collected due to ET cover installation and well packer replacement at this well. Additional discussion of water levels at the MWL is presented in the CY 2009 MWL Annual Groundwater Monitoring Report to be submitted to the NMED in the summer of 2010.

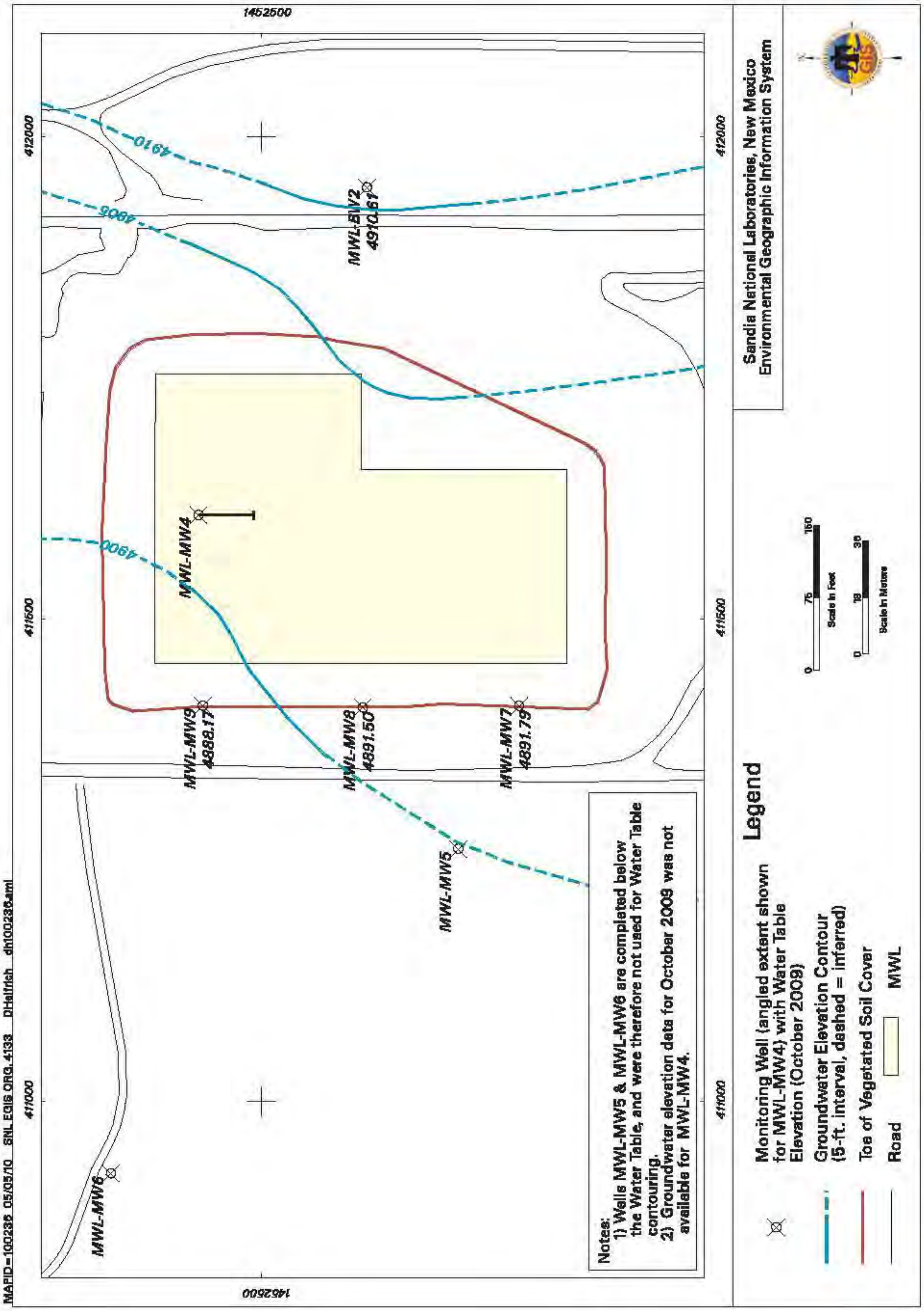

Figure 4-2. Localized Potentiometric Surface of the Basin Fill Aquifer at the Mixed Waste Landfill

Figure 4-2. Localized Potentiometric Surface of the Basin Fill Aquifer at the Mixed Waste Landfill

4.5 Analytical Methods

The analytical laboratories analyzed samples using U.S. Environmental Protection Agency (EPA)-approved analytical methods (EPA 1979, 1986, and 1999) and specified performance criteria in accordance with the *SNL/NM Statement of Work for Analytical Laboratories* (SNL March 2003). The analytical laboratory provided appropriate sample containers prepared with the required sample preservative. Table 4-2 summarizes analytical requirements and EPA Methods applicable to groundwater sampling at the MWL during CY 2009.

4.6 Summary of Analytical Results

The results for chemical and radiological constituent analysis are compared with established EPA Safe Water Drinking Act (SWDA) maximum contaminant levels (MCLs) (EPA 2001, 2009), where applicable.

The QC samples associated with each sampling event are discussed in Section 4.7. Data qualifiers resulting from QC samples or data validation are presented with the related data in the respective data tables (Attachment 4A).

4.6.1 Volatile and Semivolatile Organic Compounds

Table 4A-1 (Attachment 4A) summarizes the results for detected VOCs and SVOCs, and Table 4A-2 presents the analytical methods and corresponding method detection limits (MDLs) for VOCs and SVOCs. During the July sampling event at MWL-MW7, the SVOC bis(2-ethylhexyl)phthalate was detected at a concentration of 9.82 µg/L. This result falls below the practical quantitation limit (PQL) of 10.6 µg/L and above the MCL of 6.0 µg/L. Trace concentrations of toluene were reported for groundwater samples from the MWL monitoring wells. The MCL for toluene is 1,000 µg/L. Concentration results range from a minimum detection of 0.253 µg/L in October 2009 for the MWL-MW8 sample to a maximum detection of 0.892 µg/L in January 2009 for the MWL-MW9 sample. Neither toluene nor bis(2-ethylhexyl)phthalate have been consistently detected in historical MWL groundwater samples. As both compounds are common laboratory contaminants, an investigation into these inconsistencies is ongoing, and further sampling will help to identify the source.

No MCL is established for acetone; therefore, detections reported are those that exceed the laboratory MDL. Acetone was detected only in samples from the January sampling event, and the results range from a minimum detection of 3.65 µg/L in the MWL-MW8 duplicate sample to a maximum detection of 4.42 µg/L in the MWL-MW8 primary sample. The results for acetone, toluene, and bis(2-ethylhexyl)phthalate presented in Table 4A-1 are qualified as estimated values and are less than the respective PQLs.

During the April groundwater sampling event, both 2-hexanone and 2-butanone were detected in the sample from MWL-MW6. The 2-hexanone result was qualified as not detected during data validation due to associated laboratory method blank contamination, and the 2-butanone result was qualified as an estimated value as it was detected below the PQL (Section 4.7). Neither constituent has an established MCL.

4.6.2 General Chemistry Parameters

The general chemistry analytical results are presented in Attachment 4A, Tables 4A-3 and 4A-4. No general chemistry parameters exceed the MCLs (where established) in the groundwater samples. The only two parameters that have established MCLs are NPN (as nitrogen) and fluoride (10 and 4 milligrams per liter [mg/L], respectively). Concentrations of NPN (as nitrogen) range from 0.175 mg/L in the July MWL-MW8 sample to 3.86 mg/L in the July MWL-MW7 sample. Fluoride was detected at concentrations ranging from 0.679 mg/L in the July MWL-BW2 sample to 1.06 mg/L in the January MWL-MW8 sample.

4.6.3 Perchlorate

The Order (NMED 2004) requires that new wells be sampled for perchlorate for a minimum of four quarters. If perchlorate is detected above the screening level in a specific well, monitoring will continue for that well at a frequency negotiated with the NMED. Four consecutive nondetections using the screening level of 4 μg/L are considered by the NMED to be reason to remove that well from the perchlorate screening monitoring network.

The sampling results for perchlorate for the new wells (MWL-MW7, MWL-MW8, MWL-MW9, and MWL-BW2) are presented in Table 4A-5 (Attachment 4A). No detections of perchlorate at or above the screening level of 4 μg/L were reported at these locations during four consecutive quarters; therefore, these wells have been removed from the perchlorate monitoring network.

4.6.4 Metals

Metal analysis includes two sets of analyses and results, filtered and unfiltered. Groundwater samples obtained for total metal analyses are collected without filtering to obtain the total metal fraction. Dissolved metal samples are collected by filtering the sample prior to analysis to obtain metal concentrations in the dissolved fraction of the sample (SNL August 2007). 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-6 (Attachment 4A) summarizes the metal results from all unfiltered groundwater samples collected during the CY 2009 groundwater monitoring events at the MWL. Samples were analyzed for TAL metals according to EPA Method 6020 (EPA 1986). No metals were detected in the unfiltered samples at concentrations that exceed the established MCLs.

Table 4A-7 (Attachment 4A) summarizes the results for TAL metal analysis for the filtered samples collected during the CY 2009 groundwater monitoring events. No detections of any metals in the filtered samples exceed the respective MCLs.

Samples from MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9 were analyzed for total uranium during all quarterly sampling events. All results, presented in Tables 4A-6 and 4A-7, are less than the MCL of 0.03 mg/L and are consistent with previous sampling events at the MWL.

4.6.5 Radiological Parameters

Groundwater samples from the MWL monitoring wells were screened for gamma-emitting radionuclides, gross alpha/beta activity, and tritium. The results for tritium, gross alpha/beta, and gamma spectroscopy activity are presented in Table 4A-8 (Attachment 4A) and are compared with the established EPA SWDA MCLs (EPA 2001, 2009) (no MCL has been established for tritium).

Gamma spectroscopy activity levels for short-list radionuclides are less than the associated minimum detectable activity (MDA), except for potassium-40. Potassium-40 was detected above the MDAs during each sampling event from various wells (Table 4A-8). However, all potassium-40 results were qualified as estimated values or rejected (MWL-MW8 January 2009, and MWL-MW9 July 2009) during data validation as the laboratory did not identify a valid peak, and the associated MDA was biased low due to a forced activity calculation.

Radioisotopic analyses included gross alpha/beta activity and tritium analyses. The gross alpha result (not corrected by subtracting naturally occurring uranium activity) for the sample collected from MWL-MW5 during the April sampling event exceeds the MCL with an activity of 15.9 ± 4.12 picocuries per liter (pCi/L). When the contribution from naturally occurring uranium is subtracted from the result, the gross alpha activity becomes 9.26 pCi/L. As indicated in Table 4-3, corrected gross alpha activity results range from 2.67 to 9.26 pCi/L. Attachment 4B provides plots for uncorrected gross alpha activity results (Figure 4B-1). Typically, only those results that exceed the gross contamination screening level (15 pCi/L) have the naturally occurring uranium subtracted.

Table 4-3. Corrected Gross Alpha Activity Results (subtraction of uranium only), Mixed Waste Landfill Groundwater Sampling, Calendar Year 2009

Well ID	Sample Date	Uranium (mg/L)	Uranium (pCi/L)[a]	Gross Alpha (pCi/L)	Corrected Gross Alpha (pCi/L)
MWL-BW2	01-Apr-09	0.00754	5.05	12.3	7.25
MWL-MW4	13-Apr-09	0.0059	3.95	6.62	2.67
MWL-MW5	02-Apr-09	0.00991	6.64	15.9	9.26
MWL-MW6	03-Apr-09	0.0101	6.77	13.4	6.63
MWL-MW6 (duplicate)	03-Apr-09	0.00975	6.53	13.9	7.37
MWL-MW7	08-Apr-09	0.00806	5.40	8.44	3.04
MWL-MW8	07-Apr-09	0.00847	5.67	9.60	3.93
MWL-MW9	09-Apr-09	0.00963	6.45	11.3	4.85

[a]Conversion factor of 670 pCi/mg natural uranium as listed in Code of Federal Regulations, Vol. 65, No. 236, and *Recommendations for a Uranium Health-Based Ground Water Standard*, New Mexico Environment Department, Santa Fe, New Mexico, May 2003.
ID = Identification.
mg/L = Milligram(s) per liter.
pCi/L = Picocurie(s) per liter.
pCi/mg = Picocurie(s) per milligram.

Gross beta activity screening results do not exceed established limits. Tritium activity levels were reported below laboratory MDAs in all groundwater samples. All radiological parameter results are summarized in Table 4A-8 (Attachment 4A).

Tritium is considered a COC at the MWL; therefore, the results are presented in Table 4A-8. However, tritium was not detected above the MDA in any of the 2009 groundwater samples.

4.6.6 Water Quality Parameters

The field water quality parameters represent readings measured immediately before sampling. The CY 2009 results for MWL wells are presented in Attachment 4A, Table 4A-9.

4.7 Quality Control Results

Field and laboratory QC samples were prepared both in the field and by the laboratory 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 AOP [Administrative Operating Procedure] 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). 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 EB, TB, FB, and field duplicate samples. TB samples are submitted whenever samples are collected for VOC analysis to assess whether contamination of the samples occurred during shipment and storage. An FB sample provides a method to check for potential sources of sample contamination or sampling error. An EB sample is collected to verify the effectiveness of the sampling equipment decontamination process, and a duplicate sample is collected immediately after the environmental sample and provides information about sampling variability. The following sections discuss the analytical results for each QC sample type.

4.7.1.1 Duplicate Environmental Samples

Duplicate groundwater samples were collected at MWL-MW8 (January), MWL-MW6 (April), MWL-MW9 (July), and MWL-BW2 (October). Relative percent difference (RPD) calculations were performed for all detected chemical analytes for duplicate samples to measure sample variability and are presented in Table 4A-10 (Attachment 4A).

The MWL Mini-Sampling and Analysis Plans (SAPs) (SNL January 2009, April 2009, July 2009, and October 2009) do not specify QC acceptance criteria for duplicate sample data; however, duplicate sample results show good correlation (low RPD values less than or equal to 20) for all calculated parameters, with the following exceptions:

- MWL-MW8 (January 2009)—The RPD for aluminum was calculated at 22 for the unfiltered sample and 55 for the filtered sample. Iron RPDs were 123 in the unfiltered sample and 143 in the filtered sample. The RPD for filtered magnesium was calculated at 22. The elevated RPD values may be attributed to changes in water chemistry due to the low-yield characteristics of this well. The well was purged to dryness prior to meeting minimum purge volume requirements.

- MWL-MW6 (April 2009)—The elevated RPD values for both aluminum and cobalt are considered estimated values, as reported concentrations were detected below the PQL.

- MWL-MW9 (July 2009)—The RPD values for arsenic and zinc parameters are considered estimated values, as reported concentrations were detected below the PQL. The elevated RPD values may be attributed to changes in water chemistry due to the low yield characteristics of this well. The well was purged to dryness prior to meeting minimum purge volume requirements.

- MWL-BW2 (October 2009)—The RPD for total selenium was calculated at 34 for the unfiltered sample. Note that the RPD value for selenium in the filtered sample was calculated at 4.

4.7.1.2 Equipment Blank Samples

A total of four EB samples were collected during the CY 2009 sampling events at the MWL to verify the equipment decontamination process. The following equipment rinsate samples were collected prior to sampling and submitted for all analytical parameters:

- January 2009—One EB sample was collected prior to sampling MWL-MW8. Various organic and inorganic parameters detected in the EB sample included acetone, bromodichloromethane, chloroform, dibromochloromethane, chloride, chromium, copper, sodium, aluminum, magnesium, and total alkalinity. No corrective action was required for bromodichloromethane, chloroform, dibromochloromethane, chloride, sodium, aluminum, magnesium, or total alkalinity as these compounds were not detected in the associated environmental samples at concentrations greater than five times the blank contamination. Acetone was qualified as not detected during data validation in MWL-MW8 environmental samples as the sampling results are less than 10 times the blank contamination. Both unfiltered and filtered fractions for chromium and copper were qualified as not detected during data validation in MWL-MW8 environmental samples as chromium and copper results are less than five times the blank contamination.

- April 2009—Various organic and inorganic parameters detected in EB samples included bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, sulfate, aluminum, copper, magnesium, sodium, vanadium, and total alkalinity. No corrective action was required for bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, sulfate, magnesium, sodium, or total alkalinity as these analytes were either not detected in the environmental samples or detected in associated environmental samples at concentrations greater than five times the blank contamination. The filtered fraction of vanadium was qualified as not detected during data validation in MWL-MW6 samples as the sampling results are less than five times the blank contamination. Both unfiltered and filtered fractions for aluminum and copper were qualified as not detected during data validation in MWL-MW7 samples as aluminum and copper results reported for both environmental samples are less than five times the blank contamination.

- July 2009—Various organic and inorganic parameters detected in EB samples included 2-butanone, bromodichloromethane, chloroform, dibromochloromethane, chloride, copper, magnesium, and sodium. No corrective action was required for 2-butanone, bromodichloromethane, chloroform, dibromochloromethane, chloride, magnesium, or sodium as these analytes were either not detected in the environmental samples or detected in associated environmental samples at concentrations greater than five times the blank contamination. Both unfiltered and filtered fractions for copper were qualified as not detected during data validation as copper was reported in associated environmental samples at less than five times the blank contamination.

- October 2009—Various organic and inorganic parameters detected in EB samples included bromodichloromethane, bromoform, chloroform, dibromochloromethane, alkalinity, chloride, copper, and sodium. No corrective action was required for all parameters except copper, as analytes either were not detected in the environmental samples or were detected at concentrations greater than five times the blank contamination. The unfiltered fractions for copper were qualified as not detected during data validation as copper was reported in associated environmental samples at less than five times the blank contamination.

4.7.1.3 Field Blank Samples

FB samples were returned to the laboratory with each shipment containing environmental samples to assess whether contamination of the samples resulted from ambient field conditions. The FB samples are prepared by pouring deionized water into sample containers at the sampling point to simulate the transfer of environmental samples from the sampling system to the sample container.

The following lists results for the FB samples collected during the CY 2009 sampling events at the MWL:

- January 2009—FB samples collected for VOCs. Acetone, bromodichloromethane, and carbon disulfides were detected in the FB sample from the January 2009 sampling event. No corrective action was required as these compounds were not detected in the associated environmental sample.

- April 2009—Dibromochloromethane was the only VOC detected in the FB sample. No corrective action was required as this compound was not detected in the associated environmental sample.

- July 2009—No VOCs were detected in the FB sample above associated laboratory MDLs.

- October 2009—Bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the FB sample. No corrective action was required as these compounds were not detected in the associated environmental sample.

4.7.1.4 Trip Blank Samples

TB samples consist of laboratory reagent grade water with hydrochloric acid preservative contained in 40-milliliter VOC vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. The TBs were brought to the field and accompanied each sample shipment. The following lists the results for TB samples collected during the CY 2009 sampling events at the MWL:

- January 2009—Five TBs were submitted with the January 2009 samples. No VOCs were detected above associated laboratory MDLs.

- April 2009— A total of nine TBs were submitted with the April 2009 samples. No VOCs were detected above associated laboratory MDLs, except for 2-hexanone, which was detected in the TB associated with the sample from MWL-MW6. However, the result for this compound was qualified as not detected during data validation due to associated laboratory method blank contamination.

- July 2009—Four TBs were submitted with the July 2009 samples. No VOCs were detected above the associated laboratory MDLs.

- October 2009—Five TBs were submitted with the October 2009 samples. No VOCs were detected above associated laboratory MDLs, except for chloromethane. No corrective action was required as chloromethane was not detected in the environmental samples.

4.7.2 Laboratory Quality Control Samples

Although some analytical results were qualified as not detected or as estimated values during the data validation process, no significant data quality problems were noted for any CY 2009 MWL groundwater monitoring samples, with the following exceptions:

- Potassium-40 result for the January MWL-MW8 duplicate sample. This result was qualified as unusable during data validation due to the peak not meeting identification criteria.

- SVOC 4-nitrophenol results for MWL-MW7, MWL-MW8, and MWL-MW9 for the April 2009 samples. The results were qualified as unusable during data validation due to low matrix spike recoveries.

- Potassium-40 isotope result for the MWL-MW9 July 2009 environmental sample. The result was qualified as unusable during data validation as the laboratory rejected the data due to the peak not meeting identification criteria.

- Potassium-40 isotope result for the MWL-MW7 October 2009 environmental sample. The result was qualified as unusable during data validation as the laboratory rejected the data due to the peak not meeting identification criteria.

4.8 Variances and Nonconformances

All analytical and field methods were performed according to the requirements specified in the MWL groundwater monitoring mini-SAPs for Fiscal Years 2009 and 2010 (SNL January 2009, April 2009, July 2009, and October 2009), and there were no variances from the plans. Project-specific issues that deviate from requirements described in the mini-SAPs are noted as follows:

- Monitoring wells MWL-MW7 and MWL-MW8 were purged dry prior to sampling in January 2009. These monitoring wells were allowed to recover and then sampled to collect the most representative groundwater sample possible given the low yield of both wells.

- Monitoring wells MWL-MW4, MWL-MW8, and MWL-MW9 were purged dry prior to sampling in April 2009. These monitoring wells were allowed to recover and then sampled to collect the most representative groundwater sample possible given the low yield of these wells.

- Monitoring wells MWL-MW8 and MWL-MW9 were purged dry prior to sampling in July 2009. These monitoring wells were allowed to recover and then sampled to collect the most representative groundwater sample possible given the low yield of these wells. Toluene and bis(2-ethylhexyl)phthalate were detected in the July 2009 groundwater samples. SNL/NM has initiated an investigation to determine whether field equipment or laboratory QC may be contributing factors to these low detections. Fieldwork associated with MWL ET cover installation activities were in progress during the CY 2009 groundwater monitoring activities. Because heavy equipment was operating nearby, FB samples for VOCs were collected at each sampling location.

- Monitoring wells MWL-MW8 and MWL-MW9 were purged dry prior to sampling during the October 2009 sampling event. These monitoring wells were allowed to recover and then sampled to collect the most representative groundwater sample possible given the low yield of these wells.

- Various parameters have been detected in field QC samples since SNL/NM changed suppliers for deionized water. SNL/NM continues to test and investigate the quality of deionized water currently in use and will make adjustments as necessary.

4.9 Summary and Conclusions

Groundwater sampling and analysis was conducted at the MWL during four quarters in 2009 according to the mini-SAPs (SNL January 2009, April 2009, July 2009, and October 2009). One sample from MWL-MW7 collected during the July sampling period showed one detection of bis-(2-ethylhexyl)phthalate at a concentration of 9.82 µg/L that exceeds the MCL (6.0 µg/L) but is below the PQL (10 µg/L). No other inorganic or organic constituents were detected at concentrations that exceed the respective MCLs (where applicable) in the groundwater samples. Toluene was detected at concentrations less than both the MCL (1,000 µg/L) and PQL (1.0 µg/L) but greater than the MDL (0.250 µg/L) in several samples.

During April 2009, groundwater samples were collected from seven MWL groundwater monitoring wells. The gross alpha activity screening result (not corrected by subtracting naturally occurring uranium activity) for the sample from MWL-MW5 exceeded the MCL of 15 pCi/L at an activity of 15.9 ± 4.12 pCi/L; however, the gross alpha activity result decreases to 9.26 pCi/L when naturally occurring uranium is subtracted. The remaining total uranium results from the CY 2009 samples are consistent with data from previous sampling events and well within the range of historical MWL groundwater data.

Detections of bis(2-ethylhexyl)phthalate have not been consistently reported for historical MWL groundwater samples. This constituent is a common laboratory contaminant and was not detected during subsequent sampling and analysis events performed in CY 2009.

No general chemistry parameters exceed the established MCLs in any of the CY 2009 MWL groundwater samples. Based on the results of the groundwater monitoring events conducted at the MWL during CY 2009, COC concentration results remain within historical ranges for the site. The results for the laboratory QC samples and data validation indicate that the CY 2009 groundwater sampling results for the MWL are defensible as representative of the uppermost portion of the regional aquifer.

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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 and Semivolatile Organic Compounds, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2 05-Jan-09	Toluene	0.759	0.250	1.00	1000	J		086943-001	SW846-8260B
MWL-MW7	Acetone	3.74	3.50	10.0	NE	J		086946-001	SW846-8260B
06-Jan-09	Toluene	0.510	0.250	1.00	1000	J		086946-001	SW846-8260B
MWL-MW8	Acetone	4.42	3.50	10.0	NE	J	10.0U	086950-001	SW846-8260B
07-Jan-09	Toluene	0.496	0.250	1.00	1000	J		086950-001	SW846-8260B
MWL-MW8 (Duplicate)	Acetone	3.65	3.50	10.0	NE	J	10.0U	086951-001	SW846-8260B
07-Jan-09	Toluene	0.495	0.250	1.00	1000	J		086951-001	SW846-8260B
MWL-MW9 08-Jan-09	Toluene	0.852	0.250	1.00	1000	J		086953-001	SW846-8260B
MWL-MW6	2-Butanone	1.37	1.25	5.00	NE	J	J-	087158-001	SW846-8260B
03-Apr-09	2-Hexanone	8.25	1.25	5.00	NE	B	8.25U	087158-001	SW846-8260B
MWL-MW6 (Duplicate) 03-Apr-09	2-Hexanone	3.82	1.25	5.00	NE	B, J	5.00U	087159-001	SW846-8260B
MWL-MW7 08-Apr-09	Toluene	0.267	0.250	1.00	1000	J		087165-001	SW846-8260B
MWL-MW8	Toluene	0.457	0.250	1.00	1000	J		087161-001	SW846-8260B
07-Apr-09	bis(2-Ethylhexyl)phthalate	4.52	2.50	12.5	6.00	J		087161-002	SW846-8270C
MWL-MW9 09-Apr-09	Toluene	0.306	0.250	1.00	1000	J		087167-001	SW846-8260B
MWL-BW2 06-Jul-09	Toluene	0.366	0.250	1.00	1000	J		087489-001	SW846-8260B
MWL-MW7	Toluene	0.645	0.250	1.00	1000	J	J	087492-001	SW846-8260B
07-Jul-09	bis(2-Ethylhexyl)phthalate	**9.82**	2.13	10.6	6.00	J		087492-002	SW846-8270C
MWL-MW8	Toluene	0.475	0.250	1.00	1000	J		087495-001	SW846-8260B
08-Jul-09	bis(2-Ethylhexyl)phthalate	4.92	2.17	10.9	6.00	J		087495-002	SW846-8270C
MWL-MW9	Toluene	0.711	0.250	1.00	1000	J		087500-001	SW846-8260B
09-Jul-09	bis(2-Ethylhexyl)phthalate	2.35	2.22	11.1	6.00	J		087500-002	SW846-8270C
MWL-MW9 (Duplicate)	Toluene	0.692	0.250	1.00	1000	J		087501-001	SW846-8260B
09-Jul-09	bis(2-Ethylhexyl)phthalate	2.37	2.30	11.5	6.00	J		087501-002	SW846-8270C
MWL-MW8 07-Oct-09	Toluene	0.253	0.250	1.00	1000	J	J+	087772-001	SW846-8260B
MWL-MW9	Toluene	0.513	0.250	1.00	1000	J		087765-001	SW846-8260B
05-Oct-09	bis(2-Ethylhexyl)phthalate	1.91	1.79	8.93	6.00	B, J	8.9U	087765-002	SW846-8270C

Refer to footnotes on page 4A-70.

Table 4A-2
Method Detection Limits for Volatile and Semivolatile Organic Compounds, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

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	0.325	8260	1,2,4-Trichlorobenzene	1.79 - 2.50	8270	Di-n-butyl phthalate	1.79 - 2.50	8270
1,1,2,2-Tetrachloroethane	0.250	8260	1,2-Dichlorobenzene	1.79 - 2.50	8270	Di-n-octyl phthalate	2.68 - 3.75	8270
1,1,2-Trichloroethane	0.250	8260	1,3-Dichlorobenzene	1.79 - 2.50	8270	Dibenz[a,h]anthracene	0.179 - 0.250	8270
1,1-Dichloroethane	0.300	8260	1,4-Dichlorobenzene	1.79 - 2.50	8270	Dibenzofuran	1.79 - 2.50	8270
1,1-Dichloroethene	0.300	8260	2,4,5-Trichlorophenol	1.00 - 2.44	8270	Diethylphthalate	1.79 - 2.50	8270
1,2-Dichloroethane	0.250	8260	2,4,6-Trichlorophenol	1.79 - 2.50	8270	Dimethylphthalate	1.79 - 2.50	8270
1,2-Dichloropropane	0.250	8260	2,4-Dichlorophenol	1.79 - 2.50	8270	Dinitro-o-cresol	2.68 - 3.75	8270
2-Butanone	1.25	8260	2,4-Dimethylphenol	1.79 - 2.50	8270	Diphenyl amine	2.68 - 3.75	8270
2-Hexanone	1.25	8260	2,4-Dinitrophenol	4.46 - 12.5	8270	Fluoranthene	0.179 - 0.250	8270
4-methyl-, 2-Pentanone	1.25	8260	2,4-Dinitrotoluene	1.79 - 2.50	8270	Fluorene	0.179 - 0.250	8270
Acetone	3.50	8260	2,6-Dinitrotoluene	1.79 - 2.50	8270	Hexachlorobenzene	1.79 - 2.50	8270
Benzene	0.300	8260	2-Chloronaphthalene	0.268 - 0.438	8270	Hexachlorobutadiene	1.79 - 2.50	8270
Bromodichloromethane	0.250	8260	2-Chlorophenol	1.79 - 2.50	8270	Hexachlorocyclopentadiene	2.00 - 3.66	8270
Bromoform	0.250	8260	2-Methylnaphthalene	0.268 - 0.375	8270	Hexachloroethane	1.79 - 2.50	8270
Bromomethane	0.300 - 0.500	8260	2-Nitroaniline	1.79 - 2.50	8270	Indeno(1,2,3-c,d)pyrene	0.179 - 0.250	8270
Carbon disulfide	1.25	8260	2-Nitrophenol	1.79 - 2.50	8270	Isophorone	2.00 - 3.66	8270
Carbon tetrachloride	0.260 - 0.300	8260	3,3'-Dichlorobenzidine	1.00 - 2.44	8270	Naphthalene	0.268 - 0.375	8270
Chlorobenzene	0.250	8260	3-Nitroaniline	1.79 - 2.50	8270	Nitro-benzene	2.68 - 3.75	8270
Chloroethane	0.300	8260	4-Bromophenyl phenyl ether	1.79 - 2.50	8270	Pentachlorophenol	1.79 - 2.50	8270
Chloroform	0.250	8260	4-Chloro-3-methylphenol	1.79 - 2.50	8270	Phenanthrene	0.179 - 0.250	8270
Chloromethane	0.300	8260	4-Chlorobenzenamine	1.79 - 2.50	8270	Phenol	0.893 - 1.25	8270
Dibromochloromethane	0.260 - 0.300	8260	4-Chlorophenyl phenyl ether	1.79 - 2.50	8270	Pyrene	0.268 - 0.375	8270
Ethyl benzene	0.250	8260	4-Nitroaniline	2.68 - 3.75	8270	bis(2-Chloroethoxy)methane	2.68 - 3.75	8270
Methylene chloride	3.00	8260	4-Nitrophenol	1.79 - 2.50	8270	bis(2-Chloroethyl)ether	1.79 - 2.50	8270
Styrene	0.250	8260	Acenaphthene	0.277 - 0.388	8270	bis(2-Ethylhexyl)phthalate	1.79 - 2.50	8270
Tetrachloroethene	0.300 - 0.450	8260	Acenaphthylene	0.179 - 0.250	8270	bis-Chloroisopropyl ether	1.79 - 2.50	8270
Toluene	0.250	8260	Anthracene	0.179 - 0.250	8270	m,p-Cresol	2.68 - 3.75	8270
Trichloroethene	0.250	8260	Benzo(a)anthracene	0.179 - 0.250	8270	n-Nitrosodipropylamine	1.79 - 2.50	8270
Vinyl acetate	1.50	8260	Benzo(a)pyrene	0.179 - 0.250	8270	o-Cresol	1.79 - 2.50	8270
Vinyl chloride	0.500	8260	Benzo(b)fluoranthene	0.179 - 0.250	8270			
Xylene	0.300 - 0.600	8260	Benzo(ghi)perylene	0.179 - 0.250	8270			
cis-1,2-Dichloroethene	0.300	8260	Benzo(k)fluoranthene	0.179 - 0.250	8270			
cis-1,3-Dichloropropene	0.250	8260	Butylbenzyl phthalate	1.79 - 2.50	8270			
trans-1,2-Dichloroethene	0.300	8260	Carbazole	0.179 - 0.250	8270			
trans-1,3-Dichloropropene	0.250	8260	Chrysene	0.179 - 0.250	8270			

Refer to footnotes on page 4A-70.

Table 4A-3
Summary of Nitrate plus Nitrite Analytical Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 05-Jan-09	Nitrate plus nitrite as N	2.12	0.100	0.500	10			086943-018	EPA 353.2
MWL-MW7 06-Jan-09	Nitrate plus nitrite as N	3.15	0.250	1.25	10			086946-018	EPA 353.2
MWL-MW8 07-Jan-09	Nitrate plus nitrite as N	1.11	0.050	0.250	10			086950-018	EPA 353.2
MWL-MW8 (Duplicate) 07-Jan-09	Nitrate plus nitrite as N	1.12	0.050	0.250	10			086951-018	EPA 353.2
MWL-MW9 08-Jan-09	Nitrate plus nitrite as N	1.82	0.250	1.25	10			086953-018	EPA 353.2
MWL-BW2 01-Apr-09	Nitrate plus nitrite as N	2.06	0.100	0.500	10			087151-018	EPA 353.2
MWL-MW4 13-Apr-09	Nitrate plus nitrite as N	0.920	0.050	0.250	10			087169-018	EPA 353.2
MWL-MW5 02-Apr-09	Nitrate plus nitrite as N	1.39	0.050	0.250	10			087153-018	EPA 353.2
MWL-MW6 03-Apr-09	Nitrate plus nitrite as N	1.52	0.050	0.250	10			087158-018	EPA 353.2
MWL-MW6 (Duplicate) 03-Apr-09	Nitrate plus nitrite as N	1.72	0.100	0.500	10			087159-018	EPA 353.2
MWL-MW7 08-Apr-09	Nitrate plus nitrite as N	3.86	0.100	0.500	10			087165-018	EPA 353.2
MWL-MW8 07-Apr-09	Nitrate plus nitrite as N	1.61	0.100	0.500	10			087161-018	EPA 353.2
MWL-MW9 09-Apr-09	Nitrate plus nitrite as N	2.18	0.100	0.500	10			087167-018	EPA 353.2
MWL-BW2 06-Jul-09	Nitrate plus nitrite as N	2.01	0.050	0.250	10			087489-018	EPA 353.2
MWL-MW7 07-Jul-09	Nitrate plus nitrite as N	3.03	0.050	0.250	10			087492-018	EPA 353.2
MWL-MW8 08-Jul-09	Nitrate plus nitrite as N	0.175	0.010	0.050	10			087495-018	EPA 353.2
MWL-MW9 09-Jul-09	Nitrate plus nitrite as N	2.03	0.050	0.250	10			087500-018	EPA 353.2
MWL-MW9 (Duplicate) 09-Jul-09	Nitrate plus nitrite as N	1.96	0.050	0.250	10			087501-018	EPA 353.2

Refer to footnotes on page 4A-70.

Table 4A-3 *(Concluded)*
Summary of Nitrate plus Nitrite Analytical Results,
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 06-Oct-09	Nitrate plus nitrite as N	2.04	0.100	0.500	10			087769-018	EPA 353.2
MWL-BW2 (Duplicate) 06-Oct-09	Nitrate plus nitrite as N	1.98	0.100	0.500	10			087770-018	EPA 353.2
MWL-MW7 08-Oct-09	Nitrate plus nitrite as N	3.04	0.100	0.500	10			087774-018	EPA 353.2
MWL-MW8 07-Oct-09	Nitrate plus nitrite as N	0.850	0.050	0.250	10			087772-018	EPA 353.2
MWL-MW9 05-Oct-09	Nitrate plus nitrite as N	2.08	0.100	0.500	10			087765-018	EPA 353.2

Refer to footnotes on page 4A-70.

Table 4A-4
Summary of Alkalinity and Anion Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	Alkalinity, total as CaCO3	247	1.45	2.00	NE	B		086943-016	SM 2320B
05-Jan-09	Bromide	0.424	0.067	0.200	NE			086943-016	SW846 9056
	Chloride	62.2	0.660	2.00	NE			086943-016	SW846 9056
	Fluoride	0.680	0.033	0.100	4.0			086943-016	SW846 9056
	Sulfate	46.7	1.00	4.00	NE			086943-016	SW846 9056
MWL-MW7	Alkalinity, total as CaCO3	215	0.725	1.00	NE	B		086946-016	SM 2320B
06-Jan-09	Bromide	0.320	0.067	0.200	NE			086946-016	SW846 9056
	Chloride	42.2	0.330	1.00	NE			086946-016	SW846 9056
	Fluoride	1.00	0.033	0.100	4.0			086946-016	SW846 9056
	Sulfate	37.4	0.100	0.400	NE			086946-016	SW846 9056
MWL-MW8	Alkalinity, total as CaCO3	222	0.725	1.00	NE	B		086950-016	SM 2320B
07-Jan-09	Bromide	0.302	0.067	0.200	NE			086950-016	SW846 9056
	Chloride	44.7	0.660	2.00	NE			086950-016	SW846 9056
	Fluoride	1.05	0.033	0.100	4.0			086950-016	SW846 9056
	Sulfate	34.9	0.100	0.400	NE			086950-016	SW846 9056
MWL-MW8 **(Duplicate)**	Alkalinity, total as CaCO3	222	0.725	1.00	NE	B		086951-016	SM 2320B
07-Jan-09	Bromide	0.328	0.067	0.200	NE			086951-016	SW846 9056
	Chloride	44.4	0.660	2.00	NE			086951-016	SW846 9056
	Fluoride	1.02	0.033	0.100	4.0			086951-016	SW846 9056
	Sulfate	34.7	0.100	0.400	NE			086951-016	SW846 9056
MWL-MW9	Alkalinity, total as CaCO3	221	1.45	2.00	NE	B		086953-016	SM 2320B
08-Jan-09	Bromide	0.292	0.067	0.200	NE			086953-016	SW846 9056
	Chloride	40.0	0.660	2.00	NE			086953-016	SW846 9056
	Fluoride	1.04	0.033	0.100	4.0			086953-016	SW846 9056
	Sulfate	38.7	0.100	0.400	NE			086953-016	SW846 9056
MWL-BW2	Alkalinity, total as CaCO3	248	0.725	1.00	NE	B		087151-016	SM 2320B
01-Apr-09	Bromide	0.401	0.066	0.200	NE			087151-016	SW846 9056
	Chloride	63.0	0.660	2.00	NE			087151-016	SW846 9056
	Fluoride	0.698	0.033	0.100	4.0			087151-016	SW846 9056
	Sulfate	45.4	1.00	4.00	NE			087151-016	SW846 9056
MWL-MW4	Alkalinity, total as CaCO3	203	0.725	1.00	NE	B		087169-016	SM 2320B
13-Apr-09	Bromide	0.354	0.066	0.200	NE			087169-016	SW846 9056
	Chloride	53.1	0.330	1.00	NE			087169-016	SW846 9056
	Fluoride	0.869	0.033	0.100	4.0			087169-016	SW846 9056
	Sulfate	41.3	0.500	2.00	NE			087169-016	SW846 9056

Refer to footnotes on page 4A-70.

Table 4A-4 *(Continued)*
Summary of Alkalinity and Anion Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	Alkalinity, total as CaCO3	320	0.725	1.00	NE	B		087153-016	SM 2320B
02-Apr-09	Bromide	0.462	0.066	0.200	NE			087153-016	SW846 9056
	Chloride	82.7	0.660	2.00	NE			087153-016	SW846 9056
	Fluoride	0.791	0.033	0.100	4.0			087153-016	SW846 9056
	Sulfate	53.4	1.00	4.00	NE			087153-016	SW846 9056
MWL-MW6	Alkalinity, total as CaCO3	298	0.725	1.00	NE	B		087158-016	SM 2320B
03-Apr-09	Bromide	0.457	0.066	0.200	NE			087158-016	SW846 9056
	Chloride	76.1	0.660	2.00	NE			087158-016	SW846 9056
	Fluoride	0.726	0.033	0.100	4.0			087158-016	SW846 9056
	Sulfate	51.9	1.00	4.00	NE			087158-016	SW846 9056
MWL-MW6 (Duplicate)	Alkalinity, total as CaCO3	298	0.725	1.00	NE	B		087159-016	SM 2320B
03-Apr-09	Bromide	0.435	0.066	0.200	NE			087159-016	SW846 9056
	Chloride	75.9	0.660	2.00	NE			087159-016	SW846 9056
	Fluoride	0.746	0.033	0.100	4.0			087159-016	SW846 9056
	Sulfate	51.8	1.00	4.00	NE			087159-016	SW846 9056
MWL-MW7	Alkalinity, total as CaCO3	215	0.725	1.00	NE	B		087165-016	SM 2320B
08-Apr-09	Bromide	0.306	0.066	0.200	NE			087165-016	SW846 9056
	Chloride	41.7	0.330	1.00	NE			087165-016	SW846 9056
	Fluoride	0.982	0.033	0.100	4.0			087165-016	SW846 9056
	Sulfate	37.6	0.100	0.400	NE			087165-016	SW846 9056
MWL-MW8	Alkalinity, total as CaCO3	218	0.725	1.00	NE	B		087161-016	SM 2320B
07-Apr-09	Bromide	0.332	0.066	0.200	NE			087161-016	SW846 9056
	Chloride	44.2	0.330	1.00	NE			087161-016	SW846 9056
	Fluoride	1.03	0.033	0.100	4.0			087161-016	SW846 9056
	Sulfate	34.7	0.100	0.400	NE			087161-016	SW846 9056
MWL-MW9	Alkalinity, total as CaCO3	221	0.725	1.00	NE	B		087167-016	SM 2320B
09-Apr-09	Bromide	0.312	0.066	0.200	NE			087167-016	SW846 9056
	Chloride	40.2	0.330	1.00	NE			087167-016	SW846 9056
	Fluoride	1.02	0.033	0.100	4.0			087167-016	SW846 9056
	Sulfate	39.0	0.100	0.400	NE			087167-016	SW846 9056
MWL-BW2	Alkalinity, total as CaCO3	243	0.725	1.00	NE	B	J	087489-016	SM 2320B
06-Jul-09	Bromide	0.328	0.066	0.200	NE			087489-016	SW846 9056
	Chloride	61.2	0.660	2.00	NE			087489-016	SW846 9056
	Fluoride	0.679	0.033	0.100	4.0			087489-016	SW846 9056
	Sulfate	45.1	1.00	4.00	NE			087489-016	SW846 9056

Refer to footnotes on page 4A-70.

Table 4A-4 *(Continued)*
Summary of Alkalinity and Anion Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	Alkalinity, total as CaCO3	213	0.725	1.00	NE	B	J	087492-016	SM 2320B
07-Jul-09	Bromide	0.217	0.066	0.200	NE			087492-016	SW846 9056
	Chloride	39.5	0.660	2.00	NE			087492-016	SW846 9056
	Fluoride	0.951	0.033	0.100	4.0			087492-016	SW846 9056
	Sulfate	36.5	0.100	0.400	NE			087492-016	SW846 9056
MWL-MW8	Alkalinity, total as CaCO3	219	0.725	1.00	NE	B	J	087495-016	SM 2320B
08-Jul-09	Bromide	0.318	0.066	0.200	NE			087495-016	SW846 9056
	Chloride	43.8	0.660	2.00	NE			087495-016	SW846 9056
	Fluoride	0.970	0.033	0.100	4.0			087495-016	SW846 9056
	Sulfate	33.8	0.100	0.400	NE			087495-016	SW846 9056
MWL-MW9	Alkalinity, total as CaCO3	217	0.725	1.00	NE	B	J	087500-016	SM 2320B
09-Jul-09	Bromide	0.267	0.066	0.200	NE			087500-016	SW846 9056
	Chloride	39.5	0.660	2.00	NE			087500-016	SW846 9056
	Fluoride	1.02	0.033	0.100	4.0			087500-016	SW846 9056
	Sulfate	37.7	0.100	0.400	NE			087500-016	SW846 9056
MWL-MW9 (Duplicate)	Alkalinity, total as CaCO3	220	0.725	1.00	NE	B	J	087501-016	SM 2320B
09-Jul-09	Bromide	0.291	0.066	0.200	NE			087501-016	SW846 9056
	Chloride	38.1	0.660	2.00	NE			087501-016	SW846 9056
	Fluoride	0.996	0.033	0.100	4.0			087501-016	SW846 9056
	Sulfate	37.8	0.100	0.400	NE			087501-016	SW846 9056
MWL-BW2	Alkalinity, total as CaCO3	252	0.725	1.00	NE	B		087769-016	SM 2320B
06-Oct-09	Bromide	0.374	0.066	0.200	NE			087769-016	SW846 9056
	Chloride	61.4	0.660	2.00	NE			087769-016	SW846 9056
	Fluoride	0.700	0.033	0.100	4.0			087769-016	SW846 9056
	Sulfate	43.0	1.00	4.00	NE			087769-016	SW846 9056
MWL-BW2 (Duplicate)	Alkalinity, total as CaCO3	248	0.725	1.00	NE	B		087770-016	SM 2320B
06-Oct-09	Bromide	0.365	0.066	0.200	NE			087770-016	SW846 9056
	Chloride	61.3	0.660	2.00	NE			087770-016	SW846 9056
	Fluoride	0.716	0.033	0.100	4.0			087770-016	SW846 9056
	Sulfate	42.8	1.00	4.00	NE			087770-016	SW846 9056
MWL-MW7	Alkalinity, total as CaCO3	221	0.725	1.00	NE	B		087774-016	SM 2320B
08-Oct-09	Bromide	0.300	0.066	0.200	NE			087774-016	SW846 9056
	Chloride	40.7	0.330	1.00	NE			087774-016	SW846 9056
	Fluoride	1.00	0.033	0.100	4.0			087774-016	SW846 9056
	Sulfate	36.4	0.100	0.400	NE			087774-016	SW846 9056

Refer to footnotes on page 4A-70.

Table 4A-4 *(Concluded)*
Summary of Alkalinity and Anion Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	Alkalinity, total as CaCO3	231	0.725	1.00	NE	B		087772-016	SM 2320B
07-Oct-09	Bromide	0.306	0.066	0.200	NE			087772-016	SW846 9056
	Chloride	48.3	0.330	1.00	NE			087772-016	SW846 9056
	Fluoride	0.951	0.033	0.100	4.0			087772-016	SW846 9056
	Sulfate	35.1	0.100	0.400	NE			087772-016	SW846 9056
MWL-MW9	Alkalinity, total as CaCO3	224	0.725	1.00	NE	B		087765-016	SM 2320B
05-Oct-09	Bromide	0.281	0.066	0.200	NE			087765-016	SW846 9056
	Chloride	39.2	0.330	1.00	NE			087765-016	SW846 9056
	Fluoride	1.06	0.033	0.100	4.0			087765-016	SW846 9056
	Sulfate	37.5	0.100	0.400	NE			087765-016	SW846 9056

Refer to footnotes on page 4A-70.

Table 4A-5
Summary of Perchlorate Results,
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

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]
MWL-BW2 05-Jan-09	ND	0.004	0.012	NE	U		086943-020	EPA 314.0
MWL-MW7 06-Jan-09	ND	0.004	0.012	NE	U		086946-020	EPA 314.0
MWL-MW8 07-Jan-09	ND	0.004	0.012	NE	U		086950-020	EPA 314.0
MWL-MW8 (Duplicate) 07-Jan-09	ND	0.004	0.012	NE	U		086951-020	EPA 314.0
MWL-MW9 08-Jan-09	ND	0.004	0.012	NE	U		086953-020	EPA 314.0
MWL-MW7 08-Apr-09	ND	0.004	0.012	NE	U		087165-020	EPA 314.0
MWL-MW8 07-Apr-09	ND	0.004	0.012	NE	U		087161-020	EPA 314.0
MWL-MW9 09-Apr-09	ND	0.004	0.012	NE	U		087167-020	EPA 314.0

Refer to footnotes on page 4A-70.

Table 4A-6
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.00856	0.005	0.015	NE	J		086943-009	SW846 6020
05-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086943-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086943-009	SW846 6020
	Barium	0.0955	0.0005	0.002	2.00			086943-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086943-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086943-009	SW846 6020
	Calcium	71.7	0.100	0.500	NE	B		086943-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		086943-009	SW846 6020
	Cobalt	0.000129	0.0001	0.001	NE	J		086943-009	SW846 6020
	Copper	0.000528	0.0003	0.001	NE	J		086943-009	SW846 6020
	Iron	0.189	0.010	0.025	NE	B		086943-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086943-009	SW846 6020
	Magnesium	22.6	0.0052	0.015	NE			086943-009	SW846 6020
	Manganese	0.00136	0.001	0.005	NE	J		086943-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086943-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	J	J+	086943-009	SW846 6020
	Potassium	4.03	0.080	0.300	NE			086943-009	SW846 6020
	Selenium	0.00151	0.001	0.005	0.050	J		086943-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086943-009	SW846 6020
	Sodium	53.0	0.400	1.25	NE			086943-009	SW846 6020
	Thallium	0.000467	0.0003	0.001	0.002	J		086943-009	SW846 6020
	Uranium	0.0077	0.00005	0.0002	0.030	B		086943-009	SW846 6020
	Vanadium	0.00419	0.003	0.010	NE	J		086943-009	SW846 6020
	Zinc	0.00281	0.0026	0.010	NE	J		086943-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.354	0.005	0.015	NE			086946-009	SW846 6020
06-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086946-009	SW846 6020
	Arsenic	0.00249	0.0015	0.005	0.010	J		086946-009	SW846 6020
	Barium	0.102	0.0005	0.002	2.00			086946-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086946-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086946-009	SW846 6020
	Calcium	54.4	0.100	0.500	NE	B		086946-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		086946-009	SW846 6020
	Cobalt	0.000255	0.0001	0.001	NE	J		086946-009	SW846 6020
	Copper	0.00127	0.0003	0.001	NE			086946-009	SW846 6020
	Iron	0.854	0.010	0.025	NE	B		086946-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086946-009	SW846 6020
	Magnesium	17.9	0.0052	0.015	NE			086946-009	SW846 6020
	Manganese	0.0122	0.001	0.005	NE			086946-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086946-009	SW846 7470
	Nickel	0.0014	0.0005	0.002	NE	J	J+	086946-009	SW846 6020
	Potassium	5.26	0.080	0.300	NE			086946-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086946-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086946-009	SW846 6020
	Sodium	43.9	0.080	0.250	NE			086946-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086946-009	SW846 6020
	Uranium	0.00841	0.00005	0.0002	0.030	B		086946-009	SW846 6020
	Vanadium	0.00441	0.003	0.010	NE	J		086946-009	SW846 6020
	Zinc	0.0038	0.0026	0.010	NE	J		086946-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.760	0.005	0.015	NE			086950-009	SW846 6020
07-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086950-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086950-009	SW846 6020
	Barium	0.123	0.005	0.020	2.00			086950-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086950-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086950-009	SW846 6020
	Calcium	54.4	0.200	1.00	NE	B		086950-009	SW846 6020
	Chromium	0.00359	0.0015	0.003	0.100		0.011U	086950-009	SW846 6020
	Cobalt	0.000501	0.0001	0.001	NE	J		086950-009	SW846 6020
	Copper	0.00192	0.0003	0.001	NE		0.0049U	086950-009	SW846 6020
	Iron	0.718	0.010	0.025	NE			086950-009	SW846 6020
	Lead	0.0005	0.0005	0.002	NE	J		086950-009	SW846 6020
	Magnesium	19.1	0.0052	0.015	NE			086950-009	SW846 6020
	Manganese	0.0274	0.001	0.005	NE			086950-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086950-009	SW846 7470
	Nickel	0.00236	0.0005	0.002	NE			086950-009	SW846 6020
	Potassium	5.44	0.080	0.300	NE			086950-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086950-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086950-009	SW846 6020
	Sodium	49.0	0.800	2.50	NE			086950-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086950-009	SW846 6020
	Uranium	0.00875	0.00005	0.0002	0.030			086950-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		086950-009	SW846 6020
	Zinc	0.00384	0.0026	0.010	NE	J		086950-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW8 (Duplicate) 07-Jan-09	Aluminum	0.608	0.005	0.015	NE			086951-009	SW846 6020
	Antimony	ND	0.0005	0.002	0.006	U		086951-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086951-009	SW846 6020
	Barium	0.122	0.005	0.020	2.00			086951-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086951-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086951-009	SW846 6020
	Calcium	52.9	0.200	1.00	NE	B		086951-009	SW846 6020
	Chromium	0.00373	0.0015	0.003	0.100		0.011U	086951-009	SW846 6020
	Cobalt	0.00046	0.0001	0.001	NE	J		086951-009	SW846 6020
	Copper	0.00188	0.0003	0.001	NE		0.0049U	086951-009	SW846 6020
	Iron	0.171	0.010	0.025	NE			086951-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086951-009	SW846 6020
	Magnesium	18.4	0.0052	0.015	NE			086951-009	SW846 6020
	Manganese	0.0256	0.001	0.005	NE			086951-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086951-009	SW846 7470
	Nickel	0.00262	0.0005	0.002	NE			086951-009	SW846 6020
	Potassium	5.68	0.080	0.300	NE			086951-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086951-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086951-009	SW846 6020
	Sodium	47.9	0.800	2.50	NE			086951-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086951-009	SW846 6020
	Uranium	0.00856	0.00005	0.0002	0.030			086951-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		086951-009	SW846 6020
	Zinc	0.00383	0.0026	0.010	NE	J		086951-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.106	0.005	0.015	NE			086953-009	SW846 6020
08-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086953-009	SW846 6020
	Arsenic	0.00246	0.0015	0.005	0.010	J		086953-009	SW846 6020
	Barium	0.098	0.0005	0.002	2.00			086953-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086953-009	SW846 6020
	Cadmium	0.000376	0.00011	0.001	0.005	J		086953-009	SW846 6020
	Calcium	54.4	0.200	1.00	NE	B		086953-009	SW846 6020
	Chromium	0.00202	0.0015	0.003	0.100	J		086953-009	SW846 6020
	Cobalt	0.000262	0.0001	0.001	NE	J		086953-009	SW846 6020
	Copper	0.00106	0.0003	0.001	NE			086953-009	SW846 6020
	Iron	0.288	0.010	0.025	NE			086953-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086953-009	SW846 6020
	Magnesium	19.8	0.0052	0.015	NE			086953-009	SW846 6020
	Manganese	0.0141	0.001	0.005	NE			086953-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086953-009	SW846 7470
	Nickel	0.00194	0.0005	0.002	NE	J		086953-009	SW846 6020
	Potassium	4.93	0.080	0.300	NE			086953-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086953-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086953-009	SW846 6020
	Sodium	48.4	0.800	2.50	NE			086953-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086953-009	SW846 6020
	Uranium	0.00934	0.00005	0.0002	0.030			086953-009	SW846 6020
	Vanadium	0.00514	0.003	0.010	NE	J		086953-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		086953-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0104	0.005	0.015	NE	J	J+	087151-009	SW846 6020
01-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087151-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087151-009	SW846 6020
	Barium	0.0985	0.0005	0.002	2.00			087151-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087151-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087151-009	SW846 6020
	Calcium	69.3	0.100	0.500	NE	B		087151-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087151-009	SW846 6020
	Cobalt	0.00015	0.0001	0.001	NE	J		087151-009	SW846 6020
	Copper	0.000777	0.0003	0.001	NE	J		087151-009	SW846 6020
	Iron	0.218	0.010	0.025	NE			087151-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087151-009	SW846 6020
	Magnesium	24.4	0.0052	0.015	NE			087151-009	SW846 6020
	Manganese	0.00113	0.001	0.005	NE	J		087151-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087151-009	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	J		087151-009	SW846 6020
	Potassium	3.82	0.080	0.300	NE			087151-009	SW846 6020
	Selenium	0.00214	0.001	0.005	0.050	J		087151-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087151-009	SW846 6020
	Sodium	58.4	0.400	1.25	NE			087151-009	SW846 6020
	Thallium	0.000512	0.0003	0.001	0.002	J	0.0024U	087151-009	SW846 6020
	Uranium	0.00754	0.00005	0.0002	0.030	B		087151-009	SW846 6020
	Vanadium	0.00432	0.003	0.010	NE	J		087151-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087151-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.00719	0.005	0.015	NE	B, J	0.030U	087169-009	SW846 6020
13-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087169-009	SW846 6020
	Arsenic	0.00171	0.0015	0.005	0.010	J		087169-009	SW846 6020
	Barium	0.109	0.0025	0.010	2.00			087169-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087169-009	SW846 6020
	Cadmium	0.00275	0.00011	0.001	0.005			087169-009	SW846 6020
	Calcium	59.0	0.200	1.00	NE	B		087169-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087169-009	SW846 6020
	Cobalt	0.000265	0.0001	0.001	NE	J		087169-009	SW846 6020
	Copper	0.00294	0.0003	0.001	NE			087169-009	SW846 6020
	Iron	0.239	0.010	0.025	NE			087169-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087169-009	SW846 6020
	Magnesium	19.2	0.052	0.150	NE			087169-009	SW846 6020
	Manganese	0.00689	0.001	0.005	NE			087169-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087169-009	SW846 7470
	Nickel	0.0291	0.0005	0.002	NE			087169-009	SW846 6020
	Potassium	4.76	0.080	0.300	NE			087169-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087169-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087169-009	SW846 6020
	Sodium	53.2	0.800	2.50	NE			087169-009	SW846 6020
	Thallium	0.00097	0.0003	0.001	0.002	J	0.0049U	087169-009	SW846 6020
	Uranium	0.0059	0.00005	0.0002	0.030			087169-009	SW846 6020
	Vanadium	0.00344	0.003	0.010	NE	J		087169-009	SW846 6020
	Zinc	0.0799	0.0026	0.010	NE			087169-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0073	0.005	0.015	NE	J	J+	087153-009	SW846 6020
02-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087153-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087153-009	SW846 6020
	Barium	0.120	0.0005	0.002	2.00			087153-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087153-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087153-009	SW846 6020
	Calcium	83.4	0.100	0.500	NE	B		087153-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087153-009	SW846 6020
	Cobalt	0.000183	0.0001	0.001	NE	J		087153-009	SW846 6020
	Copper	0.000809	0.0003	0.001	NE	J		087153-009	SW846 6020
	Iron	0.307	0.010	0.025	NE			087153-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087153-009	SW846 6020
	Magnesium	34.3	0.0052	0.015	NE			087153-009	SW846 6020
	Manganese	0.00844	0.001	0.005	NE			087153-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087153-009	SW846 7470
	Nickel	0.0018	0.0005	0.002	NE	J		087153-009	SW846 6020
	Potassium	5.41	0.080	0.300	NE			087153-009	SW846 6020
	Selenium	0.00161	0.001	0.005	0.050	J		087153-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087153-009	SW846 6020
	Sodium	64.1	0.400	1.25	NE			087153-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087153-009	SW846 6020
	Uranium	0.00991	0.00005	0.0002	0.030	B		087153-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087153-009	SW846 6020
	Zinc	0.00357	0.0026	0.010	NE	J		087153-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.00593	0.005	0.015	NE	J		087158-009	SW846 6020
03-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087158-009	SW846 6020
	Arsenic	0.00229	0.0015	0.005	0.010	B, J	0.010U	087158-009	SW846 6020
	Barium	0.120	0.0005	0.002	2.00			087158-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087158-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087158-009	SW846 6020
	Calcium	88.7	0.100	0.500	NE	B		087158-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087158-009	SW846 6020
	Cobalt	0.000219	0.0001	0.001	NE	J		087158-009	SW846 6020
	Copper	0.00131	0.0003	0.001	NE			087158-009	SW846 6020
	Iron	0.338	0.010	0.025	NE			087158-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087158-009	SW846 6020
	Magnesium	27.6	0.0052	0.015	NE			087158-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087158-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087158-009	SW846 7470
	Nickel	0.00186	0.0005	0.002	NE	J		087158-009	SW846 6020
	Potassium	5.82	0.080	0.300	NE			087158-009	SW846 6020
	Selenium	0.00126	0.001	0.005	0.050	J		087158-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087158-009	SW846 6020
	Sodium	62.5	0.400	1.25	NE			087158-009	SW846 6020
	Thallium	0.000376	0.0003	0.001	0.002	J		087158-009	SW846 6020
	Uranium	0.0101	0.00005	0.0002	0.030			087158-009	SW846 6020
	Vanadium	0.00867	0.003	0.010	NE	J	0.023U	087158-009	SW846 6020
	Zinc	0.00489	0.0026	0.010	NE	B, J	0.013U	087158-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 (Duplicate) 03-Apr-09	Aluminum	0.0085	0.005	0.015	NE	J		087159-009	SW846 6020
	Antimony	ND	0.0005	0.002	0.006	U		087159-009	SW846 6020
	Arsenic	0.00193	0.0015	0.005	0.010	B, J	0.010U	087159-009	SW846 6020
	Barium	0.120	0.0005	0.002	2.00			087159-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087159-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087159-009	SW846 6020
	Calcium	91.1	0.100	0.500	NE	B		087159-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087159-009	SW846 6020
	Cobalt	0.000223	0.0001	0.001	NE	J		087159-009	SW846 6020
	Copper	0.00112	0.0003	0.001	NE			087159-009	SW846 6020
	Iron	0.344	0.010	0.025	NE			087159-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087159-009	SW846 6020
	Magnesium	29.2	0.0052	0.015	NE			087159-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087159-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087159-009	SW846 7470
	Nickel	0.00199	0.0005	0.002	NE	J		087159-009	SW846 6020
	Potassium	6.39	0.080	0.300	NE			087159-009	SW846 6020
	Selenium	0.00132	0.001	0.005	0.050	J		087159-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087159-009	SW846 6020
	Sodium	66.1	0.400	1.25	NE			087159-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087159-009	SW846 6020
	Uranium	0.00975	0.00005	0.0002	0.030			087159-009	SW846 6020
	Vanadium	0.00801	0.003	0.010	NE	J	0.023U	087159-009	SW846 6020
	Zinc	0.0032	0.0026	0.010	NE	B, J	0.013U	087159-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.014	0.005	0.015	NE	J	0.052U	087165-009	SW846 6020
08-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087165-009	SW846 6020
	Arsenic	0.00159	0.0015	0.005	0.010	B, J	0.010U	087165-009	SW846 6020
	Barium	0.104	0.0005	0.002	2.00			087165-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087165-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087165-009	SW846 6020
	Calcium	55.8	0.100	0.500	NE	B		087165-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087165-009	SW846 6020
	Cobalt	0.00016	0.0001	0.001	NE	J		087165-009	SW846 6020
	Copper	0.000944	0.0003	0.001	NE	J	0.0020U	087165-009	SW846 6020
	Iron	0.247	0.010	0.025	NE			087165-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087165-009	SW846 6020
	Magnesium	19.2	0.0052	0.015	NE			087165-009	SW846 6020
	Manganese	0.00151	0.001	0.005	NE	J		087165-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087165-009	SW846 7470
	Nickel	0.00138	0.0005	0.002	NE	J		087165-009	SW846 6020
	Potassium	4.94	0.080	0.300	NE			087165-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087165-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087165-009	SW846 6020
	Sodium	45.3	0.080	0.250	NE			087165-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087165-009	SW846 6020
	Uranium	0.00806	0.00005	0.0002	0.030			087165-009	SW846 6020
	Vanadium	0.00703	0.003	0.010	NE	J		087165-009	SW846 6020
	Zinc	0.00373	0.0026	0.010	NE	B, J	0.013U	087165-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0219	0.005	0.015	NE			087161-009	SW846 6020
07-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087161-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087161-009	SW846 6020
	Barium	0.131	0.0005	0.002	2.00			087161-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087161-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087161-009	SW846 6020
	Calcium	61.1	0.100	0.500	NE	B		087161-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087161-009	SW846 6020
	Cobalt	0.000166	0.0001	0.001	NE	J		087161-009	SW846 6020
	Copper	0.00128	0.0003	0.001	NE			087161-009	SW846 6020
	Iron	0.244	0.010	0.025	NE			087161-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087161-009	SW846 6020
	Magnesium	18.6	0.0052	0.015	NE			087161-009	SW846 6020
	Manganese	0.00436	0.001	0.005	NE	J		087161-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087161-009	SW846 7470
	Nickel	0.00143	0.0005	0.002	NE	J		087161-009	SW846 6020
	Potassium	5.32	0.080	0.300	NE			087161-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087161-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087161-009	SW846 6020
	Sodium	47.6	0.400	1.25	NE			087161-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087161-009	SW846 6020
	Uranium	0.00847	0.00005	0.0002	0.030			087161-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087161-009	SW846 6020
	Zinc	0.00409	0.0026	0.010	NE	B, J	0.013U	087161-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0812	0.005	0.015	NE			087167-009	SW846 6020
09-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087167-009	SW846 6020
	Arsenic	0.00237	0.0015	0.005	0.010	B, J	0.010U	087167-009	SW846 6020
	Barium	0.104	0.0005	0.002	2.00			087167-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087167-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087167-009	SW846 6020
	Calcium	59.1	0.100	0.500	NE	B		087167-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087167-009	SW846 6020
	Cobalt	0.000237	0.0001	0.001	NE	J		087167-009	SW846 6020
	Copper	0.00108	0.0003	0.001	NE			087167-009	SW846 6020
	Iron	0.368	0.010	0.025	NE			087167-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087167-009	SW846 6020
	Magnesium	19.0	0.0052	0.015	NE			087167-009	SW846 6020
	Manganese	0.00884	0.001	0.005	NE			087167-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087167-009	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	J		087167-009	SW846 6020
	Potassium	5.03	0.080	0.300	NE			087167-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087167-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087167-009	SW846 6020
	Sodium	44.3	0.080	0.250	NE			087167-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087167-009	SW846 6020
	Uranium	0.00963	0.00005	0.0002	0.030			087167-009	SW846 6020
	Vanadium	0.0085	0.003	0.010	NE	J		087167-009	SW846 6020
	Zinc	0.00578	0.0026	0.010	NE	B, J	0.013U	087167-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0381	0.010	0.030	NE	B	0.134U	087489-009	SW846 6020
06-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087489-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087489-009	SW846 6020
	Barium	0.0904	0.0005	0.002	2.00			087489-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087489-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087489-009	SW846 6020
	Calcium	66.0	0.100	1.00	NE	B		087489-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087489-009	SW846 6020
	Cobalt	0.000186	0.0001	0.001	NE	J		087489-009	SW846 6020
	Copper	0.000861	0.0003	0.001	NE	J		087489-009	SW846 6020
	Iron	0.334	0.010	0.100	NE			087489-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087489-009	SW846 6020
	Magnesium	21.9	0.005	0.015	NE			087489-009	SW846 6020
	Manganese	0.00143	0.001	0.005	NE	J		087489-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087489-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	J		087489-009	SW846 6020
	Potassium	3.82	0.080	0.300	NE			087489-009	SW846 6020
	Selenium	0.00224	0.001	0.005	0.050	J		087489-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087489-009	SW846 6020
	Sodium	54.5	0.400	1.25	NE			087489-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087489-009	SW846 6020
	Uranium	0.0081	0.00005	0.0002	0.030			087489-009	SW846 6020
	Vanadium	0.00467	0.003	0.010	NE	J		087489-009	SW846 6020
	Zinc	0.00321	0.0026	0.010	NE	J		087489-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0321	0.010	0.030	NE	B	0.134U	087492-009	SW846 6020
07-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087492-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087492-009	SW846 6020
	Barium	0.0985	0.0005	0.002	2.00			087492-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087492-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087492-009	SW846 6020
	Calcium	56.7	0.100	1.00	NE	B		087492-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087492-009	SW846 6020
	Cobalt	0.000173	0.0001	0.001	NE	J		087492-009	SW846 6020
	Copper	0.000908	0.0003	0.001	NE	J		087492-009	SW846 6020
	Iron	0.283	0.010	0.100	NE			087492-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087492-009	SW846 6020
	Magnesium	20.1	0.005	0.015	NE			087492-009	SW846 6020
	Manganese	0.00168	0.001	0.005	NE	J		087492-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087492-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	J		087492-009	SW846 6020
	Potassium	4.95	0.080	0.300	NE			087492-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087492-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087492-009	SW846 6020
	Sodium	48.9	0.080	0.250	NE			087492-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087492-009	SW846 6020
	Uranium	0.0093	0.00005	0.0002	0.030			087492-009	SW846 6020
	Vanadium	0.00434	0.003	0.010	NE	J		087492-009	SW846 6020
	Zinc	0.0102	0.0026	0.010	NE			087492-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.201	0.010	0.030	NE	B		087495-009	SW846 6020
08-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087495-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087495-009	SW846 6020
	Barium	0.131	0.0005	0.002	2.00			087495-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087495-009	SW846 6020
	Cadmium	0.000193	0.00011	0.001	0.005	J		087495-009	SW846 6020
	Calcium	56.5	0.100	1.00	NE	B		087495-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087495-009	SW846 6020
	Cobalt	0.000227	0.0001	0.001	NE	J		087495-009	SW846 6020
	Copper	0.00135	0.0003	0.001	NE			087495-009	SW846 6020
	Iron	0.497	0.010	0.100	NE			087495-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087495-009	SW846 6020
	Magnesium	20.4	0.005	0.015	NE			087495-009	SW846 6020
	Manganese	0.00876	0.001	0.005	NE			087495-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087495-009	SW846 7470
	Nickel	0.00196	0.0005	0.002	NE	J		087495-009	SW846 6020
	Potassium	5.25	0.080	0.300	NE			087495-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087495-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087495-009	SW846 6020
	Sodium	46.8	0.400	1.25	NE			087495-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087495-009	SW846 6020
	Uranium	0.00924	0.00005	0.0002	0.030			087495-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087495-009	SW846 6020
	Zinc	0.0557	0.0026	0.010	NE			087495-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0858	0.010	0.030	NE	B	0.134U	087500-009	SW846 6020
09-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087500-009	SW846 6020
	Arsenic	0.00268	0.0015	0.005	0.010	J		087500-009	SW846 6020
	Barium	0.096	0.0005	0.002	2.00			087500-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087500-009	SW846 6020
	Cadmium	0.000163	0.00011	0.001	0.005	J		087500-009	SW846 6020
	Calcium	57.2	0.100	1.00	NE	B		087500-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087500-009	SW846 6020
	Cobalt	0.000208	0.0001	0.001	NE	J		087500-009	SW846 6020
	Copper	0.000906	0.0003	0.001	NE	J	0.012UJ	087500-009	SW846 6020
	Iron	0.350	0.010	0.100	NE			087500-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087500-009	SW846 6020
	Magnesium	21.1	0.005	0.015	NE			087500-009	SW846 6020
	Manganese	0.00648	0.001	0.005	NE			087500-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087500-009	SW846 7470
	Nickel	0.00178	0.0005	0.002	NE	J		087500-009	SW846 6020
	Potassium	5.00	0.080	0.300	NE			087500-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087500-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087500-009	SW846 6020
	Sodium	44.2	0.400	1.25	NE			087500-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087500-009	SW846 6020
	Uranium	0.0106	0.00005	0.0002	0.030			087500-009	SW846 6020
	Vanadium	0.00918	0.003	0.010	NE	J		087500-009	SW846 6020
	Zinc	0.00398	0.0026	0.010	NE	J		087500-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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) 09-Jul-09	Aluminum	0.207	0.010	0.030	NE	B		087501-009	SW846 6020
	Antimony	ND	0.0005	0.003	0.006	U		087501-009	SW846 6020
	Arsenic	0.00368	0.0015	0.005	0.010	J		087501-009	SW846 6020
	Barium	0.0978	0.0005	0.002	2.00			087501-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087501-009	SW846 6020
	Cadmium	0.000167	0.00011	0.001	0.005	J		087501-009	SW846 6020
	Calcium	59.1	0.100	1.00	NE	B		087501-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087501-009	SW846 6020
	Cobalt	0.000249	0.0001	0.001	NE	J		087501-009	SW846 6020
	Copper	0.0014	0.0003	0.001	NE		0.012UJ	087501-009	SW846 6020
	Iron	0.525	0.010	0.100	NE			087501-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087501-009	SW846 6020
	Magnesium	20.5	0.005	0.015	NE			087501-009	SW846 6020
	Manganese	0.00918	0.001	0.005	NE			087501-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087501-009	SW846 7470
	Nickel	0.00201	0.0005	0.002	NE			087501-009	SW846 6020
	Potassium	5.18	0.080	0.300	NE			087501-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087501-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087501-009	SW846 6020
	Sodium	48.1	0.080	0.250	NE			087501-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087501-009	SW846 6020
	Uranium	0.0107	0.00005	0.0002	0.030			087501-009	SW846 6020
	Vanadium	0.00859	0.003	0.010	NE	J		087501-009	SW846 6020
	Zinc	0.00693	0.0026	0.010	NE	J		087501-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087769-009	SW846 6020
06-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087769-009	SW846 6020
	Arsenic	0.00274	0.0015	0.005	0.010	B, J	0.014U	087769-009	SW846 6020
	Barium	0.103	0.0005	0.002	2.00			087769-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087769-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087769-009	SW846 6020
	Calcium	65.4	0.200	2.00	NE	B		087769-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087769-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087769-009	SW846 6020
	Copper	0.000466	0.0003	0.001	NE	J	0.012U	087769-009	SW846 6020
	Iron	0.169	0.010	0.100	NE	B		087769-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087769-009	SW846 6020
	Magnesium	19.6	0.005	0.015	NE		J	087769-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087769-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087769-009	SW846 7470
	Nickel	0.001	0.0005	0.002	NE	J		087769-009	SW846 6020
	Potassium	4.01	0.080	0.300	NE			087769-009	SW846 6020
	Selenium	0.00279	0.001	0.005	0.050	J		087769-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087769-009	SW846 6020
	Sodium	55.0	0.800	2.05	NE		J	087769-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087769-009	SW846 6020
	Uranium	0.00734	0.00005	0.0002	0.030			087769-009	SW846 6020
	Vanadium	0.0119	0.003	0.010	NE	B	0.041U	087769-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087769-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 (Duplicate) 06-Oct-09	Aluminum	ND	0.010	0.030	NE	U		087770-009	SW846 6020
	Antimony	ND	0.0005	0.003	0.006	U		087770-009	SW846 6020
	Arsenic	0.00546	0.0015	0.005	0.010	B	0.014U	087770-009	SW846 6020
	Barium	0.104	0.0005	0.002	2.00			087770-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087770-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087770-009	SW846 6020
	Calcium	67.7	0.200	2.00	NE	B		087770-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087770-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087770-009	SW846 6020
	Copper	0.000427	0.0003	0.001	NE	J	0.012U	087770-009	SW846 6020
	Iron	0.166	0.010	0.100	NE	B		087770-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087770-009	SW846 6020
	Magnesium	20.6	0.005	0.015	NE		J	087770-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087770-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087770-009	SW846 7470
	Nickel	0.000888	0.0005	0.002	NE	J		087770-009	SW846 6020
	Potassium	4.14	0.080	0.300	NE			087770-009	SW846 6020
	Selenium	0.00197	0.001	0.005	0.050	J		087770-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087770-009	SW846 6020
	Sodium	49.8	0.080	0.250	NE		J	087770-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087770-009	SW846 6020
	Uranium	0.0073	0.00005	0.0002	0.030			087770-009	SW846 6020
	Vanadium	0.0117	0.003	0.010	NE	B	0.041U	087770-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087770-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087774-009	SW846 6020
08-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087774-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087774-009	SW846 6020
	Barium	0.109	0.0005	0.002	2.00			087774-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087774-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087774-009	SW846 6020
	Calcium	49.3	0.020	0.200	NE	B		087774-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087774-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087774-009	SW846 6020
	Copper	0.000646	0.0003	0.001	NE	J		087774-009	SW846 6020
	Iron	0.145	0.010	0.100	NE	B		087774-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087774-009	SW846 6020
	Magnesium	16.9	0.005	0.015	NE		J	087774-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087774-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087774-009	SW846 7470
	Nickel	0.000731	0.0005	0.002	NE	J		087774-009	SW846 6020
	Potassium	5.12	0.080	0.300	NE			087774-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087774-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087774-009	SW846 6020
	Sodium	43.0	0.080	0.250	NE		J	087774-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087774-009	SW846 6020
	Uranium	0.00791	0.00005	0.0002	0.030			087774-009	SW846 6020
	Vanadium	0.00863	0.003	0.010	NE	B, J	0.041U	087774-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087774-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Continued)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.231	0.010	0.030	NE			087772-009	SW846 6020
07-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087772-009	SW846 6020
	Arsenic	0.00173	0.0015	0.005	0.010	B, J	0.014U	087772-009	SW846 6020
	Barium	0.153	0.0005	0.002	2.00			087772-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087772-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087772-009	SW846 6020
	Calcium	59.0	0.200	2.00	NE	B		087772-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087772-009	SW846 6020
	Cobalt	0.0002	0.0001	0.001	NE	J		087772-009	SW846 6020
	Copper	0.00116	0.0003	0.001	NE			087772-009	SW846 6020
	Iron	0.526	0.010	0.100	NE	B		087772-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087772-009	SW846 6020
	Magnesium	18.1	0.005	0.015	NE		J	087772-009	SW846 6020
	Manganese	0.171	0.001	0.005	NE			087772-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087772-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	J		087772-009	SW846 6020
	Potassium	5.78	0.080	0.300	NE			087772-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087772-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087772-009	SW846 6020
	Sodium	45.0	0.080	0.250	NE		J	087772-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087772-009	SW846 6020
	Uranium	0.00817	0.00005	0.0002	0.030			087772-009	SW846 6020
	Vanadium	0.00377	0.003	0.010	NE	B, J	0.041U	087772-009	SW846 6020
	Zinc	0.0109	0.0026	0.010	NE			087772-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-6 *(Concluded)*
Summary of Total Metal Results (Unfiltered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.029	0.010	0.030	NE	J		087765-009	SW846 6020
05-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087765-009	SW846 6020
	Arsenic	0.00581	0.0015	0.005	0.010	B	0.014U	087765-009	SW846 6020
	Barium	0.103	0.0005	0.002	2.00			087765-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087765-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087765-009	SW846 6020
	Calcium	55.3	0.200	2.00	NE	B		087765-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087765-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087765-009	SW846 6020
	Copper	0.000557	0.0003	0.001	NE	J		087765-009	SW846 6020
	Iron	0.185	0.010	0.100	NE	B		087765-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087765-009	SW846 6020
	Magnesium	16.5	0.005	0.015	NE		J	087765-009	SW846 6020
	Manganese	0.00505	0.001	0.005	NE			087765-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087765-009	SW846 7470
	Nickel	0.00099	0.0005	0.002	NE	J		087765-009	SW846 6020
	Potassium	5.09	0.080	0.300	NE			087765-009	SW846 6020
	Selenium	0.00103	0.001	0.005	0.050	J		087765-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087765-009	SW846 6020
	Sodium	38.9	0.080	0.250	NE		J	087765-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087765-009	SW846 6020
	Uranium	0.00937	0.00005	0.0002	0.030			087765-009	SW846 6020
	Vanadium	0.0179	0.003	0.010	NE	B	0.041U	087765-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087765-009	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.005	0.015	NE	U		086943-010	SW846 6020
05-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086943-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086943-010	SW846 6020
	Barium	0.0964	0.0005	0.002	2.00			086943-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086943-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086943-010	SW846 6020
	Calcium	68.5	0.100	0.500	NE	B		086943-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		086943-010	SW846 6020
	Cobalt	0.00011	0.0001	0.001	NE	J		086943-010	SW846 6020
	Copper	0.000645	0.0003	0.001	NE	J		086943-010	SW846 6020
	Iron	0.180	0.010	0.025	NE	B		086943-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086943-010	SW846 6020
	Magnesium	22.7	0.0052	0.015	NE			086943-010	SW846 6020
	Manganese	0.00112	0.001	0.005	NE	J		086943-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086943-010	SW846 7470
	Nickel	0.00122	0.0005	0.002	NE	J	J+	086943-010	SW846 6020
	Potassium	4.13	0.080	0.300	NE			086943-010	SW846 6020
	Selenium	0.00146	0.001	0.005	0.050	J		086943-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086943-010	SW846 6020
	Sodium	56.7	0.400	1.25	NE			086943-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086943-010	SW846 6020
	Uranium	0.00757	0.00005	0.0002	0.030	B		086943-010	SW846 6020
	Vanadium	0.00429	0.003	0.010	NE	J		086943-010	SW846 6020
	Zinc	0.00358	0.0026	0.010	NE	J		086943-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.005	0.015	NE	U		086946-010	SW846 6020
06-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086946-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086946-010	SW846 6020
	Barium	0.102	0.0005	0.002	2.00			086946-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086946-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086946-010	SW846 6020
	Calcium	54.2	0.100	0.500	NE	B		086946-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		086946-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		086946-010	SW846 6020
	Copper	0.0007	0.0003	0.001	NE	J		086946-010	SW846 6020
	Iron	0.147	0.010	0.025	NE	B		086946-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086946-010	SW846 6020
	Magnesium	19.3	0.0052	0.015	NE			086946-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		086946-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086946-010	SW846 7470
	Nickel	0.000937	0.0005	0.002	NE	J	J+	086946-010	SW846 6020
	Potassium	5.14	0.080	0.300	NE			086946-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086946-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086946-010	SW846 6020
	Sodium	44.5	0.080	0.250	NE			086946-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086946-010	SW846 6020
	Uranium	0.0085	0.00005	0.0002	0.030	B		086946-010	SW846 6020
	Vanadium	0.00354	0.003	0.010	NE	J		086946-010	SW846 6020
	Zinc	0.00262	0.0026	0.010	NE	J		086946-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0183	0.005	0.015	NE			086950-010	SW846 6020
07-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086950-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086950-010	SW846 6020
	Barium	0.114	0.005	0.020	2.00			086950-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086950-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086950-010	SW846 6020
	Calcium	49.8	0.020	0.100	NE	B		086950-010	SW846 6020
	Chromium	0.00225	0.0015	0.003	0.100	J	0.011U	086950-010	SW846 6020
	Cobalt	0.000166	0.0001	0.001	NE	J		086950-010	SW846 6020
	Copper	0.00113	0.0003	0.001	NE		0.0049U	086950-010	SW846 6020
	Iron	0.164	0.010	0.025	NE			086950-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086950-010	SW846 6020
	Magnesium	19.0	0.0052	0.015	NE			086950-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		086950-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086950-010	SW846 7470
	Nickel	0.00185	0.0005	0.002	NE	J		086950-010	SW846 6020
	Potassium	5.16	0.080	0.300	NE			086950-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086950-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086950-010	SW846 6020
	Sodium	46.4	0.800	2.50	NE			086950-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086950-010	SW846 6020
	Uranium	0.00853	0.00005	0.0002	0.030			086950-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		086950-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		086950-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW8 (Duplicate) 07-Jan-09	Aluminum	0.0104	0.005	0.015	NE	J		086951-010	SW846 6020
	Antimony	ND	0.0005	0.002	0.006	U		086951-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		086951-010	SW846 6020
	Barium	0.100	0.005	0.020	2.00			086951-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086951-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086951-010	SW846 6020
	Calcium	43.5	0.020	0.100	NE	B		086951-010	SW846 6020
	Chromium	0.00221	0.0015	0.003	0.100	J	0.011U	086951-010	SW846 6020
	Cobalt	0.000162	0.0001	0.001	NE	J		086951-010	SW846 6020
	Copper	0.00102	0.0003	0.001	NE		0.0049U	086951-010	SW846 6020
	Iron	0.977	0.010	0.025	NE			086951-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086951-010	SW846 6020
	Magnesium	15.3	0.0052	0.015	NE			086951-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		086951-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086951-010	SW846 7470
	Nickel	0.00167	0.0005	0.002	NE	J		086951-010	SW846 6020
	Potassium	4.51	0.080	0.300	NE			086951-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086951-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086951-010	SW846 6020
	Sodium	39.8	0.800	2.50	NE			086951-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086951-010	SW846 6020
	Uranium	0.00719	0.00005	0.0002	0.030			086951-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		086951-010	SW846 6020
	Zinc	0.00269	0.0026	0.010	NE	J		086951-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.014	0.005	0.015	NE	J		086953-010	SW846 6020
08-Jan-09	Antimony	ND	0.0005	0.002	0.006	U		086953-010	SW846 6020
	Arsenic	0.00231	0.0015	0.005	0.010	J		086953-010	SW846 6020
	Barium	0.097	0.0005	0.002	2.00			086953-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		086953-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		086953-010	SW846 6020
	Calcium	52.0	0.200	1.00	NE	B		086953-010	SW846 6020
	Chromium	0.00311	0.0015	0.003	0.100			086953-010	SW846 6020
	Cobalt	0.000182	0.0001	0.001	NE	J		086953-010	SW846 6020
	Copper	0.00082	0.0003	0.001	NE	J		086953-010	SW846 6020
	Iron	0.170	0.010	0.025	NE			086953-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		086953-010	SW846 6020
	Magnesium	18.8	0.0052	0.015	NE			086953-010	SW846 6020
	Manganese	0.00938	0.001	0.005	NE			086953-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		086953-010	SW846 7470
	Nickel	0.00195	0.0005	0.002	NE	J		086953-010	SW846 6020
	Potassium	4.54	0.080	0.300	NE			086953-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		086953-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		086953-010	SW846 6020
	Sodium	49.2	0.800	2.50	NE			086953-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		086953-010	SW846 6020
	Uranium	0.00952	0.00005	0.0002	0.030			086953-010	SW846 6020
	Vanadium	0.00545	0.003	0.010	NE	J		086953-010	SW846 6020
	Zinc	0.00286	0.0026	0.010	NE	J		086953-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.005	0.015	NE	U		087151-010	SW846 6020
01-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087151-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087151-010	SW846 6020
	Barium	0.0966	0.0005	0.002	2.00			087151-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087151-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087151-010	SW846 6020
	Calcium	66.8	0.100	0.500	NE	B		087151-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087151-010	SW846 6020
	Cobalt	0.000127	0.0001	0.001	NE	J		087151-010	SW846 6020
	Copper	0.000691	0.0003	0.001	NE	J		087151-010	SW846 6020
	Iron	0.215	0.010	0.025	NE			087151-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087151-010	SW846 6020
	Magnesium	28.0	0.0052	0.015	NE			087151-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087151-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087151-010	SW846 7470
	Nickel	0.00131	0.0005	0.002	NE	J		087151-010	SW846 6020
	Potassium	3.93	0.080	0.300	NE			087151-010	SW846 6020
	Selenium	0.0019	0.001	0.005	0.050	J		087151-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087151-010	SW846 6020
	Sodium	56.7	0.400	1.25	NE			087151-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087151-010	SW846 6020
	Uranium	0.00785	0.00005	0.0002	0.030	B		087151-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087151-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087151-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0347	0.005	0.015	NE	B		087169-010	SW846 6020
13-Apr-09	Antimony	0.000713	0.0005	0.002	0.006	B, J	0.0043U	087169-010	SW846 6020
	Arsenic	0.00234	0.0015	0.005	0.010	J		087169-010	SW846 6020
	Barium	0.112	0.0025	0.010	2.00			087169-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087169-010	SW846 6020
	Cadmium	0.00277	0.00011	0.001	0.005			087169-010	SW846 6020
	Calcium	59.4	0.200	1.00	NE	B		087169-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087169-010	SW846 6020
	Cobalt	0.000225	0.0001	0.001	NE	J		087169-010	SW846 6020
	Copper	0.00252	0.0003	0.001	NE			087169-010	SW846 6020
	Iron	0.210	0.010	0.025	NE			087169-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087169-010	SW846 6020
	Magnesium	20.8	0.052	0.150	NE			087169-010	SW846 6020
	Manganese	0.00118	0.001	0.005	NE	J		087169-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087169-010	SW846 7470
	Nickel	0.0294	0.0005	0.002	NE			087169-010	SW846 6020
	Potassium	4.90	0.080	0.300	NE			087169-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087169-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087169-010	SW846 6020
	Sodium	53.0	0.800	2.50	NE			087169-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087169-010	SW846 6020
	Uranium	0.00624	0.00005	0.0002	0.030			087169-010	SW846 6020
	Vanadium	0.00359	0.003	0.010	NE	J		087169-010	SW846 6020
	Zinc	0.080	0.0026	0.010	NE			087169-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.005	0.015	NE	U		087153-010	SW846 6020
02-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087153-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087153-010	SW846 6020
	Barium	0.120	0.0005	0.002	2.00			087153-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087153-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087153-010	SW846 6020
	Calcium	86.4	0.100	0.500	NE	B		087153-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087153-010	SW846 6020
	Cobalt	0.000175	0.0001	0.001	NE	J		087153-010	SW846 6020
	Copper	0.000867	0.0003	0.001	NE	J		087153-010	SW846 6020
	Iron	0.260	0.010	0.025	NE			087153-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087153-010	SW846 6020
	Magnesium	36.4	0.0052	0.015	NE			087153-010	SW846 6020
	Manganese	0.0038	0.001	0.005	NE	J		087153-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	087153-010	SW846 7470
	Nickel	0.00195	0.0005	0.002	NE	J		087153-010	SW846 6020
	Potassium	5.67	0.080	0.300	NE			087153-010	SW846 6020
	Selenium	0.00195	0.001	0.005	0.050	J		087153-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087153-010	SW846 6020
	Sodium	69.4	0.400	1.25	NE			087153-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087153-010	SW846 6020
	Uranium	0.00999	0.00005	0.0002	0.030	B		087153-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087153-010	SW846 6020
	Zinc	0.00309	0.0026	0.010	NE	J		087153-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.005	0.015	NE	U		087158-010	SW846 6020
03-Apr-09	Antimony	0.000708	0.0005	0.002	0.006	B, J	0.0040U	087158-010	SW846 6020
	Arsenic	0.00202	0.0015	0.005	0.010	B, J	0.010U	087158-010	SW846 6020
	Barium	0.120	0.0005	0.002	2.00			087158-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087158-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087158-010	SW846 6020
	Calcium	87.6	0.100	0.500	NE	B		087158-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087158-010	SW846 6020
	Cobalt	0.000242	0.0001	0.001	NE	J		087158-010	SW846 6020
	Copper	0.00121	0.0003	0.001	NE			087158-010	SW846 6020
	Iron	0.327	0.010	0.025	NE			087158-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087158-010	SW846 6020
	Magnesium	28.6	0.0052	0.015	NE			087158-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087158-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087158-010	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	J		087158-010	SW846 6020
	Potassium	5.74	0.080	0.300	NE			087158-010	SW846 6020
	Selenium	0.00142	0.001	0.005	0.050	J		087158-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087158-010	SW846 6020
	Sodium	58.9	0.400	1.25	NE			087158-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087158-010	SW846 6020
	Uranium	0.00964	0.00005	0.0002	0.030			087158-010	SW846 6020
	Vanadium	0.00906	0.003	0.010	NE	J	0.023U	087158-010	SW846 6020
	Zinc	0.00358	0.0026	0.010	NE	B, J	0.013U	087158-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 (Duplicate) 03-Apr-09	Aluminum	0.00633	0.005	0.015	NE	J		087159-010	SW846 6020
	Antimony	ND	0.0005	0.002	0.006	U		087159-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087159-010	SW846 6020
	Barium	0.111	0.0005	0.002	2.00			087159-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087159-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087159-010	SW846 6020
	Calcium	88.6	0.100	0.500	NE	B		087159-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087159-010	SW846 6020
	Cobalt	0.000189	0.0001	0.001	NE	J		087159-010	SW846 6020
	Copper	0.00117	0.0003	0.001	NE			087159-010	SW846 6020
	Iron	0.293	0.010	0.025	NE			087159-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087159-010	SW846 6020
	Magnesium	24.0	0.0052	0.015	NE			087159-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087159-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087159-010	SW846 7470
	Nickel	0.00174	0.0005	0.002	NE	J		087159-010	SW846 6020
	Potassium	5.41	0.080	0.300	NE			087159-010	SW846 6020
	Selenium	0.00162	0.001	0.005	0.050	J		087159-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087159-010	SW846 6020
	Sodium	61.3	0.400	1.25	NE			087159-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087159-010	SW846 6020
	Uranium	0.00973	0.00005	0.0002	0.030			087159-010	SW846 6020
	Vanadium	0.00704	0.003	0.010	NE	J	0.023U	087159-010	SW846 6020
	Zinc	0.00316	0.0026	0.010	NE	B, J	0.013U	087159-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0231	0.005	0.015	NE		0.052U	087165-010	SW846 6020
08-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087165-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087165-010	SW846 6020
	Barium	0.107	0.0005	0.002	2.00			087165-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087165-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087165-010	SW846 6020
	Calcium	58.5	0.100	0.500	NE	B		087165-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087165-010	SW846 6020
	Cobalt	0.000164	0.0001	0.001	NE	J		087165-010	SW846 6020
	Copper	0.00117	0.0003	0.001	NE		0.0020U	087165-010	SW846 6020
	Iron	0.240	0.010	0.025	NE			087165-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087165-010	SW846 6020
	Magnesium	19.1	0.0052	0.015	NE			087165-010	SW846 6020
	Manganese	0.00131	0.001	0.005	NE	J		087165-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087165-010	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	J		087165-010	SW846 6020
	Potassium	5.02	0.080	0.300	NE			087165-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087165-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087165-010	SW846 6020
	Sodium	46.9	0.080	0.250	NE			087165-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087165-010	SW846 6020
	Uranium	0.00812	0.00005	0.0002	0.030			087165-010	SW846 6020
	Vanadium	0.00549	0.003	0.010	NE	J		087165-010	SW846 6020
	Zinc	0.00395	0.0026	0.010	NE	B, J	0.013U	087165-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.00534	0.005	0.015	NE	J		087161-010	SW846 6020
07-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087161-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087161-010	SW846 6020
	Barium	0.129	0.0005	0.002	2.00			087161-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087161-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087161-010	SW846 6020
	Calcium	59.2	0.100	0.500	NE	B		087161-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087161-010	SW846 6020
	Cobalt	0.000162	0.0001	0.001	NE	J		087161-010	SW846 6020
	Copper	0.00106	0.0003	0.001	NE			087161-010	SW846 6020
	Iron	0.225	0.010	0.025	NE			087161-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087161-010	SW846 6020
	Magnesium	18.8	0.0052	0.015	NE			087161-010	SW846 6020
	Manganese	0.00194	0.001	0.005	NE	J		087161-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087161-010	SW846 7470
	Nickel	0.00152	0.0005	0.002	NE	J		087161-010	SW846 6020
	Potassium	5.84	0.080	0.300	NE			087161-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087161-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087161-010	SW846 6020
	Sodium	49.5	0.080	0.250	NE			087161-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087161-010	SW846 6020
	Uranium	0.00845	0.00005	0.0002	0.030			087161-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087161-010	SW846 6020
	Zinc	0.0041	0.0026	0.010	NE	B, J	0.013U	087161-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0111	0.005	0.015	NE	J		087167-010	SW846 6020
09-Apr-09	Antimony	ND	0.0005	0.002	0.006	U		087167-010	SW846 6020
	Arsenic	0.00244	0.0015	0.005	0.010	B, J	0.010U	087167-010	SW846 6020
	Barium	0.101	0.0005	0.002	2.00			087167-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087167-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087167-010	SW846 6020
	Calcium	58.5	0.100	0.500	NE	B		087167-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	U		087167-010	SW846 6020
	Cobalt	0.000181	0.0001	0.001	NE	J		087167-010	SW846 6020
	Copper	0.00096	0.0003	0.001	NE	J		087167-010	SW846 6020
	Iron	0.252	0.010	0.025	NE			087167-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087167-010	SW846 6020
	Magnesium	19.8	0.0052	0.015	NE			087167-010	SW846 6020
	Manganese	0.00418	0.001	0.005	NE	J		087167-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		087167-010	SW846 7470
	Nickel	0.0016	0.0005	0.002	NE	J		087167-010	SW846 6020
	Potassium	5.17	0.080	0.300	NE			087167-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087167-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087167-010	SW846 6020
	Sodium	45.8	0.080	0.250	NE			087167-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087167-010	SW846 6020
	Uranium	0.00935	0.00005	0.0002	0.030			087167-010	SW846 6020
	Vanadium	0.0085	0.003	0.010	NE	J		087167-010	SW846 6020
	Zinc	0.00451	0.0026	0.010	NE	B, J	0.013U	087167-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0215	0.010	0.030	NE	B, J	0.134U	087489-010	SW846 6020
06-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087489-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087489-010	SW846 6020
	Barium	0.0935	0.0005	0.002	2.00			087489-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087489-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087489-010	SW846 6020
	Calcium	68.6	0.100	1.00	NE	B		087489-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087489-010	SW846 6020
	Cobalt	0.000186	0.0001	0.001	NE	J		087489-010	SW846 6020
	Copper	0.000806	0.0003	0.001	NE	J		087489-010	SW846 6020
	Iron	0.320	0.010	0.100	NE			087489-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087489-010	SW846 6020
	Magnesium	22.7	0.005	0.015	NE			087489-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087489-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087489-010	SW846 7470
	Nickel	0.00171	0.0005	0.002	NE	J		087489-010	SW846 6020
	Potassium	3.90	0.080	0.300	NE			087489-010	SW846 6020
	Selenium	0.00169	0.001	0.005	0.050	J		087489-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087489-010	SW846 6020
	Sodium	53.9	0.400	1.25	NE			087489-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087489-010	SW846 6020
	Uranium	0.00835	0.00005	0.0002	0.030			087489-010	SW846 6020
	Vanadium	0.00614	0.003	0.010	NE	J		087489-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087489-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.024	0.010	0.030	NE	B, J	0.134U	087492-010	SW846 6020
07-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087492-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087492-010	SW846 6020
	Barium	0.0981	0.0005	0.002	2.00			087492-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087492-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087492-010	SW846 6020
	Calcium	55.4	0.100	1.00	NE	B		087492-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087492-010	SW846 6020
	Cobalt	0.000158	0.0001	0.001	NE	J		087492-010	SW846 6020
	Copper	0.00095	0.0003	0.001	NE	J		087492-010	SW846 6020
	Iron	0.262	0.010	0.100	NE			087492-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087492-010	SW846 6020
	Magnesium	19.3	0.005	0.015	NE			087492-010	SW846 6020
	Manganese	0.00153	0.001	0.005	NE	J		087492-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087492-010	SW846 7470
	Nickel	0.00166	0.0005	0.002	NE	J		087492-010	SW846 6020
	Potassium	4.93	0.080	0.300	NE			087492-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087492-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087492-010	SW846 6020
	Sodium	46.3	0.080	0.250	NE			087492-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087492-010	SW846 6020
	Uranium	0.00923	0.00005	0.0002	0.030			087492-010	SW846 6020
	Vanadium	0.00635	0.003	0.010	NE	J		087492-010	SW846 6020
	Zinc	0.0112	0.0026	0.010	NE			087492-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0311	0.010	0.030	NE	B	0.134U	087495-010	SW846 6020
08-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087495-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087495-010	SW846 6020
	Barium	0.128	0.0005	0.002	2.00			087495-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087495-010	SW846 6020
	Cadmium	0.000133	0.00011	0.001	0.005	J		087495-010	SW846 6020
	Calcium	56.1	0.100	1.00	NE	B		087495-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087495-010	SW846 6020
	Cobalt	0.000165	0.0001	0.001	NE	J		087495-010	SW846 6020
	Copper	0.00105	0.0003	0.001	NE			087495-010	SW846 6020
	Iron	0.275	0.010	0.100	NE			087495-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087495-010	SW846 6020
	Magnesium	20.1	0.005	0.015	NE			087495-010	SW846 6020
	Manganese	0.00219	0.001	0.005	NE	J		087495-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087495-010	SW846 7470
	Nickel	0.00186	0.0005	0.002	NE	J		087495-010	SW846 6020
	Potassium	5.20	0.080	0.300	NE			087495-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087495-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087495-010	SW846 6020
	Sodium	47.8	0.080	0.250	NE			087495-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087495-010	SW846 6020
	Uranium	0.00909	0.00005	0.0002	0.030			087495-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087495-010	SW846 6020
	Zinc	0.0473	0.0026	0.010	NE			087495-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0267	0.010	0.030	NE	B, J	0.134U	087500-010	SW846 6020
09-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087500-010	SW846 6020
	Arsenic	0.00259	0.0015	0.005	0.010	J		087500-010	SW846 6020
	Barium	0.0914	0.0005	0.002	2.00			087500-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087500-010	SW846 6020
	Cadmium	0.000183	0.00011	0.001	0.005	J		087500-010	SW846 6020
	Calcium	54.9	0.100	1.00	NE	B		087500-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087500-010	SW846 6020
	Cobalt	0.00016	0.0001	0.001	NE	J		087500-010	SW846 6020
	Copper	0.00122	0.0003	0.001	NE		0.002U	087500-010	SW846 6020
	Iron	0.264	0.010	0.100	NE			087500-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087500-010	SW846 6020
	Magnesium	19.3	0.005	0.015	NE			087500-010	SW846 6020
	Manganese	0.00342	0.001	0.005	NE	J		087500-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087500-010	SW846 7470
	Nickel	0.00166	0.0005	0.002	NE	J		087500-010	SW846 6020
	Potassium	4.99	0.080	0.300	NE			087500-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087500-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087500-010	SW846 6020
	Sodium	46.7	0.080	0.250	NE			087500-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087500-010	SW846 6020
	Uranium	0.0102	0.00005	0.0002	0.030			087500-010	SW846 6020
	Vanadium	0.00783	0.003	0.010	NE	J		087500-010	SW846 6020
	Zinc	0.00431	0.0026	0.010	NE	J		087500-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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) 09-Jul-09	Aluminum	0.0244	0.010	0.030	NE	B, J	0.134U	087501-010	SW846 6020
	Antimony	ND	0.0005	0.003	0.006	U		087501-010	SW846 6020
	Arsenic	0.0031	0.0015	0.005	0.010	J		087501-010	SW846 6020
	Barium	0.097	0.0005	0.002	2.00			087501-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087501-010	SW846 6020
	Cadmium	0.000221	0.00011	0.001	0.005	J		087501-010	SW846 6020
	Calcium	59.2	0.100	1.00	NE	B		087501-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087501-010	SW846 6020
	Cobalt	0.000173	0.0001	0.001	NE	J		087501-010	SW846 6020
	Copper	0.0017	0.0003	0.001	NE		0.002U	087501-010	SW846 6020
	Iron	0.269	0.010	0.100	NE			087501-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087501-010	SW846 6020
	Magnesium	20.9	0.005	0.015	NE			087501-010	SW846 6020
	Manganese	0.00384	0.001	0.005	NE	J		087501-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087501-010	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	J		087501-010	SW846 6020
	Potassium	5.02	0.080	0.300	NE			087501-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087501-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087501-010	SW846 6020
	Sodium	47.5	0.400	1.25	NE			087501-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087501-010	SW846 6020
	Uranium	0.0107	0.00005	0.0002	0.030			087501-010	SW846 6020
	Vanadium	0.00778	0.003	0.010	NE	J		087501-010	SW846 6020
	Zinc	0.00578	0.0026	0.010	NE	J		087501-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087769-010	SW846 6020
06-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087769-010	SW846 6020
	Arsenic	0.00376	0.0015	0.005	0.010	B, J	0.014U	087769-010	SW846 6020
	Barium	0.103	0.0005	0.002	2.00			087769-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087769-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087769-010	SW846 6020
	Calcium	68.4	0.200	2.00	NE	B		087769-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087769-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087769-010	SW846 6020
	Copper	0.000892	0.0003	0.001	NE	J	0.012U	087769-010	SW846 6020
	Iron	0.153	0.010	0.100	NE	B		087769-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087769-010	SW846 6020
	Magnesium	20.9	0.005	0.015	NE		J	087769-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087769-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087769-010	SW846 7470
	Nickel	0.000817	0.0005	0.002	NE	J		087769-010	SW846 6020
	Potassium	4.32	0.080	0.300	NE			087769-010	SW846 6020
	Selenium	0.00216	0.001	0.005	0.050	J		087769-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087769-010	SW846 6020
	Sodium	51.5	0.800	2.50	NE		J	087769-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087769-010	SW846 6020
	Uranium	0.00732	0.00005	0.0002	0.030			087769-010	SW846 6020
	Vanadium	0.0116	0.003	0.010	NE	B	0.041U	087769-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087769-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 (Duplicate) 06-Oct-09	Aluminum	ND	0.010	0.030	NE	U		087770-010	SW846 6020
	Antimony	ND	0.0005	0.003	0.006	U		087770-010	SW846 6020
	Arsenic	0.00178	0.0015	0.005	0.010	B, J	0.014U	087770-010	SW846 6020
	Barium	0.102	0.0005	0.002	2.00			087770-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087770-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087770-010	SW846 6020
	Calcium	67.4	0.200	2.00	NE	B		087770-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087770-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087770-010	SW846 6020
	Copper	0.00083	0.0003	0.001	NE	J	0.012U	087770-010	SW846 6020
	Iron	0.158	0.010	0.100	NE	B		087770-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087770-010	SW846 6020
	Magnesium	19.2	0.005	0.015	NE		J	087770-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087770-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087770-010	SW846 7470
	Nickel	0.000813	0.0005	0.002	NE	J		087770-010	SW846 6020
	Potassium	4.06	0.080	0.300	NE			087770-010	SW846 6020
	Selenium	0.00224	0.001	0.005	0.050	J		087770-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087770-010	SW846 6020
	Sodium	49.1	0.080	0.250	NE		J	087770-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087770-010	SW846 6020
	Uranium	0.00731	0.00005	0.0002	0.030			087770-010	SW846 6020
	Vanadium	0.0103	0.003	0.010	NE	B	0.041U	087770-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087770-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered),
Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087774-010	SW846 6020
08-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087774-010	SW846 6020
	Arsenic	0.0017	0.0015	0.005	0.010	B, J	0.014U	087774-010	SW846 6020
	Barium	0.109	0.0005	0.002	2.00			087774-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087774-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087774-010	SW846 6020
	Calcium	48.7	0.020	0.200	NE	B		087774-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087774-010	SW846 6020
	Cobalt	0.000275	0.0001	0.001	NE	J		087774-010	SW846 6020
	Copper	0.000487	0.0003	0.001	NE	J		087774-010	SW846 6020
	Iron	0.110	0.010	0.100	NE	B	0.12U	087774-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087774-010	SW846 6020
	Magnesium	17.4	0.005	0.015	NE		J	087774-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087774-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087774-010	SW846 7470
	Nickel	0.000773	0.0005	0.002	NE	J		087774-010	SW846 6020
	Potassium	5.11	0.080	0.300	NE			087774-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087774-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087774-010	SW846 6020
	Sodium	39.1	0.080	0.250	NE		J	087774-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087774-010	SW846 6020
	Uranium	0.00789	0.00005	0.0002	0.030			087774-010	SW846 6020
	Vanadium	0.00896	0.003	0.010	NE	B, J	0.041U	087774-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087774-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Continued)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087772-010	SW846 6020
07-Oct-09	Antimony	ND	0.0005	0.003	0.006	U		087772-010	SW846 6020
	Arsenic	0.00243	0.0015	0.005	0.010	B, J	0.014U	087772-010	SW846 6020
	Barium	0.150	0.0005	0.002	2.00			087772-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087772-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087772-010	SW846 6020
	Calcium	55.8	0.200	2.00	NE	B		087772-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087772-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087772-010	SW846 6020
	Copper	0.000661	0.0003	0.001	NE	J		087772-010	SW846 6020
	Iron	0.125	0.010	0.100	NE	B		087772-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087772-010	SW846 6020
	Magnesium	17.8	0.005	0.015	NE		J	087772-010	SW846 6020
	Manganese	0.151	0.001	0.005	NE			087772-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087772-010	SW846 7470
	Nickel	0.00113	0.0005	0.002	NE	J		087772-010	SW846 6020
	Potassium	5.51	0.080	0.300	NE			087772-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087772-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087772-010	SW846 6020
	Sodium	44.7	0.080	0.250	NE		J	087772-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087772-010	SW846 6020
	Uranium	0.00801	0.00005	0.0002	0.030			087772-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087772-010	SW846 6020
	Zinc	0.00905	0.0026	0.010	NE	J		087772-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-7 *(Concluded)*
Summary of Total Metal Results (Filtered), Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.113	0.010	0.030	NE			087765-010	SW846 6020
05-Oct-09	Antimony	0.000561	0.0005	0.003	0.006	J		087765-010	SW846 6020
	Arsenic	0.0056	0.0015	0.005	0.010	B	0.014U	087765-010	SW846 6020
	Barium	0.099	0.0005	0.002	2.00			087765-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087765-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087765-010	SW846 6020
	Calcium	55.7	0.200	2.00	NE	B		087765-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087765-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087765-010	SW846 6020
	Copper	0.000471	0.0003	0.001	NE	J		087765-010	SW846 6020
	Iron	0.146	0.010	0.100	NE	B		087765-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087765-010	SW846 6020
	Magnesium	17.3	0.005	0.015	NE		J	087765-010	SW846 6020
	Manganese	0.00316	0.001	0.005	NE	J		087765-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087765-010	SW846 7470
	Nickel	0.00114	0.0005	0.002	NE	J		087765-010	SW846 6020
	Potassium	4.79	0.080	0.300	NE			087765-010	SW846 6020
	Selenium	0.00146	0.001	0.005	0.050	J		087765-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087765-010	SW846 6020
	Sodium	38.8	0.080	0.250	NE		J	087765-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087765-010	SW846 6020
	Uranium	0.00918	0.00005	0.0002	0.030			087765-010	SW846 6020
	Vanadium	0.0142	0.003	0.010	NE	B	0.041U	087765-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087765-010	SW846 6020

Refer to footnotes on page 4A-70.

Table 4A-8
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2	Americium-241	1.92 ± 7.66	11.5	5.75	NE	U	BD	086943-033	EPA 901.1
05-Jan-09	Cesium-137	0.672 ± 1.91	3.21	1.60	NE	U	BD	086943-033	EPA 901.1
	Cobalt-60	-0.353 ± 2.02	3.33	1.67	NE	U	BD	086943-033	EPA 901.1
	Potassium-40	-36.1 ± 37.4	42.0	21.0	NE	U	BD	086943-033	EPA 901.1
	Gross Alpha	9.97 ± 5.47	6.36	2.50	15		J+	086943-034	EPA 900.0
	Gross Beta	7.48 ± 2.16	2.69	1.31	4 mrem/yr		J	086943-034	EPA 900.0
	Tritium	55.7 ± 102	172	83.0	NE	U	BD	086943-036	EPA 906.0 M
MWL-MW7	Americium-241	-27.6 ± 12.7	20.4	10.2	NE	U	BD	086946-033	EPA 901.1
06-Jan-09	Cesium-137	0.248 ± 2.15	3.57	1.78	NE	U	BD	086946-033	EPA 901.1
	Cobalt-60	0.821 ± 2.24	3.82	1.91	NE	U	BD	086946-033	EPA 901.1
	Potassium-40	17.1 ± 59.3	30.5	15.3	NE	U	BD	086946-033	EPA 901.1
	Gross Alpha	11.7 ± 5.00	3.50	1.14	15		J+	086946-034	EPA 900.0
	Gross Beta	5.81 ± 1.61	1.94	0.948	4 mrem/yr		J	086946-034	EPA 900.0
	Tritium	-62 ± 96.1	171	82.5	NE	U	BD	086946-036	EPA 906.0 M
MWL-MW8	Americium-241	-3.18 ± 9.09	13.4	6.69	NE	U	BD	086950-033	EPA 901.1
07-Jan-09	Cesium-137	0.262 ± 1.84	3.10	1.55	NE	U	BD	086950-033	EPA 901.1
	Cobalt-60	-0.0527 ± 1.97	3.27	1.63	NE	U	BD	086950-033	EPA 901.1
	Potassium-40	-9.95 ± 40.6	43.6	21.8	NE	U	BD	086950-033	EPA 901.1
	Gross Alpha	10.1 ± 3.51	1.06	0.457	15			086950-034	EPA 900.0
	Gross Beta	8.89 ± 2.02	1.96	0.952	4 mrem/yr			086950-034	EPA 900.0
	Tritium	0.00 ± 98.7	171	82.8	NE	U	BD	086950-036	EPA 906.0 M
MWL-MW8 (Duplicate)	Americium-241	-3.7 ± 11.6	19.6	9.83	NE	U	BD	086951-033	EPA 901.1
07-Jan-09	Cesium-137	0.379 ± 2.05	3.50	1.75	NE	U	BD	086951-033	EPA 901.1
	Cobalt-60	-3.27 ± 4.36	3.52	1.76	NE	U	BD	086951-033	EPA 901.1
	Potassium-40	48.3 ± 57.2	32.5	16.3	NE	X	R	086951-033	EPA 901.1
	Gross Alpha	10.5 ± 3.09	1.35	0.602	15			086951-034	EPA 900.0
	Gross Beta	7.44 ± 1.76	1.81	0.880	4 mrem/yr			086951-034	EPA 900.0
	Tritium	-4.47 ± 99.2	172	83.4	NE	U	BD	086951-036	EPA 906.0 M
MWL-MW9	Americium-241	-8.34 ± 11.4	19.1	9.54	NE	U	BD	086953-033	EPA 901.1
08-Jan-09	Cesium-137	0.276 ± 2.05	3.50	1.75	NE	U	BD	086953-033	EPA 901.1
	Cobalt-60	-1.96 ± 4.40	3.85	1.92	NE	U	BD	086953-033	EPA 901.1
	Potassium-40	15.7 ± 56.8	31.9	15.9	NE	U	BD	086953-033	EPA 901.1
	Gross Alpha	10.8 ± 2.69	1.83	0.845	15			086953-034	EPA 900.0
	Gross Beta	6.84 ± 1.71	1.85	0.897	4 mrem/yr			086953-034	EPA 900.0
	Tritium	76.8 ± 104	174	84.2	NE	U	BD	086953-036	EPA 906.0 M

Refer to footnotes on page 4A-70.

Table 4A-8 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2	Americium-241	1.79 ± 8.72	13.5	6.74	NE	U	BD	087151-033	EPA 901.1
01-Apr-09	Cesium-137	-2.19 ± 2.60	2.95	1.47	NE	U	BD	087151-033	EPA 901.1
	Cobalt-60	-0.749 ± 1.96	3.22	1.61	NE	U	BD	087151-033	EPA 901.1
	Potassium-40	-44.1 ± 34.8	39.4	19.7	NE	U	BD	087151-033	EPA 901.1
	Gross Alpha	12.3 ± 3.46	2.74	1.27	15			087151-034	EPA 900.0
	Gross Beta	7.77 ± 2.46	3.26	1.60	4 mrem/yr		J	087151-034	EPA 900.0
	Tritium	28.2 ± 95.0	163	78.7	NE	U	BD	087151-036	EPA 906.0 M
MWL-MW4	Americium-241	0.611 ± 3.95	5.82	2.91	NE	U	BD	087169-033	EPA 901.1
13-Apr-09	Cesium-137	2.93 ± 2.58	4.56	2.28	NE	U	BD	087169-033	EPA 901.1
	Cobalt-60	-1.68 ± 3.10	4.82	2.41	NE	U	BD	087169-033	EPA 901.1
	Potassium-40	-13.5 ± 44.7	56.4	28.2	NE	U	BD	087169-033	EPA 901.1
	Gross Alpha	6.62 ± 1.83	0.903	0.375	15			087169-034	EPA 900.0
	Gross Beta	5.04 ± 1.49	1.89	0.921	4 mrem/yr		J	087169-034	EPA 900.0
	Tritium	-44.1 ± 91.1	176	80.4	NE	U	BD	087169-036	EPA 906.0 M
MWL-MW5	Americium-241	-15.1 ± 7.54	12.0	6.01	NE	U	BD	087153-033	EPA 901.1
02-Apr-09	Cesium-137	0.375 ± 1.84	3.08	1.54	NE	U	BD	087153-033	EPA 901.1
	Cobalt-60	0.874 ± 1.99	3.42	1.71	NE	U	BD	087153-033	EPA 901.1
	Potassium-40	-36.6 ± 40.1	40.3	20.1	NE	U	BD	087153-033	EPA 901.1
	Gross Alpha	**15.9 ± 4.12**	1.76	0.753	15			087153-034	EPA 900.0
	Gross Beta	8.18 ± 2.81	3.82	1.86	4 mrem/yr		J	087153-034	EPA 900.0
	Tritium	78.1 ± 97.8	163	78.7	NE	U	BD	087153-036	EPA 906.0 M
MWL-MW6	Americium-241	0.125 ± 13.1	19.8	9.91	NE	U	BD	087158-033	EPA 901.1
03-Apr-09	Cesium-137	0.157 ± 2.18	3.61	1.81	NE	U	BD	087158-033	EPA 901.1
	Cobalt-60	-0.798 ± 3.29	3.69	1.85	NE	U	BD	087158-033	EPA 901.1
	Potassium-40	93.8 ± 43.5	36.3	18.2	NE		J	087158-033	EPA 901.1
	Gross Alpha	13.4 ± 2.91	1.37	0.604	15			087158-034	EPA 900.0
	Gross Beta	8.27 ± 1.78	1.34	0.637	4 mrem/yr			087158-034	EPA 900.0
	Tritium	54.3 ± 96.5	163	78.8	NE	U	BD	087158-036	EPA 906.0 M
MWL-MW6 (Duplicate)	Americium-241	-3.47 ± 11.0	18.7	9.38	NE	U	BD	087159-033	EPA 901.1
03-Apr-09	Cesium-137	0.939 ± 1.97	3.40	1.70	NE	U	BD	087159-033	EPA 901.1
	Cobalt-60	-0.234 ± 2.08	3.46	1.73	NE	U	BD	087159-033	EPA 901.1
	Potassium-40	-9.76 ± 43.8	49.7	24.9	NE	U	BD	087159-033	EPA 901.1
	Gross Alpha	13.9 ± 3.18	1.44	0.637	15			087159-034	EPA 900.0
	Gross Beta	7.89 ± 1.95	1.89	0.910	4 mrem/yr			087159-034	EPA 900.0
	Tritium	28.1 ± 94.5	162	78.3	NE	U	BD	087159-036	EPA 906.0 M

Refer to footnotes on page 4A-70.

Table 4A-8 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW7	Americium-241	-6.93 ± 5.09	8.19	4.10	NE	U	BD	087165-033	EPA 901.1
08-Apr-09	Cesium-137	-1.13 ± 1.83	3.00	1.50	NE	U	BD	087165-033	EPA 901.1
	Cobalt-60	1.63 ± 1.87	3.33	1.67	NE	U	BD	087165-033	EPA 901.1
	Potassium-40	-2.78 ± 33.0	42.7	21.4	NE	U	BD	087165-033	EPA 901.1
	Gross Alpha	8.44 ± 1.99	1.28	0.576	15			087165-034	EPA 900.0
	Gross Beta	6.22 ± 1.36	1.15	0.551	4 mrem/yr			087165-034	EPA 900.0
	Tritium	10.9 ± 94.6	164	79.1	NE	U	BD	087165-036	EPA 906.0 M
MWL-MW8	Americium-241	11.7 ± 12.5	19.4	9.71	NE	U	BD	087161-033	EPA 901.1
07-Apr-09	Cesium-137	0.838 ± 2.05	3.46	1.73	NE	U	BD	087161-033	EPA 901.1
	Cobalt-60	0.904 ± 2.16	3.69	1.85	NE	U	BD	087161-033	EPA 901.1
	Potassium-40	68.3 ± 36.6	34.7	17.4	NE		J	087161-033	EPA 901.1
	Gross Alpha	9.60 ± 2.25	1.16	0.516	15			087161-034	EPA 900.0
	Gross Beta	7.49 ± 1.51	1.01	0.480	4 mrem/yr			087161-034	EPA 900.0
	Tritium	21.7 ± 94.7	163	78.7	NE	U	BD	087161-036	EPA 906.0 M
MWL-MW9	Americium-241	2.82 ± 3.77	6.15	3.08	NE	U	BD	087167-033	EPA 901.1
09-Apr-09	Cesium-137	0.440 ± 2.92	4.85	2.43	NE	U	BD	087167-033	EPA 901.1
	Cobalt-60	-3.16 ± 4.29	4.85	2.43	NE	U	BD	087167-033	EPA 901.1
	Potassium-40	63.0 ± 32.3	63.0	31.3	NE	U	BD	087167-033	EPA 901.1
	Gross Alpha	11.3 ± 2.45	0.815	0.348	15			087167-034	EPA 900.0
	Gross Beta	5.27 ± 1.16	0.949	0.452	4 mrem/yr			087167-034	EPA 900.0
	Tritium	17.4 ± 94.6	163	78.8	NE	U	BD	087167-036	EPA 906.0 M
MWL-BW2	Americium-241	3.48 ± 6.04	9.26	4.63	NE	U	BD	087489-033	EPA 901.1
06-Jul-09	Cesium-137	0.118 ± 1.53	2.64	1.32	NE	U	BD	087489-033	EPA 901.1
	Cobalt-60	1.51 ± 1.66	2.91	1.46	NE	U	BD	087489-033	EPA 901.1
	Potassium-40	8.12 ± 43.8	25.2	12.6	NE	U	BD	087489-033	EPA 901.1
	Gross Alpha	10.0 ± 3.27	2.04	0.901	15			087489-034	EPA 900.0
	Gross Beta	8.67 ± 4.30	5.60	2.45	4 mrem/yr		J	087489-034	EPA 900.0
	Tritium	-66.1 ± 91.6	163	78.9	NE	U	BD	087489-036	EPA 906.0 M

Refer to footnotes on page 4A-70.

Table 4A-8 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-MW7	Americium-241	-10.8 ± 12.8	19.2	9.59	NE	U	BD	087492-033	EPA 901.1
07-Jul-09	Cesium-137	1.91 ± 4.46	3.07	1.54	NE	U	BD	087492-033	EPA 901.1
	Cobalt-60	-0.00746 ± 1.95	3.32	1.66	NE	U	BD	087492-033	EPA 901.1
	Potassium-40	2.11 ± 42.1	43.4	21.7	NE	U	BD	087492-033	EPA 901.1
	Gross Alpha	9.84 ± 2.59	1.85	0.819	15			087492-034	EPA 900.0
	Gross Beta	5.81 ± 2.38	3.48	1.70	4 mrem/yr		J	087492-034	EPA 900.0
	Tritium	-128 ± 89.4	163	78.9	NE	U	BD	087492-036	EPA 906.0 M
MWL-MW8	Americium-241	-1.01 ± 5.53	8.25	4.13	NE	U	BD	087495-033	EPA 901.1
08-Jul-09	Cesium-137	0.105 ± 1.83	3.09	1.55	NE	U	BD	087495-033	EPA 901.1
	Cobalt-60	0.712 ± 1.83	3.16	1.58	NE	U	BD	087495-033	EPA 901.1
	Potassium-40	17.0 ± 47.3	31.0	15.5	NE	U	BD	087495-033	EPA 901.1
	Gross Alpha	12.9 ± 3.10	1.86	0.826	15			087495-034	EPA 900.0
	Gross Beta	6.10 ± 3.79	5.32	2.31	4 mrem/yr		J	087495-034	EPA 900.0
	Tritium	-82.8 ± 91.2	163	79.0	NE	U	BD	087495-036	EPA 906.0 M
MWL-MW9	Americium-241	19.9 ± 15.5	24.3	12.2	NE	U	BD	087500-033	EPA 901.1
09-Jul-09	Cesium-137	-1.5 ± 1.80	2.94	1.47	NE	U	BD	087500-033	EPA 901.1
	Cobalt-60	0.210 ± 2.03	3.46	1.73	NE	U	BD	087500-033	EPA 901.1
	Potassium-40	45.7 ± 44.1	29.8	14.9	NE	X	R	087500-033	EPA 901.1
	Gross Alpha	10.6 ± 2.82	2.32	1.05	15			087500-034	EPA 900.0
	Gross Beta	8.18 ± 2.28	2.72	1.32	4 mrem/yr			087500-034	EPA 900.0
	Tritium	-82.5 ± 90.9	163	78.8	NE	U	BD	087500-036	EPA 906.0 M
MWL-MW9 (Duplicate)	Americium-241	2.48 ± 7.82	13.6	6.82	NE	U	BD	087501-033	EPA 901.1
09-Jul-09	Cesium-137	-3.56 ± 2.89	3.10	1.55	NE	U	BD	087501-033	EPA 901.1
	Cobalt-60	0.070 ± 1.89	3.16	1.58	NE	U	BD	087501-033	EPA 901.1
	Potassium-40	5.11 ± 52.8	28.6	14.3	NE	U	BD	087501-033	EPA 901.1
	Gross Alpha	10.9 ± 2.73	1.27	0.526	15			087501-034	EPA 900.0
	Gross Beta	4.78 ± 3.10	4.16	1.72	4 mrem/yr		J	087501-034	EPA 900.0
	Tritium	-47.6 ± 92.3	163	78.9	NE	U	BD	087501-036	EPA 906.0 M

Refer to footnotes on page 4A-70.

Table 4A-8 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
MWL-BW2	Americium-241	5.72 ± 6.12	9.47	4.74	NE	U	BD	087769-033	EPA 901.1
06-Oct-09	Cesium-137	-0.584 ± 1.52	2.56	1.28	NE	U	BD	087769-033	EPA 901.1
	Cobalt-60	0.374 ± 1.54	2.57	1.29	NE	U	BD	087769-033	EPA 901.1
	Potassium-40	18.7 ± 32.4	28.3	14.2	NE	U	BD	087769-033	EPA 901.1
	Gross Alpha	9.54 ± 2.69	1.86	0.836	15			087769-034	EPA 900.0
	Gross Beta	3.17 ± 1.76	2.73	1.33	4 mrem/yr		J	087769-034	EPA 900.0
	Tritium	-11.6 ± 90.9	158	76.6	NE	U	BD	087769-036	EPA 906.0 M
MWL-BW2 (Duplicate)	Americium-241	2.73 ± 2.69	4.18	2.09	NE	U	BD	087770-033	EPA 901.1
06-Oct-09	Cesium-137	-3.96 ± 5.30	5.42	2.71	NE	U	BD	087770-033	EPA 901.1
	Cobalt-60	1.28 ± 2.22	3.86	1.93	NE	U	BD	087770-033	EPA 901.1
	Potassium-40	20.3 ± 48.1	34.7	17.4	NE	U	BD	087770-033	EPA 901.1
	Gross Alpha	7.43 ± 5.05	6.27	2.36	15		J	087770-034	EPA 900.0
	Gross Beta	6.30 ± 2.13	2.88	1.40	4 mrem/yr		J	087770-034	EPA 900.0
	Tritium	-78.9 ± 88.1	157	76.2	NE	U	BD	087770-036	EPA 906.0 M
MWL-MW7	Americium-241	-1.03 ± 4.56	5.00	2.50	NE	U	BD	087774-033	EPA 901.1
08-Oct-09	Cesium-137	-3.52 ± 3.64	3.85	1.92	NE	U	BD	087774-033	EPA 901.1
	Cobalt-60	1.71 ± 2.47	4.29	2.15	NE	U	BD	087774-033	EPA 901.1
	Potassium-40	40.5 ± 23.2	34.8	17.4	NE	X	R	087774-033	EPA 901.1
	Gross Alpha	8.99 ± 2.56	1.82	0.819	15			087774-034	EPA 900.0
	Gross Beta	8.92 ± 4.15	5.23	2.31	4 mrem/yr		J	087774-034	EPA 900.0
	Tritium	9.69 ± 91.9	158	76.8	NE	U	BD	087774-036	EPA 906.0 M
MWL-MW8	Americium-241	-0.0692 ± 7.92	11.8	5.90	NE	U	BD	087772-033	EPA 901.1
07-Oct-09	Cesium-137	0.322 ± 1.92	3.21	1.61	NE	U	BD	087772-033	EPA 901.1
	Cobalt-60	-0.195 ± 1.85	3.07	1.54	NE	U	BD	087772-033	EPA 901.1
	Potassium-40	3.48 ± 40.7	33.3	16.7	NE	U	BD	087772-033	EPA 901.1
	Gross Alpha	8.98 ± 5.46	6.54	2.55	15		J	087772-034	EPA 900.0
	Gross Beta	5.19 ± 3.17	4.34	1.86	4 mrem/yr		J	087772-034	EPA 900.0
	Tritium	-48.5 ± 89.8	158	76.8	NE	U	BD	087772-036	EPA 906.0 M
MWL-MW9	Americium-241	2.94 ± 11.4	17.2	8.59	NE	U	BD	087765-033	EPA 901.1
05-Oct-09	Cesium-137	-2.78 ± 1.95	3.06	1.53	NE	U	BD	087765-033	EPA 901.1
	Cobalt-60	-0.124 ± 2.10	3.55	1.78	NE	U	BD	087765-033	EPA 901.1
	Potassium-40	-37.9 ± 40.9	47.7	23.9	NE	U	BD	087765-033	EPA 901.1
	Gross Alpha	11.0 ± 2.94	1.70	0.759	15			087765-034	EPA 900.0
	Gross Beta	5.75 ± 3.61	5.14	2.25	4 mrem/yr		J	087765-034	EPA 900.0
	Tritium	9.66 ± 91.6	158	76.6	NE	U	BD	087765-036	EPA 906.0 M

Refer to footnotes on page 4A-70.

Table 4A-9
Summary of Field Water Quality Measurements[h], Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)	Alkalinity (mg/L $CaCO_3$ at 4.5 pH)
MWL-BW2	05-Jan-09	15.54	761	133.5	7.36	0.76	6.1	0.61	216
MWL-MW7	06-Jan-09	15.48	627	263.0	7.53	11.8	44.6	4.44	163
MWL-MW8	07-Jan-09	16.74	625	209.3	7.52	1.73	63.8	6.11	182
MWL-MW9	08-Jan-09	15.99	626	219.2	7.34	1.05	18.1	1.80	177
MWL-BW2	01-Apr-09	17.51	762	108.8	7.34	0.25	6.7	0.64	NM
MWL-MW4	13-Apr-09	18.60	644	187.3	7.54	0.35	19.5	1.82	NM
MWL-MW5	02-Apr-09	19.21	951	121.0	7.23	0.36	27.1	2.50	NM
MWL-MW6	03-Apr-09	19.89	903	115.0	7.36	0.21	30.7	2.79	NM
MWL-MW7	08-Apr-09	19.99	630	165.2	7.50	1.03	43.0	3.90	NM
MWL-MW8	07-Apr-09	19.48	626	119.9	7.53	0.97	60.5	5.55	NM
MWL-MW9	09-Apr-09	19.92	629	116.9	7.50	6.82	44.0	4.00	NM
MWL-BW2	06-Jul-09	21.28	793	-70.3	7.73	0.37	8.4	0.75	NM
MWL-MW7	07-Jul-09	23.20	655	-19.9	7.82	0.69	53.2	4.45	NM
MWL-MW8	08-Jul-09	24.95	666	-53.1	8.02	2.05	96.6	7.99	NM
MWL-MW9	09-Jul-09	26.32	657	-75.2	8.07	7.81	65.1	5.24	NM
MWL-BW2	06-Oct-09	18.76	688	146.6	7.23	0.40	6.5	0.61	NM
MWL-MW7	08-Oct-09	19.24	555	195.4	7.46	0.48	47.5	4.37	NM
MWL-MW8	07-Oct-09	20.93	569	152.9	7.36	0.83	26.9	2.39	NM
MWL-MW9	05-Oct-09	21.19	544	166.0	7.38	1.10	33.1	2.91	NM

Refer to footnotes on page 4A-70.

Table 4A-10
Duplicate Sample Analytical Results for Chemical Analyses, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Sample Location	MWL-MW8* Environmental	MWL-MW8* Duplicate	RPD[b]
	Result (R_1)	Result (R_2)	
Parameter[a]	All results in mg/L (except where noted)		
Toluene	0.496 µg/L	0.495 µg/L	<1
Nitrate plus nitrite as N	1.11	1.12	1
Alkalinity, total as CaCO3	222	222	<1
Bromide	0.302	0.328	8
Chloride	44.7	44.4	1
Fluoride	1.05	1.02	3
Sulfate	34.9	34.7	1
Aluminum (unfiltered)	0.760	0.608	22
Barium (unfiltered)	0.123	0.122	1
Calcium (unfiltered)	54.4	52.9	3
Chromium (unfiltered)	0.00359	0.00373	4
Cobalt (unfiltered)	0.000501	0.000460	9
Copper (unfiltered)	0.00192	0.00188	2
Iron (unfiltered)	0.718	0.171	123
Lead (unfiltered)	0.0005	ND	NC
Magnesium (unfiltered)	19.1	18.4	4
Manganese (unfiltered)	0.0274	0.0256	7
Nickel (unfiltered)	0.00236	0.00262	10
Potassium (unfiltered)	5.44	5.68	4
Sodium (unfiltered)	49.0	47.9	2
Uranium (unfiltered)	0.00875	0.00856	2
Zinc (unfiltered)	0.00384	0.00383	<1
Aluminum (filtered)	0.0183	0.0104	55
Barium (filtered)	0.114	0.100	13
Calcium (filtered)	49.8	43.5	14
Chromium (filtered)	0.00225	0.00221	2
Cobalt (filtered)	0.000166	0.000162	2
Copper (filtered)	0.00113	0.00102	10
Iron (filtered)	0.164	0.977	143
Magnesium (filtered)	19.0	15.3	22
Nickel (filtered)	0.00185	0.00167	10
Potassium (filtered)	5.16	4.51	13
Sodium (filtered)	46.4	39.8	15

Refer to footnotes at end of table.

Table 4A-10 *(Continued)*
Duplicate Sample Analytical Results for Chemical Analyses, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Sample Location	MWL-MW6[a] Environmental	MWL-MW6[a] Duplicate	RPD[b]
	Result (R_1)	Result (R_2)	
Parameter[c]	All results in mg/L (except where noted)		
2-Butanone	1.37 µg/L	ND	NC
Nitrate plus nitrite as N	1.52	1.72	12
Alkalinity, total as CaCO3	298	298	< 1
Bromide	0.457	0.435	5
Chloride	76.1	75.9	< 1
Fluoride	0.726	0.746	3
Sulfate	51.9	51.8	< 1
Aluminum (unfiltered)	0.00593	0.0085	36
Barium (unfiltered)	0.120	0.120	< 1
Calcium (unfiltered)	88.7	91.1	3
Cobalt (unfiltered)	0.000219	0.000223	2
Copper (unfiltered)	0.00131	0.00112	16
Iron (unfiltered)	0.338	0.344	2
Magnesium (unfiltered)	27.6	29.2	6
Nickel (unfiltered)	0.00186	0.00199	7
Potassium (unfiltered)	5.82	6.39	9
Selenium (unfiltered)	0.00126	0.00132	5
Sodium (unfiltered)	62.5	66.1	6
Thallium (unfiltered)	0.000376	ND	NC
Uranium (unfiltered)	0.0101	0.00975	4
Aluminum (filtered)	ND	0.00633	NC
Barium (filtered)	0.120	0.111	8
Calcium (filtered)	87.6	88.6	1
Cobalt (filtered)	0.000242	0.000189	25
Copper (filtered)	0.00121	0.00117	3
Iron (filtered)	0.327	0.293	11
Magnesium (filtered)	28.6	24.0	17
Nickel (filtered)	0.00172	0.00174	1
Potassium (filtered)	5.74	5.41	6
Selenium (filtered)	0.00142	0.00162	13
Sodium (filtered)	58.9	61.3	4
Uranium (filtered)	0.00964	0.00973	1
2-Butanone	1.37 µg/L	ND	NC
Nitrate plus nitrite as N	1.52	1.72	12

Refer to footnotes at end of table.

Table 4A-10 *(Continued)*
Duplicate Sample Analytical Results for Chemical Analyses, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Sample Location	MWL-MW9[a] Environmental	MWL-MW9[a] Duplicate	RPD[b]
	Result (R_1)	Result (R_2)	
Parameter[c]	All results in mg/L (except where noted)		
Toluene	0.711 µg/L	0.692 µg/L	3
bis(2-Ethylhexyl) phthalate (µg/L)	2.35	2.37	1
Nitrate plus nitrite as N	2.03	1.96	4
Alkalinity, total as CaCO3	217	220	1
Bromide	0.267	0.291	9
Chloride	39.5	38.1	4
Fluoride	1.020	0.996	2
Sulfate	37.7	37.8	< 1
Aluminum (unfiltered)	ND (0.134)	0.207	NC
Arsenic (unfiltered)	0.00268	0.00368	31
Barium (unfiltered)	0.096	0.0978	2
Cadmium (unfiltered)	0.000163	0.000167	2
Calcium (unfiltered)	57.2	59.1	3
Cobalt (unfiltered)	0.000208	0.000249	18
Iron (unfiltered)	0.350	0.525	40
Magnesium (unfiltered)	21.1	20.5	3
Manganese (unfiltered)	0.00648	0.00918	34
Nickel (unfiltered)	0.00178	0.00201	12
Potassium (unfiltered)	5.00	5.18	4
Sodium (unfiltered)	44.2	48.1	8
Uranium (unfiltered)	0.0106	0.0107	1
Vanadium (unfiltered)	0.00918	0.00859	7
Zinc (unfiltered)	0.00398	0.00693	54
Arsenic (unfiltered)	0.00259	0.0031	18
Barium (filtered)	0.0914	0.097	6
Cadmium (filtered)	0.000183	0.000221	19
Calcium (filtered)	54.9	59.2	8
Cobalt (filtered)	0.00016	0.000173	8
Iron (filtered)	0.264	0.269	2
Magnesium (filtered)	19.3	20.9	8
Manganese (filtered)	0.00342	0.00384	12
Nickel (filtered)	0.00166	0.00168	1
Potassium (filtered)	4.99	5.02	1

Refer to footnotes at end of table.

Table 4A-10 *(Concluded)*
Duplicate Sample Analytical Results for Chemical Analyses, Mixed Waste Landfill, Sandia National Laboratories/New Mexico

Calendar Year 2009

Sample Location	MWL-BW2[a] Environmental	MWL-BW2[a] Duplicate	RPD[b]
	Result (R_1)	Result (R_2)	
Parameter[c]	All results in mg/L		
Nitrate plus nitrite as N	2.04	1.98	3
Alkalinity, total as CaCO3	252	248	2
Bromide	0.374	0.365	2
Chloride	61.4	61.3	<1
Fluoride	0.700	0.716	2
Sulfate	43.0	42.8	<1
Barium (unfiltered)	0.103	0.104	1
Calcium (unfiltered)	65.4	67.7	3
Iron (unfiltered)	0.169	0.166	2
Magnesium (unfiltered)	19.6	20.6	5
Nickel (unfiltered)	0.001	0.000888	12
Potassium (unfiltered)	4.01	4.14	3
Selenium (unfiltered)	0.00279	0.00197	34
Sodium (unfiltered)	55.0	49.8000	10
Uranium (unfiltered)	0.00734	0.00730	1
Vanadium (unfiltered)	0.0119	0.01170	2
Barium (filtered)	0.1030	0.102	1
Calcium (filtered)	68.4	67.4	1
Iron (filtered)	0.153	0.158	3
Magnesium (filtered)	20.9	19.2	8
Nickel (filtered)	0.000817	0.000813	<1
Potassium (filtered)	4.32	4.06	6
Selenium (filtered)	0.00216	0.00224	4
Sodium (filtered)	51.5	49.1	5
Uranium (filtered)	0.0073	0.00731	<1
Nitrate plus nitrite as N	2.04	1.98	3
Alkalinity, total as CaCO3	252	248	2
Bromide	0.374	0.365	2
Chloride	61.4	61.3	<1
Fluoride	0.700	0.716	2
Sulfate	43.0	42.8	<1
Barium (unfiltered)	0.103	0.104	1
Calcium (unfiltered)	65.4	67.7	3

[a]Results for MWL-MW8 are from January 2009, MWL-MW6 are from April 2009, MWL-MW9 are from July 2009, and MWL-BW2 are from October 2009.
[b]RPD is not calculated for estimated values.
[c]Parameters not detected in both samples are not listed.

BW = Background well.
J = Analyte detected below practical quantitation limit or reported as an estimated concentration.
µg/L = Microgram(s) per liter.
mg/L = Milligram(s) per liter.
MW = Monitoring well.
MWL = Mixed Waste Landfill.
N = Nitrogen.
NC = Not calculated.
RPD = Relative percent difference is calculated with the following equation and rounded to nearest whole number:

$$RPD = \frac{|R_1 - R_2|}{[(R_1 + R_2)/2]} \times 100$$

where:

R_1 = analysis result
R_2 = duplicate analysis result

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.
- 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.

[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.

[d]MCL

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11(b)), National Primary Drinking Water Standards, EPA, July 2002.
- mrem/yr = millirem per year.
- 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, but not including radon and total uranium.
  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).
U	=	Analyte is absent or below the method detection limit.
X	=	Data rejected due to low abundance.

[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 associate value is an estimated quantity.
J+	=	The associated numerical value is an estimated quantity with suspected positive bias.
J-	=	The associated numerical value is an estimated quantity with suspected negative bias.
R	=	The data are unusable (compound may or may not be present).
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

- U.S. Environmental Protection Agency (EPA), 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA 9310: EPA, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1999, *Perchlorate in Drinking Water Using Ion Chromatography*, EPA 815/R-00-014, U.S. Environmental Protection Agency, Cincinnati, Ohio.

[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.
NM	=	not measured.
NTU	=	nephelometric turbidity units.
pH	=	potential of hydrogen (negative logarithm of the hydrogen ion concentration).

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Attachment 4B
Mixed Waste Landfill
Plots

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Attachment 4B Plots

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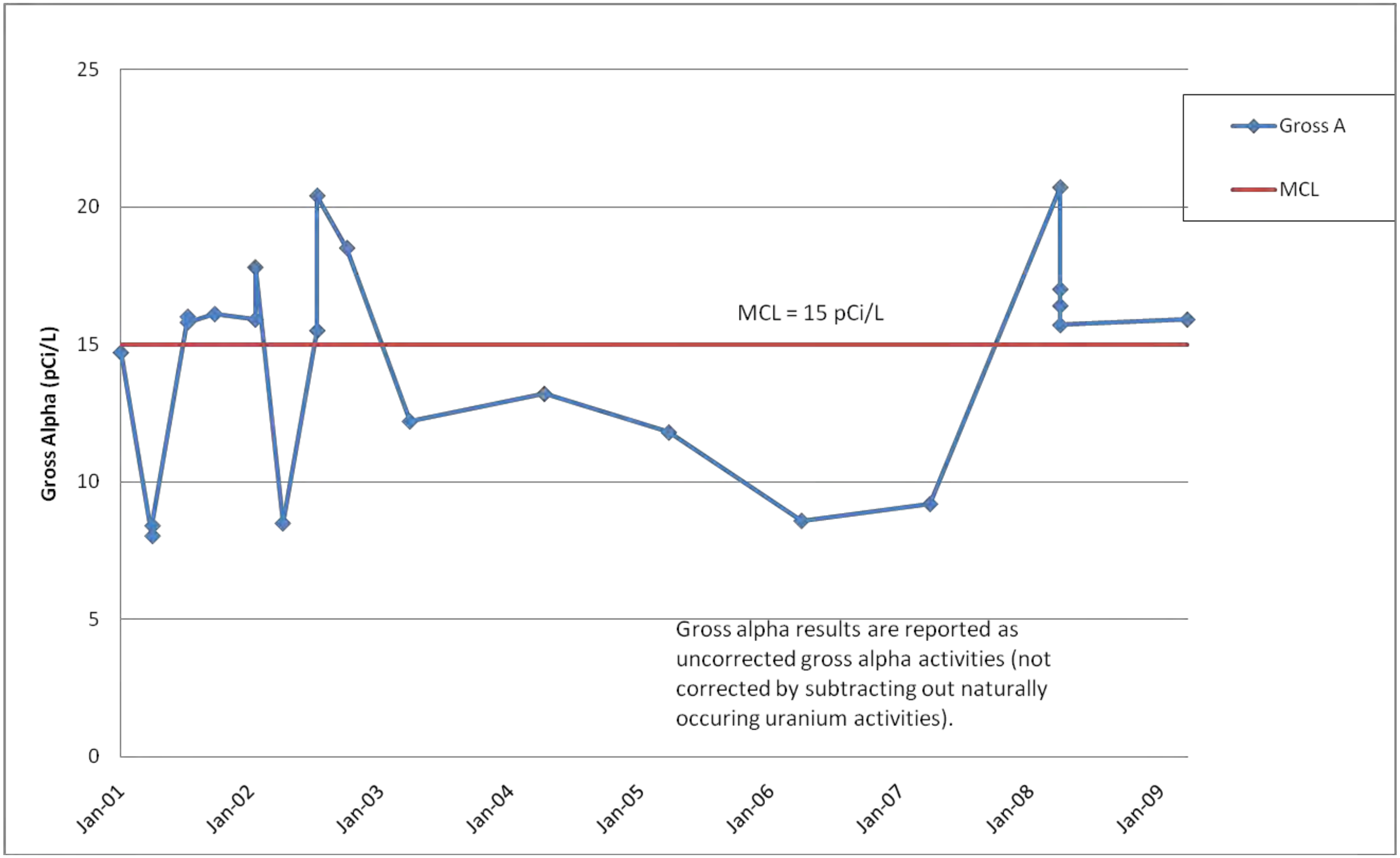

Figure 4B-1. Uncorrected Gross Alpha Activity Results for MWL-MW5

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Attachment 4C
Mixed Waste Landfill
Hydrographs

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Attachment 4C Hydrographs

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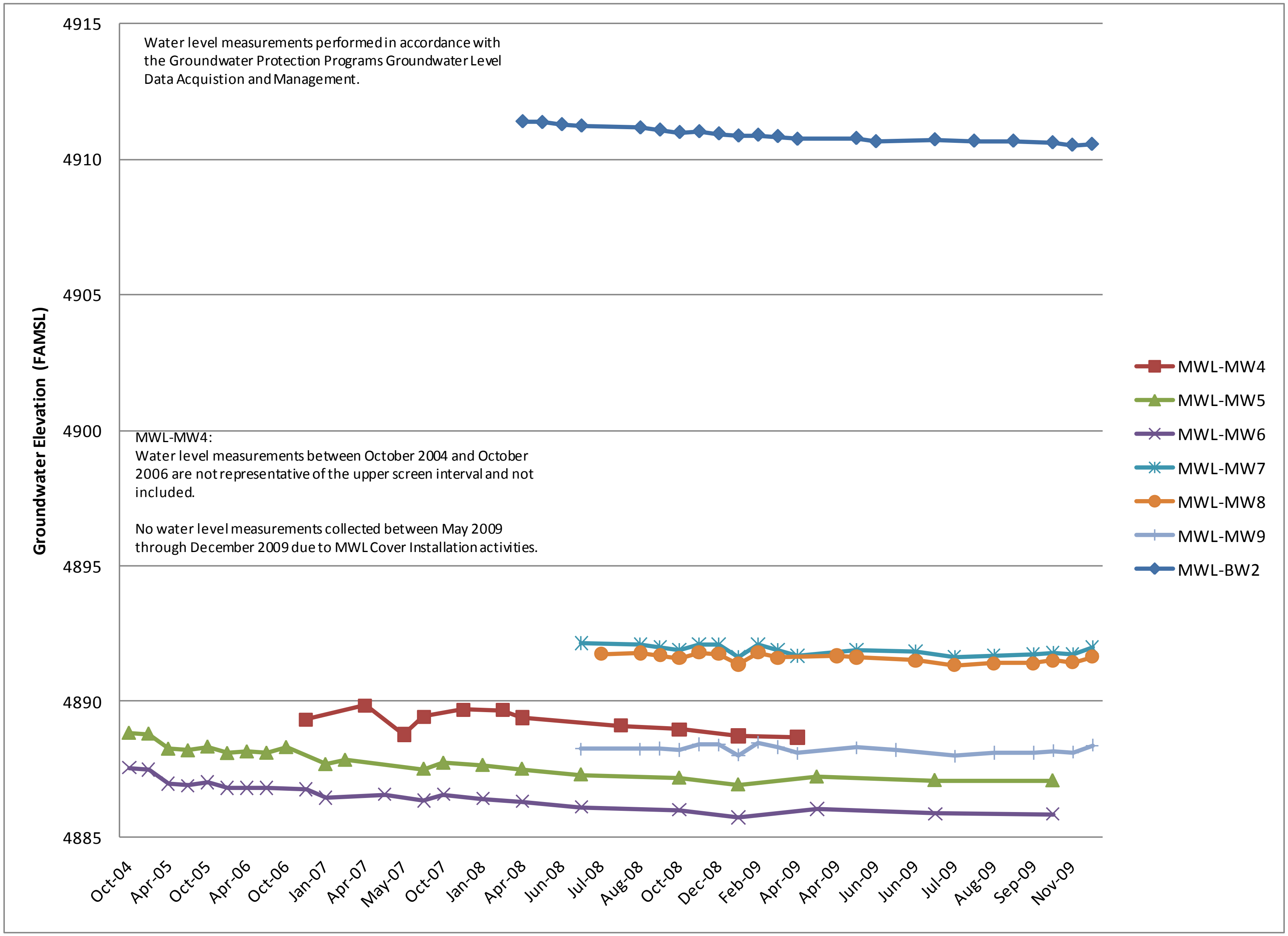

Figure 4C-1. MWL Water Level Hydrograph for MWL Monitoring Wells

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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 level (MCL) in samples collected from monitoring wells. Since 1993, the maximum concentrations detected in the study area have been 26 micrograms per liter (μg/L) of TCE and 19 milligrams per liter (mg/L) of nitrate. The EPA and State of New Mexico drinking water standards (MCLs) 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

Sandia National Laboratories, New Mexico (SNL/NM) manages TA-V, which occupies approximately 35 acres in the northeastern corner of TA-III (Figure 5-1). TA-V is located in the north-central portion of Kirtland Air Force Base (KAFB), south of the City of Albuquerque (COA) (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 through the Sandia Site 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. These facilities include two research reactors, a Gamma Irradiation Facility, and Hot Cell Facility. Historically, wastewater containing contaminants derived from these facilities was disposed of to drain fields, seepage pits, and unlined ponds. The SNL/NM Environmental Restoration (ER) Project has 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 Sandia over the past 17 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 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).

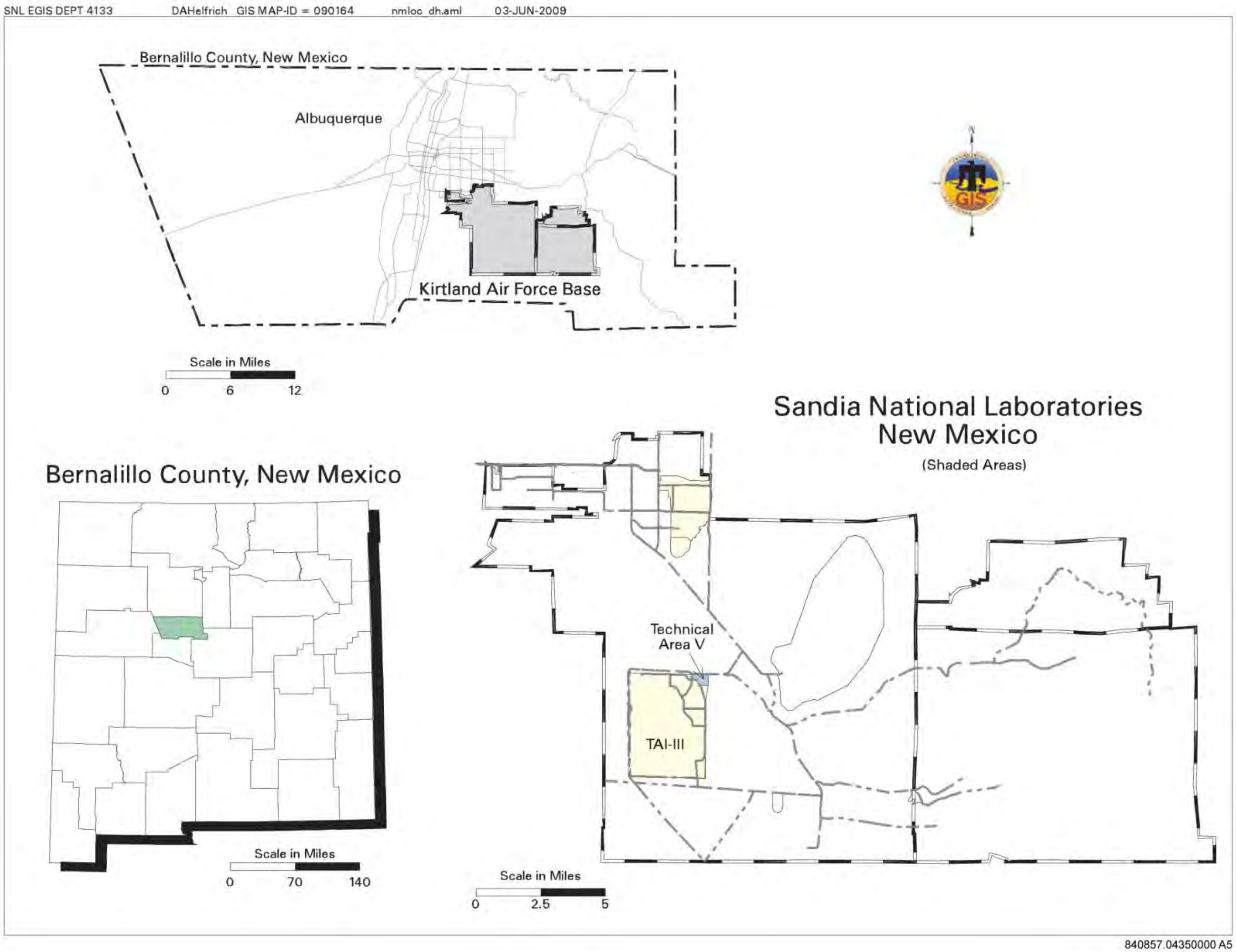

Figure 5-1. Location of the TA-V Study Area

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.	NMSEO 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	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	DOE submits 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 is plugged and abandoned as there is a potential for the ungrouted borehole for this production well to act as a conduit for contaminant transport into the groundwater.	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	DOE/Sandia provides 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	DOE/Sandia provides 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	SNL/NM submits 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 2003a
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 Consent Order) to the DOE/Sandia, which identified TA-V as an area with groundwater contamination requiring a CME.	NMED April 2004
May	2004	DOE/Sandia submit the *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Technical Area-V*. This document was required by the Consent Order.	SNL April 2004a
May	2004	DOE/Sandia submits the *Corrective Measures Evaluation Work Plan, Technical Area V Groundwate*r. This document was required by the Consent Order.	SNL April 2004b
October	2004	The NMED issues an approval with modifications to the TA-V CME Work Plan and the Current Conceptual Model of Groundwater Flow and Contaminant Transport.	NMED October 2004

Table 5-1. Historical Timeline of the TA-V Study Area *(Continued)*

Month	Year	Event	Reference
December	2004	DOE/Sandia 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	DOE/Sandia 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	DOE/Sandia 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	DOE/Sandia 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	SNL/NM, DOE, 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	DOE/Sandia submit a response to the NOD on the July 2005 CME Report for TA-V Groundwater.	SNL April 2009a
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	DOE/Sandia 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

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.
NMSEO = New Mexico State Engineer Office.
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 Consent Order) between the New Mexico Environment Department (NMED), DOE, and Sandia specified that TA-V was 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 Consent Order, this document was submitted to the NMED along with the *Corrective Measures Evaluation (CME) Work Plan, TA-V Groundwater* (SNL April 2004b) by 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 CME Work Plan, Sandia submitted the CME Report to the NMED in July 2005 (SNL July 2005).

5.1.4 Current Monitoring Network

Currently 13 wells in the TA-V study area are being monitored for water quality and water levels (Figure 5-2; Table 5-2). Table XI-1 of the Consent Order (NMED April 2004) specifies that the sampling frequency for groundwater monitoring at TA-V is quarterly.

5.1.5 Summary of Calendar Year Activities

The following activities took place for the TA-V study area during Calendar Year (CY) 2009:

- Monthly water level measurements were obtained for all TA-V wells.

- Quarterly groundwater sampling events were conducted at 12 wells (Table 5-2) in February 2009, May/June 2009, August/September 2009, and November/December 2009.

- Quarterly perchlorate screening groundwater sampling and reporting were performed for LWDS-MW1 in May/June 2009, August/September 2009, and November/December 2009 (NMED April 2009).

- The letter from the NMED, *RE: Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID#NM5890110518,* was received in April 2009 (NMED April 2009).

- The *DOE/Sandia Responses to NMED Notice of Disapproval [NOD]: Corrective Measures Evaluation Report for Technical Area V Groundwater, July 2005* were prepared and submitted to the NMED (SNL April 2009a).

- The NMED issued the second NOD*, Notice of Disapproval: DOE/Sandia Responses to NMED's Notice of Disapproval for Corrective Measures Evaluation Report for Technical Area V Groundwater, July 2005* (NMED August 2009).

- The *DOE/Sandia Responses to NMED's Notice of Disapproval: DOE/Sandia Responses to NMED's Notice of Disapproval for Corrective Measures Evaluation Report for Technical Area V Groundwater, July 2005* (response to the second NOD) were prepared and submitted to the NMED (SNL November 2009).

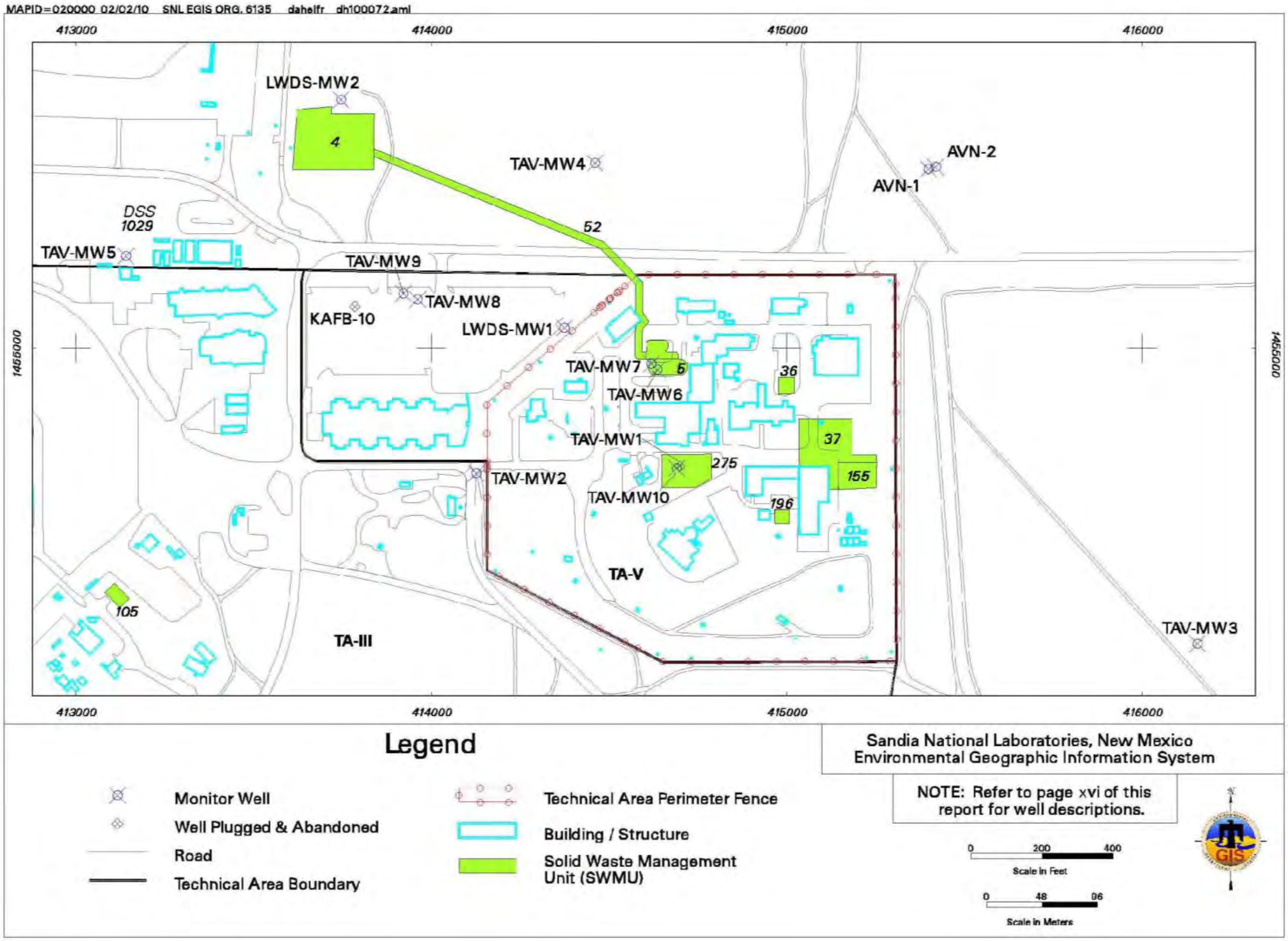

Figure 5-2. TA-V Monitoring Well Locations (12 Active Wells)

Table 5-2. Groundwater Monitoring Wells at the TA-V Study Area

Well	Installation Year	WQ	WL	Comments
LWDS-MW1	1993	√	√	Regional aquifer
LWDS-MW2	1992	√	√	Regional aquifer
AVN-1	1995	√	√	Regional aquifer
AVN-2	1995			Regional aquifer; currently dry
TAV-MW1	1995			Regional aquifer, plugged and abandoned February 2008
TAV-MW2	1995	√	√	Regional aquifer
TAV-MW3	1997	√	√	Regional aquifer
TAV-MW4	1997	√	√	Regional aquifer
TAV-MW5	1997	√	√	Regional aquifer
TAV-MW6	2001	√	√	Regional aquifer, water table completion
TAV-MW7	2001	√	√	Regional aquifer, deep completion (597–617 feet)
TAV-MW8	2001	√	√	Regional aquifer, water table completion
TAV-MW9	2001	√	√	Regional aquifer, deep completion (582–602 feet)
TAV-MW10	2008	√	√	Regional aquifer, replaced TAV-MW1

NOTE: Check marks in the WQ and WL columns indicate WQ sampling and WL measurements were obtained during this reporting period.
TA-V = Technical Area V.
WL = Water level.
WQ = Water quality.

- The NMED issued the third NOD, *Notice of Disapproval: Corrective Measures Evaluation Report for Technical Area V Groundwater, July 2005–November 2009 Response to Notice of Deficiency* (NMED December 2009).

- Tables of analytical results (Attachment 5A), concentration versus time plots (Attachment 5B), and hydrographs (Attachment 5C) were prepared in support of this report.

5.1.6 Summary of Future Activities

The following activities are anticipated for the TA-V study area during CY 2010:

- Obtain monthly water level measurements for all TA-V wells.

- Conduct quarterly groundwater sampling at 12 TA-V wells.

- Perform quarterly perchlorate screening groundwater sampling and reporting for LWDS-MW1.

- Submit a response to the NMED's third NOD (NMED December 2009) *Notice of Disapproval: Corrective Measures Evaluation Report for Technical Area V Groundwater, July 2005–November 2009 Response to Notice of Deficiency*.

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 present in water 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 discharged to the seepage pits from the early 1980s until 1992 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 groundwater flow (4 to 20 ft per year [ft/yr]) is responsible for the present distribution of TCE in the aquifer.

Nitrate concentrations in groundwater at TA-V are primarily derived from unknown upgradient sources. These concentrations have exceeded MCLs in the two upgradient AVN wells, LWDS-MW1, and TAV-MW5.

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 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

Areal precipitation may provide one possible source of local recharge. 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 and Coyote arroyos to the north and Hells Canyon arroyo to the south of TA-V channel sporadic, short, ephemeral flows from mountainous drainages to the east. Part of the recharge derived from infiltration of these flows is returned to the atmosphere through processes of evapotranspiration. Some water that infiltrates arroyo channels may move past the root zone and provide some local recharge. The distance between these ephemeral stream channels and TA-V precludes a significant effect on local flow and contaminant transport.

The vadose zone at TA-V, consisting of approximately 500 ft of unconsolidated to semiconsolidated alluvial sediments, forms the potential pathway for contaminant 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 have not been fully characterized. However, they are highly variable and anisotropic because of the heterogeneous textures, lenticularity, layering, and changes in cementation. Disposal of wastewater from the LWDS drain field, the LWDS surface impoundments, and the TA-V seepage pits resulted in the development of 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 have been somewhat attenuated or diverted at horizons of contrasting hydraulic properties. Discharge of wastewater to the drain field was discontinued in 1967. Discharge to the seepage pits was discontinued in the early 1990s.

No evidence of perching has been observed at TA-V. Based on recent 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.

A wide range of hydraulic conductivity estimates were derived from aquifer tests at TA-V, 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 nine wells were used to construct a map of the 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 October 2009 horizontal gradient ranged from approximately 0.0007 to 0.002 ft/ft. Calculated groundwater flow velocities based on aquifer testing range from 4 to 10 ft/yr (SNL March 1999a). Water-table contours for October 2009 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 COA 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 facies at TA-V and permit 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 ft/yr (Attachment 5C, Figures 5C-1 and 5C-2).

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, areal precipitation, and ephemeral flows in nearby arroyos.

SWMUs 4, 5, and 275 are responsible for the majority of wastewater discharged at TA-V. Table 5-3 identifies the dates of disposal and estimated disposal volumes. After 1992, wastewater was disposed of to the COA sanitary sewer system.

Sampling and analysis have been conducted in the vadose zone in order 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 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 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).

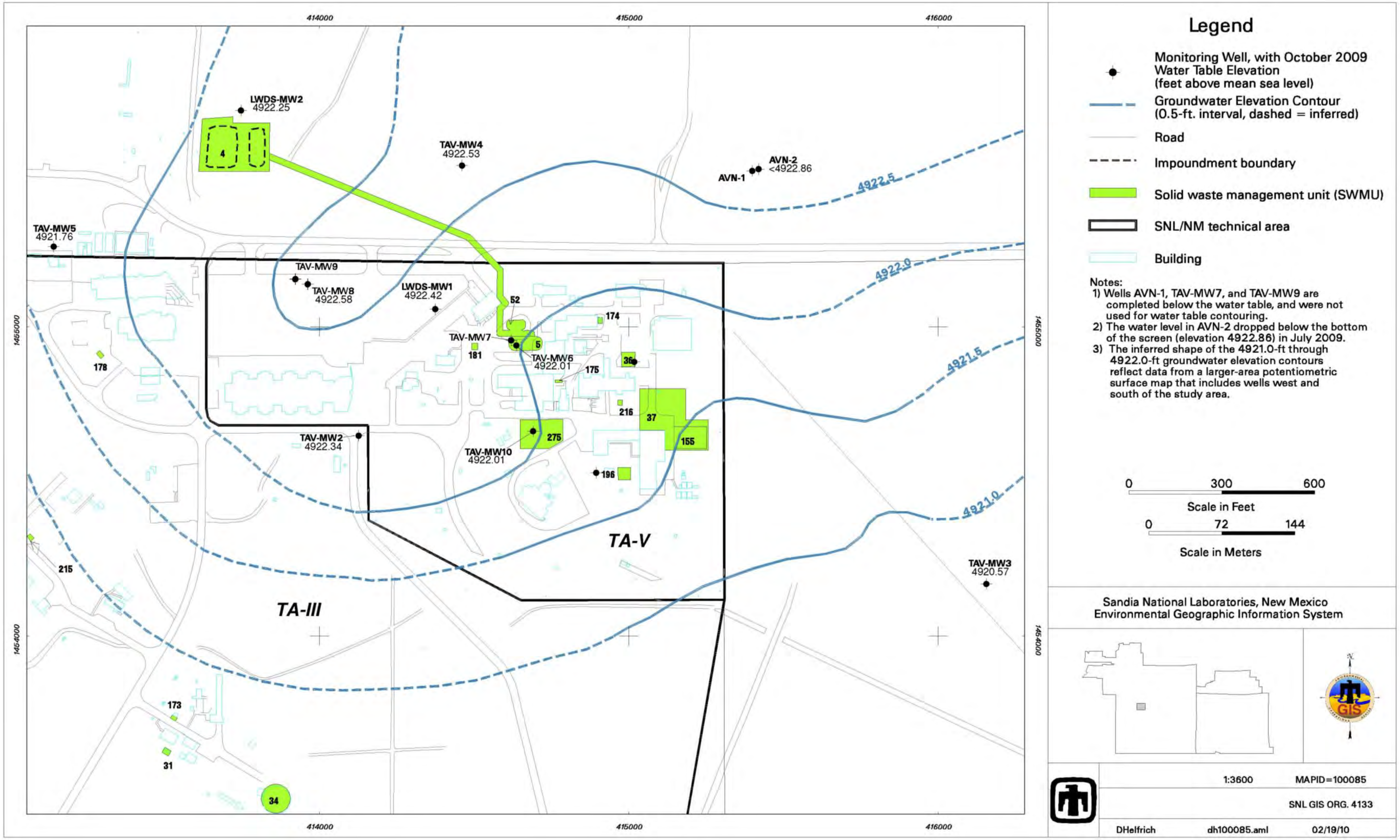

Figure 5-3. TA-V Study Area Potentiometric Surface Map (October 2009)

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

Disposal Site	Dates	Estimated Volume of Wastewater (gal.)
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

gal. = Gallon(s).
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 and from collected 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 in TAV-BH-01 (SNL March 1999a). Solvent disposals to the seepage pits were most likely reduced in the early 1980s (SNL March 1999a), but wastewater disposal continued. This likely flushed any residual contaminants that may have been present in the vapor and aqueous phase in the vadose zone into the aquifer.

Other surface contamination sites have been investigated at TA-V. Investigations have included surficial and subsurficial passive and active vapor-phase sampling for COCs. Sampling results have shown that these other sites probably have not contributed to groundwater contamination. For example, 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 vapor transport; therefore, vapor transport in the vadose zone is a possible mechanism for the presence of TCE in the aquifer. Some TCE will typically be retained in the vadose zone due to absorption onto fine-grain materials and capillary forces.

Three physical processes, occurring in the vadose zone, affect the migration of TCE to the aquifer as follows:

- Vaporization from the source
- Transport to the capillary fringe
- Adsorption into the water table

Nitrate is present primarily in the aqueous phase in both the vadose zone and aquifer. It is nonsorptive and, for the most part, does not exchange on sediment surfaces in the vadose zone or groundwater. Therefore, any locally derived nitrate was most likely 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 in Figure 5-4 shows that the center of the TCE mass is located about 200 ft northwest of the SWMU 5 drain field and about 300 ft northwest of the SWMU 275 seepage pits.

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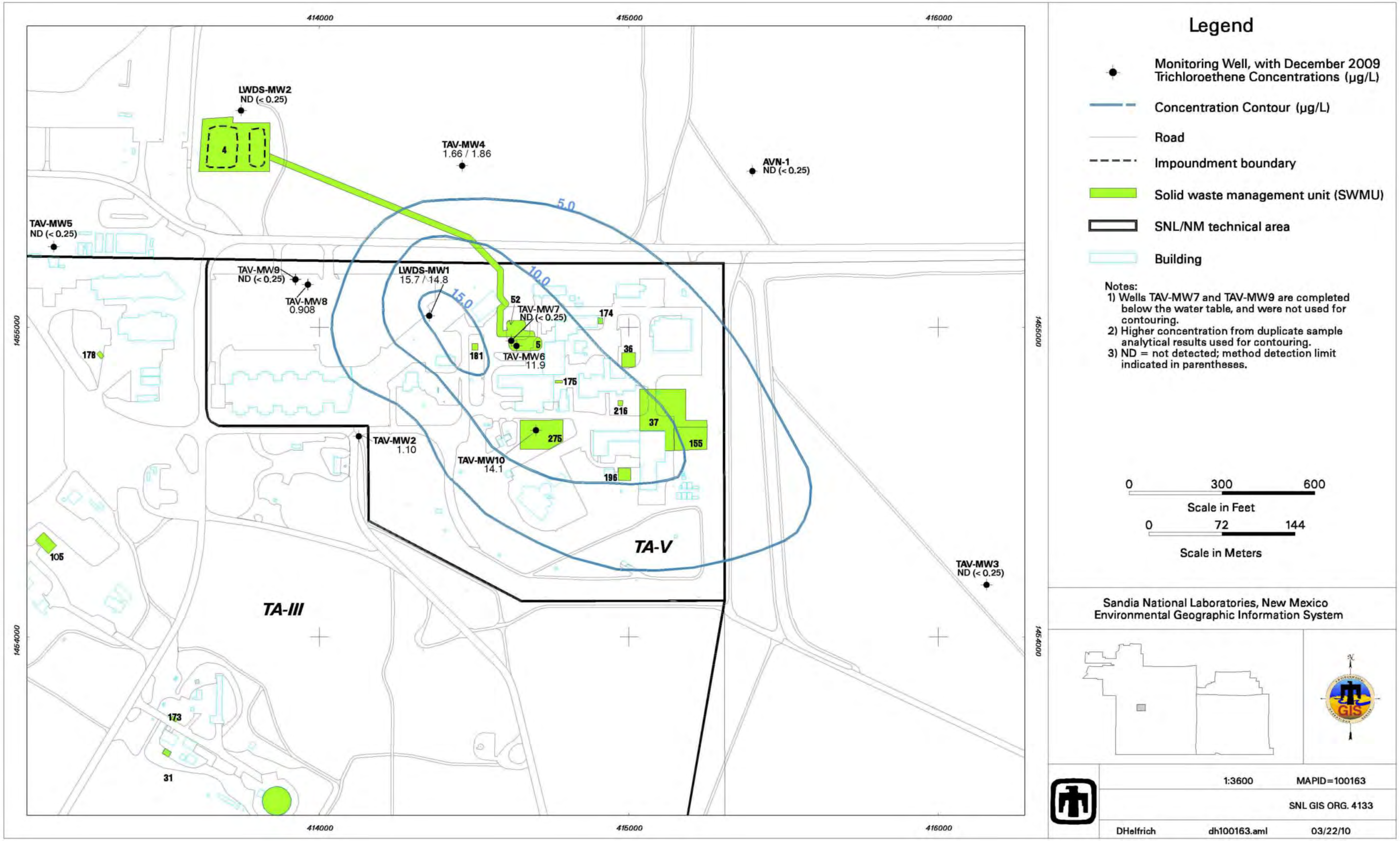

Figure 5-4. Distribution of TCE in Groundwater at SNL/NM TA-V, December 2009

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Maximum historical TCE concentrations reported at TA-V were 23 to 26 µg/L for LWDS-MW1 on November 13, 2000. TCE has consistently exceeded the MCL at LWDS-MW1 since 1993, and concentrations at TAV-MW6 and TAV-MW10 have exceeded the MCL in 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 wells TAV-MW7 and TAV-MW9.

Nitrate is present in groundwater in all wells at TA-V, generally at concentrations ranging from less than 5 to more than 10 mg/L. Nitrate concentrations have exceeded MCLs in AVN-1, AVN-2, LWDS-MW1, and TAV-MW5, although concentrations do not appear to be increasing over time. The highest reported concentrations for TA-V 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; and 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 concentrations with depth and over time.

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 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 the ER Project as well as implements and enforces federal regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER Project SWMUs and Areas of Concern (AOCs) are listed in Module IV of the SNL/NM RCRA Part B Operating Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA for Sandia National Laboratories* (NMED 1993).

All investigations and corrective action requirements pertaining to SWMUs and AOCs are contained in the Consent Order (NMED April 2004). Groundwater characterization for TA-V was initiated to satisfy the requirements of the SNL/NM HSWA permit for characterization of SWMUs. 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 the ER Project.

The Consent Order, which became effective in April 2004, transferred regulatory authority for corrective action requirements from the HSWA module to the Consent Order. The TA-V investigations must comply with requirements set forth in the Consent Order for site characterization and the development of a CME. The Consent Order also contains schedules that define dates for the delivery of plans and reports related to TA-V.

Although the Consent Order requires that the DOE and Sandia evaluate the nature and extent of contamination in the TA-V study area, no specific reporting requirements are prescribed in the Consent Order. Sandia continues to present TA-V data with the data from the other groundwater sites in the Groundwater Protection Program (GWPP) Annual Groundwater Monitoring Report. The outline of this report is based on the required elements of a ―Periodic Monitoring Report” described in Section X.D. of the Consent Order (NMED April 2004).

In this report, TA-V 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 Consent Order. Additional information on radionuclides and the scope of the Consent Order is available in Section III.A of the Consent Order (NMED April 2004).

5.3 Scope of Activities

The activities for the TA-V investigation for CY 2009, including plans and reports, are listed in Section 5.1.5. However, the only field activity completed in the study area was groundwater monitoring. The CY 2009 sampling events (four quarterly events) are summarized in Table 5-4, and the analytical parameters for each well for each sampling event are listed in Table 5-5.

Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples include equipment blanks (EBs), duplicate samples, split samples, and trip blanks (TBs). Field QC samples are used to monitor the sampling process. EB samples are used to verify the effectiveness of sampling equipment decontamination procedures. Duplicate samples are used to measure the precision of the sampling process. Split samples are used to verify the performance of the analytical laboratory. TB samples are used to determine whether volatile organic compounds (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, as conducted by the ER Project, are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986). The following sections provide an overview of the sampling and data collection procedures.

5.4.1 Groundwater Elevation

Throughout CY 2009, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table elevations. Water levels are periodically measured in TA-V groundwater monitoring wells according to the instructions and requirements of SNL/NM Field Operating Procedure (FOP) 03-02, *Groundwater Level Data Acquisition and Management,* Rev. 02 (SNL November 2007). The water level information was used to develop the potentiometric surface map presented in Figure 5-3 and the hydrographs presented in Figures 5C-1 and 5C-2 (Attachment 5C).

5.4.2 Well Purging and Water Quality Measurements

A Bennett™ groundwater sampling system (a nitrogen gas-powered portable piston pump) was used to collect the groundwater samples from TA-V wells. The wells are purged a minimum of one saturated screen volume. Field water quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were recorded from the well, prior to the collection of groundwater samples, according to SNL/NM FOP 05-01 (SNL August 2007a). Groundwater temperature, SC, ORP, DO, and pH were measured using a YSI™ Model 620 Water Quality Meter. Turbidity was measured with a HACH™ Model 2100P portable turbidity meter.

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 mini-sampling and analysis plans (SAPs) (Table 5-4), purging continues until four stable measurements for temperature, SC, pH, and turbidity are obtained. .

Groundwater stability is considered acceptable when measurements are equal to or within 10 percent of 5 nephelometric turbidity units, pH is within 0.1 units, temperature is within 1.0 degree Celsius, and SC is within 5 percent. Associated Field Measurement Logs documenting details of well purging and water quality measurements for each sampling event have been submitted to the SNL/NM Customer Funded Records Center.

Table 5-4. Groundwater Monitoring Well Network and Sampling Dates for the TA-V Study Area, Calendar Year 2009

Date of Sampling Event	Wells Sampled(1)	SAP
February 2009	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, and TAV-MW10	*TA-V Groundwater Monitoring Mini-SAP for Second Quarter, Fiscal Year 2009* (SNL January 2009)
May/June 2009	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, and TAV-MW10	*TA-V Groundwater Monitoring Mini-SAP for Third Quarter, Fiscal Year 2009* (SNL April 2009b)
August/ September 2009	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, and TAV-MW10	*TA-V Groundwater Monitoring Mini-SAP for Fourth Quarter, Fiscal Year 2009* (SNL August 2009)
November/ December 2009	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, and TAV-MW10	*TA-V Groundwater Monitoring Mini-SAP for First Quarter, Fiscal Year 2010* (SNL October 2009)

NOTE: (1) Refer to page xvii of this report for well descriptions.
SAP = Sampling and Analysis Plan.
TA-V = Technical Area V.

5.4.3 Pump Decontamination

The Bennett™ sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in *Long-Term Environmental Stewardship (LTES) Groundwater Sampling Equipment Decontamination,* SNL/NM FOP 05-03 (SNL August 2007b). An EB or rinsate sample was collected to verify the effectiveness of the equipment decontamination process.

5.4.4 Sample Collection Sampling Procedures

Groundwater samples are collected using the Bennett™ pump in accordance with SNL/NM FOP 05-01 (SNL August 2007a). Sample bottles are filled directly from the pump discharge line, with the VOC samples collected at the lowest achievable discharge rate.

5.4.5 Sample Handling and Shipment

The SNL/NM Sample Management Office (SMO) processes environmental samples collected by the ER Project. The SMO reviews the mini-SAPs, orders sample containers, issues sample control and tracking numbers, tracks the chain-of-custody, and reviews analytical results returned from the laboratories for laboratory contract compliance (SNL March 2003b and April 2007). All groundwater samples are analyzed by off-site laboratories using EPA-specified protocols.

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 (LCS), matrix spike, matrix spike duplicate, and surrogate spike samples. Reported laboratory analytical and QC data are reviewed against quality assurance requirements specified in the *Procedure for Completing the Contract Verification Review (CVR), SMO-05-03, Issue 03*, (SNL April 2007) and Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data*, (SNL July 2007).

Table 5-5. Parameters Sampled at TA-V Wells[1] for Each Sampling Event, Calendar Year 2009

Parameter	February 2009	Parameter	May/June 2009
NPN VOCs	AVN-1 LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW3 (dup) TAV-MW4 TAV-MW5 TAV-MW5 (dup) TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10	NPN VOCs	AVN-1 LWDS-MW1 LWDS-MW2 TAV-MW2 TAV-MW2 (dup) TAV-MW3 TAV-MW4 TAV-MW5 TAV-MW6 TAV-MW6 (dup) TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10
		Perchlorate	LWDS-MW1
Parameter	**August/September 2009**	**Parameter**	**November/December 2009**
Anions Gamma Spec* Gross Alpha Gross Beta NPN TAL Metals, plus Total Uranium Tritium VOCs	AVN-1 AVN-1 (dup) LWDS-MW1 LWDS-MW1 (dup) LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW4 TAV-MW5 TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10	NPN VOCs	AVN-1 LWDS-MW1 LWDS-MW1 (dup) LWDS-MW2 TAV-MW2 TAV-MW3 TAV-MW4 TAV-MW4 (dup) TAV-MW5 TAV-MW6 TAV-MW7 TAV-MW8 TAV-MW9 TAV-MW10
Perchlorate	LWDS-MW1 LWDS-MW1 (dup)	Perchlorate	LWDS-MW1 LWDS-MW1 (dup)

NOTE: [1] Refer to page xvii of this report for well descriptions.

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).

TAL = Target analyte list.

TA-V = Technical Area V.

VOC = Volatile organic compound.

5.4.6 Waste Management

Purge and decontamination water generated from sampling activities were placed into 55-gallon containers and stored at the ER Project Field Office waste accumulation area. All waste was managed in accordance with SNL/NM FOP 05-04 (SNL August 2007c) as nonregulated waste, based on historical sampling results and process knowledge of the monitoring well location. Associated environmental sampling results provide supplemental data for approval to discharge water to the sanitary sewer. All data were compared with COA discharge limits.

5.5 Analytical Methods

All groundwater samples were analyzed by off-site laboratories using EPA-specified protocols. Groundwater samples were submitted to General Engineering Laboratories, Inc. (GEL) for analysis. Samples were analyzed in accordance with applicable EPA analytical methods (Tables 5-6 and 5-7), including:

- *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0* (EPA 1983).
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA 1990).
- *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* (EPA 1980).

Table 5-6. TA-V Study Area Chemical Analytical Methods

Analyte	Analytical Method[a, b]
Anions	SW846-9056
NPN	EPA 353.2
Perchlorate	EPA 314.0
TAL Metals, plus Uranium	SW846-6020/7470
VOC	SW846-8260

Notes: [a]U.S. Environmental Protection Agency, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.
[b]U.S. Environmental Protection Agency, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.
EPA = U.S. Environmental Protection Agency.
NPN = Nitrate plus nitrite (reported as nitrogen).
SW = Solid Waste.
TAL = Target analyte list.
TA-V = Technical Area V.
VOC = Volatile organic compound.

Table 5-7. TA-V Study Area Radiochemical Analytical Methods

Analyte	Analytical Method[a]
Gamma Spectroscopy (short list)	EPA 901.0
Gross Alpha/Beta Activity	EPA 900.0
Tritium	EPA 906.0

Notes: [a]U.S. Environmental Protection Agency, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
EPA = U.S. Environmental Protection Agency.
TA-V = Technical Area V.

5.6 Summary of Analytical Results

The following section includes a discussion of monitoring results, exceedances of standards, and pertinent trends in concentrations for COCs in the TA-V study area that exceed standards.

The analytical results and field measurements for all TA-V sampling events are presented in Attachment 5A, Tables 5A-1 through 5A-8; concentration trend plots for COCs that exceed the MCLs are presented in Attachment 5B, Figures 5B-1 through 5B-6. 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 in low concentrations include:

- Carbon Disulfide
- Chloroform
- Chloromethane
- cis-1,2-Dichloroethene
- Toluene
- TCE

Six VOCs were detected in CY 2009. Three of these VOCs have promulgated MCLs. Only TCE exceeds its corresponding MCL, which is 5 µg/L (Table 5A-1). TCE was detected in samples from three wells: LWDS-MW1, TAV-MW6, and TAV-MW10. The maximum concentration of TCE detected during this reporting period was 18.3 µg/L in the sample from LWDS-MW1 collected in June 2009. Figures 5B-1, 5B-2, and 5B-3 (Attachment 5B) show that the TCE concentrations are decreasing over time in LWDS-MW1 and increasing over time in TAV-MW6 and TAV-MW10.

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 LWDS-MW1, TAV-MW10, and AVN-1. The maximum concentration of NPN detected during this reporting period is 12.8 mg/L in the sample collected from LWDS-MW1 in June 2009. Figure 5B-4 (Attachment 5B) shows that the NPN concentrations in LWDS-MW1 have typically exceeded the MCL, with concentrations being stable over time. In contrast, Figure 5B-5 (Attachment 5B) shows that NPN concentrations in TAV-MW10 (and its predecessor, TAV-MW1) only occasionally exceed the MCL with the trend increasing over time. Prior to June 2009, the NPN concentrations for AVN-1 had not exceeded the MCL. Because the concentration of 11.8 mg/L exceeds the nitrate MCL of 10 mg/L, the sample was reanalyzed, and a concentration of 8.60 mg/L was reported. Figure 5B-6 (Attachment 5B) shows that NPN concentrations in AVN-1 are relatively stable over time.

The analytical results for anions (bromide, chloride, fluoride, and sulfate) are presented in Table 5A-4 (Attachment 5A). Secondary MCLs have been promulgated for three of the anions; none of the results exceed the corresponding secondary MCLs.

The analytical results for perchlorate are presented in Table 5A-5; perchlorate was not detected in any of the CY 2009 groundwater samples.

Total metal results are presented in Table 5A-6; no metal results exceed established primary or secondary MCLs.

Tritium, gross alpha/beta activity, and gamma spectroscopy results are presented in Table 5A-7; all radionuclide results are below established MCLs.

Field water quality parameters were measured during purging of each well prior to sampling and included temperature, SC, ORP, pH, turbidity, and DO. The parameter measurements obtained immediately before sample collection are presented in Table 5A-8.

5.7 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 TA-V quarterly sampling events are discussed in the following sections.

5.7.1 Field Quality Control Samples

Field QC samples included environmental duplicate samples and EB samples. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the mini-SAPs (SNL January 2009, April 2009b, August 2009, and October 2009).

5.7.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed in order to estimate the overall reproducibility of the sampling and analytical process. A duplicate sample is collected immediately after the original environmental sample in order to reduce variability caused by time and/or sampling mechanics. The results of duplicate sample analyses (detected parameters, only) are used to calculate relative percent difference (RPD) values. Duplicate sample results for all wells and all sampling periods show good correlation (RPD values of less than 20) for all calculated parameters.

5.7.1.2 Equipment Blank Samples

The Bennett™ pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in SNL/NM FOP 05-03 (SNL August 2007b). An EB or rinsate sample was collected to verify the effectiveness of the equipment decontamination process. The results of the EB analyses are as follows:

- **February 2009 Sampling Event—**EB samples were collected prior to sampling at TAV-MW3 and TAV-MW5 and submitted for VOC and NPN analyses. Bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental samples.

- **May/June 2009 Sampling Event—**EB samples were collected prior to sampling at TAV-MW2 and TAV-MW6 and submitted for VOC and NPN analyses. Bromodichloromethane, bromoform, carbon disulfide, chloroform, dibromochloromethane, and toluene were detected above the laboratory MDLs. No corrective action was necessary for bromodichloromethane, bromoform, chloroform, dibromochloromethane, and toluene as these compounds were not detected in the associated environmental samples. Carbon disulfide was detected in the EB sample associated with TAV-MW2 samples, at a concentration less than five times the environmental sample. Carbon disulfide was qualified as not detected during data validation in the TAV-MW2 environmental sample due to EB contamination.

- **August/September 2009 Sampling Event—**EB samples were collected prior to sampling at AVN-1 and LWDS-MW1 and submitted for all analyses. Bromodichloromethane, bromoform, carbon disulfide, chloroform, dibromochloromethane, and 2-butanone were detected above the laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental samples. Inorganic analytes detected in EB samples included copper, chloride, sodium, and zinc. No corrective action was required for chloride and sodium as associated sampling results were greater than five times the blank result. Copper and zinc were qualified as not detected during data validation in the associated environmental sample due to EB contamination.

- **November/December 2008 Sampling Event—**EB samples were collected prior to sampling at LWDS-MW1 and TAV-MW10 and submitted for VOC and NPN analyses. Bromodichloromethane, carbon disulfide, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental samples.

5.7.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analysis to assess whether contamination of the samples has occurred during shipment and storage. TB samples consist of laboratory reagent grade water with hydrochloric acid preservative contained in 40-milliliter volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. TBs were brought to the field and accompanied each sample shipment. TB qualifiers are provided with the analytical results in Table 5A-1 (Attachment 5A).

5.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate LCSs were analyzed concurrently with all groundwater samples. All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). Laboratory data qualifiers are provided with the analytical results in Tables 5A-1 through 5A-7 (Attachment 5A).

5.8 Variances and Nonconformances

The following sections describe differences between planned work and actual work, findings of the data validation process, and impacts to the monitoring schedule.

5.8.1 Variances and Nonconformances

Several variances and nonconformances from field or sampling requirements in the TA-V groundwater monitoring mini-SAPs (SNL January 2009, April 2009b, August 2009, and October 2009) occurred during sampling activities. The following project-specific variances associated with these sampling events are noted:

- **May/June 2009 Sampling Event—**NPN was detected above the MCL in the sample from AVN-1 at a concentration of 11.8 mg/L. The sample was reanalyzed for NPN and the result was reported at a concentration of 8.60 mg/L. Both results are reported.

- **August/September 2009 Sampling Event—(**1) The contract analytical laboratory (GEL) reanalyzed VOC samples from LWDS-MW1 and TAV-MW10 as the original results were not comparable with historical values. GEL determined the root cause as human error; sample vials were misidentified during loading into the auto sampler. All detected VOCs were qualified during data validation as estimated values and nondetected compounds are qualified as unusable. (2) The contract analytical laboratory analyzed perchlorate samples outside holding time requirements due to problems with its analytical instrument. The results were qualified as estimated as the samples were analyzed outside the method-specific holding time, but within two times the holding time requirement. Perchlorate was not detected above the MDL of 0.004 mg/L.

No other variances or nonconformances occurred; however, the following project-specific issue associated with these sampling events is noted:

- **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.

5.8.2 Data Validation

All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for TA-V COCs during CY 2009 sampling events. Data validation qualifiers are presented with the analytical results in Tables 5A-1 through 5A-7 (Attachment 5A). The data validation report associated with each sampling event has been submitted to the SNL/NM Customer Funded Records Center.

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 when disposal practices were modified to protect the environment. 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 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 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 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. These concentrations have exceeded MCLs in the two upgradient AVN wells (AVN-1 and AVN-2), LWDS-MW1, and TAV-MW5.

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 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 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.

DOE/Sandia recommends the following approach as part of the ongoing environmental studies of the TA-V study area:

- Continue collection of groundwater samples at the 12 TA-V groundwater monitoring wells on a quarterly basis. At a minimum, the analytes for groundwater sampling will consist of VOCs and NPN.

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

- Continue to report future TA-V investigation results in the SNL/NM GWPP Annual Groundwater Monitoring Report.

- Complete and submit the response to the NMED's third NOD for the TA-V CME Report (NMED December 2009).

- Upon NMED approval of DOE/Sandia's response to the third NOD for the TA-V CME Report, install and sample additional monitoring wells and prepare a corresponding well installation report.

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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 2009

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	Toluene	0.407	0.250	1.00	1000	J		087026-001	SW846-8260B
18-Feb-09	Trichloroethene	**13.8**	0.250	1.00	5.00			087026-001	SW846-8260B
	cis-1,2-Dichloroethene	2.78	0.300	1.00	70.0			087026-001	SW846-8260B
TAV-MW2 10-Feb-09	Trichloroethene	0.902	0.250	1.00	5.00	J		087015-001	SW846-8260B
TAV-MW4	Chloroform	0.459	0.250	1.00	NE	J		087019-001	SW846-8260B
12-Feb-09	Trichloroethene	1.30	0.250	1.00	5.00			087019-001	SW846-8260B
TAV-MW5 05-Feb-09	Toluene	0.252	0.250	1.00	1000	J		087008-001	SW846-8260B
TAV-MW6	Trichloroethene	**10.6**	0.250	1.00	5.00			087021-001	SW846-8260B
13-Feb-09	cis-1,2-Dichloroethene	1.79	0.300	1.00	70.0			087021-001	SW846-8260B
TAV-MW8 11-Feb-09	Trichloroethene	1.37	0.250	1.00	5.00			087017-001	SW846-8260B
TAV-MW9 02-Feb-09	Toluene	0.298	0.250	1.00	1000	J		086997-001	SW846-8260B
TAV-MW10	Toluene	0.252	0.250	1.00	1000	J		087023-001	SW846-8260B
16-Feb-09	Trichloroethene	**13.5**	0.250	1.00	5.00			087023-001	SW846-8260B
	cis-1,2-Dichloroethene	2.36	0.300	1.00	70.0			087023-001	SW846-8260B
AVN-1 01-Jun-09	Toluene	0.285	0.250	1.00	1000	J		087446-001	SW846-8260B
LWDS-MW1	Toluene	0.460	0.250	1.00	1000	J		087464-001	SW846-8260B
10-Jun-09	Trichloroethene	**18.3**	0.250	1.00	5.00			087464-001	SW846-8260B
	cis-1,2-Dichloroethene	3.25	0.300	1.00	70.0			087464-001	SW846-8260B
TAV-MW2	Carbon Disulfide	6.84	1.25	5.00	NE		6.84U	087452-001	SW846-8260B
03-Jun-09	Trichloroethene	1.23	0.250	1.00	5.00			087452-001	SW846-8260B
TAV-MW2 (Duplicate) 03-Jun-09	Trichloroethene	1.12	0.250	1.00	5.00			087453-001	SW846-8260B
TAV-MW4	Chloroform	0.646	0.250	1.00	NE	J		087455-001	SW846-8260B
04-Jun-09	Trichloroethene	2.05	0.250	1.00	5.00			087455-001	SW846-8260B
TAV-MW6	Trichloroethene	**12.7**	0.250	1.00	5.00			087459-001	SW846-8260B
05-Jun-09	cis-1,2-Dichloroethene	2.15	0.300	1.00	70.0			087459-001	SW846-8260B
TAV-MW6 (Duplicate)	Trichloroethene	**13.2**	0.250	1.00	5.00			087460-001	SW846-8260B
05-Jun-09	cis-1,2-Dichloroethene	2.17	0.300	1.00	70.0			087460-001	SW846-8260B
TAV-MW8 02-Jun-09	Trichloroethene	1.70	0.250	1.00	5.00			087448-001	SW846-8260B

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

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-MW9 20-May-09	Toluene	0.350	0.250	1.00	1000	J		087435-001	SW846-8260B
TAV-MW10 08-Jun-09	Toluene	0.324	0.250	1.00	1000	J		087462-001	SW846-8260B
	Trichloroethene	**15.2**	0.250	1.00	5.00			087462-001	SW846-8260B
	cis-1,2-Dichloroethene	2.48	0.300	1.00	70.0			087462-001	SW846-8260B
AVN-1 (Duplicate) 31-Aug-09	Toluene	0.270	0.250	1.00	1000	J		087647-001	SW846-8260B
LWDS-MW1 15-Sep-09	Toluene	0.820	0.250	1.00	1000	H, J	J	087662-R01	SW846-8260B
	Trichloroethene	**13.5**	0.250	1.00	5.00	H	J	087662-R01	SW846-8260B
	cis-1,2-Dichloroethene	2.73	0.300	1.00	70.0	H	J	087662-R01	SW846-8260B
LWDS-MW1 (Duplicate) 15-Sep-09	Chloromethane	0.320	0.300	1.00	NE	J	J	087663-R01	SW846-8260B
	Toluene	0.860	0.250	1.00	1000	J	J	087663-R01	SW846-8260B
	Trichloroethene	**13.4**	0.250	1.00	5.00		J	087663-R01	SW846-8260B
	cis-1,2-Dichloroethene	2.72	0.300	1.00	70.0		J	087663-R01	SW846-8260B
TAV-MW2 08-Sep-09	Toluene	0.271	0.250	1.00	1000	J		087651-001	SW846-8260B
	Trichloroethene	0.700	0.250	1.00	5.00	J		087651-001	SW846-8260B
TAV-MW4 09-Sep-09	Chloroform	0.475	0.250	1.00	NE	J		087654-001	SW846-8260B
	Trichloroethene	1.29	0.250	1.00	5.00			087654-001	SW846-8260B
TAV-MW6 10-Sep-09	Trichloroethene	**10.5**	0.250	1.00	5.00			087656-001	SW846-8260B
	cis-1,2-Dichloroethene	1.64	0.300	1.00	70.0			087656-001	SW846-8260B
TAV-MW7 26-Aug-09	Chloromethane	0.379	0.300	1.00	NE	J		087637-001	SW846-8260B
TAV-MW8 02-Sep-09	Trichloroethene	1.37	0.250	1.00	5.00			087649-001	SW846-8260B
TAV-MW9 24-Aug-09	Toluene	0.339	0.250	1.00	1000	J		087633-001	SW846-8260B
TAV-MW10 11-Sep-09	Trichloroethene	**13.0**	0.250	1.00	5.00	H	J	087658-R01	SW846-8260B
	cis-1,2-Dichloroethene	2.24	0.300	1.00	70.0	H	J	087658-R01	SW846-8260B
LWDS-MW1 08-Dec-09	Trichloroethene	**15.7**	0.250	1.00	5.00			087970-001	SW846-8260B
	cis-1,2-Dichloroethene	2.75	0.300	1.00	70.0			087970-001	SW846-8260B
LWDS-MW1 (Duplicate) 08-Dec-09	Trichloroethene	**14.8**	0.250	1.00	5.00			087971-001	SW846-8260B
	cis-1,2-Dichloroethene	2.62	0.300	1.00	70.0			087971-001	SW846-8260B
TAV-MW2 01-Dec-09	Trichloroethene	1.10	0.250	1.00	5.00			087956-001	SW846-8260B

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW4	Chloroform	0.546	0.250	1.00	NE	J	1.0U	087960-001	SW846-8260B
02-Dec-09	Trichloroethene	1.66	0.250	1.00	5.00			087960-001	SW846-8260B
TAV-MW4 (Duplicate)	Chloroform	0.601	0.250	1.00	NE	J	1.0U	087961-001	SW846-8260B
02-Dec-09	Trichloroethene	1.86	0.250	1.00	5.00			087961-001	SW846-8260B
TAV-MW6	Trichloroethene	**11.9**	0.250	1.00	5.00			087963-001	SW846-8260B
03-Dec-09	cis-1,2-Dichloroethene	2.08	0.300	1.00	70.0			087963-001	SW846-8260B
TAV-MW8 30-Nov-09	Trichloroethene	0.908	0.250	1.00	5.00	J		087954-001	SW846-8260B
TAV-MW10	Trichloroethene	**14.1**	0.250	1.00	5.00			087965-001	SW846-8260B
04-Dec-09	cis-1,2-Dichloroethene	2.10	0.300	1.00	70.0			087965-001	SW846-8260B

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

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 - 0.500
Carbon disulfide	1.25
Carbon tetrachloride	0.260 - 0.300
Chlorobenzene	0.250
Chloroethane	0.300
Chloroform	0.250
Chloromethane	0.300
Dibromochloromethane	0.260 - 0.300
Ethyl benzene	0.250
Methylene chloride	3.00
Styrene	0.250
Tetrachloroethene	0.300 - 0.450
Toluene	0.250
Trichloroethene	0.250
Vinyl acetate	1.50
Vinyl chloride	0.500
Xylene	0.300 - 0.600
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 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 09-Feb-09	Nitrate plus nitrite as N	9.70	0.250	1.25	10.0			087013-018	EPA 353.2
LWDS-MW1 18-Feb-09	Nitrate plus nitrite as N	**11.2**	0.250	1.25	10.0			087026-018	EPA 353.2
LWDS-MW2 06-Feb-09	Nitrate plus nitrite as N	8.08	0.250	1.25	10.0			087011-018	EPA 353.2
TAV-MW2 10-Feb-09	Nitrate plus nitrite as N	3.38	0.100	0.500	10.0			087015-018	EPA 353.2
TAV-MW3 03-Feb-09	Nitrate plus nitrite as N	4.85	0.250	1.25	10.0			087001-018	EPA 353.2
TAV-MW3 (Duplicate) 03-Feb-09	Nitrate plus nitrite as N	5.15	0.250	1.25	10.0			087002-018	EPA 353.2
TAV-MW4 12-Feb-09	Nitrate plus nitrite as N	6.90	0.100	0.500	10.0			087019-018	EPA 353.2
TAV-MW5 05-Feb-09	Nitrate plus nitrite as N	7.55	0.500	2.50	10.0			087008-018	EPA 353.2
TAV-MW5 (Duplicate) 05-Feb-09	Nitrate plus nitrite as N	6.90	0.500	2.50	10.0			087009-018	EPA 353.2
TAV-MW6 13-Feb-09	Nitrate plus nitrite as N	8.33	0.250	1.25	10.0			087021-018	EPA 353.2
TAV-MW7 04-Feb-09	Nitrate plus nitrite as N	3.85	0.250	1.25	10.0			087004-018	EPA 353.2
TAV-MW8 11-Feb-09	Nitrate plus nitrite as N	6.05	0.100	0.500	10.0			087017-018	EPA 353.2
TAV-MW9 02-Feb-09	Nitrate plus nitrite as N	3.89	0.100	0.500	10.0			086997-018	EPA 353.2
TAV-MW10 16-Feb-09	Nitrate plus nitrite as N	10.0	0.250	1.25	10.0			087023-018	EPA 353.2
AVN-1 01-Jun-09	Nitrate plus nitrite as N	**11.8**	0.100	0.500	10.0			087446-018	EPA 353.2
AVN-1 (Re-analysis) 01-Jun-09	Nitrate plus nitrite as N	8.60	0.250	1.25	10.0	H	J	087446-R18	EPA 353.2
LWDS-MW1 10-Jun-09	Nitrate plus nitrite as N	**12.8**	0.250	1.25	10.0			087464-018	EPA 353.2
LWDS-MW2 29-May-09	Nitrate plus nitrite as N	9.16	0.100	0.500	10.0			087444-018	EPA 353.2

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 03-Jun-09	Nitrate plus nitrite as N	4.05	0.050	0.250	10.0			087452-018	EPA 353.2
TAV-MW2 (Duplicate) 03-Jun-09	Nitrate plus nitrite as N	4.22	0.050	0.250	10.0			087453-018	EPA 353.2
TAV-MW3 21-May-09	Nitrate plus nitrite as N	5.45	0.250	1.25	10.0			087437-018	EPA 353.2
TAV-MW4 04-Jun-09	Nitrate plus nitrite as N	7.17	0.100	0.500	10.0			087455-018	EPA 353.2
TAV-MW5 28-May-09	Nitrate plus nitrite as N	7.33	0.100	0.500	10.0			087442-018	EPA 353.2
TAV-MW6 05-Jun-09	Nitrate plus nitrite as N	9.53	0.250	1.25	10.0			087459-018	EPA 353.2
TAV-MW6 (Duplicate) 05-Jun-09	Nitrate plus nitrite as N	8.95	0.250	1.25	10.0			087460-018	EPA 353.2
TAV-MW7 26-May-09	Nitrate plus nitrite as N	4.13	0.100	0.500	10.0			087440-018	EPA 353.2
TAV-MW8 02-Jun-09	Nitrate plus nitrite as N	7.76	0.100	0.500	10.0			087448-018	EPA 353.2
TAV-MW9 20-May-09	Nitrate plus nitrite as N	4.10	0.250	1.25	10.0			087435-018	EPA 353.2
TAV-MW10 08-Jun-09	Nitrate plus nitrite as N	**10.7**	0.250	1.25	10.0			087462-018	EPA 353.2
AVN-1 31-Aug-09	Nitrate plus nitrite as N	8.65	0.250	1.25	10.0			087646-018	EPA 353.2
AVN-1 (Duplicate) 31-Aug-09	Nitrate plus nitrite as N	8.78	0.250	1.25	10.0			087647-018	EPA 353.2
LWDS-MW1 15-Sep-09	Nitrate plus nitrite as N	**11.2**	0.250	1.25	10.0	B		087662-018	EPA 353.2
LWDS-MW1 (Duplicate) 15-Sep-09	Nitrate plus nitrite as N	**11.2**	0.250	1.25	10.0	B		087663-018	EPA 353.2
LWDS-MW2 27-Aug-09	Nitrate plus nitrite as N	7.20	0.250	1.25	10.0			087642-018	EPA 353.2
TAV-MW2 08-Sep-09	Nitrate plus nitrite as N	3.29	0.100	0.500	10.0			087651-018	EPA 353.2
TAV-MW3 25-Aug-09	Nitrate plus nitrite as N	5.00	0.250	1.25	10.0			087635-018	EPA 353.2

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 09-Sep-09	Nitrate plus nitrite as N	6.19	0.100	0.500	10.0			087654-018	EPA 353.2
TAV-MW5 28-Aug-09	Nitrate plus nitrite as N	6.83	0.250	1.25	10.0			087640-018	EPA 353.2
TAV-MW6 10-Sep-09	Nitrate plus nitrite as N	8.75	0.250	1.25	10.0			087656-018	EPA 353.2
TAV-MW7 26-Aug-09	Nitrate plus nitrite as N	3.88	0.250	1.25	10.0			087637-018	EPA 353.2
TAV-MW8 02-Sep-09	Nitrate plus nitrite as N	5.48	0.250	1.25	10.0			087649-018	EPA 353.2
TAV-MW9 24-Aug-09	Nitrate plus nitrite as N	3.78	0.250	1.25	10.0			087633-018	EPA 353.2
TAV-MW10 11-Sep-09	Nitrate plus nitrite as N	**10.2**	0.250	1.25	10.0	B		087658-018	EPA 353.2
AVN-1 24-Nov-09	Nitrate plus nitrite as N	8.45	0.250	1.25	10.0	B		087952-018	EPA 353.2
LWDS-MW1 08-Dec-09	Nitrate plus nitrite as N	**10.3**	0.250	1.25	10.0			087970-018	EPA 353.2
LWDS-MW1 (Duplicate) 08-Dec-09	Nitrate plus nitrite as N	**10.2**	0.250	1.25	10.0			087971-018	EPA 353.2
LWDS-MW2 23-Nov-09	Nitrate plus nitrite as N	6.75	0.250	1.25	10.0	B		087950-018	EPA 353.2
TAV-MW2 01-Dec-09	Nitrate plus nitrite as N	3.11	0.100	0.500	10.0	B		087956-018	EPA 353.2
TAV-MW3 17-Nov-09	Nitrate plus nitrite as N	5.03	0.250	1.25	10.0			087944-018	EPA 353.2
TAV-MW4 02-Dec-09	Nitrate plus nitrite as N	5.85	0.250	1.25	10.0	B		087960-018	EPA 353.2
TAV-MW4 (Duplicate) 02-Dec-09	Nitrate plus nitrite as N	5.93	0.250	1.25	10.0	B		087961-018	EPA 353.2
TAV-MW5 19-Nov-09	Nitrate plus nitrite as N	6.93	0.250	1.25	10.0			087948-018	EPA 353.2
TAV-MW6 03-Dec-09	Nitrate plus nitrite as N	8.23	0.250	1.25	10.0	B		087963-018	EPA 353.2

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 18-Nov-09	Nitrate plus nitrite as N	3.98	0.250	1.25	10.0			087946-018	EPA 353.2
TAV-MW8 30-Nov-09	Nitrate plus nitrite as N	5.28	0.250	1.25	10.0	B		087954-018	EPA 353.2
TAV-MW9 16-Nov-09	Nitrate plus nitrite as N	3.75	0.250	1.25	10.0			087941-018	EPA 353.2
TAV-MW10 04-Dec-09	Nitrate plus nitrite as N	9.03	0.250	1.25	10.0			087965-018	EPA 353.2

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.103	0.066	0.200	NE	J		087646-016	SW846 9056
31-Aug-09	Chloride	8.78	0.066	0.200	NE			087646-016	SW846 9056
	Fluoride	1.17	0.033	0.100	4.0			087646-016	SW846 9056
	Sulfate	30.0	0.100	0.400	NE	B		087646-016	SW846 9056
AVN-1 (Duplicate)	Bromide	0.110	0.066	0.200	NE	J		087647-016	SW846 9056
31-Aug-09	Chloride	8.78	0.066	0.200	NE			087647-016	SW846 9056
	Fluoride	1.19	0.033	0.100	4.0			087647-016	SW846 9056
	Sulfate	30.0	0.100	0.400	NE	B		087647-016	SW846 9056
LWDS-MW1	Bromide	0.788	0.066	0.200	NE			087662-016	SW846 9056
15-Sep-09	Chloride	71.0	0.660	2.00	NE			087662-016	SW846 9056
	Fluoride	0.649	0.033	0.100	4.0			087662-016	SW846 9056
	Sulfate	37.3	1.00	4.00	NE			087662-016	SW846 9056
LWDS-MW1 (Duplicate)	Bromide	0.798	0.066	0.200	NE			087663-016	SW846 9056
15-Sep-09	Chloride	71.5	0.660	2.00	NE			087663-016	SW846 9056
	Fluoride	0.628	0.033	0.100	4.0			087663-016	SW846 9056
	Sulfate	37.2	1.00	4.00	NE			087663-016	SW846 9056
LWDS-MW2	Bromide	0.141	0.066	0.200	NE	J		087642-016	SW846 9056
27-Aug-09	Chloride	13.6	0.066	0.200	NE			087642-016	SW846 9056
	Fluoride	1.24	0.033	0.100	4.0			087642-016	SW846 9056
	Sulfate	39.9	0.100	0.400	NE			087642-016	SW846 9056
TAV-MW2	Bromide	0.325	0.066	0.200	NE			087651-016	SW846 9056
08-Sep-09	Chloride	53.8	0.660	2.00	NE			087651-016	SW846 9056
	Fluoride	0.951	0.033	0.100	4.0			087651-016	SW846 9056
	Sulfate	50.9	1.00	4.00	NE			087651-016	SW846 9056
TAV-MW3	Bromide	0.187	0.066	0.200	NE	J		087635-016	SW846 9056
25-Aug-09	Chloride	20.7	0.660	2.00	NE			087635-016	SW846 9056
	Fluoride	1.52	0.033	0.100	4.0			087635-016	SW846 9056
	Sulfate	58.9	1.00	4.00	NE			087635-016	SW846 9056
TAV-MW4	Bromide	0.343	0.066	0.200	NE			087654-016	SW846 9056
09-Sep-09	Chloride	29.4	0.330	1.00	NE			087654-016	SW846 9056
	Fluoride	1.18	0.033	0.100	4.0			087654-016	SW846 9056
	Sulfate	35.8	0.100	0.400	NE			087654-016	SW846 9056

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	Bromide	0.151	0.066	0.200	NE	J		087640-016	SW846 9056
28-Aug-09	Chloride	16.4	0.066	0.200	NE			087640-016	SW846 9056
	Fluoride	1.24	0.033	0.100	4.0			087640-016	SW846 9056
	Sulfate	38.3	0.200	0.800	NE	B		087640-016	SW846 9056
TAV-MW6	Bromide	0.697	0.066	0.200	NE			087656-016	SW846 9056
10-Sep-09	Chloride	61.0	0.330	1.00	NE			087656-016	SW846 9056
	Fluoride	1.16	0.033	0.100	4.0			087656-016	SW846 9056
	Sulfate	42.3	0.500	2.00	NE			087656-016	SW846 9056
TAV-MW7	Bromide	0.223	0.066	0.200	NE			087637-016	SW846 9056
26-Aug-09	Chloride	24.6	0.660	2.00	NE			087637-016	SW846 9056
	Fluoride	1.01	0.033	0.100	4.0			087637-016	SW846 9056
	Sulfate	57.2	1.00	4.00	NE			087637-016	SW846 9056
TAV-MW8	Bromide	0.296	0.066	0.200	NE			087649-016	SW846 9056
02-Sep-09	Chloride	34.7	0.330	1.00	NE			087649-016	SW846 9056
	Fluoride	1.35	0.033	0.100	4.0			087649-016	SW846 9056
	Sulfate	49.1	0.500	2.00	NE			087649-016	SW846 9056
TAV-MW9	Bromide	0.254	0.066	0.200	NE			087633-016	SW846 9056
24-Aug-09	Chloride	31.8	0.660	2.00	NE			087633-016	SW846 9056
	Fluoride	1.00	0.033	0.100	4.0			087633-016	SW846 9056
	Sulfate	55.6	1.00	4.00	NE			087633-016	SW846 9056
TAV-MW10	Bromide	0.398	0.066	0.200	NE			087658-016	SW846 9056
11-Sep-09	Chloride	45.3	1.32	4.00	NE			087658-016	SW846 9056
	Fluoride	1.34	0.033	0.100	4.0			087658-016	SW846 9056
	Sulfate	43.7	2.00	8.00	NE			087658-016	SW846 9056

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 10-Jun-09	Perchlorate	ND	0.004	0.012	NE	U		087464-020	EPA 314.0
LWDS-MW1 15-Sep-09	Perchlorate	ND	0.004	0.012	NE	H, U	UJ	087662-020	EPA 314.0
LWDS-MW1 (Duplicate) 15-Sep-09	Perchlorate	ND	0.004	0.012	NE	H, U	UJ	087663-020	EPA 314.0
LWDS-MW1 08-Dec-09	Perchlorate	ND	0.004	0.012	NE	U		087970-020	EPA 314.0
LWDS-MW1 (Duplicate) 08-Dec-09	Perchlorate	ND	0.004	0.012	NE	U		087971-020	EPA 314.0

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.116	0.010	0.030	NE			087646-009	SW846 6020
31-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087646-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087646-009	SW846 6020
	Barium	0.0853	0.0005	0.002	2.00			087646-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087646-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087646-009	SW846 6020
	Calcium	44.3	0.020	0.200	NE	B		087646-009	SW846 6020
	Chromium	0.00329	0.0025	0.010	0.100	J		087646-009	SW846 6020
	Cobalt	0.000159	0.0001	0.001	NE	J		087646-009	SW846 6020
	Copper	0.00396	0.0003	0.001	NE		0.015UJ	087646-009	SW846 6020
	Iron	0.204	0.010	0.100	NE			087646-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087646-009	SW846 6020
	Magnesium	10.6	0.005	0.015	NE			087646-009	SW846 6020
	Manganese	0.0028	0.001	0.005	NE	J		087646-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087646-009	SW846 7470
	Nickel	0.00135	0.0005	0.002	NE	J		087646-009	SW846 6020
	Potassium	3.42	0.080	0.300	NE			087646-009	SW846 6020
	Selenium	0.00187	0.001	0.005	0.050	J		087646-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087646-009	SW846 6020
	Sodium	43.0	0.080	0.250	NE			087646-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087646-009	SW846 6020
	Uranium	0.00239	0.00005	0.0002	0.030			087646-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087646-009	SW846 6020
	Zinc	0.00769	0.0026	0.010	NE	J	0.017U	087646-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1 (Duplicate) 31-Aug-09	Aluminum	0.0968	0.010	0.030	NE			087647-009	SW846 6020
	Antimony	ND	0.0005	0.003	0.006	U		087647-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087647-009	SW846 6020
	Barium	0.0849	0.0005	0.002	2.00			087647-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087647-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087647-009	SW846 6020
	Calcium	43.5	0.020	0.200	NE	B		087647-009	SW846 6020
	Chromium	0.00361	0.0025	0.010	0.100	J		087647-009	SW846 6020
	Cobalt	0.000147	0.0001	0.001	NE	J		087647-009	SW846 6020
	Copper	0.00379	0.0003	0.001	NE		0.015UJ	087647-009	SW846 6020
	Iron	0.194	0.010	0.100	NE			087647-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087647-009	SW846 6020
	Magnesium	10.9	0.005	0.015	NE			087647-009	SW846 6020
	Manganese	0.00265	0.001	0.005	NE	J		087647-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087647-009	SW846 7470
	Nickel	0.00133	0.0005	0.002	NE	J		087647-009	SW846 6020
	Potassium	3.49	0.080	0.300	NE			087647-009	SW846 6020
	Selenium	0.00212	0.001	0.005	0.050	J		087647-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087647-009	SW846 6020
	Sodium	39.9	0.080	0.250	NE			087647-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087647-009	SW846 6020
	Uranium	0.00227	0.00005	0.0002	0.030			087647-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087647-009	SW846 6020
	Zinc	0.00654	0.0026	0.010	NE	J	0.017U	087647-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087662-009	SW846 6020
15-Sep-09	Antimony	0.000751	0.0005	0.003	0.006	B, J	0.0071U	087662-009	SW846 6020
	Arsenic	0.00187	0.0015	0.005	0.010	J		087662-009	SW846 6020
	Barium	0.0734	0.0005	0.002	2.00			087662-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087662-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087662-009	SW846 6020
	Calcium	66.2	0.100	1.00	NE	B		087662-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087662-009	SW846 6020
	Cobalt	0.000187	0.0001	0.001	NE	J		087662-009	SW846 6020
	Copper	0.00104	0.0003	0.001	NE		0.017U	087662-009	SW846 6020
	Iron	0.290	0.010	0.100	NE	B		087662-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087662-009	SW846 6020
	Magnesium	20.3	0.005	0.015	NE			087662-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087662-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087662-009	SW846 7470
	Nickel	0.00171	0.0005	0.002	NE	J		087662-009	SW846 6020
	Potassium	3.31	0.080	0.300	NE			087662-009	SW846 6020
	Selenium	0.00508	0.001	0.005	0.050			087662-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087662-009	SW846 6020
	Sodium	62.4	0.400	1.25	NE			087662-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087662-009	SW846 6020
	Uranium	0.00354	0.00005	0.0002	0.030			087662-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087662-009	SW846 6020
	Zinc	0.00495	0.0026	0.010	NE	J		087662-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 (Duplicate) 15-Sep-09	Aluminum	ND	0.010	0.030	NE	U		087663-009	SW846 6020
	Antimony	0.000573	0.0005	0.003	0.006	B, J	0.0071U	087663-009	SW846 6020
	Arsenic	0.00177	0.0015	0.005	0.010	J		087663-009	SW846 6020
	Barium	0.0756	0.0005	0.002	2.00			087663-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087663-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087663-009	SW846 6020
	Calcium	67.0	0.100	1.00	NE	B		087663-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087663-009	SW846 6020
	Cobalt	0.000195	0.0001	0.001	NE	J		087663-009	SW846 6020
	Copper	0.00104	0.0003	0.001	NE		0.017U	087663-009	SW846 6020
	Iron	0.284	0.010	0.100	NE	B		087663-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087663-009	SW846 6020
	Magnesium	20.8	0.005	0.015	NE			087663-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087663-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087663-009	SW846 7470
	Nickel	0.00169	0.0005	0.002	NE	J		087663-009	SW846 6020
	Potassium	3.24	0.080	0.300	NE			087663-009	SW846 6020
	Selenium	0.00561	0.001	0.005	0.050			087663-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087663-009	SW846 6020
	Sodium	63.9	0.400	1.25	NE			087663-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087663-009	SW846 6020
	Uranium	0.00363	0.00005	0.0002	0.030			087663-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087663-009	SW846 6020
	Zinc	0.00442	0.0026	0.010	NE	J		087663-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087642-009	SW846 6020
27-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087642-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087642-009	SW846 6020
	Barium	0.0716	0.0005	0.002	2.00			087642-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087642-009	SW846 6020
	Cadmium	0.000199	0.00011	0.001	0.005	J		087642-009	SW846 6020
	Calcium	44.1	0.020	0.200	NE	B		087642-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087642-009	SW846 6020
	Cobalt	0.000102	0.0001	0.001	NE	J		087642-009	SW846 6020
	Copper	0.00501	0.0003	0.001	NE			087642-009	SW846 6020
	Iron	0.157	0.010	0.100	NE			087642-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087642-009	SW846 6020
	Magnesium	13.8	0.005	0.015	NE			087642-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087642-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087642-009	SW846 7470
	Nickel	0.000954	0.0005	0.002	NE	J		087642-009	SW846 6020
	Potassium	2.91	0.080	0.300	NE			087642-009	SW846 6020
	Selenium	0.00207	0.001	0.005	0.050	J		087642-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087642-009	SW846 6020
	Sodium	42.4	0.080	0.250	NE			087642-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087642-009	SW846 6020
	Uranium	0.00344	0.00005	0.0002	0.030			087642-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087642-009	SW846 6020
	Zinc	0.00606	0.0026	0.010	NE	J		087642-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW2	Aluminum	0.0103	0.010	0.030	NE	J		087651-009	SW846 6020
08-Sep-09	Antimony	ND	0.0005	0.003	0.006	U		087651-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087651-009	SW846 6020
	Barium	0.0604	0.0005	0.002	2.00			087651-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087651-009	SW846 6020
	Cadmium	0.000349	0.00011	0.001	0.005	J		087651-009	SW846 6020
	Calcium	71.1	0.100	1.00	NE	B		087651-009	SW846 6020
	Chromium	0.00329	0.0025	0.010	0.100	J		087651-009	SW846 6020
	Cobalt	0.000263	0.0001	0.001	NE	J		087651-009	SW846 6020
	Copper	0.00128	0.0003	0.001	NE			087651-009	SW846 6020
	Iron	0.400	0.010	0.100	NE			087651-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087651-009	SW846 6020
	Magnesium	22.1	0.005	0.015	NE			087651-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087651-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087651-009	SW846 7470
	Nickel	0.00328	0.0005	0.002	NE			087651-009	SW846 6020
	Potassium	3.36	0.080	0.300	NE			087651-009	SW846 6020
	Selenium	0.00322	0.001	0.005	0.050	J		087651-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087651-009	SW846 6020
	Sodium	63.1	0.400	1.25	NE			087651-009	SW846 6020
	Thallium	0.000417	0.0003	0.001	0.002	J		087651-009	SW846 6020
	Uranium	0.00714	0.00005	0.0002	0.030			087651-009	SW846 6020
	Vanadium	0.00415	0.003	0.010	NE	J		087651-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087651-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW3	Aluminum	0.0222	0.010	0.030	NE	J		087635-009	SW846 6020
25-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087635-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087635-009	SW846 6020
	Barium	0.0461	0.0005	0.002	2.00			087635-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087635-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087635-009	SW846 6020
	Calcium	57.7	0.100	1.00	NE	B		087635-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087635-009	SW846 6020
	Cobalt	0.000119	0.0001	0.001	NE	J		087635-009	SW846 6020
	Copper	0.000768	0.0003	0.001	NE	J		087635-009	SW846 6020
	Iron	0.211	0.010	0.100	NE			087635-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087635-009	SW846 6020
	Magnesium	14.7	0.005	0.015	NE			087635-009	SW846 6020
	Manganese	0.0013	0.001	0.005	NE	J		087635-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087635-009	SW846 7470
	Nickel	0.00113	0.0005	0.002	NE	J		087635-009	SW846 6020
	Potassium	4.66	0.080	0.300	NE			087635-009	SW846 6020
	Selenium	0.00193	0.001	0.005	0.050	J		087635-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087635-009	SW846 6020
	Sodium	55.4	0.400	1.25	NE			087635-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087635-009	SW846 6020
	Uranium	0.0038	0.00005	0.0002	0.030			087635-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087635-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087635-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087654-009	SW846 6020
09-Sep-09	Antimony	ND	0.0005	0.003	0.006	U		087654-009	SW846 6020
	Arsenic	0.0025	0.0015	0.005	0.010	J		087654-009	SW846 6020
	Barium	0.087	0.0005	0.002	2.00			087654-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087654-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087654-009	SW846 6020
	Calcium	49.5	0.100	1.00	NE	B		087654-009	SW846 6020
	Chromium	0.0211	0.0025	0.010	0.100			087654-009	SW846 6020
	Cobalt	0.000184	0.0001	0.001	NE	J		087654-009	SW846 6020
	Copper	0.000854	0.0003	0.001	NE	J		087654-009	SW846 6020
	Iron	0.283	0.010	0.100	NE			087654-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087654-009	SW846 6020
	Magnesium	14.6	0.005	0.015	NE			087654-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087654-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087654-009	SW846 7470
	Nickel	0.003	0.0005	0.002	NE			087654-009	SW846 6020
	Potassium	3.03	0.080	0.300	NE			087654-009	SW846 6020
	Selenium	0.00353	0.001	0.005	0.050	J		087654-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087654-009	SW846 6020
	Sodium	42.0	0.400	1.25	NE			087654-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087654-009	SW846 6020
	Uranium	0.00355	0.00005	0.0002	0.030			087654-009	SW846 6020
	Vanadium	0.00429	0.003	0.010	NE	J		087654-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087654-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW5	Aluminum	ND	0.010	0.030	NE	U		087640-009	SW846 6020
28-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087640-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087640-009	SW846 6020
	Barium	0.0688	0.0005	0.002	2.00			087640-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087640-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087640-009	SW846 6020
	Calcium	52.6	0.100	1.00	NE	B		087640-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087640-009	SW846 6020
	Cobalt	0.000141	0.0001	0.001	NE	J		087640-009	SW846 6020
	Copper	0.00079	0.0003	0.001	NE	J		087640-009	SW846 6020
	Iron	0.103	0.010	0.100	NE			087640-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087640-009	SW846 6020
	Magnesium	15.5	0.005	0.015	NE			087640-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087640-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087640-009	SW846 7470
	Nickel	0.00121	0.0005	0.002	NE	J		087640-009	SW846 6020
	Potassium	3.15	0.080	0.300	NE			087640-009	SW846 6020
	Selenium	0.00225	0.001	0.005	0.050	J		087640-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087640-009	SW846 6020
	Sodium	49.0	0.400	1.25	NE			087640-009	SW846 6020
	Thallium	0.000713	0.0003	0.001	0.002	J		087640-009	SW846 6020
	Uranium	0.00384	0.00005	0.0002	0.030			087640-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087640-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087640-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087656-009	SW846 6020
10-Sep-09	Antimony	ND	0.0005	0.003	0.006	U		087656-009	SW846 6020
	Arsenic	0.00201	0.0015	0.005	0.010	J		087656-009	SW846 6020
	Barium	0.0644	0.0005	0.002	2.00			087656-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087656-009	SW846 6020
	Cadmium	0.000361	0.00011	0.001	0.005	J		087656-009	SW846 6020
	Calcium	55.8	0.100	1.00	NE	B		087656-009	SW846 6020
	Chromium	0.0035	0.0025	0.010	0.100	J		087656-009	SW846 6020
	Cobalt	0.000247	0.0001	0.001	NE	J		087656-009	SW846 6020
	Copper	0.00114	0.0003	0.001	NE			087656-009	SW846 6020
	Iron	0.381	0.010	0.100	NE			087656-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087656-009	SW846 6020
	Magnesium	20.1	0.005	0.015	NE		J	087656-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087656-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087656-009	SW846 7470
	Nickel	0.00372	0.0005	0.002	NE			087656-009	SW846 6020
	Potassium	3.58	0.080	0.300	NE			087656-009	SW846 6020
	Selenium	0.00397	0.001	0.005	0.050	J		087656-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087656-009	SW846 6020
	Sodium	66.6	0.400	1.25	NE		J	087656-009	SW846 6020
	Thallium	0.000347	0.0003	0.001	0.002	J		087656-009	SW846 6020
	Uranium	0.0045	0.00005	0.0002	0.030			087656-009	SW846 6020
	Vanadium	0.00701	0.003	0.010	NE	J		087656-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087656-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW7	Aluminum	0.0167	0.010	0.030	NE	J		087637-009	SW846 6020
26-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087637-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087637-009	SW846 6020
	Barium	0.0526	0.0005	0.002	2.00			087637-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087637-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087637-009	SW846 6020
	Calcium	60.9	0.100	1.00	NE	B		087637-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087637-009	SW846 6020
	Cobalt	0.000156	0.0001	0.001	NE	J		087637-009	SW846 6020
	Copper	0.000756	0.0003	0.001	NE	J		087637-009	SW846 6020
	Iron	0.214	0.010	0.100	NE			087637-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087637-009	SW846 6020
	Magnesium	20.1	0.005	0.015	NE			087637-009	SW846 6020
	Manganese	0.00172	0.001	0.005	NE	J		087637-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087637-009	SW846 7470
	Nickel	0.00112	0.0005	0.002	NE	J		087637-009	SW846 6020
	Potassium	4.02	0.080	0.300	NE			087637-009	SW846 6020
	Selenium	0.00178	0.001	0.005	0.050	J		087637-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087637-009	SW846 6020
	Sodium	52.6	0.400	1.25	NE			087637-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087637-009	SW846 6020
	Uranium	0.00526	0.00005	0.0002	0.030			087637-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087637-009	SW846 6020
	Zinc	0.00271	0.0026	0.010	NE	J		087637-009	SW846 6020

Refer to footnotes on page 5A-31.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0439	0.010	0.030	NE			087649-009	SW846 6020
02-Sep-09	Antimony	ND	0.0005	0.003	0.006	U		087649-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087649-009	SW846 6020
	Barium	0.0559	0.0005	0.002	2.00			087649-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087649-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087649-009	SW846 6020
	Calcium	57.9	0.100	1.00	NE	B		087649-009	SW846 6020
	Chromium	0.00282	0.0025	0.010	0.100	J		087649-009	SW846 6020
	Cobalt	0.000159	0.0001	0.001	NE	J		087649-009	SW846 6020
	Copper	0.000932	0.0003	0.001	NE	J		087649-009	SW846 6020
	Iron	0.139	0.010	0.100	NE			087649-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087649-009	SW846 6020
	Magnesium	17.9	0.005	0.015	NE			087649-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087649-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087649-009	SW846 7470
	Nickel	0.0016	0.0005	0.002	NE	J		087649-009	SW846 6020
	Potassium	3.88	0.080	0.300	NE			087649-009	SW846 6020
	Selenium	0.00241	0.001	0.005	0.050	J		087649-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087649-009	SW846 6020
	Sodium	54.7	0.400	1.25	NE			087649-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087649-009	SW846 6020
	Uranium	0.00374	0.00005	0.0002	0.030			087649-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087649-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087649-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW9	Aluminum	ND	0.010	0.030	NE	U		087633-009	SW846 6020
24-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087633-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087633-009	SW846 6020
	Barium	0.0664	0.0005	0.002	2.00			087633-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087633-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087633-009	SW846 6020
	Calcium	64.2	0.100	1.00	NE	B		087633-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087633-009	SW846 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		087633-009	SW846 6020
	Copper	0.000793	0.0003	0.001	NE	J		087633-009	SW846 6020
	Iron	0.216	0.010	0.100	NE			087633-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087633-009	SW846 6020
	Magnesium	20.9	0.005	0.015	NE			087633-009	SW846 6020
	Manganese	0.00136	0.001	0.005	NE	J		087633-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087633-009	SW846 7470
	Nickel	0.00122	0.0005	0.002	NE	J		087633-009	SW846 6020
	Potassium	3.79	0.080	0.300	NE			087633-009	SW846 6020
	Selenium	0.00172	0.001	0.005	0.050	J		087633-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087633-009	SW846 6020
	Sodium	58.8	0.400	1.25	NE			087633-009	SW846 6020
	Thallium	0.000393	0.0003	0.001	0.002	J		087633-009	SW846 6020
	Uranium	0.00616	0.00005	0.0002	0.030			087633-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087633-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087633-009	SW846 6020

Refer to footnotes on page 5A-35.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U		087658-009	SW846 6020
11-Sep-09	Antimony	0.000663	0.0005	0.003	0.006	B, J	0.0071U	087658-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087658-009	SW846 6020
	Barium	0.0569	0.0005	0.002	2.00			087658-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087658-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087658-009	SW846 6020
	Calcium	62.7	0.100	1.00	NE	B		087658-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087658-009	SW846 6020
	Cobalt	0.00017	0.0001	0.001	NE	J		087658-009	SW846 6020
	Copper	0.000781	0.0003	0.001	NE	J		087658-009	SW846 6020
	Iron	0.261	0.010	0.100	NE	B		087658-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087658-009	SW846 6020
	Magnesium	17.5	0.005	0.015	NE			087658-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087658-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087658-009	SW846 7470
	Nickel	0.00138	0.0005	0.002	NE	J		087658-009	SW846 6020
	Potassium	4.27	0.080	0.300	NE			087658-009	SW846 6020
	Selenium	0.00273	0.001	0.005	0.050	J		087658-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087658-009	SW846 6020
	Sodium	61.8	0.400	1.25	NE			087658-009	SW846 6020
	Thallium	0.000531	0.0003	0.001	0.002	J	0.0021U	087658-009	SW846 6020
	Uranium	0.00363	0.00005	0.0002	0.030			087658-009	SW846 6020
	Vanadium	0.00356	0.003	0.010	NE	J		087658-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087658-009	SW846 6020

Refer to footnotes on page 5A-35.

Table 5A-7
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Technical Area V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
AVN-1	Americium-241	-11.4 ± 17.7	19.6	9.80	NE	U	BD	087646-033	EPA 901.1
31-Aug-09	Cesium-137	0.555 ± 4.82	2.88	1.44	NE	U	BD	087646-033	EPA 901.1
	Cobalt-60	1.14 ± 1.91	3.40	1.70	NE	U	BD	087646-033	EPA 901.1
	Potassium-40	-10.1 ± 29.8	43.3	21.7	NE	U	BD	087646-033	EPA 901.1
	Gross Alpha	8.54 ± 4.13	4.34	1.70	15		NJ+	087646-034	EPA 900.0
	Gross Beta	5.88 ± 2.13	2.98	1.45	4 mrem/yr		J	087646-034	EPA 900.0
	Tritium	-16.7 ± 100	173	84.6	NE	U	BD	087646-036	EPA 906.0 M
AVN-1 (Duplicate)	Americium-241	-20.2 ± 12.3	20.0	10.0	NE	U	BD	087647-033	EPA 901.1
31-Aug-09	Cesium-137	-0.144 ± 2.07	3.41	1.71	NE	U	BD	087647-033	EPA 901.1
	Cobalt-60	0.729 ± 2.27	3.86	1.93	NE	U	BD	087647-033	EPA 901.1
	Potassium-40	-33.7 ± 51.7	44.8	22.4	NE	U	BD	087647-033	EPA 901.1
	Gross Alpha	3.24 ± 2.10	2.35	0.796	15		NJ+	087647-034	EPA 900.0
	Gross Beta	2.98 ± 1.96	3.13	1.52	4 mrem/yr	U	BD	087647-034	EPA 900.0
	Tritium	-69.9 ± 98.4	173	84.2	NE	U	BD	087647-036	EPA 906.0 M
LWDS-MW1	Americium-241	-22.9 ± 9.69	15.3	7.67	NE	U	BD	087662-033	EPA 901.1
15-Sep-09	Cesium-137	-0.568 ± 1.79	2.90	1.45	NE	U	BD	087662-033	EPA 901.1
	Cobalt-60	0.668 ± 1.87	3.18	1.59	NE	U	BD	087662-033	EPA 901.1
	Potassium-40	-12.2 ± 33.5	46.3	23.2	NE	U	BD	087662-033	EPA 901.1
	Gross Alpha	3.58 ± 2.11	3.08	1.42	15		J	087662-034	EPA 900.0
	Gross Beta	4.00 ± 2.04	3.13	1.53	4 mrem/yr		J	087662-034	EPA 900.0
	Tritium	-8.52 ± 48.1	85.8	40.8	NE	U	BD	087662-036	EPA 906.0 M
LWDS-MW1 (Duplicate)	Americium-241	-6.41 ± 11.9	20.1	10.1	NE	U	BD	087663-033	EPA 901.1
15-Sep-09	Cesium-137	-1.63 ± 3.33	4.06	2.03	NE	U	BD	087663-033	EPA 901.1
	Cobalt-60	0.750 ± 1.86	3.27	1.64	NE	U	BD	087663-033	EPA 901.1
	Potassium-40	4.74 ± 37.1	41.9	20.9	NE	U	BD	087663-033	EPA 901.1
	Gross Alpha	7.51 ± 4.49	4.25	1.35	15		J	087663-034	EPA 900.0
	Gross Beta	10.8 ± 5.10	6.89	3.12	4 mrem/yr		J	087663-034	EPA 900.0
	Tritium	-5.25 ± 49.6	88.1	41.9	NE	U	BD	087663-036	EPA 906.0 M
LWDS-MW2	Americium-241	11.0 ± 9.27	14.2	7.11	NE	U	BD	087642-033	EPA 901.1
27-Aug-09	Cesium-137	0.493 ± 1.86	3.13	1.57	NE	U	BD	087642-033	EPA 901.1
	Cobalt-60	1.86 ± 3.25	3.78	1.89	NE	U	BD	087642-033	EPA 901.1
	Potassium-40	-7.00 ± 36.4	42.4	21.2	NE	U	BD	087642-033	EPA 901.1
	Gross Alpha	6.81 ± 4.20	3.83	1.10	15		J+	087642-034	EPA 900.0
	Gross Beta	4.36 ± 1.70	2.41	1.17	4 mrem/yr		J	087642-034	EPA 900.0
	Tritium	109 ± 115	189	91.2	NE	U	BD	087642-036	EPA 906.0 M

Refer to footnotes on page 5A-35.

Table 5A-7 *(Continued)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Technical Area V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW2	Americium-241	-10.7 ± 10.6	17.9	8.95	NE	U	BD	087651-033	EPA 901.1
08-Sep-09	Cesium-137	1.20 ± 2.05	3.56	1.78	NE	U	BD	087651-033	EPA 901.1
	Cobalt-60	1.34 ± 2.00	3.50	1.75	NE	U	BD	087651-033	EPA 901.1
	Potassium-40	18.6 ± 51.1	37.1	18.6	NE	U	BD	087651-033	EPA 901.1
	Gross Alpha	5.44 ± 2.53	1.94	0.623	15		J	087651-034	EPA 900.0
	Gross Beta	6.62 ± 1.87	2.23	1.08	4 mrem/yr		J	087651-034	EPA 900.0
	Tritium	-3.59 ± 45.2	80.8	38.1	NE	U	BD	087651-036	EPA 906.0 M
TAV-MW3	Americium-241	-1.84 ± 9.68	14.5	7.25	NE	U	BD	087635-033	EPA 901.1
25-Aug-09	Cesium-137	-0.502 ± 1.81	2.95	1.48	NE	U	BD	087635-033	EPA 901.1
	Cobalt-60	0.509 ± 1.76	2.99	1.50	NE	U	BD	087635-033	EPA 901.1
	Potassium-40	13.2 ± 42.6	27.9	14.0	NE	U	BD	087635-033	EPA 901.1
	Gross Alpha	7.31 ± 4.59	5.04	1.71	15		J+	087635-034	EPA 900.0
	Gross Beta	4.58 ± 1.67	2.31	1.12	4 mrem/yr		J	087635-034	EPA 900.0
	Tritium	43.9 ± 112	192	92.6	NE	U	BD	087635-036	EPA 906.0 M
TAV-MW4	Americium-241	8.72 ± 14.7	22.9	11.4	NE	U	BD	087654-033	EPA 901.1
09-Sep-09	Cesium-137	-1.13 ± 1.94	3.21	1.61	NE	U	BD	087654-033	EPA 901.1
	Cobalt-60	1.47 ± 1.91	3.42	1.71	NE	U	BD	087654-033	EPA 901.1
	Potassium-40	79.1 ± 27.7	79.1	24.4	NE	U	BD	087654-033	EPA 901.1
	Gross Alpha	4.12 ± 2.43	2.76	1.01	15		J	087654-034	EPA 900.0
	Gross Beta	7.22 ± 4.60	6.85	3.11	4 mrem/yr		J	087654-034	EPA 900.0
	Tritium	19.5 ± 46.2	79.6	37.6	NE	U	BD	087654-036	EPA 906.0 M
TAV-MW5	Americium-241	-0.155 ± 11.0	18.2	9.11	NE	U	BD	087640-033	EPA 901.1
28-Aug-09	Cesium-137	0.488 ± 2.01	3.46	1.73	NE	U	BD	087640-033	EPA 901.1
	Cobalt-60	-0.833 ± 2.02	3.32	1.66	NE	U	BD	087640-033	EPA 901.1
	Potassium-40	-14.8 ± 50.4	50.1	25.1	NE	U	BD	087640-033	EPA 901.1
	Gross Alpha	5.10 ± 2.81	2.64	0.855	15		J	087640-034	EPA 900.0
	Gross Beta	9.95 ± 5.13	7.15	3.24	4 mrem/yr		J	087640-034	EPA 900.0
	Tritium	-11.5 ± 99.2	171	83.5	NE	U	BD	087640-036	EPA 906.0 M
TAV-MW6	Americium-241	5.48 ± 7.74	11.9	5.96	NE	U	BD	087656-033	EPA 901.1
10-Sep-09	Cesium-137	0.966 ± 1.71	2.90	1.45	NE	U	BD	087656-033	EPA 901.1
	Cobalt-60	2.97 ± 1.87	3.41	1.71	NE	U	BD	087656-033	EPA 901.1
	Potassium-40	-14.6 ± 35.2	38.7	19.4	NE	U	BD	087656-033	EPA 901.1
	Gross Alpha	9.07 ± 3.52	2.63	0.942	15			087656-034	EPA 900.0
	Gross Beta	3.85 ± 1.43	1.94	0.932	4 mrem/yr		J	087656-034	EPA 900.0
	Tritium	17.5 ± 45.6	78.8	37.2	NE	U	BD	087656-036	EPA 906.0 M

Refer to footnotes on page 5A-35.

Table 5A-7 *(Concluded)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Technical Area V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[b] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TAV-MW7	Americium-241	3.19 ± 3.39	5.12	2.56	NE	U	BD	087637-033	EPA 901.1
26-Aug-09	Cesium-137	1.57 ± 2.44	4.14	2.07	NE	U	BD	087637-033	EPA 901.1
	Cobalt-60	1.76 ± 2.44	4.25	2.12	NE	U	BD	087637-033	EPA 901.1
	Potassium-40	40.0 ± 25.2	47.4	23.7	NE	U	BD	087637-033	EPA 901.1
	Gross Alpha	9.06 ± 2.70	2.76	1.29	15		J+	087637-034	EPA 900.0
	Gross Beta	5.72 ± 1.84	2.38	1.15	4 mrem/yr		J	087637-034	EPA 900.0
	Tritium	-17.6 ± 107	186	90.1	NE	U	BD	087637-036	EPA 906.0 M
TAV-MW8	Americium-241	3.95 ± 7.61	11.6	5.83	NE	U	BD	087649-033	EPA 901.1
02-Sep-09	Cesium-137	0.444 ± 1.81	3.03	1.51	NE	U	BD	087649-033	EPA 901.1
	Cobalt-60	-0.488 ± 1.81	2.94	1.47	NE	U	BD	087649-033	EPA 901.1
	Potassium-40	9.25 ± 35.3	21.7	10.8	NE	U	BD	087649-033	EPA 901.1
	Gross Alpha	8.73 ± 4.20	4.29	1.64	15		J	087649-034	EPA 900.0
	Gross Beta	6.45 ± 1.94	2.42	1.17	4 mrem/yr		J	087649-034	EPA 900.0
	Tritium	13.3 ± 101	173	84.3	NE	U	BD	087649-036	EPA 906.0 M
TAV-MW9	Americium-241	-4.15 ± 10.8	11.9	5.94	NE	U	BD	087633-033	EPA 901.1
24-Aug-09	Cesium-137	0.0793 ± 1.89	3.14	1.57	NE	U	BD	087633-033	EPA 901.1
	Cobalt-60	0.835 ± 2.07	3.54	1.77	NE	U	BD	087633-033	EPA 901.1
	Potassium-40	4.00 ± 33.4	44.4	22.2	NE	U	BD	087633-033	EPA 901.1
	Gross Alpha	11.6 ± 5.50	4.25	1.33	15		J+	087633-034	EPA 900.0
	Gross Beta	4.52 ± 1.95	2.88	1.40	4 mrem/yr		J	087633-034	EPA 900.0
	Tritium	77.0 ± 117	197	95.3	NE	U	BD	087633-036	EPA 906.0 M
TAV-MW10	Americium-241	-2.89 ± 4.81	5.03	2.52	NE	U	BD	087658-033	EPA 901.1
11-Sep-09	Cesium-137	2.06 ± 2.25	3.88	1.94	NE	U	BD	087658-033	EPA 901.1
	Cobalt-60	-2.7 ± 3.38	4.08	2.04	NE	U	BD	087658-033	EPA 901.1
	Potassium-40	53.1 ± 43.5	37.5	18.7	NE	X	R	087658-033	EPA 901.1
	Gross Alpha	9.01 ± 5.28	5.49	1.94	15		J	087658-034	EPA 900.0
	Gross Beta	3.59 ± 1.79	2.70	1.31	4 mrem/yr		J	087658-034	EPA 900.0
	Tritium	8.54 ± 49.2	86.1	40.9	NE	U	BD	087658-036	EPA 906.0 M

Refer to footnotes on page 5A-35.

Table 5A-8
Summary of Field Water Quality Measurements[h], Technical Area V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
AVN-1	09-Feb-09	13.75	445	179.1	7.65	0.69	38.1	3.94
LWDS-MW1	18-Feb-09	15.09	778	164.1	7.42	0.28	70.4	7.08
LWDS-MW2	06-Feb-09	18.88	513	182.5	7.55	0.20	49.8	4.60
TAV-MW2	10-Feb-09	15.40	768	179.0	7.31	0.33	53.9	5.37
TAV-MW3	03-Feb-09	19.00	592	184.8	7.49	0.32	75.2	7.01
TAV-MW4	12-Feb-09	16.21	550	188.7	7.53	0.45	66.5	6.60
TAV-MW5	05-Feb-09	20.10	533	171.0	7.50	0.16	50.6	4.58
TAV-MW6	13-Feb-09	15.11	720	191.9	7.42	0.21	67.6	6.72
TAV-MW7	04-Feb-09	16.47	654	139.9	7.38	0.70	3.2	0.33
TAV-MW8	11-Feb-09	16.98	621	183.7	7.49	0.52	67.6	6.53
TAV-MW9	02-Feb-09	19.01	718	164.9	7.30	0.44	18.0	1.67
TAV-MW10	16-Feb-09	19.42	706	171.5	7.43	0.26	79.6	7.31
AVN-1	01-Jun-09	21.20	467	79.5	7.40	1.22	44.3	3.94
LWDS-MW1	10-Jun-09	17.10	806	46.1	7.31	0.37	75.7	7.27
LWDS-MW2	29-May-09	21.18	533	80.5	7.29	0.27	50.7	4.50
TAV-MW2	03-Jun-09	21.52	805	60.2	7.12	0.64	61.2	5.38
TAV-MW3	21-May-09	21.03	612	95.8	7.27	0.44	78.6	6.99
TAV-MW4	04-Jun-09	22.63	580	60.1	7.30	0.41	74.0	6.40
TAV-MW5	28-May-09	21.13	553	70.8	7.28	0.17	51.7	4.59
TAV-MW6	05-Jun-09	21.67	756	52.9	7.24	0.68	75.6	6.72
TAV-MW7	26-May-09	20.30	681	20.4	7.17	0.65	3.3	0.29
TAV-MW8	02-Jun-09	22.36	650	58.9	7.25	0.57	72.8	6.32
TAV-MW9	20-May-09	22.97	745	39.7	7.11	0.45	21.1	1.80
TAV-MW10	08-Jun-09	21.11	729	63.3	7.22	0.23	80.0	7.18
AVN-1	31-Aug-09	22.09	467	389.7	7.75	0.37	46.1	3.98
LWDS-MW1	15-Sep-09	20.23	799	380.0	7.55	0.36	80.7	7.28
LWDS-MW2	27-Aug-09	22.01	533	330.1	7.66	0.21	51.5	4.50
TAV-MW2	08-Sep-09	22.66	792	399.3	7.43	0.50	62.6	5.46
TAV-MW3	25-Aug-09	19.60	610	391.9	7.63	0.53	74.3	6.78
TAV-MW4	09-Sep-09	22.40	575	374.9	7.64	0.50	70.8	6.13
TAV-MW5	28-Aug-09	22.78	555	321.8	7.62	0.27	51.9	4.48
TAV-MW6	10-Sep-09	20.05	750	378.7	7.56	0.44	73.3	6.65
TAV-MW7	26-Aug-09	20.51	679	354.5	7.50	1.98	3.8	0.33
TAV-MW8	02-Sep-09	23.17	649	343.3	7.57	0.49	71.7	6.13

Refer to footnotes on page 5A-35.

Table 5A-8 *(Concluded)*
Summary of Field Water Quality Measurements[h], Technical Area V Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^0C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TAV-MW9	24-Aug-09	21.17	740	396.8	7.42	0.37	18.8	1.65
TAV-MW10	11-Sep-09	20.96	727	377.3	7.54	0.23	81.0	7.21
AVN-1	24-Nov-09	17.94	404	242.1	7.79	1.36	40.4	3.82
LWDS-MW1	08-Dec-09	14.55	699	273.4	7.35	0.27	70.6	7.19
LWDS-MW2	23-Nov-09	18.76	458	241.0	7.68	0.33	47.6	4.44
TAV-MW2	01-Dec-09	15.13	684	241.7	7.26	0.52	56.2	5.54
TAV-MW3	17-Nov-09	19.54	527	244.3	7.60	0.59	71.0	6.51
TAV-MW4	02-Dec-09	18.81	499	248.6	7.49	0.55	68.3	6.35
TAV-MW5	19-Nov-09	18.86	477	242.0	7.63	0.28	50.0	4.65
TAV-MW6	03-Dec-09	17.12	646	255.2	7.37	0.32	69.5	6.70
TAV-MW7	18-Nov-09	20.20	592	208.2	7.47	0.34	3.1	0.30
TAV-MW8	30-Nov-09	17.35	548	214.7	7.42	0.49	65.0	6.13
TAV-MW9	16-Nov-09	18.71	596	223.6	7.38	1.39	19.0	1.79
TAV-MW10	04-Dec-09	17.10	631	266.0	7.37	0.26	69.7	6.69

Refer to footnotes on page 5A-35.

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.
- 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

[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

[d]MCL

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11(b)), *National Primary Drinking Water Standards,* EPA, July 2002. Primary MCLs and secondary MCLs were promulgated (http://www.epa.gov/safewater/contaminants/index.html).
- mrem/yr = millirem per year.
- 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 (including radium and total uranium).
  5 pCi/L = radium-226 and radium-228 combined.
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate). Tritium has an equivalent MCL of 20,000 pCi/L.

[e]Laboratory Qualifier

B	=	Analyte is detected in associated laboratory method blank.
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.
X	=	Data rejected due to low abundance.

[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 associate value is an estimated quantity.
J+	=	The associated numerical value is an estimated quantity with suspected positive bias.
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 (compound may or may not be present). Re-sampling and reanalysis are necessary for verification.

Footnotes for Technical Area V Groundwater Monitoring Tables *(Concluded)*

[g]Analytical Method

- U.S. Environmental Protection Agency (EPA), 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA 9310: EPA, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography–Method 300.0*, EPA-600/4-84-017, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1999, *Perchlorate in Drinking Water Using Ion Chromatography*, EPA 815/R-00-014, U.S. Environmental Protection Agency, Cincinnati, Ohio.

[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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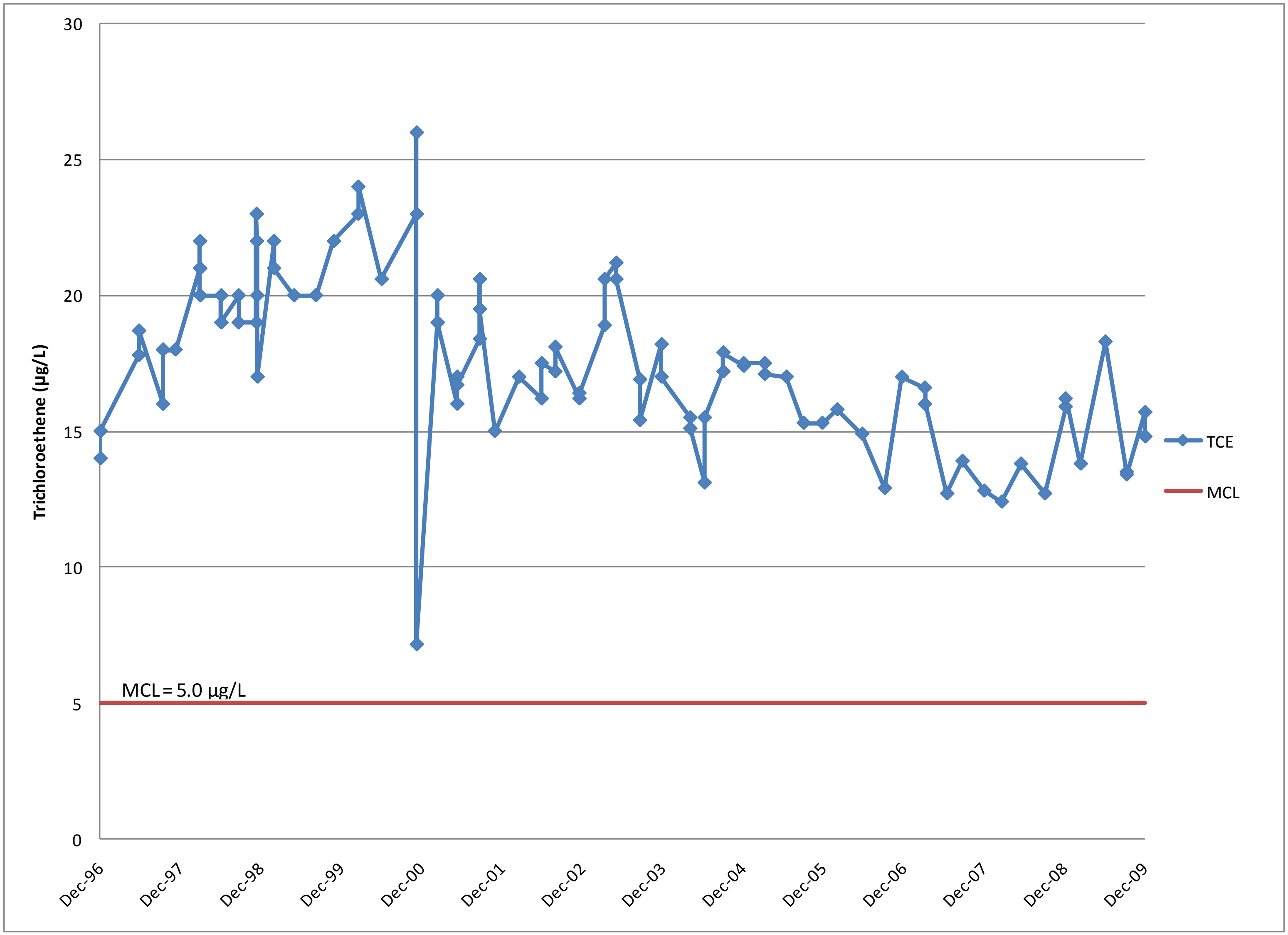

Figure 5B-1. Trichloroethene Concentrations, LWDS-MW1

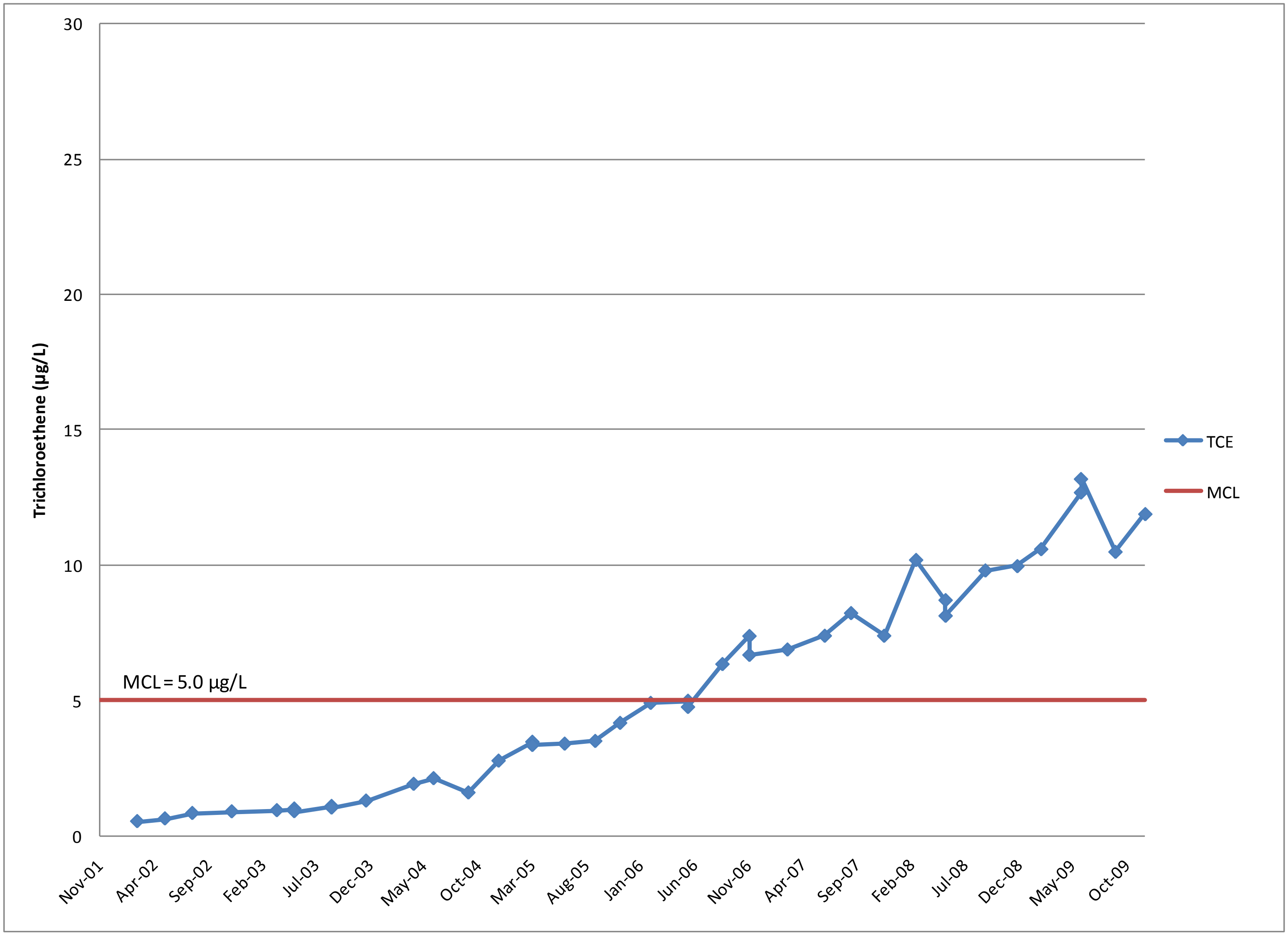

Figure 5B-2. Trichloroethene Concentrations, TAV-MW6

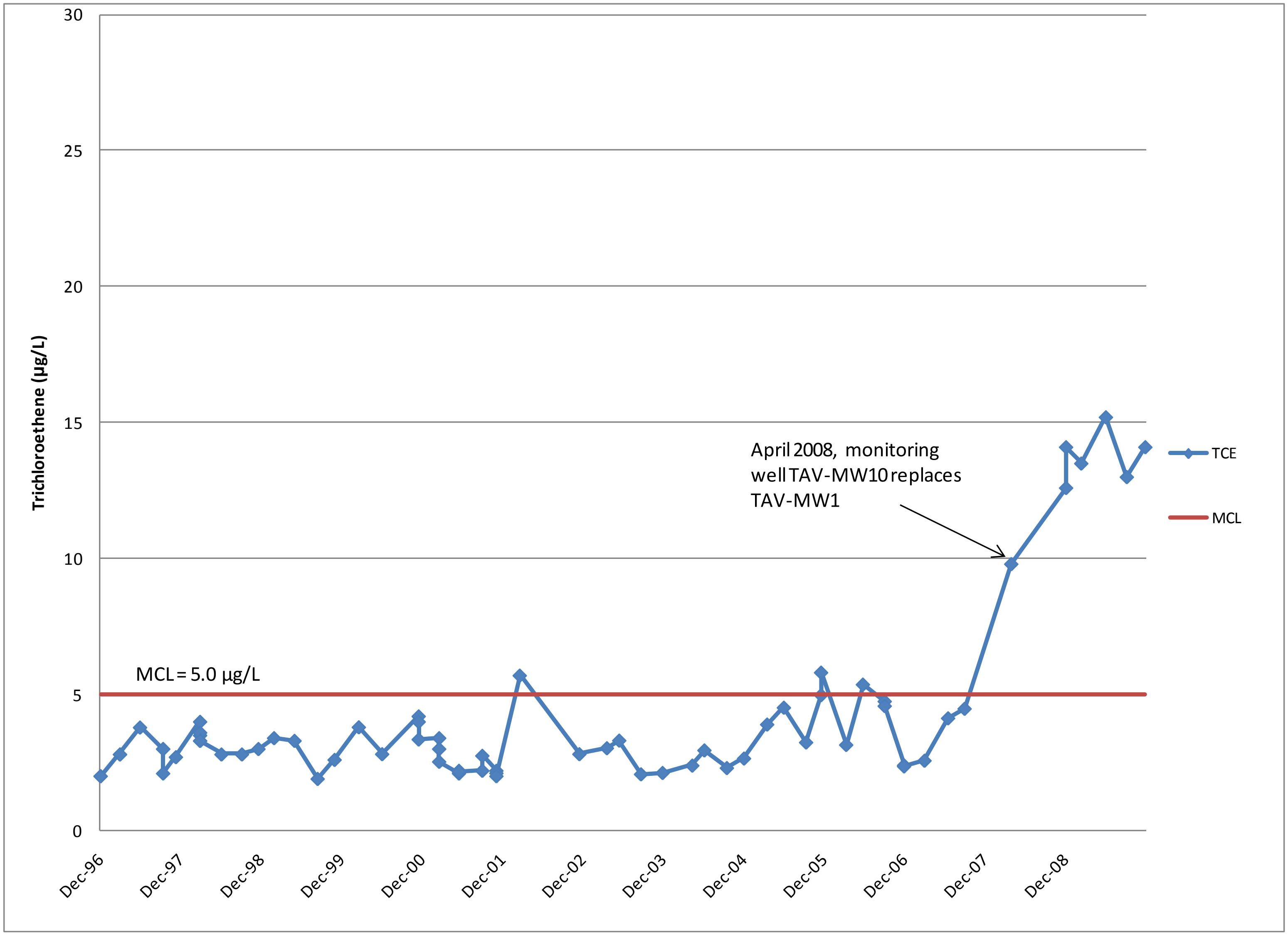

Figure 5B-3. Trichloroethene Concentrations, TAV-MW10

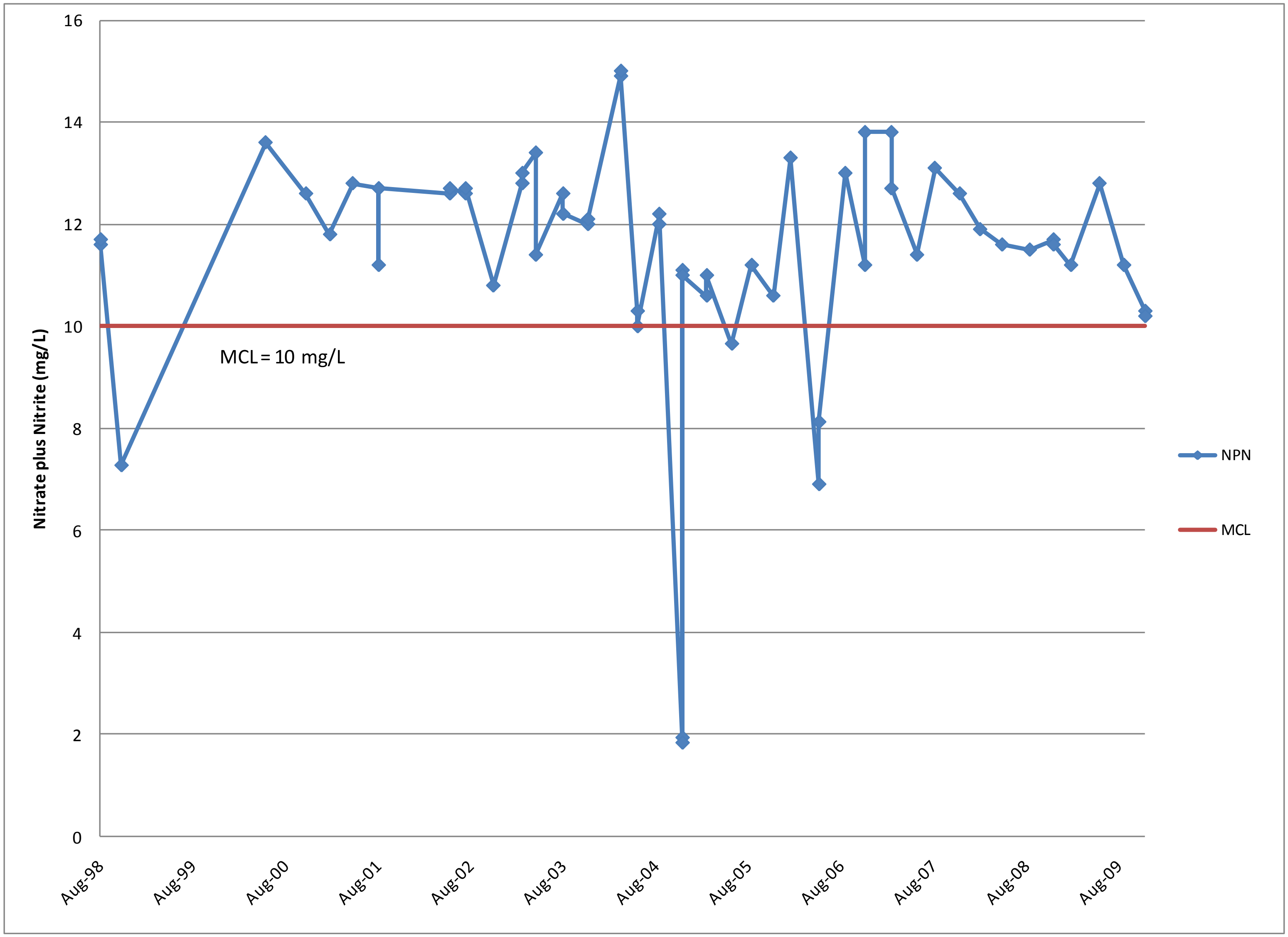

Figure 5B-4. Nitrate plus Nitrite Concentrations, LWDS-MW1

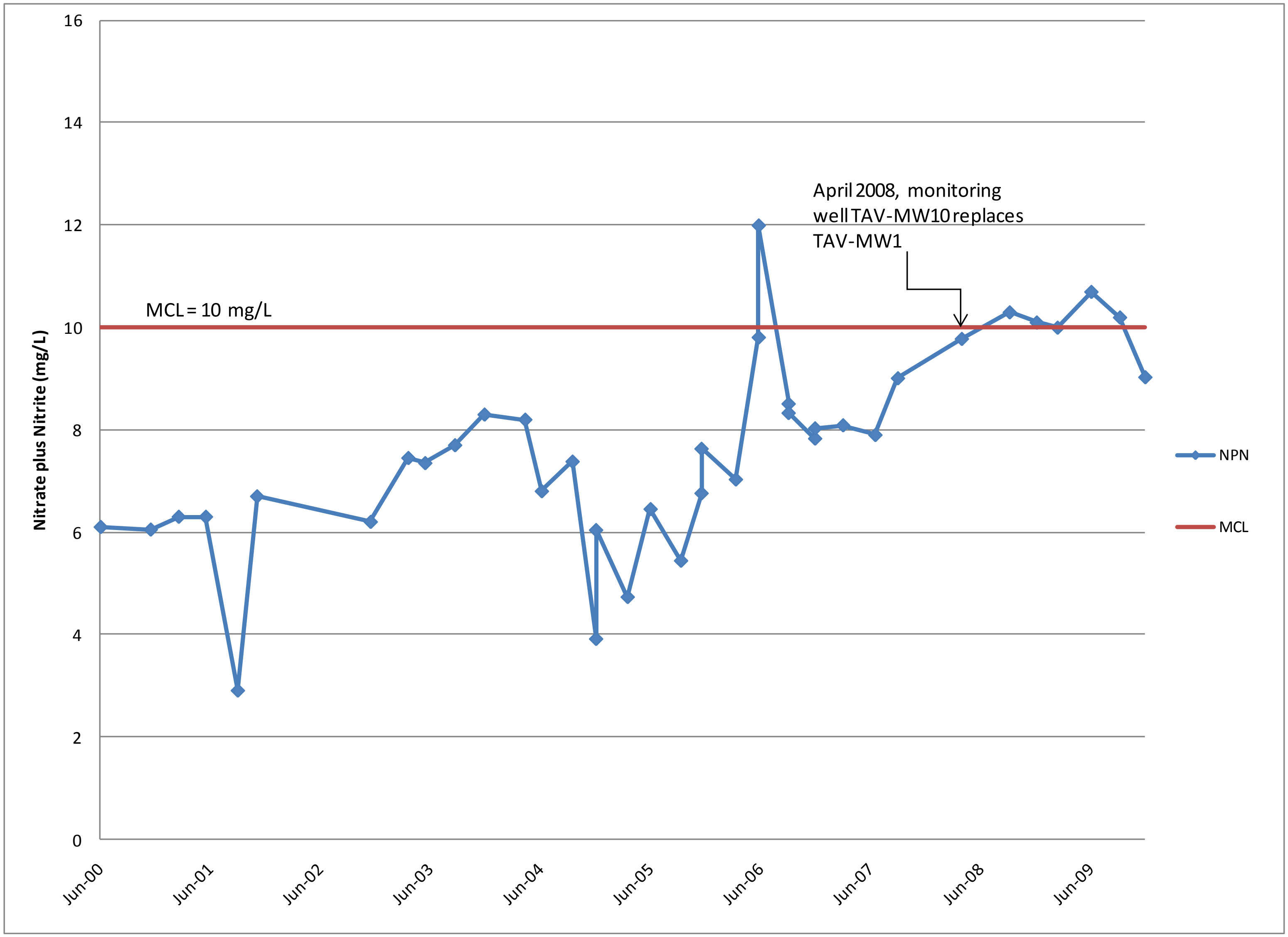

Figure 5B-5. Nitrate plus Nitrite Concentrations, TAV-MW10

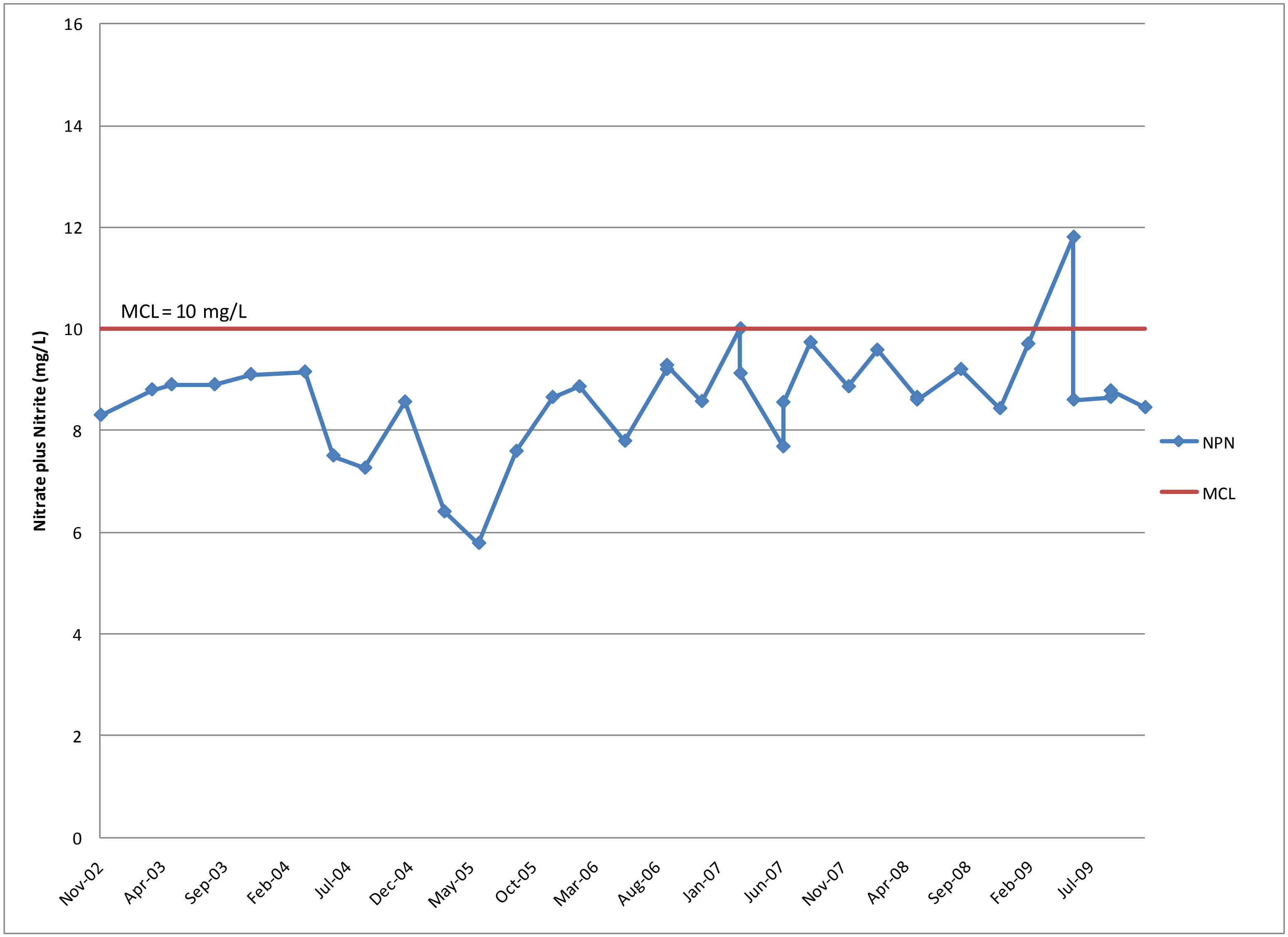

Figure 5B-6. Nitrate plus Nitrite Concentrations, AVN-1

Attachment 5C
Technical Area V
Hydrographs

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Attachment 5C Hydrographs

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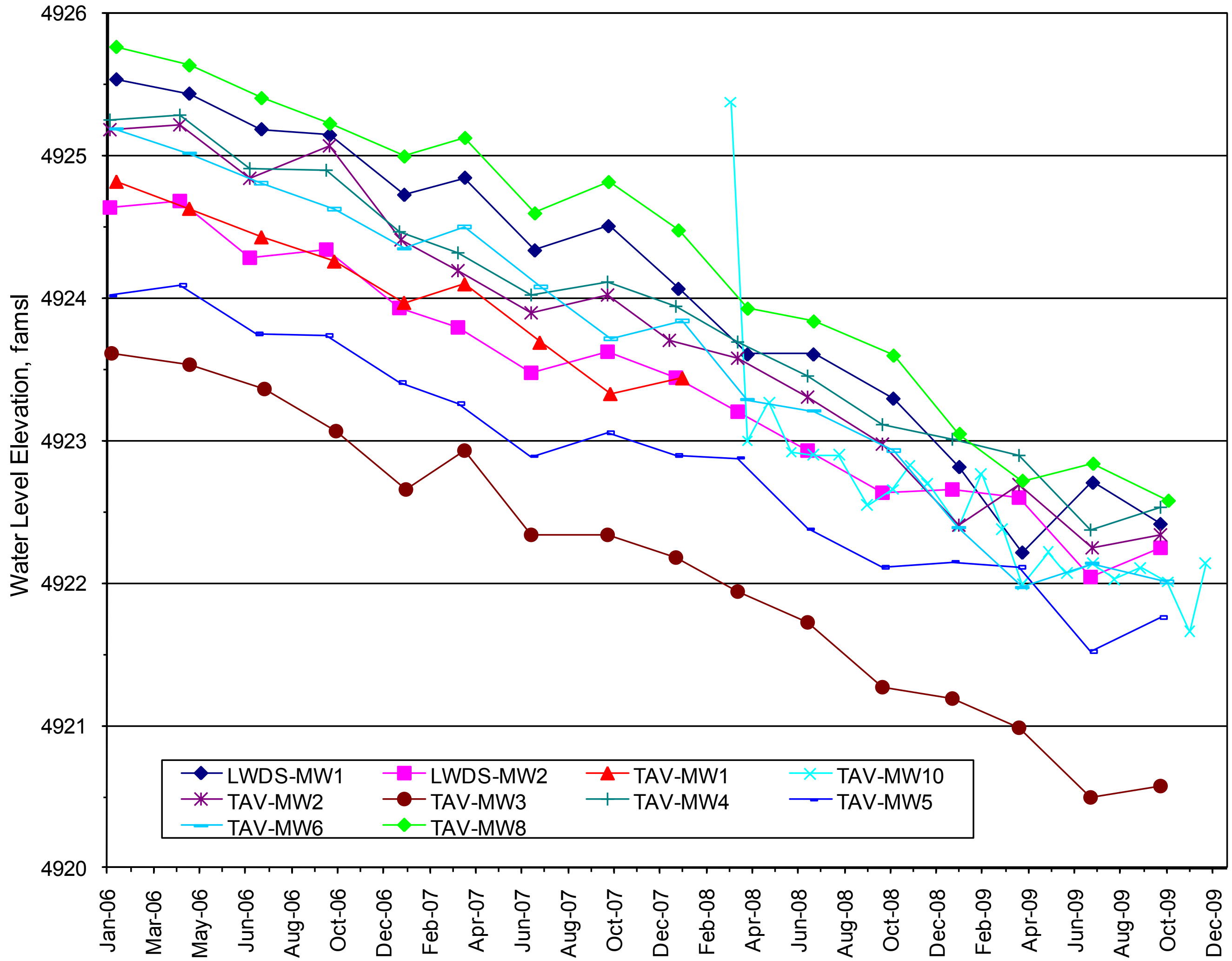

Figure 5C-1. TA-V Study Area Water Table Completion Wells

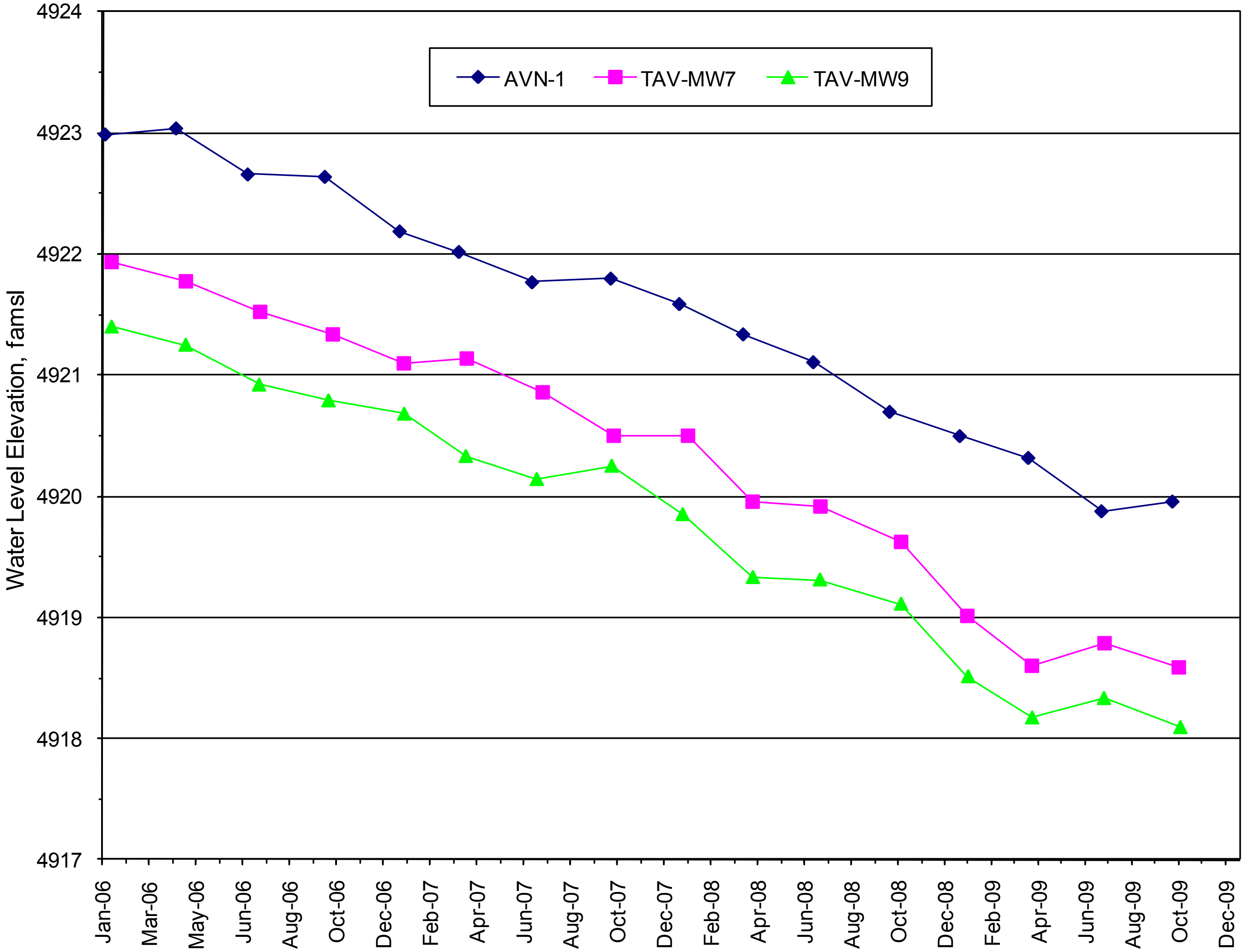

Figure 5C-2. TA-V Study Area Deep Completion Wells

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 COCs exceed the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) in 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 and State of New Mexico drinking water standards (MCLs) for TCE and nitrate are 5 μg/L and 10 mg/L (as nitrogen), respectively.

Unique features of the TAG 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) managed by Sandia National Laboratories, New Mexico (SNL/NM) are located in 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 through the Sandia Site 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 three parties identified as potentially responsible for groundwater contamination within the TAG area include 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 brig, a diesel-fuel tank farm, 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.

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 1942, 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 of 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 of both defense and nondefense components. The current work performed in TA-I and TA-II can be

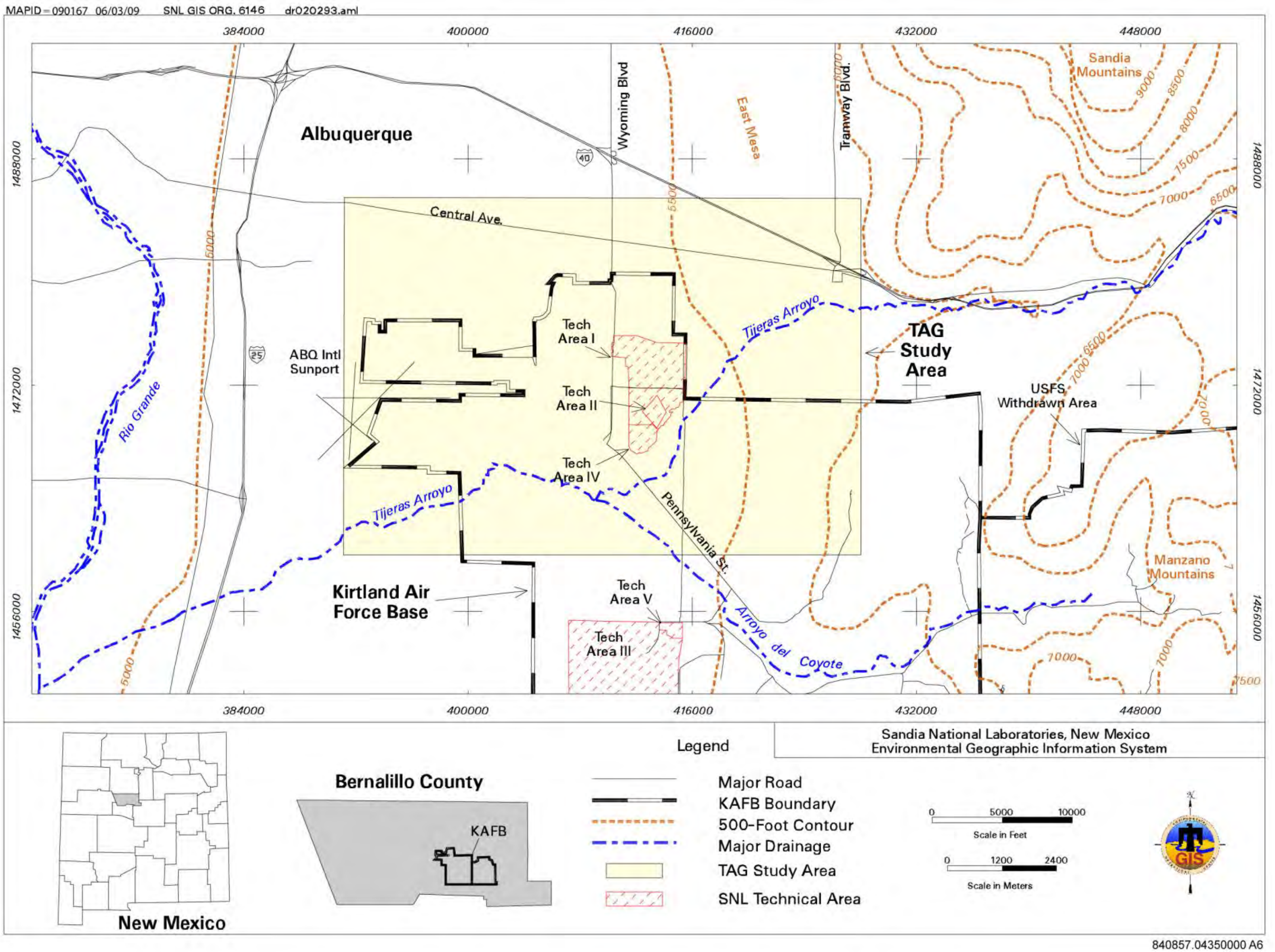

Figure 6-1. Location of the TAG Study Area

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 of most SNL/NM operations has resulted in an inventory of numerous chemicals, which are generally stored and used indoors in small quantities.

The SNL/NM Environmental Restoration (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 *TAG Investigation Report* (SNL November 2005).

6.1.3 Monitoring History

Investigations of groundwater quality in the TAG study area have been conducted by Sandia over the past 17 years (Table 6-1). In 1992, Sandia began to investigate groundwater quality as part of the overall TA-II investigation 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 caused Sandia 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 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 Sandia until an alternative sampling method could be implemented. In June 2003, SNL/NM submitted the *TAG Investigation Work Plan* (SNL June 2003) to the New Mexico Environment Department (NMED). This work plan presented a comprehensive scope of work for groundwater investigations that are being jointly conducted by SNL/NM, KAFB, and COA. Based on the requirements of the work plan, Sandia 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 *TAG Investigation Report* (SNL November 2005). The November 2005 report presents a conceptual model that provides a comprehensive list of groundwater monitoring data sources used to support the investigations.

In April 2004, the Compliance Order on Consent (the Consent Order), issued by the NMED, specified that TAG was an area of groundwater contamination (NMED April 2004). In response to the Consent Order, Sandia submitted the *TAG Corrective Measures Evaluation (CME) Work Plan* to the NMED in July 2004 (SNL July 2004). After fulfilling the requirements of the CME Work Plan, Sandia submitted the CME Report to the NMED (SNL/NM August 2005).

Table 6-1. Historical Timeline of the TAG Study Area

Month	Year	Event	Reference
November–July	1992–1993	SNL/NM 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 from 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 from 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 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 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 2003a
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 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	NMED issues the Compliance Order on Consent (the Consent Order), which 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	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	SNL/NM submits TAG Investigation Report 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	SNL/NM submits 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 2009a
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

Notes:

BGW = Balleau Groundwater, Inc.
CME = Corrective Measures Evaluation
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
IT = IT Corporation.
KAFB = Kirtland Air Force Base.
MCL = Maximum Contaminant Level.
μg/L = Microgram(s) per liter.
NMED = New Mexico Environment Department.
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 Consent Order (NMED April 2004) specifies the minimum sampling frequency for the groundwater monitoring and sampling schedule for TAG as: ―Sixevents – 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 (FY05). Having fulfilled those requirements, Sandia has continued groundwater monitoring on a voluntary basis, and TAG wells have been sampled quarterly, semiannually, or annually. All sampling since FY05 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 being monitored for water quality, and 27 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 groundwater system at approximately 440 to 570 ft bgs. Groundwater monitoring wells are completed either in the PGWS or regional aquifer (Table 6-2).

6.1.5 Summary of Calendar Year 2009 Activities

The following activities took place for the TAG investigation during Calendar Year 2009 (CY09):

- Monthly 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 January 2009, May 2009, July/August 2009, and October/November 2009 (SNL December 2008, April 2009, June 2009b, and October 2009).

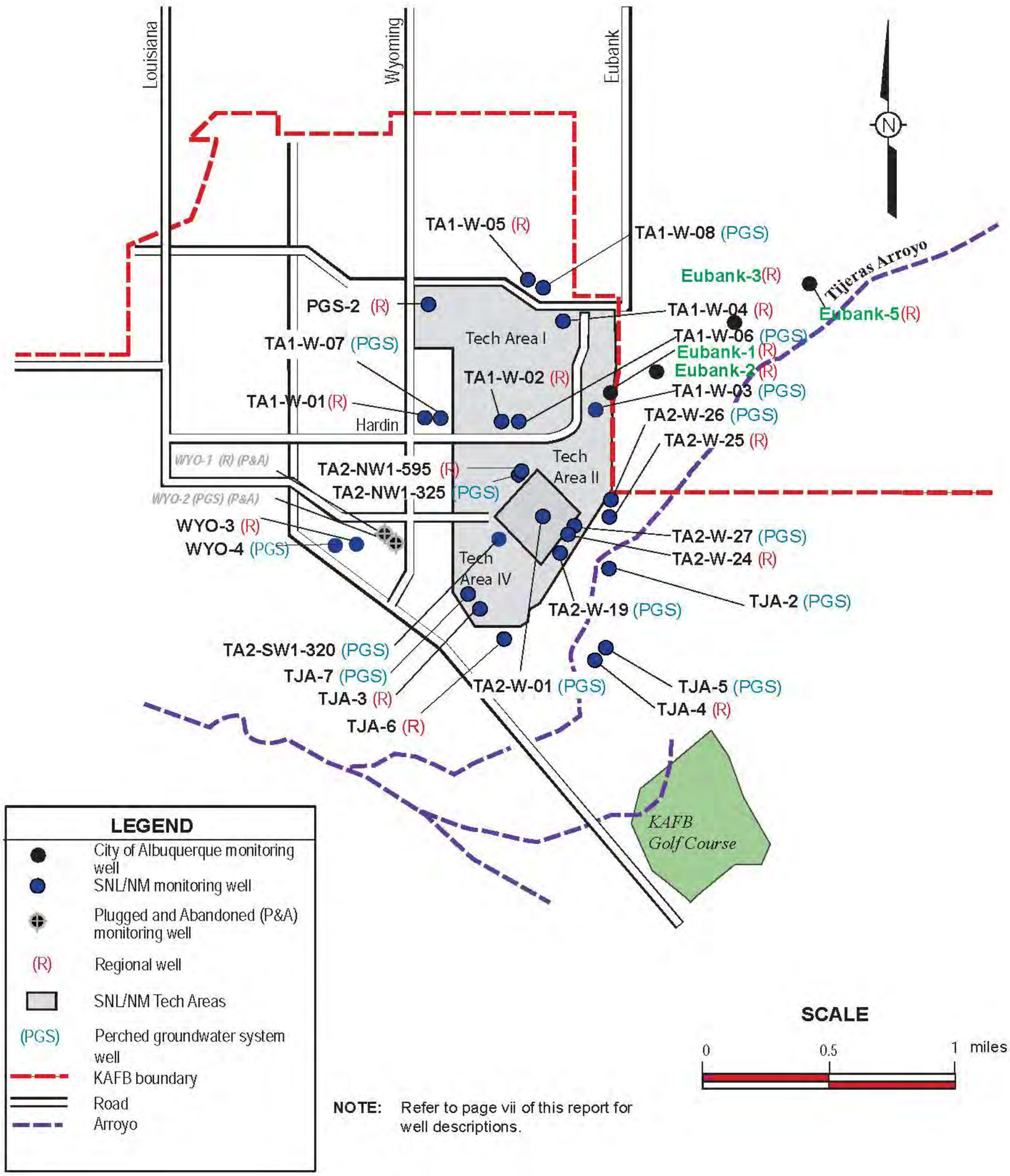

Figure 6-2. Tijeras Arroyo Groundwater (TAG) Investigation Monitoring Well Locations (30 Active Wells)

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)
Eubank-3	1997		✓	Regional aquifer (COA well)
Eubank-5	1997		✓	Regional aquifer (COA well)
PGS-2	1995	✓	✓	Regional aquifer
TA1-W-01	1997	✓	✓	Regional aquifer
TA1-W-02	1998	✓	✓	Regional aquifer
TA1-W-03	1998	✓	✓	PGWS
TA1-W-04	1998	✓	✓	Regional aquifer
TA1-W-05	1998	✓	✓	Regional aquifer
TA1-W-06	1998	✓	✓	PGWS
TA1-W-08	2001	✓	✓	PGWS
TA2-NW1-595	1993	✓	✓	Regional aquifer
TA2-SW1-320	1992	✓	✓	PGWS
TA2-W-01	1994	✓	✓	PGWS
TA2-W-19	1995	✓	✓	PGWS
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

NOTE: Check marks in the WQ and WL columns indicate WQ sampling and WL measurements were obtained during this reporting period.
COA = City of Albuquerque.
PGWS = Perched Groundwater System.
TAG = Tijeras Arroyo Groundwater.
WL = Water level.
WQ = Water quality.

- Semiannual groundwater sampling was conducted at four wells (TA2-W-01, TA2-W-27, TJA-3, and TJA-6) in January 2009 and July/August 2009 (SNL December 2008 and June 2009b).

- Annual groundwater sampling was conducted at nine wells (PGS-2, TA1-W-01, TA1-W-02, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, and WYO-3) in July/August 2009 (SNL June 2009b).

- Quarterly perchlorate screening groundwater sampling was conducted at four wells (TA1-W-06, TA1-W-08, TA2-W-01, and TA2-W-27) in July/August 2009 and October/November 2009 (SNL June 2009b and October 2009).

- Responses to the NMED's *Notice of Disapproval (NOD) of November 2005 TAG Investigation Report* were submitted to the NMED (SNL February 2009).

- Letter from the NMED, *RE: Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID#NM5890110518,* was received in April 2009 (NMED April 2009).

- The second *NOD of the November 2005 TAG Investigation Report* (NMED August 2009) was received from the NMED.

- Quarterly reporting of perchlorate analyses for TA1-W-06, TA1-W-08, TA2-W-01, and TA2-W-27 was conducted.

- 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 (Calendar Year 2010 [CY10]):

- Monthly water level measurements from 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.

- Quarterly perchlorate screening groundwater sampling and reporting at five wells: TA1-W-03, TA1-W-06, TA1-W-08, TA2-W-01, and TA2-W-27.

- Submission of responses to the NMED's second *NOD of November 2005 TAG Investigation Report* (NMED August 2009).

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 groundwater system at approximately 440 to 570 ft bgs. The uppermost saturated interval of the PGWS is between 10 and 30 ft in thickness. Water in the PGWS moves to 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.

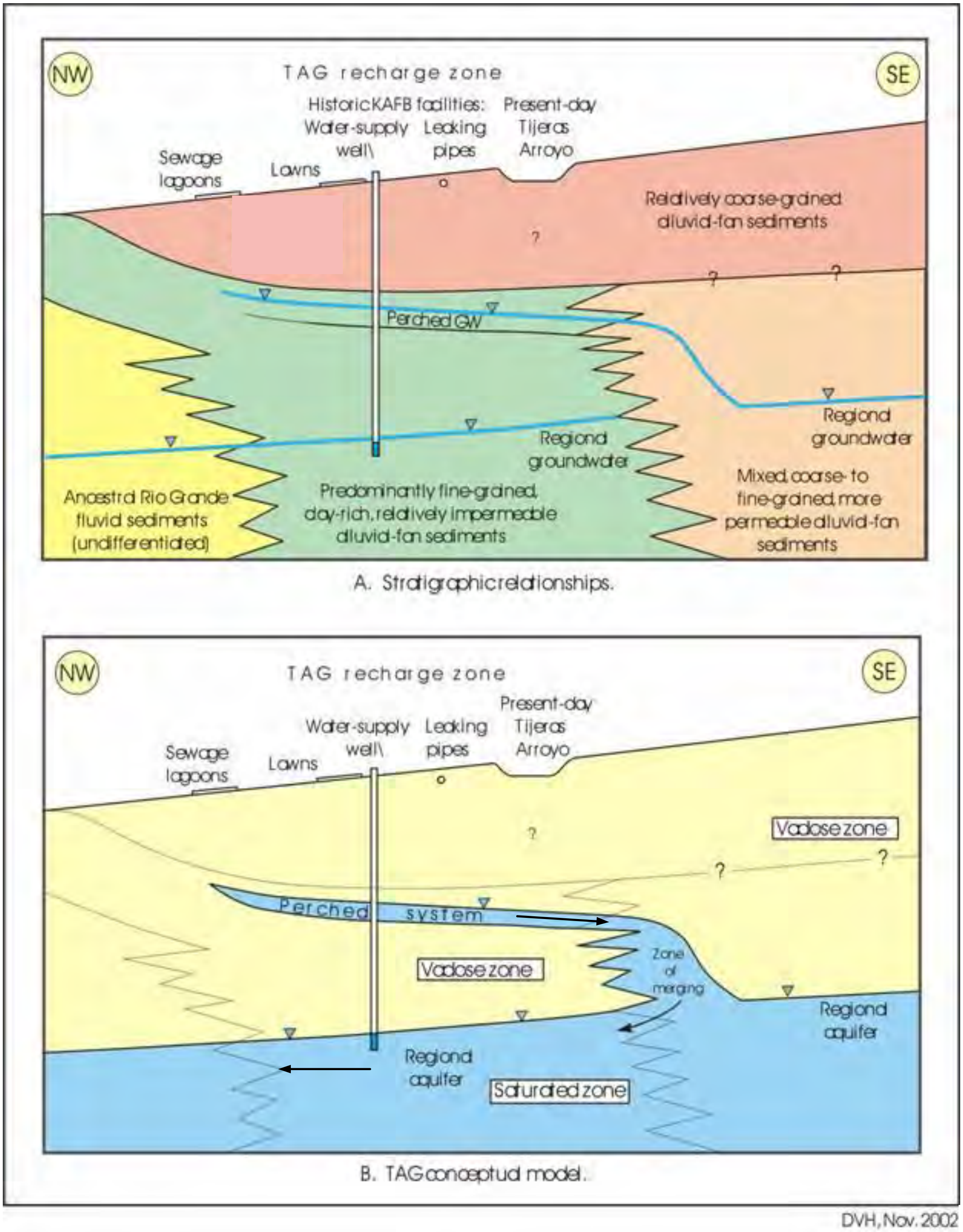

Figure 6-3. TAG Conceptual Model Illustration

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 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 to yield volumes of water sufficient for the construction of monitoring wells. The PGWS is not used as a water supply source.

The direction of groundwater flow in the PGWS is to the southeast. Groundwater flows through low-yield, alluvial fan sediments with an average hydraulic gradient of approximately 0.008 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 the former sewage lagoons) and natural sources (Tijeras Arroyo and possibly ancestral Tijeras Creek). Principal hydrogeologic controls on the PGWS include: (1) eastward bedding-plane dip attributed to the western limb of an inferred syncline; (2) stratigraphic variations (such as braided paleochannels); and (3) multiple recharge locations in the northwestern portion of the TAG study area.

Multiple overlapping lenses 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 facies and alluvial fan facies. 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 the KAFB, COA, and Veterans Administration (VA) water supply wells. 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. Groundwater elevations 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 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, COA, 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 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 6 miles west of KAFB. Surface water flows in the arroyo several times per year as a result of storm events. The annual precipitation for the area, as measured at the 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 million years old 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 is presently understood to cover 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 horizontal gradient that varies from approximately 0.02 to 0.004 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 current potentiometric surface for the PGWS (October and November 2009). The direction of groundwater flow in the PGWS is towards the southeast. The horizontal gradient of the PGWS varies from approximately 0.02 to 0.004 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 (Attachment 6C, Figures 6C-1 through 6C-11).

Figure 6-5 presents the current potentiometric surface for the regional aquifer (October and November 2009). The direction of groundwater flow in the regional aquifer is to the northwest towards the KAFB, COA, and VA water supply wells. The horizontal gradient of the regional aquifer across the central portion of the study area is approximately 0.01 ft/ft. Vertical flow gradients within the TAG study area have not been measured but are inferred to be downward, consistent with TA-V groundwater studies.

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 0.007 ft/ft	Approximate average of 0.009 ft/ft, but steeper near water supply wells
Flow velocities	4 to 10 ft/yr	4 to 10 ft/yr
Usage	Not used for water supply purposes	Utilized for water supply by KAFB, COA, 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 thick across much of the study area
Geochemical Variability	Geochemical signatures variable between monitoring wells	Geochemical signatures consistent between monitoring wells
Geochemical	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	Steadily declining water levels in the northwest, but 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 perched system, 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, COA, and VA water supply wells

Notes:
ARG = Ancestral Rio Grande (facies).
COA = City of Albuquerque.
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 = Veteran's Administration.

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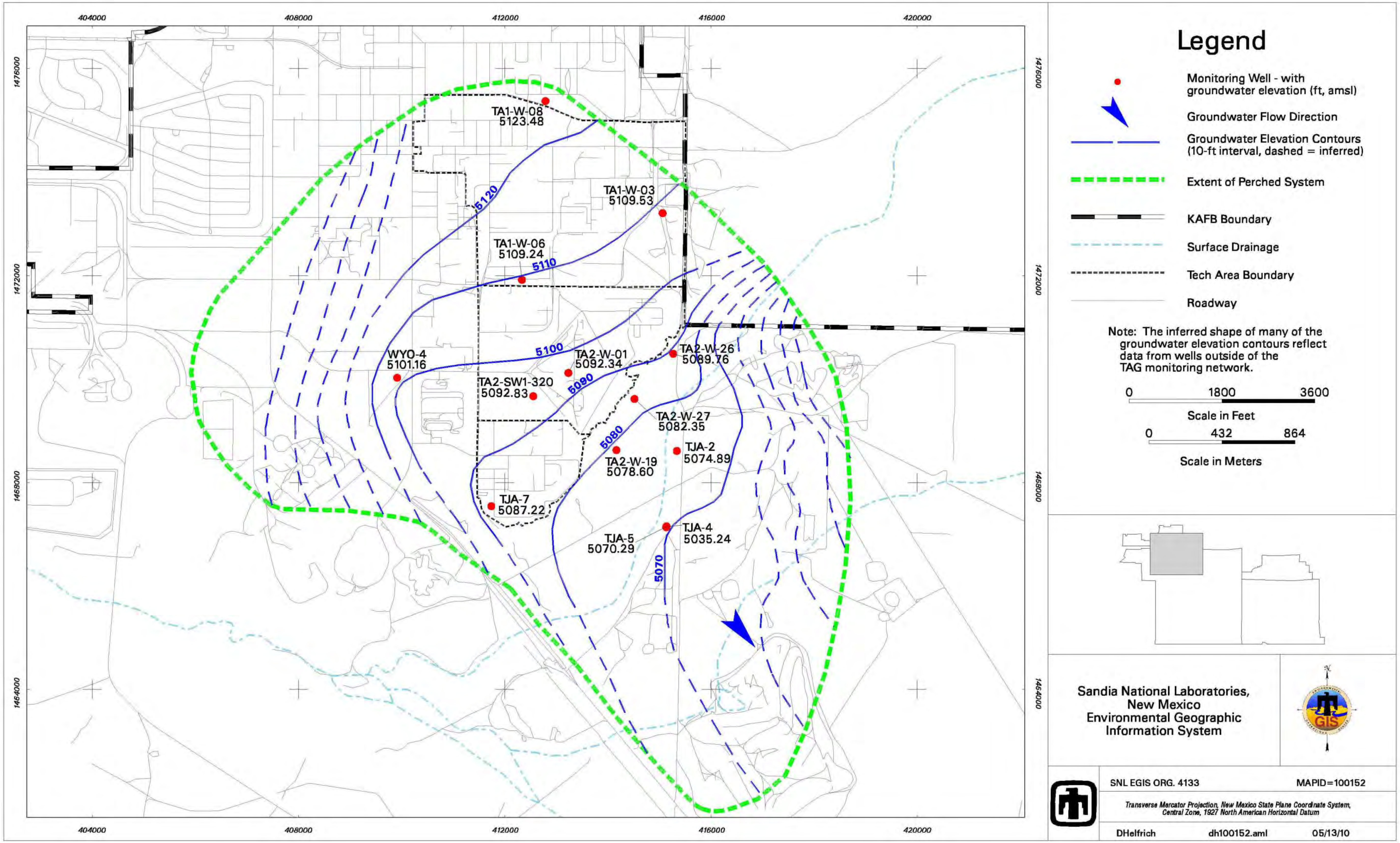

Figure 6-4. Tijeras Arroyo Groundwater Investigation Potentiometric Surface Map for the Perched Groundwater System (October and November 2009)

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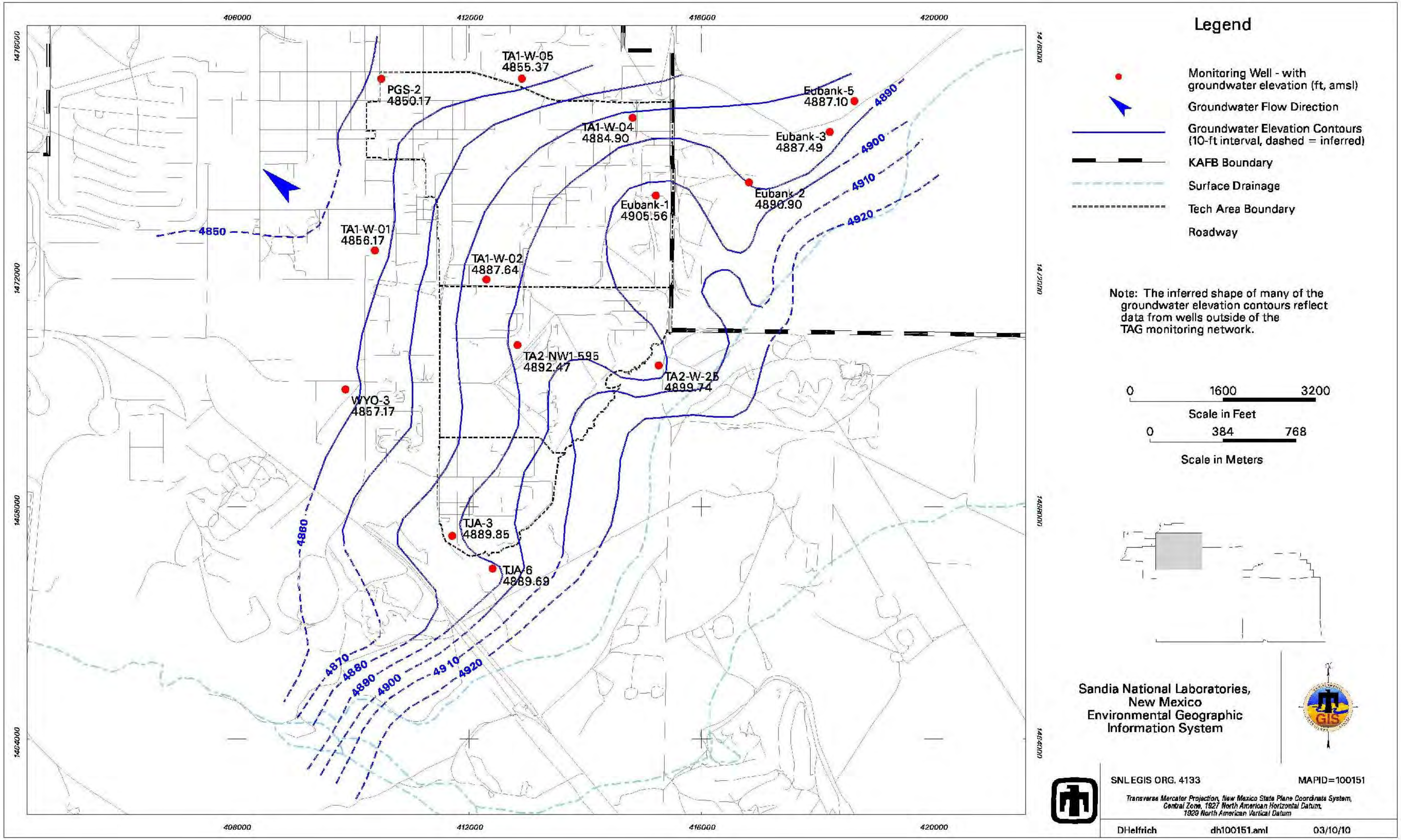

Figure 6-5. Tijeras Arroyo Groundwater Investigation Potentiometric Surface Map for the Regional Aquifer (October and November 2009)

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Historically, water levels in the regional aquifer have fluctuated across the study area (SNL November 2005). A line of demarcation between increasing and declining water levels is evident along the eastern extent of the ARG-fluvial lithofacies. Declining water levels approaching 1.5 ft/year (ft/yr) are apparently associated with the KAFB, COA, and VA water supply wells. Increases in groundwater elevations of up to 1.8 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 (Attachment 6C, Figures 6C-1 through 6C-11).

6.1.7.4 Contaminant Sources

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 report, two potential TCE and three potential nitrate sources are believed to be the responsibility of 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. Possible TCE and nitrate were 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. Well 46-VW-01 is located near the waste-line outfall, and 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 115 ft bgs. Well 46-VW-02, located 900 ft farther southeast, has 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 96 ft bgs.

SWMU 165 (Building 901 Septic System)—TCE and Nitrate: The septic system leach field is connected to a personnel shower/laundry facility (Building 901) and small research/machine shop (Building 902). Possible TCE and high explosives 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 are possibly leaking and several cross-connects with wastewater lines. The system is connected to numerous research/office buildings in TA-I. No significant contamination has been detected in soil samples.

Soil-vapor and soil samples collected from the vadose zone (land surface to the water table) during drilling operations and from the vapor monitoring network have indicated evidence of vapor-phase contaminants. 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 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.

Based on soil-vapor data (SNL November 2005), the mass of TCE that the vapor phase is contributing to the aquifer is minimal. In addition, the consistency of soil-vapor concentration measurements 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 of 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 ever 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 *Resource Conservation and Recovery Act (RCRA) Corrective Action Plan* (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 the sites. 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 in well TA2-W-26; samples from only three TAG study area wells have exceeded the MCL (5 µg/L) for TCE (TA2-W-19, TA2-W-26, and WYO-4).

The maximum historical concentration of nitrate in the PGWS within the TAG study area is 44 mg/L in well TA2-SW1-320. Concentrations of nitrate in the PGWS exceeding the MCL (10 mg/L) are scattered across the TAG study area. According to KAFB IRP terminology, the nitrate contamination in the PGWS forms what is referred to as Plume 3 (MWH Americas, Inc. July 2003). Plume 3, which is centered on monitoring well TA2-SW1-320, is located under the southwest portion of TA-II and extends southward to TJA-7. Monitoring wells in the PGWS that have nitrate concentrations below the MCL surround these wells. The plume is 0.3 miles long and 0.2 miles wide (MWH Americas, Inc. July 2003) and is thought to emanate from SWMU 165, the Building 901 Septic System.

Regional Aquifer

The regional aquifer monitoring wells have generally yielded no samples with detectable TCE concentrations except for low level detections in samples from TJA-3. No samples from the SNL/NM TAG study area regional aquifer wells exceed the MCL for TCE.

In the regional aquifer, samples from nine SNL/NM TAG study area wells have exceeded the MCL for nitrate during at least one sampling event. The maximum historical concentration of nitrate for wells completed in the regional aquifer system is 49 mg/L in monitoring well TJA-4. However, this is the only monitoring well that has had nitrate concentrations that exceed the MCL. The nitrate contamination in the regional aquifer southeast of TA-II forms what is referred to as Plume 4 (MWH Americas, Inc. July 2003). Plume 4 is most likely responsible for the nitrate concentrations in TJA-4, a well near where the PGWS and regional aquifer merge. Plume 4 is 1.9 miles long and 1 mile wide and is associated with the active KAFB Landfill (MWH Americas, Inc. July 2003).

Potential downgradient receptors for the TAG plume are the COA 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 nitrate and TCE concentrations are decreasing in groundwater to below levels of concern through dispersion and dilution as the plume moves into the more hydraulically conductive deposits at the COA and KAFB well fields.

6.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of the ER Project as well as implements and enforces federal regulations mandated by RCRA. All ER Project SWMUs and Areas of Concern (AOCs) are listed in Module IV of the SNL/NM RCRA Part B Operating Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA for Sandia National Laboratories* (NMED 1993).

All investigations and corrective action requirements pertaining to SWMUs and AOCs are contained in the Consent Order (NMED April 2004). The groundwater monitoring activities for the TAG investigation are not associated with a single SWMU but are more regional in nature. 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 Consent Order, finalized by the NMED in April 2004, transferred regulatory authority for corrective action requirements from the HSWA module to the Consent Order. The TAG investigation must comply with requirements set forth in the Consent Order for site characterization and the development of a CME. The Consent Order also contains schedules that define dates for the delivery of plans and reports related to TAG. The NMED is the regulatory agency responsible for enforcing the requirements identified in the Consent Order for the CME.

Although the Consent Order requires that the DOE and Sandia evaluate the nature and extent of contamination in the TAG study area, no specific reporting requirements are prescribed in the Consent Order. However, the *TAG Investigation Report* (SNL November 2005) specifies that data would continue to be presented in annual reports such as this Groundwater Protection Program (GWPP) Annual Groundwater Monitoring Report. The outline of this report is based on the required elements of a ―Periodic Monitoring Report" described in Section X.D. of the Consent Order (NMED April 2004).

In this report, TAG 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 Consent Order. Additional information on radionuclides and the scope of the Consent Order is available in Section III.A of the Consent Order (NMED April 2004).

6.3 Scope of Activities

The activities for the TAG investigation from January through November 2009, including plans and reports, are listed in Section 6.1.5. However, the only field activity completed in the study area was groundwater monitoring. The four groundwater sampling events conducted from January through November 2009 are summarized in Table 6-4, and the analytical parameters for each well and each sampling event are listed in Table 6-5.

Table 6-4. Groundwater Monitoring Well Network and Sampling Dates for the TAG Study Area, January through November 2009

Date of Sampling Event	Wells Sampled[1]		SAP
January 2009	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 FY09, 2nd Quarter Sampling, January 2009* (SNL December 2008)
May 2009	TA2-SW1-320 TA2-W-19 TA2-W-26 TJA-2	TJA-4 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY09, 3rd Quarter Sampling, May 2009* (SNL April 2009)
July/August 2009	PGS-2 TA1-W-01 TA1-W-02 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 FY09, 4th Quarter Sampling, July/August 2009* (SNL June 2009b)
October/ November 2009	TA1-W-06 TA1-W-08 TA2-SW1-320 TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27 TJA-2	TJA-4 TJA-7 WYO-4	*Tijeras Arroyo Groundwater Investigation, Mini-SAP for FY10, 1st Quarter Sampling, October/November 2009* (SNL October 2009)

Note: [1] Refer to page xvii of this report for well descriptions.
FY = Fiscal Year.
SAP = Sampling and Analysis Plan.
SNL = Sandia National Laboratories.
TAG = Tijeras Arroyo Groundwater.

Table 6-5. Parameters Sampled at TAG Wells[(1)] for Each Sampling Event

Parameter	January 2009		Parameter	May 2009
NPN VOCs	TA2-SW1-320 (QED) TA2-W-01 TA2-W-19 TA2-W-26 TA2-W-27 TA2-W-27 (dup) TJA-2	TJA-3 TJA-4 TJA-6 TJA-6 (dup) TJA-7 WYO-4	NPN VOCs	TA2-SW1-320 (QED) TA2-W-19 TA2-W-19 (dup) TA2-W-26 TJA-2 TJA-4 TJA-7 WYO-4 WYO-4 (dup)
Parameter	**July/August 2009**		**Parameter**	**October/November 2009**
NPN VOCs	PGS-2 (QED) TA1-W-01 TA1-W-02 TA1-W-04 TA1-W-05 TA1-W-06 TA1-W-06 (dup) TA1-W-08 TA2-NW1-595 TA2-SW1-320 (QED) TA2-W-01 TA2-W-19	TA2-W-26 TA2-W-26 (dup) TA2-W-27 TA2-W-27 (dup) TJA-2 TJA-3 TJA-4 TJA-6 TJA-7 WYO-3 WYO-4	NPN VOCs	TA2-SW1-320 (QED) TA2-W-19 TA2-W-19 (dup) TA2-W-26 TJA-2 TJA-4 TJA-7 WYO-4
Perchlorate	TA1-W-06 TA1-W-06 (dup) TA1-W-08 TA2-W-01 TA2-W-27 TA2-W-27 (dup)		Perchlorate	TA1-W-06 TA1-W-08 TA2-W-01 TA2-W-01 (dup) TA2-W-27
Anions Gamma Spec* Gross alpha/beta TAL Metals, plus Total Uranium Tritium	PGS-2 (QED) TA1-W-01 TA1-W-02 TA1-W-04 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-4 TJA-6 TJA-7 WYO-3 WYO-4		

NOTE: [(1)] Refer to page xvii of this report for well descriptions.
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 = MicroPurge, low-flow sampling method.
TAG = Tijeras Arroyo Groundwater.
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 equipment blank (EB) samples, duplicate samples, split samples, and trip blank (TB) samples. Field QC samples are used to monitor the sampling process. EB samples are used to verify the effectiveness of sampling equipment decontamination procedures. Duplicate samples are used to measure the precision of the sampling process. Split samples are used to verify the performance of the analytical laboratory. 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.

6.4 Field Methods and Measurements

The monitoring procedures, as conducted by the ER Project, are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986). The following sections provide an overview of the sampling and data collection procedures.

6.4.1 Groundwater Elevation

Throughout CY09, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table elevations. Water levels are periodically measured in TAG monitoring wells according to the instructions and requirements specified in SNL/NM Field Operating Procedure (FOP) 03-02, *Groundwater Level Data Acquisition and Management,* Rev. 02 (SNL November 2007). 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.

6.4.2 Well Purging and Water Quality Measurements

A portable Bennett™ groundwater sampling system was used to collect the groundwater samples from TAG wells. The wells are purged a minimum of one saturated screen volume. Field water quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were recorded from the well prior to collecting groundwater samples, according to SNL/NM FOP 05-01 (SNL August 2007a). Groundwater temperature, SC, ORP, DO, and pH were measured using a YSI™ Model 620 Water Quality Meter. Turbidity was measured with a HACH™ Model 2100P portable turbidity meter.

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 mini-sampling and analysis plans (SAPs), purging continued until four stable measurements for temperature, SC, pH, and turbidity were obtained. Groundwater stability is considered acceptable when measurements range within 10 percent or 5 nephelometric turbidity units (NTU), 0.1 pH units, 1.0 degree Celsius, and SC is within 5 percent. Associated Field Measurement Logs documenting details of well purging and water quality measurements for each sampling event have been submitted to the SNL/NM Customer Funded Records Center.

6.4.3 Pump Decontamination

A portable Bennett™ groundwater sampling system was used to collect groundwater samples from all wells. The sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in *Long-Term Environmental Stewardship Groundwater Sampling Equipment Decontamination*, SNL/NM FOP 05-03 (SNL August 2007b). An EB or rinsate sample was collected to verify the equipment decontamination process.

6.4.4 Sample Collection Sampling Procedures

Groundwater samples are collected using a nitrogen gas-powered portable piston pump (Bennett™) and/or a nitrogen gas-powered bladder pump (QED™) in accordance with SNL/NM FOP 05-01 (SNL August 2007a). Sample bottles are filled directly from the pump discharge line, with the VOC samples collected at the lowest achievable discharge rate.

6.4.5 Sample Handling and Shipment

The SNL/NM Sample Management Office (SMO) processes environmental samples collected by the ER Project. The SMO reviews the mini-SAPs (Table 6-4), orders sample containers, issues sample control and tracking numbers, tracks the chain-of-custody, and reviews analytical results returned from the laboratories for laboratory contract compliance (SNL March 2003b and April 2007). All groundwater samples are analyzed by off-site laboratories using EPA-specified protocols.

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 duplicates, and surrogate spike samples. Reported laboratory analytical and QC data are reviewed against quality assurance (QA) requirements specified in the *Procedure for Completing the Contract Verification Review, SMO-05-03, Issue 03* (SNL April 2007) and Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data,* (SNL July 2007).

6.4.6 Waste Management

Purge and decontamination water generated from sampling activities were placed into 55-gallon containers and stored at the ER Project Field Office waste accumulation area. All waste was managed in accordance with SNL/NM FOP 05-04 (SNL August 2007c) 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 COA discharge limits.

6.5 Analytical Methods

All groundwater samples are analyzed by off-site laboratories using EPA-specified protocols. Groundwater samples were submitted to General Engineering Laboratories, Inc. (GEL) for analysis. Samples were analyzed in accordance with applicable EPA methods (Tables-6-6 and 6-7), including the following:

- *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0* (EPA 1983).
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA 1990).
- *Prescribed Procedures for Measurement of Radioactivity in Drinking Water* (EPA 1980).

Table 6-6. TAG Study Area Chemical Analytical Methods

Analyte	Analytical Method[a,b]
Anions	SW846-9056
NPN	EPA 353.2
Perchlorate	EPA 314.0
TAL Metals, plus Total Uranium	SW846-6020/7470
VOCs	SW846-8260

Notes: [a]U.S. Environmental Protection Agency, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.
[b]U.S. Environmental Protection Agency, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.
EPA = U.S. Environmental Protection Agency.
NPN = Nitrate plus nitrite (reported as nitrogen).
SW = Solid waste.
TAG = Tijeras Arroyo Groundwater.
TAL = Target analyte list.
VOC = Volatile organic compound.

Table 6-7. TAG Study Area Radiochemical Analytical Methods

Analyte	Analytical Method[a]
Gamma Spectroscopy (short list)	EPA 901.0
Gross Alpha/Beta Activity	EPA 900.0
Tritium	EPA 906.0

Notes: [a]U.S. Environmental Protection Agency, 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
EPA = U.S. Environmental Protection Agency.
TAG = Tijeras Arroyo Groundwater.

6.6 Summary of Analytical Results

The following section discusses monitoring results, exceedances of standards, and pertinent trends in concentrations for COCs that exceed standards.

The analytical results and field measurements for all TAG sampling events are presented in Attachment 6A, Tables 6A-1 through 6A-8; concentration trend plots for COCs that exceed the MCLs are presented in Attachment 6B, Figures 6B-1 through 6B-7. A summary of detected VOC results are presented in Table 6A-1. The method detection limits (MDLs) for all analyzed VOCs are listed in Table 6A-2. The VOCs detected in low concentrations include the following:

- 1,1-Dichloroethane
- Acetone
- Carbon Disulfide
- Chloroform
- Chloromethane
- *cis*-1,2-Dichloroethene
- Tetrachloroethene (PCE)
- Toluene
- TCE

Nine VOCs were detected in CY09. Four of these VOCs have promulgated MCLs. Only TCE exceeded its corresponding MCL; the MCL for TCE is 5 µg/L (Table 6A-1). TCE was detected in two PGWS wells, TA2-W-19 and WYO-4. The maximum concentration of TCE detected during this reporting period is 8.55 µg/L in the sample from WYO-4 collected during the May 2009 sampling event. Figures 6B-1 and 6B-2 (Attachment 6B) show that the TCE concentrations in samples from TA2-W-19 and WYO-4 have slightly exceeded the MCL, and trends are level 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 TA2-SW1-320, TA2-W-19, TJA-2, TJA-4, and TJA-7. The maximum concentration of NPN detected during this reporting period is 29.4 mg/L in the sample from TJA-4 collected during the August 2009 sampling event. Figures 6B-3 through 6B-7 (Attachment 6B) show that the NPN concentrations in wells TA2-SW1-320, TJA-4, and TJA-7 have generally exceeded the MCL for the life of the wells, and trends are slightly increasing to slightly decreasing over time. In contrast, NPN concentrations in TA2-W-19 and TJA-2 only occasionally exceed the MCL, and trends are slightly increasing over time.

Analytical results for anions are presented in Table 6A-4; no anion concentrations exceed established MCLs. Analytical results for perchlorate are presented in Table 6A-5; no perchlorate was detected above the MDL. Total metal analytical results are presented in Table 6A-6; no metal results exceed established MCLs. Groundwater samples were analyzed for tritium, gross alpha/beta activity, and gamma spectroscopy. The results are presented in Table 6A-7. 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, SC, ORP, pH, turbidity, and DO. The parameter measurements obtained immediately before collecting the samples are presented in Table 6A-8.

6.7 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 following sections discuss site-specific QA/QC samples for the TAG quarterly sampling events.

6.7.1 Field Quality Control Samples

Field QC samples included an environmental duplicate sample and an EB sample. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the mini-SAPs (SNL December 2008, April 2009, June 2009b, and October 2009).

6.7.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed in order to estimate the overall reproducibility of the sampling and analytical process. A duplicate sample is collected immediately after the original environmental sample, in order to reduce variability caused by time and/or sampling mechanics. The results of duplicate sample analyses (detected parameters only) are used to calculate relative percent difference (RPD) values. Duplicate sample results for all wells and all sampling periods show good correlation (RPD values less than 20) for all calculated parameters, with one exception. During the July/August 2009 sampling event, the RPD for detected VOCs in TA2-W-27 samples exceeded 20. The RPD for PCE and TCE were calculated at 35 and 31, respectively. Although analytical results were not duplicated, reported concentrations for both PCE and TCE are comparable to historical values.

6.7.1.2 Equipment Decontamination Samples

A portable Bennett™ groundwater sampling system was used to collect groundwater samples from all wells except TA2-SW1-320, which is fitted with a dedicated pumping system. 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 August 2007b). An EB or rinsate sample was collected to verify the effectiveness of the equipment decontamination process. The results of the rinsate sample analyses are as follows:

- **January 2009 Sampling Event—**The EB sample was collected prior to sampling wells TA2-W-27 and TJA-6 and submitted for VOC and NPN analyses. Acetone, bromodichloromethane, carbon disulfide, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was required for bromodichloromethane, carbon disulfide, chloroform, or dibromochloromethane as these compounds were not detected in the associated environmental or duplicate samples. Acetone was detected in the EB sample associated with TJA-6 samples at a concentration of 4.12 µg/L. Acetone was qualified as not detected in the sample from TJA-6 during data validation as the concentration in the environmental sample was less than 10 times the blank contamination.

- **May 2009 Sampling Event—**An EB sample was collected prior to sampling wells TA2-W-19 and WYO-4 and submitted for VOC and NPN analyses. Bromodichloromethane, bromoform, carbon disulfide, chloroform, and dibromochloromethane were detected in the EB samples. No corrective action was required as these compounds were not detected in the associated environmental or duplicate samples.

- **July/August 2009 Sampling Event—**EB samples were collected prior to sampling wells TA1-W-06, TA2-W-26, and TA2-W-27 and submitted for all analyses. VOCs detected in various EB samples included 2-butanone, bromodichloromethane, bromoform, carbon disulfide, chloroform, and dibromochloromethane. Of these compounds, none were detected in the associated environmental samples, except chloroform. Chloroform was qualified as not detected during data validation in the TA2-W-26 duplicate sample as the blank contamination was within five times the environmental sample concentration. Copper was detected in all EB samples at concentrations within five times the associated environmental sample result. Copper was qualified as not detected during data validation in samples from TA1-W-06, TA2-W-26, and TA2-W-27 due to EB contamination. Arsenic was detected in the EB sample associated with TA2-W-26 at a concentration of 0.00226 mg/L. The environmental sample result was less than five times the EB sample contamination and therefore qualified as not detected during data validation.

6.7.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analysis to assess whether contamination of the samples has occurred during shipment and storage. The TB samples consist of laboratory reagent grade water with hydrochloric acid preservative contained in 40-milliliter volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. TBs were brought to the field and accompanied each sample shipment. TB qualifiers are provided with the analytical results in Table 6A-1 (Attachment 6A).

6.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples were analyzed concurrently with all groundwater samples. All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). Laboratory data qualifiers are provided with the analytical results in Tables 6A-1 through 6A-7 (Attachment 6A).

6.8 Variances and Nonconformances

The following sections describe differences between planned work and actual work, findings of the data validation process, and any impacts to schedule.

6.8.1 Variances and Nonconformances

Several variances and nonconformances from field or sampling requirements in the TAG Investigation mini-SAPs (SNL December 2008, April 2009, June 2009b, and October 2009) occurred during sampling activities. Project-specific variances associated with these sampling events are noted as follows:

- **July/August 2009 Sampling Event—(**1) Based on the letter dated April 30, 2009, from the NMED (April 2009), SNL/NM was required to sample TA1-W-03 for perchlorate. However, no groundwater sample was collected from monitoring well TA1-W-03 due to unstable turbidity measurements. Two attempts were performed on July 16 and July 24, 2009. A total of 88 gallons were purged, and turbidity measurements ranged from 5.30 to greater than 1,000 NTU. (2) GEL performed gross alpha and beta reanalysis for samples from PGS-2, TA1-W-01, TA1-W-02, TA1-W-04, TA1-W-05, TA1-W-06, and TA2-NW1-595. Upon investigation by GEL, it was discovered that initial samples were counted after instrument calibration sources. All results for the reanalysis are comparable to historical values.

No other variances and nonconformances were noted; however, project-specific issues associated with these sampling events are noted as follows:

- **All sampling events—**(1) WYO-4 was purged dry prior to sampling. This well was allowed to recover to a minimum of 80 percent of original water level and then samples were collected. (2) A MicroPurge®, low-flow (QED™) sampling system was used to collect a groundwater sample from TA2-SW1-320. Conventional sampling equipment cannot be lowered to the proper sampling depth due to well construction issues. The pump intake was set at 279 ft bgs in TA2-W-19 due to sediment at bottom of well.

- **July/August 2009 Sampling Event—**In addition to issues associated with WYO-4 as discussed for previous sampling events, WYO-3 was purged dry prior to sampling. This well was allowed to recover to a minimum of 80 percent of original water level and then a sample was collected.

6.8.2 Data Validation

All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for TAG study area COCs. Data validation qualifiers are provided with the analytical results in Tables 6A-1 through 6A-7 (Attachment 6A). The data validation report associated with each sampling event has been submitted to the SNL/NM Customer Funded Records Center.

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 CY10 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 27 wells for water level measurements. For this reporting period, wells were sampled in January 2009, May 2009, July/August 2009, and October/November 2009. The samples were analyzed for VOCs, NPN, anions, perchlorate, 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, wells were sampled quarterly, semiannually, or annually during this reporting period.

Only NPN and TCE were detected above MCLs in TAG study area wells. NPN concentrations exceeded the MCL of 10 mg/L in samples from TA2-SW1-320, TJA-2, TJA-4, and TJA-7 during all sampling events, with a maximum concentration of 29.4 mg/L in the sample from TJA-4 collected during the August 2009 sampling event. NPN concentrations occasionally exceeded the MCL in samples from TA2-W-19.

TCE exceeded the MCL of 5 µg/L in samples from two PGWS wells, TA2-W-19 and WYO-4. The maximum concentration of TCE detected during this reporting period was 8.55 µg/L detected in the sample from WYO-4 during the May 2009 sampling event. TCE concentrations in TA2-W-19 and WYO-4 wells have barely exceeded the MCL for the life of the wells, and trends are level to slightly increasing over time.

The analytical results from 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 current conceptual model described in Section 6.1.7 does not require modification based on the analytical results for this reporting period.

DOE/Sandia recommends the following approach as part of the ongoing environmental studies of the TAG study area:

- Continue collection of groundwater samples at the 21 TAG groundwater monitoring wells on a quarterly, semiannual, and 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 the SNL/NM GWPP Annual Groundwater Monitoring Report.

- Complete and submit the response to the NMED's second *NOD of the November 2005 TAG Investigation Report* (NMED August 2009).

- 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 (EPA Method[g] 8260), Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

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.
TA2-SW1-320 13-Jan-09	Acetone	3.76	3.50	10.0	NE	B, J	10.0U	086959-001
TA2-W-01 14-Jan-09	Acetone	3.70	3.50	10.0	NE	B, J	10.0U	086961-001
	Toluene	0.586	0.250	1.00	1000	J		086961-001
	Trichloroethene	1.40	0.250	1.00	5.00			086961-001
TA2-W-19 27-Jan-09	1,1-Dichloroethane	0.574	0.300	1.00	NE	J		086982-001
	Acetone	3.99	3.50	10.0	NE	B, J	10.0U	086982-001
	Trichloroethene	**5.03**	0.250	1.00	5.00			086982-001
	cis-1,2-Dichloroethene	0.578	0.300	1.00	70.0	J		086982-001
TA2-W-26 21-Jan-09	Chloroform	0.272	0.250	1.00	NE	J		086976-001
	Tetrachloroethene	0.784	0.450	1.00	5.00	J		086976-001
	Toluene	0.259	0.250	1.00	1000	J		086976-001
	Trichloroethene	1.28	0.250	1.00	5.00			086976-001
TA2-W-27 15-Jan-09	Tetrachloroethene	0.669	0.450	1.00	5.00	J		086965-001
	Toluene	0.312	0.250	1.00	1000	J		086965-001
	Trichloroethene	0.570	0.250	1.00	5.00	J		086965-001
TA2-W-27 (Duplicate) 15-Jan-09	Acetone	4.34	3.50	10.0	NE	B, J	10.0U	086966-001
	Tetrachloroethene	0.774	0.450	1.00	5.00	J		086966-001
	Toluene	0.323	0.250	1.00	1000	J		086966-001
	Trichloroethene	0.618	0.250	1.00	5.00	J		086966-001
TJA-2 26-Jan-09	1,1-Dichloroethane	0.509	0.300	1.00	NE	J		086980-001
	Acetone	3.65	3.50	10.0	NE	B, J	10.0U	086980-001
	Toluene	0.306	0.250	1.00	1000	J		086980-001
	Trichloroethene	3.47	0.250	1.00	5.00			086980-001
	cis-1,2-Dichloroethene	0.556	0.300	1.00	70.0	J		086980-001
TJA-3 16-Jan-09	Toluene	0.341	0.250	1.00	1000	J		086968-001
TJA-6 20-Jan-09	Acetone	3.58	3.50	10.0	NE	J	10.0U	086973-001
	Toluene	0.377	0.250	1.00	1000	J		086973-001
TJA-6 (Duplicate) 20-Jan-09	Toluene	0.403	0.250	1.00	1000	J		086974-001
TJA-7 29-Jan-09	Acetone	3.54	3.50	10.0	NE	B, J	10.0U	087031-001
	Trichloroethene	0.342	0.250	1.00	5.00	J		087031-001
WYO-4 23-Jan-09	1,1-Dichloroethane	0.891	0.300	1.00	NE	J		086978-001
	Toluene	0.375	0.250	1.00	1000	J		086978-001
	Trichloroethene	**7.93**	0.250	1.00	5.00			086978-001
	cis-1,2-Dichloroethene	1.62	0.300	1.00	70.0			086978-001

Refer to footnotes on page 6A-44.

Table 6A-1 *(Continued)*
Summary of Detected Volatile Organic Compounds (EPA Method[g] 8260), Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

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.
TA2-W-19	1,1-Dichloroethane	0.639	0.300	1.00	NE	J		087399-001
06-May-09	Trichloroethene	4.94	0.250	1.00	5.00			087399-001
	cis-1,2-Dichloroethene	0.681	0.300	1.00	70.0	J		087399-001
TA2-W-19 (Duplicate)	1,1-Dichloroethane	0.645	0.300	1.00	NE	J		087400-001
06-May-09	Trichloroethene	4.77	0.250	1.00	5.00			087400-001
	cis-1,2-Dichloroethene	0.625	0.300	1.00	70.0	J		087400-001
TA2-W-26	Chloroform	0.351	0.250	1.00	NE	J		087395-001
05-May-09	Tetrachloroethene	0.889	0.450	1.00	5.00	J	J	087395-001
	Toluene	0.294	0.250	1.00	1000	J		087395-001
	Trichloroethene	1.37	0.250	1.00	5.00			087395-001
TJA-2	1,1-Dichloroethane	0.557	0.300	1.00	NE	J		087406-001
11-May-09	Toluene	0.492	0.250	1.00	1000	J		087406-001
	Trichloroethene	3.56	0.250	1.00	5.00			087406-001
	cis-1,2-Dichloroethene	0.619	0.300	1.00	70.0	J		087406-001
TJA-7	Carbon Disulfide	1.29	1.25	5.00	NE	J	J+	087404-001
08-May-09	Toluene	0.307	0.250	1.00	1000	J		087404-001
	Trichloroethene	0.392	0.250	1.00	5.00	J		087404-001
WYO-4	1,1-Dichloroethane	1.07	0.300	1.00	NE			087410-001
13-May-09	Toluene	0.640	0.250	1.00	1000	J		087410-001
	Trichloroethene	**8.55**	0.250	1.00	5.00			087410-001
	cis-1,2-Dichloroethene	1.99	0.300	1.00	70.0			087410-001
WYO-4 (Duplicate)	1,1-Dichloroethane	1.14	0.300	1.00	NE			087411-001
13-May-09	Toluene	0.674	0.250	1.00	1000	J		087411-001
	Trichloroethene	**8.54**	0.250	1.00	5.00			087411-001
	cis-1,2-Dichloroethene	2.11	0.300	1.00	70.0			087411-001
TA1-W-01 14-Jul-09	Toluene	0.315	0.250	1.00	1000	J		087537-001
TA1-W-02 15-Jul-09	Toluene	0.267	0.250	1.00	1000	J		087539-001
TA1-W-04 17-Jul-09	Chloromethane	0.315	0.300	1.00	NE	J		087544-001
TA1-W-05 20-Jul-09	Toluene	0.330	0.250	1.00	1000	J		087546-001
TA1-W-06	1,1-Dichloroethene	0.775	0.300	1.00	7.00	J		087550-001
21-Jul-09	Toluene	0.275	0.250	1.00	1000	J		087550-001

Refer to footnotes on page 6A-44.

Table 6A-1 *(Continued)*
Summary of Detected Volatile Organic Compounds (EPA Method[g] 8260), Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

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.
TA1-W-06 (Duplicate)	1,1-Dichloroethene	0.776	0.300	1.00	7.00	J		087551-001
21-Jul-09	Toluene	0.278	0.250	1.00	1000	J		087551-001
TA2-W-01 30-Jul-09	Trichloroethene	1.47	0.250	1.00	5.00			087562-001
TA2-W-19	1,1-Dichloroethane	0.633	0.300	1.00	NE	J		087585-001
17-Aug-09	Toluene	0.383	0.250	1.00	1000	J		087585-001
	Trichloroethene	4.82	0.250	1.00	5.00			087585-001
	cis-1,2-Dichloroethene	0.686	0.300	1.00	70.0	J		087585-001
TA2-W-26	Tetrachloroethene	0.848	0.300	1.00	5.00	J		087577-001
10-Aug-09	Toluene	0.286	0.250	1.00	1000	J		087577-001
	Trichloroethene	1.08	0.250	1.00	5.00			087577-001
TA2-W-26 (Duplicate)	Chloroform	0.276	0.250	1.00	NE	J	1.00U	087578-001
10-Aug-09	Tetrachloroethene	0.788	0.300	1.00	5.00	J		087578-001
	Toluene	0.309	0.250	1.00	1000	J		087578-001
	Trichloroethene	1.21	0.250	1.00	5.00			087578-001
TA2-W-27	Tetrachloroethene	0.536	0.300	1.00	5.00	J		087566-001
03-Aug-09	Trichloroethene	0.519	0.250	1.00	5.00	J		087566-001
TA2-W-27 (Duplicate)	Tetrachloroethene	0.763	0.300	1.00	5.00	J		087567-001
03-Aug-09	Trichloroethene	0.707	0.250	1.00	5.00	J		087567-001
TJA-2	1,1-Dichloroethane	0.312	0.300	1.00	NE	J		087583-001
13-Aug-09	Toluene	0.254	0.250	1.00	1000	J		087583-001
	Trichloroethene	2.07	0.250	1.00	5.00			087583-001
	cis-1,2-Dichloroethene	0.336	0.300	1.00	70.0	J		087583-001
TJA-7	Toluene	0.294	0.250	1.00	1000	J		087589-001
19-Aug-09	Trichloroethene	0.447	0.250	1.00	5.00	J		087589-001
WYO-3 28-Jul-09	Toluene	0.674	0.250	1.00	1000	J		087557-001
WYO-4	1,1-Dichloroethane	0.828	0.300	1.00	NE	J		087580-001
12-Aug-09	Toluene	0.628	0.250	1.00	1000	J		087580-001
	Trichloroethene	**6.77**	0.250	1.00	5.00			087580-001
	cis-1,2-Dichloroethene	1.52	0.300	1.00	70.0			087580-001
TA2-W-19	1,1-Dichloroethane	0.580	0.300	1.00	NE	J		087884-001
05-Nov-09	Trichloroethene	**5.10**	0.250	1.00	5.00			087884-001
	cis-1,2-Dichloroethene	0.650	0.300	1.00	70.0	J		087884-001

Refer to footnotes on page 6A-44.

Table 6A-1 *(Concluded)*
Summary of Detected Volatile Organic Compounds (EPA Method[g] 8260),
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

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.
TA2-W-19 (Duplicate)	Trichloroethene	4.93	0.250	1.00	5.00			087885-001
05-Nov-09	cis-1,2-Dichloroethene	0.590	0.300	1.00	70.0	J		087885-001
TA2-W-26	Chloroform	0.280	0.250	1.00	NE	J		087880-001
04-Nov-09	Tetrachloroethene	0.920	0.300	1.00	5.00	J		087880-001
	Trichloroethene	1.15	0.250	1.00	5.00			087880-001
TJA-2	1,1-Dichloroethane	0.440	0.300	1.00	NE	J		087891-001
10-Nov-09	Trichloroethene	3.00	0.250	1.00	5.00			087891-001
	cis-1,2-Dichloroethene	0.450	0.300	1.00	70.0	J		087891-001
TJA-7 09-Nov-09	Trichloroethene	0.290	0.250	1.00	5.00	J		087889-001
WYO-4	1,1-Dichloroethane	0.810	0.300	1.00	NE	J		087893-001
12-Nov-09	Trichloroethene	**6.74**	0.250	1.00	5.00			087893-001
	cis-1,2-Dichloroethene	1.56	0.300	1.00	70.0			087893-001

Refer to footnotes on page 6A-44.

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 2009

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 - 0.500
Carbon disulfide	1.25
Carbon tetrachloride	0.260 - 0.300
Chlorobenzene	0.250
Chloroethane	0.300
Chloroform	0.250
Chloromethane	0.300
Dibromochloromethane	0.260 - 0.300
Ethyl benzene	0.250
Methylene chloride	3.00
Styrene	0.250
Tetrachloroethene	0.300 - 0.450
Toluene	0.250
Trichloroethene	0.250
Vinyl acetate	1.50
Vinyl chloride	0.500
Xylene	0.300 - 0.600
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 6A-44.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-Jan-09	Nitrate plus nitrite as N	**21.1**	0.500	2.50	10			086959-018	EPA 353.2
TA2-W-01 14-Jan-09	Nitrate plus nitrite as N	4.35	0.250	1.25	10			086961-018	EPA 353.2
TA2-W-19 27-Jan-09	Nitrate plus nitrite as N	9.83	0.250	1.25	10			086982-018	EPA 353.2
TA2-W-26 21-Jan-09	Nitrate plus nitrite as N	4.63	0.100	0.500	10			086976-018	EPA 353.2
TA2-W-27 15-Jan-09	Nitrate plus nitrite as N	3.45	0.050	0.250	10			086965-018	EPA 353.2
TA2-W-27 (Duplicate) 15-Jan-09	Nitrate plus nitrite as N	3.89	0.100	0.500	10			086966-018	EPA 353.2
TJA-2 26-Jan-09	Nitrate plus nitrite as N	**10.1**	0.250	1.25	10			086980-018	EPA 353.2
TJA-3 16-Jan-09	Nitrate plus nitrite as N	2.76	0.050	0.250	10			086968-018	EPA 353.2
TJA-4 28-Jan-09	Nitrate plus nitrite as N	**27.0**	0.500	2.50	10			087029-018	EPA 353.2
TJA-6 20-Jan-09	Nitrate plus nitrite as N	2.44	0.050	0.250	10			086973-018	EPA 353.2
TJA-6 (Duplicate) 20-Jan-09	Nitrate plus nitrite as N	2.43	0.050	0.250	10			086974-018	EPA 353.2
TJA-7 29-Jan-09	Nitrate plus nitrite as N	**23.1**	0.500	2.50	10			087031-018	EPA 353.2
WYO-4 23-Jan-09	Nitrate plus nitrite as N	2.88	0.050	0.250	10			086978-018	EPA 353.2
TA2-SW1-320 04-May-09	Nitrate plus nitrite as N	**21.8**	0.500	2.50	10	B		087392-018	EPA 353.2
TA2-W-19 06-May-09	Nitrate plus nitrite as N	**10.2**	0.250	1.25	10	B		087399-018	EPA 353.2
TA2-W-19 (Duplicate) 06-May-09	Nitrate plus nitrite as N	**10.3**	0.250	1.25	10	B		087400-018	EPA 353.2
TA2-W-26 05-May-09	Nitrate plus nitrite as N	5.05	0.250	1.25	10	B		087395-018	EPA 353.2

Refer to footnotes on page 6A-44.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 11-May-09	Nitrate plus nitrite as N	**11.1**	0.250	1.25	10			087406-018	EPA 353.2
TJA-4 07-May-09	Nitrate plus nitrite as N	**26.5**	0.500	2.50	10	B		087402-018	EPA 353.2
TJA-7 08-May-09	Nitrate plus nitrite as N	**24.4**	0.500	2.50	10			087404-018	EPA 353.2
WYO-4 13-May-09	Nitrate plus nitrite as N	3.13	0.100	0.500	10			087410-018	EPA 353.2
WYO-4 (Duplicate) 13-May-09	Nitrate plus nitrite as N	3.11	0.100	0.500	10			087411-018	EPA 353.2
PGS-2 29-Jul-09	Nitrate plus nitrite as N	0.690	0.050	0.250	10			087559-018	EPA 353.2
TA1-W-01 14-Jul-09	Nitrate plus nitrite as N	3.21	0.050	0.250	10	B		087537-018	EPA 353.2
TA1-W-02 15-Jul-09	Nitrate plus nitrite as N	0.237	0.010	0.050	10	B		087539-018	EPA 353.2
TA1-W-04 17-Jul-09	Nitrate plus nitrite as N	1.62	0.100	0.500	10			087544-018	EPA 353.2
TA1-W-05 20-Jul-09	Nitrate plus nitrite as N	1.18	0.050	0.250	10			087546-018	EPA 353.2
TA1-W-06 21-Jul-09	Nitrate plus nitrite as N	3.42	0.100	0.500	10			087550-018	EPA 353.2
TA1-W-06 (Duplicate) 21-Jul-09	Nitrate plus nitrite as N	3.35	0.100	0.500	10			087551-018	EPA 353.2
TA1-W-08 22-Jul-09	Nitrate plus nitrite as N	7.30	0.250	1.25	10			087553-018	EPA 353.2
TA2-NW1-595 23-Jul-09	Nitrate plus nitrite as N	3.54	0.100	0.500	10			087555-018	EPA 353.2
TA2-SW1-320 06-Aug-09	Nitrate plus nitrite as N	**20.2**	0.250	1.25	10	B		087575-018	EPA 353.2
TA2-W-01 30-Jul-09	Nitrate plus nitrite as N	2.75	0.050	0.250	10			087562-018	EPA 353.2
TA2-W-19 17-Aug-09	Nitrate plus nitrite as N	**11.2**	0.250	1.25	10			087585-018	EPA 353.2

Refer to footnotes on page 6A-44.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 10-Aug-09	Nitrate plus nitrite as N	4.95	0.100	0.500	10			087577-018	EPA 353.2
TA2-W-26 (Duplicate) 10-Aug-09	Nitrate plus nitrite as N	5.10	0.100	0.500	10			087578-018	EPA 353.2
TA2-W-27 03-Aug-09	Nitrate plus nitrite as N	4.55	0.050	0.250	10			087566-018	EPA 353.2
TA2-W-27 (Duplicate) 03-Aug-09	Nitrate plus nitrite as N	4.06	0.050	0.250	10			087567-018	EPA 353.2
TJA-2 13-Aug-09	Nitrate plus nitrite as N	**10.7**	0.250	1.25	10			087583-018	EPA 353.2
TJA-3 04-Aug-09	Nitrate plus nitrite as N	2.94	0.100	0.500	10			087569-018	EPA 353.2
TJA-4 18-Aug-09	Nitrate plus nitrite as N	**29.4**	0.500	2.50	10			087587-018	EPA 353.2
TJA-6 05-Aug-09	Nitrate plus nitrite as N	2.76	0.100	0.500	10			087571-018	EPA 353.2
TJA-7 19-Aug-09	Nitrate plus nitrite as N	**25.5**	0.250	1.25	10			087589-018	EPA 353.2
WYO-3 28-Jul-09	Nitrate plus nitrite as N	3.28	0.250	1.25	10			087557-018	EPA 353.2
WYO-4 12-Aug-09	Nitrate plus nitrite as N	3.11	0.050	0.250	10			087580-018	EPA 353.2
TA2-SW1-320 03-Nov-09	Nitrate plus nitrite as N	**22.1**	0.500	2.50	10	B		087878-018	EPA 353.2
TA2-W-19 05-Nov-09	Nitrate plus nitrite as N	10.0	0.250	1.25	10	B		087884-018	EPA 353.2
TA2-W-19 (Duplicate) 05-Nov-09	Nitrate plus nitrite as N	9.93	0.250	1.25	10	B		087885-018	EPA 353.2
TA2-W-26 04-Nov-09	Nitrate plus nitrite as N	4.74	0.100	0.500	10	B		087880-018	EPA 353.2
TJA-2 10-Nov-09	Nitrate plus nitrite as N	**10.6**	0.250	1.25	10			087891-018	EPA 353.2
TJA-4 06-Nov-09	Nitrate plus nitrite as N	**27.9**	0.500	2.50	10	B		087887-018	EPA 353.2

Refer to footnotes on page 6A-44.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 09-Nov-09	Nitrate plus nitrite as N	**23.4**	0.250	1.25	10			087889-018	EPA 353.2
WYO-4 12-Nov-09	Nitrate plus nitrite as N	2.98	0.100	0.500	10			087893-018	EPA 353.2

Refer to footnotes on page 6A-44.

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

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.177	0.066	0.200	NE	J		087559-016	SW846 9056
29-Jul-09	Chloride	12.9	0.066	0.200	NE			087559-016	SW846 9056
	Fluoride	0.225	0.033	0.100	4.0			087559-016	SW846 9056
	Sulfate	57.4	0.500	2.00	NE			087559-016	SW846 9056
TA1-W-01	Bromide	0.180	0.066	0.200	NE	J		087537-016	SW846 9056
14-Jul-09	Chloride	15.3	0.066	0.200	NE			087537-016	SW846 9056
	Fluoride	0.482	0.033	0.100	4.0			087537-016	SW846 9056
	Sulfate	75.7	0.500	2.00	NE			087537-016	SW846 9056
TA1-W-02	Bromide	0.166	0.066	0.200	NE	J		087539-016	SW846 9056
15-Jul-09	Chloride	14.5	0.066	0.200	NE			087539-016	SW846 9056
	Fluoride	0.458	0.033	0.100	4.0			087539-016	SW846 9056
	Sulfate	77.4	0.500	2.00	NE			087539-016	SW846 9056
TA1-W-04	Bromide	0.174	0.066	0.200	NE	J		087544-016	SW846 9056
17-Jul-09	Chloride	14.1	0.066	0.200	NE			087544-016	SW846 9056
	Fluoride	0.411	0.033	0.100	4.0			087544-016	SW846 9056
	Sulfate	54.9	0.500	2.00	NE			087544-016	SW846 9056
TA1-W-05	Bromide	0.149	0.066	0.200	NE	J		087546-016	SW846 9056
20-Jul-09	Chloride	10.3	0.066	0.200	NE			087546-016	SW846 9056
	Fluoride	0.344	0.033	0.100	4.0			087546-016	SW846 9056
	Sulfate	88.8	0.500	2.00	NE			087546-016	SW846 9056
TA1-W-06	Bromide	1.22	0.066	0.200	NE			087550-016	SW846 9056
21-Jul-09	Chloride	92.7	0.660	2.00	NE			087550-016	SW846 9056
	Fluoride	0.347	0.033	0.100	4.0			087550-016	SW846 9056
	Sulfate	186	1.00	4.00	NE			087550-016	SW846 9056
TA1-W-08	Bromide	2.34	0.066	0.200	NE			087553-016	SW846 9056
22-Jul-09	Chloride	178	3.30	10.0	NE			087553-016	SW846 9056
	Fluoride	0.299	0.033	0.100	4.0			087553-016	SW846 9056
	Sulfate	639	5.00	20.0	NE			087553-016	SW846 9056
TA2-NW1-595	Bromide	1.21	0.066	0.200	NE			087555-016	SW846 9056
23-Jul-09	Chloride	89.1	0.660	2.00	NE			087555-016	SW846 9056
	Fluoride	0.341	0.033	0.100	4.0			087555-016	SW846 9056
	Sulfate	99.2	1.00	4.00	NE			087555-016	SW846 9056

Refer to footnotes on page 6A-44.

Table 6A-4 *(Continued)*
Summary of Anion Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	Bromide	0.486	0.066	0.200	NE			087575-016	SW846 9056
06-Aug-09	Chloride	30.4	0.132	0.400	NE			087575-016	SW846 9056
	Fluoride	0.475	0.033	0.100	4.0			087575-016	SW846 9056
	Sulfate	14.0	0.100	0.400	NE			087575-016	SW846 9056
TA2-W-01	Bromide	1.38	0.066	0.200	NE			087562-016	SW846 9056
30-Jul-09	Chloride	92.7	0.660	2.00	NE			087562-016	SW846 9056
	Fluoride	0.350	0.033	0.100	4.0			087562-016	SW846 9056
	Sulfate	46.1	1.00	4.00	NE			087562-016	SW846 9056
TA2-W-19	Bromide	0.829	0.066	0.200	NE			087585-016	SW846 9056
17-Aug-09	Chloride	62.1	0.660	2.00	NE			087585-016	SW846 9056
	Fluoride	0.363	0.033	0.100	4.0			087585-016	SW846 9056
	Sulfate	50.9	1.00	4.00	NE			087585-016	SW846 9056
TA2-W-26	Bromide	1.99	0.066	0.200	NE			087577-016	SW846 9056
10-Aug-09	Chloride	135	3.30	10.0	NE			087577-016	SW846 9056
	Fluoride	0.306	0.033	0.100	4.0			087577-016	SW846 9056
	Sulfate	272	5.00	20.0	NE			087577-016	SW846 9056
TA2-W-27	Bromide	1.52	0.066	0.200	NE			087566-016	SW846 9056
03-Aug-09	Chloride	98.4	1.32	4.00	NE			087566-016	SW846 9056
	Fluoride	0.312	0.033	0.100	4.0			087566-016	SW846 9056
	Sulfate	138	2.00	8.00	NE			087566-016	SW846 9056
TJA-2	Bromide	0.894	0.066	0.200	NE			087583-016	SW846 9056
13-Aug-09	Chloride	66.0	0.330	1.00	NE		J	087583-016	SW846 9056
	Fluoride	0.386	0.033	0.100	4.0			087583-016	SW846 9056
	Sulfate	49.2	0.500	2.00	NE		J	087583-016	SW846 9056
TJA-3	Bromide	0.177	0.066	0.200	NE	J		087569-016	SW846 9056
04-Aug-09	Chloride	12.9	0.066	0.200	NE			087569-016	SW846 9056
	Fluoride	0.396	0.033	0.100	4.0			087569-016	SW846 9056
	Sulfate	70.5	0.500	2.00	NE			087569-016	SW846 9056
TJA-4	Bromide	0.293	0.066	0.200	NE			087587-016	SW846 9056
18-Aug-09	Chloride	19.5	0.132	0.400	NE			087587-016	SW846 9056
	Fluoride	0.446	0.033	0.100	4.0			087587-016	SW846 9056
	Sulfate	16.0	0.100	0.400	NE			087587-016	SW846 9056

Refer to footnotes on page 6A-44.

Table 6A-4 *(Concluded)*
Summary of Anion Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-6	Bromide	0.191	0.066	0.200	NE	J		087571-016	SW846 9056
05-Aug-09	Chloride	14.6	0.066	0.200	NE			087571-016	SW846 9056
	Fluoride	0.440	0.033	0.100	4.0			087571-016	SW846 9056
	Sulfate	57.7	0.500	2.00	NE			087571-016	SW846 9056
TJA-7	Bromide	0.356	0.066	0.200	NE			087589-016	SW846 9056
19-Aug-09	Chloride	24.2	0.132	0.400	NE			087589-016	SW846 9056
	Fluoride	0.376	0.033	0.100	4.0			087589-016	SW846 9056
	Sulfate	18.4	0.100	0.400	NE			087589-016	SW846 9056
WYO-3	Bromide	0.206	0.066	0.200	NE			087557-016	SW846 9056
28-Jul-09	Chloride	15.4	0.066	0.200	NE			087557-016	SW846 9056
	Fluoride	0.470	0.033	0.100	4.0			087557-016	SW846 9056
	Sulfate	76.4	0.500	2.00	NE			087557-016	SW846 9056
WYO-4	Bromide	1.24	0.066	0.200	NE			087580-016	SW846 9056
12-Aug-09	Chloride	96.4	1.32	4.00	NE			087580-016	SW846 9056
	Fluoride	0.363	0.033	0.100	4.0			087580-016	SW846 9056
	Sulfate	48.0	2.00	8.00	NE			087580-016	SW846 9056

Refer to footnotes on page 6A-44.

Table 6A-5
Summary of Perchlorate Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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 21-Jul-09	Perchlorate	ND	0.004	0.012	NE	U		087550-020	EPA 314.0
TA1-W-06 (Duplicate) 21-Jul-09	Perchlorate	ND	0.004	0.012	NE	U		087551-020	EPA 314.0
TA1-W-08 22-Jul-09	Perchlorate	ND	0.004	0.012	NE	U		087553-020	EPA 314.0
TA2-W-01 30-Jul-09	Perchlorate	ND	0.004	0.012	NE	U		087562-020	EPA 314.0
TA2-W-27 03-Aug-09	Perchlorate	ND	0.004	0.012	NE	U		087566-020	EPA 314.0
TA2-W-27 (Duplicate) 03-Aug-09	Perchlorate	ND	0.004	0.012	NE	U		087567-020	EPA 314.0
TA1-W-06 28-Oct-09	Perchlorate	ND	0.004	0.012	NE	U		087872-020	EPA 314.0
TA1-W-08 29-Oct-09	Perchlorate	ND	0.004	0.012	NE	U		087873-020	EPA 314.0
TA2-W-01 30-Oct-09	Perchlorate	ND	0.004	0.012	NE	U		087875-020	EPA 314.0
TA2-W-01 (Duplicate) 30-Oct-09	Perchlorate	ND	0.004	0.012	NE	U		087876-020	EPA 314.0
TA2-W-27 02-Nov-09	Perchlorate	ND	0.004	0.012	NE	U		087877-020	EPA 314.0

Refer to footnotes on page 6A-44.

Table 6A-6
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0144	0.010	0.030	NE	B, J	0.17U	087559-009	SW846 6020
29-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087559-009	SW846 6020
	Arsenic	0.00167	0.0015	0.005	0.010	B, J		087559-009	SW846 6020
	Barium	0.0695	0.0005	0.002	2.00			087559-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087559-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087559-009	SW846 6020
	Calcium	53.1	0.100	1.00	NE	B		087559-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087559-009	SW846 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		087559-009	SW846 6020
	Copper	0.000429	0.0003	0.001	NE	J		087559-009	SW846 6020
	Iron	0.130	0.010	0.100	NE		J	087559-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087559-009	SW846 6020
	Magnesium	11.3	0.025	0.075	NE			087559-009	SW846 6020
	Manganese	0.00148	0.001	0.005	NE	J	J	087559-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087559-009	SW846 7470
	Nickel	0.00647	0.0005	0.002	NE			087559-009	SW846 6020
	Potassium	2.66	0.080	0.300	NE			087559-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087559-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087559-009	SW846 6020
	Sodium	27.5	0.080	0.25	NE		J	087559-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087559-009	SW846 6020
	Uranium	0.00151	0.00005	0.0002	0.030			087559-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087559-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087559-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-01	Aluminum	ND	0.010	0.030	NE	U		087537-009	SW846 6020
14-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087537-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087537-009	SW846 6020
	Barium	0.0471	0.0005	0.002	2.00			087537-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087537-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087537-009	SW846 6020
	Calcium	68.3	0.100	1.00	NE			087537-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087537-009	SW846 6020
	Cobalt	0.000138	0.0001	0.001	NE	J		087537-009	SW846 6020
	Copper	0.000907	0.0003	0.001	NE	J		087537-009	SW846 6020
	Iron	0.263	0.010	0.100	NE			087537-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087537-009	SW846 6020
	Magnesium	12.0	0.005	0.015	NE			087537-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087537-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087537-009	SW846 7470
	Nickel	0.00144	0.0005	0.002	NE	J		087537-009	SW846 6020
	Potassium	2.17	0.080	0.300	NE			087537-009	SW846 6020
	Selenium	0.00123	0.001	0.005	0.050	J		087537-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087537-009	SW846 6020
	Sodium	23.8	0.080	0.250	NE			087537-009	SW846 6020
	Thallium	0.000389	0.0003	0.001	0.002	J		087537-009	SW846 6020
	Uranium	0.0035	0.00005	0.0002	0.030	B		087537-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087537-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087537-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-02	Aluminum	ND	0.010	0.030	NE	U		087539-009	SW846 6020
15-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087539-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087539-009	SW846 6020
	Barium	0.0501	0.0005	0.002	2.00			087539-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087539-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087539-009	SW846 6020
	Calcium	67.8	0.100	1.00	NE			087539-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087539-009	SW846 6020
	Cobalt	0.000126	0.0001	0.001	NE	J		087539-009	SW846 6020
	Copper	0.000838	0.0003	0.001	NE	J		087539-009	SW846 6020
	Iron	0.235	0.010	0.100	NE			087539-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087539-009	SW846 6020
	Magnesium	12.5	0.005	0.015	NE			087539-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087539-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087539-009	SW846 7470
	Nickel	0.00117	0.0005	0.002	NE	J		087539-009	SW846 6020
	Potassium	2.09	0.080	0.300	NE			087539-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087539-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087539-009	SW846 6020
	Sodium	22.5	0.080	0.250	NE			087539-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087539-009	SW846 6020
	Uranium	0.00339	0.00005	0.0002	0.030	B		087539-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087539-009	SW846 6020
	Zinc	0.00487	0.0026	0.010	NE	J		087539-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.923	0.010	0.030	NE	B	J-	087544-009	SW846 6020
17-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087544-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087544-009	SW846 6020
	Barium	0.0519	0.0005	0.002	2.00			087544-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087544-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087544-009	SW846 6020
	Calcium	67.8	0.100	1.00	NE	B		087544-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087544-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087544-009	SW846 6020
	Copper	0.00062	0.0003	0.001	NE	J		087544-009	SW846 6020
	Iron	0.155	0.010	0.100	NE			087544-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087544-009	SW846 6020
	Magnesium	11.5	0.005	0.015	NE			087544-009	SW846 6020
	Manganese	0.00108	0.001	0.005	NE	J		087544-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087544-009	SW846 7470
	Nickel	0.000832	0.0005	0.002	NE	J		087544-009	SW846 6020
	Potassium	2.37	0.080	0.300	NE			087544-009	SW846 6020
	Selenium	0.00112	0.001	0.005	0.050	J		087544-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087544-009	SW846 6020
	Sodium	20.9	0.080	0.250	NE		J	087544-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087544-009	SW846 6020
	Uranium	0.0031	0.00005	0.0002	0.030	B		087544-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087544-009	SW846 6020
	Zinc	0.00324	0.0026	0.010	NE	J		087544-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0149	0.010	0.030	NE	B, J	0.088UJ	087546-009	SW846 6020
20-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087546-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087546-009	SW846 6020
	Barium	0.0385	0.0005	0.002	2.00			087546-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087546-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087546-009	SW846 6020
	Calcium	83.7	0.100	1.00	NE	B		087546-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087546-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087546-009	SW846 6020
	Copper	0.000377	0.0003	0.001	NE	J		087546-009	SW846 6020
	Iron	0.193	0.010	0.100	NE			087546-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087546-009	SW846 6020
	Magnesium	11.5	0.005	0.015	NE			087546-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087546-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087546-009	SW846 7470
	Nickel	0.000865	0.0005	0.002	NE	J		087546-009	SW846 6020
	Potassium	2.34	0.080	0.300	NE			087546-009	SW846 6020
	Selenium	0.00133	0.001	0.005	0.050	J		087546-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087546-009	SW846 6020
	Sodium	28.6	0.080	0.250	NE		J	087546-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087546-009	SW846 6020
	Uranium	0.00363	0.00005	0.0002	0.030	B		087546-009	SW846 6020
	Vanadium	ND	0.015	0.050	NE	U		087546-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087546-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.187	0.010	0.030	NE	B	J-	087550-009	SW846 6020
21-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087550-009	SW846 6020
	Arsenic	0.00214	0.0015	0.005	0.010	B, J	0.020U	087550-009	SW846 6020
	Barium	0.0268	0.0005	0.002	2.00			087550-009	SW846 6020
	Beryllium	0.00015	0.0001	0.0005	0.004	B, J	0.00052U	087550-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087550-009	SW846 6020
	Calcium	129	0.100	1.00	NE	B		087550-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087550-009	SW846 6020
	Cobalt	0.000137	0.0001	0.001	NE	J	J+	087550-009	SW846 6020
	Copper	0.000658	0.0003	0.001	NE	J	0.012U	087550-009	SW846 6020
	Iron	0.301	0.010	0.100	NE			087550-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087550-009	SW846 6020
	Magnesium	15.3	0.005	0.015	NE			087550-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087550-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087550-009	SW846 7470
	Nickel	0.00128	0.0005	0.002	NE	J	J+	087550-009	SW846 6020
	Potassium	2.34	0.080	0.300	NE			087550-009	SW846 6020
	Selenium	0.00834	0.001	0.005	0.050			087550-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087550-009	SW846 6020
	Sodium	28.7	0.080	0.250	NE		J	087550-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087550-009	SW846 6020
	Uranium	0.00121	0.00005	0.0002	0.030	B		087550-009	SW846 6020
	Vanadium	ND	0.015	0.050	NE	U		087550-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087550-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0425	0.010	0.030	NE	B	0.088UJ	087553-009	SW846 6020
22-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087553-009	SW846 6020
	Arsenic	0.0018	0.0015	0.005	0.010	B, J	0.020U	087553-009	SW846 6020
	Barium	0.021	0.0005	0.002	2.00			087553-009	SW846 6020
	Beryllium	0.000174	0.0001	0.0005	0.004	B, J	0.00052U	087553-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087553-009	SW846 6020
	Calcium	317	0.400	4.00	NE	B		087553-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087553-009	SW846 6020
	Cobalt	0.000297	0.0001	0.001	NE	J	J+	087553-009	SW846 6020
	Copper	0.00177	0.0003	0.001	NE		J+	087553-009	SW846 6020
	Iron	0.738	0.010	0.100	NE			087553-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087553-009	SW846 6020
	Magnesium	41.6	0.005	0.015	NE			087553-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087553-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087553-009	SW846 7470
	Nickel	0.00367	0.0005	0.002	NE		J+	087553-009	SW846 6020
	Potassium	3.14	0.080	0.300	NE			087553-009	SW846 6020
	Selenium	0.0255	0.001	0.005	0.050			087553-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087553-009	SW846 6020
	Sodium	88.3	1.60	5.00	NE		J	087553-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087553-009	SW846 6020
	Uranium	0.00199	0.00005	0.0002	0.030	B		087553-009	SW846 6020
	Vanadium	ND	0.015	0.050	NE	U		087553-009	SW846 6020
	Zinc	0.00278	0.0026	0.010	NE	J		087553-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0306	0.010	0.030	NE	B	0.088UJ	087555-009	SW846 6020
23-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087555-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087555-009	SW846 6020
	Barium	0.0491	0.0005	0.002	2.00			087555-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087555-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087555-009	SW846 6020
	Calcium	109	0.100	1.00	NE	B		087555-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087555-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087555-009	SW846 6020
	Copper	0.000439	0.0003	0.001	NE	J	J+	087555-009	SW846 6020
	Iron	0.238	0.010	0.100	NE			087555-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087555-009	SW846 6020
	Magnesium	17.2	0.005	0.015	NE			087555-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087555-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087555-009	SW846 7470
	Nickel	0.00115	0.0005	0.002	NE	J	J+	087555-009	SW846 6020
	Potassium	2.47	0.080	0.300	NE			087555-009	SW846 6020
	Selenium	0.00754	0.001	0.005	0.050			087555-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087555-009	SW846 6020
	Sodium	29.2	0.080	0.250	NE		J	087555-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087555-009	SW846 6020
	Uranium	0.00237	0.00005	0.0002	0.030	B		087555-009	SW846 6020
	Vanadium	ND	0.015	0.050	NE	U		087555-009	SW846 6020
	Zinc	0.00676	0.0026	0.010	NE	J		087555-009	SW846 6020

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Table 6A-6 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-SW1-320	Aluminum	0.183	0.010	0.030	NE	B		087575-009	SW846 6020
06-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087575-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087575-009	SW846 6020
	Barium	0.199	0.0005	0.002	2.00			087575-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087575-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087575-009	SW846 6020
	Calcium	61.0	0.200	2.00	NE	B		087575-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087575-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J	0.001U	087575-009	SW846 6020
	Copper	ND	0.0003	0.001	NE	U		087575-009	SW846 6020
	Iron	0.201	0.010	0.100	NE	B		087575-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087575-009	SW846 6020
	Magnesium	11.4	0.005	0.015	NE			087575-009	SW846 6020
	Manganese	0.00301	0.001	0.005	NE	J		087575-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087575-009	SW846 7470
	Nickel	0.00158	0.0005	0.002	NE	J		087575-009	SW846 6020
	Potassium	1.94	0.080	0.300	NE			087575-009	SW846 6020
	Selenium	0.00292	0.001	0.005	0.050	J		087575-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087575-009	SW846 6020
	Sodium	18.0	0.800	2.50	NE			087575-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087575-009	SW846 6020
	Uranium	0.00143	0.00005	0.0002	0.030	B		087575-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087575-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087575-009	SW846 6020

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Table 6A-6 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-01	Aluminum	0.0247	0.010	0.030	NE	B, J	0.17U	087562-009	SW846 6020
30-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087562-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087562-009	SW846 6020
	Barium	0.140	0.0005	0.002	2.00			087562-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087562-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087562-009	SW846 6020
	Calcium	88.5	0.100	1.00	NE	B		087562-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087562-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087562-009	SW846 6020
	Copper	0.000372	0.0003	0.001	NE	J		087562-009	SW846 6020
	Iron	0.193	0.010	0.100	NE		J	087562-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087562-009	SW846 6020
	Magnesium	10.7	0.025	0.075	NE			087562-009	SW846 6020
	Manganese	0.00127	0.001	0.005	NE	J	J	087562-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087562-009	SW846 7470
	Nickel	0.00109	0.0005	0.002	NE	J		087562-009	SW846 6020
	Potassium	1.96	0.080	0.300	NE			087562-009	SW846 6020
	Selenium	0.00714	0.001	0.005	0.050			087562-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087562-009	SW846 6020
	Sodium	21.6	0.080	0.250	NE		J	087562-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087562-009	SW846 6020
	Uranium	0.00101	0.00005	0.0002	0.030			087562-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087562-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087562-009	SW846 6020

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Table 6A-6 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-19	Aluminum	ND	0.010	0.030	NE	U		087585-009	SW846 6020
17-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087585-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087585-009	SW846 6020
	Barium	0.0456	0.0005	0.002	2.00			087585-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087585-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087585-009	SW846 6020
	Calcium	77.1	0.200	2.00	NE	B		087585-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087585-009	SW846 6020
	Cobalt	0.000134	0.0001	0.001	NE	J		087585-009	SW846 6020
	Copper	0.000554	0.0003	0.001	NE	J		087585-009	SW846 6020
	Iron	0.222	0.010	0.100	NE			087585-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087585-009	SW846 6020
	Magnesium	9.57	0.050	0.150	NE			087585-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087585-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087585-009	SW846 7470
	Nickel	0.000827	0.0005	0.002	NE	J		087585-009	SW846 6020
	Potassium	1.77	0.080	0.300	NE			087585-009	SW846 6020
	Selenium	0.00422	0.001	0.005	0.050	J		087585-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087585-009	SW846 6020
	Sodium	21.2	0.080	0.250	NE			087585-009	SW846 6020
	Thallium	0.000629	0.0003	0.001	0.002	J	0.0029U	087585-009	SW846 6020
	Uranium	0.00114	0.00005	0.0002	0.030			087585-009	SW846 6020
	Vanadium	0.00563	0.003	0.010	NE	B, J	0.018U	087585-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087585-009	SW846 6020

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Table 6A-6 *(Continued)*
Summary of Total Metal Results,
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Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-26	Aluminum	0.010	0.010	0.030	NE	J		087577-009	SW846 6020
10-Aug-09	Antimony	0.000525	0.0005	0.003	0.006	B, J	0.0046UJ	087577-009	SW846 6020
	Arsenic	0.004	0.0015	0.005	0.010	B, J	0.011UJ	087577-009	SW846 6020
	Barium	0.064	0.0005	0.002	2.00			087577-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087577-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U	UJ	087577-009	SW846 6020
	Calcium	179	0.400	4.00	NE	B		087577-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087577-009	SW846 6020
	Cobalt	0.000199	0.0001	0.001	NE	J	J+	087577-009	SW846 6020
	Copper	0.00116	0.0003	0.001	NE	B	0.012U	087577-009	SW846 6020
	Iron	0.394	0.010	0.100	NE			087577-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	087577-009	SW846 6020
	Magnesium	21.9	0.005	0.015	NE		J	087577-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087577-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087577-009	SW846 7470
	Nickel	0.00156	0.0005	0.002	NE	J	J+	087577-009	SW846 6020
	Potassium	2.26	0.080	0.300	NE			087577-009	SW846 6020
	Selenium	0.0127	0.001	0.005	0.050			087577-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087577-009	SW846 6020
	Sodium	30.1	0.080	0.250	NE		J	087577-009	SW846 6020
	Thallium	0.000513	0.0003	0.001	0.002	J	0.0016U	087577-009	SW846 6020
	Uranium	0.00118	0.00005	0.0002	0.030			087577-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087577-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087577-009	SW846 6020

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Table 6A-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]
TA2-W-27	Aluminum	0.0235	0.010	0.030	NE	B, J	0.069U	087566-009	SW846 6020
03-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087566-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087566-009	SW846 6020
	Barium	0.063	0.0005	0.002	2.00			087566-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087566-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087566-009	SW846 6020
	Calcium	122	0.100	1.00	NE	B		087566-009	SW846 6020
	Chromium	0.0026	0.0025	0.010	0.100	J	J+	087566-009	SW846 6020
	Cobalt	0.000334	0.0001	0.001	NE	J	J+	087566-009	SW846 6020
	Copper	0.00149	0.0003	0.001	NE		0.013U	087566-009	SW846 6020
	Iron	0.597	0.010	0.100	NE			087566-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087566-009	SW846 6020
	Magnesium	17.4	0.005	0.015	NE			087566-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087566-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087566-009	SW846 7470
	Nickel	0.00443	0.0005	0.002	NE		J+	087566-009	SW846 6020
	Potassium	2.28	0.080	0.300	NE			087566-009	SW846 6020
	Selenium	0.00838	0.001	0.005	0.050		J-	087566-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087566-009	SW846 6020
	Sodium	33.1	0.080	0.250	NE		J	087566-009	SW846 6020
	Thallium	0.00045	0.0003	0.001	0.002	J		087566-009	SW846 6020
	Uranium	0.00122	0.00005	0.0002	0.030			087566-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087566-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087566-009	SW846 6020

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Table 6A-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]
TJA-2	Aluminum	ND	0.010	0.030	NE	U		087583-009	SW846 6020
13-Aug-09	Antimony	0.00081	0.0005	0.003	0.006	B, J	0.0046UJ	087583-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U	UJ	087583-009	SW846 6020
	Barium	0.0426	0.0005	0.002	2.00			087583-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087583-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U	UJ	087583-009	SW846 6020
	Calcium	72.5	0.400	4.00	NE	B		087583-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087583-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087583-009	SW846 6020
	Copper	0.000671	0.0003	0.001	NE	B, J	0.0015U	087583-009	SW846 6020
	Iron	0.175	0.010	0.100	NE			087583-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	087583-009	SW846 6020
	Magnesium	12.0	0.005	0.015	NE		J	087583-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087583-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087583-009	SW846 7470
	Nickel	0.000946	0.0005	0.002	NE	J		087583-009	SW846 6020
	Potassium	1.72	0.080	0.300	NE			087583-009	SW846 6020
	Selenium	0.00439	0.001	0.005	0.050	J		087583-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087583-009	SW846 6020
	Sodium	22.2	0.080	0.250	NE		J	087583-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087583-009	SW846 6020
	Uranium	0.00122	0.00005	0.0002	0.030			087583-009	SW846 6020
	Vanadium	0.00616	0.003	0.010	NE	B, J	0.27U	087583-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087583-009	SW846 6020

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Table 6A-6 *(Continued)*
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TJA-3	Aluminum	0.0217	0.010	0.030	NE	B, J	0.12U	087569-009	SW846 6020
04-Aug-09	Antimony	0.000503	0.0005	0.003	0.006	B, J	0.008U	087569-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087569-009	SW846 6020
	Barium	0.0431	0.0005	0.002	2.00			087569-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087569-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087569-009	SW846 6020
	Calcium	67.2	0.200	2.00	NE	B		087569-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087569-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087569-009	SW846 6020
	Copper	0.000374	0.0003	0.001	NE	B, J	0.0015U	087569-009	SW846 6020
	Iron	0.107	0.010	0.100	NE	B		087569-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087569-009	SW846 6020
	Magnesium	11.4	0.005	0.015	NE			087569-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087569-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087569-009	SW846 7470
	Nickel	0.00146	0.0005	0.002	NE	J		087569-009	SW846 6020
	Potassium	1.91	0.080	0.300	NE			087569-009	SW846 6020
	Selenium	0.00107	0.001	0.005	0.050	J		087569-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087569-009	SW846 6020
	Sodium	23.4	0.800	2.50	NE			087569-009	SW846 6020
	Thallium	0.000418	0.0003	0.001	0.002	J	0.0024U	087569-009	SW846 6020
	Uranium	0.00278	0.00005	0.0002	0.030	B		087569-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087569-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087569-009	SW846 6020

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Table 6A-6 *(Continued)*
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TJA-4	Aluminum	ND	0.010	0.030	NE	U		087587-009	SW846 6020
18-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087587-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087587-009	SW846 6020
	Barium	0.173	0.0005	0.002	2.00			087587-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087587-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087587-009	SW846 6020
	Calcium	65.3	0.200	2.00	NE	B		087587-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087587-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087587-009	SW846 6020
	Copper	0.0005	0.0003	0.001	NE	J		087587-009	SW846 6020
	Iron	0.197	0.010	0.100	NE			087587-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087587-009	SW846 6020
	Magnesium	13.2	0.050	0.150	NE			087587-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087587-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087587-009	SW846 7470
	Nickel	0.000654	0.0005	0.002	NE	J		087587-009	SW846 6020
	Potassium	3.24	0.080	0.300	NE			087587-009	SW846 6020
	Selenium	0.00257	0.001	0.005	0.050	J		087587-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087587-009	SW846 6020
	Sodium	23.0	0.080	0.250	NE			087587-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087587-009	SW846 6020
	Uranium	0.00294	0.00005	0.0002	0.030			087587-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087587-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087587-009	SW846 6020

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Table 6A-6 *(Continued)*
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Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0491	0.010	0.030	NE	B	0.12U	087571-009	SW846 6020
05-Aug-09	Antimony	0.00127	0.0005	0.003	0.006	B, J	0.008U	087571-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087571-009	SW846 6020
	Barium	0.0625	0.0005	0.002	2.00			087571-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087571-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087571-009	SW846 6020
	Calcium	58.1	0.200	2.00	NE	B		087571-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087571-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087571-009	SW846 6020
	Copper	0.000325	0.0003	0.001	NE	B, J	0.0015U	087571-009	SW846 6020
	Iron	0.111	0.010	0.100	NE	B		087571-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087571-009	SW846 6020
	Magnesium	11.4	0.005	0.015	NE			087571-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087571-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087571-009	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	J		087571-009	SW846 6020
	Potassium	2.36	0.080	0.300	NE			087571-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087571-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087571-009	SW846 6020
	Sodium	20.2	0.800	2.50	NE			087571-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087571-009	SW846 6020
	Uranium	0.00329	0.00005	0.0002	0.030	B		087571-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087571-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087571-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0546	0.010	0.030	NE			087589-009	SW846 6020
19-Aug-09	Antimony	ND	0.0005	0.003	0.006	U		087589-009	SW846 6020
	Arsenic	0.00179	0.0015	0.005	0.010	J		087589-009	SW846 6020
	Barium	0.217	0.0005	0.002	2.00			087589-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087589-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087589-009	SW846 6020
	Calcium	66.1	0.200	2.00	NE	B		087589-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087589-009	SW846 6020
	Cobalt	0.000533	0.0001	0.001	NE	J		087589-009	SW846 6020
	Copper	0.000509	0.0003	0.001	NE	J		087589-009	SW846 6020
	Iron	0.248	0.010	0.100	NE			087589-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087589-009	SW846 6020
	Magnesium	11.1	0.050	0.150	NE			087589-009	SW846 6020
	Manganese	0.0013	0.001	0.005	NE	J		087589-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087589-009	SW846 7470
	Nickel	0.000708	0.0005	0.002	NE	J		087589-009	SW846 6020
	Potassium	1.84	0.080	0.300	NE			087589-009	SW846 6020
	Selenium	0.00439	0.001	0.005	0.050	J		087589-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087589-009	SW846 6020
	Sodium	17.4	0.080	0.250	NE			087589-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087589-009	SW846 6020
	Uranium	0.00178	0.00005	0.0002	0.030			087589-009	SW846 6020
	Vanadium	0.00434	0.003	0.010	NE	B, J	0.018U	087589-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087589-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Continued)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0531	0.010	0.030	NE			087557-009	SW846 6020
28-Jul-09	Antimony	ND	0.0005	0.003	0.006	U		087557-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087557-009	SW846 6020
	Barium	0.0556	0.0005	0.002	2.00			087557-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087557-009	SW846 6020
	Cadmium	0.000139	0.00011	0.001	0.005	J		087557-009	SW846 6020
	Calcium	72.5	0.100	1.00	NE	B		087557-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087557-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087557-009	SW846 6020
	Copper	0.000515	0.0003	0.001	NE	J		087557-009	SW846 6020
	Iron	0.203	0.010	0.100	NE		J	087557-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087557-009	SW846 6020
	Magnesium	14.1	0.025	0.075	NE			087557-009	SW846 6020
	Manganese	0.00342	0.001	0.005	NE	J	J	087557-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087557-009	SW846 7470
	Nickel	0.0012	0.0005	0.002	NE	J		087557-009	SW846 6020
	Potassium	2.46	0.080	0.300	NE			087557-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	U		087557-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087557-009	SW846 6020
	Sodium	25.3	0.080	0.250	NE		J	087557-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087557-009	SW846 6020
	Uranium	0.00409	0.00005	0.0002	0.030			087557-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087557-009	SW846 6020
	Zinc	0.00485	0.0026	0.010	NE	J		087557-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-6 *(Concluded)*
Summary of Total Metal Results,
Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.012	0.010	0.030	NE	J		087580-009	SW846 6020
12-Aug-09	Antimony	0.00143	0.0005	0.003	0.006	B, J	0.0046UJ	087580-009	SW846 6020
	Arsenic	0.0031	0.0015	0.005	0.010	B, J	0.011UJ	087580-009	SW846 6020
	Barium	0.162	0.0005	0.002	2.00			087580-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U	UJ	087580-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U	UJ	087580-009	SW846 6020
	Calcium	78.9	0.400	4.00	NE	B		087580-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087580-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		087580-009	SW846 6020
	Copper	0.000713	0.0003	0.001	NE	B, J	0.0015U	087580-009	SW846 6020
	Iron	0.208	0.010	0.100	NE			087580-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U	UJ	087580-009	SW846 6020
	Magnesium	14.5	0.005	0.015	NE		J	087580-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087580-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087580-009	SW846 7470
	Nickel	0.000886	0.0005	0.002	NE	J		087580-009	SW846 6020
	Potassium	1.81	0.080	0.300	NE			087580-009	SW846 6020
	Selenium	0.00408	0.001	0.005	0.050	J		087580-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087580-009	SW846 6020
	Sodium	20.3	0.080	0.250	NE		J	087580-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087580-009	SW846 6020
	Uranium	0.00122	0.00005	0.0002	0.030			087580-009	SW846 6020
	Vanadium	0.0148	0.003	0.010	NE	B	0.27U	087580-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087580-009	SW846 6020

Refer to footnotes on page 6A-44.

Table 6A-7
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
PGS-2	Americium-241	-5.49 ± 12.1	13.3	6.65	NE	U	BD	087559-033	EPA 901.1
29-Jul-09	Cesium-137	-1.28 ± 2.63	3.04	1.52	NE	U	BD	087559-033	EPA 901.1
	Cobalt-60	1.75 ± 2.01	3.57	1.79	NE	U	BD	087559-033	EPA 901.1
	Potassium-40	1.55 ± 34.7	41.0	20.5	NE	U	BD	087559-033	EPA 901.1
	Gross Alpha	2.52 ± 0.871	0.649	0.264	15			087559-034	EPA 900.0
	Gross Beta	3.87 ± 1.43	2.01	0.983	4 mrem/yr		J	087559-034	EPA 900.0
	Tritium	51.3 ± 114	198	91.3	NE	U	BD	087559-036	EPA 906.0 M
TA1-W-01	Americium-241	3.73 ± 9.27	13.9	6.95	NE	U	BD	087537-033	EPA 901.1
14-Jul-09	Cesium-137	-0.0139 ± 1.94	3.23	1.62	NE	U	BD	087537-033	EPA 901.1
	Cobalt-60	-4.42 ± 3.23	3.20	1.60	NE	U	BD	087537-033	EPA 901.1
	Potassium-40	32.3 ± 48.0	29.6	14.8	NE	X	R	087537-033	EPA 901.1
	Gross Alpha	7.20 ± 4.08	3.93	1.32	15		J	087537-R34	EPA 900.0
	Gross Beta	0.887 ± 0.639	1.01	0.484	4 mrem/yr	U	BD	087537-R34	EPA 900.0
	Tritium	-25.6 ± 103	178	86.7	NE	U	BD	087537-036	EPA 906.0 M
TA1-W-02	Americium-241	-0.87 ± 8.38	13.0	6.50	NE	U	BD	087539-033	EPA 901.1
15-Jul-09	Cesium-137	2.16 ± 3.11	2.98	1.49	NE	U	BD	087539-033	EPA 901.1
	Cobalt-60	-1.57 ± 2.41	3.08	1.54	NE	U	BD	087539-033	EPA 901.1
	Potassium-40	-14.4 ± 34.8	42.9	21.5	NE	U	BD	087539-033	EPA 901.1
	Gross Alpha	6.70 ± 3.97	3.95	1.31	15		J	087539-R34	EPA 900.0
	Gross Beta	2.28 ± 0.956	1.32	0.629	4 mrem/yr		J	087539-R34	EPA 900.0
	Tritium	147 ± 117	186	87.9	NE	U	BD	087539-036	EPA 906.0 M
TA1-W-04	Americium-241	2.60 ± 12.6	18.7	9.36	NE	U	BD	087544-033	EPA 901.1
17-Jul-09	Cesium-137	0.802 ± 2.02	3.49	1.75	NE	U	BD	087544-033	EPA 901.1
	Cobalt-60	0.312 ± 2.11	3.62	1.81	NE	U	BD	087544-033	EPA 901.1
	Potassium-40	14.1 ± 49.7	33.4	16.7	NE	U	BD	087544-033	EPA 901.1
	Gross Alpha	8.28 ± 2.31	1.81	0.836	15			087544-R34	EPA 900.0
	Gross Beta	3.20 ± 1.37	1.99	0.964	4 mrem/yr		J	087544-R34	EPA 900.0
	Tritium	-34.3 ± 111	198	94.5	NE	U	BD	087544-036	EPA 906.0 M
TA1-W-05	Americium-241	9.32 ± 14.6	22.7	11.4	NE	U	BD	087546-033	EPA 901.1
20-Jul-09	Cesium-137	0.250 ± 1.74	2.98	1.49	NE	U	BD	087546-033	EPA 901.1
	Cobalt-60	0.263 ± 1.97	3.36	1.68	NE	U	BD	087546-033	EPA 901.1
	Potassium-40	103 ± 39.2	29.6	14.8	NE	X	R	087546-033	EPA 901.1
	Gross Alpha	5.05 ± 1.57	1.26	0.559	15			087546-R34	EPA 900.0
	Gross Beta	2.09 ± 1.06	1.59	0.765	4 mrem/yr		J	087546-R34	EPA 900.0
	Tritium	-15.3 ± 112	198	94.8	NE	U	BD	087546-036	EPA 906.0 M

Refer to footnotes on page 6A-44.

Table 6A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA1-W-06	Americium-241	-13.3 ± 11.8	19.6	9.80	NE	U	BD	087550-033	EPA 901.1
21-Jul-09	Cesium-137	-2.7 ± 3.69	3.56	1.78	NE	U	BD	087550-033	EPA 901.1
	Cobalt-60	-0.166 ± 2.30	3.79	1.90	NE	U	BD	087550-033	EPA 901.1
	Potassium-40	2.30 ± 30.6	43.0	21.5	NE	U	BD	087550-033	EPA 901.1
	Gross Alpha	5.60 ± 4.22	5.30	1.83	15		J	087550-R34	EPA 900.0
	Gross Beta	0.948 ± 0.668	1.06	0.510	4 mrem/yr	U	BD	087550-R34	EPA 900.0
	Tritium	-65 ± 110	198	94.8	NE	U	BD	087550-036	EPA 906.0 M
TA1-W-08	Americium-241	14.1 ± 16.2	23.3	11.6	NE	U	BD	087553-033	EPA 901.1
22-Jul-09	Cesium-137	-0.555 ± 1.90	3.18	1.59	NE	U	BD	087553-033	EPA 901.1
	Cobalt-60	-1.75 ± 3.64	3.01	1.51	NE	U	BD	087553-033	EPA 901.1
	Potassium-40	10.9 ± 52.5	29.1	14.6	NE	U	BD	087553-033	EPA 901.1
	Gross Alpha	2.78 ± 3.51	5.88	2.74	15	U	BD	087553-034	EPA 900.0
	Gross Beta	2.02 ± 3.31	5.55	2.71	4 mrem/yr	U	BD	087553-034	EPA 900.0
	Tritium	-34.2 ± 111	197	94.2	NE	U	BD	087553-036	EPA 906.0 M
TA2-NW1-595	Americium-241	-24.7 ± 11.8	12.3	6.15	NE	U	BD	087555-033	EPA 901.1
23-Jul-09	Cesium-137	-0.223 ± 1.89	3.11	1.56	NE	U	BD	087555-033	EPA 901.1
	Cobalt-60	0.594 ± 1.93	3.30	1.65	NE	U	BD	087555-033	EPA 901.1
	Potassium-40	3.60 ± 41.7	41.6	20.8	NE	U	BD	087555-033	EPA 901.1
	Gross Alpha	3.78 ± 1.67	2.13	0.980	15		J	087555-R34	EPA 900.0
	Gross Beta	5.32 ± 1.97	2.78	1.36	4 mrem/yr		J	087555-R34	EPA 900.0
	Tritium	-144 ± 106	200	95.4	NE	U	BD	087555-036	EPA 906.0 M
TA2-SW1-320	Americium-241	4.72 ± 10.3	15.7	7.87	NE	U	BD	087575-033	EPA 901.1
06-Aug-09	Cesium-137	-0.671 ± 1.95	3.16	1.58	NE	U	BD	087575-033	EPA 901.1
	Cobalt-60	0.359 ± 1.85	3.10	1.55	NE	U	BD	087575-033	EPA 901.1
	Potassium-40	65.1 ± 30.0	28.1	14.1	NE		J	087575-033	EPA 901.1
	Gross Alpha	2.11 ± 0.867	0.906	0.389	15		J	087575-034	EPA 900.0
	Gross Beta	3.63 ± 1.28	1.77	0.861	4 mrem/yr		J	087575-034	EPA 900.0
	Tritium	-36.2 ± 88.9	164	76.8	NE	U	BD	087575-036	EPA 906.0 M
TA2-W-01	Americium-241	2.51 ± 12.3	14.2	7.12	NE	U	BD	087562-033	EPA 901.1
30-Jul-09	Cesium-137	0.285 ± 2.63	3.15	1.58	NE	U	BD	087562-033	EPA 901.1
	Cobalt-60	5.39 ± 2.96	5.39	1.87	NE	U	BD	087562-033	EPA 901.1
	Potassium-40	3.89 ± 34.6	40.9	20.5	NE	U	BD	087562-033	EPA 901.1
	Gross Alpha	1.94 ± 0.881	0.992	0.423	15		J	087562-034	EPA 900.0
	Gross Beta	1.79 ± 1.30	2.07	1.01	4 mrem/yr	U	BD	087562-034	EPA 900.0
	Tritium	162 ± 127	199	91.7	NE	U	BD	087562-036	EPA 906.0 M

Refer to footnotes on page 6A-44.

Table 6A-7 *(Continued)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TA2-W-19	Americium-241	0.00166 ± 16.7	25.6	12.8	NE	U	BD	087585-033	EPA 901.1
17-Aug-09	Cesium-137	0.374 ± 1.85	3.19	1.59	NE	U	BD	087585-033	EPA 901.1
	Cobalt-60	0.695 ± 1.96	3.40	1.70	NE	U	BD	087585-033	EPA 901.1
	Potassium-40	84.6 ± 43.9	84.6	15.0	NE	U	BD	087585-033	EPA 901.1
	Gross Alpha	4.55 ± 1.49	1.24	0.524	15			087585-034	EPA 900.0
	Gross Beta	3.39 ± 1.70	2.58	1.25	4 mrem/yr		J	087585-034	EPA 900.0
	Tritium	29.6 ± 114	196	94.9	NE	U	BD	087585-036	EPA 906.0 M
TA2-W-26	Americium-241	10.6 ± 11.5	18.4	9.22	NE	U	BD	087577-033	EPA 901.1
10-Aug-09	Cesium-137	0.449 ± 2.05	3.51	1.76	NE	U	BD	087577-033	EPA 901.1
	Cobalt-60	2.81 ± 2.22	3.99	2.00	NE	U	BD	087577-033	EPA 901.1
	Potassium-40	21.2 ± 45.4	32.1	16.1	NE	U	BD	087577-033	EPA 901.1
	Gross Alpha	4.00 ± 1.59	1.58	0.649	15		J	087577-034	EPA 900.0
	Gross Beta	3.79 ± 1.76	2.65	1.29	4 mrem/yr		J	087577-034	EPA 900.0
	Tritium	-17.3 ± 74.7	138	63.9	NE	U	BD	087577-036	EPA 906.0 M
TA2-W-27	Americium-241	1.06 ± 14.2	24.3	12.2	NE	U	BD	087566-033	EPA 901.1
03-Aug-09	Cesium-137	-0.324 ± 1.86	3.15	1.57	NE	U	BD	087566-033	EPA 901.1
	Cobalt-60	-0.80 ± 2.09	3.44	1.72	NE	U	BD	087566-033	EPA 901.1
	Potassium-40	19.0 ± 57.3	32.0	16.0	NE	U	BD	087566-033	EPA 901.1
	Gross Alpha	2.53 ± 1.09	1.16	0.493	15		J	087566-034	EPA 900.0
	Gross Beta	1.72 ± 1.54	2.52	1.23	4 mrem/yr	U	BD	087566-034	EPA 900.0
	Tritium	-19.3 ± 92.7	162	78.4	NE	U	BD	087566-036	EPA 906.0 M
TJA-2	Americium-241	-14.6 ± 12.1	20.1	10.1	NE	U	BD	087583-033	EPA 901.1
13-Aug-09	Cesium-137	1.43 ± 2.18	3.71	1.86	NE	U	BD	087583-033	EPA 901.1
	Cobalt-60	1.51 ± 2.22	3.87	1.94	NE	U	BD	087583-033	EPA 901.1
	Potassium-40	-26.8 ± 40.8	43.6	21.8	NE	U	BD	087583-033	EPA 901.1
	Gross Alpha	6.71 ± 2.38	2.63	1.20	15		J	087583-034	EPA 900.0
	Gross Beta	3.50 ± 1.75	2.65	1.29	4 mrem/yr		J	087583-034	EPA 900.0
	Tritium	10.2 ± 75.4	135	62.5	NE	U	BD	087583-036	EPA 906.0 M
TJA-3	Americium-241	-9.56 ± 7.42	12.3	6.16	NE	U	BD	087569-033	EPA 901.1
04-Aug-09	Cesium-137	-0.752 ± 2.74	3.26	1.63	NE	U	BD	087569-033	EPA 901.1
	Cobalt-60	-0.447 ± 1.92	3.15	1.57	NE	U	BD	087569-033	EPA 901.1
	Potassium-40	-36.7 ± 40.9	43.3	21.7	NE	U	BD	087569-033	EPA 901.1
	Gross Alpha	4.17 ± 3.10	3.75	1.22	15		J	087569-034	EPA 900.0
	Gross Beta	4.73 ± 2.21	2.64	1.11	4 mrem/yr		J	087569-034	EPA 900.0
	Tritium	3.77 ± 78.6	143	65.7	NE	U	BD	087569-036	EPA 906.0 M

Refer to footnotes on page 6A-44.

Table 6A-7 *(Concluded)*
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Tritium Results, Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
TJA-4	Americium-241	-28.5 ± 7.79	11.7	5.84	NE	U	BD	087587-033	EPA 901.1
18-Aug-09	Cesium-137	2.96 ± 1.77	3.14	1.57	NE	U	BD	087587-033	EPA 901.1
	Cobalt-60	-2.49 ± 4.27	3.05	1.53	NE	U	BD	087587-033	EPA 901.1
	Potassium-40	-38.6 ± 35.5	38.1	19.1	NE	U	BD	087587-033	EPA 901.1
	Gross Alpha	4.08 ± 1.95	2.62	1.20	15		J	087587-034	EPA 900.0
	Gross Beta	1.69 ± 1.52	2.49	1.21	4 mrem/yr	U	BD	087587-034	EPA 900.0
	Tritium	94.3 ± 112	186	89.9	NE	U	BD	087587-036	EPA 906.0 M
TJA-6	Americium-241	-3.01 ± 5.74	9.56	4.78	NE	U	BD	087571-033	EPA 901.1
05-Aug-09	Cesium-137	-0.177 ± 1.89	3.19	1.59	NE	U	BD	087571-033	EPA 901.1
	Cobalt-60	-1.52 ± 2.08	3.31	1.66	NE	U	BD	087571-033	EPA 901.1
	Potassium-40	-8.6 ± 35.5	42.9	21.5	NE	U	BD	087571-033	EPA 901.1
	Gross Alpha	4.15 ± 2.84	3.11	0.981	15		J	087571-034	EPA 900.0
	Gross Beta	1.11 ± 1.26	2.09	1.02	4 mrem/yr	U	BD	087571-034	EPA 900.0
	Tritium	13.7 ± 92.1	163	76.4	NE	U	BD	087571-036	EPA 906.0 M
TJA-7	Americium-241	-1.1 ± 8.26	12.8	6.40	NE	U	BD	087589-033	EPA 901.1
19-Aug-09	Cesium-137	-1.47 ± 3.54	3.28	1.64	NE	U	BD	087589-033	EPA 901.1
	Cobalt-60	-0.00616 ± 1.98	3.30	1.65	NE	U	BD	087589-033	EPA 901.1
	Potassium-40	-40.1 ± 35.9	43.9	22.0	NE	U	BD	087589-033	EPA 901.1
	Gross Alpha	1.81 ± 1.01	1.38	0.607	15		J	087589-034	EPA 900.0
	Gross Beta	2.34 ± 1.49	2.35	1.13	4 mrem/yr	U	BD	087589-034	EPA 900.0
	Tritium	5.11 ± 108	187	90.2	NE	U	BD	087589-036	EPA 906.0 M
WYO-3	Americium-241	-26.3 ± 9.74	15.2	7.58	NE	U	BD	087557-033	EPA 901.1
28-Jul-09	Cesium-137	0.358 ± 1.85	3.08	1.54	NE	U	BD	087557-033	EPA 901.1
	Cobalt-60	0.708 ± 1.91	3.25	1.63	NE	U	BD	087557-033	EPA 901.1
	Potassium-40	-31.8 ± 35.0	43.0	21.5	NE	U	BD	087557-033	EPA 901.1
	Gross Alpha	5.37 ± 1.67	0.993	0.386	15			087557-034	EPA 900.0
	Gross Beta	7.47 ± 2.22	2.66	1.28	4 mrem/yr		J	087557-034	EPA 900.0
	Tritium	40.9 ± 112	197	91.0	NE	U	BD	087557-036	EPA 906.0 M
WYO-4	Americium-241	-2.35 ± 11.3	19.4	9.70	NE	U	BD	087580-033	EPA 901.1
12-Aug-09	Cesium-137	7.01 ± 2.72	7.01	1.55	NE	U	BD	087580-033	EPA 901.1
	Cobalt-60	-0.357 ± 1.98	3.31	1.66	NE	U	BD	087580-033	EPA 901.1
	Potassium-40	55.3 ± 22.4	55.4	21.7	NE	U	BD	087580-033	EPA 901.1
	Gross Alpha	0.729 ± 1.02	1.73	0.761	15	U	BD	087580-034	EPA 900.0
	Gross Beta	2.39 ± 1.90	3.08	1.50	4 mrem/yr	U	BD	087580-034	EPA 900.0
	Tritium	50.2 ± 81.0	138	63.9	NE	U	BD	087580-036	EPA 906.0 M

Refer to footnotes on page 6A-44.

Table 6A-8
Summary of Field Water Quality Measurements[h], Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TA2-SW1-320	13-Jan-09	15.39	513	206.6	7.60	21.1	79.8	7.97
TA2-W-01	14-Jan-09	16.59	660	200.0	7.53	0.66	78.9	7.69
TA2-W-19	27-Jan-09	15.37	616	196.9	7.58	1.27	82.1	8.20
TA2-W-26	21-Jan-09	16.84	1,208	185.2	7.46	2.52	79.9	7.69
TA2-W-27	15-Jan-09	17.12	868	192.1	7.48	0.32	86.7	8.34
TJA-2	26-Jan-09	16.37	618	190.5	7.58	0.29	88.0	8.65
TJA-3	16-Jan-09	18.60	519	188.7	7.40	1.06	74.0	6.91
TJA-4	28-Jan-09	14.06	571	181.3	7.55	0.38	53.6	5.50
TJA-6	20-Jan-09	17.70	488	181.9	7.43	2.22	58.5	5.57
TJA-7	29-Jan-09	15.34	544	191.5	7.58	3.30	80.8	8.07
WYO-4	23-Jan-09	15.79	661	185.8	7.72	0.66	78.6	7.78
TA2-SW1-320	04-May-09	18.37	510	52.2	7.80	20.8	85.3	8.01
TA2-W-19	06-May-09	20.26	623	111.7	7.32	0.21	90.6	8.18
TA2-W-26	05-May-09	19.01	1,228	122.6	7.21	0.91	82.3	7.61
TJA-2	11-May-09	19.10	625	123.0	7.27	0.33	95.5	9.00
TJA-4	07-May-09	20.01	585	111.1	7.26	0.37	59.1	5.36
TJA-7	08-May-09	20.99	553	114.9	7.28	2.11	92.3	8.20
WYO-4	13-May-09	19.82	690	85.2	7.40	0.39	87.9	8.00
PGS-2	29-Jul-09	20.96	484	229.4	8.23	0.33	13.4	1.20
TA1-W-01	14-Jul-09	22.46	560	39.9	8.16	0.33	70.8	6.13
TA1-W-02	15-Jul-09	22.55	543	11.1	8.13	0.45	64.2	5.54
TA1-W-04	17-Jul-09	22.97	517	181.7	7.38	0.47	69.8	5.96
TA1-W-05	20-Jul-09	22.24	632	199.8	7.28	0.38	80.0	6.99
TA1-W-06	21-Jul-09	21.98	937	202.8	7.56	0.36	82.7	7.20
TA1-W-08	22-Jul-09	20.54	2,072	203.8	7.39	0.78	82.8	7.41
TA2-NW1-595	23-Jul-09	22.33	844	173.2	7.36	0.35	87.7	7.60
TA2-SW1-320	06-Aug-09	19.98	537	246.4	7.77	1.77	88.9	8.09
TA2-W-01	30-Jul-09	20.97	687	223.7	7.65	0.40	79.2	7.04
TA2-W-19	17-Aug-09	23.15	639	247.3	7.68	0.35	90.0	7.69
TA2-W-26	10-Aug-09	21.15	1,265	376.5	7.58	0.48	87.2	7.66
TA2-W-27	03-Aug-09	23.24	909	199.5	7.53	0.36	89.6	7.61

Refer to footnotes on page 6A-44.

Table 6A-8 *(Concluded)*
Summary of Field Water Quality Measurements[h], Tijeras Arroyo Groundwater Investigation, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TJA-2	13-Aug-09	20.91	637	311.8	7.69	0.34	89.8	7.92
TJA-3	04-Aug-09	22.00	542	211.8	7.50	0.20	77.5	6.76
TJA-4	18-Aug-09	22.18	599	236.1	7.62	0.40	60.4	5.27
TJA-6	05-Aug-09	23.41	509	182.7	7.52	0.86	62.0	5.27
TJA-7	19-Aug-09	21.48	564	265.5	7.68	1.80	90.6	8.00
WYO-3	28-Jul-09	21.57	557	242.3	7.64	1.32	76.4	6.73
WYO-4	12-Aug-09	20.78	688	335.1	7.79	0.28	89.3	7.98
TA1-W-06	28-Oct-09	15.04	796	279.9	7.60	0.53	80.0	8.01
TA1-W-08	29-Oct-09	15.98	1,790	293.6	7.42	0.46	75.0	7.36
TA2-SW1-320	03-Nov-09	16.92	465	225.6	7.75	0.99	81.6	7.89
TA2-W-01	30-Oct-09	15.99	582	298.8	7.64	1.38	77.6	7.66
TA2-W-19	05-Nov-09	19.76	558	233.7	7.64	0.22	82.7	7.54
TA2-W-26	04-Nov-09	19.12	1,108	244.7	7.50	0.59	82.1	7.57
TA2-W-27	02-Nov-09	19.03	7.85	300.6	7.55	0.31	84.8	7.83
TJA-2	10-Nov-09	17.56	552	265.2	7.65	0.37	87.9	8.38
TJA-4	06-Nov-09	18.80	520	217.0	7.58	0.34	57.1	5.35
TJA-7	09-Nov-09	19.08	487	254.9	7.64	0.98	83.8	7.76
WYO-4	12-Nov-09	17.50	597	255.1	7.78	0.34	81.6	7.79

Refer to footnotes on page 6A-44.

Footnotes for Tijeras Arroyo Groundwater Investigation 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.
- 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

[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

[d]MCL

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11(b)), National Primary Drinking Water Standards, EPA, July 2002. Both primary MCLs and secondary MCLs were promulgated (http://www.epa.gov/safewater/contaminants/index.html).mrem/yr = millirem per year.
- 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 (including radium-226 but excluding radon and total uranium).
  5 pCi/L = radium-226 and radium-228 combined.
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate). Tritium has an equivalent MCL of 20,000 pCi/L.

[e]Laboratory Qualifier

B	=	Analyte is detected in associated laboratory method blank.
J	=	Amount detected is below the practical quantitation limit (PQL).
U	=	Analyte is absent or below the method detection limit.
X	=	Data rejected due to low abundance.

[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 associate value is an estimated quantity.
J+	=	The associated numerical value is an estimated quantity with suspected positive bias.
J-	=	The associated numerical value is an estimated quantity with a suspected negative bias.
U	=	The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable (compound may or may not be present). Re-sampling and reanalysis are necessary for verification.

[g]Analytical Method

- U.S. Environmental Protection Agency (EPA), 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA 9310: EPA, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography–Method 300.0*, EPA-600/4-84-017, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1999, *Perchlorate in Drinking Water Using Ion Chromatography*, EPA 815/R-00-014, U.S. Environmental Protection Agency, Cincinnati, Ohio.

[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 6B
Tijeras Arroyo Groundwater
Plots

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Attachment 6B Plots

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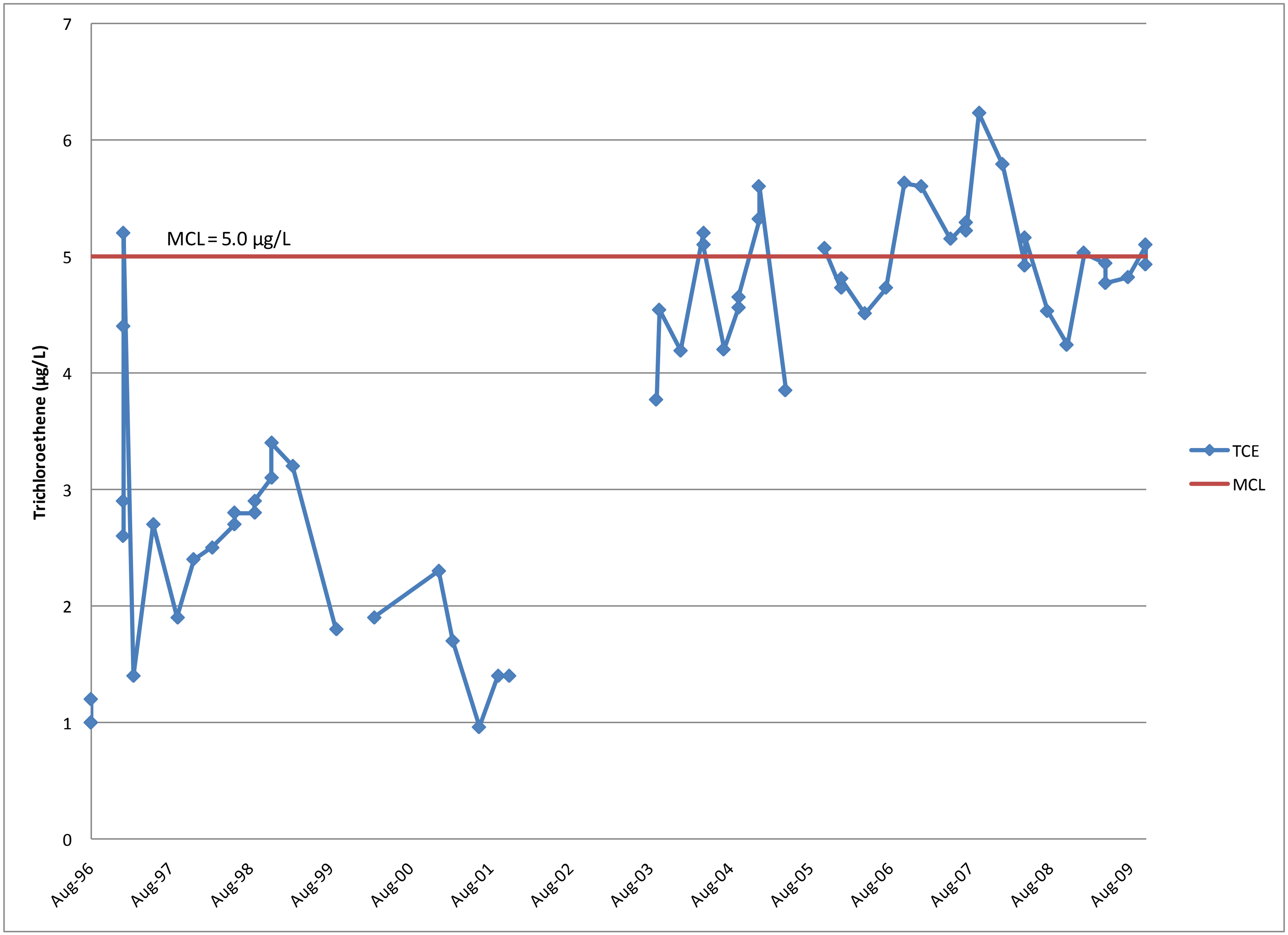

Figure 6B-1. Trichloroethene Concentrations, TA2-W-19

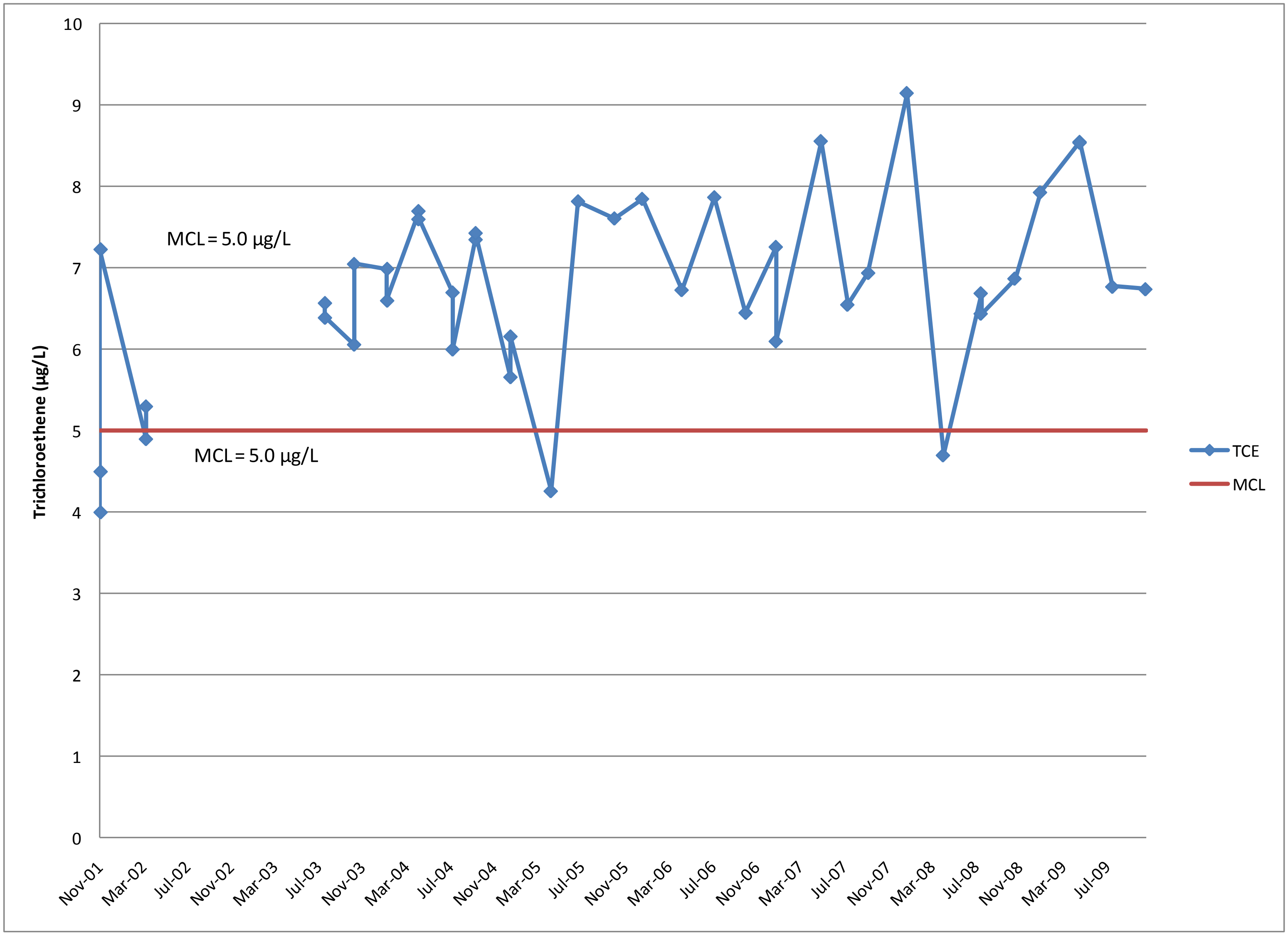

Figure 6B-2. Trichloroethene Concentrations, WYO-4

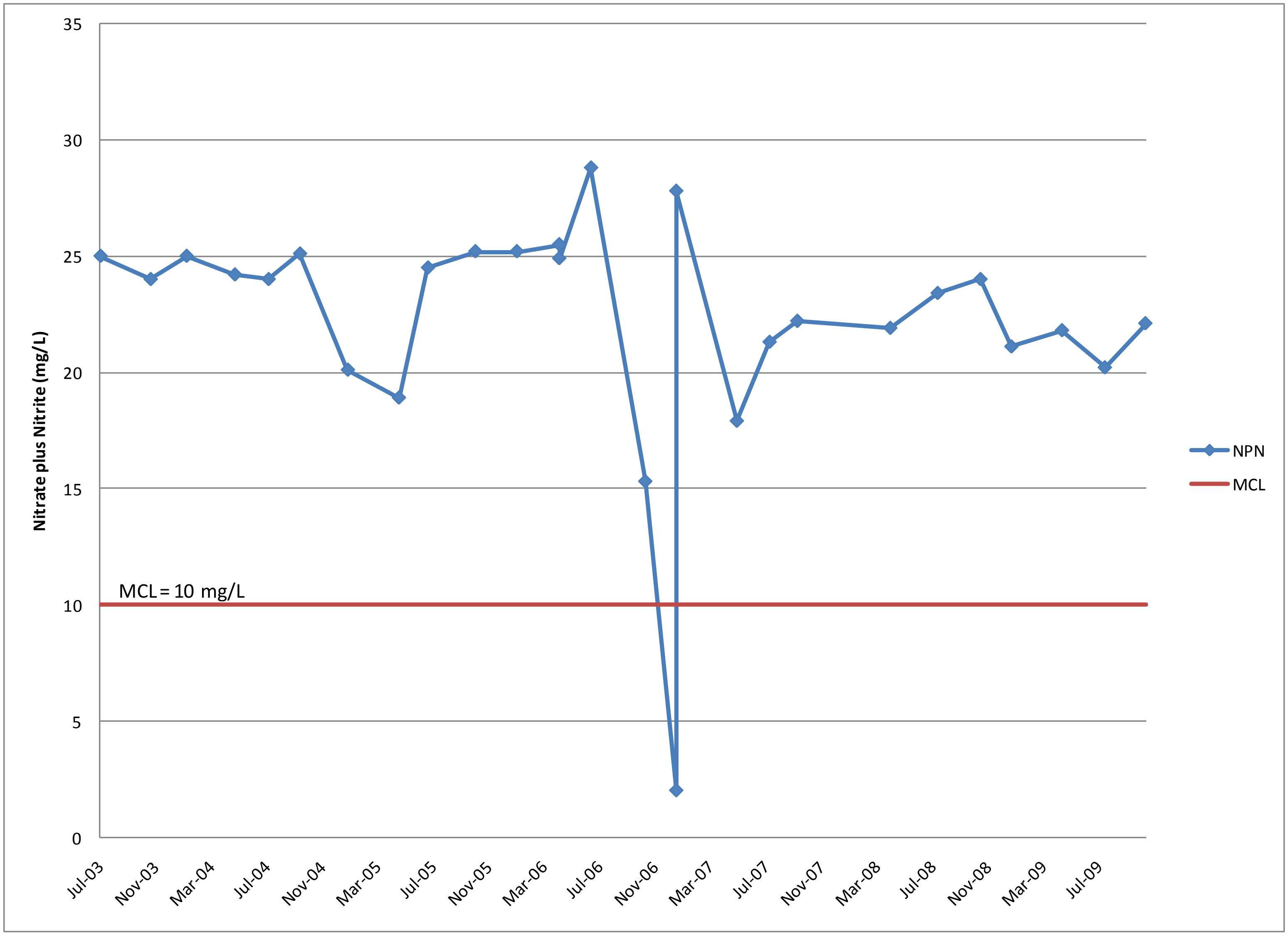

Figure 6B-3. Nitrate plus Nitrite Concentrations, TA2-SW1-320

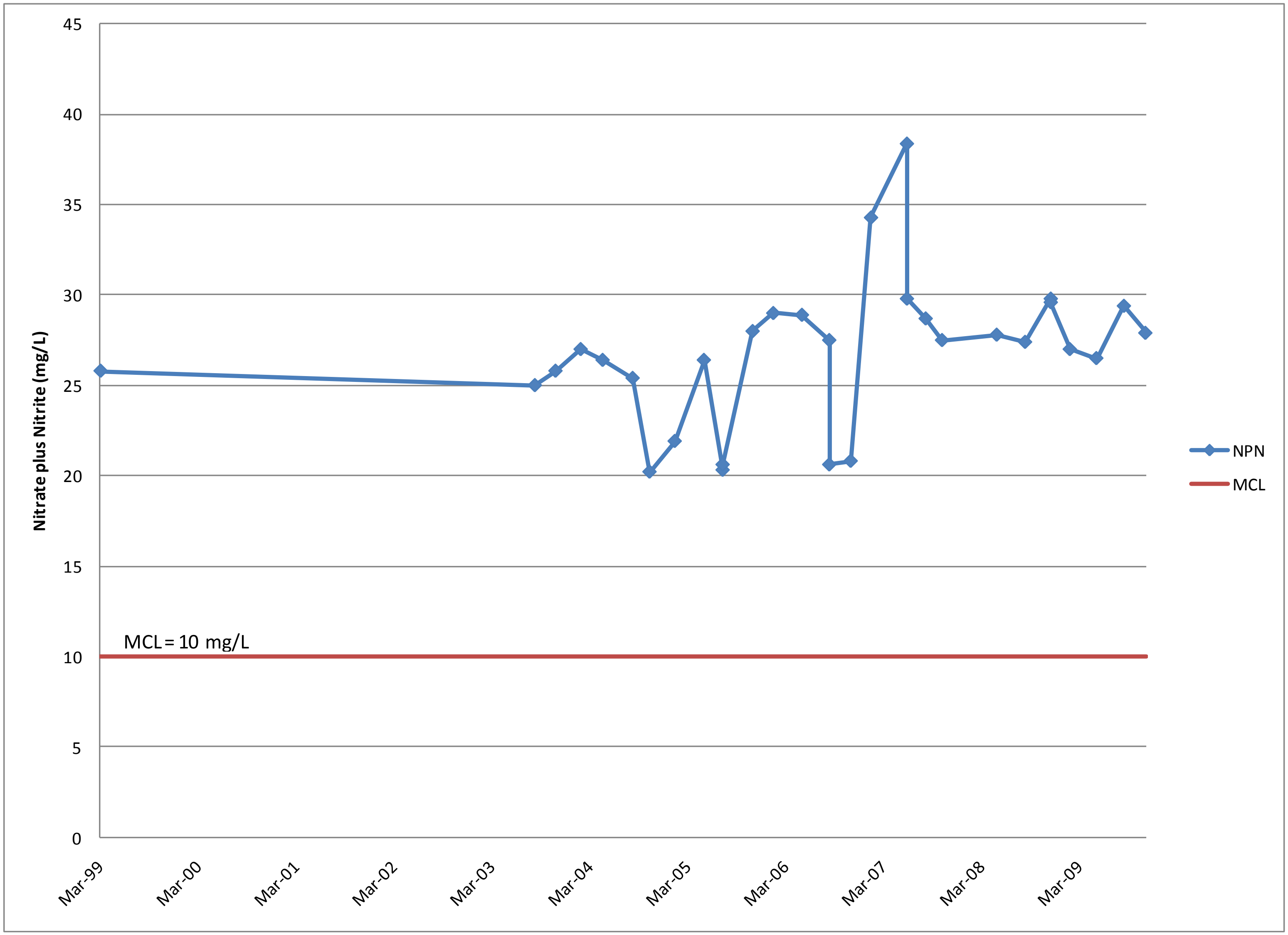

Figure 6B-4. Nitrate plus Nitrite Concentrations, TJA-4

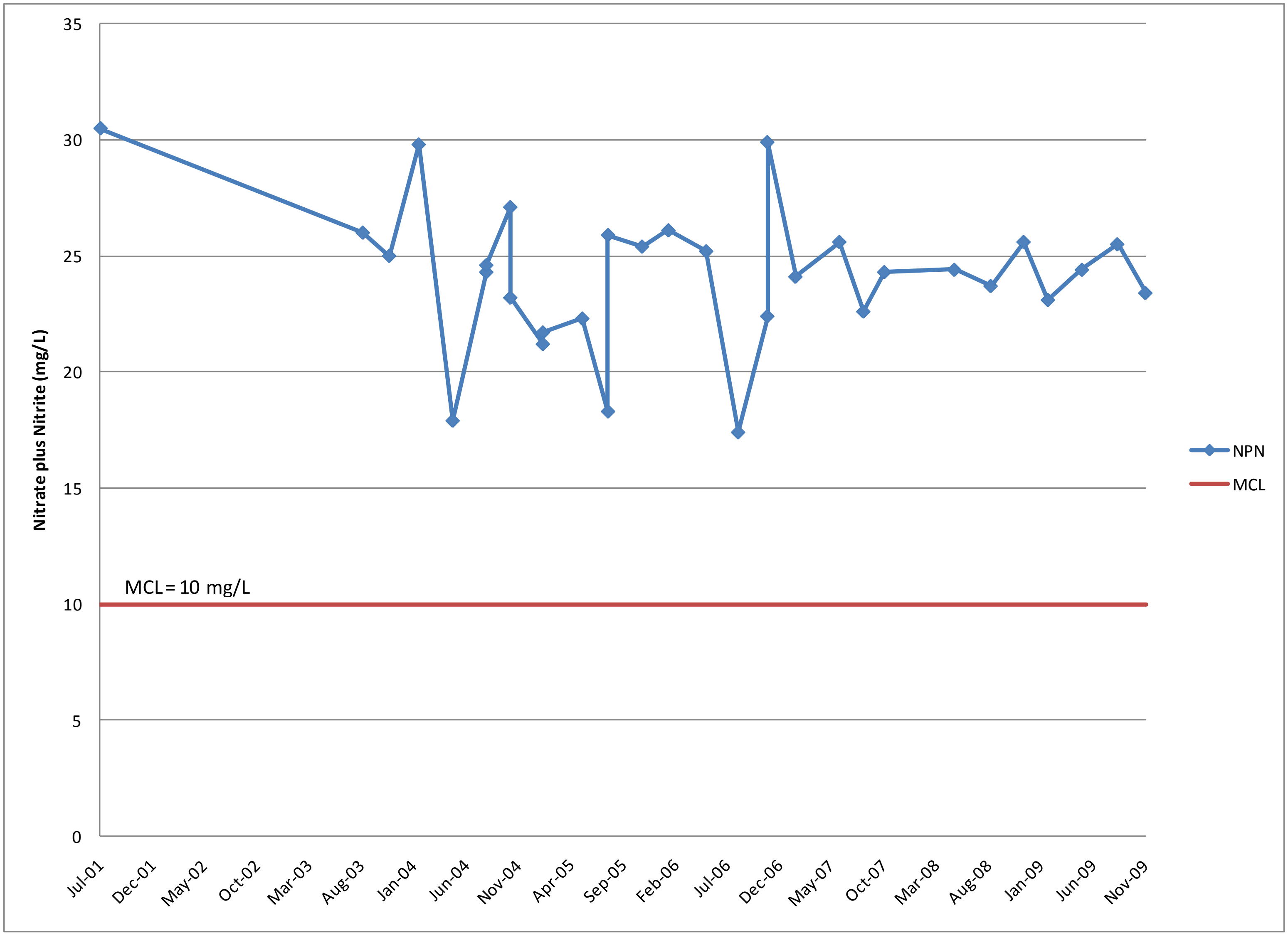

Figure 6B-5. Nitrate plus Nitrite Concentrations, TJA-7

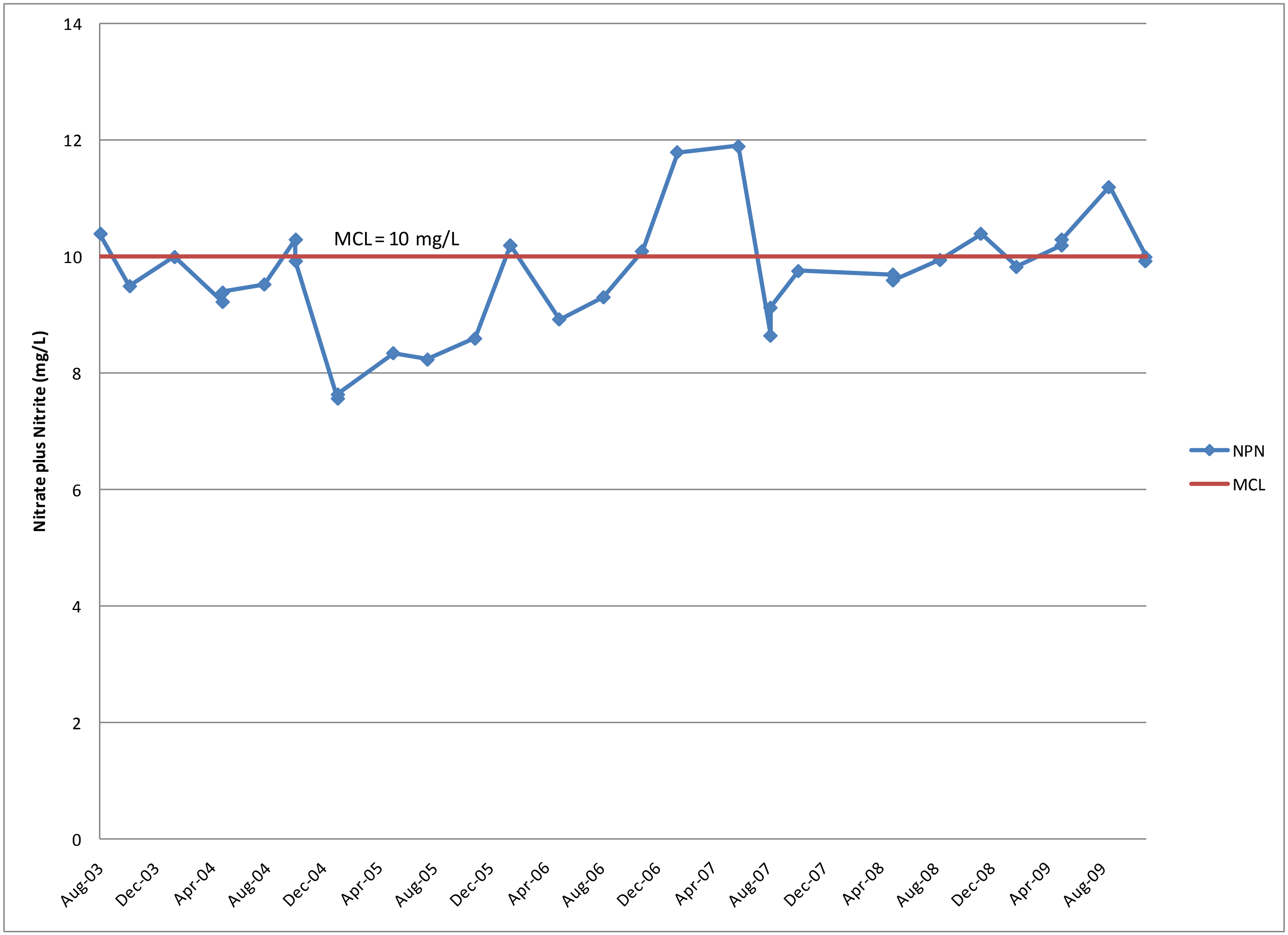

Figure 6B-6. Nitrate plus Nitrite Concentrations, TA2-W-19

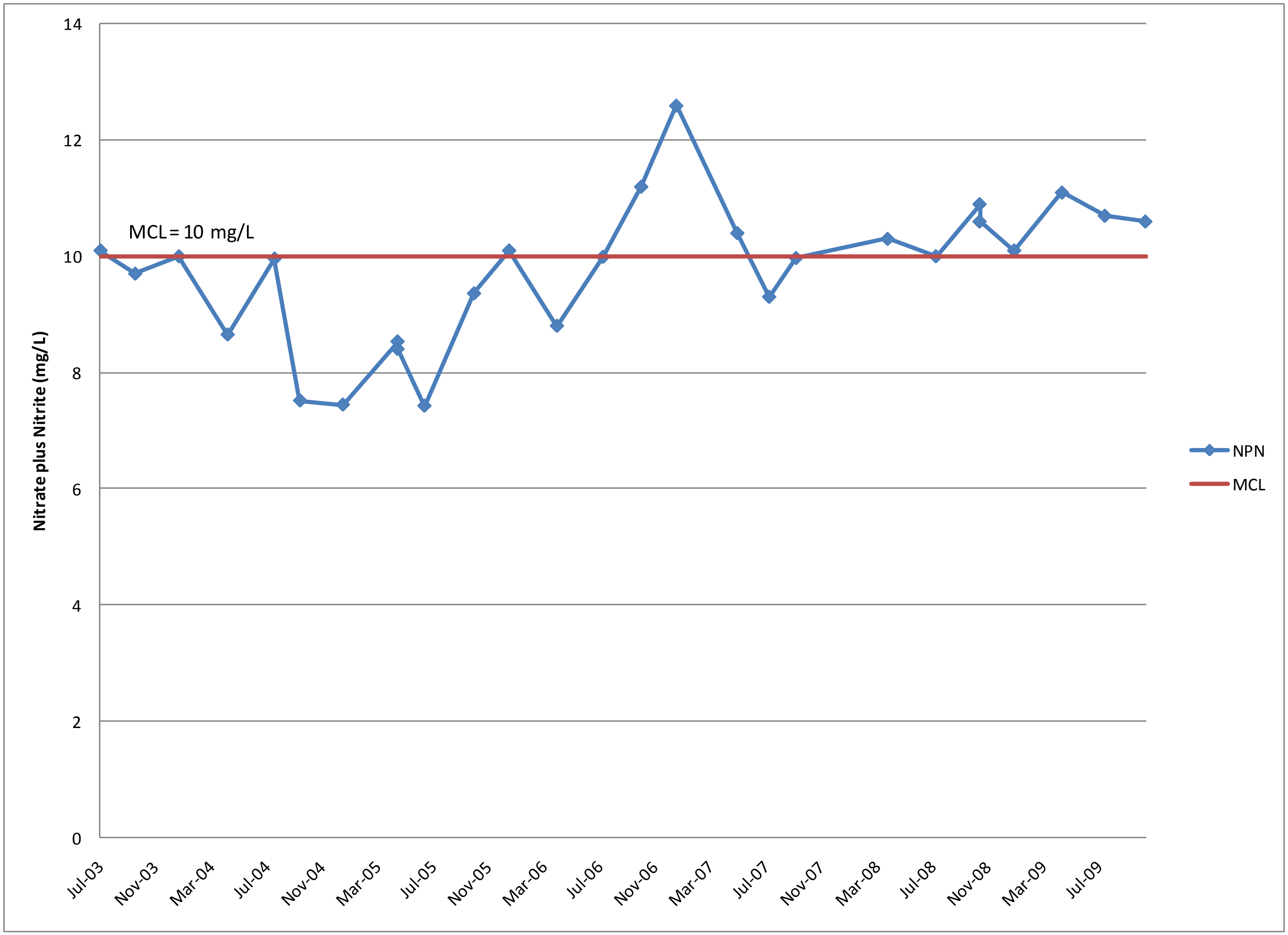

Figure 6B-7. Nitrate plus Nitrite Concentrations, TJA-2

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Attachment 6C
Tijeras Arroyo Groundwater
Hydrographs

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Attachment 6C Hydrographs

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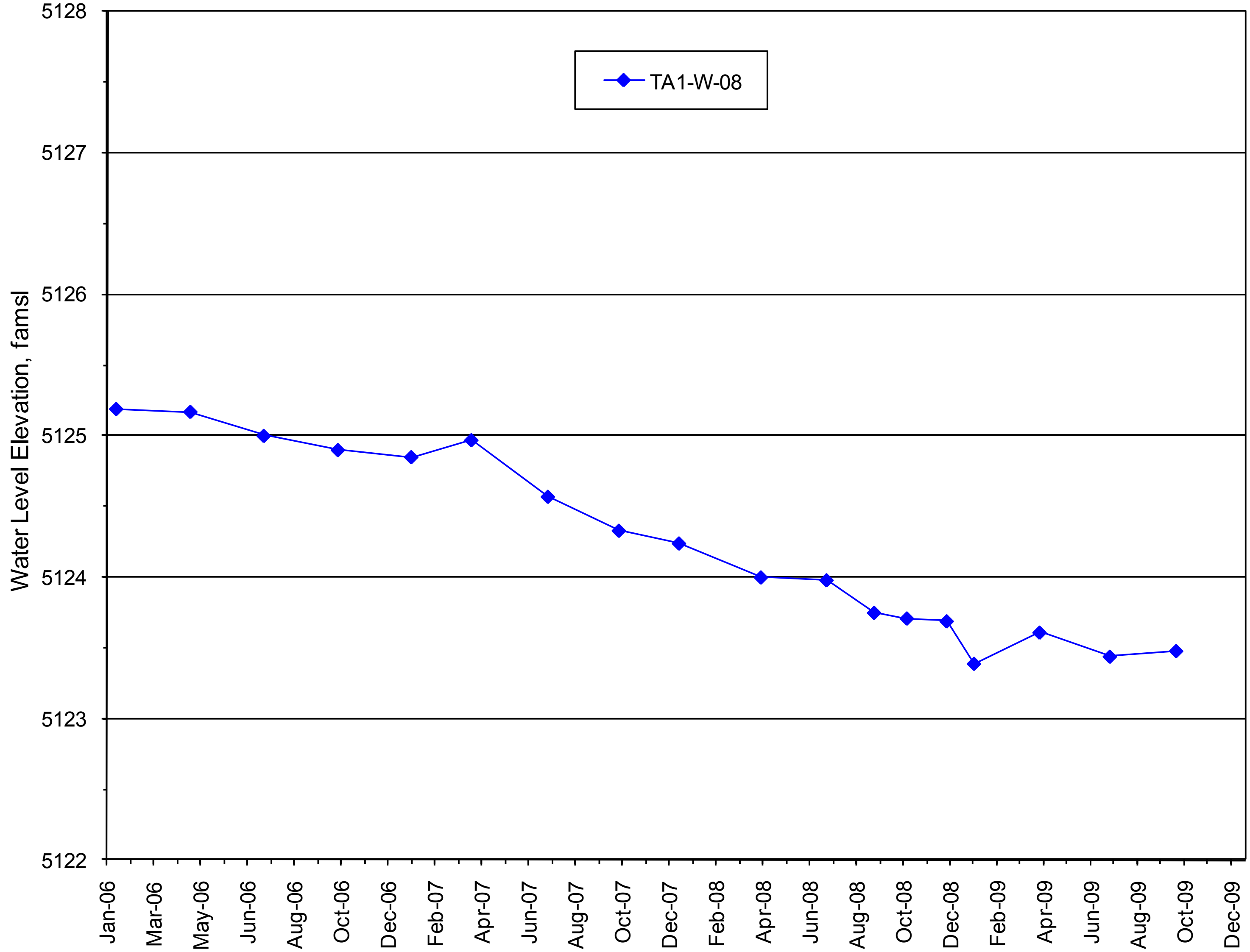

Figure 6C-1. TAG Study Area PGWS Wells (1 of 5)

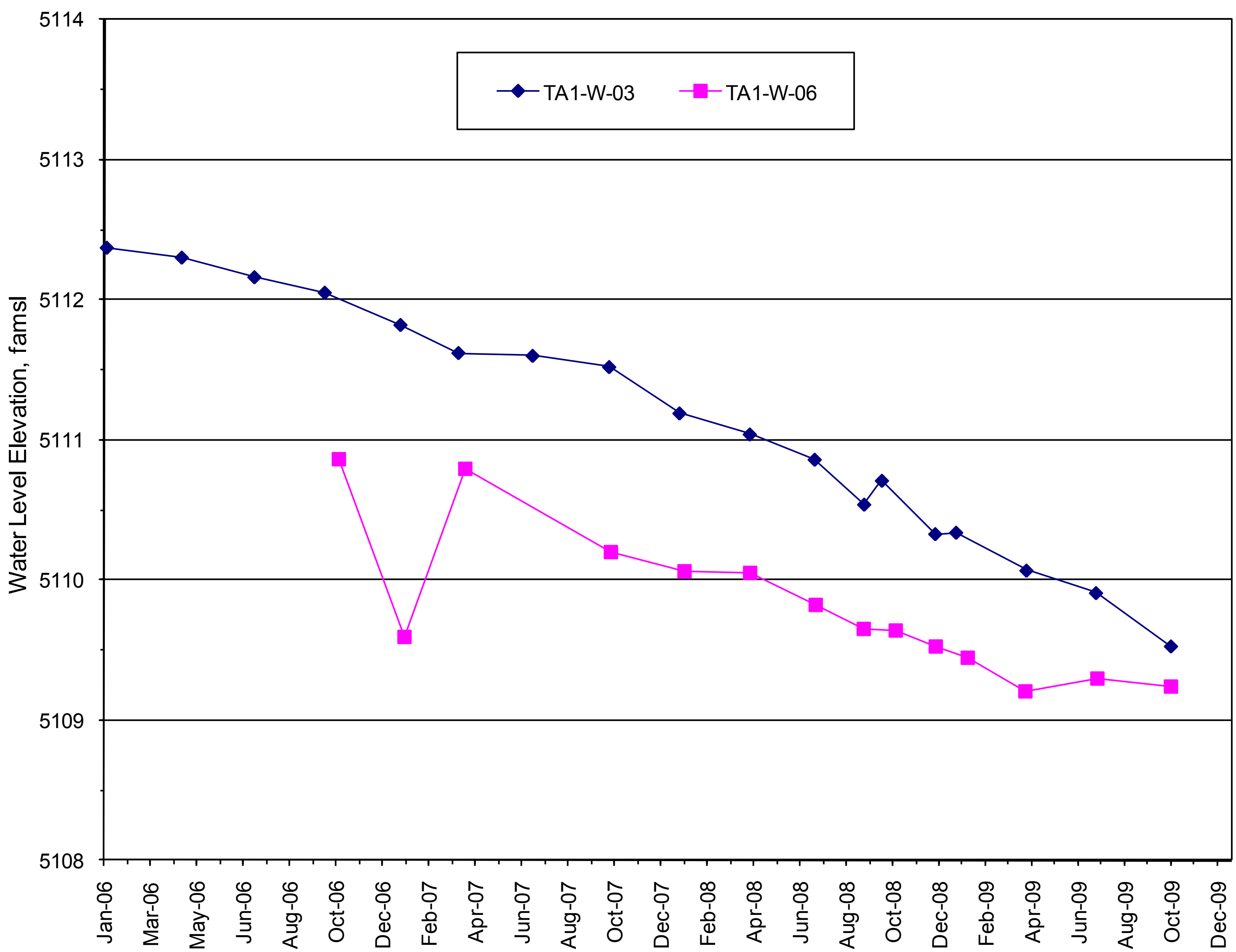

Figure 6C-2. TAG Study Area PGWS Wells (2 of 5)

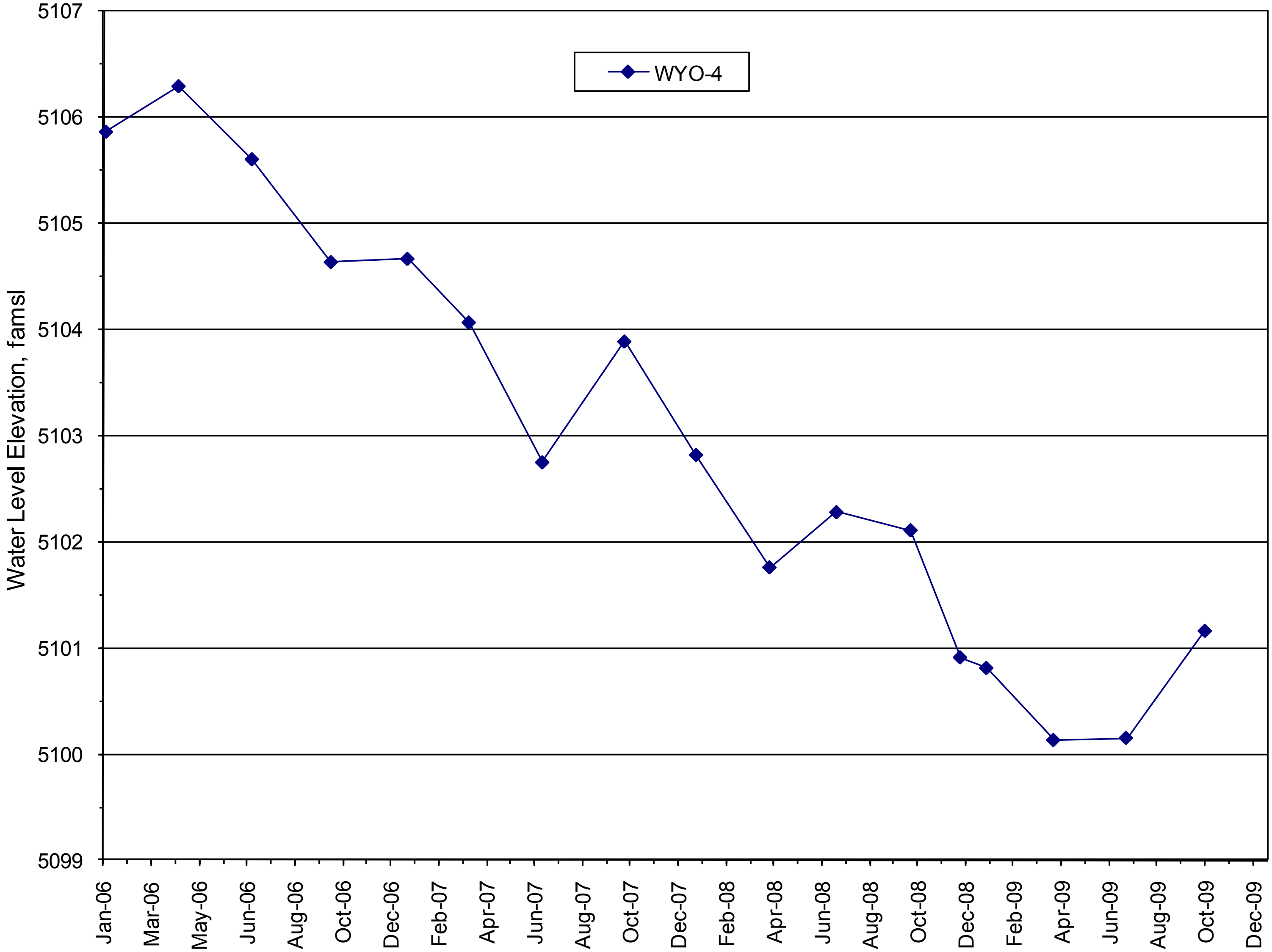

Figure 6C-3. TAG Study Area PGWS Wells (3 of 5)

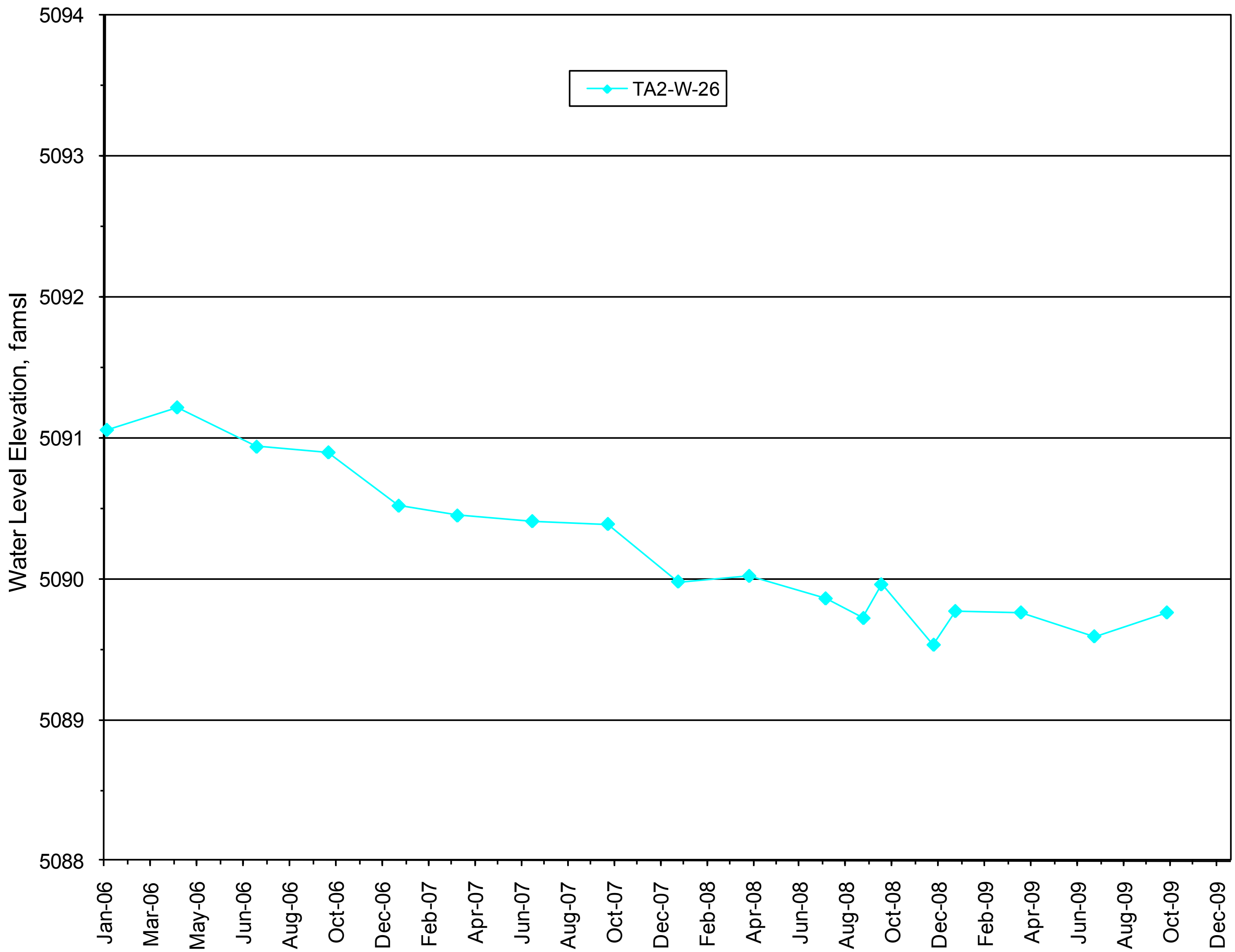

Figure 6C-4. TAG Study Area PGWS Wells (4 of 5)

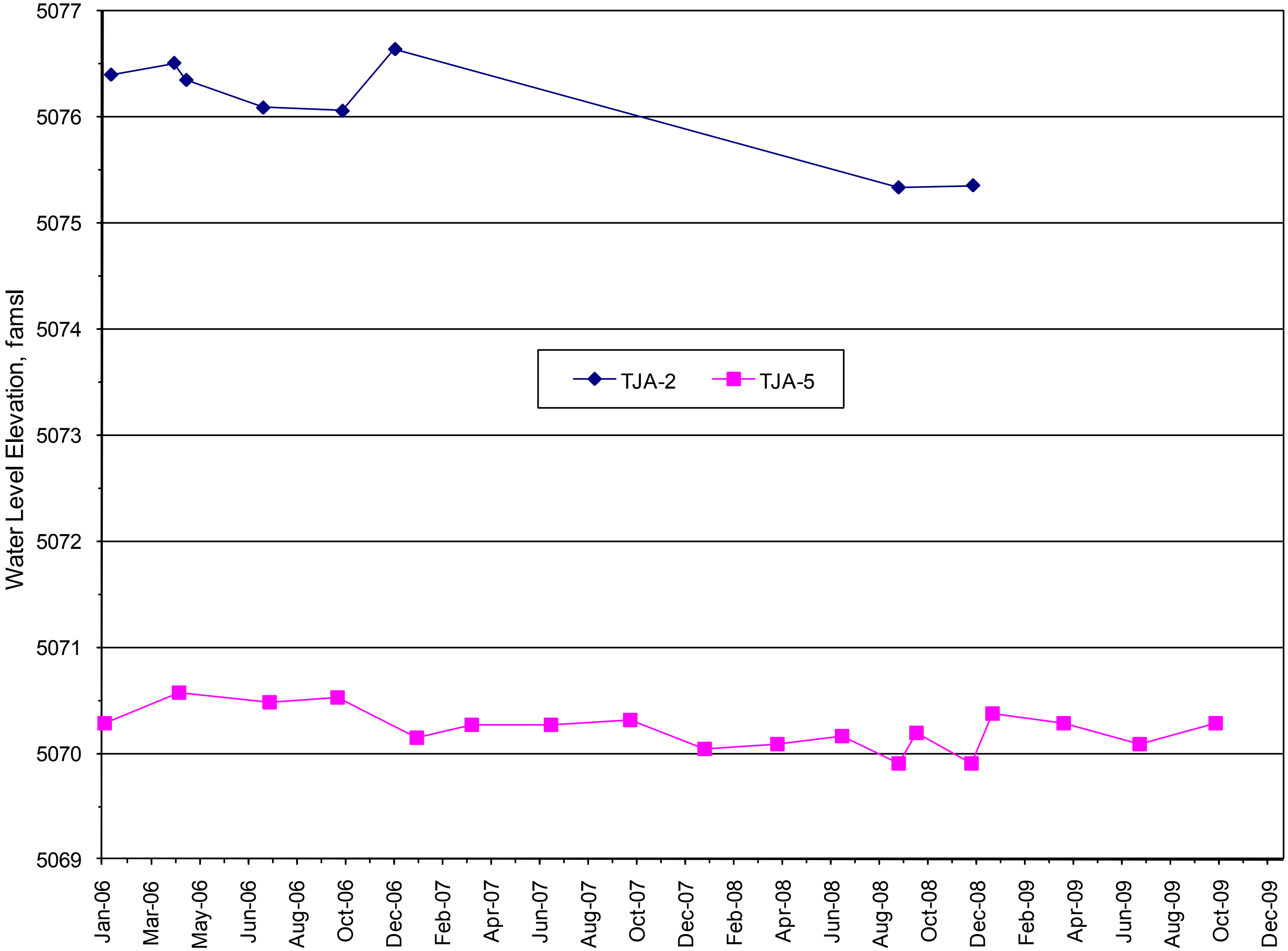

Figure 6C-5. TAG Study Area PGWS Wells (5 of 5)

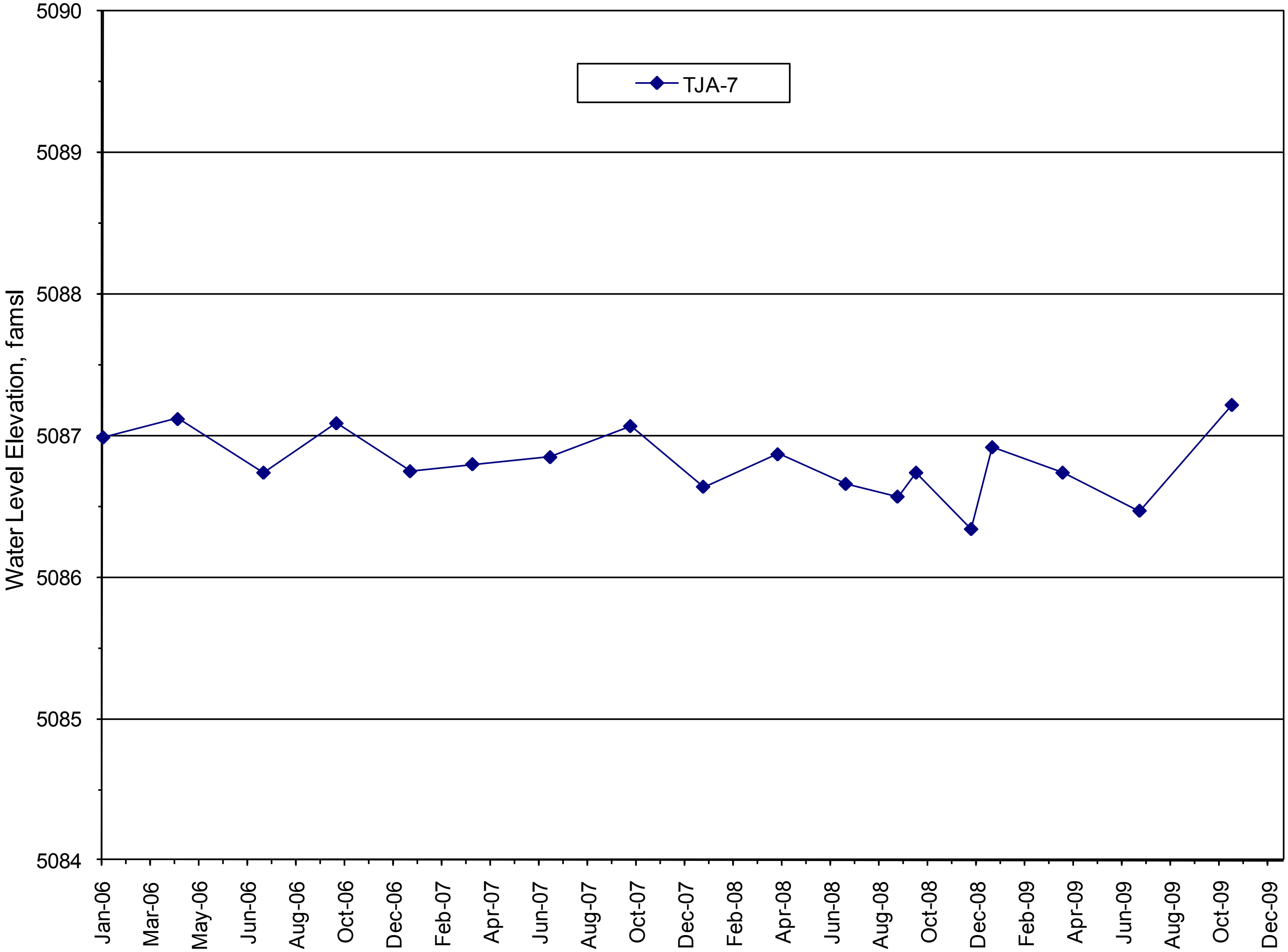

Figure 6C-6. TAG Study Area Regional Aquifer Wells (1 of 6)

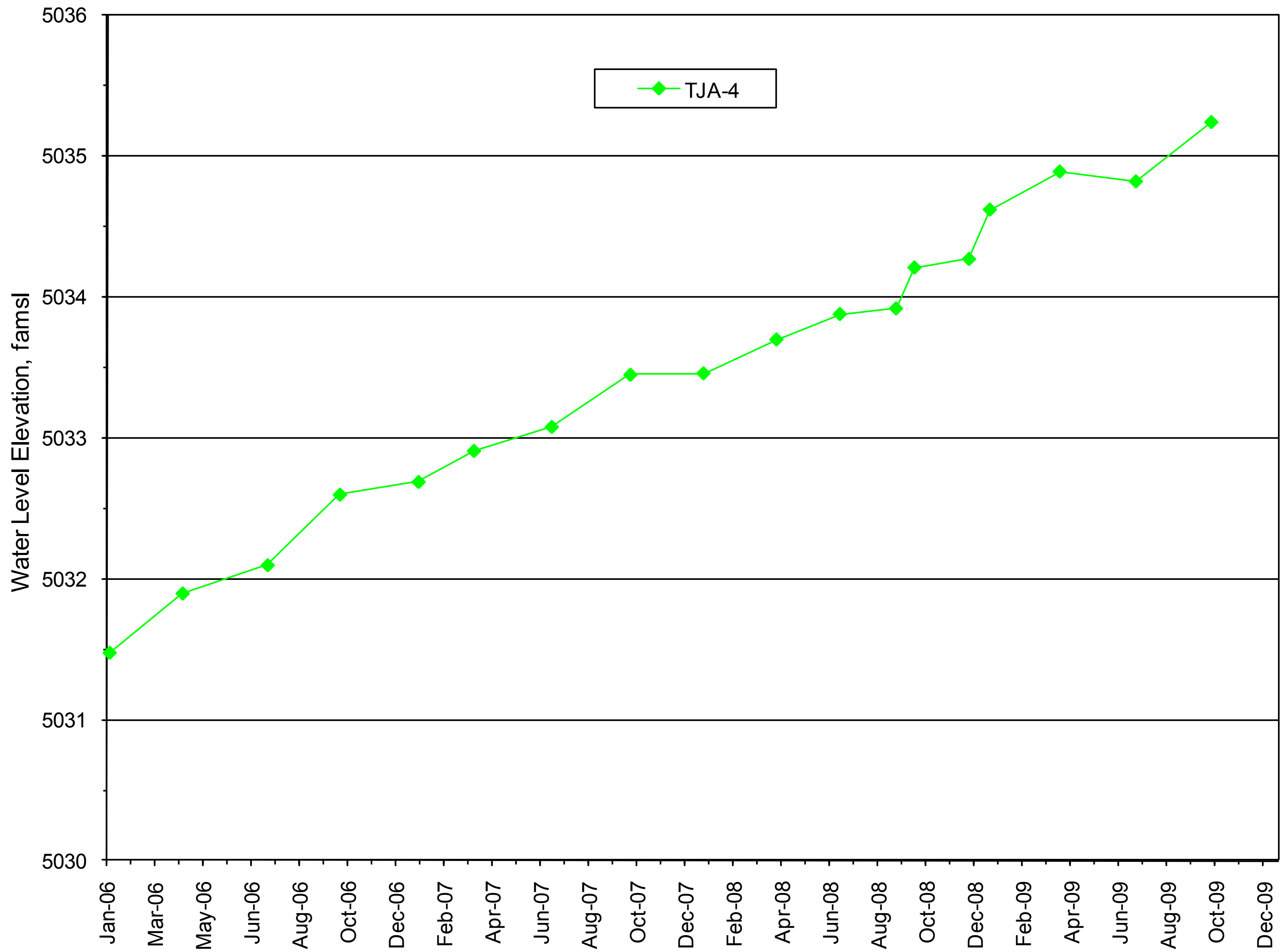

Figure 6C-7. TAG Study Area Regional Aquifer Wells (2 of 6)

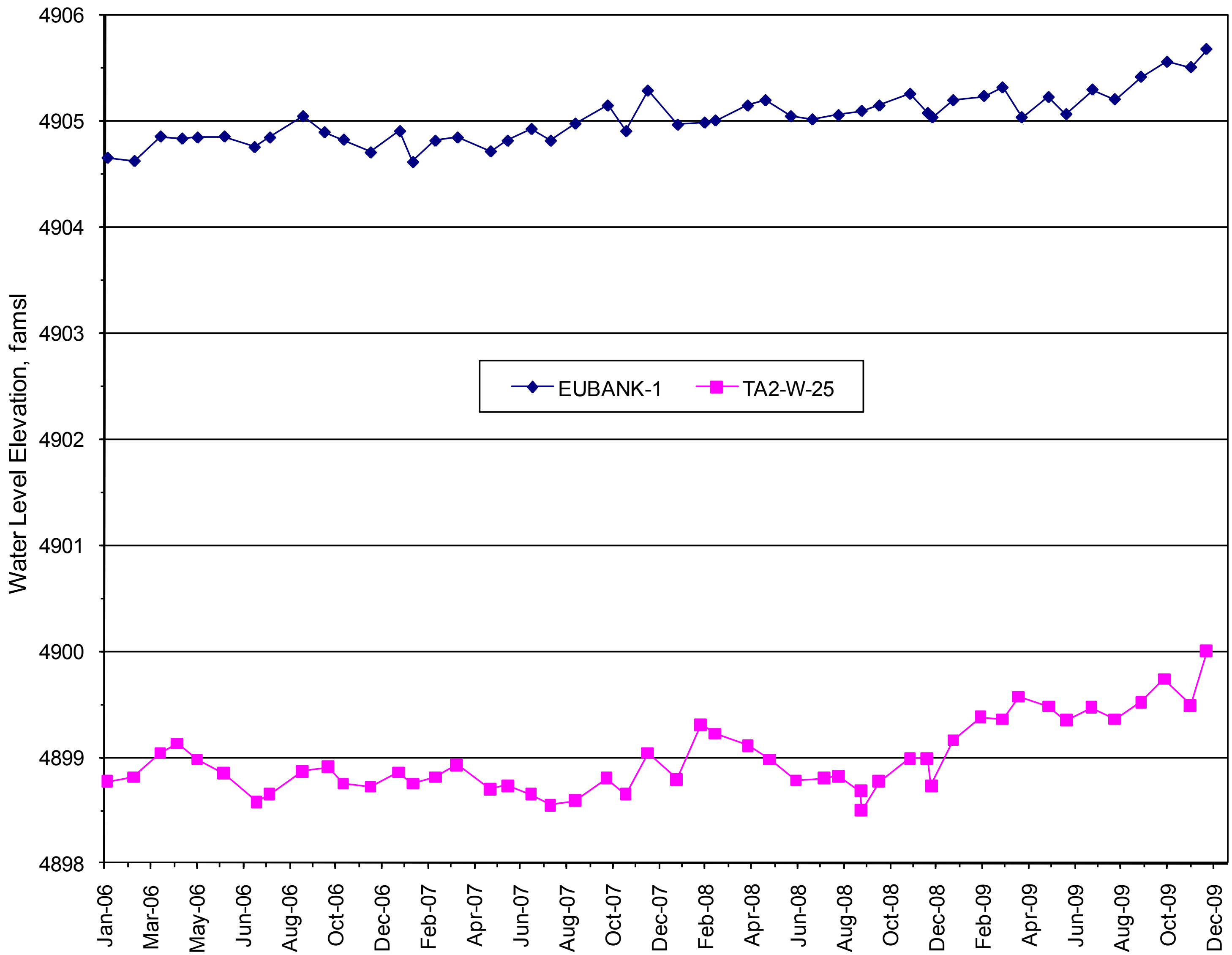

Figure 6C-8. TAG Study Area Regional Aquifer Wells (3 of 6)

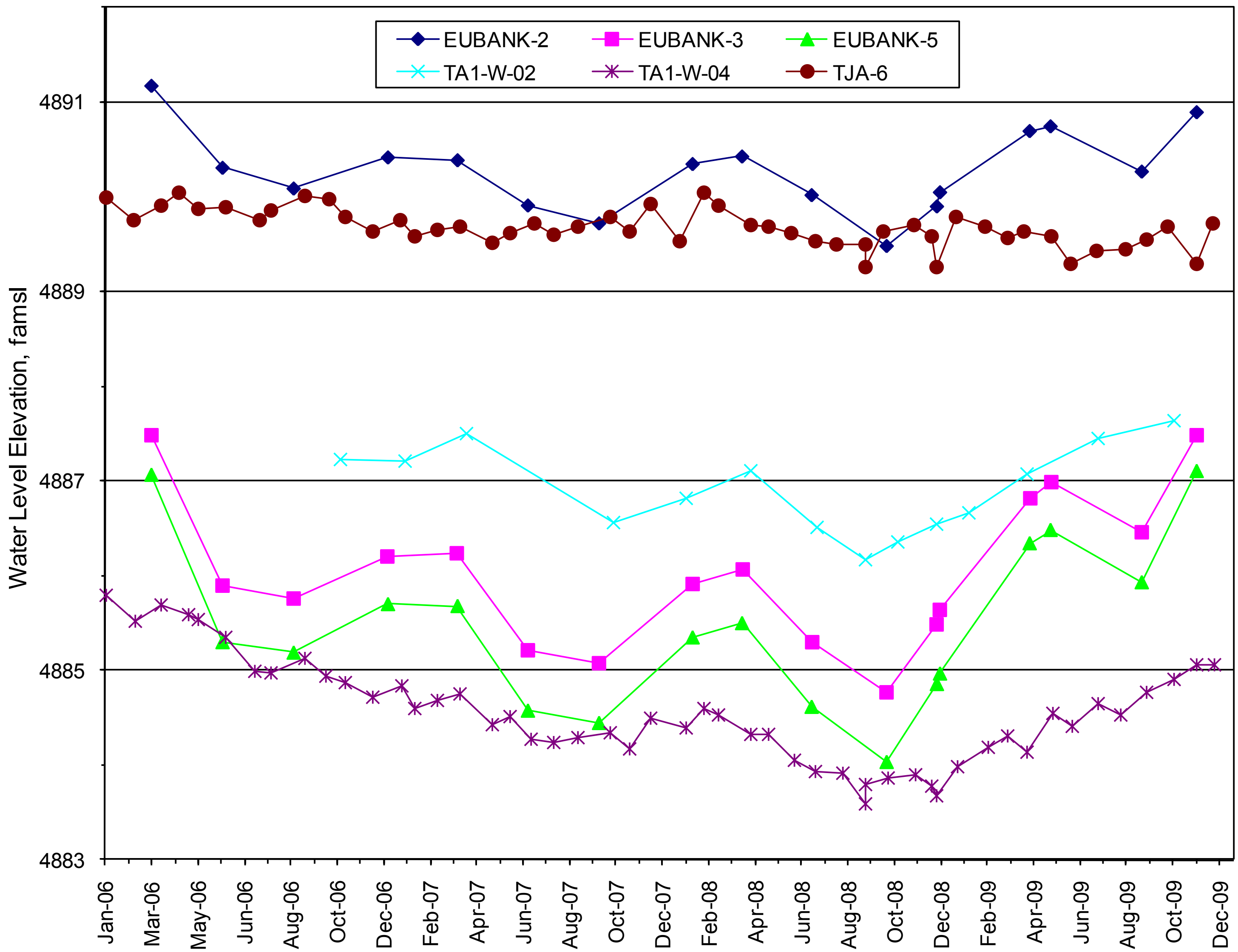

Figure 6C-9. TAG Study Area Regional Aquifer Wells (4 of 6)

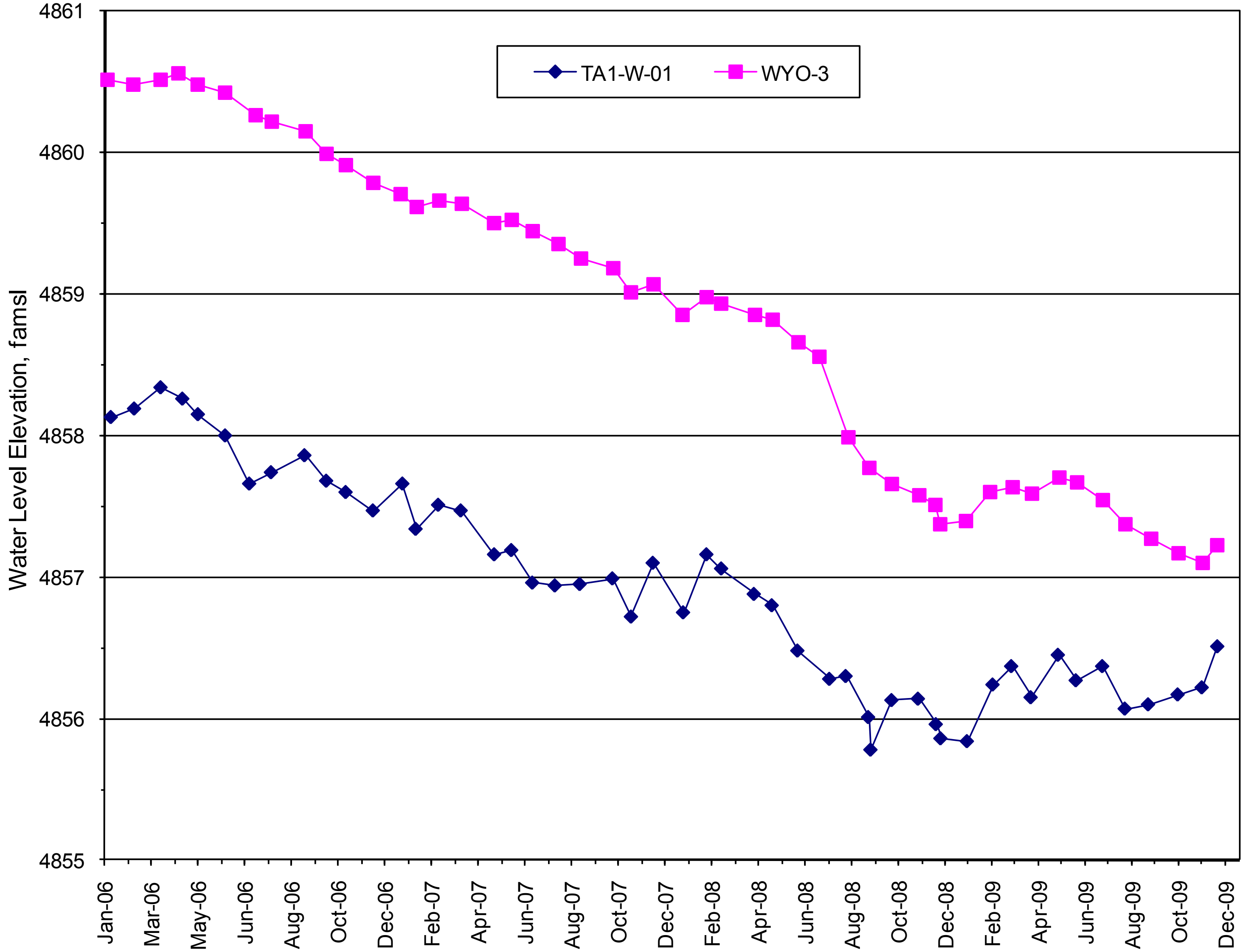

Figure 6C-10. TAG Study Area Regional Aquifer Wells (5 of 6)

Figure 6C-11. TAG Study Area Regional Aquifer Wells (6 of 6)

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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 and perchlorate 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 29.3 milligrams per liter (mg/L). The EPA and State of New Mexico drinking water standard (MCL) for nitrate is 10 mg/L (as nitrogen).

Perchlorate has also been identified as a COC in groundwater at 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 Consent Order), between the New Mexico Environment Department (NMED), the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia) stipulates that a select group of groundwater monitoring wells be sampled for perchlorate using a screening level/method detection limit (MDL) of 4 micrograms per liter (µg/L) (NMED April 2004). Furthermore, the Consent Order requires that for detections equal to or greater than 4 µg/L, the DOE/Sandia will evaluate the nature and extent of perchlorate contamination. Perchlorate has been detected in one well and since March 2006 the maximum concentration of perchlorate in the study area has been 8.93 µg/L.

7.1.1 Location

Sandia National Laboratories, New Mexico (SNL/NM) manages the Coyote Canyon Test Area 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 DOE, National Nuclear Security Administration through the Sandia Site Office in Albuquerque, New Mexico. Sandia, a wholly owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM under Contract DE-AC04-94AL85000.

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 explosives (HE) (Table 7-1) and the open burning of HE materials, liquid propellants, and solid propellants. Most HE testing occurred between 1967 and 1975 and was completely phased out by the 1980s. Burn testing began in the early

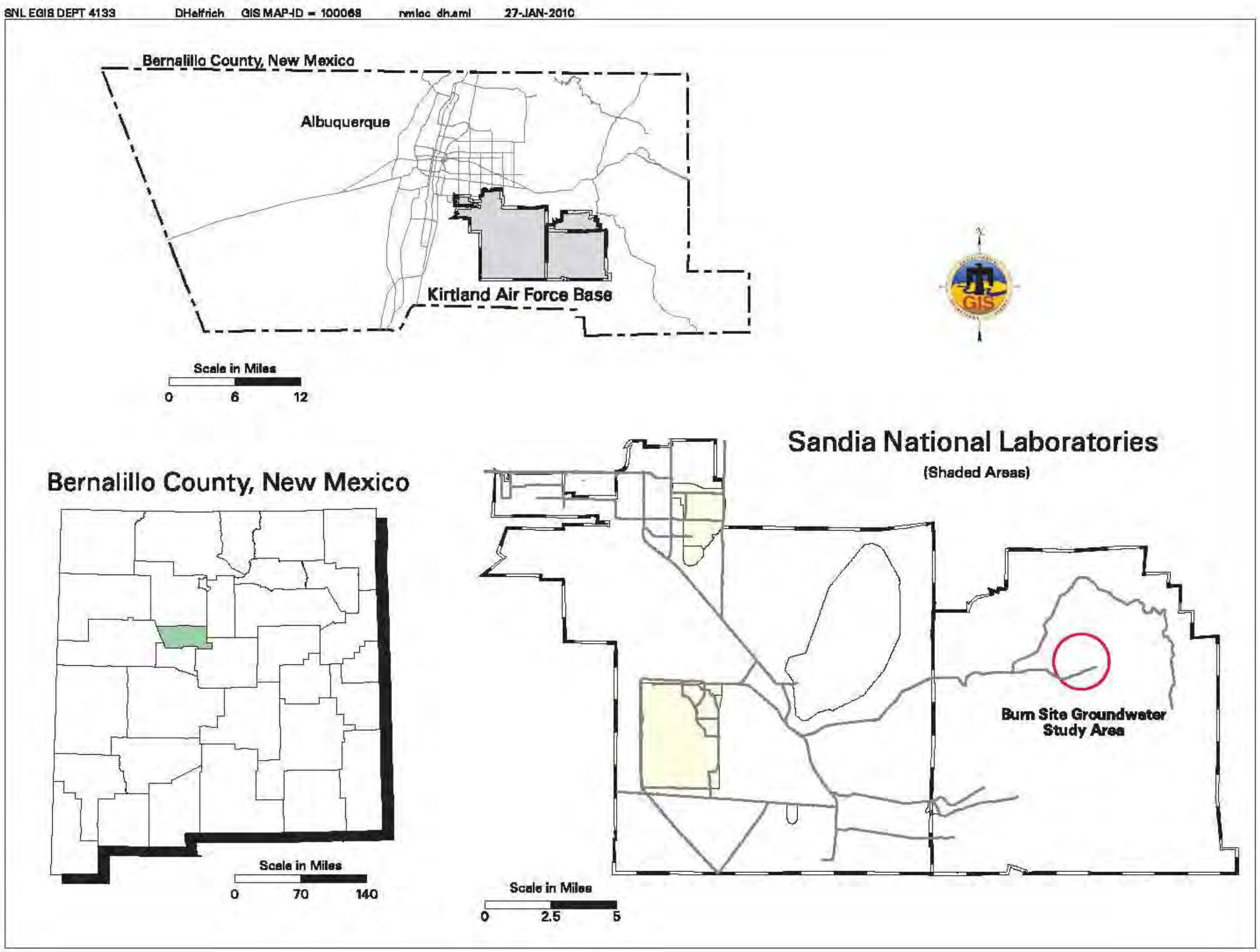

Figure 7-1. Location of the Burn Site Groundwater Study Area

Table 7-1. Historical Timeline of the Burn Site Groundwater Study Area

Month	Year	Event	Reference
	1967-early 1980s	HE testing at 18 SWMUs conducted within the BSG Study Area until early 1980s. Burn testing began in 1970s using excavation pits and portable burn pans with JP-4. Wastewater discharged into unlined pits. Nitrate and diesel range organics identified as potential COCs.	SNL November 2001
September	1999	Site-Wide Hydrogeologic Characterization Project CY95 Annual Report containing description of BSG hydrogeology submitted.	SNL September 1999
	1996	Burn Site Well showed elevated nitrate levels (25 mg/L).	SNL January 2005
July	1997	NMED/OB and SNL/NM agree on installation of deep and shallow monitoring wells and one year of quarterly sampling.	SNL July 1997
November	1997	Monitoring well CYN-MW1D and piezometers CYN-MW2S and 12AUP-01 installed.	SNL June 1998
March	1999	GWPP FY98 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 FY99 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2000
April	2001	GWPP FY00 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL April 2001
November	2001	Comprehensive BSG Investigation Report documenting hydrogeologic characteristics of the study area prepared.	SNL November 2001
March	2002	GWPP FY01 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2002
March	2003	GWPP FY02 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2003a
June	2003	Further refinements of the hydrogeologic setting of the BSG Study Area are presented.	Van Hart June 2003
March	2004	GWPP FY03 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2004
April	2004	Consent Order lists BSG as an Area of Concern that requires a CME.	NMED April 2004
June	2004	A revised conceptual site model 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
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 requires supplemental information for the Interim Measures Work Plan.	NMED July 2005
August	2005	SNL/NM submits response for RSI.	SNL August 2005
October	2005	GWPP FY04 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL October 2005
October	2006	CYN-MW6, CYN-MW7, and CYN-MW8 installed.	SNL October 2006

Table 7-1. Historical Timeline of the Burn Site Groundwater Study Area *(Concluded)*

Month	Year	Event	Reference
March	2007	GWPP FY06 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL March 2007
April	2008	BSG Current Conceptual Site Model resubmitted.	SNL April 2008a
April	2008	BSG CME Work Plan resubmitted.	SNL April 2008b
March	2008	GWPP FY07 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 CY08 Annual Groundwater Monitoring Report provided BSG analytical data.	SNL June 2009a

Notes:
BSG = Burn Site Groundwater.
CME = Corrective Measures Evaluation.
COC = Constituent of concern.
CY = Calendar Year.
FY = Fiscal Year.
GWPP = Groundwater Protection Program.
HE = High explosive(s).
JP-4 = Jet propellant fuel composition 4
mg/L = Milligram(s) per liter.
NFA/CAC = No Further Action/Corrective Action Complete.
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.

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 well CYN-MW1D and piezometer CYN-MW2S were installed downgradient of the Burn Site Well (Table 7-2). Samples from well CYN-MW1D contained nitrate concentrations above the MCL. Two more 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.

Previous monitoring reports include analytical results for CYN-MW5. Groundwater monitoring well CYN-MW5 was installed in 2001 as part of the investigation of Drain and Septic System (DSS) sites. This well was sampled for eight quarters as part of the DSS investigation and was then incorporated into

Table 7-2. Groundwater Monitoring Wells and Piezometers at the Burn Site Groundwater Study Area

Well	Installation Year	WQ	WL	Comments
2AUP-01	1996		√	Underflow piezometer (typically dry)
Burn Site Well	1986			Nonpotable production well
CYN-MW1D	1997	√	√	Bedrock groundwater well
CYN-MW2S	1997		√	Underflow piezometer (typically dry)
CYN-MW3	1999	√	√	Bedrock groundwater well
CYN-MW4	1999	√	√	Bedrock groundwater well
CYN-MW6	2006	√	√	Bedrock groundwater well
CYN-MW7	2006	√	√	Bedrock groundwater well
CYN-MW8	2006	√	√	Bedrock groundwater well

Note: 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

the BSG Study Area investigation as a downgradient well. However, in its February 2005 letter, the NMED stated that it ―wilhot 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, CYN-MW5 has not been sampled since the third quarter of Fiscal Year (FY) 2005.

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.

The Consent Order, issued by the NMED, specified the Burn Site as an area of groundwater contamination (NMED April 2004). In response to the Consent Order, DOE/Sandia submitted the Corrective Measures Evaluation (CME) Work Plan for the Burn Site to the NMED in June 2004 (SNL June 2004b). Based on requirements stipulated by the NMED (discussed in Section 7.2), DOE/Sandia submitted the BSG Interim Measures Work Plan (IMWP) (SNL May 2005) on May 30, 2005. As detailed in the IMWP, three new monitoring wells (CYN-MW6, CYN-MW7, and CYN-MW8) were installed near the Burn Site during December 2005 to January 2006 at locations shown in Figure 7-2. Quarterly sampling for eight quarters began for the three new monitoring wells in March 2006 and was completed in December 2007. Samples from the newly installed wells downgradient of CYN-MW1D (CYN-MW7 and CYN-MW8) were sampled and analyzed for nitrate. Samples from the newly installed well adjacent to SWMU 94F (CYN-MW6) were analyzed for gasoline and diesel range organics, nitrate, and other parameters. Groundwater monitoring programs continued as outlined in the IMWP (SNL May 2005).

7.1.4 Current Monitoring Network

Currently six wells in the BSG Study Area are monitored for water quality including CYN-MW1D, CYN-MW3, CYN-MW4, CYN-MW6, CYN-MW7, and CYN-MW8 (Figure 7-2). Two shallow piezometers (12AUP-01 and CYN-MW2S) were installed in 1997 to determine whether any ephemeral flow was occurring at the alluvium-bedrock interface. Both piezometers have been predominately dry since installation.

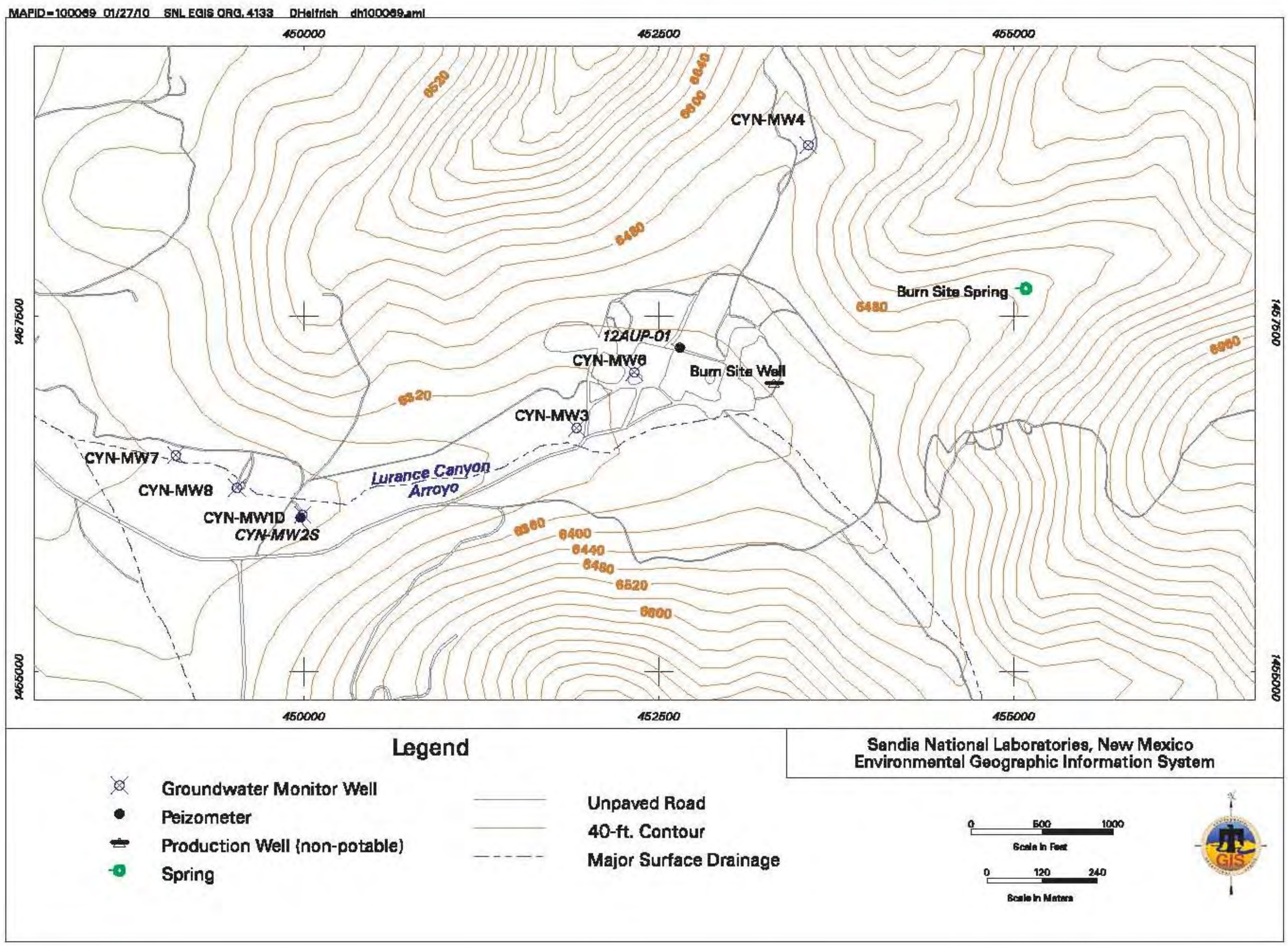

Figure 7-2. Wells and Piezometers in the Burn Site Groundwater Study Area (6 Active Wells)

7.1.5 Summary of Calendar Year Activities

The following activities took place for the BSG Study Area investigation during Calendar Year (CY) 2009 (January through December 2009):

- Semiannual groundwater sampling was conducted at six wells (CYN-MW1D, CYN-MW3, CYN-MW4, CYN-MW6, CYN-MW7, and CYN-MW8) in February and March 2009 and September 2009.
- Letter from the NMED, *RE: Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID#NM5890110518,* was received in April 2009 (NMED April 2009).
- Two meetings with the NMED were held to resolve perchlorate characterization requirements at CYN-MW6.
- The *Burn Site Groundwater Characterization Work Plan, Installation of Groundwater Monitoring Wells CYN-MW9, CYN-MW10, and CYN-MW11, Collection of Subsurface Soil Samples* (SNL November 2009) was prepared and submitted to the NMED.
- Semiannual reporting of perchlorate analyses for CYN-MW6 was conducted.
- 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 2010:

- Semiannual groundwater sampling will be conducted at six wells (CYN-MW1D, CYN-MW3, CYN-MW4, CYN-MW6, CYN-MW7, and CYN-MW8) during the second and fourth quarters of FY 2010.
- Upon NMED approval of the *Burn Site Groundwater Characterization Work Plan, Installation of Groundwater Monitoring Wells CYN-MW9, CYN-MW10, and CYN-MW11, Collection of Subsurface Soil Samples* (SNL November 2009), field studies will be initiated.
- After completion of the well installation field activities, a report will be submitted to the NMED describing the field activities.
- The newly installed groundwater monitoring wells will be sampled.
- Semiannual reporting of perchlorate analyses for 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 of the testing facilities at a limestone outcrop. The permeability of the fractured bedrock units is low and well yields are small. 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 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 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 well CYN-MW4. Nearby outcrops indicate that the fault displacement is approximately 160 ft.

The canyon floor at the Burn Site 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 borings drilled at the Burn Site.

7.1.7.2 Hydrogeologic Conditions at the Burn Site

When the Burn Site Well was drilled in 1986, the depth to groundwater-bearing strata was approximately 222 ft. 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 towards the west from a groundwater flow divide located east of the Burn Site (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 (in.) (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 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. Two piezometers (Figure 7-2) were constructed in Lurance Canyon to monitor moisture within the channel deposits at the contact with underlying Precambrian bedrock. No water was detected in either piezometer until September 2, 2004. After a series of rain events, between 1 and 2 in. of water was measured in 12AUP-01. The water level remained fairly constant through September 2004. However, more recent water level measurements show no measurable water in 12AUP-01. It is likely that significant saturation in the vadose zone occurs only after a series of significant rain events. Episodic accumulation of precipitation, as evidenced by the occurrence of water in the piezometer, 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 7-3 presents the current potentiometric surface for the Burn Site monitoring well network (October 2009). The general direction of groundwater flow beneath the Burn Site is to the west as indicated by the potentiometric surface. No water supply wells are located near the Burn Site, except for the Burn Site Well that is used only occasionally for nonpotable applications such as fire suppression. Groundwater levels in the Paleozoic rocks near the Burn Site 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 Burn Site wells, piezometers, and springs varies from approximately 0.004 to 0.14 (SNL April 2008a). The hydraulic gradient west of the Burn Site flattens substantially. 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 Burn Site 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 well CYN-MW1D, the minimum apparent velocity of the COCs is estimated to be approximately 160 ft/year (ft/yr) (SNL April 2008a). No information is available about vertical flow velocity within the fractured rocks at the Burn Site. However, vertical movement of water to the water table 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 Burn Site wells since 1999. Figures 7C-1 through 7C-4 (Attachment 7C) show groundwater levels in Burn Site 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 Burn Site is poorly connected. Water level fluctuations may be a result of local heterogeneities in hydraulic properties related to the fractured system. The six groundwater monitoring wells at the Burn Site have shown significant groundwater declines over the past two to three years, with decreases in water levels ranging from 0.7 to 4.5 ft/yr. Declining water levels may be due to reduced amounts of precipitation.

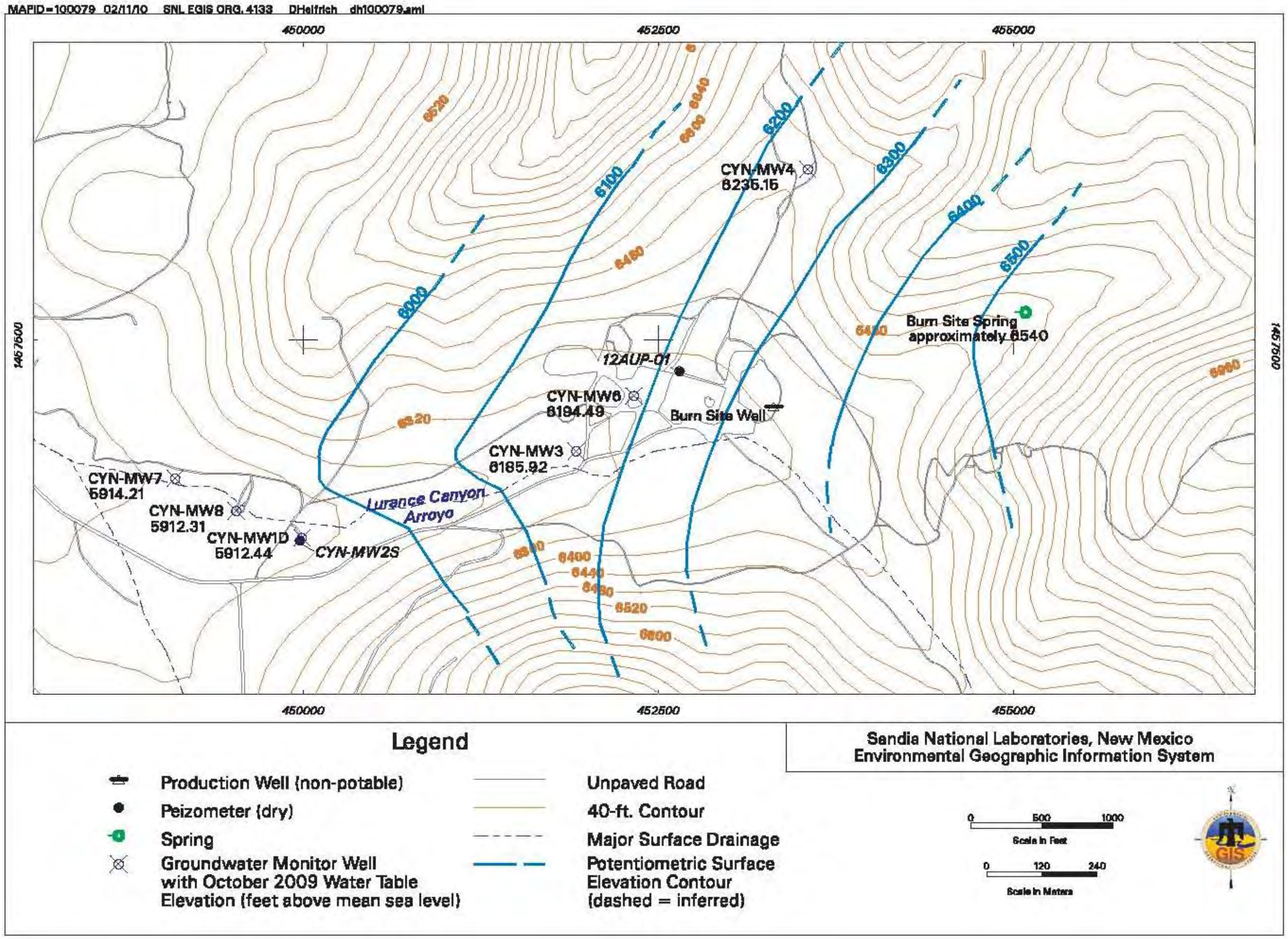

Figure 7-3. Burn Site Groundwater Potentiometric Surface Map (October 2009)

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. 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 the degradation of HE materials and septic systems.

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.

SWMU 65 is located in the center of the Burn Site area and contains open-air detonation areas where nitrate-based explosives were used. The detonations may have dispersed HE materials across the ground surface, and subsequent degradation (weathering) of these HE materials mostly likely released nitrate. SWMU 94 testing also involved the burning of HE material 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 required further evaluation.

7.1.7.5 Contaminant Distribution and Transport in Groundwater

Nitrate was first detected above the MCL of 10 mg/L in groundwater from the Burn Site Well. Since the completion of wells CYN-MW1D (December 1997), CYN-MW3 (June 1999) and CYN-MW6 (February 2006), nitrate concentrations above the MCL have been consistently detected in samples from these three wells. Nitrate concentrations in groundwater samples from wells CYN-MW4, CYN-MW7, and CYN-MW8 have not exceeded the MCL.

Nitrate concentrations in groundwater from the Burn Site Well decreased from 24.3 mg/L in 1996 to 5.5 mg/L in 2001. Concentrations in groundwater samples from well CYN-MW6, approximately 1,000 ft downgradient of the Burn Site Well, have ranged from 22.9 to 39.9 mg/L since 2006. Concentrations in groundwater samples from well CYN-MW3, located approximately 1,400 ft downgradient of the Burn Site Well, have ranged from less than 5 to 15 mg/L since 1999. Nitrate concentrations have increased from approximately 10 to more than 25 mg/L from 1998 to 2008 in groundwater samples from well CYN-MW1D, located approximately 3,400 ft downgradient of the Burn Site Well. The September 2009 nitrate concentration for CYN-MW1D was 8.44 mg/L.

The greatest nitrate concentrations for CY2009 were 11.0 and 39.9 mg/L for wells CYN-MW3 and CYN-MW6, respectively. These two wells are located in the center of the Burn Site. Downgradient wells CYN-MW7 and CYN-MW8 had nitrate concentrations of 1.92 and 4.98 mg/L, respectively.

Potential downgradient receptors for the nitrate plume are Coyote Springs, approximately 3 miles west of the study area, and the City of Albuquerque (COA) and KAFB well fields, approximately 12 miles to the west-northwest of the study area. Numerical simulations suggest nitrate concentrations will be decreasing in groundwater to below the MCL at Coyote Springs and to below MDLs through dispersion and dilution as the plume moves into the more hydraulically conductive Ancestral Rio Grande deposits west of Coyote Springs. Numerical simulations also show that contaminant travel times exceed 600 years from the study area to the COA and KAFB well fields (SNL May 2005).

7.2 Regulatory Criteria

The NMED Hazardous Waste Bureau provides regulatory oversight of the Environmental Restoration (ER) Project as well as implements and enforces federal regulations mandated by the Resource Conservation and Recovery Act (RCRA). All ER Project SWMUs and Areas of Concern (AOCs) are listed in Module IV of the SNL/NM RCRA Part B Operating Permit, *Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA for Sandia National Laboratories* (NMED 1993).

All investigations and corrective action requirements pertaining to SWMUs and AOCs are contained in the Consent Order (NMED April 2004). The groundwater monitoring activities for BSG are not associated with a single SWMU but are more regional in nature. Before the finalization of the Consent Order in April 2004, groundwater investigations at the Burn Site had been conducted voluntarily by the ER Project.

Initially, groundwater monitoring for the BSG was initiated to satisfy the requirements of the SNL/NM HSWA permit for characterization of SWMUs. The Consent Order transferred regulatory authority for corrective action requirements from the HSWA module to the Consent Order. The BSG investigation must comply with requirements set forth in the Consent Order for site characterization and the development of a CME.

In response to the Consent Order, DOE/Sandia submitted the following two documents to the NMED: (1) *Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site* (SNL June 2004a), and (2) *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 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 Consent Order and with the guidance of the RCRA Corrective Action Plan (EPA 1994).

On March 1, 2005, the DOE and Sandia received a letter from the NMED (February 2005) that rejected the CME Work Plan and stipulated the following requirements:

- 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 Burn Site. 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 Burn Site.
- 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.”

The DOE and Sandia submitted an IMWP to the NMED in May 2005 that proposed the installation of additional groundwater monitoring wells to characterize the extent of nitrate contamination in the bedrock aquifer downgradient of CYN-MW1D and fuel-related compounds downgradient of SWMU 94F (SNL May 2005). The selected interim measures described in the IMWP included additional well installation, groundwater monitoring, and institutional controls. These interim measures were proposed to serve three purposes: (1) provide data to support the CME; (2) monitor the migration of the nitrate plume in order to provide an early warning system to trigger an action if a danger to downgradient ecological receptors (Coyote Springs) becomes apparent; and (3) protect human health and the environment by limiting exposure to contaminated groundwater by restricting access to the monitoring wells.

In support of the selected interim measures, the IMWP included the following reports as attachments: (1) Remedial Alternatives Data Gaps Review, (2) Nitrate Source Evaluation, and (3) Evaluation of Contaminant Transport. The Data Gaps Review document included detailed definitions of remedial alternatives and a preliminary evaluation of remedial alternatives with the purpose of identifying data gaps. 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 (SNL May 2005).

Data collected as part of additional characterization required by the IMWP 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 was developed to address the concerns outlined in the letter from the NMED (February 2005) and to comply with requirements of the Consent Order. The work plan provides information and data gathered during interim measures and performance and compliance goals and objectives for the remediation of the BSG.

A letter was received from the NMED by DOE/Sandia on April 30th, 2009, entitled: ―Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID# NM5890110518" (NMED April 2009). The NMED's 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 states that DOE/Sandia must characterize the nature and extent of the perchlorate contamination at the Burn Site and submit to the NMED a plan for such characterization. DOE/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 2009a and July 2009) have been incorporated into the BSG Characterization Work Plan (SNL/NM November 2009).

In this report, BSG monitoring data are being presented for both hazardous and radioactive constituents; however, the monitoring data for radionuclides (gamma spectroscopy, gross/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 Consent Order. Additional information on radionuclides and the scope of the Consent Order is available in Section III.A of the Consent Order (NMED April 2004).

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. However, the only field activity completed in the study area during this reporting period was groundwater monitoring sampling and analysis. The February through September 2009 sampling events are summarized in Table 7-3.

Table 7-3. Groundwater Monitoring Well Network and Sampling Dates for the Burn Site Groundwater Study Area, February 2009 through September 2009

Date of Sampling Event	Wells Sampled[1]	SAP
February and March 2009	CYN-MW1D CYN-MW3 CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW8	*Burn Site Groundwater Monitoring, Mini-SAP for Second Quarter Fiscal Year 2009* (SNL February 2009)
September 2009	CYN-MW1D CYN-MW3 CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW8	*Burn Site Groundwater Monitoring, Mini-SAP for Fourth Quarter Fiscal Year 2009* (SNL August 2009)

Note: [1] Refer to page xvii of this report for well descriptions.
SAP = Sampling and analysis Plan.
SNL = Sandia National Laboratories.

The analytical parameters for each well and each sampling event are listed in Table 7-4. Quality control (QC) samples are collected in the field at the time of environmental sample collection. Field QC samples include equipment blank (EB) samples, duplicate samples, split samples, and trip blank (TB) samples. Field QC samples are used to monitor the sampling process. EB samples are used to verify the effectiveness of sampling equipment decontamination procedures. Duplicate samples are used to measure the precision of the sampling process. Split samples are used to verify the performance of the analytical laboratory. 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, as conducted by the ER Project, are consistent with procedures identified in the EPA technical enforcement guidance document (EPA 1986). The following sections provide an overview of the sampling and data collection procedures.

7.4.1 Groundwater Elevation

Throughout CY 2009, water level measurements were obtained to determine groundwater flow directions, hydraulic gradients, and changes in water table elevations. Water levels are periodically measured in BSG monitoring wells according to the instructions and requirements specified in SNL/NM Field Operating Procedure (FOP) 03-02, Groundwater Level Data Acquisition and Management, Rev. 02 (SNL November 2007). The water level information was used to create the potentiometric surface map presented in Figure 7-3 and the hydrographs presented in Figures 7C-1 through 7C-4 (Attachment 7C).

Table 7-4. Parameters Sampled at Burn Site Groundwater Study Area Wells[1] for Each Sampling Event

Parameter	February/March 2009
NPN TPH-DRO TPH-GRO	CYN-MW1D CYN-MW1D (dup) CYN-MW3 CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW8
Perchlorate	CYN-MW6
Parameter	**September 2009**
NPN TPH-DRO TPH-GRO	CYN-MW1D CYN-MW3 CYN-MW3 (dup) CYN-MW4 CYN-MW6 CYN-MW6 (dup) CYN-MW7 CYN-MW8
Anions Gamma Spec* Gross Alpha Gross Beta TAL Metals, plus Total Uranium Tritium VOCs	CYN-MW1D CYN-MW3 CYN-MW4 CYN-MW6 CYN-MW7 CYN-MW8
Perchlorate	CYN-MW6 CYN-MW6 (dup)

NOTE: [1] Refer to page xvii of this report for well descriptions.

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.
NPN	= Nitrate plus nitrate (reported as nitrogen).
TAL	= Target analyte list.
TPH	= Total petroleum hydrocarbons.
VOC	= Volatile organic compound.

7.4.2 Well Purging and Water Quality Measurements

A portable Bennett™ groundwater sampling system was used to collect the groundwater samples from Burn Site wells. The wells are purged a minimum of one saturated screen volume. Field water quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were recorded from the well, prior to the collection of groundwater samples according to SNL/NM FOP 05-01 (SNL August 2007a). Groundwater temperature, SC, ORP, DO, and pH were measured using a YSI™ Model 620 Water Quality Meter. Turbidity was measured with a HACH™ Model 2100P portable turbidity meter.

The amount of water required to achieve stability of field parameters is fairly consistent. However, the ability of the bedrock units to produce water varies greatly from well to well. In accordance with the mini-sampling and analysis plans (SAPs), purging continued until four stable measurements for temperature, SC, pH, and turbidity were obtained.

Groundwater stability is considered acceptable when turbidity measurements are within 10 percent of 5 nephelometric turbidity units, pH is within 0.1 units, temperature is within 1.0 degrees Celsius, and SC is within 5 percent. Associated Field Measurement Logs documenting details of well purging and water quality measurements for each sampling event have been submitted to the SNL/NM Customer Funded Records Center.

7.4.3 Pump Decontamination

A portable Bennett™ sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in *Long-Term Environmental Stewardship Groundwater Sampling Equipment Decontamination,* SNL/NM FOP 05-03 (SNL August 2007b). An EB or rinsate sample was collected to verify the effectiveness of the equipment decontamination process.

7.4.4 Sample Collection Sampling Procedures

Groundwater samples are collected using the Bennett™ nitrogen gas-powered portable piston pump or a MicroPurge®, low-flow (QED™), nitrogen gas-powered bladder pump. Sample bottles are filled directly from the pump discharge line, with the VOC samples collected at the lowest achievable discharge rate. The alluvial piezometers have continued to be dry, and no groundwater samples have ever been collected from these piezometers.

7.4.5 Sample Handling and Shipment

The SNL/NM Sample Management Office (SMO) processes environmental samples collected by the ER Project. The SMO reviews the mini-SAPs (Table 7-3), orders sample containers, issues sample control and tracking numbers, tracks the chain-of-custody, and reviews analytical results returned from the laboratories for laboratory contract compliance (SNL March 2003b and April 2007). All groundwater samples are analyzed by off-site laboratories using EPA-specified protocols.

QC samples are also prepared at the laboratory to determine whether contaminant chemicals are introduced in laboratory processes and procedures. These include method blanks, laboratory control samples, matrix spike, matrix spike duplicate, and surrogate spike samples. Reported laboratory analytical and QC data are reviewed against quality assurance (QA) requirements specified in the *Procedure for Completing the Contract Verification Review,* SMO-05-03, Issue 03 (SNL April 2007) and Administrative Operating Procedure (AOP) 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007).

7.4.6 Waste Management

Purge and decontamination water generated from sampling activities were placed into 55-gallon containers and stored at the ER Project Field Office waste accumulation area. All waste was managed in accordance with FOP 05-04 (SNL August 2007c) 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 COA discharge limits.

7.5 Analytical Methods

Groundwater samples were submitted to General Engineering Laboratories, Inc. for analysis. Samples were analyzed in accordance with applicable EPA analytical methods (Tables 7-5 and 7-6), including the following:

- *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0* (EPA 1983).
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA 1990).
- *Perchlorate in Drinking Water Using Ion Chromatography* (EPA 1999).
- *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032 (EPA 1980).

7.6 Summary of Analytical Results

The following section discusses analytical results, exceedances of regulatory standards, and pertinent trends in COC concentrations. The analytical results and field measurements for the CY 2009 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.

A summary of detected VOC results is presented in Table 7A-1. The MDLs for all analyzed VOCs are listed in Table 7A-2. The only VOC detected was chloromethane (Table 7A-1). Chloromethane was reported at concentrations of 0.355 J and 0.466 J (where ―J" is an estimated value below the laboratory practical quantitation limit) for samples from monitoring wells CYN-MW3 and CYN-MW6, respectively.

The analytical results for nitrate plus nitrite (NPN) (reported as nitrogen) are presented in Table 7A-3. NPN results exceed the MCL of 10 mg/L in samples from CYN-MW3 and CYN-MW6. For CY2009, the maximum NPN concentrations for wells CYN-MW3 and CYN-MW6 were 11.0 and 39.9 mg/L, respectively. Figures 7B-1 and 7B-2 (Attachment 7B) show that the NPN concentrations in these wells have typically exceeded the MCL. The historical range of NPN concentrations for CYN-MW3 is approximately 4 to 15 mg/L with a slightly decreasing trend. The historical range of NPN concentrations for CYN-MW6 is 22.9 to approximately 40 mg/L with an increasing trend. NPN concentrations in the other BSG wells are less than the MCL (Table 7A-3).

The results for total petroleum hydrocarbons (TPH) are listed for diesel range organics (DRO) and gasoline range organics (GRO) in Table 7A-4. No detections of TPH-GRO or TPH-DRO were reported for either sampling event. No MCLs have been established for TPH-DRO or TPH-GRO.

The analytical results for anions and perchlorate are presented in Tables 7A-5 and 7A-6, respectively. None of the anions exceed MCLs, where established.

Perchlorate was detected above the MDL of 0.004 mg/L only in samples collected from CYN-MW6. Perchlorate concentrations for CYN-MW6 are estimated values and range from 4.12 J to 7.24 J mg/L. Currently, no MCL is established for perchlorate. However, perchlorate is a COC for the BSG Study Area because it exceeds the NMED-specified screening level/MDL of 4 μg/L (NMED April 2004). Figure 7B-3 (Attachment 7B) shows that the perchlorate concentration in this 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.

Table 7-5. Burn Site Groundwater Study Area Chemical Analytical Methods

Analyte	Analytical Method[a,b,c]
Anions	SW846-9056
NPN	EPA 353.2
Perchlorate	EPA 314.0
TAL Metals, plus Total Uranium	SW846-6020/7470
TPH Diesel Range Organics	SW846-8015
TPH Gasoline Range Organics	SW846-8015
VOCs	SW846-8260

Notes:

[a]U.S. Environmental Protection Agency, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

[b]U.S. Environmental Protection Agency, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography-Method 300.0*, EPA-600/4-84-017.

[c]U.S. Environmental Protection Agency, 1999, *Perchlorate in Drinking Water Using Ion Chromatography*, EPA 815/R-00-014.

EPA = U.S. Environmental Protection Agency.
NPN = Nitrate plus nitrite (reported as nitrogen).
SW = Solid waste.
TAL = Target analyte list.
TPH = Total petroleum hydrocarbons.
VOC = Volatile organic compound.

Table 7-6. Burn Site Groundwater Study Area Radiochemical Analytical Methods

Analyte	Analytical Method[a]
Gamma Spectroscopy (short list)	EPA 901.0
Gross Alpha/Beta	EPA 900.0
Tritium	EPA 906.0

Notes:

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

EPA = U.S. Environmental Protection Agency.

Groundwater samples were analyzed for tritium, gross alpha/beta activity, and gamma spectroscopy. The results are presented in Table 7A-8. Gross alpha activity exceeds the MCL (15 picocuries per liter [pCi/L]) in samples collected from CYN-MW4, CYN-MW7, and CYN-MW8, with activity levels ranging from 26.4 + 9.48 to 49.6 + 15.5 pCi/L. These wells are completed in fractured Precambrian bedrock that contains materials high in naturally occurring uranium. The results for gross alpha activity over time (reported as uncorrected gross alpha activity, i.e., not corrected by subtracting naturally occurring uranium activity) are shown in Figures 7B-4 through 7B-6 (Attachment 7B) and are consistent with historical activity levels. All other radionuclide activities are below MCLs, where established. 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, SC, ORP, pH, turbidity, and DO. 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 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 following sections discuss site-specific QA/QC results for the BSG quarterly sampling events.

7.7.1 Field Quality Control Samples

Field QC samples included an environmental duplicate sample and an EB sample. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the mini-SAPs (SNL February 2009 and August 2009).

7.7.1.1 Duplicate Environmental Samples

Duplicate environmental samples were analyzed in order to estimate the overall reproducibility of the sampling and analytical process. A duplicate sample is collected immediately after the original environmental sample in order to reduce variability caused by time and/or sampling mechanics. The results of duplicate sample analyses (detected parameters only) are used to calculate relative percent difference (RPD) values. Duplicate sample results show good correlation (RPD values less than 20) for all calculated parameters.

7.7.1.2 Equipment Blank Samples

A portable Bennett™ groundwater sampling system was used to collect groundwater samples in all wells. The sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in SNL/NM FOP 05-03 (SNL August 2007b). An EB or rinsate sample was collected to verify the effectiveness of the equipment decontamination process. The results of the EB sample analyses are as follows:

- **February/March 2009 Sampling Event at CYN-MW1D—**The EB sample was collected prior to sampling and analyzed for NPN, TPH-DRO, and TPH-GRO. No parameters were detected above the associated laboratory MDLs.

- **September 2009 Sampling Events at CYN-MW3 and CYN-MW6—**The EB sample was collected prior to sampling CYN-MW3 and CYN-MW6 and analyzed for VOCs, NPN, TPH-DRO, TPH-GRO, perchlorate (CYN-MW6 only), total Target Analyte List (TAL) metals plus total uranium, gamma spectroscopy, gross alpha/beta activity, and tritium. Bromodichloromethane, bromoform, chloroform, dibromochloromethane, and toluene were detected above the laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental samples. Inorganic analytes detected in EB samples included aluminum, copper, chloride, sodium, and sulfate. No corrective action was required for chloride, sodium, or sulfate as the associated sample results were greater than five times the blank result. Aluminum and copper were qualified as not detected during data validation in the associated CYN-MW3 environmental sample due to EB sample contamination.

7.7.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analysis to assess whether contamination of the samples has occurred during shipment and storage. The TB samples consist of laboratory reagent grade water with hydrochloric acid preservative contained in 40-milliliter volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. The TBs were brought to the field and accompanied each sample shipment.

7.7.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples were analyzed concurrently with all groundwater samples. All chemical data were reviewed and qualified in accordance with AOP 00-03, *Data Validation Procedure for Chemical and Radiochemical Data* (SNL July 2007). Laboratory data qualifiers are provided with the analytical results in Tables 7A-1 through 7A-8 (Attachment 7A).

7.8 Variances and Nonconformances

The following sections describe differences between planned work and actual work, findings of the data validation process, and any impacts to schedule.

7.8.1 Variances and Nonconformances

No variances or nonconformances from field or sampling requirements specified in the BSG monitoring mini-SAPs (SNL February 2009 and August 2009) occurred during sampling activities. The only project-specific issue associated with the CY 2009 sampling events for BSG occurred during September 2009. Monitoring well CYN-MW6 was purged dry, allowed to recover, and then sampled to collect a representative groundwater sample. This is the first occurrence of purging this well dry.

7.8.2 Data Validation

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for BSG COCs. Data validation qualifiers are provided with the analytical results in Tables 7A-1 through 7A-8 (Attachment 7A). The data validation report associated with each sampling event has been submitted to the SNL/NM Customer Funded Records Center.

Specific data validation issues associated with the September 2009 sampling event are noted as follows:

- Aluminum and copper were qualified as not detected during data validation in the associated CYN-MW3 environmental sample due to EB sample contamination.

- Chloromethane in the sample from CYN-MW3 was qualified as not detected during data validation due to associated TB contamination.

- NPN in the sample from CYN-MW4 was qualified as not detected during data validation due to associated laboratory method blank contamination.

- The perchlorate detections in the CYN-MW6 primary and duplicate samples were qualified as estimated with a suspected negative bias during data validation, due to matrix spike recovery outside QC limits.

7.9 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 site model, and plans for studies to be completed during CY 2010 at the BSG Study Area.

The BSG Study Area 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 nonpotable Burn Site Well. The study area consists of six monitoring wells. Wells were sampled during February and March 2009 and September 2009. The samples were analyzed for VOCs, TPH-DRO, TPH-GRO, anions, 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 CYN-MW6.

Only NPN and gross alpha activity were detected above MCLs in study area wells. NPN results exceeded the MCL of 10 mg/L in samples from CYN-MW3 and CYN-MW6 collected during both sampling events, with a maximum concentration of 39.9 mg/L in the sample collected from CYN-MW6 during the September 2009 sampling event. Nitrate concentrations in CYN-MW6 have consistently exceeded the MCL. The maximum NPN concentration of 11.0 mg/L was detected in the sample collected from CYN-MW3 during the February 2009 sampling event. Nitrate concentrations have been relatively stable in CYN-MW3.

The greatest nitrate concentrations for CY 2009 are 11.0 and 39.9 mg/L for samples from wells CYN-MW3 and CYN-MW6, respectively. These two wells are located in the center of the Burn Site. Samples from downgradient wells CYN-MW7 and CYN-MW8 contain nitrate concentrations of 1.92 and 4.98 mg/L, respectively.

Uncorrected gross alpha activity values in samples from CYN-MW4, CYN-MW7, and CYN-MW8 exceed the MCL of 15 pCi/L at activities ranging from 26.4 ± 9.48 to 49.6 ± 15.5 pCi/L. These wells are completed in fractured Precambrian bedrock that contains naturally occurring uranium. Gross alpha activity results are consistent with historical activities in Burn Site monitoring wells and are reported as uncorrected gross alpha activity (i.e., not corrected by subtracting naturally occurring uranium or radium activity).

The analytical results from 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 from this reporting period.

During CY 2010, semiannual groundwater sampling will continue at the six BSG Study Area wells (CYN-MW1D, CYN-MW3, CYN-MW4, CYN-MW6, CYN-MW7, and CYN-MW8) during the second and fourth quarters of FY 2010. Upon NMED approval of the *Burn Site Groundwater Characterization Work Plan, Installation of Groundwater Monitoring Wells CYN-MW9, CYN-MW10, and CYN-MW11, Collection of Subsurface Soil Samples* (SNL November 2009), field studies will be initiated. After completion of the well installation field activities, a report 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
Summary of Detected Volatile Organic Compounds, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

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-MW3 28-Sep-09	Chloromethane	0.355	0.300	1.00	NE	J	1.0UJ	087729-001	SW846-8260B
CYN-MW6 30-Sep-09	Chloromethane	0.466	0.300	1.00	NE	J	J-	087734-001	SW846-8260B

Refer to footnotes on page 7A-20.

Table 7A-2
Method Detection Limits for Volatile Organic Compounds (EPA Method[g] 8260), Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

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 7A-20.

Table 7A-3
Summary of Nitrate plus Nitrite Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW1D 26-Feb-09	Nitrate plus nitrite as N	5.05	0.250	1.25	10.0			087044-018	EPA 353.2
CYN-MW1D (Duplicate) 26-Feb-09	Nitrate plus nitrite as N	4.88	0.250	1.25	10.0			087045-018	EPA 353.2
CYN-MW3 27-Feb-09	Nitrate plus nitrite as N	**11.0**	0.250	1.25	10.0			087046-018	EPA 353.2
CYN-MW4 23-Feb-09	Nitrate plus nitrite as N	0.0985	0.050	0.250	10.0	J		087040-018	EPA 353.2
CYN-MW6 02-Mar-09	Nitrate plus nitrite as N	**37.4**	1.00	5.00	10.0			087047-018	EPA 353.2
CYN-MW7 24-Feb-09	Nitrate plus nitrite as N	1.92	0.100	0.500	10.0			087041-018	EPA 353.2
CYN-MW8 25-Feb-09	Nitrate plus nitrite as N	4.98	0.250	1.25	10.0			087042-018	EPA 353.2
CYN-MW1D 24-Sep-09	Nitrate plus nitrite as N	8.44	0.100	0.500	10.0	B		087724-018	EPA 353.2
CYN-MW3 28-Sep-09	Nitrate plus nitrite as N	**10.7**	0.250	1.25	10.0			087729-018	EPA 353.2
CYN-MW3 (Duplicate) 28-Sep-09	Nitrate plus nitrite as N	**10.7**	0.250	1.25	10.0			087730-018	EPA 353.2
CYN-MW4 23-Sep-09	Nitrate plus nitrite as N	0.149	0.050	0.250	10.0	B, J	0.055U	087718-018	EPA 353.2
CYN-MW6 30-Sep-09	Nitrate plus nitrite as N	**39.4**	0.500	2.50	10.0			087734-018	EPA 353.2
CYN-MW6 (Duplicate) 30-Sep-09	Nitrate plus nitrite as N	**39.9**	0.500	2.50	10.0			087735-018	EPA 353.2
CYN-MW7 21-Sep-09	Nitrate plus nitrite as N	1.78	0.050	0.250	10.0	B		087720-018	EPA 353.2
CYN-MW8 22-Sep-09	Nitrate plus nitrite as N	4.54	0.100	0.500	10.0	B		087722-018	EPA 353.2

Refer to footnotes on page 7A-20.

Table 7A-4
Summary of Diesel Range Organics and Gasoline Range Organics Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

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-MW1D	Diesel Range Organics	ND	51.6	110	NE	U		087044-005	SW846 8015A/B
26-Feb-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087044-006	SW846 8015B
CYN-MW1D (Duplicate)	Diesel Range Organics	ND	51.6	110	NE	U		087045-005	SW846 8015A/B
26-Feb-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087045-006	SW846 8015B
CYN-MW3	Diesel Range Organics	ND	52.2	111	NE	U, h	UJ	087046-005	SW846 8015A/B
27-Feb-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087046-006	SW846 8015B
CYN-MW4	Diesel Range Organics	ND	58.8	125	NE	U		087040-005	SW846 8015A/B
23-Feb-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087040-006	SW846 8015B
CYN-MW6	Diesel Range Organics	ND	58.0	123	NE	U, h	UJ	087047-005	SW846 8015A/B
02-Mar-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087047-006	SW846 8015B
CYN-MW7	Diesel Range Organics	ND	52.2	111	NE	U		087041-005	SW846 8015A/B
24-Feb-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087041-006	SW846 8015B
CYN-MW8	Diesel Range Organics	ND	52.2	111	NE	U		087042-005	SW846 8015A/B
25-Feb-09	Gasoline Range Organics	ND	13.0	50.0	NE	U		087042-006	SW846 8015B
CYN-MW1D	Diesel Range Organics	ND	67.7	208	NE	U		087724-005	SW846 8015A/B
24-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087724-006	SW846 8015B
CYN-MW3	Diesel Range Organics	ND	74.7	230	NE	U		087729-005	SW846 8015A/B
28-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087729-006	SW846 8015B
CYN-MW3 (Duplicate)	Diesel Range Organics	ND	69.1	213	NE	U		087730-005	SW846 8015A/B
28-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087730-006	SW846 8015B
CYN-MW4	Diesel Range Organics	ND	69.9	215	NE	U		087718-005	SW846 8015A/B
23-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087718-006	SW846 8015B
CYN-MW6	Diesel Range Organics	ND	69.9	215	NE	U		087734-005	SW846 8015A/B
30-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087734-006	SW846 8015B
CYN-MW6 (Duplicate)	Diesel Range Organics	ND	69.9	215	NE	U		087735-005	SW846 8015A/B
30-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087735-006	SW846 8015B
CYN-MW7	Diesel Range Organics	ND	69.9	215	NE	U		087720-005	SW846 8015A/B
21-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087720-006	SW846 8015B
CYN-MW8	Diesel Range Organics	ND	67.7	208	NE	U		087722-005	SW846 8015A/B
22-Sep-09	Gasoline Range Organics	ND	10.5	50.0	NE	U		087722-006	SW846 8015B

Refer to footnotes on page 7A-20.

Table 7A-5
Summary of Anion Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW1D	Bromide	0.438	0.066	0.200	NE			087724-016	SW846 9056
24-Sep-09	Chloride	26.5	0.330	1.00	NE			087724-016	SW846 9056
	Fluoride	1.74	0.033	0.100	4.0			087724-016	SW846 9056
	Sulfate	108	0.500	2.00	NE			087724-016	SW846 9056
CYN-MW3	Bromide	0.725	0.066	0.200	NE			087729-016	SW846 9056
28-Sep-09	Chloride	51.3	0.660	2.00	NE			087729-016	SW846 9056
	Fluoride	0.635	0.033	0.100	4.0			087729-016	SW846 9056
	Sulfate	153	1.00	4.00	NE			087729-016	SW846 9056
CYN-MW4	Bromide	0.354	0.066	0.200	NE			087718-016	SW846 9056
23-Sep-09	Chloride	23.4	0.330	1.00	NE			087718-016	SW846 9056
	Fluoride	0.745	0.033	0.100	4.0			087718-016	SW846 9056
	Sulfate	127	0.500	2.00	NE			087718-016	SW846 9056
CYN-MW6	Bromide	1.08	0.066	0.200	NE			087734-016	SW846 9056
30-Sep-09	Chloride	82.0	0.660	2.00	NE			087734-016	SW846 9056
	Fluoride	0.563	0.033	0.100	4.0			087734-016	SW846 9056
	Sulfate	169	1.00	4.00	NE			087734-016	SW846 9056
CYN-MW7	Bromide	0.576	0.066	0.200	NE			087720-016	SW846 9056
21-Sep-09	Chloride	37.9	0.330	1.00	NE			087720-016	SW846 9056
	Fluoride	1.23	0.033	0.100	4.0			087720-016	SW846 9056
	Sulfate	73.6	0.500	2.00	NE			087720-016	SW846 9056
CYN-MW8	Bromide	0.715	0.066	0.200	NE			087722-016	SW846 9056
22-Sep-09	Chloride	58.4	0.330	1.00	NE			087722-016	SW846 9056
	Fluoride	1.37	0.033	0.100	4.0			087722-016	SW846 9056
	Sulfate	116	0.500	2.00	NE			087722-016	SW846 9056

Refer to footnotes on page 7A-20.

Table 7A-6
Summary of Perchlorate Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

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 02-Mar-09	0.00724	0.004	0.012	NE	J		087047-020	EPA 314.0
CYN-MW6 30-Sep-09	0.00412	0.004	0.012	NE	J	J-	087734-020	EPA 314.0
CYN-MW6 (Duplicate) 30-Sep-09	0.00471	0.004	0.012	NE	J	J-	087735-020	EPA 314.0

Refer to footnotes on page 7A-20.

Table 7A-7
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW1D	Aluminum	ND	0.010	0.030	NE	U	UJ	087724-009	SW846 6020
24-Sep-09	Antimony	ND	0.0005	0.003	0.006	U		087724-009	SW846 6020
	Arsenic	0.00227	0.0015	0.005	0.010	J		087724-009	SW846 6020
	Barium	0.0477	0.0005	0.002	2.00			087724-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087724-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087724-009	SW846 6020
	Calcium	63.0	0.100	1.00	NE	B		087724-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087724-009	SW846 6020
	Cobalt	0.000437	0.0001	0.001	NE	J		087724-009	SW846 6020
	Copper	0.000956	0.0003	0.001	NE	B, J	0.0026U	087724-009	SW846 6020
	Iron	11.9	0.010	0.100	NE	B		087724-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087724-009	SW846 6020
	Magnesium	12.6	0.005	0.015	NE		J	087724-009	SW846 6020
	Manganese	0.0901	0.001	0.005	NE			087724-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087724-009	SW846 7470
	Nickel	0.00192	0.0005	0.002	NE	J		087724-009	SW846 6020
	Potassium	2.12	0.080	0.300	NE			087724-009	SW846 6020
	Selenium	0.00106	0.001	0.005	0.050	J		087724-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087724-009	SW846 6020
	Sodium	27.0	0.080	0.250	NE			087724-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087724-009	SW846 6020
	Uranium	0.000973	0.00005	0.0002	0.030			087724-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087724-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087724-009	SW846 6020

Refer to footnotes on page 7A-20.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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-MW3	Aluminum	0.0229	0.010	0.030	NE	J	0.095U	087729-009	SW846 6020
28-Sep-09	Antimony	0.000685	0.0005	0.003	0.006	B, J	0.008U	087729-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087729-009	SW846 6020
	Barium	0.049	0.0005	0.002	2.00			087729-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087729-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087729-009	SW846 6020
	Calcium	134	0.100	1.00	NE	B		087729-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087729-009	SW846 6020
	Cobalt	0.0003	0.0001	0.001	NE	J		087729-009	SW846 6020
	Copper	0.00162	0.0003	0.001	NE		0.012U	087729-009	SW846 6020
	Iron	0.486	0.010	0.100	NE			087729-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087729-009	SW846 6020
	Magnesium	30.2	0.005	0.015	NE			087729-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087729-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087729-009	SW846 7470
	Nickel	0.00278	0.0005	0.002	NE			087729-009	SW846 6020
	Potassium	1.91	0.080	0.300	NE			087729-009	SW846 6020
	Selenium	0.00752	0.001	0.005	0.050			087729-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087729-009	SW846 6020
	Sodium	38.8	0.080	0.250	NE			087729-009	SW846 6020
	Thallium	0.000758	0.0003	0.001	0.002	J	0.0019U	087729-009	SW846 6020
	Uranium	0.00744	0.00005	0.0002	0.030			087729-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087729-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	U		087729-009	SW846 6020

Refer to footnotes on page 7A-20.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U	UJ	087718-009	SW846 6020
23-Sep-09	Antimony	ND	0.0005	0.003	0.006	U		087718-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087718-009	SW846 6020
	Barium	0.0519	0.0005	0.002	2.00			087718-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087718-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087718-009	SW846 6020
	Calcium	70.6	0.100	1.00	NE	B		087718-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087718-009	SW846 6020
	Cobalt	0.000145	0.0001	0.001	NE	J		087718-009	SW846 6020
	Copper	0.00123	0.0003	0.001	NE	B	0.0026U	087718-009	SW846 6020
	Iron	0.137	0.010	0.100	NE	B		087718-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087718-009	SW846 6020
	Magnesium	31.1	0.005	0.015	NE		J	087718-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		087718-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087718-009	SW846 7470
	Nickel	0.00186	0.0005	0.002	NE	J		087718-009	SW846 6020
	Potassium	5.73	0.080	0.300	NE			087718-009	SW846 6020
	Selenium	0.0122	0.001	0.005	0.050			087718-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087718-009	SW846 6020
	Sodium	42.4	0.080	0.250	NE			087718-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087718-009	SW846 6020
	Uranium	0.0132	0.00005	0.0002	0.030			087718-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087718-009	SW846 6020
	Zinc	0.00758	0.0026	0.010	NE	J		087718-009	SW846 6020

Refer to footnotes on page 7A-20.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.0174	0.010	0.030	NE	J		087734-009	SW846 6020
30-Sep-09	Antimony	0.00085	0.0005	0.003	0.006	B, J		087734-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087734-009	SW846 6020
	Barium	0.0819	0.0005	0.002	2.00			087734-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087734-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087734-009	SW846 6020
	Calcium	204	0.100	1.00	NE	B		087734-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087734-009	SW846 6020
	Cobalt	0.0005	0.0001	0.001	NE	J		087734-009	SW846 6020
	Copper	0.00444	0.0003	0.001	NE			087734-009	SW846 6020
	Iron	0.739	0.010	0.100	NE			087734-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087734-009	SW846 6020
	Magnesium	48.8	0.005	0.015	NE			087734-009	SW846 6020
	Manganese	0.00315	0.001	0.005	NE	J		087734-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	087734-009	SW846 7470
	Nickel	0.00402	0.0005	0.002	NE			087734-009	SW846 6020
	Potassium	2.29	0.080	0.300	NE			087734-009	SW846 6020
	Selenium	0.00941	0.001	0.005	0.050			087734-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087734-009	SW846 6020
	Sodium	48.6	0.400	1.25	NE			087734-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087734-009	SW846 6020
	Uranium	0.0128	0.00005	0.0002	0.030			087734-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087734-009	SW846 6020
	Zinc	0.0124	0.0026	0.010	NE			087734-009	SW846 6020

Refer to footnotes on page 7A-20.

Table 7A-7 *(Continued)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/L)	MDL[b] (mg/L)	PQL[c] (mg/L)	MCL[d] (mg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW7	Aluminum	0.0344	0.010	0.030	NE		UJ	087720-009	SW846 6020
21-Sep-09	Antimony	0.000698	0.0005	0.003	0.006	B, J	0.014U	087720-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087720-009	SW846 6020
	Barium	0.108	0.0005	0.002	2.00			087720-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087720-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		087720-009	SW846 6020
	Calcium	102	0.100	1.00	NE	B		087720-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087720-009	SW846 6020
	Cobalt	0.000139	0.0001	0.001	NE	J	J+	087720-009	SW846 6020
	Copper	0.00117	0.0003	0.001	NE	B	0.0026U	087720-009	SW846 6020
	Iron	0.190	0.010	0.100	NE	B		087720-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087720-009	SW846 6020
	Magnesium	17.7	0.005	0.015	NE		J	087720-009	SW846 6020
	Manganese	0.00633	0.001	0.005	NE		J+	087720-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087720-009	SW846 7470
	Nickel	0.00272	0.0005	0.002	NE		J+	087720-009	SW846 6020
	Potassium	2.37	0.080	0.300	NE			087720-009	SW846 6020
	Selenium	0.00391	0.001	0.005	0.050	J		087720-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087720-009	SW846 6020
	Sodium	34.8	0.080	0.250	NE			087720-009	SW846 6020
	Thallium	0.000393	0.0003	0.001	0.002	J		087720-009	SW846 6020
	Uranium	0.00686	0.00005	0.0002	0.030			087720-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087720-009	SW846 6020
	Zinc	0.00358	0.0026	0.010	NE	J	J+	087720-009	SW846 6020

Refer to footnotes on page 7A-20.

Table 7A-7 *(Concluded)*
Summary of Total Metal Results,
Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Result[a] (mg/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	0.010	0.030	NE	U	UJ	087722-009	SW846 6020
22-Sep-09	Antimony	0.000682	0.0005	0.003	0.006	B, J	0.014U	087722-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	U		087722-009	SW846 6020
	Barium	0.0636	0.0005	0.002	2.00			087722-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	U		087722-009	SW846 6020
	Cadmium	0.000169	0.00011	0.001	0.005	J	J+	087722-009	SW846 6020
	Calcium	115	0.100	1.00	NE	B		087722-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	U		087722-009	SW846 6020
	Cobalt	0.000369	0.0001	0.001	NE	J	J+	087722-009	SW846 6020
	Copper	0.00119	0.0003	0.001	NE	B	0.0026U	087722-009	SW846 6020
	Iron	0.199	0.010	0.100	NE	B		087722-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		087722-009	SW846 6020
	Magnesium	23.4	0.005	0.015	NE		J	087722-009	SW846 6020
	Manganese	0.00701	0.001	0.005	NE		J+	087722-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		087722-009	SW846 7470
	Nickel	0.00283	0.0005	0.002	NE		J+	087722-009	SW846 6020
	Potassium	2.41	0.080	0.300	NE			087722-009	SW846 6020
	Selenium	0.00477	0.001	0.005	0.050	J		087722-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		087722-009	SW846 6020
	Sodium	42.7	0.080	0.250	NE			087722-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	U		087722-009	SW846 6020
	Uranium	0.00841	0.00005	0.0002	0.030			087722-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	U		087722-009	SW846 6020
	Zinc	0.00513	0.0026	0.010	NE	J	J+	087722-009	SW846 6020

Refer to footnotes on page 7A-20.

Table 7A-8
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW1D	Americium-241	10.3 ± 7.83	12.1	6.07	NE	U	BD	087724-033	EPA 901.1
24-Sep-09	Cesium-137	-0.223 ± 1.93	3.17	1.59	NE	U	BD	087724-033	EPA 901.1
	Cobalt-60	0.021 ± 1.88	3.14	1.57	NE	U	BD	087724-033	EPA 901.1
	Potassium-40	53.7 ± 33.3	31.4	15.7	NE		J	087724-033	EPA 901.1
	Gross Alpha	2.92 ± 1.10	1.23	0.544	15		J	087724-034	EPA 900.0
	Gross Beta	6.57 ± 3.20	4.41	2.01	4mrem/yr		J	087724-034	EPA 900.0
	Tritium	-55.5 ± 93.4	168	80.6	NE	U	BD	087724-036	EPA 906.0 M
CYN-MW3	Americium-241	2.67 ± 7.71	13.5	6.73	NE	U	BD	087729-033	EPA 901.1
28-Sep-09	Cesium-137	-2.06 ± 3.92	3.02	1.51	NE	U	BD	087729-033	EPA 901.1
	Cobalt-60	1.76 ± 1.91	3.39	1.70	NE	U	BD	087729-033	EPA 901.1
	Potassium-40	-26.9 ± 41.7	43.6	21.8	NE	U	BD	087729-033	EPA 901.1
	Gross Alpha	8.63 ± 5.47	5.89	2.03	15		J	087729-034	EPA 900.0
	Gross Beta	2.28 ± 1.88	2.95	1.44	4mrem/yr	U	BD	087729-034	EPA 900.0
	Tritium	42.1 ± 49.5	82.2	39.0	NE	U	BD	087729-036	EPA 906.0 M
CYN-MW4	Americium-241	5.43 ± 10.2	17.3	8.64	NE	U	BD	087718-033	EPA 901.1
23-Sep-09	Cesium-137	-1.57 ± 1.90	3.09	1.55	NE	U	BD	087718-033	EPA 901.1
	Cobalt-60	-0.766 ± 1.83	3.00	1.50	NE	U	BD	087718-033	EPA 901.1
	Potassium-40	43.8 ± 47.8	28.7	14.4	NE	X	R	087718-033	EPA 901.1
	Gross Alpha	**49.6 ± 15.5**	9.07	3.48	15			087718-034	EPA 900.0
	Gross Beta	8.34 ± 5.07	7.35	3.34	4mrem/yr		J	087718-034	EPA 900.0
	Tritium	-56 ± 94.2	170	81.3	NE	U	BD	087718-036	EPA 906.0 M
CYN-MW6	Americium-241	-5.4 ± 12.2	18.9	9.45	NE	U	BD	087734-033	EPA 901.1
30-Sep-09	Cesium-137	-1.04 ± 2.14	3.55	1.78	NE	U	BD	087734-033	EPA 901.1
	Cobalt-60	-0.958 ± 2.09	3.37	1.69	NE	U	BD	087734-033	EPA 901.1
	Potassium-40	8.96 ± 60.7	33.2	16.6	NE	U	BD	087734-033	EPA 901.1
	Gross Alpha	15.0 ± 8.09	7.27	2.43	15		J	087734-034	EPA 900.0
	Gross Beta	9.25 ± 3.15	3.50	1.60	4mrem/yr		J	087734-034	EPA 900.0
	Tritium	24.0 ± 48.9	83.8	39.7	NE	U	BD	087734-036	EPA 906.0 M

Refer to footnotes on page 7A-20.

Table 7A-8 *(Concluded)*
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Analyte	Activity[a] (pCi/L)	MDA[b] (pCi/L)	Critical Level[c] (pCi/L)	MCL[d] (pCi/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Sample No.	Analytical Method[g]
CYN-MW7	Americium-241	-21.9 ± 12.3	20.0	10.0	NE	U	BD	087720-033	EPA 901.1
21-Sep-09	Cesium-137	2.26 ± 2.08	3.63	1.82	NE	U	BD	087720-033	EPA 901.1
	Cobalt-60	0.0409 ± 2.17	3.60	1.80	NE	U	BD	087720-033	EPA 901.1
	Potassium-40	-22.3 ± 36.9	42.2	21.1	NE	U	BD	087720-033	EPA 901.1
	Gross Alpha	**26.4 ± 9.48**	5.43	1.92	15			087720-034	EPA 900.0
	Gross Beta	4.54 ± 1.76	2.48	1.20	4 mrem/yr		J	087720-034	EPA 900.0
	Tritium	-13.8 ± 95.0	167	80.3	NE	U	BD	087720-036	EPA 906.0 M
CYN-MW8	Americium-241	4.20 ± 3.93	5.92	2.96	NE	U	BD	087722-033	EPA 901.1
22-Sep-09	Cesium-137	-0.46 ± 2.58	4.21	2.11	NE	U	BD	087722-033	EPA 901.1
	Cobalt-60	1.80 ± 2.62	4.53	2.26	NE	U	BD	087722-033	EPA 901.1
	Potassium-40	39.8 ± 24.9	46.9	23.5	NE	U	BD	087722-033	EPA 901.1
	Gross Alpha	**30.1 ± 10.5**	4.63	1.43	15			087722-034	EPA 900.0
	Gross Beta	6.68 ± 1.94	2.32	1.12	4 mrem/yr		J	087722-034	EPA 900.0
	Tritium	-55.5 ± 93.4	168	80.6	NE	U	BD	087722-036	EPA 906.0 M

Refer to footnotes on page 7A-20.

Table 7A-9
Summary of Field Water Quality Measurements[h], Burn Site Groundwater Monitoring, Sandia National Laboratories/New Mexico

Calendar Year 2009

Well ID	Sample Date	Temperature (^{0}C)	Specific Conductivity (μmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CYN-MW1D	26-Feb-09	18.01	515	-140.9	8.06	41.7	4.4	0.46
CYN-MW3	27-Feb-09	14.90	1061	179.0	7.33	0.34	60.3	6.07
CYN-MW4	23-Feb-09	16.66	760	156.4	7.36	0.41	32.6	3.16
CYN-MW6	02-Mar-09	17.58	1482	158.1	7.07	1.77	11.6	1.10
CYN-MW7	24-Feb-09	19.05	789	151.1	7.16	4.40	31.2	2.88
CYN-MW8	25-Feb-09	18.49	916	147.3	7.20	0.30	36.0	3.37
CYN-MW1D	24-Sep-09	17.77	536	59.1	8.04	150	8.1	0.77
CYN-MW3	28-Sep-09	15.62	920	170.4	7.27	0.33	61.8	6.18
CYN-MW4	23-Sep-09	17.52	778	367.2	7.49	0.23	35.0	3.41
CYN-MW6	30-Sep-09	16.37	1236	151.0	6.99	1.24	24.0	2.34
CYN-MW7	21-Sep-09	18.25	809	383.5	7.31	0.83	31.7	2.98
CYN-MW8	22-Sep-09	18.23	936	372.4	7.32	0.28	33.9	3.10

Refer to footnotes on page 7A-20.

Footnotes for Burn Site 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.
- 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

[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

[d]MCL

- Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11(b)), National Primary Drinking Water Standards, EPA, July 2002.
- mrem/yr – millirem per year.
- 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.
  5 pCi/L = radium-226 and radium-228 combined.
  4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate). Tritium has an equivalent MCL of 20,000 pCi/L.

[e]Laboratory Qualifier

B	=	Analyte is detected in associated laboratory method blank.
J	=	Amount detected is below the practical quantitation limit (PQL).
h	=	Sample prep holding time was exceeded.
U	=	Analyte is absent or below the method detection limit.
X	=	Data rejected due to low abundance.

[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 suspected positive bias.
J-	=	The associated numerical value is an estimated quantity with a suspected negative bias.
U	=	The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	=	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	=	The data are unusable (compound may or may not be present). Re-sampling and reanalysis are necessary for verification.

Footnotes for Burn Site Groundwater Monitoring Tables *(Concluded)*

[g]Analytical Method

- U.S. Environmental Protection Agency (EPA), 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA 9310: EPA, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd ed. (and updates), Office of Solid Waste Management and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1983, *The Determination of Inorganic Anions in Water by Ion Chromatography–Method 300.0*, EPA-600/4-84-017, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water,* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
- EPA, 1999, *Perchlorate in Drinking Water Using Ion Chromatography*, EPA 815/R-00-014, U.S. Environmental Protection Agency, Cincinnati, Ohio.

[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 7B
Burn Site Groundwater
Plots

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Attachment 7B Plots

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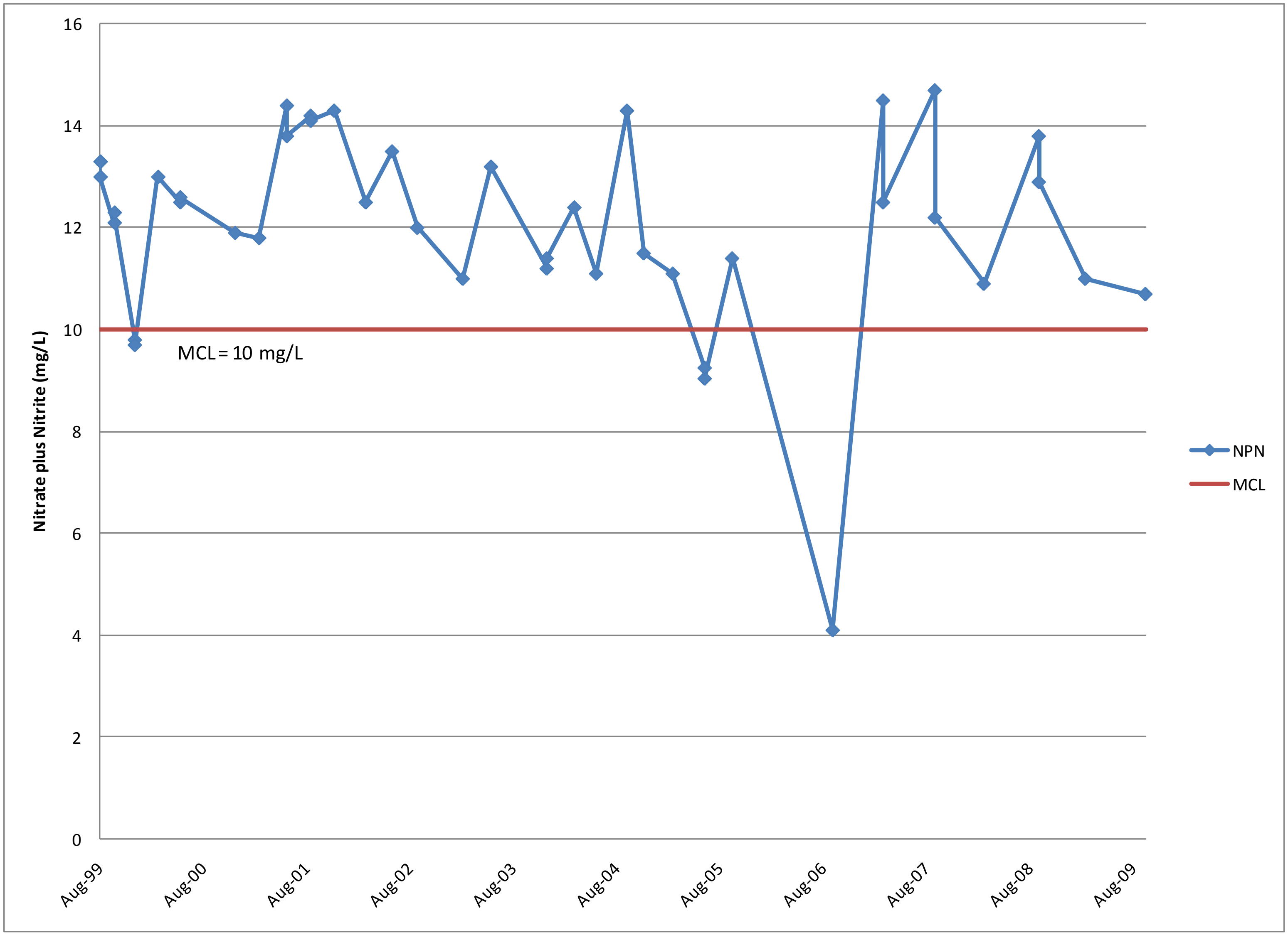

Figure 7B-1. Nitrate plus Nitrite Concentrations, CYN-MW3

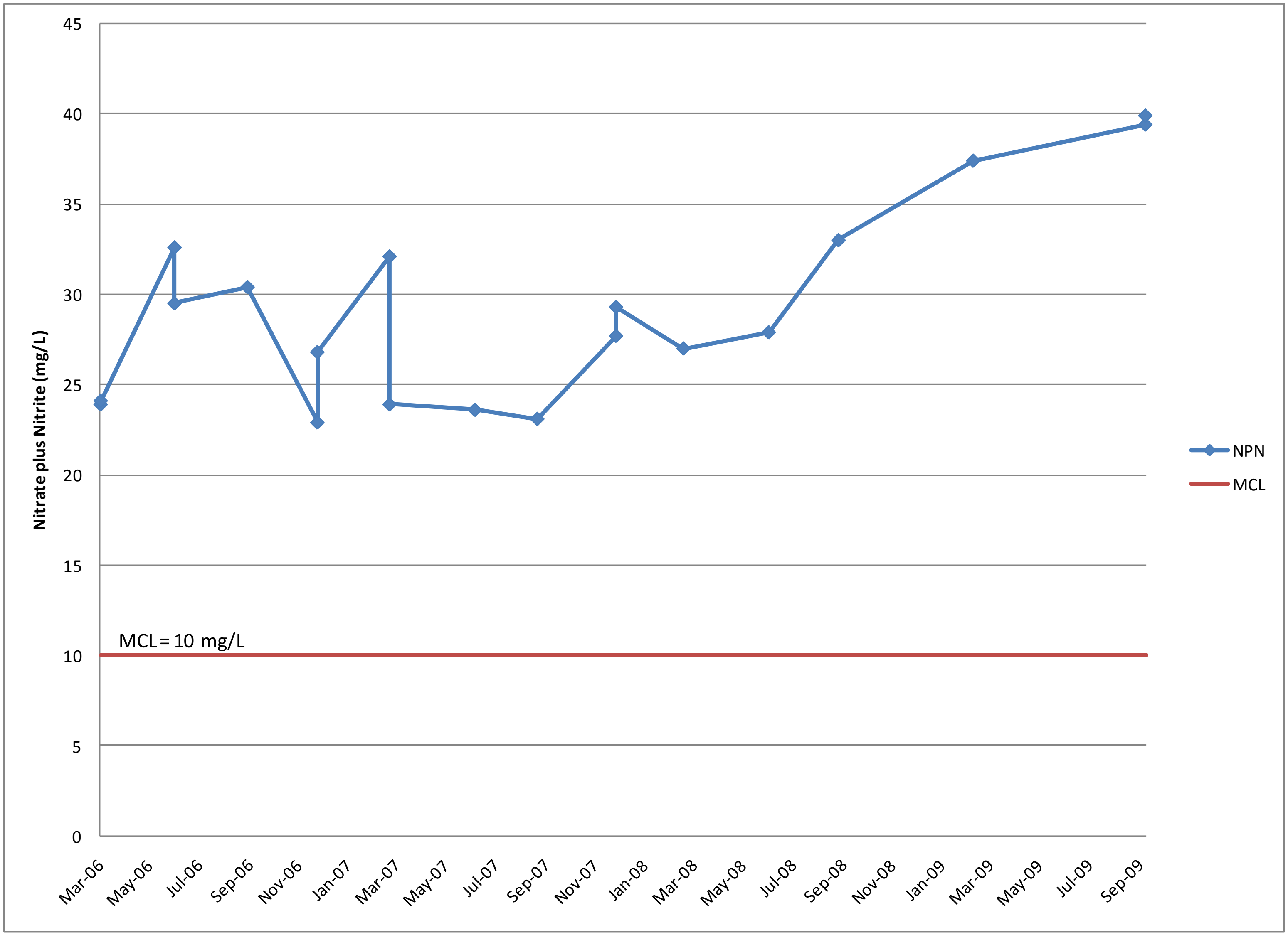

Figure 7B-2. Nitrate plus Nitrite Concentrations, CYN-MW6

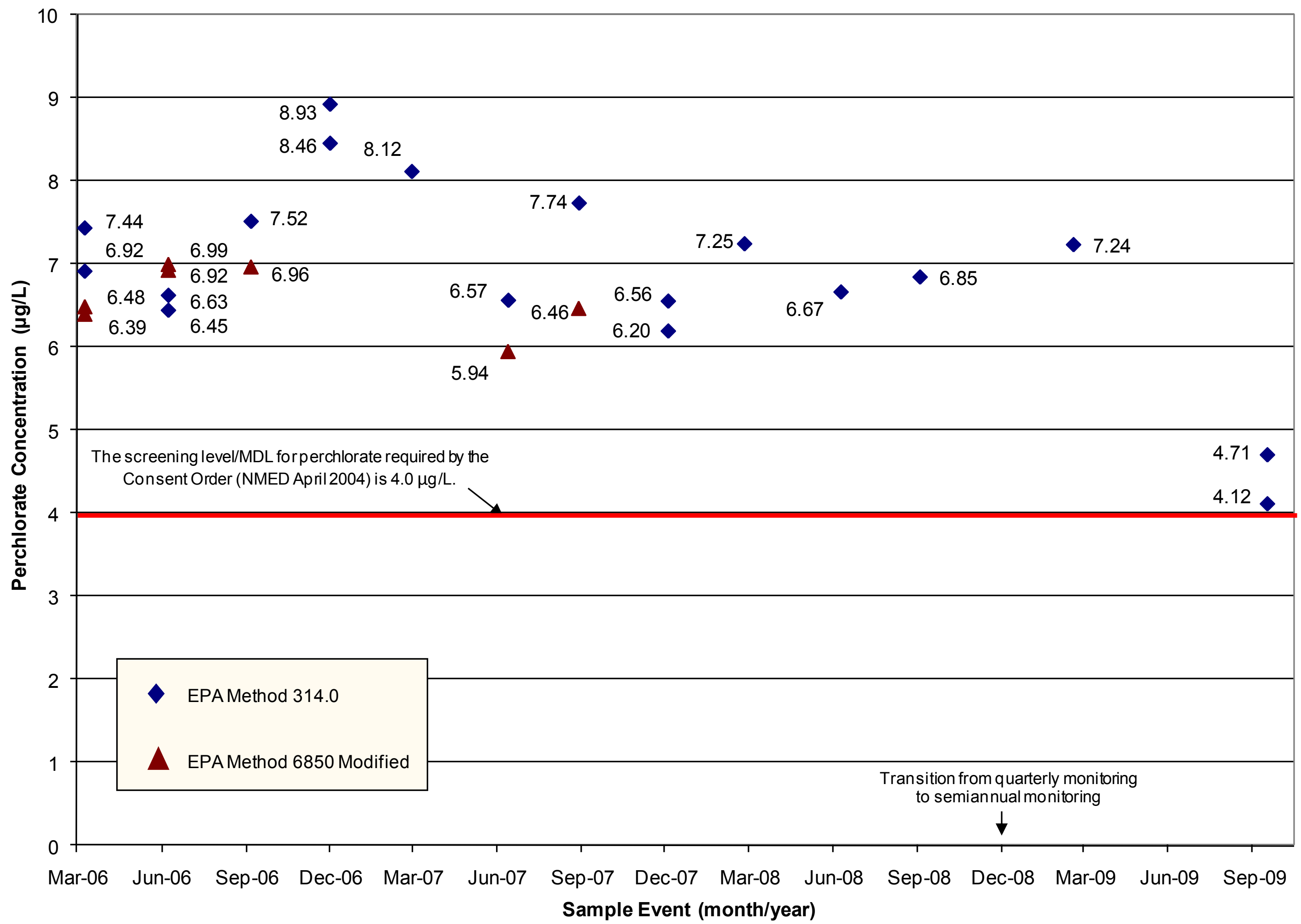

Figure 7B-3. Perchlorate Concentrations, CYN-MW6

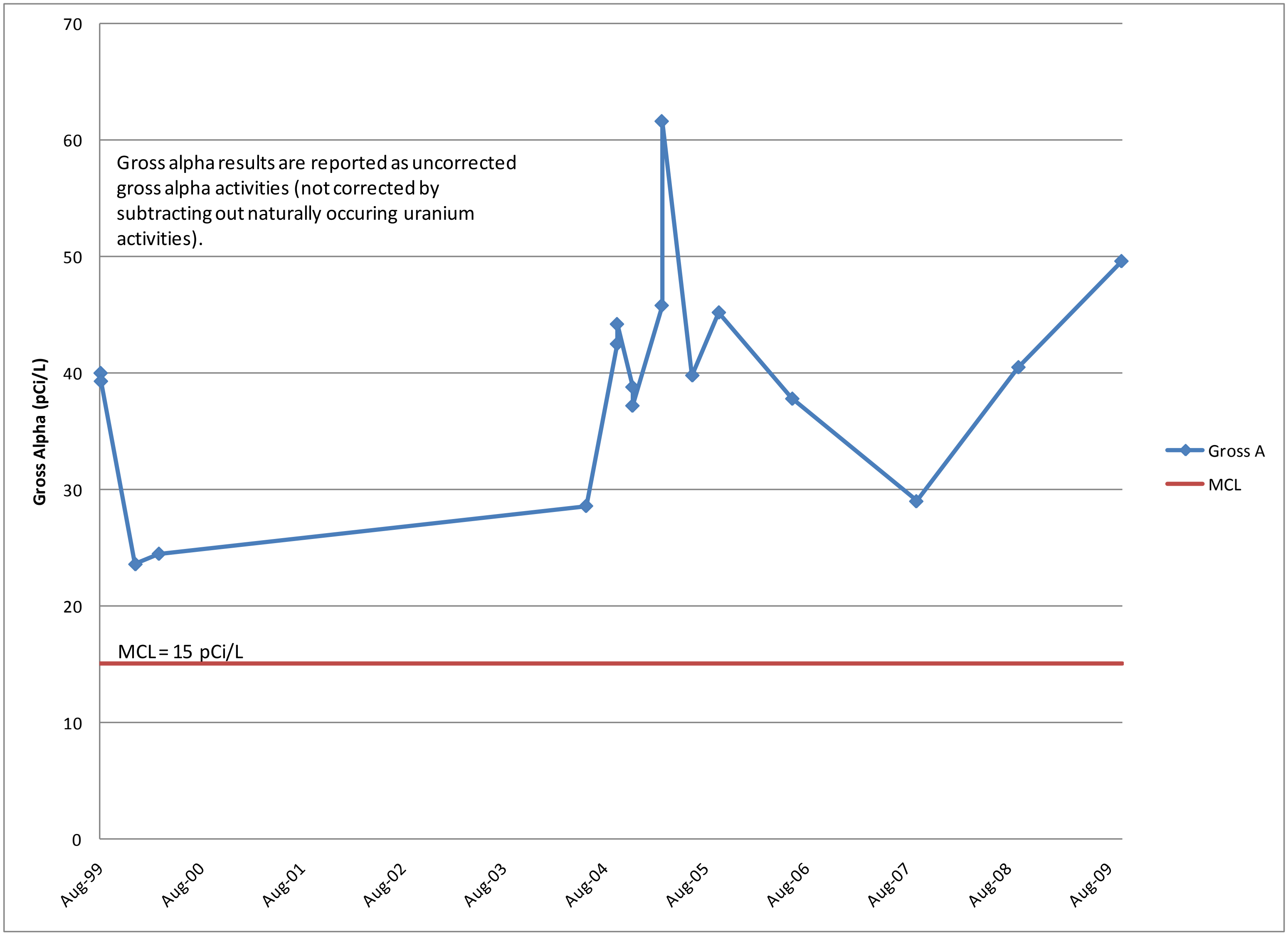

Figure 7B-4. Gross Alpha Activity, CYN-MW4

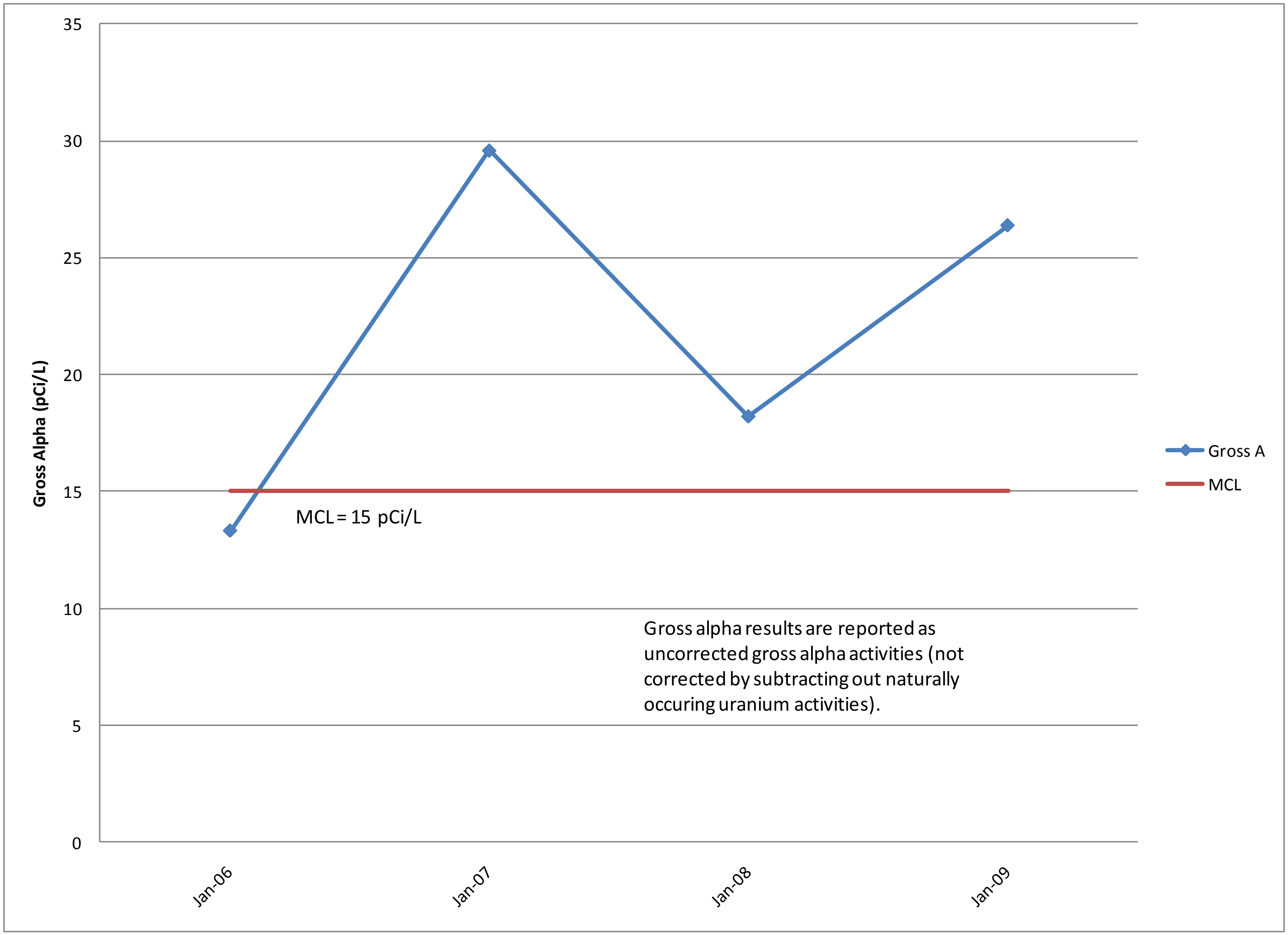

Figure 7B-5. Gross Alpha Activity, CYN-MW7

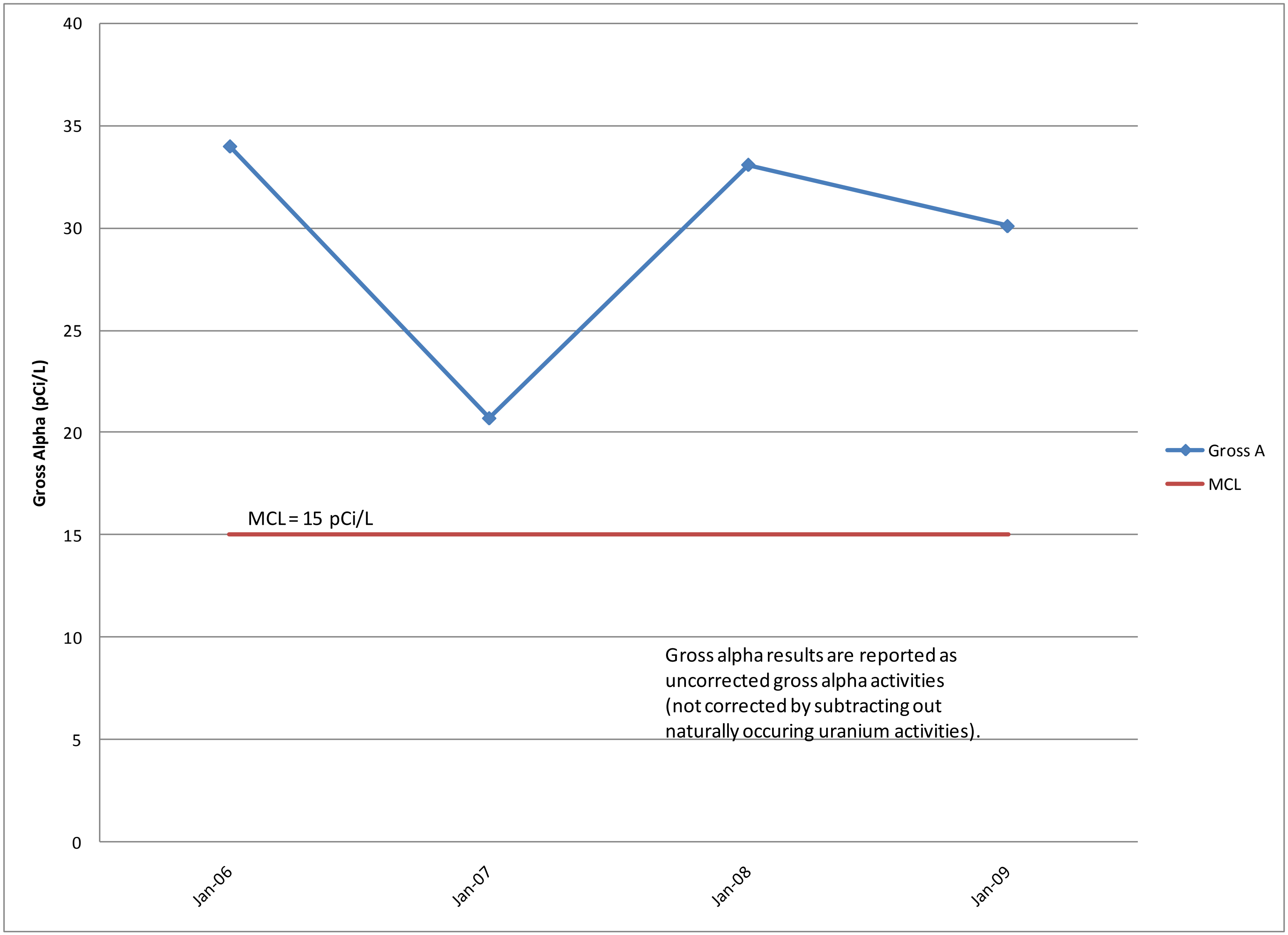

Figure 7B-6. Gross Alpha Activity, CYN-MW8

Attachment 7C
Burn Site Groundwater
Hydrographs

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Attachment 7C Hydrographs

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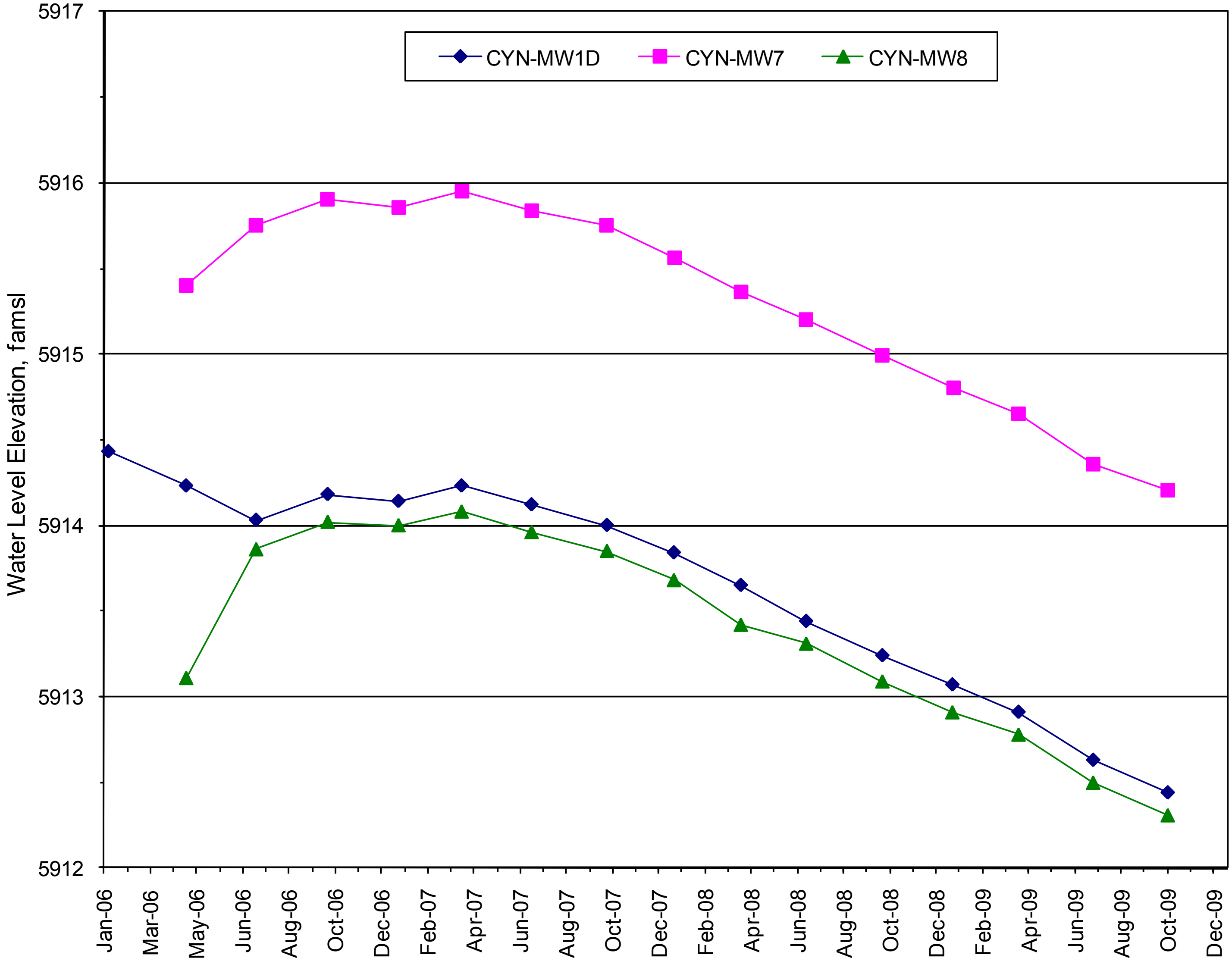

Figure 7C-1. Burn Site Groundwater Wells (1 of 4)

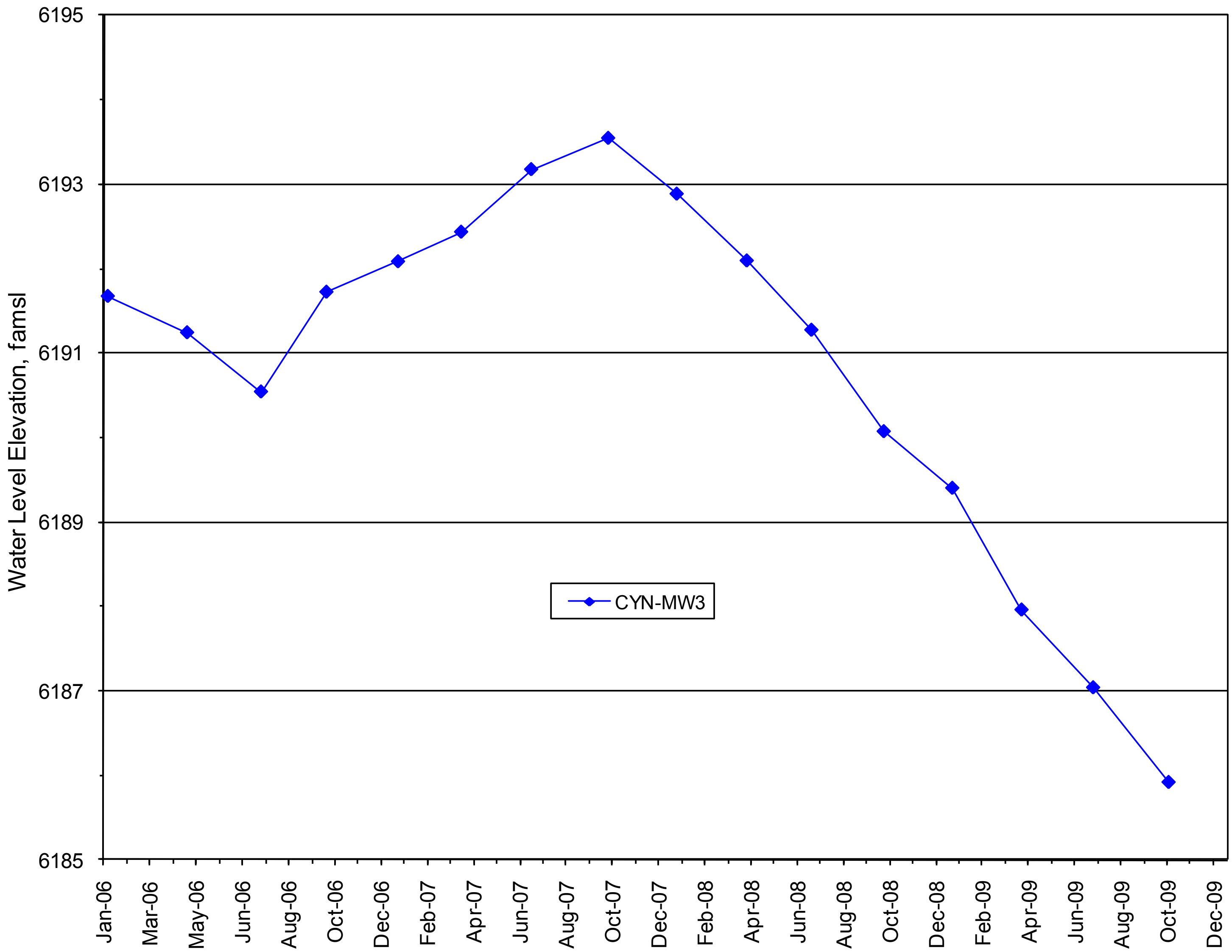

Figure 7C-2. Burn Site Groundwater Wells (2 of 4)

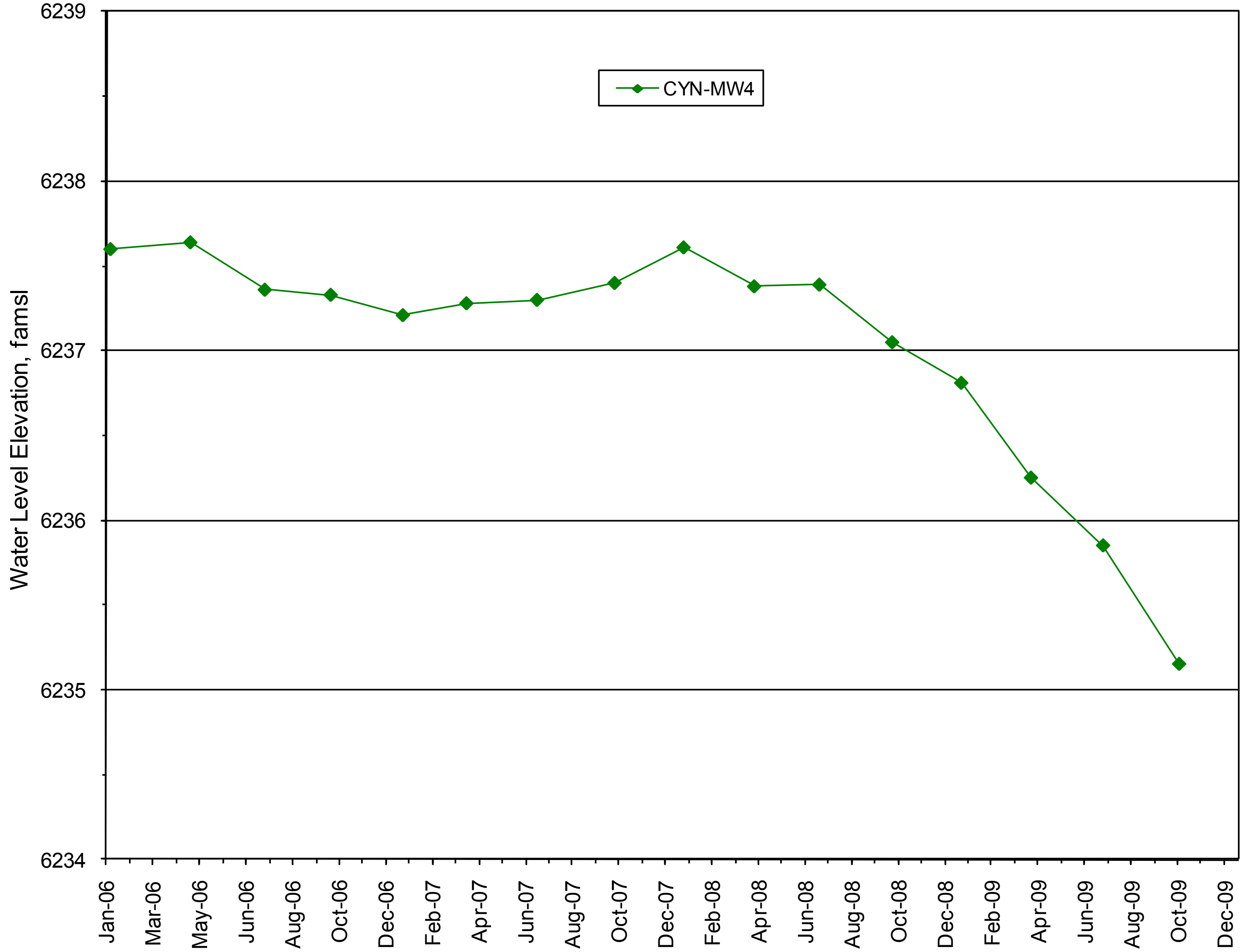

Figure 7C-3. Burn Site Groundwater Wells (3 of 4)

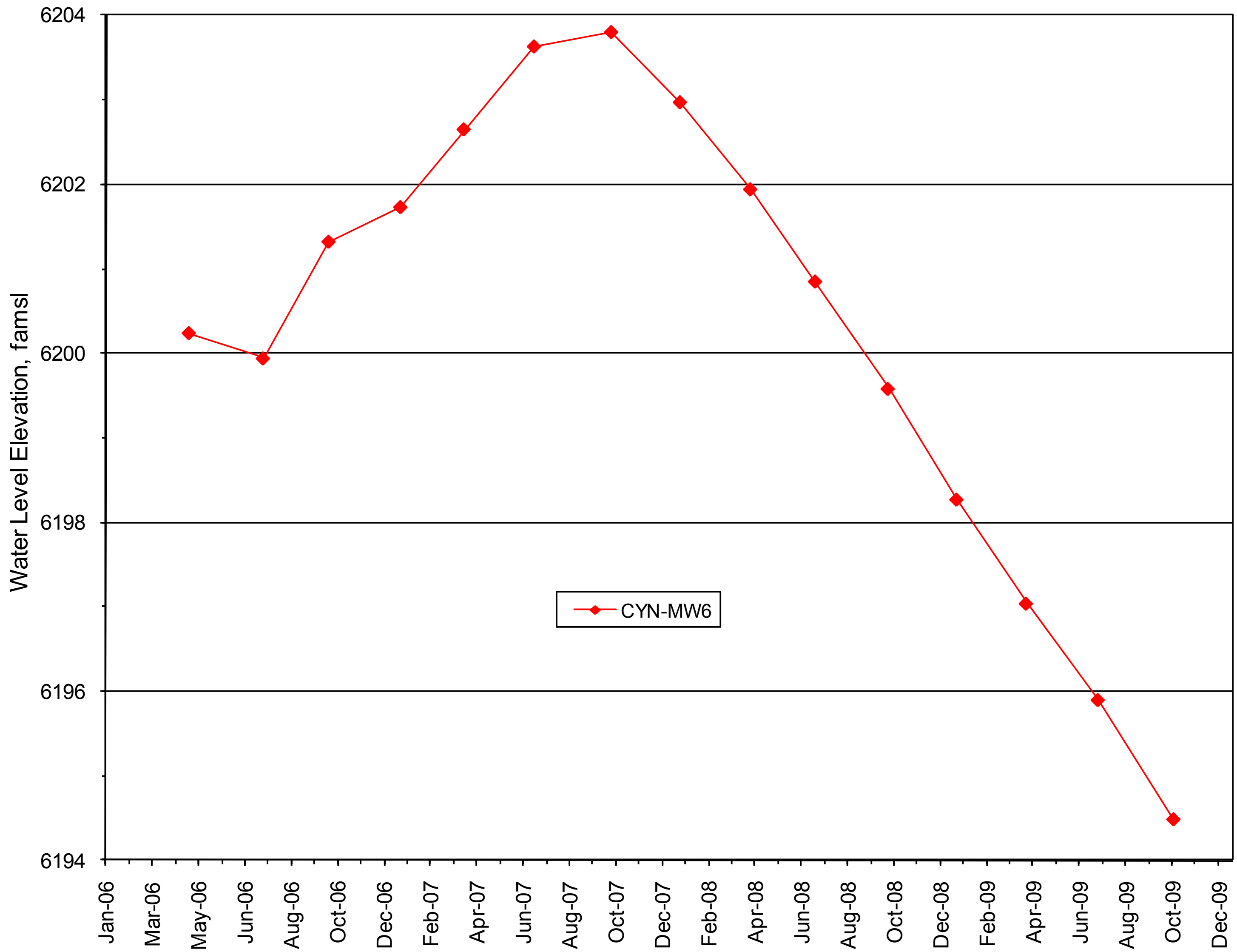

Figure 7C-4. Burn Site Groundwater Wells (4 of 4)

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