National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

ENTERED

JUN 7 2010

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

JUN 2010

James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505

Subject: Mixed Waste Landfill (MWL) Groundwater Monitoring Report Calendar Year (CY) 2009

Dear Mr. Bearzi:

On behalf of the Department of Energy/National Nuclear Security Administration (DOE/NNSA) and Sandia Corporation (Sandia), DOE/NNSA is submitting the *"Mixed Waste Landfill Groundwater Monitoring Report Calendar Year 2009"*. The report presents Groundwater Monitoring data from sampling events conducted at the MWL in 2009. Below is a brief summary of information contained in this CY2009 Report.

The results of the Groundwater Monitoring Report showed constituent concentrations within historical ranges for the MWL. Toluene and bis(2-ethylhexyl)phthalate have been detected during historic Groundwater Monitoring at the MWL and were detected in Groundwater samples from the newly installed wells during quarterly sampling performed in 2009. Both of these compounds are common laboratory contaminants; however, DOE/NNSA and Sandia initiated an investigation in late 2009 to confirm the source. New Mexico Environmental Department further provided direction in an April 30, 2010 letter for conducting a purging/sampling study of the Groundwater along with any other studies necessary to determine the source. This investigation is ongoing and will be completed in 2010.

Should you have any questions regarding this correspondence, please feel free to contact me at (505) 845-6036, or John Gould of my staff at (505) 845-6089.

Sincerely,

Kimberly A Davis for

Patty Wagner
Manager

Enclosure

JUN 7 2010

cc w/enclosure:
W. Moats, NMED (Via Certified Mail)
L. King, EPA, Region 6 (Via Certified Mail)
T. Skibitski, NMED-OB
B. Birch, NMED-OB
Records Center, SNL/NM, Org. 6765, MS-0718
Zimmerman Library, UNM

cc w/o enclosure:
A. Blumberg, SNL/NM, Org. 11100, MS-0141
M. Walck, SNL/NM, Org. 6700, MS-0701
D. Miller, SNL/NM, Org 6765, MS-0718
J. Cochran, SNL/NM, Org. 6765, MS-0719
S. Saltzstein, SNL/NM, Org. 6702, MS-0701
B. Langkopf, SNL/NM, Org. 6765, MS-0718
C. Daniel, SNL/NM, Org. 6765, MS-0718
J. Estrada, SSO
J. Gould, SSO
D. Pellegrino, SSO

AOP 95-45, 06

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: **Mixed Waste Landfill Groundwater Monitoring Report Calendar Year 2009**

Document author: **Alicia Aragon, Department 06765**

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

Signature: Marianne C Walck — 5-27-10
Date

Marianne Walck
Director
Nuclear Energy & Global Security Technologies
Center 6700
Sandia National Laboratories/New Mexico
Albuquerque, New Mexico 87185
Operator

and

Signature: Kimberly A Davis for — 6/7/10
Date

Patty Wagner
Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

Sandia National Laboratories/New Mexico Environmental Restoration Project

MIXED WASTE LANDFILL GROUNDWATER MONITORING REPORT CALENDAR YEAR 2009

JUNE 2010

United States Department of Energy
Sandia Site Office

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

EXECUTIVE SUMMARY

Groundwater sampling was conducted at a total of seven groundwater monitoring wells at the Sandia National Laboratories, New Mexico (SNL/NM) Mixed Waste Landfill (MWL) in January, April, July, and October 2009. During 2008, four new monitoring wells were installed (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) and required Consent Order compliant (NMED April 2004) sampling for eight consecutive quarters. In addition, sampling for perchlorate is required at the new wells for at least four consecutive quarters. The MWL monitoring wells were sampled in accordance with appropriate field operating procedures (SNL/NM August 2007a, 2007b, and 2007c) for groundwater sampling activities and mini-sampling and analysis plans (mini-SAPs) (SNL/NM January 2009, April 2009, July 2009, and October 2009). The results of the groundwater monitoring showed constituent concentrations within historical ranges for the MWL. The field activities and analytical results for Calendar Year 2009 groundwater sampling events are presented in this report.

This page intentionally left blank.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
LIST OF FIGURES v
LIST OF TABLES vii
LIST OF APPENDICES ix
ACRONYMS AND ABBREVIATIONS xi

1.0 INTRODUCTION 1-1

2.0 REGULATORY CRITERIA 2-1

3.0 SCOPE OF ACTIVITIES 3-1

3.1 Analytical Parameters 3-1
3.2 Monitoring History 3-1
3.3 Monitoring Network 3-2

4.0 FIELD METHODS AND MEASUREMENTS 4-1

4.1 Groundwater Elevation Measurements 4-1
4.2 Well Purging and Water Quality Measurements 4-3
4.3 Pump Decontamination 4-5
4.4 Sample Collection 4-5
4.5 Sample Handling and Shipment 4-5
4.6 Waste Management 4-6

5.0 ANALYTICAL METHODS 5-1

6.0 SUMMARY OF ANALYTICAL RESULTS 6-1

6.1 General Chemistry Parameters 6-1
6.2 Metals 6-1
6.3 Volatile and Semivolatile Organic Compounds 6-2
6.4 Perchlorate 6-3
6.5 Radiological Parameters 6-3

7.0 QUALITY CONTROL SAMPLE RESULTS 7-1

7.1 Field Quality Control Samples 7-1

7.1.1 Trip Blank Samples 7-1
7.1.2 Equipment Blank Samples 7-2
7.1.3 Field Blank Samples 7-3
7.1.4 Field Duplicate Samples 7-3

7.2 Laboratory Quality Control Samples 7-4

TABLE OF CONTENTS (Concluded)

8.0 VARIANCES AND NONCONFORMANCES 8-1

9.0 SUMMARY AND CONCLUSIONS 9-1

10.0 REFERENCES 10-1

LIST OF FIGURES

Figure

1-1 Location of Sandia National Laboratories and Kirtland Air Force Base.....1-2

1-2 Location of Groundwater Monitoring Wells at the Mixed Waste Landfill 1-3

4.1-1 Potentiometric Surface of the Regional Aquifer at the Mixed Waste Landfill, October 2009.....4-2

4.1-2 Hydrographs for MWL Monitoring Wells.....4-4

This page intentionally left blank.

LIST OF TABLES

Table

2-1 Monitoring Report Crosswalk for Mixed Waste Landfill Annual Groundwater Monitoring Report 2-1

3.3-1 Calendar Year 2009 Groundwater Sampling Events at the Mixed Waste Landfill 3-2

4.1-1 Mixed Waste Landfill October 2009 Groundwater Elevation Data 4-1

This page intentionally left blank.

LIST OF APPENDICES

Appendix

A Summary Tables of Field Measurements and Analytical Results

B Generalized Conceptual Hydrogeologic Model Explaining the Lower Groundwater Elevations Measured in MWL-MW7 through MWL-MW9 at the Mixed Waste Landfill

This page intentionally left blank.

ACRONYMS AND ABBREVIATIONS

AOP	Administrative Operating Procedure
ARG	Ancestral Rio Grande
BW	background well
COA	City of Albuquerque
COC	constituent of concern
CY	Calendar Year
EB	equipment blank
EPA	U.S. Environmental Protection Agency
FB	field blank
FOP	Field Operating Procedure
GEL	General Engineering Laboratories, Inc.
KAFB	Kirtland Air Force Base
LTES	Long-Term Environmental Stewardship
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
μg/L	microgram(s) per liter
mg/L	milligram(s) per liter
MS	matrix spike
MW	monitoring well
MWL	Mixed Waste Landfill
NMED	New Mexico Environment Department
NPN	nitrate plus nitrite
pCi/L	picocurie(s) per liter
PQL	practical quantitation limit
PVC	polyvinyl chloride
QC	quality control
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SC	specific conductance
SNL/NM	Sandia National Laboratories/New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TAL	target analyte list
TB	trip blank
VOC	volatile organic compound

This page intentionally left blank.

1.0 INTRODUCTION

Groundwater monitoring of seven wells was conducted at the Sandia National Laboratories/New Mexico (SNL/NM) Mixed Waste Landfill (MWL) throughout Calendar Year (CY) 2009. This report describes the field activities conducted during the sampling events and presents the analytical results. Appendix A presents summary tables of the field measurements and sampling results.

The MWL is located on Kirtland Air Force Base (KAFB), four miles south of the SNL/NM Technical Area (TA)-I facilities and 5 miles southeast of Albuquerque International Sunport. The MWL is a 2.6-acre site in the north-central portion of TA-III (Figure 1-1). The MWL was established in 1959 as a disposal area for low-level radioactive and mixed waste generated by SNL/NM research facilities and accepted low-level radioactive and minor amounts of mixed waste 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 was 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. An evapotranspirative cover that includes a biointrusion barrier was installed during Fiscal Year 2009 (SNL/NM January 2010) in accordance with the New Mexico Environment Department (NMED)-approved “MWL Corrective Measures Implementation Plan” (SNL/NM November 2005).

Groundwater at the MWL has been extensively characterized since 1990 for major ion chemistry, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), nitrate plus nitrite (NPN), metals, radionuclides, and perchlorate. Twenty years of quarterly, semiannual, and annual data indicate that groundwater has not been contaminated by releases from the MWL (Goering et al. 2002; Lyon and Goering January 2006; SNL/NM December 2001, January 2002, March 2002, July 2002, August 2002, October 2002, June 2003, September 2003, July 2004, November 2006, January 2008, and May 2009).

The MWL groundwater monitoring well network was modified in 2008 (SNL/NM May 2009). Due to declining water levels, four monitoring wells were plugged and abandoned (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3) and four new monitoring wells were installed (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9). Figure 1-2 shows the current groundwater monitoring well network at the MWL. The well network consists of seven wells completed within the interfingering, fine-grained, alluvial fan deposits and coarse-grained, Ancestral Rio Grande deposits. The monitoring well network currently consists of one background well (BW) (MWL-BW2), one on-site monitoring well (MW) (MWL-MW4), and five downgradient wells (MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, and MWL-MW9) (Figure 1-2).

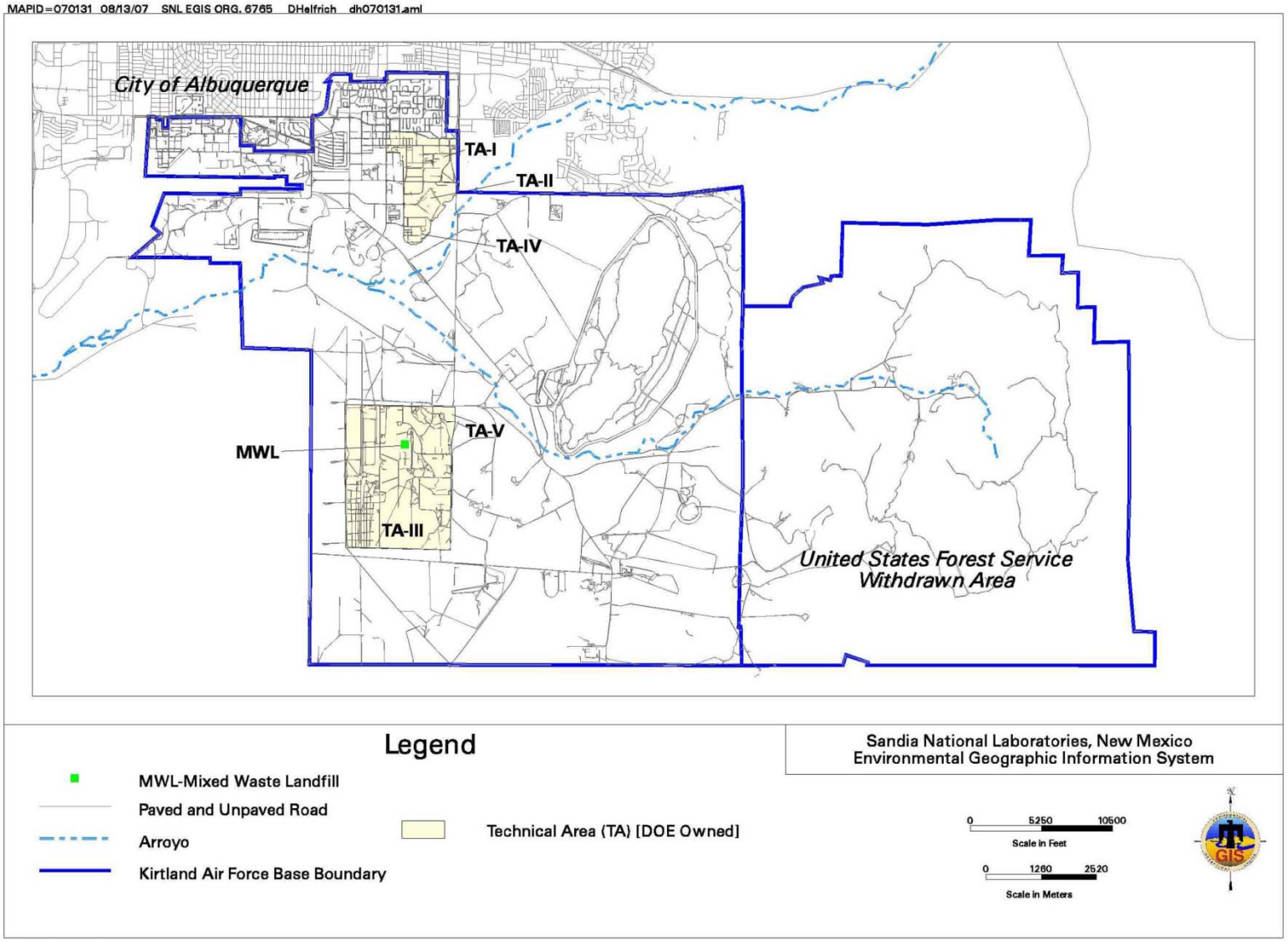

Figure 1-1
Location of Sandia National Laboratories and Kirtland Air Force Base

Figure 1-2
Location of Groundwater Monitoring Wells at the Mixed Waste Landfill

This page intentionally left blank.

2.0 REGULATORY CRITERIA

Historically, the NMED Hazardous Waste Bureau has provided regulatory oversight of the MWL as Solid Waste Management Unit (SWMU) 76 under the Hazardous and Solid Waste Amendments module of the facility Resource Conservation and Recovery Act 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 4.1.500, 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 Consent Order) in April 2004, which transferred the regulatory requirements for groundwater sampling at the MWL to the Consent Order (NMED April 2004). This report has been formatted to address the content criteria set forth in the Consent Order for Periodic Monitoring Reports. Table 2-1 provides a "crosswalk" that lists the required elements from the Consent Order and the corresponding section(s) in which these elements are addressed in this report.

Table 2-1
Monitoring Report Crosswalk for Mixed Waste Landfill
Annual Groundwater Monitoring Report

Required Elements of the Consent Order (NMED April 2004)	MWL Groundwater Monitoring Report Calendar Year 2009
1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible DOE and Sandia representative)	Title Page Signatures for full Sandia and DOE chain of command on the transmittal paperwork that accompanies the report from Sandia to the DOE to the NMED
2. Executive Summary (Abstract)	Executive Summary and Section 9.0
3. Table of Contents	Table of Contents
4. Introduction	Section 1.0 Introduction
5. Scope of Activities	Section 3.0 Scope of Activities
6. Regulatory Criteria	Section 2.0 Regulatory Criteria
7. Monitoring Results	Section 6.0 Summary of Analytical Results
8. Conclusions	Section 9.0 Summary and Conclusions
9. Tables	Appendix A
10. Figures	Section 1.0 Introduction; Section 4.0 Field Methods and Measurements Appendix B
11. Appendices	Appendix A and Appendix B

DOE = U.S. Department of Energy.
MWL = Mixed Waste Landfill.
NMED = New Mexico Environment Department.
Sandia = Sandia Corporation.

Although radionuclides are being monitored at the MWL, the information related to radionuclides is provided voluntarily by Sandia. The voluntary inclusion of such radionuclide information shall not be enforceable and shall not constitute the basis for any enforcement because such information falls wholly outside the requirements imposed by the NMED, as specified in Section III.A of the Consent Order (NMED April 2004).

This page intentionally left blank.

3.0 SCOPE OF ACTIVITIES

Groundwater sampling was conducted during CY 2009 at the MWL in accordance with the appropriate field operating procedures (FOPs) (SNL/NM August 2007a, 2007b, and 2007c) and Mini-Sampling and Analysis Plans (SAPs) (SNL/NM January 2009, April 2009, July 2009, and October 2009). Seven monitoring wells at the MWL were sampled, including one background well (MWL-BW-2), one on-site monitoring well (MWL-MW4), and five downgradient monitoring wells (MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, and MWL-MW9).

3.1 Analytical Parameters

The analytical parameters selected for monitoring at the MWL groundwater wells during CY 2009 include target analyte list (TAL) metals, total uranium, VOCs, SVOCs, NPN, and major anions. For newly installed wells, the Consent 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 (NMED April 2004, Table XI-1). Alkalinity titrations were performed in the field on groundwater collected from each well. Radiochemical analysis included gross alpha/beta radioactivity, tritium, and gamma-emitting radionuclides. The analytical results are presented in Section 6.0.

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), and field blank (FB) samples. In addition, trip blank (TB) samples were submitted with the samples for VOC analysis. Section 7.0 discusses the QC sample results.

3.2 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. During CY 2008, four monitoring wells were plugged and abandoned (MWL-BW1, MWL-MW1, MWL-MW2, and MWL-MW3) and four new monitoring wells were installed (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) (Bearzi January 2009).

In 1993, MWL-MW4 was completed at an angle of 6 degrees from vertical and is screened at two discrete intervals 20 feet apart (Peace et al. September 2002) to evaluate vertical anisotropy, 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 isolate the two screened intervals. Although monitoring well MWL-MW4 is screened in two discrete intervals, only the upper interval was sampled during CY 2009, as this is the uppermost water-bearing interval beneath the MWL. References in this report to groundwater samples from MWL-MW4 refer to groundwater withdrawn from the upper interval.

3.3 Monitoring Network

The MWL wells were sampled either quarterly or annually in CY 2009. The established wells (MWL-MW4, MWL-MW5, and MWL-MW6) are required to undergo only annual sampling and analysis. Wells MWL-MW7, MWL-MW8, MWL-MW9, and MWL-BW2 are considered new wells and, as required by the Consent Order (NMED April 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. Figure 1-2 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 alluvial deposits. All seven MWL wells are constructed of 5-inch diameter, Schedule 80 polyvinyl chloride (PVC) casing and screen.

Due to the timing of the installation of the new wells, the eight-quarter sampling requirement began at different times depending the availability of the wells. Four sampling events occurred at the MWL during CY 2009 on the following dates: January 5 to January 8, April 1 to April 13, July 6 to July 9, and October 5 to October 8. Table 3.3-1 summarizes the groundwater sampling events conducted at the MWL during CY 2009.

Table 3.3-1
Calendar Year 2009 Groundwater Sampling Events at the Mixed Waste Landfill

Well ID	January 2009	April 2009	July 2009	October 2009
MWL-BW-2	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.

4.0 FIELD METHODS AND MEASUREMENTS

Field measurements performed during groundwater sampling activities included groundwater elevations and water quality parameters. The following sections present a detailed discussion of field activities and methods.

4.1 Groundwater Elevation Measurements

Depth-to-groundwater measurements to support groundwater sampling activities were obtained using a Solinst™ water level meter prior to purging activities. Depth-to-groundwater measurements were performed in accordance with FOP 05-01, "Long-Term Environmental Stewardship (LTES) Groundwater Monitoring Well Sampling and Field Analytical Measurements" (SNL/NM August 2007a). Measurements were obtained from all sampled monitoring. Table A-1 presents depth to water and groundwater elevations.

Separate groundwater elevation measurements are collected in accordance with FOP 03-02, Revision 3, "LTES Groundwater Level Data Acquisition and Management" (SNL/NM November 2009) that are used to map the potentiometric surface at the MWL. October 2009 groundwater elevation data for the MWL monitoring well network are summarized in Table 4.1-1 and in Figure 4.1-1.

Table 4.1-1
Mixed Waste Landfill October 2009 Groundwater Elevation Data

Monitoring Well	Groundwater Elevation	Comments
MWL-BW2	4910.61	Used to contour top of water table
MWL-MW4	--	No measurement, packer not installed
MWL-MW5	4887.07	Not used, well screened below water table
MWL-MW6	4885.84	Not used, well screened below water table
MWL-MW7	4891.79	Used to contour top of water table
MWL-MW8	4891.50	Used to contour top of water table
MWL-MW9	4888.17	Used to contour top of water table

Groundwater occurs at approximately 500 feet below ground surface within Santa Fe Group deposits (basin fill) in either fine-grained, alluvial fan deposits or coarse-grained, Ancestral Rio Grande deposits.

Figure 4.1-1 shows the localized potentiometric surface of the regional aquifer at the MWL in October 2009. Only MWL wells screened across the water table (MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9) were used to contour the MWL potentiometric surface. Groundwater elevation data were not available in October 2009 for MWL-MW4. The inflatable packer, which was removed in May 2009 to allow the surface well casing to be extended as part of the MWL Evapotranspirative Cover construction activities, had not been reinstalled between the two screen intervals at the time groundwater elevation measurements were obtained. MWL-MW4 is the only well at the MWL with two screen intervals. Based upon the potentiometric surface contours, groundwater flows to the west-northwest.

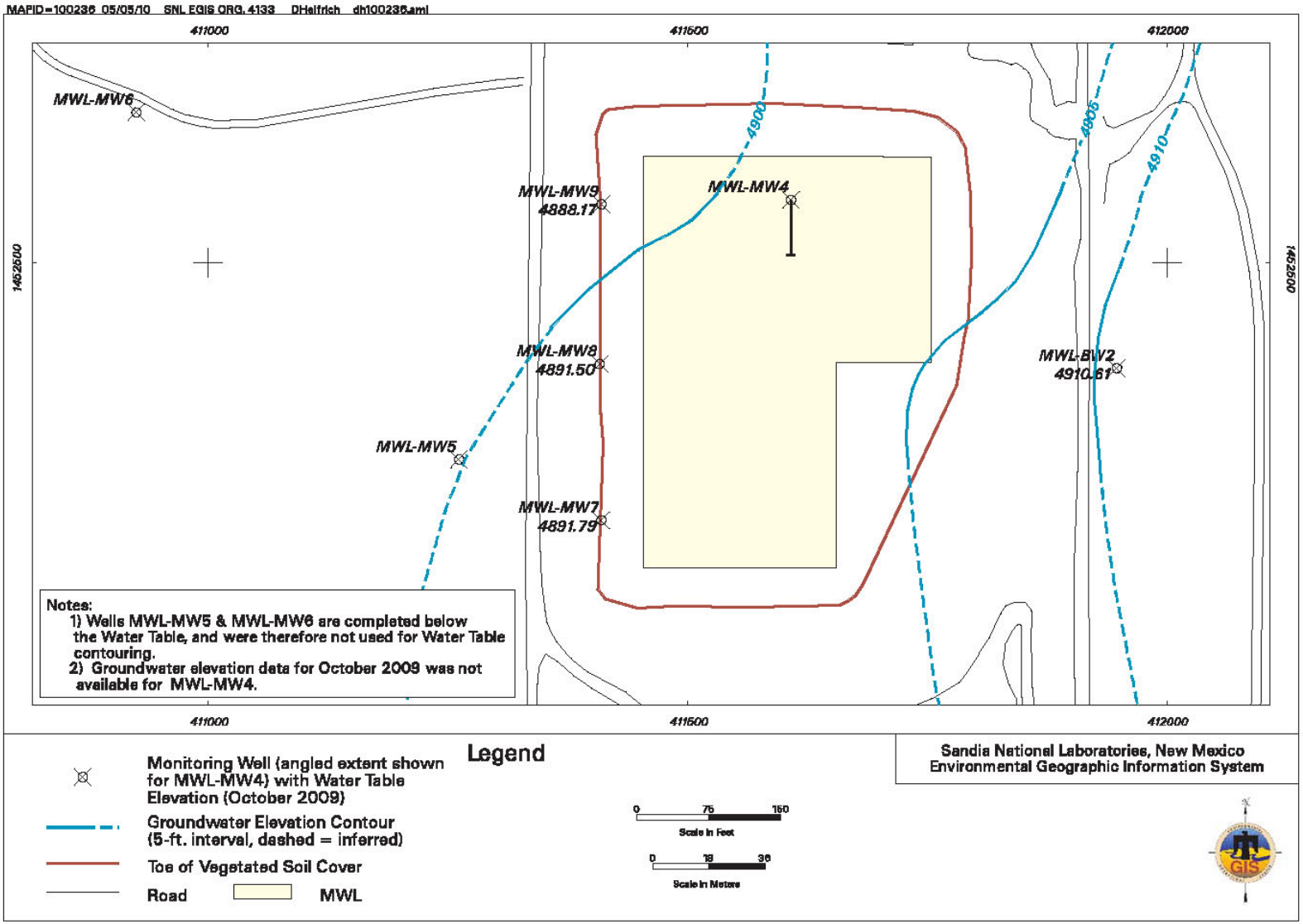

Figure 4.1-1
Potentiometric Surface of the Regional Aquifer at the Mixed Waste Landfill, October 2009

A hydrograph showing water level data for all MWL monitoring wells is provided as Figure 4.1-2. Groundwater elevations on the west side of the MWL decreased from 0.03 (MWL-MW9) to 0.11 feet (MWL-MW7). The largest decrease was observed at MWL-BW2 on the east side, which declined 0.38 feet. From 2005 through 2008, water levels at MWL-MW5, MWL-MW6, and MWL-MW4 declined an average of 0.40 feet per year. The decline is less between 2008 and 2009, ranging from 0.10 at MWL-MW5 to 0.15 feet per year at MWL-MW6 (no October 2009 data were available for MWL-MW4). No seasonal fluctuations are evident.

Installation of new wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9 in 2008 provided additional information regarding the regional aquifer beneath the MWL. This information augments the comprehensive conceptual model presented in the "Mixed Waste Landfill Groundwater Report, 1990 through 2001" (Goering et al December 2002) and the Phase 2 RCRA Facility Investigation Report (Peace et al. September 2002). In general, the groundwater elevation (i.e., top of the regional aquifer or water table) along the west side of the MWL is approximately 20 feet lower than it was in the older monitoring wells that were replaced (MWL-MW2 and MWL-MW3). This lower groundwater elevation appears to be related to two major factors. First, the geology of the upper part of the regional groundwater system, which is a stratified system, varies with depth from a low hydraulic conductivity layer (in which MWL-MW2 and MWL-MW3 were screened) to a medium conductivity layer (in which the lower parts of the screens of MWL-MW7, MWL-MW8, and MWL-MW9 reside) to a high conductivity layer corresponding to the Ancestral Rio Grande sediments (in which the lower screen of MWL-MW4, the MWL-MW6 screen, and the lower part of the MWL-MW5 screen are located). Second, the regional aquifer continues to decline as a result of historic and ongoing large-scale removal of water by the City of Albuquerque and KAFB. The overall effect at the MWL is that groundwater flow is predominantly vertically downward in the low and medium conductivity layers in response to this regional drawdown from pumping (i.e., a draining system).

Because the screen intervals of the new wells (MWL-MW7, MWL-MW8, and MWL-MW9) extend across the medium hydraulic conductivity layer and the screens in the wells they replaced (MWL-MW1, MWL-MW2, and MWL-MW3) were completely within the lower conductivity layer above the medium hydraulic conductivity layer, the vertical gradient has a larger impact on the groundwater elevation in the new wells. The end result is that the top of the regional water table is significantly lower in MWL-MW7, MWL-MW8, and MWL-MW9. Additional supporting hydrogeologic information is provided in Appendix B in the form of summary text, site-specific hydrogeologic cross sections, and generalized time-phased conceptual figures.

4.2 Well Purging and Water Quality Measurements

Prior to sample collection, each monitoring well was purged to remove stagnant water from the well so that a representative groundwater sample could be obtained. In accordance with procedures described in FOP 05-01 (SNL/NM August 2007a), all wells were purged a minimum of one saturated casing volume (the volume of the saturated screen plus the annulus). Purging continued until four stable measurements for turbidity, pH, temperature, and specific conductance (SC), were obtained prior to the collection of groundwater samples. Groundwater stability is considered acceptable when:

- Turbidity measurements are within 10% of 5 nephelometric turbidity units
- pH is within 0.1 units
- Temperature is within 1.0 degrees Celsius
- SC is within 5%

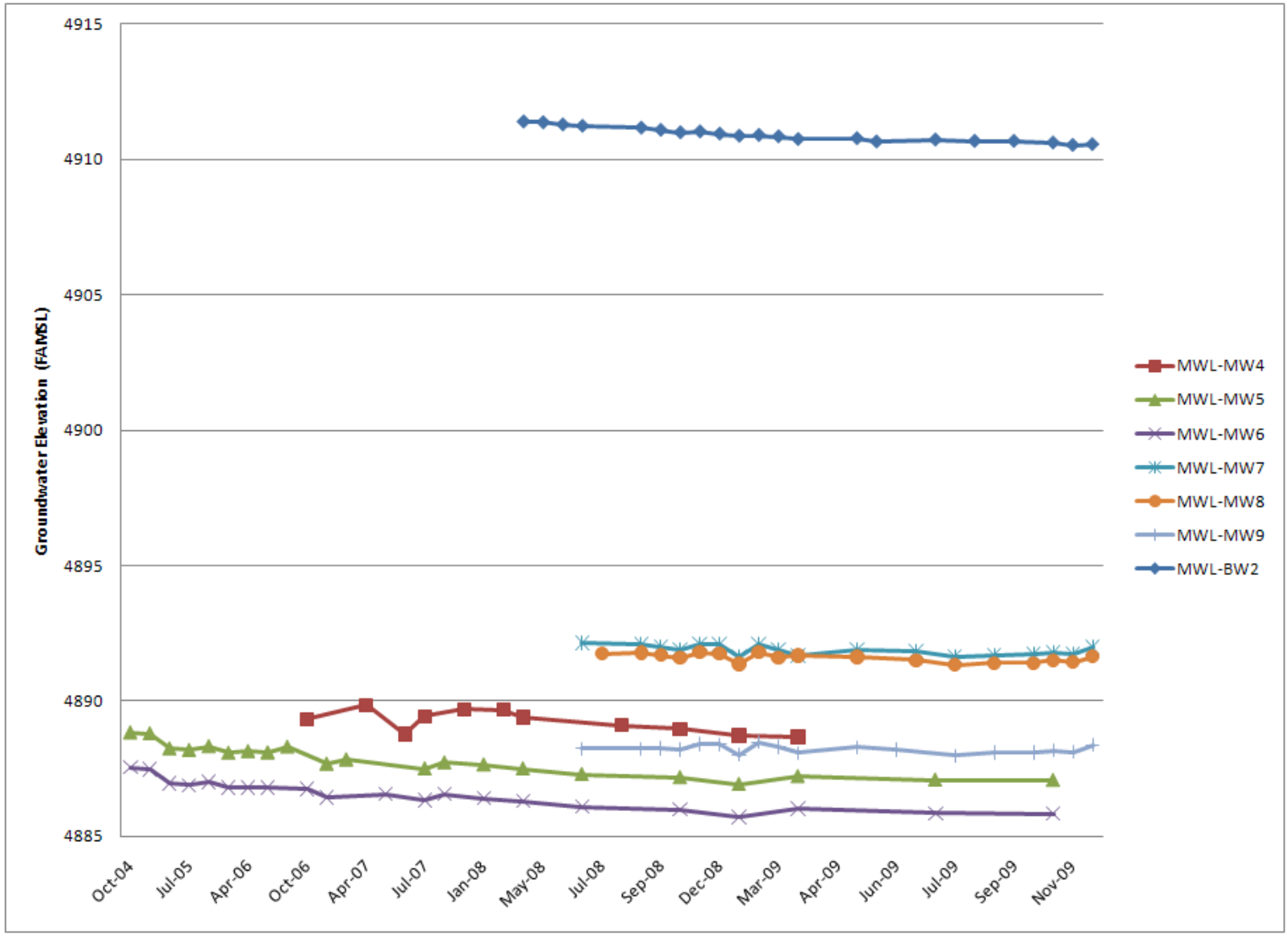

Figure 4.1-2
Hydrographs for MWL Monitoring Wells

Purge volumes and indicator parameter measurements are shown in Table A-2.

Some of the monitoring wells have low yield and were purged to dryness (see Table A-2), allowed to recover, and then sampled to collect representative groundwater samples.

Field analytical measurements of stabilization parameters were collected in accordance with FOP 05-01 (SNL/NM August 2007a). Groundwater temperature, SC, pH, oxidation-reduction potential, and dissolved oxygen were measured using a YSI™ Model 620 Water Quality Meter. Turbidity was measured with a Hach™ Model 2100P portable turbidity meter. Field alkalinity was measured by field personnel using HACH method 8203. Field water quality results are presented in Table A-3.

4.3 Pump Decontamination

The Bennett™ pump and tubing bundle used to collect groundwater samples were decontaminated prior to installation in MWL monitoring wells according to FOP 05-03, "LTES Groundwater Sampling Equipment and Decontamination" (SNL/NM August 2007b). The EB samples for the CY 2009 groundwater sampling events were collected after decontamination to verify the effectiveness of the decontamination procedure and are discussed in Section 7.1.2.

4.4 Sample Collection

A Bennett sampling system was used to collect the groundwater samples from all MWL monitoring wells. The pump intake was set near or at the bottom of each screen interval. The minimum flow rate, given limitations of equipment and well characteristics, was used for all purging and sampling activities. All groundwater samples were collected directly from the pump discharge tubing into laboratory-provided sample containers.

Two groundwater samples were collected from each monitoring well for metals analyses. One unfiltered sample was collected for total metals analyses. The other sample was filtered through a 0.45-micron filter for dissolved metals analyses. Where appropriate for the requested analysis, chemical preservatives were added to the sample containers at the laboratory prior to shipment.

4.5 Sample Handling and Shipment

Immediately after collection, all sample containers were custody-taped, sealed in plastic bags, and placed on cold packs in shipping containers. Analysis Request/Chain-of-Custody forms were completed at the time of collection. The samples for chemical and radiological analyses were shipped via the SNL/NM Sample Management Office to the contracted analytical laboratory. Sample management activities followed SNL/NM Administrative Operating Procedure (AOP) 95-16, "Sample Management and Custody" (SNL/NM February 2007).

4.6 Waste Management

All purge and decontamination water was managed according to FOP 05-04, “LTES Groundwater Monitoring Waste Management” (SNL/NM August 2007c) and was containerized on site pending the results of the analyses. All waste was managed as “nonregulated” waste, based upon historical sampling results and process knowledge of monitoring well locations. Results for the associated environmental samples provide supplemental data for approval to discharge water to the City of Albuquerque (COA) sanitary sewer system.

5.0 ANALYTICAL METHODS

Groundwater samples were submitted to GEL, Hall Analytical, and Metrohm Peak for chemical and radiological analyses. Analyses were performed in accordance with the U.S. Environmental Protection Agency (EPA) test methods (EPA 1979, 1980, 1986, and 1999a) and specified performance criteria (SNL/NM March 2003). Table A-4 specifies the analytical parameters, appropriate test methods, and target analyte quantitation limits for sample analyses.

Analytical reports including certificates of analyses, analytical methods, method detection limits (MDLs), practical quantitation limits (PQLs), dates of analyses, results of quality control (QC) analyses, and data validation findings are filed in the SNL/NM Customer Funded Records Center.

This page intentionally left blank.

6.0 SUMMARY OF ANALYTICAL RESULTS

Tables summarizing field measurements and analytical results are included as Appendix A. Complete field and laboratory documentation are on file at the SNL/NM Customer Funded Records Center.

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

The QC samples associated with each sampling event are included in the analysis of results and are discussed in Section 7.0. Data qualifiers resulting from QC samples or data validation results are presented with the related data in respective data tables in Appendix A.

6.1 General Chemistry Parameters

The general chemistry analytical results are presented in Table A-5 and Table A-6. No general chemistry parameters exceed the MCLs (where established) in the groundwater samples. The only two parameters that have established MCLs are NPN and fluoride (10 and 4 milligrams per liter [mg/L], respectively). Concentrations of NPN range from 0.175 mg/L in the sample collected in July from MWL-MW8 to 3.86 mg/L in the sample collected in April 2009 from MWL-MW7. Fluoride was detected at concentrations ranging from 0.679 mg/L (July 2009 sample from MWL-BW2) to 1.06 mg/L (October 2009 sample from MWL-MW9).

6.2 Metals

Table A-7 summarizes the metal results from all unfiltered groundwater samples collected during the CY 2009 groundwater monitoring events at the MWL and NMED-approved maximum background concentrations (Dinwiddie September 1997). Samples were analyzed for TAL metals according to EPA Method 6020 (EPA 1986). Barium exceeded the background concentration of 0.12 mg/L in five samples (including one duplicate sample) from MWL-MW8, with a range of 0.122 mg/L to 0.153 mg/L. One nickel and one cadmium result for MWL-MW4 exceeded the respective background concentrations (0.028 and 0.004 mg/L) in the April sample (nickel was 0.0291 mg/L and cadmium was 0.00275 mg/L), and one vanadium result exceeded the background concentration of 0.013 for MWL-MW9 (0.0179 mg/L) in October 2009. All unfiltered results are within historical ranges for metals at the MWL and no metals in the unfiltered samples exceed the respective MCLs.

Table A-8 summarizes the results for TAL metal analysis for the filtered samples collected during the CY 2009 groundwater monitoring events. Barium exceeded the background concentration of 0.12 mg/L in three samples from MWL-MW8, with a range of 0.15 to 0.128 mg/L. One nickel and one cadmium result for MWL-MW4 exceeded the respective background concentrations (0.028 and 0.004 mg/L) in the April sample (nickel was 0.0294 mg/L and cadmium was 0.00277 mg/L), and one vanadium result exceeded the background concentration of 0.013 mg/L for MWL-MW9 (0.0142 mg/L) in October 2009. All filtered results are within historical ranges for metals at the MWL. 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. Total uranium exceeded the background concentration of 0.005 mg/L in all MWL groundwater samples (unfiltered and filtered), ranging from 0.0059 to 0.0107 mg/L in the unfiltered samples and 0.00624 to 0.0107 mg/L in the filtered samples. The total uranium results are consistent with historical results, reflect a higher site-specific background concentration at the MWL (note concentration exceeded background at MWL-BW2), and are less than the MCL of 0.03 mg/L. The range in total uranium concentrations at the MWL are within the background concentration range established by Bexfield for the Middle Rio Grande Basin (USGS 2002) and the background concentration range measured during the SNL/NM KAFB background study (IT March 1996).

6.3 Volatile and Semivolatile Organic Compounds

Table A-9 summarizes the results for detected VOCs and SVOCs, and Table A-10 presents the analytical methods and corresponding MDLs for VOCs and SVOCs.

Trace concentrations of acetone and toluene were reported for groundwater samples from the MWL monitoring wells. The results for acetone and toluene presented in Table A-9 are qualified as estimated values and are less than the respective PQLs. No MCL is established for acetone; therefore, detections reported are those that exceed the laboratory MDL. Acteone was detected only in samples from the January sampling event, and the results vary from 3.65 µg/L in the duplicate sample from MWL-MW8 to 4.42 µg/L in the primary MWL-MW8 sample. Acetone results in both MWL-MW8 samples were qualified as not detected during data validation due to associated EB contamination. Acetone is a common laboratory contaminant (EPA 1999b) and has been frequently detected in blank and QC samples.

The MCL for toluene is 1,000 µg/L and the NMED maximum allowable concentration is 750 µg/L. Concentration results vary from 0.253 µg/L in the MWL-MW8 October 2009 sample to 0.852 µg/L in the MWL-MW9 January sample. All detections are below the practical quantitation limit (PQL) of 1 µg/L and are therefore qualified as estimated concentrations. An investigation of potential sources of toluene was initiated in late 2009. This investigation includes the analytical laboratory, sampling equipment, well construction materials. To evaluate the MWL as a potential source of the toluene detections, a review of the 1994 and 2008 soil gas sampling survey results (Peace et al. September 2002 and SNL/NM August 2008) and the Phase 2 RCRA Facility Investigation Report soil sampling results (Peace et al. September 2002) was performed. Based upon this evaluation the MWL is not the source of toluene in groundwater samples.

During the April sampling, 2-hexanone was detected in both MWL-MW6 samples but qualified as not detected during data validation due to associated laboratory method blank contamination (Section 4.7). The VOC 2-butanone was detected in the April sample from MWL-MW6 at a concentration of 1.37 µg/L. This compound was not detected above the laboratory MDL in the associated MWL-MW6 duplicate sample. The SVOC bis(2-ethylhexyl)phthalate was detected at a concentration of 4.52 µg/L, which is above the MDL, but below the MCL of 6 µg/L.

During the July sampling event, the SVOC bis(2-ethylhexyl)phthalate was detected above the MCL of 6.0 µg/L in the sample from MWL-MW7 at a concentration of 9.82 µg/L, which is below the PQL (i.e., this concentration is qualified as estimated). This SVOC was not detected in any other MWL-MW7 samples in 2009, is a common laboratory contaminant (EPA 1999b), is not a COC at the MWL, and has been frequently detected in blank and QC samples. In October, the

bis(2-ethylhexyl)phthalate result for the sample from MWL-MW9 was qualified as not detected during data validation due to laboratory method blank contamination.

6.4 Perchlorate

The Consent Order (NMED April 2004) requires that new wells be sampled for perchlorate for a minimum of four quarters. During CY 2008, groundwater monitoring wells MWL-MW7, MWL-MW8, and MWL-MW9 and background monitoring well MWL-BW2 were installed and therefore added to the perchlorate screening monitoring well network. 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 sufficient by the NMED to remove that well from the perchlorate screening monitoring network.

The sampling results for perchlorate for these wells (MWL-MW7, MWL-MW8, MWL-MW9, and MWL-BW2) are presented in Table A-11. No detections of perchlorate at or above the screening level of 4 µg/L were reported at these locations during their consecutive four quarters of groundwater monitoring. The final quarter of perchlorate sampling for MWL-BW2 coincided with the first quarter of CY09, while the final quarter of perchlorate sampling for MWL-MW7, MWL-MW8, and MWL-MW9 coincided with the second quarter of CY09. Based on these four consecutive nondetections, all MWL wells are no longer being sampled for perchlorate.

6.5 Radiological Parameters

Groundwater samples from the MWL monitoring wells were analyzed 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 A-12 and are compared with the established EPA Safe Drinking Water Act MCLs (EPA 2009) (no MCL has been established for tritium).

Gamma spectroscopy activities for short-list radionuclides were less than associated minimum detectable activity (MDA), except for potassium-40. Potassium-40 was detected above the MDA during each sampling event from various wells (see Table A-12). However, all potassium-40 results were qualified as estimated values during data validation since the laboratory did not identify a definitive peak and the associated MDA was biased low.

Gross alpha activity is measured as a screening tool and according to 40 Code of Federal Regulations (CFR) Parts 9, 141, and 142, Table I-4, does not include uranium, which is measured independently as part of TAL metals list as described in Section 6.2. Therefore, gross alpha activity measurements were corrected by subtracting out the total uranium activity. Uranium concentrations in mg/L determined from TAL metal analyses are converted to pCi/L and subtracted from the overall gross alpha activity. A conversion factor of 670 pCi/mg natural uranium is used (40 CFR Parts 9, 141, and 142, Subpart I and Malcewska-Toth, Myers, Shuey, and Lewis May 2003). Corrected gross alpha activity results are all below the MCL of 15 pCi/L and range from 2.54 to 9.26 pCi/L. Gross beta activity results did not exceed established limits. Tritium activities were reported below laboratory MDAs in all groundwater samples. Because tritium is a constituent of concern (COC) at the MWL, the results are reported in Table A-12.

This page intentionally left blank.

7.0 QUALITY CONTROL SAMPLE RESULTS

Field and laboratory QC samples were prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. All data were reviewed in accordance with AOP 00-03 "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM July 2007). The results for each QC analysis and the impact on data quality are discussed in the following sections.

7.1 Field Quality Control Samples

The QC samples collected in the field included TB, EB, FB, and field duplicate samples. A TB sample is collected to assess whether contamination occurred during shipment and storage. An EB sample is collected to verify the effectiveness of the sampling equipment decontamination process. An FB sample provides a method to check for potential sources of sample contamination or sampling error. 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.

7.1.1 Trip Blank Samples

TB samples were submitted whenever samples were collected for VOC analysis to assess whether contamination of the samples had occurred during shipment and storage. TB samples consist of laboratory reagent grade water with hydrochloric acid preservative contained in 40-mL 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.

January 2009. A total of 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 2-hexanone, which was detected in the trip blank sample associated with MWL-MW6 samples. This compound was qualified during data validation as not detected due to associated laboratory method blank contamination.

July 2009. A total of four TBs were submitted with the July 2009 samples. No VOCs were detected above associated laboratory MDLs.

October 2009. A total of five TBs were submitted with the October 2009 samples. No VOCs were detected above associated laboratory MDLs, except chloromethane. No corrective action was required as chloromethane was not detected in the associated environmental sample.

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 EB samples are collected prior to sampling various wells 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 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 environmental samples or detected in associated environmental samples at concentrations greater than five times the blank contamination. Acetone in MWL-MW8 environmental samples was qualified as not detected during data validation as the sampling results are less than 10 times the blank contamination. Both unfiltered and filtered fractions for chromium and copper in MWL-MW8 environmental samples were qualified as not detected during data validation as chromium and copper results are less than five times the blank contamination.

April 2009. EB samples were collected prior to sampling MWL-MW6 and MWL-MW7. 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 not detected in the environmental samples or were detected in associated environmental samples at concentrations less than five times the blank contamination. The filtered fraction of vanadium in MWL-MW6 samples was qualified as not detected during data validation as the sampling results are less than five times the blank contamination. Both unfiltered and filtered fractions for aluminum and copper in MWL-MW7 samples were qualified as not detected during data validation as aluminum and copper reported for both environmental samples were less than five times the blank contamination.

July 2009. An EB sample was collected prior to sampling MWL-MW9. Various organic and inorganic parameters detected in the EB sample 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 not detected in the environmental samples or were detected in associated environmental samples at concentrations less 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. An EB sample was collected prior to sampling MWL-BW2. Various organic and inorganic parameters detected in the EB sample included bromodichloromethane, bromoform, chloroform, dibromochloromethane, alkalinity, chloride, copper, and sodium. No corrective action was required for all parameters as the analytes were not detected in the environmental samples or were detected at concentrations less 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.

7.1.3 Field Blank Samples

FB samples were returned to the laboratory with each shipment containing environmental samples for VOC analysis to assess whether contamination of the samples resulted from ambient field conditions. 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.

January 2009. The FB sample was prepared by pouring deionized water into sample containers at the MWL-BW2 sampling point. Acetone, bromodichloromethane, and carbon disulfides were detected in the FB sample. No corrective action was required as these compounds were not detected in the associated environmental sample.

April 2009. The FB sample was prepared by pouring deionized water into sample containers at the MWL-MW5 sampling point. 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. FB samples were collected at all well locations due to equipment operation associated with MWL cover construction activities. Bromodichloromethane, chloroform, and dibromochloromethane were detected in every FB sample. No corrective action was required, however, as these compounds were not detected in the associated environmental samples.

October 2009. The FB sample was prepared by pouring deionized water into sample containers at the MWL-MW7 sampling point. Bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected in the FB sample from the October 2009 sampling event. No corrective action was required as these compounds were not detected in the associated environmental sample.

7.1.4 Field Duplicate Samples

Duplicate environmental samples were collected in order to estimate the overall reproducibility of the sampling and analytical processes. The duplicate samples were collected immediately after the original environmental sample in order to reduce variability caused by time and/or sampling mechanics. Duplicate samples were analyzed for all analytical parameters.

Relative percent difference (RPD) calculations between duplicate samples were performed for detected analytes. Table A-13 summarizes the results of duplicate sample analyses and presents calculated RPD values.

January 2009. A duplicate sample was collected from MWL-MW8. The MWL mini-SAP does 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, except aluminum, iron, and magnesium. 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. The groundwater samples were collected after allowing the monitoring well to recover.

April 2009. A duplicate sample was collected from MWL-MW6. Duplicate sample results show good correlation for all calculated parameters, except aluminum and cobalt. The RPD for aluminum was calculated at 36 for the unfiltered sample. The RPD for unfiltered cobalt was calculated at 25. The elevated RPD values for both aluminum and cobalt are considered estimated values as reported concentrations were detected below the PQL.

July 2009. A duplicate sample was collected from MWL-MW9. Duplicate sample results show good correlation for all calculated parameters, except arsenic, iron, manganese, and zinc. The RPD values for arsenic, iron, and manganese were calculated at 31, 40, and 34, respectively, for the unfiltered sample. The RPD for zinc was calculated at 54 in the unfiltered sample and at 29 in the filtered sample. The RPD values for arsenic and zinc 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. The groundwater samples were collected after allowing the monitoring well to recover.

October 2009. A duplicate sample was collected from MWL-BW2. Duplicate sample results show good correlation for all calculated parameters, except total selenium. The RPD for total selenium was calculated at 34 for the unfiltered sample. The RPD value for selenium in the filtered sample was calculated at 4.

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. Additionally, batch matrix spike (MS), matrix spike duplicate, and surrogate spike analyses were analyzed by GEL. The chemical data were reviewed and qualified in accordance with AOP 00-03 (SNL/NM 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 CY 2009 MWL groundwater monitoring samples.

January 2009. The potassium-40 result from the MWL-MW8 duplicate sample was qualified as unusable during data validation due to the peak not meeting identification criteria during gamma spectroscopy analysis at the laboratory.

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

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

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

8.0 VARIANCES AND NONCONFORMANCES

All analytical and field methods were performed according to the requirements specified in the MWL groundwater monitoring mini-SAPs for CY 2009 (SNL/NM January 2009, April 2009, July 2009, and October 2009), and there were no variances from the plans. Project-specific issues associated with the sampling events are noted as follows.

Various parameters have been detected in field QC samples since SNL/NM changed suppliers for deionized water. SNL/NM is preparing to test and investigate the quality of deionized water currently in use. The results will be reported in the CY 2010 MWL Annual Groundwater Monitoring Report.

This page intentionally left blank.

9.0 SUMMARY AND CONCLUSIONS

Groundwater sampling and analysis were conducted at the MWL during four quarters in CY 2009 according to the mini-SAPs (SNL/NM January 2009, April 2009, July 2009, and October 2009).

Only one contaminant was detected above the MCL in CY 2009. The compound bis(2-ethylhexyl)phthalate was detected in the sample from MWL-MW7 during the July 2009 sampling event at a concentration of 9.82 µg/L, which is above the MCL of 6.0 µg/L but below the PQL of 10 µg/L. This compound was not detected in any other 2009 MWL-MW7 samples, is a common laboratory contaminant (EPA 1999b), and has been frequently detected in blank and QC samples. 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 well below the MCL (1,000 µg/L) and below the PQL (1.0 µg/L) but greater than the MDL (0.250 µg/L) in several samples, including the January and July samples from background well MWL-BW2. Potential sources of toluene are being further investigated. A review of the 1994 and 2008 soil gas sampling survey results (Peace et al. September 2002 and SNL/NM August 2008) and the Phase 2 RCRA Facility Investigation Report soil sampling results (Peace et al. September 2002) indicates both toluene and bis(2-ethylhexyl)phthalate are not COCs and the MWL is not the source of toluene in the groundwater samples.

All filtered and unfiltered metals results are within historical ranges for metals at the MWL and below established MCLs. Barium in MWL-MW8, nickel and cadmium in MWL-MW4, and vanadium in MWL-MW9 were detected at concentrations exceeding background concentrations. In all MWL groundwater samples total uranium exceeded the background concentration. The total uranium results are consistent with historical results, reflect a higher site-specific background concentration at the MWL, are less than the MCL, and are consistent with background ranges for the Middle Rio Grande Basin (USGS 2002) and KAFB (IT March 1996).

No radiological or general chemistry parameters exceed the established MCLs in any of the groundwater samples. Based upon the results of the groundwater monitoring events conducted at the MWL during CY 2009, constituent 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.

This page intentionally left blank.

10.0 REFERENCES

Bearzi, J. (New Mexico Environment Department Hazardous Waste Bureau), January 2009. Letter to P. Wagner (U.S. Department of Energy) and F. Nimick (Sandia National Laboratories), RE: Notice of approval: Summary report for mixed waste landfill monitoring well plug and abandonment and installation—decommissioning of groundwater monitoring wells MWL-MW1, 2, and 3; Installation of groundwater monitoring wells MWL-MW7, 8, and 9, September, 2008, Sandia National Laboratories, EPA ID#NM5890110518 HWB-SNL-08-020.

Dinwiddie, R.S. (New Mexico Environment Department), September 1997. Letter to M.J. Zamorski (U.S. Department of Energy), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB." September 24, 1997.

Dinwiddie, R.S. (New Mexico Environment Department), June 1998. Letter to M.J. Zamorski (U.S. Department of Energy), "Mixed Waste Landfill: Regulatory Status, SNL/KAFB." June 11, 1998.

EPA, see U.S. Environmental Protection Agency.

Goering, T.J., G.M. Haggerty, D. Van Hart, and J.L. Peace, December 2002. "Mixed Waste Landfill Groundwater Report, 1990 through 2001, Sandia National Laboratories, Albuquerque, New Mexico," SAND Report SAND2002-4098, prepared by Sandia National Laboratories, Albuquerque, New Mexico, for the U.S. Department of Energy under Contract DE-AC04-94AL85000.

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

IT Corporation (IT), March 1996. "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Project and the Kirtland Air Force Base Installation Restoration Program," prepared for Sandia National Laboratories, Albuquerque, New Mexico.

Lyon, M.L., and T.J. Goering, January 2006. "Mixed Waste Landfill Annual Groundwater Monitoring Report, April 2005," SAND2006-0391, Sandia National Laboratories, Albuquerque, New Mexico.

Malcewska-Toth B., O. Myers, C. Shuey, and J.L. Lewis, May 2003. "Recommendations for a Uranium Health-Based Ground Water Standard," Report to New Mexico Environment Department, Ground Water Bureau, Santa Fe, New Mexico, prepared by the University of New Mexico Community Environmental Health Program.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act," § 74-4-10, New Mexico Environment Department.

NMED, see New Mexico Environment Department.

Peace, J.L., T.J. Goering, and M.D. McVey, September 2002. "Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation, Sandia National Laboratories, Albuquerque, New Mexico," SAND Report SAND2002-2997, prepared by Sandia National Laboratories, Albuquerque, New Mexico, for the U.S. Department of Energy under Contract DE-AC04-94AL85000.

Sandia National Laboratories/New Mexico (SNL/NM), December 2001. "Mixed Waste Landfill Quarterly Groundwater Monitoring Report for Monitoring Wells MWL-MW5 and MWL-MW6, July 2001, Sandia National Laboratories/New Mexico," prepared by IT Corporation for Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), January 2002. "Mixed Waste Landfill Quarterly Groundwater Monitoring Report, MWL-MW4, MWL-MW5 and MWL-MW6, January 2002," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 2002. "Mixed Waste Landfill Quarterly Groundwater Monitoring Report, MWL-MW4, MWL-MW5, and MWL-MW6, October/November 2001," prepared by IT Corporation for Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 2002. "Mixed Waste Landfill Quarterly Groundwater Monitoring Report, MWL-MW5 and MWL-MW6, July 2002," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 2002. "Mixed Waste Landfill Annual Groundwater Monitoring Report, April 2002, Sandia National Laboratories/New Mexico," prepared by IT Corporation for Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), October 2002. "Mixed Waste Landfill Quarterly Groundwater Monitoring Report, MWL-MW5 and MWL-MW6, October 2002," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 2003. "SNL/NM Statement of Work for Analytical Laboratories, Revision 2," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 2003. "Mixed Waste Landfill Annual Groundwater Monitoring Report, April 2003," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), September 2003. "Mixed Waste Landfill Annual Groundwater Monitoring Report, April 2003, Addendum – Cadmium Verification Sampling, September 2003," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 2004. “Mixed Waste Landfill Annual Groundwater Monitoring Report, April 2004,” Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2005. “Mixed Waste Landfill Corrective Measures Implementation Plan,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), November 2006. “Mixed Waste Landfill Annual Groundwater Monitoring Report, April 2006 Sampling Event, Sandia National Laboratories/New Mexico,” prepared by Shaw Environmental, Inc. for Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), February 2007. “Sample Management and Custody,” AOP 95-16, Revision 01, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), July 2007. “Data Validation Procedure for Chemical and Radiochemical Data,” AOP 00-03, Revision 2, Sample Management Office. Sandia National Laboratories, Albuquerque, New Mexico, July 16, 2007.

Sandia National Laboratories/New Mexico (SNL/NM), August 2007a. “Long-Term Environmental Stewardship (LTES) Groundwater Monitoring Well Sampling and Field Analytical Measurements,” FOP 05-01, Revision 00, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 2007b. “LTES Groundwater Sampling Equipment Decontamination,” FOP 05-03, Revision 02, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 2007c. “LTES Groundwater Monitoring Waste Management,” FOP 05-04, Revision 02, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), November 2007. “Groundwater Level Acquisition and Management,” FOP 03-02, Rev. 02, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), January 2008. “Mixed Waste Landfill Annual Groundwater Monitoring Report, Spring 2007 Sampling Event,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2008. “Investigation Report on the Soil-Vapor Volatile Organic Compounds, Tritium, and Radon Sampling at the Mixed Waste Landfill,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2009. “Mixed Waste Landfill Groundwater Monitoring Mini-SAP for FY09, 2nd Quarter Sampling,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), April 2009. “Mixed Waste Landfill Groundwater Monitoring, Mini- SAP for FY09 3rd Quarter Sampling,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2009. “Mixed Waste Landfill Annual Groundwater Monitoring Report Calendar Year 2008,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), July 2009. “Mixed Waste Landfill Groundwater Monitoring, Mini- SAP for FY09 4th Quarter Sampling,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), October 2009. “Mixed Waste Landfill Groundwater Monitoring Mini-SAP for FY10, 1st Quarter Sampling,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2010. “Mixed Waste Landfill Corrective Measures Implementation Report,” Environmental Restoration Project, Sandia National Laboratories, New Mexico.

SNL/NM, see Sandia National Laboratories/New Mexico.

U.S. Environmental Protection Agency (EPA), 1979. “Methods for Chemical Analysis of Water and Wastes,” EPA-600/4-79-020, U.S. Environmental Protection Agency, Cincinnati, Ohio.

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

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

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

U.S. Environmental Protection Agency (EPA), 1999b. “USEPA Contract Laboratory National Functional Guidelines for Organic Data Review,” EPA540/R-99/008, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2009. “National Primary Drinking Water Regulations,” EPA 816-F-09-0004, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Geological Survey (USGS), 2002. “Preliminary Summary Statistics—All Ground-Water Sites, Middle Rio Grande Basin,” prepared by Laura Bexfield, Water Resources Division, U.S. Geological Survey, Albuquerque, New Mexico.

APPENDIX A
Summary Tables of Field Measurements and Analytical Results

APPENDIX A
LIST OF TABLES

Table

A-1 Groundwater Elevations, Pump Setting Depths, and Static Water Level Information, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-1

A-2 Summary of Purge Volumes and Purge Indicator Measurements, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-2

A-3 Summary of Field Water Quality Measurements, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-6

A-4 Analytical Parameters, Test Methods, and Target Quantitation Limits, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-7

A-5 Summary of Nitrate plus Nitrite Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-8

A-6 Summary of Alkalinity and Anion Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-10

A-7 Summary of Unfiltered Total Metal Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-14

A-8 Summary of Filtered Total Metal Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-38

A-9 Summary of Detected Volatile Organic Compounds and Semivolatile Organic Compounds, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-62

A-10 Method Detection Limits for Volatile and Semivolatile Organic Compounds, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-64

A-11 Summary of Perchlorate Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-65

APPENDIX A
LIST OF TABLES (Concluded)

Table

A-12 Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, Calendar Year 2009 ..... A-66

A-13 Duplicate Sample Analytical Results for Chemical Analyses, Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico, January 2009 ..... A-72

Table A-1
Groundwater Elevations, Pump Setting Depths, and Static Water Level Information
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Date of Measurement	Measurement Point Elevation[a] (FAMSL)	Depth to Water (FBTOC)	Groundwater Elevation[a] (FAMSL)	Elevation of Bottom of Well (FAMSL)	Static Water Height (feet)	Pump Setting Depth (FBTOC)
MWL-MW4	04/10/09	5383.46[b]	494.68	4891.49[c]	4878.59	12.90[c]	504
MWL-MW5	04/02/09	5379.89	492.72	4887.17	4856.15	31.02	517
MWL-MW6	04/03/09	5372.64	486.38	4886.26	4839.46	46.80	527
MWL-MW7	01/06/09	5380.63	488.42	4892.21	4878.96	13.25	493
	04/08/09		488.73	4891.90		12.94	493
	07/07/09		488.94	4891.69		12.73	492.5
	10/08/09		488.76	4891.87		12.91	493
MWL-MW8	01/07/09	5381.99	490.23	4891.76	4880.07	11.69	496.5
	04/07/09		490.62	4891.37		11.30	496.5
	07/08/09		490.60	4891.39		11.32	496.5
	10/07/09		490.51	4891.48		11.41	497
MWL-MW9	01/08/09	5379.24	490.88	4888.36	4876.63	11.73	497
	04/09/09		490.71	4888.53		11.90	497
	07/09/09		491.05	4888.19		11.56	496.5
	10/05/09		490.91	4888.33		11.70	497
MWL-BW2	01/05/09	5388.35	477.41	4910.94	4884.00	26.94	499
	04/01/09		477.44	4910.91		26.91	499
	07/06/09		478.59	4909.76		25.76	498.5
	10/06/09		477.85	4910.50		26.50	497.5

[a]Measurement point is the top of well casing.
[b]Represents the upper interval distance from the top of the packer to the top of the casing.
[c]Reflects well MWL-MW4 orientation of 6 degrees from vertical.
FAMSL = Feet above mean sea level.
FBTOC = Feet below top of casing.

Table A-2
Summary of Purge Volumes and Purge Indicator Measurements
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Sample Attributes	Measurement Relative to Sampling	Purge Volume (gallons)	Temp (°C)	Specific Conductivity (μmhos/cm)	ORP (mV)	pH (at 25°C)	Turbidity (NTU)	DO (% Sat)
MWL-MW7[a] Date purge began: 1/6/2009 Date sampled: 1/6/2009	Before Sampling	12	15.85	629	341.2	7.50	0.86	43.2
		13	14.78	627	247.4	7.53	0.54	50.4
		14	15.48	627	263.0	7.53	11.80	44.6
MWL-MW8[a] Date purge began: 1/7/2009 Date sampled: 1/7/2009	Before Sampling	7	16.52	624	213.9	7.52	4.03	43.5
		8	17.28	625	212.0	7.52	2.92	41.3
		9	16.74	625	209.3	7.52	1.73	63.8
MWL-MW9 Date purge began: 1/8/2009 Date sampled: 1/8/2009	Before Sampling	10	15.98	626	219.9	7.34	1.12	15.1
		11	16.09	626	219.0	7.35	1.08	17.8
		12	15.99	626	219.2	7.34	1.05	18.1
MWL-BW2 Date purge began: 1/5/2009 Date sampled: 1/5/2009	Before Sampling	36	15.22	761	133.8	7.36	0.72	6.3
		38	15.54	761	133.8	7.36	0.74	6.3
		39	15.54	761	133.5	7.36	0.76	6.1
MWL-MW4[a] Date purge began: 4/10/2009 Date sampled: 4/13/2009	Before Sampling	20	18.03	617	248.7	7.72	2.14	79.1
		21	18.42	643	207.0	7.56	0.66	24.7
		22	18.60	644	187.3	7.54	0.35	19.5
MWL-MW5 Date purge began: 4/2/2009 Date sampled: 4/2/2009	Before Sampling	34	19.34	949	121.7	7.23	0.39	27.4
		36	19.20	950	121.1	7.23	0.37	27.1
		37	19.21	951	121.0	7.23	0.36	27.1

Refer to footnotes at end of table.

Table A-2 (Continued)
Summary of Purge Volumes and Purge Indicator Measurements
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Sample Attributes	Measurement Relative to Sampling	Purge Volume (gallons)	Temp (°C)	Specific Conductivity (μmhos/cm)	ORP (mV)	pH (at 25°C)	Turbidity (NTU)	DO (% Sat)
MWL-MW6	Before Sampling	34	19.71	903	115.7	7.37	0.17	30.6
Date purge began: 4/3/2009		36	19.82	902	115.1	7.37	0.20	30.6
Date sampled: 4/3/2009		37	19.89	903	115.0	7.36	0.21	30.7
MWL-MW7	Before Sampling	7	19.76	629	170.7	7.50	1.17	42.3
Date purge began: 4/8/2009		8	19.93	630	164.9	7.50	1.06	42.4
Date sampled: 4/8/2009		9	19.99	630	165.2	7.50	1.03	43.0
MWL-MW8[a]	Before Sampling	5	19.54	616	142.1	7.52	2.41	55.8
Date purge began: 4/7/2009		5.5	19.48	620	140.0	7.52	2.53	52.7
Date sampled: 4/7/2009		6	19.48	626	119.9	7.53	0.97	60.5
MWL-MW9[a]	Before Sampling	13	17.95	625	136.0	7.52	3.46	120.5
Date purge began: 4/9/2009		14	18.11	626	134.6	7.51	4.45	46.4
Date sampled: 4/9/2009		14.5	19.92	629	116.9	7.50	6.82	44.0
MWL-BW2	Before Sampling	36	17.51	762	108.7	7.34	0.39	7.0
Date purge began: 4/1/2009		38	17.52	763	108.8	7.34	0.23	6.8
Date sampled: 4/1/2009		39	17.51	762	108.8	7.34	0.25	6.7
MWL-MW7	Before Sampling	7	22.93	654	-8.1	7.82	0.64	51.3
Date purge began: 7/7/2009		8	23.11	655	-18.1	7.83	0.69	52.6
Date sampled: 7/7/2009		9	23.20	655	-19.9	7.82	0.69	53.2

Refer to footnotes at end of table.

Table A-2 (Continued)
Summary of Purge Volumes and Purge Indicator Measurements
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Sample Attributes	Measurement Relative to Sampling	Purge Volume (gallons)	Temp (°C)	Specific Conductivity (μmhos/cm)	ORP (mV)	pH (at 25°C)	Turbidity (NTU)	DO (% Sat)
MWL-MW8[a] Date purge began: 7/8/2009 Date sampled: 7/8/2009	Before Sampling	5	23.04	648	-2.8	7.85	2.36	54.2
		6	23.26	651	-12.9	7.90	2.66	51.3
		6.5	24.95	666	-53.1	8.00	2.05	96.6
MWL-MW9[a] Date purge began: 7/9/2009 Date sampled: 7/9/2009	Before Sampling	2	24.60	635	-27.9	7.80	0.26	50.0
		3	24.07	629	-32.2	7.90	0.31	58.8
		3.5	26.32	657	-75.2	8.07	7.81	65.1
MWL-BW2 Date purge began: 7/6/2009 Date sampled: 7/6/2009	Before Sampling	36	21.31	793	-70.1	7.73	0.43	8.3
		38	21.23	793	-70.2	7.73	0.40	8.4
		39	21.28	793	-70.3	7.73	0.37	8.4
MWL-MW7 Date purge began: 10/8/2009 Date sampled: 10/8/2009	Before Sampling	7	19.33	554	196.6	7.46	0.81	45.9
		8	19.32	554	195.2	7.46	0.63	47.2
		9	19.24	555	195.4	7.46	0.48	47.5
MWL-MW8[a] Date purge began: 10/7/2009 Date sampled: 10/7/2009	Before Sampling	7.5	17.85	562	192.9	7.41	2.11	40.3
		8.5	20.64	572	153.8	7.36	1.34	40.1
		9.5	20.93	569	152.9	7.36	0.83	26.9
MWL-MW9[a] Date purge began: 10/5/2009 Date sampled: 10/5/2009	Before Sampling	4	19.23	538	214.1	7.46	0.75	43.4
		4.5	19.35	538	211.6	7.46	1.11	43.9
		5	21.19	544	166.0	7.38	1.10	33.1

Refer to footnotes at end of table.

Table A-2 (Concluded)
Summary of Purge Volumes and Purge Indicator Measurements
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Sample Attributes	Measurement Relative to Sampling	Purge Volume (gallons)	Temp (°C)	Specific Conductivity (μmhos/cm)	ORP (mV)	pH (at 25°C)	Turbidity (NTU)	DO (% Sat)
MWL-BW2	Before Sampling	36	18.77	687	146.9	7.23	0.35	8.7
Date purge began: 10/6/2009		38	18.76	687	146.6	7.23	0.34	6.6
Date sampled: 10/6/2009		39	18.76	688	146.6	7.23	0.40	6.5

[a]Wells were purged to dryness. Purge volumes show total gallons removed prior to sampling.
°C = Degree(s) Celsius.
%sat = Percent saturation.
DO = Dissolved oxygen.
μmhos/cm = Micromhos per centimeter.
mV = Millivolt(s).
NTU = Nephelometric turbidity units.
ORP = Oxidation-reduction potential.
pH = Potential of hydrogen.
Temp = Temperature.

Table A-3
Summary of Field Water Quality Measurements
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/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

°C = Degree(s) Celsius.
%sat = Percent saturation.
$CaCO_3$ = Calcium carbonate.
ID = Identification.
μmhos/cm = Micromhos per centimeter.
mg/L = Milligram(s) per liter.
mV = Millivolt(s).
NM = Not measured.
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen.

Table A-4
Analytical Parameters, Test Methods, and Target Quantitation Limits
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
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	1.00 mg/L
Perchlorate	EPA 314.0	0.012 mg/L
Radionuclides Gamma-Emitting Radionuclides Gross Alpha Activity Gross Beta Activity Tritium	 EPA 901.1 EPA 900.0 EPA 900.0 EPA 906.0	 MDA is isotope specific 0.954 – 15.5 pCi/L 1.16 – 5.28 pCi/L 131 – 176 pCi/L

[a]Methods are from EPA, 1979, "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, U.S. Environmental Protection Agency, Cincinnati, Ohio; EPA, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio; EPA, 1986, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.; EPA, 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.; or Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B.
[b]For target compounds only. Reporting limits may be elevated if an interfering component is present or if sample dilution is required.
EPA = U.S. Environmental Protection Agency.
MDA = Minimum detectable activity.
µg/L = Microgram(s) per liter.
mg/L = Milligram(s) per liter.
pCi/L = Picocurie(s) per liter.
SM = Standard Method.
SW = Solid waste.
TAL = Target analyte list.

Table A-5
Summary of Nitrate plus Nitrite Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL[a] (mg/L)	PQL[b] (mg/L)	MCL[c] (mg/L)	Laboratory Qualifier	Validation Qualifier[d]	Sample No.	Analytical Method[e]
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 at end of table.

Table A-5 (Concluded)
Summary of Nitrate plus Nitrite Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL[a] (mg/L)	PQL[b] (mg/L)	MCL[c] (mg/L)	Laboratory Qualifier	Validation Qualifier[d]	Sample No.	Analytical Method[e]
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

[a]The MDL is the minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero.
[b]The PQL is the lowest concentration of analyte in a sample that can be reliably determined within specified limits of precision and accuracy by the indicated method under routine laboratory operating conditions.
[c]The MCL is established by the EPA Primary Water Regulations (40 CFR 141.11(b)), and subsequent amendments.
[d]If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples.
[e]EPA 1979, "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, U.S. Environmental Protection Agency, Cincinnati, Ohio.
CFR = Code of Federal Regulations.
EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDL = Method detection limit.
mg/L = Milligram(s) per liter.
PQL = Practical quantitation limit.

Table A-6
Summary of Alkalinity and Anion Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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 at end of table.

Table A-6 (Continued)
Summary of Alkalinity and Anion Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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 at end of table.

Table A-6 (Continued)
Summary of Alkalinity and Anion Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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 at end of table.

Table A-6 (Concluded)
Summary of Alkalinity and Anion Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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

[a]Laboratory Qualifier.
B = Analyte is detected in associated laboratory method blank.
[b]Validation Qualifier.
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
[c]Analytical Method.
EPA 1986,"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.
Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B.CaCO3 = Calcium carbonate.

EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDL = Method detection limit.
mg/L = Milligram(s) per liter.
NE = Not established.
PQL = Practical quantitation limit.
SM = Standard Method.
SW = Solid waste.

Table A-7
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	0.00856	0.005	0.015	NE	NE	J		086943-009	SW846 6020
05-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086943-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086943-009	SW846 6020
	Barium	0.0955	0.0005	0.002	2.00	0.12			086943-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086943-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086943-009	SW846 6020
	Calcium	71.7	0.100	0.500	NE	NE	B		086943-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		086943-009	SW846 6020
	Cobalt	0.000129	0.0001	0.001	NE	0.0025	J		086943-009	SW846 6020
	Copper	0.000528	0.0003	0.001	NE	<0.05	J		086943-009	SW846 6020
	Iron	0.189	0.010	0.025	NE	NE	B		086943-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086943-009	SW846 6020
	Magnesium	22.6	0.0052	0.015	NE	NE			086943-009	SW846 6020
	Manganese	0.00136	0.001	0.005	NE	NE	J		086943-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086943-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	0.028	J	J+	086943-009	SW846 6020
	Potassium	4.03	0.080	0.300	NE	NE			086943-009	SW846 6020
	Selenium	0.00151	0.001	0.005	0.050	0.005	J		086943-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086943-009	SW846 6020
	Sodium	53.0	0.400	1.25	NE	NE			086943-009	SW846 6020
	Thallium	0.000467	0.0003	0.001	0.002	0.002	J		086943-009	SW846 6020
	Uranium	0.0077	0.00005	0.0002	0.030	0.0052	B		086943-009	SW846 6020
	Vanadium	0.00419	0.003	0.010	NE	0.013	J		086943-009	SW846 6020
	Zinc	0.00281	0.0026	0.010	NE	0.26	J		086943-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	0.354	0.005	0.015	NE	NE			086946-009	SW846 6020
06-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086946-009	SW846 6020
	Arsenic	0.00249	0.0015	0.005	0.010	0.014	J		086946-009	SW846 6020
	Barium	0.102	0.0005	0.002	2.00	0.12			086946-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086946-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086946-009	SW846 6020
	Calcium	54.4	0.100	0.500	NE	NE	B		086946-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		086946-009	SW846 6020
	Cobalt	0.000255	0.0001	0.001	NE	0.0025	J		086946-009	SW846 6020
	Copper	0.00127	0.0003	0.001	NE	<0.05			086946-009	SW846 6020
	Iron	0.854	0.010	0.025	NE	NE	B		086946-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086946-009	SW846 6020
	Magnesium	17.9	0.0052	0.015	NE	NE			086946-009	SW846 6020
	Manganese	0.0122	0.001	0.005	NE	NE			086946-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086946-009	SW846 7470
	Nickel	0.0014	0.0005	0.002	NE	0.028	J	J+	086946-009	SW846 6020
	Potassium	5.26	0.080	0.300	NE	NE			086946-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086946-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086946-009	SW846 6020
	Sodium	43.9	0.080	0.250	NE	NE			086946-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086946-009	SW846 6020
	Uranium	0.00841	0.00005	0.0002	0.030	0.0052	B		086946-009	SW846 6020
	Vanadium	0.00441	0.003	0.010	NE	0.013	J		086946-009	SW846 6020
	Zinc	0.0038	0.0026	0.010	NE	0.26	J		086946-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.760	0.005	0.015	NE	NE			086950-009	SW846 6020
07-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086950-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086950-009	SW846 6020
	Barium	0.123	0.005	0.020	2.00	0.12			086950-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086950-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086950-009	SW846 6020
	Calcium	54.4	0.200	1.00	NE	NE	B		086950-009	SW846 6020
	Chromium	0.00359	0.0015	0.003	0.100	0.043		0.011U	086950-009	SW846 6020
	Cobalt	0.000501	0.0001	0.001	NE	0.0025	J		086950-009	SW846 6020
	Copper	0.00192	0.0003	0.001	NE	<0.05		0.0049U	086950-009	SW846 6020
	Iron	0.718	0.010	0.025	NE	NE			086950-009	SW846 6020
	Lead	0.0005	0.0005	0.002	NE	0.01	J		086950-009	SW846 6020
	Magnesium	19.1	0.0052	0.015	NE	NE			086950-009	SW846 6020
	Manganese	0.0274	0.001	0.005	NE	NE			086950-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086950-009	SW846 7470
	Nickel	0.00236	0.0005	0.002	NE	0.028			086950-009	SW846 6020
	Potassium	5.44	0.080	0.300	NE	NE			086950-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086950-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086950-009	SW846 6020
	Sodium	49.0	0.800	2.50	NE	NE			086950-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086950-009	SW846 6020
	Uranium	0.00875	0.00005	0.0002	0.030	0.0052			086950-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		086950-009	SW846 6020
	Zinc	0.00384	0.0026	0.010	NE	0.26	J		086950-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8 (Duplicate)	Aluminum	0.608	0.005	0.015	NE	NE			086951-009	SW846 6020
07-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086951-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086951-009	SW846 6020
	Barium	0.122	0.005	0.020	2.00	0.12			086951-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086951-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086951-009	SW846 6020
	Calcium	52.9	0.200	1.00	NE	NE	B		086951-009	SW846 6020
	Chromium	0.00373	0.0015	0.003	0.100	0.043		0.011U	086951-009	SW846 6020
	Cobalt	0.00046	0.0001	0.001	NE	0.0025	J		086951-009	SW846 6020
	Copper	0.00188	0.0003	0.001	NE	<0.05		0.0049U	086951-009	SW846 6020
	Iron	0.171	0.010	0.025	NE	NE			086951-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086951-009	SW846 6020
	Magnesium	18.4	0.0052	0.015	NE	NE			086951-009	SW846 6020
	Manganese	0.0256	0.001	0.005	NE	NE			086951-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086951-009	SW846 7470
	Nickel	0.00262	0.0005	0.002	NE	0.028			086951-009	SW846 6020
	Potassium	5.68	0.080	0.300	NE	NE			086951-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086951-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086951-009	SW846 6020
	Sodium	47.9	0.800	2.50	NE	NE			086951-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086951-009	SW846 6020
	Uranium	0.00856	0.00005	0.0002	0.030	0.0052			086951-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		086951-009	SW846 6020
	Zinc	0.00383	0.0026	0.010	NE	0.26	J		086951-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.106	0.005	0.015	NE	NE			086953-009	SW846 6020
08-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086953-009	SW846 6020
	Arsenic	0.00246	0.0015	0.005	0.010	0.014	J		086953-009	SW846 6020
	Barium	0.098	0.0005	0.002	2.00	0.12			086953-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086953-009	SW846 6020
	Cadmium	0.000376	0.00011	0.001	0.005	0.00047	J		086953-009	SW846 6020
	Calcium	54.4	0.200	1.00	NE	NE	B		086953-009	SW846 6020
	Chromium	0.00202	0.0015	0.003	0.100	0.043	J		086953-009	SW846 6020
	Cobalt	0.000262	0.0001	0.001	NE	0.0025	J		086953-009	SW846 6020
	Copper	0.00106	0.0003	0.001	NE	<0.05			086953-009	SW846 6020
	Iron	0.288	0.010	0.025	NE	NE			086953-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086953-009	SW846 6020
	Magnesium	19.8	0.0052	0.015	NE	NE			086953-009	SW846 6020
	Manganese	0.0141	0.001	0.005	NE	NE			086953-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086953-009	SW846 7470
	Nickel	0.00194	0.0005	0.002	NE	0.028	J		086953-009	SW846 6020
	Potassium	4.93	0.080	0.300	NE	NE			086953-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086953-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086953-009	SW846 6020
	Sodium	48.4	0.800	2.50	NE	NE			086953-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086953-009	SW846 6020
	Uranium	0.00934	0.00005	0.0002	0.030	0.0052			086953-009	SW846 6020
	Vanadium	0.00514	0.003	0.010	NE	0.013	J		086953-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		086953-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	0.0104	0.005	0.015	NE	NE	J	J+	087151-009	SW846 6020
01-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087151-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087151-009	SW846 6020
	Barium	0.0985	0.0005	0.002	2.00	0.12			087151-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087151-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087151-009	SW846 6020
	Calcium	69.3	0.100	0.500	NE	NE	B		087151-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087151-009	SW846 6020
	Cobalt	0.00015	0.0001	0.001	NE	0.0025	J		087151-009	SW846 6020
	Copper	0.000777	0.0003	0.001	NE	<0.05	J		087151-009	SW846 6020
	Iron	0.218	0.010	0.025	NE	NE			087151-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087151-009	SW846 6020
	Magnesium	24.4	0.0052	0.015	NE	NE			087151-009	SW846 6020
	Manganese	0.00113	0.001	0.005	NE	NE	J		087151-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	087151-009	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	0.028	J		087151-009	SW846 6020
	Potassium	3.82	0.080	0.300	NE	NE			087151-009	SW846 6020
	Selenium	0.00214	0.001	0.005	0.050	0.005	J		087151-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087151-009	SW846 6020
	Sodium	58.4	0.400	1.25	NE	NE			087151-009	SW846 6020
	Thallium	0.000512	0.0003	0.001	0.002	0.002	J	0.0024U	087151-009	SW846 6020
	Uranium	0.00754	0.00005	0.0002	0.030	0.0052	B		087151-009	SW846 6020
	Vanadium	0.00432	0.003	0.010	NE	0.013	J		087151-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087151-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW4	Aluminum	0.00719	0.005	0.015	NE	NE	B, J	0.030U	087169-009	SW846 6020
13-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087169-009	SW846 6020
	Arsenic	0.00171	0.0015	0.005	0.010	0.014	J		087169-009	SW846 6020
	Barium	0.109	0.0025	0.010	2.00	0.12			087169-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087169-009	SW846 6020
	Cadmium	0.00275	0.00011	0.001	0.005	0.00047			087169-009	SW846 6020
	Calcium	59.0	0.200	1.00	NE	NE	B		087169-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087169-009	SW846 6020
	Cobalt	0.000265	0.0001	0.001	NE	0.0025	J		087169-009	SW846 6020
	Copper	0.00294	0.0003	0.001	NE	<0.05			087169-009	SW846 6020
	Iron	0.239	0.010	0.025	NE	NE			087169-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087169-009	SW846 6020
	Magnesium	19.2	0.052	0.150	NE	NE			087169-009	SW846 6020
	Manganese	0.00689	0.001	0.005	NE	NE			087169-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	087169-009	SW846 7470
	Nickel	0.0291	0.0005	0.002	NE	0.028			087169-009	SW846 6020
	Potassium	4.76	0.080	0.300	NE	NE			087169-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087169-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087169-009	SW846 6020
	Sodium	53.2	0.800	2.50	NE	NE			087169-009	SW846 6020
	Thallium	0.00097	0.0003	0.001	0.002	0.002	J	0.0049U	087169-009	SW846 6020
	Uranium	0.0059	0.00005	0.0002	0.030	0.0052			087169-009	SW846 6020
	Vanadium	0.00344	0.003	0.010	NE	0.013	J		087169-009	SW846 6020
	Zinc	0.0799	0.0026	0.010	NE	0.26			087169-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW5	Aluminum	0.0073	0.005	0.015	NE	NE	J	J+	087153-009	SW846 6020
02-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087153-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087153-009	SW846 6020
	Barium	0.120	0.0005	0.002	2.00	0.12			087153-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087153-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087153-009	SW846 6020
	Calcium	83.4	0.100	0.500	NE	NE	B		087153-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087153-009	SW846 6020
	Cobalt	0.000183	0.0001	0.001	NE	0.0025	J		087153-009	SW846 6020
	Copper	0.000809	0.0003	0.001	NE	<0.05	J		087153-009	SW846 6020
	Iron	0.307	0.010	0.025	NE	NE			087153-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087153-009	SW846 6020
	Magnesium	34.3	0.0052	0.015	NE	NE			087153-009	SW846 6020
	Manganese	0.00844	0.001	0.005	NE	NE			087153-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	087153-009	SW846 7470
	Nickel	0.0018	0.0005	0.002	NE	0.028	J		087153-009	SW846 6020
	Potassium	5.41	0.080	0.300	NE	NE			087153-009	SW846 6020
	Selenium	0.00161	0.001	0.005	0.050	0.005	J		087153-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087153-009	SW846 6020
	Sodium	64.1	0.400	1.25	NE	NE			087153-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087153-009	SW846 6020
	Uranium	0.00991	0.00005	0.0002	0.030	0.0052	B		087153-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087153-009	SW846 6020
	Zinc	0.00357	0.0026	0.010	NE	0.26	J		087153-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW6	Aluminum	0.00593	0.005	0.015	NE	NE	J		087158-009	SW846 6020
03-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087158-009	SW846 6020
	Arsenic	0.00229	0.0015	0.005	0.010	0.014	B, J	0.010U	087158-009	SW846 6020
	Barium	0.120	0.0005	0.002	2.00	0.12			087158-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087158-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087158-009	SW846 6020
	Calcium	88.7	0.100	0.500	NE	NE	B		087158-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087158-009	SW846 6020
	Cobalt	0.000219	0.0001	0.001	NE	0.0025	J		087158-009	SW846 6020
	Copper	0.00131	0.0003	0.001	NE	<0.05			087158-009	SW846 6020
	Iron	0.338	0.010	0.025	NE	NE			087158-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087158-009	SW846 6020
	Magnesium	27.6	0.0052	0.015	NE	NE			087158-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087158-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087158-009	SW846 7470
	Nickel	0.00186	0.0005	0.002	NE	0.028	J		087158-009	SW846 6020
	Potassium	5.82	0.080	0.300	NE	NE			087158-009	SW846 6020
	Selenium	0.00126	0.001	0.005	0.050	0.005	J		087158-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087158-009	SW846 6020
	Sodium	62.5	0.400	1.25	NE	NE			087158-009	SW846 6020
	Thallium	0.000376	0.0003	0.001	0.002	0.002	J		087158-009	SW846 6020
	Uranium	0.0101	0.00005	0.0002	0.030	0.0052			087158-009	SW846 6020
	Vanadium	0.00867	0.003	0.010	NE	0.013	J	0.023U	087158-009	SW846 6020
	Zinc	0.00489	0.0026	0.010	NE	0.26	B, J	0.013U	087158-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW6 (Duplicate)	Aluminum	0.0085	0.005	0.015	NE	NE	J		087159-009	SW846 6020
03-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087159-009	SW846 6020
	Arsenic	0.00193	0.0015	0.005	0.010	0.014	B, J	0.010U	087159-009	SW846 6020
	Barium	0.120	0.0005	0.002	2.00	0.12			087159-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087159-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087159-009	SW846 6020
	Calcium	91.1	0.100	0.500	NE	NE	B		087159-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087159-009	SW846 6020
	Cobalt	0.000223	0.0001	0.001	NE	0.0025	J		087159-009	SW846 6020
	Copper	0.00112	0.0003	0.001	NE	<0.05			087159-009	SW846 6020
	Iron	0.344	0.010	0.025	NE	NE			087159-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087159-009	SW846 6020
	Magnesium	29.2	0.0052	0.015	NE	NE			087159-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087159-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087159-009	SW846 7470
	Nickel	0.00199	0.0005	0.002	NE	0.028	J		087159-009	SW846 6020
	Potassium	6.39	0.080	0.300	NE	NE			087159-009	SW846 6020
	Selenium	0.00132	0.001	0.005	0.050	0.005	J		087159-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087159-009	SW846 6020
	Sodium	66.1	0.400	1.25	NE	NE			087159-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087159-009	SW846 6020
	Uranium	0.00975	0.00005	0.0002	0.030	0.0052			087159-009	SW846 6020
	Vanadium	0.00801	0.003	0.010	NE	0.013	J	0.023U	087159-009	SW846 6020
	Zinc	0.0032	0.0026	0.010	NE	0.26	B, J	0.013U	087159-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	0.014	0.005	0.015	NE	NE	J	0.052U	087165-009	SW846 6020
08-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087165-009	SW846 6020
	Arsenic	0.00159	0.0015	0.005	0.010	0.014	B, J	0.010U	087165-009	SW846 6020
	Barium	0.104	0.0005	0.002	2.00	0.12			087165-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087165-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087165-009	SW846 6020
	Calcium	55.8	0.100	0.500	NE	NE	B		087165-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087165-009	SW846 6020
	Cobalt	0.00016	0.0001	0.001	NE	0.0025	J		087165-009	SW846 6020
	Copper	0.000944	0.0003	0.001	NE	<0.05	J	0.0020U	087165-009	SW846 6020
	Iron	0.247	0.010	0.025	NE	NE			087165-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087165-009	SW846 6020
	Magnesium	19.2	0.0052	0.015	NE	NE			087165-009	SW846 6020
	Manganese	0.00151	0.001	0.005	NE	NE	J		087165-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087165-009	SW846 7470
	Nickel	0.00138	0.0005	0.002	NE	0.028	J		087165-009	SW846 6020
	Potassium	4.94	0.080	0.300	NE	NE			087165-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087165-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087165-009	SW846 6020
	Sodium	45.3	0.080	0.250	NE	NE			087165-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087165-009	SW846 6020
	Uranium	0.00806	0.00005	0.0002	0.030	0.0052			087165-009	SW846 6020
	Vanadium	0.00703	0.003	0.010	NE	0.013	J		087165-009	SW846 6020
	Zinc	0.00373	0.0026	0.010	NE	0.26	B, J	0.013U	087165-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.0219	0.005	0.015	NE	NE			087161-009	SW846 6020
07-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087161-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087161-009	SW846 6020
	Barium	0.131	0.0005	0.002	2.00	0.12			087161-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087161-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087161-009	SW846 6020
	Calcium	61.1	0.100	0.500	NE	NE	B		087161-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087161-009	SW846 6020
	Cobalt	0.000166	0.0001	0.001	NE	0.0025	J		087161-009	SW846 6020
	Copper	0.00128	0.0003	0.001	NE	<0.05			087161-009	SW846 6020
	Iron	0.244	0.010	0.025	NE	NE			087161-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087161-009	SW846 6020
	Magnesium	18.6	0.0052	0.015	NE	NE			087161-009	SW846 6020
	Manganese	0.00436	0.001	0.005	NE	NE	J		087161-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087161-009	SW846 7470
	Nickel	0.00143	0.0005	0.002	NE	0.028	J		087161-009	SW846 6020
	Potassium	5.32	0.080	0.300	NE	NE			087161-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087161-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087161-009	SW846 6020
	Sodium	47.6	0.400	1.25	NE	NE			087161-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087161-009	SW846 6020
	Uranium	0.00847	0.00005	0.0002	0.030	0.0052			087161-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087161-009	SW846 6020
	Zinc	0.00409	0.0026	0.010	NE	0.26	B, J	0.013U	087161-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.0812	0.005	0.015	NE	NE			087167-009	SW846 6020
09-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087167-009	SW846 6020
	Arsenic	0.00237	0.0015	0.005	0.010	0.014	B, J	0.010U	087167-009	SW846 6020
	Barium	0.104	0.0005	0.002	2.00	0.12			087167-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087167-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087167-009	SW846 6020
	Calcium	59.1	0.100	0.500	NE	NE	B		087167-009	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087167-009	SW846 6020
	Cobalt	0.000237	0.0001	0.001	NE	0.0025	J		087167-009	SW846 6020
	Copper	0.00108	0.0003	0.001	NE	<0.05			087167-009	SW846 6020
	Iron	0.368	0.010	0.025	NE	NE			087167-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087167-009	SW846 6020
	Magnesium	19.0	0.0052	0.015	NE	NE			087167-009	SW846 6020
	Manganese	0.00884	0.001	0.005	NE	NE			087167-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087167-009	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	0.028	J		087167-009	SW846 6020
	Potassium	5.03	0.080	0.300	NE	NE			087167-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087167-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087167-009	SW846 6020
	Sodium	44.3	0.080	0.250	NE	NE			087167-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087167-009	SW846 6020
	Uranium	0.00963	0.00005	0.0002	0.030	0.0052			087167-009	SW846 6020
	Vanadium	0.0085	0.003	0.010	NE	0.013	J		087167-009	SW846 6020
	Zinc	0.00578	0.0026	0.010	NE	0.26	B, J	0.013U	087167-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	0.0381	0.010	0.030	NE	NE	B	0.134U	087489-009	SW846 6020
06-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087489-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087489-009	SW846 6020
	Barium	0.0904	0.0005	0.002	2.00	0.12			087489-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087489-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087489-009	SW846 6020
	Calcium	66.0	0.100	1.00	NE	NE	B		087489-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087489-009	SW846 6020
	Cobalt	0.000186	0.0001	0.001	NE	0.0025	J		087489-009	SW846 6020
	Copper	0.000861	0.0003	0.001	NE	<0.05	J		087489-009	SW846 6020
	Iron	0.334	0.010	0.100	NE	NE			087489-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087489-009	SW846 6020
	Magnesium	21.9	0.005	0.015	NE	NE			087489-009	SW846 6020
	Manganese	0.00143	0.001	0.005	NE	NE	J		087489-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087489-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	0.028	J		087489-009	SW846 6020
	Potassium	3.82	0.080	0.300	NE	NE			087489-009	SW846 6020
	Selenium	0.00224	0.001	0.005	0.050	0.005	J		087489-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087489-009	SW846 6020
	Sodium	54.5	0.400	1.25	NE	NE			087489-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087489-009	SW846 6020
	Uranium	0.0081	0.00005	0.0002	0.030	0.0052			087489-009	SW846 6020
	Vanadium	0.00467	0.003	0.010	NE	0.013	J		087489-009	SW846 6020
	Zinc	0.00321	0.0026	0.010	NE	0.26	J		087489-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	0.0321	0.010	0.030	NE	NE	B	0.134U	087492-009	SW846 6020
07-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087492-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087492-009	SW846 6020
	Barium	0.0985	0.0005	0.002	2.00	0.12			087492-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087492-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087492-009	SW846 6020
	Calcium	56.7	0.100	1.00	NE	NE	B		087492-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087492-009	SW846 6020
	Cobalt	0.000173	0.0001	0.001	NE	0.0025	J		087492-009	SW846 6020
	Copper	0.000908	0.0003	0.001	NE	<0.05	J		087492-009	SW846 6020
	Iron	0.283	0.010	0.100	NE	NE			087492-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087492-009	SW846 6020
	Magnesium	20.1	0.005	0.015	NE	NE			087492-009	SW846 6020
	Manganese	0.00168	0.001	0.005	NE	NE	J		087492-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087492-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	0.028	J		087492-009	SW846 6020
	Potassium	4.95	0.080	0.300	NE	NE			087492-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087492-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087492-009	SW846 6020
	Sodium	48.9	0.080	0.250	NE	NE			087492-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087492-009	SW846 6020
	Uranium	0.0093	0.00005	0.0002	0.030	0.0052			087492-009	SW846 6020
	Vanadium	0.00434	0.003	0.010	NE	0.013	J		087492-009	SW846 6020
	Zinc	0.0102	0.0026	0.010	NE	0.26			087492-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.201	0.010	0.030	NE	NE	B		087495-009	SW846 6020
08-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087495-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087495-009	SW846 6020
	Barium	0.131	0.0005	0.002	2.00	0.12			087495-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087495-009	SW846 6020
	Cadmium	0.000193	0.00011	0.001	0.005	0.00047	J		087495-009	SW846 6020
	Calcium	56.5	0.100	1.00	NE	NE	B		087495-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087495-009	SW846 6020
	Cobalt	0.000227	0.0001	0.001	NE	0.0025	J		087495-009	SW846 6020
	Copper	0.00135	0.0003	0.001	NE	<0.05			087495-009	SW846 6020
	Iron	0.497	0.010	0.100	NE	NE			087495-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087495-009	SW846 6020
	Magnesium	20.4	0.005	0.015	NE	NE			087495-009	SW846 6020
	Manganese	0.00876	0.001	0.005	NE	NE			087495-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087495-009	SW846 7470
	Nickel	0.00196	0.0005	0.002	NE	0.028	J		087495-009	SW846 6020
	Potassium	5.25	0.080	0.300	NE	NE			087495-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087495-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087495-009	SW846 6020
	Sodium	46.8	0.400	1.25	NE	NE			087495-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087495-009	SW846 6020
	Uranium	0.00924	0.00005	0.0002	0.030	0.0052			087495-009	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087495-009	SW846 6020
	Zinc	0.0557	0.0026	0.010	NE	0.26			087495-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.0858	0.010	0.030	NE	NE	B	0.134U	087500-009	SW846 6020
09-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087500-009	SW846 6020
	Arsenic	0.00268	0.0015	0.005	0.010	0.014	J		087500-009	SW846 6020
	Barium	0.096	0.0005	0.002	2.00	0.12			087500-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087500-009	SW846 6020
	Cadmium	0.000163	0.00011	0.001	0.005	0.00047	J		087500-009	SW846 6020
	Calcium	57.2	0.100	1.00	NE	NE	B		087500-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087500-009	SW846 6020
	Cobalt	0.000208	0.0001	0.001	NE	0.0025	J		087500-009	SW846 6020
	Copper	0.000906	0.0003	0.001	NE	<0.05	J	0.012UJ	087500-009	SW846 6020
	Iron	0.350	0.010	0.100	NE	NE			087500-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087500-009	SW846 6020
	Magnesium	21.1	0.005	0.015	NE	NE			087500-009	SW846 6020
	Manganese	0.00648	0.001	0.005	NE	NE			087500-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087500-009	SW846 7470
	Nickel	0.00178	0.0005	0.002	NE	0.028	J		087500-009	SW846 6020
	Potassium	5.00	0.080	0.300	NE	NE			087500-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087500-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087500-009	SW846 6020
	Sodium	44.2	0.400	1.25	NE	NE			087500-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087500-009	SW846 6020
	Uranium	0.0106	0.00005	0.0002	0.030	0.0052			087500-009	SW846 6020
	Vanadium	0.00918	0.003	0.010	NE	0.013	J		087500-009	SW846 6020
	Zinc	0.00398	0.0026	0.010	NE	0.26	J		087500-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9 (Duplicate)	Aluminum	0.207	0.010	0.030	NE	NE	B		087501-009	SW846 6020
09-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087501-009	SW846 6020
	Arsenic	0.00368	0.0015	0.005	0.010	0.014	J		087501-009	SW846 6020
	Barium	0.0978	0.0005	0.002	2.00	0.12			087501-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087501-009	SW846 6020
	Cadmium	0.000167	0.00011	0.001	0.005	0.00047	J		087501-009	SW846 6020
	Calcium	59.1	0.100	1.00	NE	NE	B		087501-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087501-009	SW846 6020
	Cobalt	0.000249	0.0001	0.001	NE	0.0025	J		087501-009	SW846 6020
	Copper	0.0014	0.0003	0.001	NE	<0.05		0.012UJ	087501-009	SW846 6020
	Iron	0.525	0.010	0.100	NE	NE			087501-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087501-009	SW846 6020
	Magnesium	20.5	0.005	0.015	NE	NE			087501-009	SW846 6020
	Manganese	0.00918	0.001	0.005	NE	NE			087501-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087501-009	SW846 7470
	Nickel	0.00201	0.0005	0.002	NE	0.028			087501-009	SW846 6020
	Potassium	5.18	0.080	0.300	NE	NE			087501-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087501-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087501-009	SW846 6020
	Sodium	48.1	0.080	0.250	NE	NE			087501-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087501-009	SW846 6020
	Uranium	0.0107	0.00005	0.0002	0.030	0.0052			087501-009	SW846 6020
	Vanadium	0.00859	0.003	0.010	NE	0.013	J		087501-009	SW846 6020
	Zinc	0.00693	0.0026	0.010	NE	0.26	J		087501-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	ND	0.010	0.030	NE	NE	U		087769-009	SW846 6020
06-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087769-009	SW846 6020
	Arsenic	0.00274	0.0015	0.005	0.010	0.014	B, J	0.014U	087769-009	SW846 6020
	Barium	0.103	0.0005	0.002	2.00	0.12			087769-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087769-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087769-009	SW846 6020
	Calcium	65.4	0.200	2.00	NE	NE	B		087769-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087769-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087769-009	SW846 6020
	Copper	0.000466	0.0003	0.001	NE	<0.05	J	0.012U	087769-009	SW846 6020
	Iron	0.169	0.010	0.100	NE	NE	B		087769-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087769-009	SW846 6020
	Magnesium	19.6	0.005	0.015	NE	NE		J	087769-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087769-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087769-009	SW846 7470
	Nickel	0.001	0.0005	0.002	NE	0.028	J		087769-009	SW846 6020
	Potassium	4.01	0.080	0.300	NE	NE			087769-009	SW846 6020
	Selenium	0.00279	0.001	0.005	0.050	0.005	J		087769-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087769-009	SW846 6020
	Sodium	55.0	0.800	2.05	NE	NE		J	087769-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087769-009	SW846 6020
	Uranium	0.00734	0.00005	0.0002	0.030	0.0052			087769-009	SW846 6020
	Vanadium	0.0119	0.003	0.010	NE	0.013	B	0.041U	087769-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087769-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2 (Duplicate)	Aluminum	ND	0.010	0.030	NE	NE	U		087770-009	SW846 6020
06-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087770-009	SW846 6020
	Arsenic	0.00546	0.0015	0.005	0.010	0.014	B	0.014U	087770-009	SW846 6020
	Barium	0.104	0.0005	0.002	2.00	0.12			087770-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087770-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087770-009	SW846 6020
	Calcium	67.7	0.200	2.00	NE	NE	B		087770-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087770-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087770-009	SW846 6020
	Copper	0.000427	0.0003	0.001	NE	<0.05	J	0.012U	087770-009	SW846 6020
	Iron	0.166	0.010	0.100	NE	NE	B		087770-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087770-009	SW846 6020
	Magnesium	20.6	0.005	0.015	NE	NE		J	087770-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087770-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087770-009	SW846 7470
	Nickel	0.000888	0.0005	0.002	NE	0.028	J		087770-009	SW846 6020
	Potassium	4.14	0.080	0.300	NE	NE			087770-009	SW846 6020
	Selenium	0.00197	0.001	0.005	0.050	0.005	J		087770-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087770-009	SW846 6020
	Sodium	49.8	0.080	0.250	NE	NE		J	087770-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087770-009	SW846 6020
	Uranium	0.0073	0.00005	0.0002	0.030	0.0052			087770-009	SW846 6020
	Vanadium	0.0117	0.003	0.010	NE	0.013	B	0.041U	087770-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087770-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	ND	0.010	0.030	NE	NE	U		087774-009	SW846 6020
08-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087774-009	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087774-009	SW846 6020
	Barium	0.109	0.0005	0.002	2.00	0.12			087774-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087774-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087774-009	SW846 6020
	Calcium	49.3	0.020	0.200	NE	NE	B		087774-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087774-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087774-009	SW846 6020
	Copper	0.000646	0.0003	0.001	NE	<0.05	J		087774-009	SW846 6020
	Iron	0.145	0.010	0.100	NE	NE	B		087774-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087774-009	SW846 6020
	Magnesium	16.9	0.005	0.015	NE	NE		J	087774-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087774-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087774-009	SW846 7470
	Nickel	0.000731	0.0005	0.002	NE	0.028	J		087774-009	SW846 6020
	Potassium	5.12	0.080	0.300	NE	NE			087774-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087774-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087774-009	SW846 6020
	Sodium	43.0	0.080	0.250	NE	NE		J	087774-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087774-009	SW846 6020
	Uranium	0.00791	0.00005	0.0002	0.030	0.0052			087774-009	SW846 6020
	Vanadium	0.00863	0.003	0.010	NE	0.013	B, J	0.041U	087774-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087774-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.231	0.010	0.030	NE	NE			087772-009	SW846 6020
07-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087772-009	SW846 6020
	Arsenic	0.00173	0.0015	0.005	0.010	0.014	B, J	0.014U	087772-009	SW846 6020
	Barium	0.153	0.0005	0.002	2.00	0.12			087772-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087772-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087772-009	SW846 6020
	Calcium	59.0	0.200	2.00	NE	NE	B		087772-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087772-009	SW846 6020
	Cobalt	0.0002	0.0001	0.001	NE	0.0025	J		087772-009	SW846 6020
	Copper	0.00116	0.0003	0.001	NE	<0.05			087772-009	SW846 6020
	Iron	0.526	0.010	0.100	NE	NE	B		087772-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087772-009	SW846 6020
	Magnesium	18.1	0.005	0.015	NE	NE		J	087772-009	SW846 6020
	Manganese	0.171	0.001	0.005	NE	NE			087772-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087772-009	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	0.028	J		087772-009	SW846 6020
	Potassium	5.78	0.080	0.300	NE	NE			087772-009	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087772-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087772-009	SW846 6020
	Sodium	45.0	0.080	0.250	NE	NE		J	087772-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087772-009	SW846 6020
	Uranium	0.00817	0.00005	0.0002	0.030	0.0052			087772-009	SW846 6020
	Vanadium	0.00377	0.003	0.010	NE	0.013	B, J	0.041U	087772-009	SW846 6020
	Zinc	0.0109	0.0026	0.010	NE	0.26			087772-009	SW846 6020

Refer to footnotes at end of table.

Table A-7 (Continued)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L) [a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.029	0.010	0.030	NE	NE	J		087765-009	SW846 6020
05-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087765-009	SW846 6020
	Arsenic	0.00581	0.0015	0.005	0.010	0.014	B	0.014U	087765-009	SW846 6020
	Barium	0.103	0.0005	0.002	2.00	0.12			087765-009	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087765-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087765-009	SW846 6020
	Calcium	55.3	0.200	2.00	NE	NE	B		087765-009	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087765-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087765-009	SW846 6020
	Copper	0.000557	0.0003	0.001	NE	<0.05	J		087765-009	SW846 6020
	Iron	0.185	0.010	0.100	NE	NE	B		087765-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087765-009	SW846 6020
	Magnesium	16.5	0.005	0.015	NE	NE		J	087765-009	SW846 6020
	Manganese	0.00505	0.001	0.005	NE	NE			087765-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087765-009	SW846 7470
	Nickel	0.00099	0.0005	0.002	NE	0.028	J		087765-009	SW846 6020
	Potassium	5.09	0.080	0.300	NE	NE			087765-009	SW846 6020
	Selenium	0.00103	0.001	0.005	0.050	0.005	J		087765-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087765-009	SW846 6020
	Sodium	38.9	0.080	0.250	NE	NE		J	087765-009	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087765-009	SW846 6020
	Uranium	0.00937	0.00005	0.0002	0.030	0.0052			087765-009	SW846 6020
	Vanadium	0.0179	0.003	0.010	NE	0.013	B	0.041U	087765-009	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087765-009	SW846 6020

[a]Maximum background concentrations in groundwater (Dinwiddie, R.S. [New Mexico Environment Department], September 1997, Letter to M.J. Zamorski [U.S. Department of Energy], "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," September 27.).
[b]Laboratory Qualifier.
B = Analyte is detected in associated laboratory method blank.
J = Amount detected is below the PQL.
U = Analyte is absent or below the MDL.
[c]Validation Qualifier.
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
J+ = The associated numerical value is an estimated quantity with suspected positive bias.
U = The analyte was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for but not detected. The associated value is an estimate and may be inaccurate or imprecise.
[d]EPA 1986, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.

Table A-7 (Concluded)
Summary of Unfiltered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDL = Method detection limit.
mg/L = Milligram(s) per liter.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit.
SW = Solid waste.

Table A-8
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	ND	0.005	0.015	NE	NE	U		086943-010	SW846 6020
05-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086943-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086943-010	SW846 6020
	Barium	0.0964	0.0005	0.002	2.00	0.12			086943-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086943-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086943-010	SW846 6020
	Calcium	68.5	0.100	0.500	NE	NE	B		086943-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		086943-010	SW846 6020
	Cobalt	0.00011	0.0001	0.001	NE	0.0025	J		086943-010	SW846 6020
	Copper	0.000645	0.0003	0.001	NE	<0.05	J		086943-010	SW846 6020
	Iron	0.180	0.010	0.025	NE	NE	B		086943-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086943-010	SW846 6020
	Magnesium	22.7	0.0052	0.015	NE	NE			086943-010	SW846 6020
	Manganese	0.00112	0.001	0.005	NE	NE	J		086943-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086943-010	SW846 7470
	Nickel	0.00122	0.0005	0.002	NE	0.028	J	J+	086943-010	SW846 6020
	Potassium	4.13	0.080	0.300	NE	NE			086943-010	SW846 6020
	Selenium	0.00146	0.001	0.005	0.050	0.005	J		086943-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086943-010	SW846 6020
	Sodium	56.7	0.400	1.25	NE	NE			086943-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086943-010	SW846 6020
	Uranium	0.00757	0.00005	0.0002	0.030	0.0052	B		086943-010	SW846 6020
	Vanadium	0.00429	0.003	0.010	NE	0.013	J		086943-010	SW846 6020
	Zinc	0.00358	0.0026	0.010	NE	0.26	J		086943-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	ND	0.005	0.015	NE	NE	U		086946-010	SW846 6020
06-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086946-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086946-010	SW846 6020
	Barium	0.102	0.0005	0.002	2.00	0.12			086946-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086946-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086946-010	SW846 6020
	Calcium	54.2	0.100	0.500	NE	NE	B		086946-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		086946-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		086946-010	SW846 6020
	Copper	0.0007	0.0003	0.001	NE	<0.05	J		086946-010	SW846 6020
	Iron	0.147	0.010	0.025	NE	NE	B		086946-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086946-010	SW846 6020
	Magnesium	19.3	0.0052	0.015	NE	NE			086946-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		086946-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086946-010	SW846 7470
	Nickel	0.000937	0.0005	0.002	NE	0.028	J	J+	086946-010	SW846 6020
	Potassium	5.14	0.080	0.300	NE	NE			086946-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086946-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086946-010	SW846 6020
	Sodium	44.5	0.080	0.250	NE	NE			086946-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086946-010	SW846 6020
	Uranium	0.0085	0.00005	0.0002	0.030	0.0052	B		086946-010	SW846 6020
	Vanadium	0.00354	0.003	0.010	NE	0.013	J		086946-010	SW846 6020
	Zinc	0.00262	0.0026	0.010	NE	0.26	J		086946-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.0183	0.005	0.015	NE	NE			086950-010	SW846 6020
07-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086950-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086950-010	SW846 6020
	Barium	0.114	0.005	0.020	2.00	0.12			086950-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086950-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086950-010	SW846 6020
	Calcium	49.8	0.020	0.100	NE	NE	B		086950-010	SW846 6020
	Chromium	0.00225	0.0015	0.003	0.100	0.043	J	0.011U	086950-010	SW846 6020
	Cobalt	0.000166	0.0001	0.001	NE	0.0025	J		086950-010	SW846 6020
	Copper	0.00113	0.0003	0.001	NE	<0.05		0.0049U	086950-010	SW846 6020
	Iron	0.164	0.010	0.025	NE	NE			086950-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086950-010	SW846 6020
	Magnesium	19.0	0.0052	0.015	NE	NE			086950-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		086950-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086950-010	SW846 7470
	Nickel	0.00185	0.0005	0.002	NE	0.028	J		086950-010	SW846 6020
	Potassium	5.16	0.080	0.300	NE	NE			086950-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086950-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086950-010	SW846 6020
	Sodium	46.4	0.800	2.50	NE	NE			086950-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086950-010	SW846 6020
	Uranium	0.00853	0.00005	0.0002	0.030	0.0052			086950-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		086950-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		086950-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8 (Duplicate)	Aluminum	0.0104	0.005	0.015	NE	NE	J		086951-010	SW846 6020
07-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086951-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		086951-010	SW846 6020
	Barium	0.100	0.005	0.020	2.00	0.12			086951-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086951-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086951-010	SW846 6020
	Calcium	43.5	0.020	0.100	NE	NE	B		086951-010	SW846 6020
	Chromium	0.00221	0.0015	0.003	0.100	0.043	J	0.011U	086951-010	SW846 6020
	Cobalt	0.000162	0.0001	0.001	NE	0.0025	J		086951-010	SW846 6020
	Copper	0.00102	0.0003	0.001	NE	<0.05		0.0049U	086951-010	SW846 6020
	Iron	0.977	0.010	0.025	NE	NE			086951-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086951-010	SW846 6020
	Magnesium	15.3	0.0052	0.015	NE	NE			086951-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		086951-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086951-010	SW846 7470
	Nickel	0.00167	0.0005	0.002	NE	0.028	J		086951-010	SW846 6020
	Potassium	4.51	0.080	0.300	NE	NE			086951-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086951-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086951-010	SW846 6020
	Sodium	39.8	0.800	2.50	NE	NE			086951-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086951-010	SW846 6020
	Uranium	0.00719	0.00005	0.0002	0.030	0.0052			086951-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		086951-010	SW846 6020
	Zinc	0.00269	0.0026	0.010	NE	0.26	J		086951-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.014	0.005	0.015	NE	NE	J		086953-010	SW846 6020
08-Jan-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		086953-010	SW846 6020
	Arsenic	0.00231	0.0015	0.005	0.010	0.014	J		086953-010	SW846 6020
	Barium	0.097	0.0005	0.002	2.00	0.12			086953-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		086953-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		086953-010	SW846 6020
	Calcium	52.0	0.200	1.00	NE	NE	B		086953-010	SW846 6020
	Chromium	0.00311	0.0015	0.003	0.100	0.043			086953-010	SW846 6020
	Cobalt	0.000182	0.0001	0.001	NE	0.0025	J		086953-010	SW846 6020
	Copper	0.00082	0.0003	0.001	NE	<0.05	J		086953-010	SW846 6020
	Iron	0.170	0.010	0.025	NE	NE			086953-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		086953-010	SW846 6020
	Magnesium	18.8	0.0052	0.015	NE	NE			086953-010	SW846 6020
	Manganese	0.00938	0.001	0.005	NE	NE			086953-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		086953-010	SW846 7470
	Nickel	0.00195	0.0005	0.002	NE	0.028	J		086953-010	SW846 6020
	Potassium	4.54	0.080	0.300	NE	NE			086953-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		086953-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		086953-010	SW846 6020
	Sodium	49.2	0.800	2.50	NE	NE			086953-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		086953-010	SW846 6020
	Uranium	0.00952	0.00005	0.0002	0.030	0.0052			086953-010	SW846 6020
	Vanadium	0.00545	0.003	0.010	NE	0.013	J		086953-010	SW846 6020
	Zinc	0.00286	0.0026	0.010	NE	0.26	J		086953-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	ND	0.005	0.015	NE	NE	U		087151-010	SW846 6020
01-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087151-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087151-010	SW846 6020
	Barium	0.0966	0.0005	0.002	2.00	0.12			087151-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087151-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087151-010	SW846 6020
	Calcium	66.8	0.100	0.500	NE	NE	B		087151-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087151-010	SW846 6020
	Cobalt	0.000127	0.0001	0.001	NE	0.0025	J		087151-010	SW846 6020
	Copper	0.000691	0.0003	0.001	NE	<0.05	J		087151-010	SW846 6020
	Iron	0.215	0.010	0.025	NE	NE			087151-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087151-010	SW846 6020
	Magnesium	28.0	0.0052	0.015	NE	NE			087151-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087151-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	087151-010	SW846 7470
	Nickel	0.00131	0.0005	0.002	NE	0.028	J		087151-010	SW846 6020
	Potassium	3.93	0.080	0.300	NE	NE			087151-010	SW846 6020
	Selenium	0.0019	0.001	0.005	0.050	0.005	J		087151-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087151-010	SW846 6020
	Sodium	56.7	0.400	1.25	NE	NE			087151-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087151-010	SW846 6020
	Uranium	0.00785	0.00005	0.0002	0.030	0.0052	B		087151-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087151-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087151-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW4	Aluminum	0.0347	0.005	0.015	NE	NE	B		087169-010	SW846 6020
13-Apr-09	Antimony	0.000713	0.0005	0.002	0.006	0.006	B, J	0.0043U	087169-010	SW846 6020
	Arsenic	0.00234	0.0015	0.005	0.010	0.014	J		087169-010	SW846 6020
	Barium	0.112	0.0025	0.010	2.00	0.12			087169-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087169-010	SW846 6020
	Cadmium	0.00277	0.00011	0.001	0.005	0.00047			087169-010	SW846 6020
	Calcium	59.4	0.200	1.00	NE	NE	B		087169-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087169-010	SW846 6020
	Cobalt	0.000225	0.0001	0.001	NE	0.0025	J		087169-010	SW846 6020
	Copper	0.00252	0.0003	0.001	NE	<0.05			087169-010	SW846 6020
	Iron	0.210	0.010	0.025	NE	NE			087169-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087169-010	SW846 6020
	Magnesium	20.8	0.052	0.150	NE	NE			087169-010	SW846 6020
	Manganese	0.00118	0.001	0.005	NE	NE	J		087169-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	087169-010	SW846 7470
	Nickel	0.0294	0.0005	0.002	NE	0.028			087169-010	SW846 6020
	Potassium	4.90	0.080	0.300	NE	NE			087169-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087169-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087169-010	SW846 6020
	Sodium	53.0	0.800	2.50	NE	NE			087169-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087169-010	SW846 6020
	Uranium	0.00624	0.00005	0.0002	0.030	0.0052			087169-010	SW846 6020
	Vanadium	0.00359	0.003	0.010	NE	0.013	J		087169-010	SW846 6020
	Zinc	0.080	0.0026	0.010	NE	0.26			087169-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW5	Aluminum	ND	0.005	0.015	NE	NE	U		087153-010	SW846 6020
02-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087153-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087153-010	SW846 6020
	Barium	0.120	0.0005	0.002	2.00	0.12			087153-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087153-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087153-010	SW846 6020
	Calcium	86.4	0.100	0.500	NE	NE	B		087153-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087153-010	SW846 6020
	Cobalt	0.000175	0.0001	0.001	NE	0.0025	J		087153-010	SW846 6020
	Copper	0.000867	0.0003	0.001	NE	<0.05	J		087153-010	SW846 6020
	Iron	0.260	0.010	0.025	NE	NE			087153-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087153-010	SW846 6020
	Magnesium	36.4	0.0052	0.015	NE	NE			087153-010	SW846 6020
	Manganese	0.0038	0.001	0.005	NE	NE	J		087153-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U	UJ	087153-010	SW846 7470
	Nickel	0.00195	0.0005	0.002	NE	0.028	J		087153-010	SW846 6020
	Potassium	5.67	0.080	0.300	NE	NE			087153-010	SW846 6020
	Selenium	0.00195	0.001	0.005	0.050	0.005	J		087153-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087153-010	SW846 6020
	Sodium	69.4	0.400	1.25	NE	NE			087153-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087153-010	SW846 6020
	Uranium	0.00999	0.00005	0.0002	0.030	0.0052	B		087153-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087153-010	SW846 6020
	Zinc	0.00309	0.0026	0.010	NE	0.26	J		087153-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW6	Aluminum	ND	0.005	0.015	NE	NE	U		087158-010	SW846 6020
03-Apr-09	Antimony	0.000708	0.0005	0.002	0.006	0.006	B, J	0.0040U	087158-010	SW846 6020
	Arsenic	0.00202	0.0015	0.005	0.010	0.014	B, J	0.010U	087158-010	SW846 6020
	Barium	0.120	0.0005	0.002	2.00	0.12			087158-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087158-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087158-010	SW846 6020
	Calcium	87.6	0.100	0.500	NE	NE	B		087158-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087158-010	SW846 6020
	Cobalt	0.000242	0.0001	0.001	NE	0.0025	J		087158-010	SW846 6020
	Copper	0.00121	0.0003	0.001	NE	<0.05			087158-010	SW846 6020
	Iron	0.327	0.010	0.025	NE	NE			087158-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087158-010	SW846 6020
	Magnesium	28.6	0.0052	0.015	NE	NE			087158-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087158-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087158-010	SW846 7470
	Nickel	0.00172	0.0005	0.002	NE	0.028	J		087158-010	SW846 6020
	Potassium	5.74	0.080	0.300	NE	NE			087158-010	SW846 6020
	Selenium	0.00142	0.001	0.005	0.050	0.005	J		087158-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087158-010	SW846 6020
	Sodium	58.9	0.400	1.25	NE	NE			087158-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087158-010	SW846 6020
	Uranium	0.00964	0.00005	0.0002	0.030	0.0052			087158-010	SW846 6020
	Vanadium	0.00906	0.003	0.010	NE	0.013	J	0.023U	087158-010	SW846 6020
	Zinc	0.00358	0.0026	0.010	NE	0.26	B, J	0.013U	087158-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW6 (Duplicate)	Aluminum	0.00633	0.005	0.015	NE	NE	J		087159-010	SW846 6020
03-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087159-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087159-010	SW846 6020
	Barium	0.111	0.0005	0.002	2.00	0.12			087159-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087159-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087159-010	SW846 6020
	Calcium	88.6	0.100	0.500	NE	NE	B		087159-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087159-010	SW846 6020
	Cobalt	0.000189	0.0001	0.001	NE	0.0025	J		087159-010	SW846 6020
	Copper	0.00117	0.0003	0.001	NE	<0.05			087159-010	SW846 6020
	Iron	0.293	0.010	0.025	NE	NE			087159-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087159-010	SW846 6020
	Magnesium	24.0	0.0052	0.015	NE	NE			087159-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087159-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087159-010	SW846 7470
	Nickel	0.00174	0.0005	0.002	NE	0.028	J		087159-010	SW846 6020
	Potassium	5.41	0.080	0.300	NE	NE			087159-010	SW846 6020
	Selenium	0.00162	0.001	0.005	0.050	0.005	J		087159-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087159-010	SW846 6020
	Sodium	61.3	0.400	1.25	NE	NE			087159-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087159-010	SW846 6020
	Uranium	0.00973	0.00005	0.0002	0.030	0.0052			087159-010	SW846 6020
	Vanadium	0.00704	0.003	0.010	NE	0.013	J	0.023U	087159-010	SW846 6020
	Zinc	0.00316	0.0026	0.010	NE	0.26	B, J	0.013U	087159-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	0.0231	0.005	0.015	NE	NE		0.052U	087165-010	SW846 6020
08-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087165-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087165-010	SW846 6020
	Barium	0.107	0.0005	0.002	2.00	0.12			087165-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087165-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087165-010	SW846 6020
	Calcium	58.5	0.100	0.500	NE	NE	B		087165-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087165-010	SW846 6020
	Cobalt	0.000164	0.0001	0.001	NE	0.0025	J		087165-010	SW846 6020
	Copper	0.00117	0.0003	0.001	NE	<0.05		0.0020U	087165-010	SW846 6020
	Iron	0.240	0.010	0.025	NE	NE			087165-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087165-010	SW846 6020
	Magnesium	19.1	0.0052	0.015	NE	NE			087165-010	SW846 6020
	Manganese	0.00131	0.001	0.005	NE	NE	J		087165-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087165-010	SW846 7470
	Nickel	0.00151	0.0005	0.002	NE	0.028	J		087165-010	SW846 6020
	Potassium	5.02	0.080	0.300	NE	NE			087165-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087165-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087165-010	SW846 6020
	Sodium	46.9	0.080	0.250	NE	NE			087165-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087165-010	SW846 6020
	Uranium	0.00812	0.00005	0.0002	0.030	0.0052			087165-010	SW846 6020
	Vanadium	0.00549	0.003	0.010	NE	0.013	J		087165-010	SW846 6020
	Zinc	0.00395	0.0026	0.010	NE	0.26	B, J	0.013U	087165-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.00534	0.005	0.015	NE	NE	J		087161-010	SW846 6020
07-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087161-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087161-010	SW846 6020
	Barium	0.129	0.0005	0.002	2.00	0.12			087161-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087161-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087161-010	SW846 6020
	Calcium	59.2	0.100	0.500	NE	NE	B		087161-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087161-010	SW846 6020
	Cobalt	0.000162	0.0001	0.001	NE	0.0025	J		087161-010	SW846 6020
	Copper	0.00106	0.0003	0.001	NE	<0.05			087161-010	SW846 6020
	Iron	0.225	0.010	0.025	NE	NE			087161-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087161-010	SW846 6020
	Magnesium	18.8	0.0052	0.015	NE	NE			087161-010	SW846 6020
	Manganese	0.00194	0.001	0.005	NE	NE	J		087161-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087161-010	SW846 7470
	Nickel	0.00152	0.0005	0.002	NE	0.028	J		087161-010	SW846 6020
	Potassium	5.84	0.080	0.300	NE	NE			087161-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087161-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087161-010	SW846 6020
	Sodium	49.5	0.080	0.250	NE	NE			087161-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087161-010	SW846 6020
	Uranium	0.00845	0.00005	0.0002	0.030	0.0052			087161-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087161-010	SW846 6020
	Zinc	0.0041	0.0026	0.010	NE	0.26	B, J	0.013U	087161-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.0111	0.005	0.015	NE	NE	J		087167-010	SW846 6020
09-Apr-09	Antimony	ND	0.0005	0.002	0.006	0.006	U		087167-010	SW846 6020
	Arsenic	0.00244	0.0015	0.005	0.010	0.014	B, J	0.010U	087167-010	SW846 6020
	Barium	0.101	0.0005	0.002	2.00	0.12			087167-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087167-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087167-010	SW846 6020
	Calcium	58.5	0.100	0.500	NE	NE	B		087167-010	SW846 6020
	Chromium	ND	0.0015	0.003	0.100	0.043	U		087167-010	SW846 6020
	Cobalt	0.000181	0.0001	0.001	NE	0.0025	J		087167-010	SW846 6020
	Copper	0.00096	0.0003	0.001	NE	<0.05	J		087167-010	SW846 6020
	Iron	0.252	0.010	0.025	NE	NE			087167-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087167-010	SW846 6020
	Magnesium	19.8	0.0052	0.015	NE	NE			087167-010	SW846 6020
	Manganese	0.00418	0.001	0.005	NE	NE	J		087167-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	0.002	U		087167-010	SW846 7470
	Nickel	0.0016	0.0005	0.002	NE	0.028	J		087167-010	SW846 6020
	Potassium	5.17	0.080	0.300	NE	NE			087167-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087167-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087167-010	SW846 6020
	Sodium	45.8	0.080	0.250	NE	NE			087167-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087167-010	SW846 6020
	Uranium	0.00935	0.00005	0.0002	0.030	0.0052			087167-010	SW846 6020
	Vanadium	0.0085	0.003	0.010	NE	0.013	J		087167-010	SW846 6020
	Zinc	0.00451	0.0026	0.010	NE	0.26	B, J	0.013U	087167-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	0.0215	0.010	0.030	NE	NE	B, J	0.134U	087489-010	SW846 6020
06-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087489-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087489-010	SW846 6020
	Barium	0.0935	0.0005	0.002	2.00	0.12			087489-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087489-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087489-010	SW846 6020
	Calcium	68.6	0.100	1.00	NE	NE	B		087489-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087489-010	SW846 6020
	Cobalt	0.000186	0.0001	0.001	NE	0.0025	J		087489-010	SW846 6020
	Copper	0.000806	0.0003	0.001	NE	<0.05	J		087489-010	SW846 6020
	Iron	0.320	0.010	0.100	NE	NE			087489-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087489-010	SW846 6020
	Magnesium	22.7	0.005	0.015	NE	NE			087489-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087489-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087489-010	SW846 7470
	Nickel	0.00171	0.0005	0.002	NE	0.028	J		087489-010	SW846 6020
	Potassium	3.90	0.080	0.300	NE	NE			087489-010	SW846 6020
	Selenium	0.00169	0.001	0.005	0.050	0.005	J		087489-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087489-010	SW846 6020
	Sodium	53.9	0.400	1.25	NE	NE			087489-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087489-010	SW846 6020
	Uranium	0.00835	0.00005	0.0002	0.030	0.0052			087489-010	SW846 6020
	Vanadium	0.00614	0.003	0.010	NE	0.013	J		087489-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087489-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	0.024	0.010	0.030	NE	NE	B, J	0.134U	087492-010	SW846 6020
07-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087492-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087492-010	SW846 6020
	Barium	0.0981	0.0005	0.002	2.00	0.12			087492-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087492-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087492-010	SW846 6020
	Calcium	55.4	0.100	1.00	NE	NE	B		087492-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087492-010	SW846 6020
	Cobalt	0.000158	0.0001	0.001	NE	0.0025	J		087492-010	SW846 6020
	Copper	0.00095	0.0003	0.001	NE	<0.05	J		087492-010	SW846 6020
	Iron	0.262	0.010	0.100	NE	NE			087492-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087492-010	SW846 6020
	Magnesium	19.3	0.005	0.015	NE	NE			087492-010	SW846 6020
	Manganese	0.00153	0.001	0.005	NE	NE	J		087492-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087492-010	SW846 7470
	Nickel	0.00166	0.0005	0.002	NE	0.028	J		087492-010	SW846 6020
	Potassium	4.93	0.080	0.300	NE	NE			087492-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087492-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087492-010	SW846 6020
	Sodium	46.3	0.080	0.250	NE	NE			087492-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087492-010	SW846 6020
	Uranium	0.00923	0.00005	0.0002	0.030	0.0052			087492-010	SW846 6020
	Vanadium	0.00635	0.003	0.010	NE	0.013	J		087492-010	SW846 6020
	Zinc	0.0112	0.0026	0.010	NE	0.26			087492-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	0.0311	0.010	0.030	NE	NE	B	0.134U	087495-010	SW846 6020
08-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087495-010	SW846 6020
	Arsenic	ND	0.0015	0.005	0.010	0.014	U		087495-010	SW846 6020
	Barium	0.128	0.0005	0.002	2.00	0.12			087495-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087495-010	SW846 6020
	Cadmium	0.000133	0.00011	0.001	0.005	0.00047	J		087495-010	SW846 6020
	Calcium	56.1	0.100	1.00	NE	NE	B		087495-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087495-010	SW846 6020
	Cobalt	0.000165	0.0001	0.001	NE	0.0025	J		087495-010	SW846 6020
	Copper	0.00105	0.0003	0.001	NE	<0.05			087495-010	SW846 6020
	Iron	0.275	0.010	0.100	NE	NE			087495-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087495-010	SW846 6020
	Magnesium	20.1	0.005	0.015	NE	NE			087495-010	SW846 6020
	Manganese	0.00219	0.001	0.005	NE	NE	J		087495-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087495-010	SW846 7470
	Nickel	0.00186	0.0005	0.002	NE	0.028	J		087495-010	SW846 6020
	Potassium	5.20	0.080	0.300	NE	NE			087495-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087495-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087495-010	SW846 6020
	Sodium	47.8	0.080	0.250	NE	NE			087495-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087495-010	SW846 6020
	Uranium	0.00909	0.00005	0.0002	0.030	0.0052			087495-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087495-010	SW846 6020
	Zinc	0.0473	0.0026	0.010	NE	0.26			087495-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.0267	0.010	0.030	NE	NE	B, J	0.134U	087500-010	SW846 6020
09-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087500-010	SW846 6020
	Arsenic	0.00259	0.0015	0.005	0.010	0.014	J		087500-010	SW846 6020
	Barium	0.0914	0.0005	0.002	2.00	0.12			087500-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087500-010	SW846 6020
	Cadmium	0.000183	0.00011	0.001	0.005	0.00047	J		087500-010	SW846 6020
	Calcium	54.9	0.100	1.00	NE	NE	B		087500-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087500-010	SW846 6020
	Cobalt	0.00016	0.0001	0.001	NE	0.0025	J		087500-010	SW846 6020
	Copper	0.00122	0.0003	0.001	NE	<0.05		0.002U	087500-010	SW846 6020
	Iron	0.264	0.010	0.100	NE	NE			087500-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087500-010	SW846 6020
	Magnesium	19.3	0.005	0.015	NE	NE			087500-010	SW846 6020
	Manganese	0.00342	0.001	0.005	NE	NE	J		087500-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087500-010	SW846 7470
	Nickel	0.00166	0.0005	0.002	NE	0.028	J		087500-010	SW846 6020
	Potassium	4.99	0.080	0.300	NE	NE			087500-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087500-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087500-010	SW846 6020
	Sodium	46.7	0.080	0.250	NE	NE			087500-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087500-010	SW846 6020
	Uranium	0.0102	0.00005	0.0002	0.030	0.0052			087500-010	SW846 6020
	Vanadium	0.00783	0.003	0.010	NE	0.013	J		087500-010	SW846 6020
	Zinc	0.00431	0.0026	0.010	NE	0.26	J		087500-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9 (Duplicate)	Aluminum	0.0244	0.010	0.030	NE	NE	B, J	0.134U	087501-010	SW846 6020
09-Jul-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087501-010	SW846 6020
	Arsenic	0.0031	0.0015	0.005	0.010	0.014	J		087501-010	SW846 6020
	Barium	0.097	0.0005	0.002	2.00	0.12			087501-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087501-010	SW846 6020
	Cadmium	0.000221	0.00011	0.001	0.005	0.00047	J		087501-010	SW846 6020
	Calcium	59.2	0.100	1.00	NE	NE	B		087501-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087501-010	SW846 6020
	Cobalt	0.000173	0.0001	0.001	NE	0.0025	J		087501-010	SW846 6020
	Copper	0.0017	0.0003	0.001	NE	<0.05		0.002U	087501-010	SW846 6020
	Iron	0.269	0.010	0.100	NE	NE			087501-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087501-010	SW846 6020
	Magnesium	20.9	0.005	0.015	NE	NE			087501-010	SW846 6020
	Manganese	0.00384	0.001	0.005	NE	NE	J		087501-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087501-010	SW846 7470
	Nickel	0.00168	0.0005	0.002	NE	0.028	J		087501-010	SW846 6020
	Potassium	5.02	0.080	0.300	NE	NE			087501-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087501-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087501-010	SW846 6020
	Sodium	47.5	0.400	1.25	NE	NE			087501-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087501-010	SW846 6020
	Uranium	0.0107	0.00005	0.0002	0.030	0.0052			087501-010	SW846 6020
	Vanadium	0.00778	0.003	0.010	NE	0.013	J		087501-010	SW846 6020
	Zinc	0.00578	0.0026	0.010	NE	0.26	J		087501-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2	Aluminum	ND	0.010	0.030	NE	NE	U		087769-010	SW846 6020
06-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087769-010	SW846 6020
	Arsenic	0.00376	0.0015	0.005	0.010	0.014	B, J	0.014U	087769-010	SW846 6020
	Barium	0.103	0.0005	0.002	2.00	0.12			087769-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087769-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087769-010	SW846 6020
	Calcium	68.4	0.200	2.00	NE	NE	B		087769-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087769-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087769-010	SW846 6020
	Copper	0.000892	0.0003	0.001	NE	<0.05	J	0.012U	087769-010	SW846 6020
	Iron	0.153	0.010	0.100	NE	NE	B		087769-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087769-010	SW846 6020
	Magnesium	20.9	0.005	0.015	NE	NE		J	087769-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087769-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087769-010	SW846 7470
	Nickel	0.000817	0.0005	0.002	NE	0.028	J		087769-010	SW846 6020
	Potassium	4.32	0.080	0.300	NE	NE			087769-010	SW846 6020
	Selenium	0.00216	0.001	0.005	0.050	0.005	J		087769-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087769-010	SW846 6020
	Sodium	51.5	0.800	2.50	NE	NE		J	087769-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087769-010	SW846 6020
	Uranium	0.00732	0.00005	0.0002	0.030	0.0052			087769-010	SW846 6020
	Vanadium	0.0116	0.003	0.010	NE	0.013	B	0.041U	087769-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087769-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-BW2 (Duplicate)	Aluminum	ND	0.010	0.030	NE	NE	U		087770-010	SW846 6020
06-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087770-010	SW846 6020
	Arsenic	0.00178	0.0015	0.005	0.010	0.014	B, J	0.014U	087770-010	SW846 6020
	Barium	0.102	0.0005	0.002	2.00	0.12			087770-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087770-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087770-010	SW846 6020
	Calcium	67.4	0.200	2.00	NE	NE	B		087770-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087770-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087770-010	SW846 6020
	Copper	0.00083	0.0003	0.001	NE	<0.05	J	0.012U	087770-010	SW846 6020
	Iron	0.158	0.010	0.100	NE	NE	B		087770-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087770-010	SW846 6020
	Magnesium	19.2	0.005	0.015	NE	NE		J	087770-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087770-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087770-010	SW846 7470
	Nickel	0.000813	0.0005	0.002	NE	0.028	J		087770-010	SW846 6020
	Potassium	4.06	0.080	0.300	NE	NE			087770-010	SW846 6020
	Selenium	0.00224	0.001	0.005	0.050	0.005	J		087770-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087770-010	SW846 6020
	Sodium	49.1	0.080	0.250	NE	NE		J	087770-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087770-010	SW846 6020
	Uranium	0.00731	0.00005	0.0002	0.030	0.0052			087770-010	SW846 6020
	Vanadium	0.0103	0.003	0.010	NE	0.013	B	0.041U	087770-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087770-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW7	Aluminum	ND	0.010	0.030	NE	NE	U		087774-010	SW846 6020
08-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087774-010	SW846 6020
	Arsenic	0.0017	0.0015	0.005	0.010	0.014	B, J	0.014U	087774-010	SW846 6020
	Barium	0.109	0.0005	0.002	2.00	0.12			087774-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087774-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087774-010	SW846 6020
	Calcium	48.7	0.020	0.200	NE	NE	B		087774-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087774-010	SW846 6020
	Cobalt	0.000275	0.0001	0.001	NE	0.0025	J		087774-010	SW846 6020
	Copper	0.000487	0.0003	0.001	NE	<0.05	J		087774-010	SW846 6020
	Iron	0.110	0.010	0.100	NE	NE	B	0.12U	087774-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087774-010	SW846 6020
	Magnesium	17.4	0.005	0.015	NE	NE		J	087774-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	NE	U		087774-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087774-010	SW846 7470
	Nickel	0.000773	0.0005	0.002	NE	0.028	J		087774-010	SW846 6020
	Potassium	5.11	0.080	0.300	NE	NE			087774-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087774-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087774-010	SW846 6020
	Sodium	39.1	0.080	0.250	NE	NE		J	087774-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087774-010	SW846 6020
	Uranium	0.00789	0.00005	0.0002	0.030	0.0052			087774-010	SW846 6020
	Vanadium	0.00896	0.003	0.010	NE	0.013	B, J	0.041U	087774-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087774-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW8	Aluminum	ND	0.010	0.030	NE	NE	U		087772-010	SW846 6020
07-Oct-09	Antimony	ND	0.0005	0.003	0.006	0.006	U		087772-010	SW846 6020
	Arsenic	0.00243	0.0015	0.005	0.010	0.014	B, J	0.014U	087772-010	SW846 6020
	Barium	0.150	0.0005	0.002	2.00	0.12			087772-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087772-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087772-010	SW846 6020
	Calcium	55.8	0.200	2.00	NE	NE	B		087772-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087772-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087772-010	SW846 6020
	Copper	0.000661	0.0003	0.001	NE	<0.05	J		087772-010	SW846 6020
	Iron	0.125	0.010	0.100	NE	NE	B		087772-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087772-010	SW846 6020
	Magnesium	17.8	0.005	0.015	NE	NE		J	087772-010	SW846 6020
	Manganese	0.151	0.001	0.005	NE	NE			087772-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087772-010	SW846 7470
	Nickel	0.00113	0.0005	0.002	NE	0.028	J		087772-010	SW846 6020
	Potassium	5.51	0.080	0.300	NE	NE			087772-010	SW846 6020
	Selenium	ND	0.001	0.005	0.050	0.005	U		087772-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087772-010	SW846 6020
	Sodium	44.7	0.080	0.250	NE	NE		J	087772-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087772-010	SW846 6020
	Uranium	0.00801	0.00005	0.0002	0.030	0.0052			087772-010	SW846 6020
	Vanadium	ND	0.003	0.010	NE	0.013	U		087772-010	SW846 6020
	Zinc	0.00905	0.0026	0.010	NE	0.26	J		087772-010	SW846 6020

Refer to footnotes at end of table.

Table A-8 (Continued)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Maximum Background (mg/L)[a]	Laboratory Qualifier[b]	Validation Qualifier[c]	Sample No.	Analytical Method[d]
MWL-MW9	Aluminum	0.113	0.010	0.030	NE	NE			087765-010	SW846 6020
05-Oct-09	Antimony	0.000561	0.0005	0.003	0.006	0.006	J		087765-010	SW846 6020
	Arsenic	0.0056	0.0015	0.005	0.010	0.014	B	0.014U	087765-010	SW846 6020
	Barium	0.099	0.0005	0.002	2.00	0.12			087765-010	SW846 6020
	Beryllium	ND	0.0001	0.0005	0.004	0.004	U		087765-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	0.00047	U		087765-010	SW846 6020
	Calcium	55.7	0.200	2.00	NE	NE	B		087765-010	SW846 6020
	Chromium	ND	0.0025	0.010	0.100	0.043	U		087765-010	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	0.0025	U		087765-010	SW846 6020
	Copper	0.000471	0.0003	0.001	NE	<0.05	J		087765-010	SW846 6020
	Iron	0.146	0.010	0.100	NE	NE	B		087765-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	0.01	U		087765-010	SW846 6020
	Magnesium	17.3	0.005	0.015	NE	NE		J	087765-010	SW846 6020
	Manganese	0.00316	0.001	0.005	NE	NE	J		087765-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	0.002	U	UJ	087765-010	SW846 7470
	Nickel	0.00114	0.0005	0.002	NE	0.028	J		087765-010	SW846 6020
	Potassium	4.79	0.080	0.300	NE	NE			087765-010	SW846 6020
	Selenium	0.00146	0.001	0.005	0.050	0.005	J		087765-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	<0.01	U		087765-010	SW846 6020
	Sodium	38.8	0.080	0.250	NE	NE		J	087765-010	SW846 6020
	Thallium	ND	0.0003	0.001	0.002	0.002	U		087765-010	SW846 6020
	Uranium	0.00918	0.00005	0.0002	0.030	0.0052			087765-010	SW846 6020
	Vanadium	0.0142	0.003	0.010	NE	0.013	B	0.041U	087765-010	SW846 6020
	Zinc	ND	0.0026	0.010	NE	0.26	U		087765-010	SW846 6020

[a]Maximum background concentrations in groundwater (Dinwiddie , R.S. [New Mexico Environment Department], September 1997, Letter to M.J. Zamorski [U.S. Department of Energy], "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," September 27.).
[b]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.
[c]Validation Qualifier.
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
J+ = The associated numerical value is an estimated quantity with suspected positive bias.
U = The analyte was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for but not detected. The associated value is an estimate and may be inaccurate or imprecise.
[d]EPA 1986, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.

Table A-8 (Concluded)
Summary of Filtered Total Metal Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDL = Method detection limit.
mg/L = Milligram(s) per liter.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit.
SW = Solid waste.

Table A-9
Summary of Detected Volatile Organic Compounds and Semivolatile Organic Compounds
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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

Refer to footnotes at end of table.

Table A-9 (Concluded)
Summary of Detected Volatile Organic Compounds and Semivolatile Organic Compounds
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Analyte	Result (μg/L)	MDL (μg/L)	PQL (μg/L)	MCL (μg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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

[a]Laboratory Qualifier
B = Analyte is detected in associated laboratory method blank.
J = Amount detected is below the practical quantitation limit (PQL).
[b]Validation Qualifier.
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
J+ = The associated numerical value is an estimated quantity with suspected positive bias.
J- = The associated numerical value is an estimated quantity with suspected negative bias.
U = The analyte was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
[c]Analytical Method.
EPA 1986, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.

EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDL = Method detection limit.
μg/L = Microgram(s) per liter.
NE = Not established.
PQL = Practical quantitation limit.
SW = Solid waste.

Table A-10
Method Detection Limits for Volatile and Semivolatile Organic Compounds
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Analyte	MDL (μg/L)	Analytical Method[a]	Analyte	MDL (μg/L)	Analytical Method[a]	Analyte	MDL (μg/L)	Analytical Method[a]
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			

[a]EPA 1986, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., Rev. 1, U.S. Environmental Protection Agency, Washington, D.C.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit.
μg/L = Microgram(s) per liter.

Table A-11
Summary of Perchlorate Results
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
Calendar Year 2009

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
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

[a]Laboratory Qualifier.
U = Analyte is absent or below the method detection limit.
[b]Validation Qualifier.
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples.
[c]EPA 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.
EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDL = Method detection limit.
mg/L = Milligram(s) per liter.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit.
SW = Solid waste.

Table A-12
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results
Mixed Waste Landfill 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 (pCi/L)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
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	4.81[g]	6.36	2.50	15		J+	086943-034	EPA 900.0
	Gross Beta	7.48 ± 2.16	2.69	1.31	4mrem/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	6.07[g]	3.50	1.14	15		J+	086946-034	EPA 900.0
	Gross Beta	5.81 ± 1.61	1.94	0.948	4mrem/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	4.24[g]	1.06	0.457	15			086950-034	EPA 900.0
	Gross Beta	8.89 ± 2.02	1.96	0.952	4mrem/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	4.76[g]	1.35	0.602	15			086951-034	EPA 900.0
	Gross Beta	7.44 ± 1.76	1.81	0.880	4mrem/yr			086951-034	EPA 900.0
	Tritium	-4.47 ± 99.2	172	83.4	NE	U	BD	086951-036	EPA 906.0 M

Refer to footnotes at end of table.

Table A-12 (Continued)
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results
Mixed Waste Landfill 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 (pCi/L)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
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	4.54 [g]	1.83	0.845	15			086953-034	EPA 900.0
	Gross Beta	6.84 ± 1.71	1.85	0.897	4mrem/yr			086953-034	EPA 900.0
	Tritium	76.8 ± 104	174	84.2	NE	U	BD	086953-036	EPA 906.0 M
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	7.25 [g]	2.74	1.27	15			087151-034	EPA 900.0
	Gross Beta	7.77 ± 2.46	3.26	1.60	4mrem/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	2.67 [g]	0.903	0.375	15			087169-034	EPA 900.0
	Gross Beta	5.04 ± 1.49	1.89	0.921	4mrem/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	9.26 [g]	1.76	0.753	15			087153-034	EPA 900.0
	Gross Beta	8.18 ± 2.81	3.82	1.86	4mrem/yr		J	087153-034	EPA 900.0
	Tritium	78.1 ± 97.8	163	78.7	NE	U	BD	087153-036	EPA 906.0 M

Refer to footnotes at end of table.

Table A-12 (Continued)
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results
Mixed Waste Landfill 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 (pCi/L)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
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	6.63 [g]	1.37	0.604	15			087158-034	EPA 900.0
	Gross Beta	8.27 ± 1.78	1.34	0.637	4mrem/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	7.37 [g]	1.44	0.637	15			087159-034	EPA 900.0
	Gross Beta	7.89 ± 1.95	1.89	0.910	4mrem/yr			087159-034	EPA 900.0
	Tritium	28.1 ± 94.5	162	78.3	NE	U	BD	087159-036	EPA 906.0 M
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	3.04 [g]	1.28	0.576	15			087165-034	EPA 900.0
	Gross Beta	6.22 ± 1.36	1.15	0.551	4mrem/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	3.93 [g]	1.16	0.516	15			087161-034	EPA 900.0
	Gross Beta	7.49 ± 1.51	1.01	0.480	4mrem/yr			087161-034	EPA 900.0
	Tritium	21.7 ± 94.7	163	78.7	NE	U	BD	087161-036	EPA 906.0 M

Refer to footnotes at end of table.

Table A-12 (Continued)
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results
Mixed Waste Landfill 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 (pCi/L)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
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	4.85 [g]	0.815	0.348	15			087167-034	EPA 900.0
	Gross Beta	5.27 ± 1.16	0.949	0.452	4mrem/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	4.77 [g]	2.04	0.901	15			087489-034	EPA 900.0
	Gross Beta	8.67 ± 4.30	5.60	2.45	4mrem/yr		J	087489-034	EPA 900.0
	Tritium	-66.1 ± 91.6	163	78.9	NE	U	BD	087489-036	EPA 906.0 M
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	3.61 [g]	1.85	0.819	15			087492-034	EPA 900.0
	Gross Beta	5.81 ± 2.38	3.48	1.70	4mrem/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	6.71 [g]	1.86	0.826	15			087495-034	EPA 900.0
	Gross Beta	6.10 ± 3.79	5.32	2.31	4mrem/yr		J	087495-034	EPA 900.0
	Tritium	-82.8 ± 91.2	163	79.0	NE	U	BD	087495-036	EPA 906.0 M

Refer to footnotes at end of table.

Table A-12 (Continued)
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results
Mixed Waste Landfill 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 (pCi/L)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
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	3.50 [g]	2.32	1.05	15			087500-034	EPA 900.0
	Gross Beta	8.18 ± 2.28	2.72	1.32	4mrem/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	3.73 [g]	1.27	0.526	15			087501-034	EPA 900.0
	Gross Beta	4.78 ± 3.10	4.16	1.72	4mrem/yr		J	087501-034	EPA 900.0
	Tritium	-47.6 ± 92.3	163	78.9	NE	U	BD	087501-036	EPA 906.0 M
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	4.62 [g]	1.86	0.836	15			087769-034	EPA 900.0
	Gross Beta	3.17 ± 1.76	2.73	1.33	4mrem/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	2.54 [g]	6.27	2.36	15		J	087770-034	EPA 900.0
	Gross Beta	6.30 ± 2.13	2.88	1.40	4mrem/yr		J	087770-034	EPA 900.0
	Tritium	-78.9 ± 88.1	157	76.2	NE	U	BD	087770-036	EPA 906.0 M

Refer to footnotes at end of table.

Table A-12 (Concluded)
Summary of Tritium, Gross Alpha, Gross Beta, and Gamma Spectroscopy Results
Mixed Waste Landfill 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 (pCi/L)	Laboratory Qualifier[d]	Validation Qualifier[e]	Sample No.	Analytical Method[f]
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	3.69 [g]	1.82	0.819	15			087774-034	EPA 900.0
	Gross Beta	8.92 ± 4.15	5.23	2.31	4mrem/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	3.51 [g]	6.54	2.55	15		J	087772-034	EPA 900.0
	Gross Beta	5.19 ± 3.17	4.34	1.86	4mrem/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	4.72 [g]	1.70	0.759	15			087765-034	EPA 900.0
	Gross Beta	5.75 ± 3.61	5.14	2.25	4mrem/yr		J	087765-034	EPA 900.0
	Tritium	9.66 ± 91.6	158	76.6	NE	U	BD	087765-036	EPA 906.0 M

[a]Activity levels of zero or less are considered to be not detected.
[b]MDA is the minimal detectable activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.
[c]Critical level is the minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.
[d]Laboratory Qualifier.
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.
[e]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
BD = Used in radiochemistry to identify results that are not statistically different from zero.
J = The associated value is an estimated quantity.
R = The data are unusable for their intended purpose. The analyte may or may not be present.
[f]EPA 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
[g]Excluding uranium (40 CFR Parts 9, 141, and 142, Table I-4)

EPA = U.S. Environmental Protection Agency.
ID = Identification.
MCL = Maximum contaminant level.
MDA = Minimum detectable activity.
mrem/yr = Millirem per year.
NE = Not established.
pCi/L = Picocurie(s) per liter.

Table A-13
Duplicate Sample Analytical Results for Chemical Analyses
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
January 2009

Sample Location	MWL-MW8 Environmental Result (R_1)	MWL-MW8 Duplicate Result (R_2)	
Parameter[a]	All results in mg/L (unless noted)		RPD[b]
Toluene (μg/L)	0.496	0.495	<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 A-13 (Continued)
Duplicate Sample Analytical Results for Chemical Analyses
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
April 2009

Sample Location	MWL-MW6 Environmental	MWL-MW6 Duplicate	
	Result (R_1)	Result (R_2)	
Parameter[a]	All results in mg/L (unless noted)		RPD[b]
2-Butanone (μg/L)	1.37	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 (μg/L)	1.37	ND	NC
Nitrate plus nitrite as N	1.52	1.72	12

Refer to footnotes at end of table.

Table A-13 (Continued)
Duplicate Sample Analytical Results for Chemical Analyses
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
July 2009

Sample Location	MWL-MW9 Environmental	MWL-MW9 Duplicate	
	Result (R_1)	Result (R_2)	
Parameter[a]	All results in mg/L (unless noted)		RPD[b]
Toluene (μg/L)	0.711	0.692	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 A-13 (Concluded)
Duplicate Sample Analytical Results for Chemical Analyses
Mixed Waste Landfill Groundwater Monitoring, Sandia National Laboratories/New Mexico
October 2009

Sample Location	MWL-BW2 Environmental	MWL-BW2 Duplicate	
	Result (R_1)	Result (R_2)	
Parameter[a]	All results in mg/L (unless noted)		RPD[b]
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]Parameters not detected in both samples are not listed.
[b]RPD is not calculated for estimated values.
CaCO3 = Calcium carbonate.
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.
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

This page intentionally left blank.

APPENDIX B
Generalized Conceptual Hydrogeologic Model Explaining the Lower Groundwater Elevations Measured in MWL-MW7 through MWL-MW9 at the Mixed Waste Landfill

APPENDIX B
LIST OF FIGURES

Figure

B-1 Location of MWL North-South Profile A – A' and MWL East-West Profile B – B' B-2

B-2 MWL North–South Profile 2009 ..... B-3

B-3 MWL East–West Profile 2009 ..... B-4

B-4 Mixed Waste Landfill Conceptual Model, Water Table Conditions – Pre-Pumping Early 1900s B-7

B-5 Mixed Waste Landfill Conceptual Model, Water Table Conditions – Early 1990s KAFB and COA Pumping of the Regional Aquifer B-8

B-6 Mixed Waste Landfill Conceptual Model, Water Table Conditions – Late 2000s Continued KAFB and COA Pumping of the Regional Aquifer B-9

This page intentionally left blank.

MIXED WASTE LANDFILL
GENERALIZED HYDROGEOLOGIC CONCEPTUAL MODEL EXPLAINING THE LOWER GROUNDWATER ELEVATIONS MEASURED IN MWL-MW7 THROUGH MWL-MW9
SUMMARY

A generalized hydrogeologic conceptual model for the aquifer system beneath the Mixed Waste Landfill (MWL) that explains lower groundwater elevations measured in MWL-MW7 through MWL-MW9 relative to the groundwater monitoring wells they replaced (MWL-MW1 through MWL-MW3) is presented in this appendix. This information augments the comprehensive conceptual model presented in the "Mixed Waste Landfill Groundwater Report, 1990 through 2001" (Goering et al. December 2002) and the Phase 2 RCRA Facility Investigation Report (Peace et al. September 2002). In general, the groundwater elevation (i.e., top of the regional aquifer or water table) along the west side of the MWL is approximately 20 feet lower in the new monitoring wells than it was in the older monitoring wells. A summary is provided, followed by a map and two hydrogeologic cross sections depicting the wells, simplified subsurface hydrogeology, groundwater levels, and hydraulic conductivity data (Figures B-1 through B-3). Although this conceptual model is simplified, it is based on actual water level and hydraulic conductivity measurements and is consistent with the geologic interpretation of monitoring well lithologic and geophysical logging information. It is intended to provide a general framework for understanding the groundwater system with respect to the groundwater elevations measured in MWL-MW7 through MWL-MW9 since they were installed in 2008. Following the map and profiles, additional supporting information and a regional perspective are presented in the section titled, "Supporting Observations and a Regional Perspective". This information is illustrated in three additional "time-phased" conceptual figures (Figures B-4 through B-6).

The lower groundwater elevations in MWL-MW7 through MWL-MW9 appear to be related to two major factors. First, the geology of the upper part of the regional groundwater system, which is in general a stratified system, varies with depth from a low hydraulic conductivity layer (in which MWL-MW2 and MWL-MW3 were screened) to a medium conductivity layer (in which the lower parts of the screens of MWL-MW7, MWL-MW8, and MWL-MW9 reside) to a high conductivity layer corresponding to the Ancestral Rio Grande sediments (in which at least part of the screen interval of MWL-MW4 [lower screen], MWL-MW5, and MWL-MW6 are located). Second, the regional aquifer continues to decline as a result of historic and ongoing large-scale removal of water by the City of Albuquerque (COA) and Kirtland Air Force Base (KAFB). The overall effect at the MWL is that groundwater flow is predominantly vertically downward in the lower conductivity and medium conductivity layers in response to this regional drawdown from pumping (i.e., a draining system).

Because the screen intervals of the new wells (MWL-MW7, MWL-MW8, and MWL-MW9) extend across the medium hydraulic conductivity layer and the screens in the wells they replaced (MWL-MW1, MWL-MW2, and MWL-MW3) were completely within the lower conductivity layer above the medium hydraulic conductivity layer, the vertical gradient has a larger impact on the groundwater elevation in the new wells. The end result is that the top of the regional water table is significantly lower in MWL-MW7, MWL-MW8, and MWL-MW9.

The profile figures (B-2 and B-3) presented in this summary are focused on depicting the hydrogeologic regime. In order to depict the hydrogeologic regime at a practical scale and because the depth to groundwater is approximately 500 ft at the MWL, the upper 400 ft of the vadose zone is not shown.

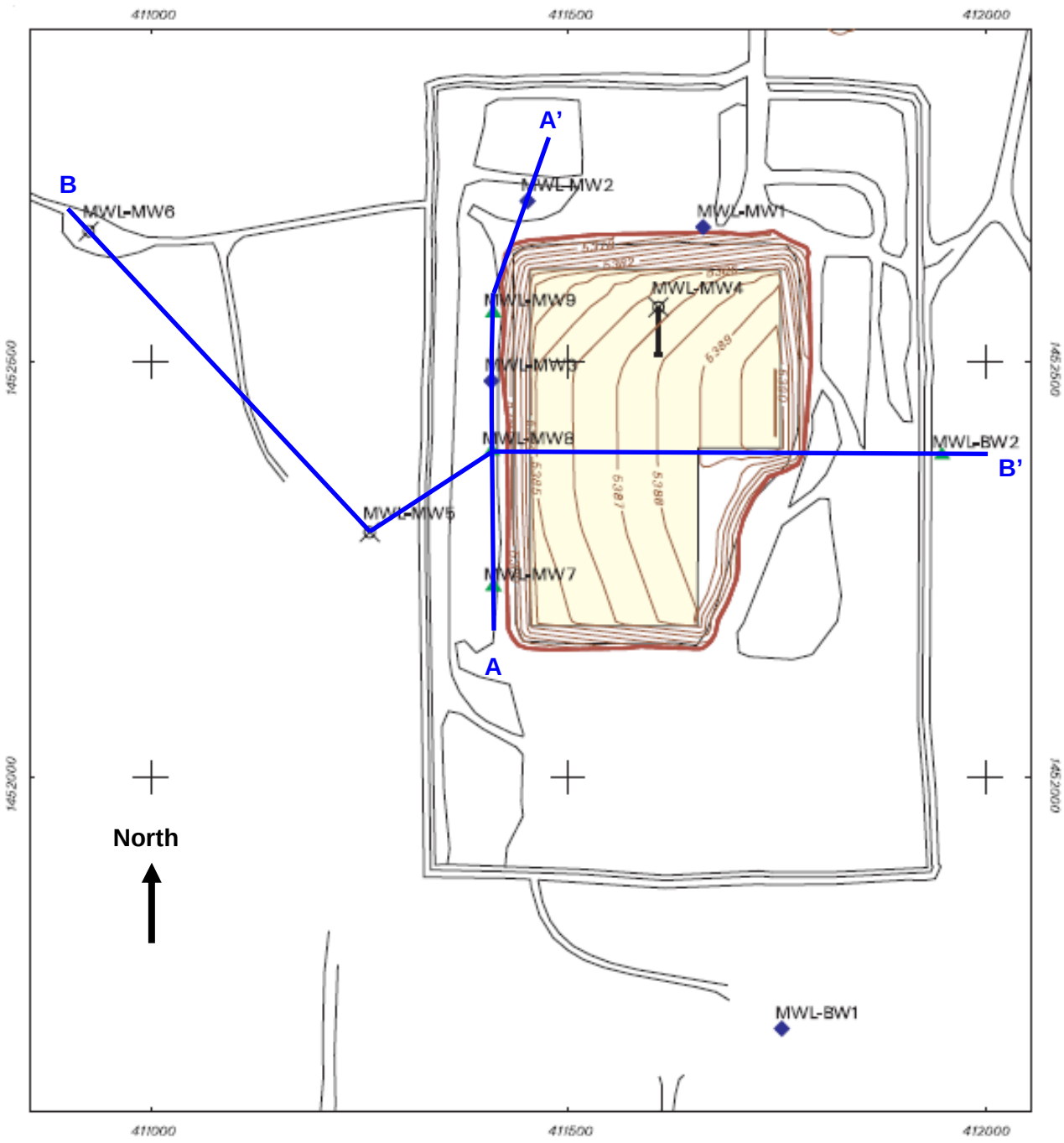

Figure B-1
Location of MWL North-South Profile A – A'
and
MWL East-West Profile B – B'

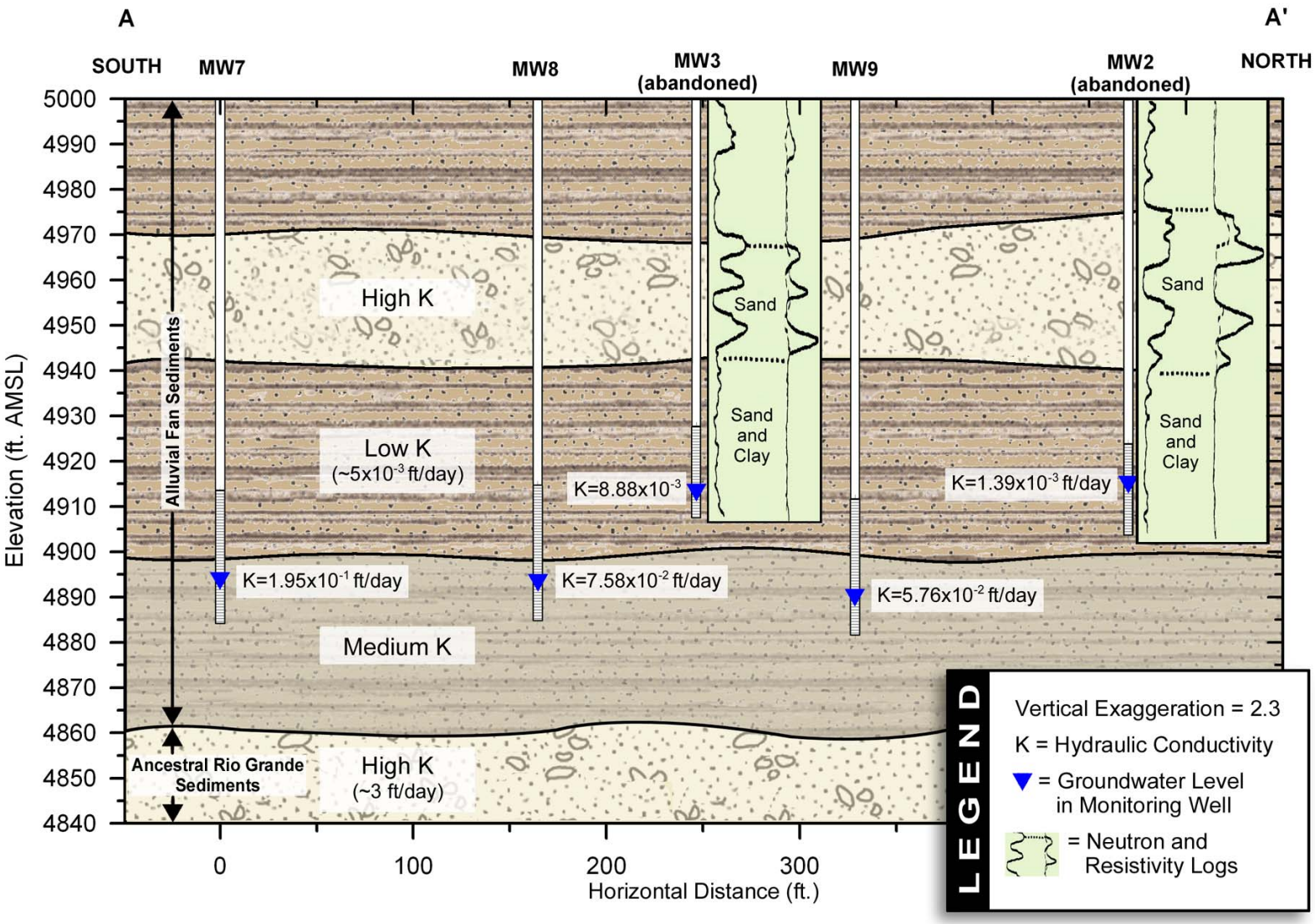

Figure B-2
MWL North–South Profile 2009

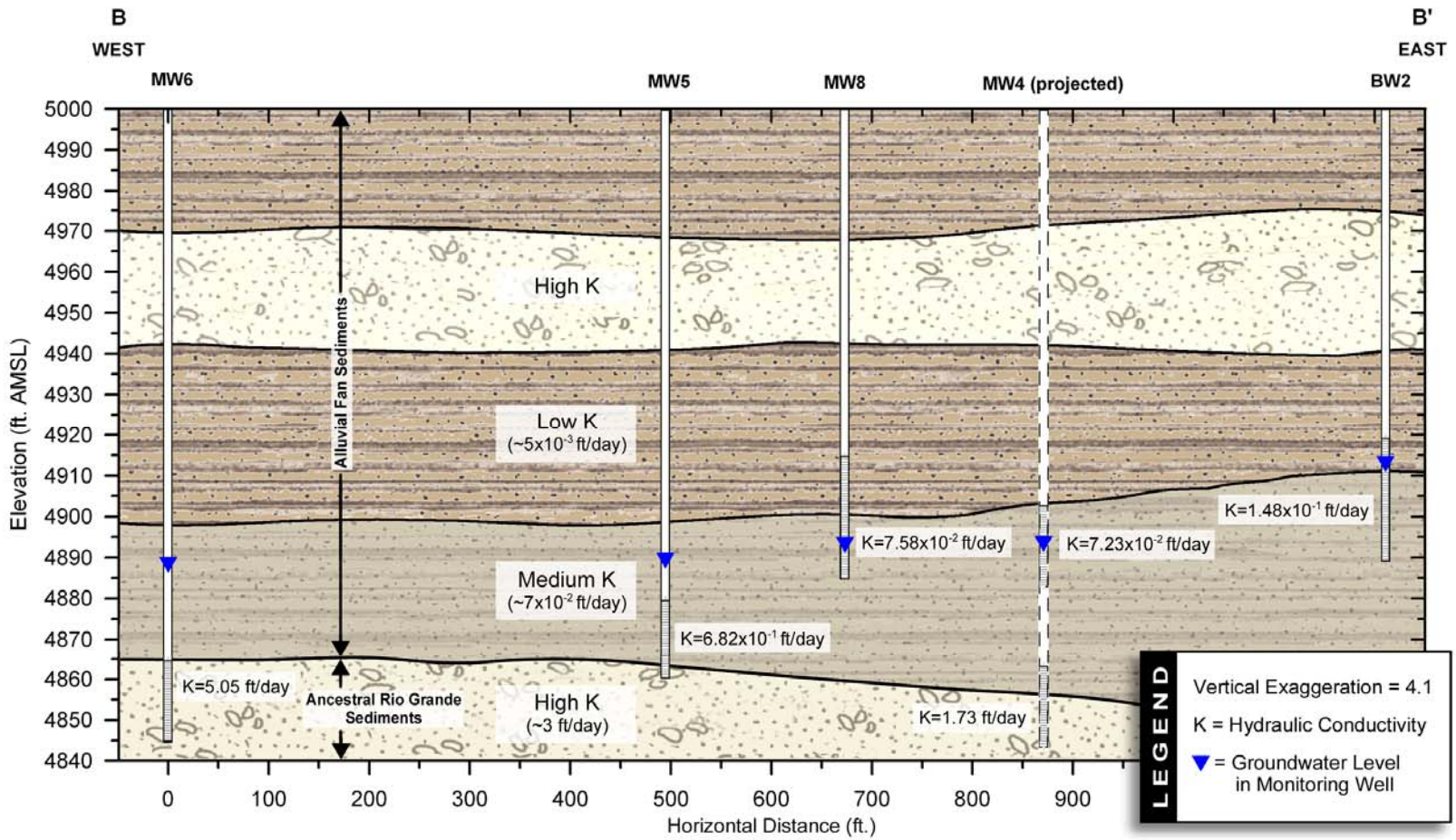

Figure B-3
MWL East–West Profile 2009

Water level data presented in the Figures B-2 and B-3 reflect 2009 conditions. All hydraulic conductivity data for the older wells is taken the “Mixed Waste Landfill Groundwater Report, 1990 through 2001” (Goering et al. December 2002). For the newer 2008 wells the hydraulic conductivity values are from slug testing performed in 2009 (Skelly et al. August 2009). All references to the hydraulic conductivity of various layers are relative and are not meant to represent a precise hydraulic conductivity value or range.

The overall elements of the hydrogeology of the site are summarized below.

- The relatively flat ground surface at the MWL slopes slightly to the west.

- Overall, the conceptual model is a stratified system that varies with depth from a low hydraulic conductivity layer (in which groundwater monitoring wells MWL-MW2 and MWL-MW3 are screened), to a medium conductivity layer (in which the lower parts of the screens of MWL-MW7, MWL-MW8, and MWL-MW9 reside), to a high conductivity layer corresponding to the Ancestral Rio Grande sediments (in which at least part of the screen interval of MWL-MW4 [lower screen], MWL-MW5, and MWL-MW6 are located). Groundwater flow is predominantly vertically downward in the low conductivity and medium conductivity layers in response to regional drawdown from pumping.

- The difference in water levels in wells MWL-MW2 and MWL-MW3 (higher), and the water levels in wells MWL-MW7, MWL-MW8, and MWL-MW9 (approximately 20 ft lower) is a result of the strong downward vertical gradient in hydraulic head associated with the downward vertical drainage of the lower conductivity units overlying the Ancestral Rio Grande sediments.

- The declining heads in the regional aquifer (i.e., regional drawdown) result from groundwater removal at KAFB and across the COA (i.e., production wells for drinking water).

- The nearest KAFB and COA production wells are located more than 3 miles north of the MWL.

Supporting Observations and a Regional Perspective

- Wells MWL-MW2 and MWL-MW3 are screened in low hydraulic conductivity material (i.e., fine-grained Alluvial Fan sediments). Hydraulic testing indicates a conductivity of about 1.39×10^{-3} to 8.88×10^{-3} ft/day. Resistivity and neutron geophysical logs also indicate that the wells are screened in fine-grained sediments.

- Wells MWL-MW7, MWL-MW8, and MWL-MW9 have well screens that straddle the low hydraulic conductivity layer described above and the underlying medium conductivity layer, also in the Alluvial Fan sediments. Hydraulic testing (i.e., aquifer pump testing) for the upper screen in MWL-MW4 in the medium conductivity layer resulted in a conductivity of approximately 7.23×10^{-2} ft/day. The hydraulic conductivity for wells MWL-MW7, MWL-MW8, and MWL-MW9 were 1.95×10^{-1}, 7.58×10^{-2}, and 5.76×10^{-2} ft/day, respectively, based on slug testing results.

- The lower screen in well MWL-MW4 and the screens in MWL-MW5 and MWL-MW6 reside in a higher conductivity material, interpreted to be the coarser Ancestral Rio Grande sediments. The well screen for MWL-MW5 straddles the contact between the Ancestral Rio Grande sediments and the Alluvial Fan sediments, whereas the lower screen of MWL-MW4 and the screen of MWL-MW6 are completely within the Ancestral Rio Grande sediments. Hydraulic testing in the lower screen of MWL-MW4 yielded a conductivity of about 1.5 ft/day, and MWL-MW6 had a conductivity of about 5.0 ft/day. The conductivity of MWL-MW5 was slightly lower at 6.83×10^{-1} ft/day.

- Based on the geologic and geophysical logging results as well as hydraulic conductivity testing results, the wells MWL-MW7, MWL-MW8, and MWL-MW9 are screened in the Alluvial Fan sediments that generally occur above the Ancestral Rio Grande sediments. However, in places the Alluvial Fan and Ancestral Rio Grande sediments appear to be inter-layered. The high hydraulic conductivity layer above the low hydraulic conductivity layer shown in Figures B-2 and B-3 is interpreted as an inter-fingering layer of the coarse-grained Ancestral Rio Grande sediments within the predominantly fine-grained Alluvial Fan sediments (Goering et al. December 2002).

- Significant drawdown has occurred in the Ancestral Rio Grande sediments over the last two to three decades. Water levels in the Ancestral Rio Grande sediments in the vicinity of the MWL were decreasing at a rate of about 2 ft/year in the mid-1990s (Peace et al. September 2002). Water levels in well MWL-MW6 decreased at a lower rate of about 0.4 ft/year from 2004 to 2007 (Goering et al. December 2002). Projecting backward in time to the mid 1990's, it is possible that the water table prior to pumping was at least 40 to 60 ft higher than current water levels. This time-dependent regional trend is shown schematically in Figures B-4 through B-6. The wells are not intended to be actual MWL monitoring wells; they are included to show the impact of the regional groundwater decline on the water levels in wells located in the different hydrogeologic units, similar to the MWL groundwater monitoring wells.

- The Alluvial Fan sediments continue to undergo significant dewatering. Groundwater movement in the low hydraulic conductivity layer and the medium conductivity layer above the Ancestral Rio Grande sediments is dominated by downward vertical drainage in

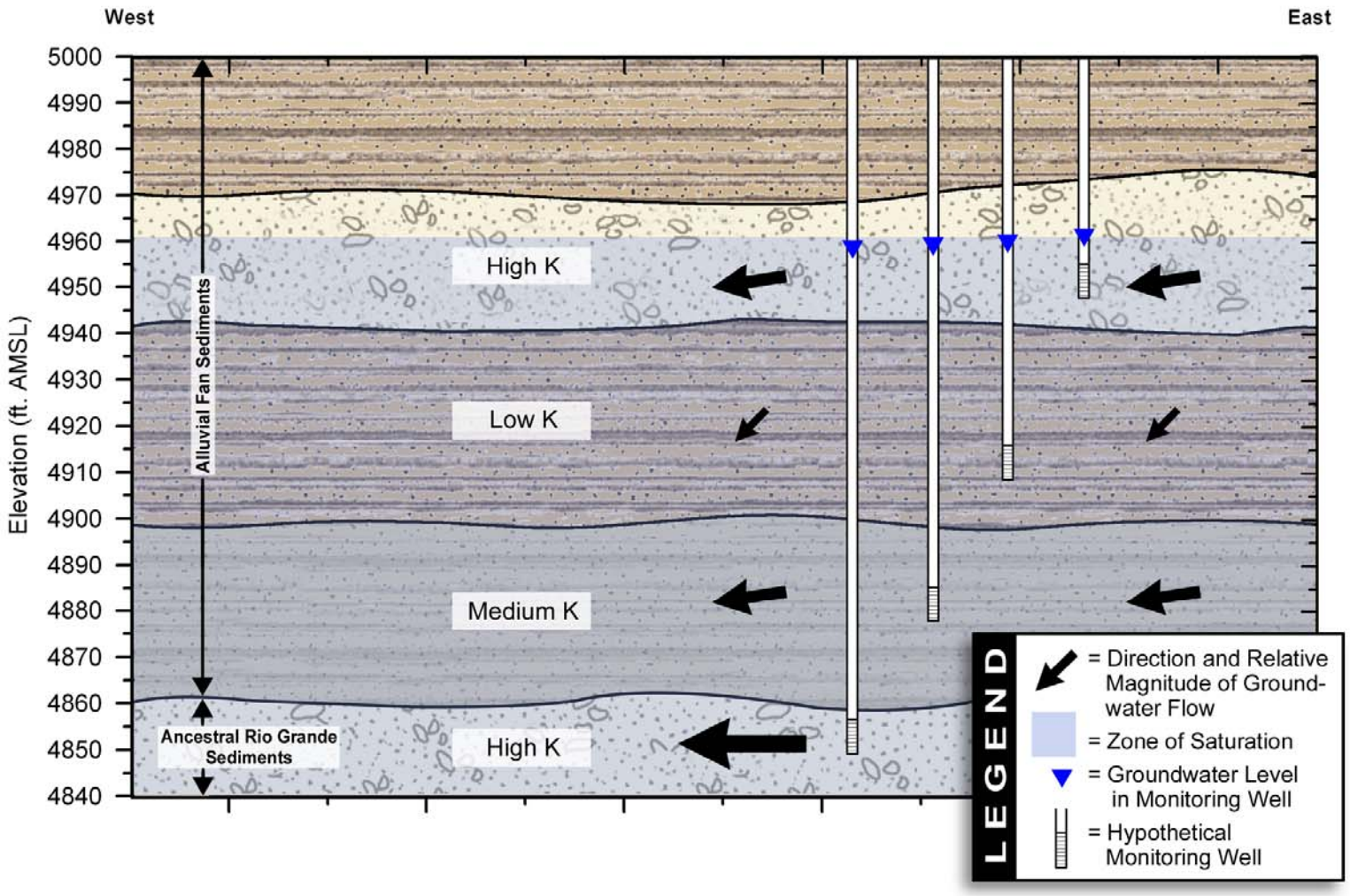

Figure B-4
Mixed Waste Landfill Conceptual Model
Water Table Conditions – Pre-Pumping Early 1900s

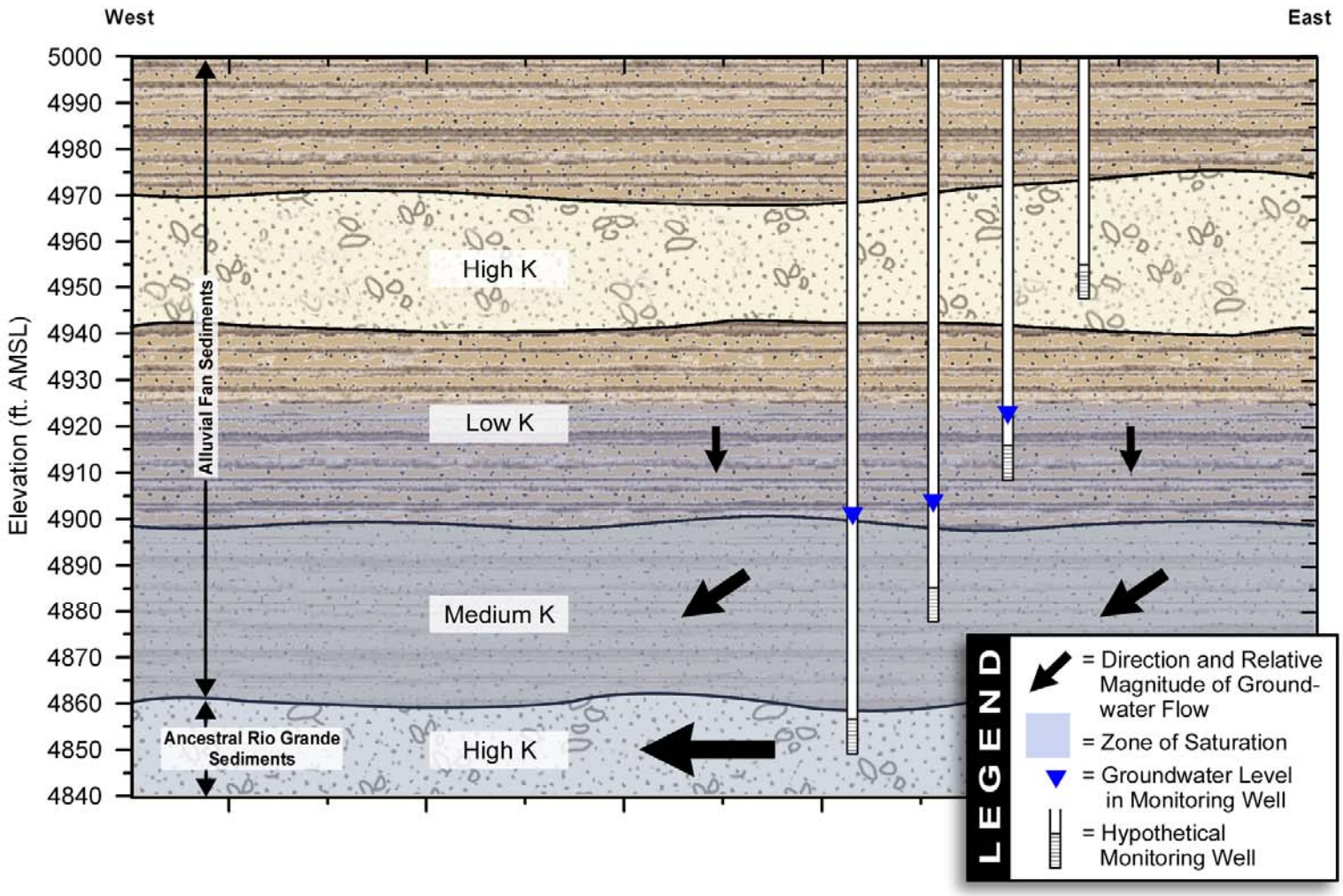

Figure B-5
Mixed Waste Landfill Conceptual Model
Water Table Conditions – Early 1990s KAFB and COA Pumping of the Regional Aquifer

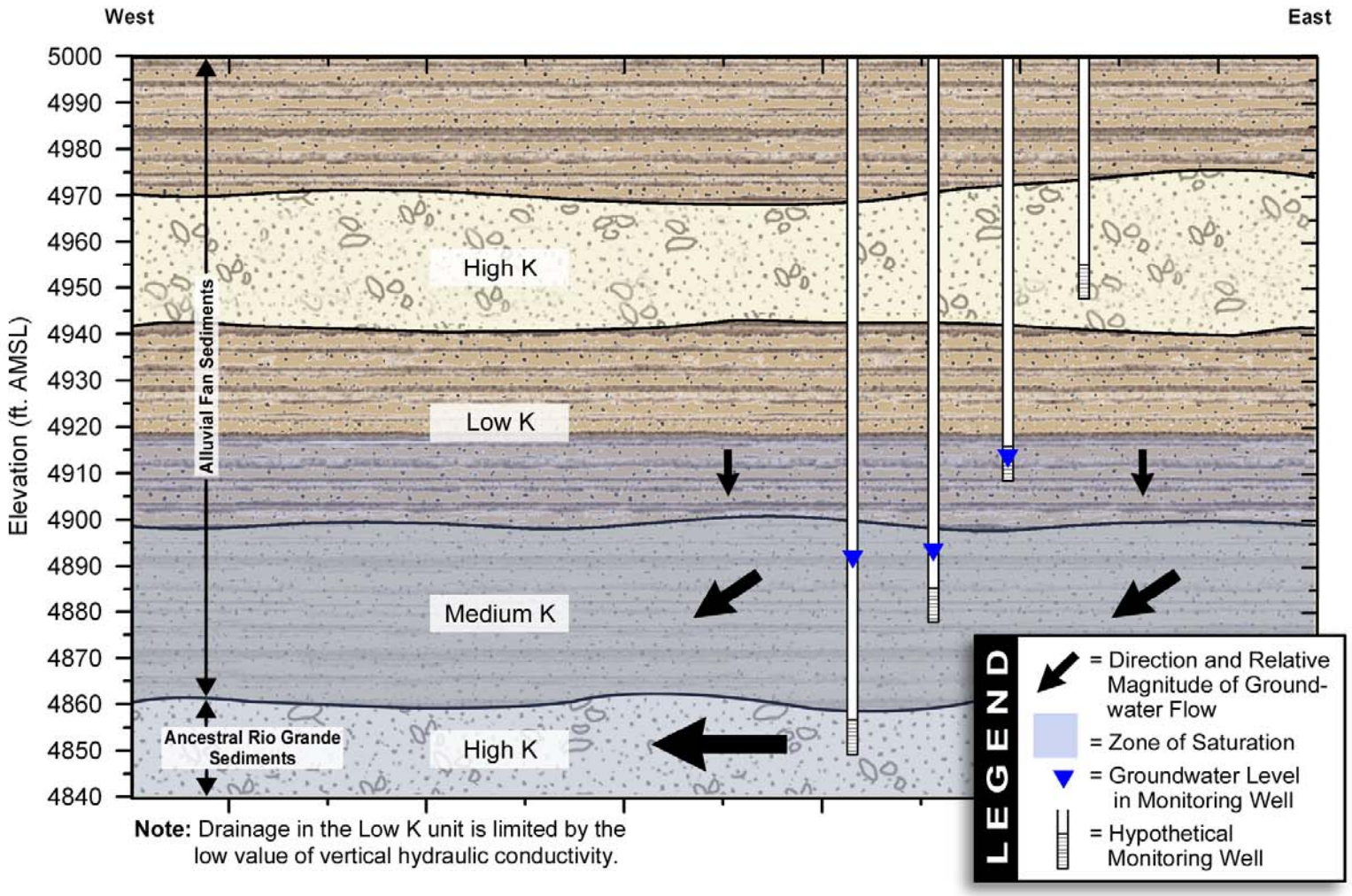

Figure B-6
Mixed Waste Landfill Conceptual Model
Water Table Conditions – Late 2000s Continued KAFB and COA Pumping of the Regional Aquifer

response to regional drawdown in the underlying Ancestral Rio Grande sediments. For example, the average vertical hydraulic gradient using the water levels in wells MWL-MW3 and MWL-MW8 is 0.93 downward. The vertical hydraulic gradient between the upper and lower screens in MWL-MW4 is downward at 0.11 (Peace et al. September 2002 and Goering et al. December 2002).

- The horizontal gradient between MWL-BW2 and MWL-MW8 was approximately 0.03 in October 2009.

- Values of vertical hydraulic gradient approaching or equal to 1.0 and the stratified nature of the Alluvial Fan sediments suggest possible variably saturated conditions between locally saturated media in the low hydraulic conductivity layer. Transient stranded water may exist in this low conductivity material as the system drains vertically downward.

- Water level measurements in monitoring wells are composite values of hydraulic head over the screened interval, with the observed water level being strongly weighted toward the head in the material with the highest hydraulic conductivity. This means that the water level measurements in MWL-MW7, MWL-MW8, and MWL-MW9 are dominated by the head in the medium hydraulic conductivity layer in the lower part of the screens.

References

Goering, T.J., G.M. Haggerty, D. Van Hart, and J.L. Peace, December 2002. "Mixed Waste Landfill Groundwater Report, 1990 through 2001, Sandia National Laboratories, Albuquerque, New Mexico," SAND Report SAND2002-4098, prepared by Sandia National Laboratories, Albuquerque, New Mexico, for the U.S. Department of Energy under Contract DE-AC04-94AL85000.

Peace, J.L., T.J. Goering, and M.D. McVey, September 2002. "Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation, Sandia National Laboratories, Albuquerque, New Mexico," SAND Report SAND2002-2997, prepared by Sandia National Laboratories, Albuquerque, New Mexico, for the U.S. Department of Energy under Contract DE-AC04-94AL85000.

Skelly, M., R. Lynch, A. Santillanes, B. Gibson, August 2009. "Technical Memorandum – Field Report on the Slug Tests at Mixed Waste Landfill Wells," Sandia National Laboratories, Albuquerque, New Mexico.