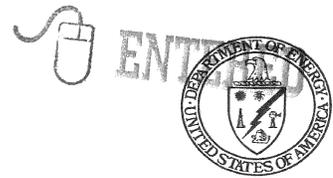




National Nuclear Security Administration
Sandia Site Office
P. O. Box 5400
Albuquerque, NM 87185



CERTIFIED MAIL-RETURN RECEIPT REQUESTED

APR 22 2013



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

Subject: Department of Energy/National Nuclear Security Administration Sandia National Laboratories *Environmental Restoration Operations Consolidated Quarterly Report, April 2013*

Dear Mr. Kieling:

Enclosed is the *Environmental Restoration Operations Consolidated Quarterly Report, April 2013* for the Department of Energy, National Nuclear Security Administration, Sandia Corporation that addresses all quarterly reporting (October through December 2012) required under the *Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent and the Chemical Waste Landfill Closure Plan* for Sandia National Laboratories/New Mexico, Environmental Protection Agency identification number NM5890110518.

If you have questions please contact John Weckerle of my staff at (505) 845-6026.

Sincerely,

Daniel Pellegrino
Assistant Manager for Operations

Enclosure

cc:
See Page 2

cc w/enclosure:

William Moats, NMED-HWB
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Albuquerque, NM 87109

Laurie King, EPA, Region 6
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cc w/enclosure:

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John Weckerle, SFO/ENG, MS-0184
13-389-506260

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: Environmental Restoration Operations Consolidated Quarterly Report, April 2013

Document author: John Cochran, Department 06234

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: 
Peter Davies, Director
Nuclear Energy & Fuel Cycle Programs
Center 6200
Sandia National Laboratories/New Mexico
Albuquerque, New Mexico 87185
Operator

4/15/13
Date

and

Signature: 
Daniel Pellegrino
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

4/21/13
Date



Sandia National Laboratories

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Peter Davies
Director, Nuclear Energy & Fuel Cycle Programs
Center 6200

Mr. Daniel Pellegrino
U. S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
PO Box 5400
Albuquerque, New Mexico 87115

Dear Mr. Pellegrino:

Subject: Department of Energy/National Nuclear Security Administration, Sandia National
Laboratories Environmental Restoration Operations Consolidated Quarterly Report,
April 2013

Please find attached copies of the *Environmental Restoration Operations Consolidated Quarterly Report, April 2013* that addresses all quarterly reporting (from October through December 2012) required under the *Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent and the Chemical Waste Landfill Closure Plan* for Sandia National Laboratories/New Mexico, Environmental Protection Agency EPA No. 5890110518.

Please transmit one copy of this report to the EPA Region 6 office in Dallas, TX, and two copies to the State of New Mexico Environment Department. If you have any questions regarding this report, please contact David Miller of my staff at 284-2574.

Sincerely,

Peter Davies

Copy to:

MS 0184, J. Estrada, NNSA/SSO
MS 0718, D. Miller, 06234
MS 0719, J. Cochran, 06234
MS 0718, ES&H Records Center, 06234

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

October – December 2012



April 2013



United States Department of Energy
Sandia Field Office

CONSOLIDATED QUARTERLY REPORT

April 2013

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY:
CONTRACTOR:
PROJECT MANAGER:

SANDIA FIELD OFFICE
SANDIA CORPORATION
John Cochran

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 36

SUSPECT WASTE: Radionuclides, metals, organic compounds, and explosives

REPORTING PERIOD: October – December 2012

OVERVIEW

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) addresses all quarterly reporting requirements pertaining to the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent, and the Chemical Waste Landfill Post-Closure Care Permit. The 36 sites in the Corrective Action regulatory process are listed in Table I-1. The 36 sites consist of 27 Solid Waste Management Units and 9 Areas of Concern (AOCs), including 8 Drain and Septic System sites and the Tijeras Arroyo Groundwater AOC. The Burn Site Groundwater and Technical Area V Groundwater AOCs are not included on the current HSWA Permit but have been added as AOCs to the revised HSWA Permit that is pending approval by the New Mexico Environment Department at this time. This ER Quarterly Report presents activities and data in sections as follows:

SECTION I: Environmental Restoration Operations Consolidated Quarterly Report, October – December 2012

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, October – December 2012

SECTION III: Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, October – December 2012

SECTION IV: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, October – December 2012

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AOC	Area of Concern
AOP	Administrative Operating Procedure
BSG	Burn Site Groundwater
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCBA	Coyote Canyon Blast Area
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
COA	Certificates of Analysis
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
DI	deionized
DO	dissolved oxygen
DOE	U.S. Department of Energy
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Operations
ER Quarterly Report	Environmental Restoration Operations (ER) Consolidated Quarterly Report
ET Cover	evapotranspirative cover
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
HE	high explosive(s)
HQ	hazard quotient
LTMMMP	Long-Term Monitoring and Maintenance Plan
LTS	Long-Term Stewardship
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
mg/L	milligram(s) per liter
mL	milliliter(s)
MWL	Mixed Waste Landfill
ND	nondetect
NMED	New Mexico Environment Department
NPDES	National Pollution Discharge Elimination System

NPN	nitrate plus nitrite
NTU	nephelometric turbidity units
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
pCi/L	picocuries per liter
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RPD	relative percent difference
Sandia	Sandia Corporation
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
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
the Order	the Compliance Order on Consent
VOC	volatile organic compound

SECTION I

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SECTION I

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, OCTOBER – DECEMBER 2012

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective actions being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the October, November, and December 2012 quarterly reporting period. The following sections outline the status of regulatory closure activities for the Mixed Waste Landfill (MWL), project management and site closure, site-wide hydrogeologic characterization, and ER/Long-Term Stewardship (LTS) activities.

2.0 Environmental Restoration Operations Work Completed

2.1 Mixed Waste Landfill

The Long-Term Monitoring and Maintenance Plan (LTMMP) was submitted to New Mexico Environment Department (NMED) in March 2012 (SNL/NM March 2012a). NMED initiated a 60-day public comment period on the MWL LTMMP on September 14, 2012, and held a public meeting on October 16, 2012. SNL/NM ER staff participated in the public meeting.

A project kick-off meeting for restoration field work at the MWL Borrow Pit in Technical Area (TA) III (Figure I-1) occurred in December. The restoration work is scheduled for May through June 2013, just prior to the 2013 monsoon season, and is designed to stabilize the site and close the National Pollution Discharge Elimination System (NPDES) Construction Permit. The NPDES Permit was established through a Storm Water Pollution Prevention Plan submitted to the U.S. Environmental Protection Agency (EPA) in 2006 as part of the MWL evapotranspirative cover (ET Cover) project. Groundwater monitoring activities for the MWL are discussed in Section I.2.3.4 of this ER Quarterly Report.



Figure I-1
View of the West End of MWL Borrow Pit

2.1.1 **MWL Evapotranspirative Cover Supplemental Watering Activities**

Due to natural weather conditions supporting the vegetative cover growth, supplemental watering did not need to be performed during this reporting period.

A comprehensive summary report of all supplemental watering performed prior to 2012 is provided in the revised MWL LTMMP (SNL/NM March 2012a).

2.1.2 **MWL Evapotranspirative Cover Maintenance Activities**

Removal of Russian thistle and other common invasive annual weed species from the MWL ET Cover and fenced perimeter was initiated on September 14, 2012 and completed on October 5, 2012. A final sweep of the site was completed from October 25 through 29. Approximately 80 cubic yards of compressed weeds were removed during the first effort, and an additional 5.3 cubic yards were removed during the final sweep. All green waste was disposed of at the Kirtland Air Force Base Landfill.

A comprehensive summary report of all cover maintenance activities performed prior to 2012 is presented in the revised MWL LTMMP (SNL/NM March 2012a).

2.2 **Project Management and Site Closure**

ER sites currently undergoing the Corrective Action Complete (CAC) process are addressed in this section. The two permit modification requests that are in process with the NMED at this time are summarized in Sections I.2.2.1 through I.2.2.3.

2.2.1 **Permit Modification Request Submitted in March 2006**

This Quarterly Report addresses 36 sites undergoing corrective action under the Permit and Compliance Order on Consent (Table I-1); of these 36 sites, 26 sites were submitted to the NMED for final determination of CAC in March 2006 (Wagner March 2006). The sites included 19 Solid Waste Management Units (SWMUs) and 7 Areas of Concern (AOCs). The NMED issued the “Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the Resource Conservation and Recovery Act (RCRA) Permit for Sandia National Laboratories” for these 26 sites in December 2007 (NMED December 2007). The NMED public review and comment period ended in February 2008. The following SWMUs and AOCs were included in this permit modification request:

- SWMUs 4, 5, 46, 49, 52, 68, 91, 101, 116, 138, 140, 147, 149, 150, 154, 161, 196, 233, and 234
- AOCs 1090, 1094, 1095, 1114, 1115, 1116, and 1117

2.2.2 Permit Modification Request Submitted in January 2008

Five additional sites were submitted for the NMED determination of CAC in a permit modification request submitted in January 2008 (Wagner January 2008). This permit modification included all remaining SNL/NM ER sites with the exception of three active sites (SWMUs 83, 84, and 240), the MWL (SWMU 76), and three groundwater investigation sites (TA-V, Burn Site Groundwater [BSG], and Tijeras Arroyo Groundwater [TAG]). The four SWMUs and one AOC included in the January 2008 permit modification request are:

- SWMUs 8, 28-2, 58, and 105
- AOC 1101

2.2.3 Status of Permit Modification Requests Submitted in March 2006 and January 2008

In April 2010, U.S. Department of Energy (DOE)/Sandia Corporation (Sandia) received a letter from the NMED entitled, “Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001” (NMED April 2010). This letter included four main sections as follows:

1. “SWMUs Requiring Additional Corrective Action”
2. “SWMUs/AOCs to be Subject to Groundwater Monitoring Controls”
3. “SWMUs/AOCs to be Restricted to Industrial Land Use”
4. “SWMUs/AOCs that do not Require Corrective Action.”

The NMED requirements stated in this letter (NMED April 2010) are summarized as follows:

- The section titled, “SWMUs Requiring Additional Corrective Action,” specifies additional groundwater characterization requirements for:

1. SWMU 68 - Old Burn Site
2. SWMU 149 - Building 9930 Septic System (Coyote Test Field [CTF])
3. SWMU 154 - Building 9960 Septic System and Seepage Pits
4. SWMUs 8/58 - Open Dump/Coyote Canyon Blast Area

Activities associated with these requirements are summarized in Section I.2.3 of this ER Quarterly Report. Analytical results for groundwater sampling at these SWMUs are presented in Sections III and IV of this ER Quarterly Report.

- The section titled, “SWMUs/AOCs to be Subject to Groundwater Monitoring Controls,” specifies that annual groundwater monitoring is to be conducted at:

1. SWMU 49 - Building 9820 Drains (Lurance Canyon)
2. SWMU116 - Building 9990 Septic Systems (CTF)

Groundwater monitoring results are summarized in Sections I.2.3.8 and I.2.3.9, respectively, of this ER Quarterly Report.

- The section titled, “SWMUs/AOCs to be Restricted to Industrial Land Use,” indicates that the NMED intends to restrict the future land use of the following SWMUs/AOCs to industrial:

1. SWMU 4 – Liquid Waste Disposal System Surface Impoundments (TA-V)
2. SWMU 46 – Old Acid Waste Line Outfall
3. SWMU 91 – Lead Firing Site (Thunder Range)
4. SWMU 196 – Building 6597 Cistern (TA-V)
5. SWMU 234 – Storm Drain System Outfall
6. AOC 1090 – Building 6721 Septic System (TA-III)

- The section titled, “SWMUs/AOCs that do not Require Corrective Action,” includes the following 25 SWMUs/AOCs:

1. SWMU 4 – Liquid Waste Disposal System Surface Impoundments
2. SWMU 5 – Liquid Waste Disposal System Drainfield
3. SWMU 28-2 – Mine Shaft
4. SWMU 46 – Old Acid Waste Line Outfall

5. SWMU 49 – Building 9820 Drains (Lurance Canyon)
6. SWMU 91 – Lead Firing Site
7. SWMU 101 – Building 9926/9926A Septic System and Seepage Pit (CTF)
8. SWMU 105 – Mercury Spill (Building 6536)
9. SWMU 116 – Building 9990 Septic System (CTF)
10. SWMU 138 – Building 6630 Septic Systems (TA-III)
11. SWMU 140 – Building 9965 Septic System and Drywell (Thunder Range)
12. SWMU 147 – Building 9925 Septic Systems (CTF)
13. SWMU 150 – Buildings 9939/9939A Septic System and Drainfield (CTF)
14. SWMU 161 – Building 6636 Septic System (TA-III)
15. SWMU 196 – Building 6597 Cistern (TA-V)
16. SWMU 233 – Storm Drain System Outfall
17. SWMU 234 – Storm Drain System Outfall
18. AOC 1090 – Building 6721 Septic System (TA-III)
19. AOC 1094 – Live Fire Range East Septic System (Lurance Canyon)
20. AOC 1095 – Building 9938 Seepage Pit (CTF)
21. AOC 1101 – Building 885 Septic System (TA-I)
22. AOC 1114 – Building 9978 Drywell (CTF)
23. AOC 1115 – Former Offices Septic System (Solar Tower Complex)
24. AOC 1116 – Building 9981A Seepage Pit (Solar Tower Complex)
25. AOC 1117 – Building 9982 Drywell (Solar Tower Complex)

SWMU 52, - Liquid Waste Disposal System Holding Tank, was addressed separately in the April 2010 NMED letter. The NMED requested additional information to aid their determination of the site status (Brandwein December 2009a and 2009b). In December 2011, SNL/NM ER personnel provided the requested information to the NMED along with a proposal to address NMED concerns about the future use of this LWDS site (SNL/NM December 2011). In October 2012, the NMED requested additional corrective action, as described in Section I.2.2.4 of this ER Quarterly Report.

In a letter dated July 27, 2012, the NMED granted CAC status to three SWMUs/AOCs, which were not opposed by the public in the public comment period ending in February 2008 (NMED July 2012). The two SWMUs and one AOC granted CAC statuses are as follows:

- SWMUs 233, 234
- AOC 1115

Via Public Notice and letter (both dated September 17, 2012), the NMED solicited public comments and initiated the public comment period, on 24 SWMUs/AOCs that the NMED intends, pending public input, to approve as CAC (NMED September 2012). The 24 SWMUs/AOCs included SWMU 52. Twenty-three of these 24 SWMUs/AOCs were

from the March 2006 and January 2008 requests. In the September 17, 2012 solicitation of public comments, the NMED states that persons who provided public comment by the February 8, 2008, deadline (for the 26 SWMUs/AOCs submitted in March 2006) do not need to resubmit their comments, and may submit additional comments concerning any of the 24 SWMUs/AOCs currently being proposed for CAC status. However, those who requested a public hearing by the February 8, 2008, deadline must request a hearing again.

In summary, of the original 31 SWMUs/AOCs submitted for CAC status (26 in 2006 and 5 in 2008), 5 are undergoing additional groundwater investigations (summarized in Sections I.2.3.7 through I.2.3.11), 3 were granted CAC status, and 23 are still in the CAC regulatory process (one site, under the responsibility of SNL Long-Term Stewardship Program rather than ER, brings the number in the CAC process to 24). There are also ongoing activities at SWMU 52, which is one of the 24 SWMUs/AOCs in the CAC process.

2.2.4 **SWMU 52 Liquid Waste Disposal System**

On October 10, 2012, the NMED requested additional corrective action for soil (Kieling October 2012). Specifically, the NMED requested submittal of a schedule by December 11, 2012; that Tanks 2 and 4 be removed or filled with a permanent insoluble material to prevent any releases of water by July 2013; and a written report submitted to the NMED by October 11, 2013 (Kieling October 2012). On December 10, 2012 DOE/Sandia requested a 30 day extension for providing the schedule to NMED (Beausoleil, December 2012). Logistical and technical challenges required consideration prior to developing a schedule. The principle logistical challenge was the potentially large excavation area necessitated by the size and depth of the tanks. Moreover, the location of the potentially large excavation would impact access to TA-V, likely intercept buried utilities, and possibly affect TA-V operations. The principle technical challenge was evaluation of the permitted confined workspace requirement to safely and effectively fill the tanks with permanent insoluble material. On December 12, 2012 NMED approved the extension request (Kieling December 2012a).

2.3 **Site-Wide Hydrogeologic Characterization**

The following sections present site-wide hydrogeologic characterization and groundwater monitoring activities conducted at three groundwater investigation sites (TA-V, BSG, and TAG), the MWL, the Chemical Waste Landfill (CWL), and the seven SWMUs subject to additional corrective action and groundwater monitoring controls as discussed in Section I.2.2.3 of this ER Quarterly Report. Table I-2 summarizes the site-wide hydrogeologic characterization for these sites.

Analytical results for groundwater monitoring at TA-V; BSG; TAG; the MWL; the CWL; and SWMUs 68, 149, 154, 8/58, 49, and 116 will be presented in the SNL/NM Calendar Year (CY) 2012 Annual Groundwater Monitoring Report (anticipated submittal to the NMED in summer 2013). Also, analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2012.

Perchlorate analysis of groundwater samples for BSG, SWMUs 8/58, 68, 149, and 154 is discussed in Section II of this ER Quarterly Report.

Analytical results for the October 2012 groundwater sampling of monitoring wells at SWMUs 8/58 (CCBA-MW-1 and CCBA-MW-2) and SWMU 68 (OBS-MW-1, OBS-MW-2, and OBS-MW-3) are presented in Section IV of this ER Quarterly Report.

Analytical results for the December 2012 groundwater sampling of monitoring wells at SWMU 149 (CTF-MW-3) and SWMU 154 (CTF-MW-2) are presented in Section III of this ER Quarterly Report.

2.3.1 **Technical Area V Groundwater**

Groundwater sampling at TA-V was conducted in October and November 2012.

2.3.2 **Burn Site Groundwater**

Groundwater sampling at BSG was conducted in October 2012. BSG monitoring wells 12AUP01, CYN-MW1D, and CYN-MW2S were decommissioned in November 2012. Replacement well CYN-MW13 was installed in December 2012.

2.3.3 **Tijeras Arroyo Groundwater**

Groundwater sampling for the TAG investigation was conducted in November and December 2012.

2.3.4 **Mixed Waste Landfill Groundwater**

No MWL groundwater monitoring activities were performed during this reporting period; annual sampling events will be discussed in future quarterly reports.

2.3.5 **Chemical Waste Landfill Groundwater**

No CWL groundwater monitoring activities were performed during this reporting period; Semi-annual sampling events will be discussed in future quarterly reports. CWL groundwater and soil-vapor monitoring wells CWL-BW3, CWL-MW1A, CWL-MW2BL, CWL-MW2BU, CWL-MW3A, CWL-MW7, CWL-MW8, and CWL-UI3-VW were decommissioned in November 2012.

2.3.6 **SWMUs 8/58 Groundwater**

Groundwater sampling for SWMUs 8/58 was conducted in October 2012.

2.3.7 **SWMU 68 Groundwater**

Groundwater sampling for SWMU 68 was conducted in October 2012.

2.3.8 **SWMU 49 Groundwater**

No SWMU 49 groundwater monitoring activities were performed during this reporting period; annual sampling events will be discussed in future quarterly reports.

2.3.9 **SWMU 116 Groundwater**

No SWMU 116 groundwater monitoring activities were performed during this reporting period; annual sampling events will be discussed in future quarterly reports.

2.3.10 **SWMU 149 Groundwater**

Groundwater sampling for SWMU 149 was conducted in December 2012.

2.3.11 **SWMU 154 Groundwater**

Groundwater sampling for SWMU 154 was conducted in December 2012.

2.4 **Environmental Restoration Operations Documents Submitted to the NMED Pending Regulatory Review and Approval**

This section lists the ER documents that have been submitted to the NMED and are, as of this reporting period, still pending review and approval:

- The TA-V Groundwater Corrective Measures Evaluation (CME) Work Plan, submitted to the NMED on May 11, 2004 (SNL/NM April 2004)
- The BSG Interim Measures Work Plan, submitted to the NMED on May 26, 2005 (SNL/NM May 2005)
- The CME Report for the TAG Investigation, submitted to the NMED on September 1, 2005 (SNL/NM August 2005)
- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport, submitted to the NMED on April 9, 2008 (SNL/NM March 2008)
- The TA-V Geophysical Logs and Slug Test Results Report, submitted to the NMED on November 24, 2010 (SNL/NM November 2010)
- Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation submitted to the NMED on June 30, 2011 (SNL/NM June 2011)
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011)
- MWL LTMMP submitted to the NMED on March 26, 2012 (SNL/NM March 2012a)

3.0 **Long-Term Stewardship Work Completed**

3.1 **Chemical Waste Landfill**

The CWL Post-Closure Care Permit (PCCP) (NMED October 2009) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011), transitioning the CWL from SNL/NM ER to LTS. A summary of post-closure care activities at the CWL for this reporting period is provided in this ER Quarterly Report. More detailed documentation of ongoing activities under the PCCP will be reported in the

CWL Annual Post-Closure Care Report (due to the NMED in March 2013). Activities for this reporting period include the following:

- Quarterly inspection of the CWL ET Cover surface, storm-water diversion structures, and security fence was performed on December 10, 2012. No maintenance or repairs were required.
- Preparation of the CWL Annual Post-Closure Care Report for CY 2012 for submittal to the NMED by March 31, 2013 occurred during the reporting period.
- Preparation of a permit modification request was initiated to make several minor changes to Attachments 1 through 4. Submittal of the permit modification request to NMED is anticipated in early February.
- Modifications to the SNL/NM analytical laboratories statement of work were made in preparation for a new contract that will take effect early next year. The revised statement of work will be submitted to the NMED within 30 days of its effective date as required by the PCCP, Attachments 2 and 3.

3.2 **Corrective Action Management Unit**

Corrective Action Management Unit (CAMU) post-closure care operations consist of vadose zone monitoring, leachate removal, and post-closure inspections, as required in the PCCP. Activities for this reporting period (October through December 2012) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in December 2012. The results will be presented in the 2013 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2013).
- Composite leachate sampling for waste characterization was conducted on October 11 and December 18, 2012. The results will be presented in the 2013 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2013).

- Weekly pumping of leachate from the leachate collection and removal system was performed. Waste management associated with the leachate collection and removal system during this reporting period is outlined in Section I.3.2.1.
- Weekly inspections of the RCRA less-than-90-day accumulation area were conducted.
- Quarterly inspection of the site was performed on December 12, 2012, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. There were no findings for this quarter. Findings from the quarterly inspection conducted in September that were addressed in this quarter are as follows:
 - Excess and undesirable vegetation between the site-boundary fence and the base of the containment cell was identified by the SNL/NM staff biologist and was removed between October 8 and October 17, 2012.
 - A small number of plants that can develop an extensive root system were identified growing on the cover system by the SNL/NM staff biologist. The plants were removed between October 8 and October 17, 2012.
 - The bases of the five primary subliner access tubes on the north side of the containment cell were painted.
 - Rope boundary around the RCRA less-than-90-day accumulation area was replaced.

3.2.1 **CAMU Waste Management Activities**

CAMU waste management data for the reporting period are documented in this section. Solid waste (i.e., personal protective equipment, paper wipes, and plastic drum pump) generated during this reporting period does not exceed 10 pounds.

- Leachate waste stored on site as of October 1, 2012 – 61 gallons
- Leachate and rinsate waste generated on site during the reporting period – 96 gallons of leachate and 6 gallons of rinsate.

- Leachate and rinsate waste removed from the site by Hazardous Waste Handling Facility personnel during the reporting period:
 - October 23, 2012 – 76 gallons leachate, 3 gallons rinsate
 - December 19, 2012 – 81 gallons leachate, 3 gallons rinsate
- Leachate and rinsate waste remaining on site at the end of this reporting period – 0 gallons

3.2.2 CAMU Regulatory Activities

On December 4, 2012, the NMED approved the “Corrective Action Management Unit Vadose Zone Monitoring System Annual Monitoring Results Report” (Kielling December 2012b) submitted to the NMED on September 27, 2012 (SNL/NM September 2012).

3.3 Long-Term Stewardship Documents Submitted to the NMED Pending Regulatory Review and Approval

There are no LTS documents that are pending review and approval by NMED.

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Wagner, P. (U.S. Department of Energy NNSA/Sandia Site Office), January 2008. Letter to J.P. Bearzi (New Mexico Environment Department) initiating a Class 3 Modification for the Designation of Four (4) Solid Waste Management Units (SWMUs) and One (1) Area of Concern (AOC) as “approved for No Further Action.”

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Tables

Table I-1
Environmental Restoration Sites Subject to
Corrective Action Regulatory Process

Solid Waste Management Units	
Site Number	Site Description
4	LWDS Surface Impoundments (TA-V)
5	LWDS Drainfield
8	Open Dump (CCBA)
28-2	Mine Shafts
46	Old Acid Waste Line Outfall
49	Building 9820 Drains (Lurance Canyon)
52	LWDS Holding Tank
58	CCBA
68	Old Burn Site
76	MWL (TA-III)
83	Long Sled Track
84	Gun Facilities
91	Lead Firing Site (Thunder Range)
101	Building 9926/9926A Septic System and Seepage Pit (CTF)
105	Mercury Spill Building 6536
116	Building 9990 Septic System (CTF)
138	Building 6630 Septic System (TA-III)
140	Building 9965 Septic System (Thunder Range)
147	Building 9925 Septic Systems (CTF)
149	Building 9930 Septic System (CTF)
150	Buildings 9939/9939A Septic System and Drain Field (CTF)
154	Building 9960 Septic System and Seepage Pits (CTF)
161	Building 6636 Septic System (TA-III)
196	Building 6597 Cistern (TA-V)
240	Short Sled Track
Total	25
Areas of Concern	
Site Number	Site Description
300	TAG Investigation
1090	Building 6721 Septic System (TA-III)
1094	Live Fire Range East Septic System (Lurance Canyon)
1095	Building 9938 Seepage Pit (CTF)
1101	Building 885 Septic System (TA-I)
1114	Building 9978 Drywell (CTF)
1116	Building 9981A Seepage Pit (Solar Tower Complex)
1117	Building 9982 Drywell (Solar Tower Complex)
Total	8

Notes

CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
LWDS = Liquid Waste Disposal System.
MWL = Mixed Waste Landfill.
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.

**Table I-2
Site-Wide Hydrogeologic Characterization**

Investigation Site	Sampling Frequency in CY 2012^a	Quarter of Sampling in CY 2012	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TAV Groundwater	Quarterly	1,2,3,4	AGMR	AGMR	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG	Quarterly, then Semiannually	1,2, 4	AGMR	AGMR, Section II of ER Quarterly (only CYN-MW6)	CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13
TAG	Quarterly	1,2,3,4	AGMR	N/A	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-SW1-320, TA2-W-01, TA2-W-19, TA2-W-26, TA2-W-27, TJA-2, TJA-3, TJA-4, TJA-6, TJA-7, WYO-3, WYO-4
MWL Groundwater	Annually	1	AGMR	N/A	MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR	N/A	CWL-BW5, CWL-MW9, CWL-MW10, CWL-11
SWMUs 8/58 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	CCBA-MW1, CCBA-MW2
SWMU 68 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	OBS-MW1, OBS-MW2, OBS-MW3
SWMU 49 Groundwater	Annually	1	AGMR	AGMR	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR	CTF-MW1
SWMU 149 Groundwater	Quarterly	1,2,3,4	AGMR, Section III of ER Quarterly	Section II of ER Quarterly	CTF-MW3
SWMU 154 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	CTF-MW2

Notes

^aNot all wells in a particular investigation are sampled at the same frequency, this represents the maximum frequency of sampling at a site.

- AGMR = Annual Groundwater Monitoring Report.
- BSG = Burn Site Groundwater.
- CWL = Chemical Waste Landfill.
- CY = Calendar year.
- ER = Environmental Restoration Operations.
- MWL = Mixed Waste Landfill.
- N/A = No wells in the site network are currently being sampled and analyzed for perchlorate.
- SWMU = Solid Waste Management Unit.
- TAG = Tijeras Arroyo Groundwater.
- TAV = Technical Area V.

SECTION II

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SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, OCTOBER – DECEMBER 2012

1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Order), between the New Mexico Environment Department (NMED); the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), jointly referred to as DOE/Sandia, for Sandia National Laboratories, New Mexico (SNL/NM), effective on April 29, 2004, stipulates that a select group of groundwater monitoring wells at SNL/NM be sampled for perchlorate (NMED April 2004). This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) summarizes the perchlorate screening groundwater monitoring completed during the Fourth Quarter of Calendar Year (CY) 2012 (October, November, and December) in response to the requirements of the Order. The outline of this report is based on the required elements of a “Periodic Monitoring Report” described in Section X.D. of the Order (NMED April 2004).

In November 2005, DOE/Sandia submitted a letter report on the status of perchlorate screening in groundwater at SNL/NM monitoring wells (SNL/NM November 2005). The purpose of the letter report was to summarize previous correspondence and sampling results and to outline proposed future work to comply with NMED requirements for perchlorate screening of groundwater. As specified in the letter report, quarterly reports will be submitted for wells active in the perchlorate-screening monitoring well network.

Based on the NMED response (NMED January 2006), DOE/Sandia will submit each quarterly report within 90 days following the quarter that the data represent. In November 2008, DOE/Sandia received approval from the NMED to proceed to semiannual reporting (NMED November 2008); however, upon further consideration, the NMED once more required quarterly reporting (NMED April 2009). This did not alter the previously negotiated frequency for monitoring well CYN-MW6, an existing Burn Site Groundwater (BSG) study area monitoring well that has been under the sampling and reporting requirements of the Order since the well was installed, which remains at a semiannual frequency for sampling and reporting. In September 2011, DOE/Sandia requested an extension of the submittal dates by one month for ER Quarterly Reports (SNL/NM September 2011). The request was approved by the NMED (September 2011), which allows DOE/Sandia to submit perchlorate quarterly reports within 120 days following the quarter that the data represent.

This report is the twenty-eighth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Third Quarter of CY 2012 (SNL/NM February 2006 and January 2013).

Groundwater at Coyote Test Field (CTF) monitoring wells CTF-MW2 and CTF-MW3 have been sampled eight times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled five times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled five times (Table II-1). (The Order requires that new wells be sampled for perchlorate for a minimum of four quarters [NMED April 2004].) Reporting will continue as long as groundwater monitoring wells remain active in the perchlorate-screening monitoring well network unless otherwise negotiated with the NMED.

2.0 **Scope of Activities**

This report provides perchlorate screening groundwater monitoring analytical results for the Fourth Quarter of CY 2012 (October, November, and December) for the wells currently active in the perchlorate-screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ($\mu\text{g/L}$) is removed from the requirement of continued monitoring for perchlorate.

Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate-screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate-screening reports are included in Table II-2. Perchlorate monitoring at wells CTF-MW1 and CYN-MW5 was recently reinstated and is discussed in Section II.3.0.

SNL/NM personnel performed groundwater sampling for perchlorate at eight wells on the dates listed in Table II-1. Several of the wells were installed after the Order was finalized (NMED April 2004) and were therefore required to be sampled for perchlorate as “new” wells; the other wells were sampled to meet other regulatory requirements (discussed in Section II.3.0). Groundwater sampling activities were conducted in accordance with procedures outlined in the following investigation-specific sampling and analysis plans (SAPs) entitled:

- “SWMUs 8/58 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2013” (SNL/NM September 2012a).
- “SWMU 68 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2013” (SNL/NM September 2012b).
- “SWMU 149 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2013” (SNL/NM November 2012a).
- “SWMU 154 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2013” (SNL/NM November 2012b).

As described in the Mini-SAPs, groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship (LTS) Project Field Operating Procedures (FOPs). A portable Bennett™ groundwater sampling system was used to collect the groundwater samples. The sampling pump and tubing bundle were decontaminated prior to insertion into monitoring wells in accordance with procedures described in FOP 05-03, “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a). With the exception of monitoring well CYN-MW6, each well was purged a minimum of one saturated screen volume before sampling in accordance with FOP 05-01, “Groundwater Monitoring Well Sampling and Field Analytical Measurements” (SNL/NM January 2012b). Monitoring well CYN-MW6 is a low-yield monitoring well and was purged dry and allowed to recover before sampling to ensure a representative groundwater sample.

Field water-quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the well prior to collecting groundwater samples. Groundwater temperature, SC, ORP, DO, and pH were measured with a YSI™ Model 6920 water quality meter. Turbidity was measured with a HACH™ Model 2100Q turbidity meter. Purging continued until four stable measurements for turbidity, pH, temperature, and SC were obtained. Groundwater stability is considered acceptable when the following parameters are achieved:

- Turbidity measurements are less than 5 nephelometric turbidity units (NTU) or within 10 percent for turbidity values greater than 5 NTU.
- pH is within 0.1 units.
- Temperature is within 1.0 degree Celsius.
- SC is within 5 percent.

Field Measurement Logs documenting details of well purging and water quality measurements have been submitted to the SNL/NM Records Center.

The groundwater samples were submitted to GEL Laboratories LLC (GEL) for chemical analysis of perchlorate using U.S. Environmental Protection Agency (EPA) Method 314.0 (EPA November 1999). The sample identification, Analysis Request/Chain-of-Custody form number, and the associated groundwater investigation are provided in Table II-3. The analytical report from GEL, including certificates of analyses (COA) (Appendix A), analytical methods, MDLs, practical quantitation limits, dates of analyses, and results of quality control (QC) analyses, and the data validation findings (Appendix B), have been submitted to the SNL/NM Records Center.

3.0 **Regulatory Criteria**

For a given monitoring well, four consecutive ND results using the screening level/MDL of 4 µg/L are considered by the NMED as evidence of the absence of perchlorate, such that additional monitoring for perchlorate in that well is not required. If perchlorate is detected using the screening level/MDL of 4 µg/L in a specific well, then monitoring will continue at that well at a frequency negotiated with the NMED. The Order (NMED April 2004) also requires that for detections equal to or greater than 4 µg/L, DOE/Sandia will evaluate the nature and extent of perchlorate contamination, based on a screening level/MDL of 4 µg/L, and incorporate the results of this evaluation into a Corrective Measures Evaluation (CME). Section VII.C of the Order clarifies that the CME process will be initiated where there is a documented release to the environment and where corrective measures are necessary to protect human health and the environment.

3.1 **Burn Site Groundwater**

In March 2007, DOE/Sandia received a letter of approval from the NMED, which stated the requirement that DOE/Sandia “determine the nature and extent of the contamination and complete a CME for the perchlorate-impacted groundwater in the vicinity of CYN-MW6” (NMED March 2007). As this was based solely on the four quarters of monitoring results, DOE/Sandia submitted a letter to the NMED in April 2007 (SNL/NM April 2007), which recommended further characterization through continued quarterly monitoring of monitoring well CYN-MW6 for four additional quarters, ending in December 2007, to ensure appropriate characterization of this well. In January 2008, DOE/Sandia requested a meeting with the NMED to discuss the need for continued monitoring or additional characterization work and, potentially, a CME.

In preparation for discussing the perchlorate-impacted groundwater in the vicinity of monitoring well CYN-MW6 and to show that the requirement “to determine the nature and extent of contamination” (NMED March 2007) has been met, DOE/Sandia provided supporting information to the NMED (SNL/NM March 2008). Perchlorate in surface soil has been characterized at SWMUs in the study area (SNL/NM June 2006 and March 2008–Appendix C). Based on these data, DOE/Sandia consider that the nature and extent of perchlorate in groundwater at the Burn Site has been sufficiently characterized. Since 2004, groundwater samples from four other monitoring wells in the vicinity of the Burn Site have been analyzed for perchlorate, including monitoring wells CYN-MW1D, CYN-MW5, CYN-MW7, and CYN-MW8. All these wells were sampled for four quarters and all results were ND for perchlorate (SNL/NM March 2008–Appendix D).

In accordance with the requirements of Section VI.K.1.b of the Order (NMED April 2004), a human health risk assessment has been performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in monitoring well CYN-MW6 groundwater samples. The maximum perchlorate concentration to date of 8.93 µg/L was used in the risk assessment. The calculated hazard quotient (HQ) of 0.35 is less than the NMED target level of a hazard index (the sum of all HQs) of 1.0 (NMED June 2006, SNL/NM March 2008–Appendix E).

Because perchlorate concentrations in samples from monitoring well CYN-MW6 have exceeded the screening level, DOE/Sandia initiated a negotiation process with the NMED (SNL/NM March 2007) to determine the frequency of continued monitoring. In November 2008, DOE/Sandia received approval from the NMED to proceed with semiannual monitoring of perchlorate in monitoring well CYN-MW6 and proceed with semiannual reporting of all perchlorate results (NMED November 2008). Upon further consideration, the NMED once more required that DOE/Sandia resume quarterly reporting of perchlorate results with the exception of monitoring well CYN-MW6 (NMED April 2009).

In April 2009, DOE/Sandia received a letter from the NMED requiring DOE/Sandia to characterize the nature and extent of the perchlorate contamination in soil and groundwater in the BSG study area (NMED April 2009). A characterization work plan was prepared and submitted to the NMED (SNL/NM November 2009), approved by the NMED (February 2010), and implemented in July 2010.

3.2 Tijeras Arroyo and Technical Area V Groundwater

The April 2009 letter from the NMED to DOE/Sandia was not limited to the BSG study area (NMED April 2009). In the April 2009 letter, the NMED had also requested that DOE/Sandia monitor perchlorate concentrations for a minimum of four quarters at several Tijeras Arroyo Groundwater and Technical Area V monitoring wells (NMED April 2009); all these wells have been sampled for four consecutive monitoring events with no perchlorate detections and have since been removed from the perchlorate sampling list.

3.3 March 2006 and January 2008 Permit Modification Requests

During the First Quarter of CY 2011, four monitoring wells were added to the perchlorate monitoring network based on the NMED letter of April 8, 2010, entitled, “Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/Areas of Concern (AOCs) (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-06-007 and HWB-SNL-08-001” (NMED April 2010). The sites and the requests are described in Section I.2.2 of this ER Quarterly Report. The NMED letter required work plans and groundwater monitoring at the following SWMUs:

- SWMU 49—Annual sampling of existing monitoring well CYN-MW5. This well was sampled four times from May 2004 through February 2005. Based on four consecutive ND results, monitoring well CYN-MW5 was removed from the perchlorate monitoring network (SNL/NM November 2005).
- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.
- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.
- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

To fulfill the requirements of the April 2010 NMED letter, DOE/Sandia submitted a SAP for monitoring wells CTF-MW2 and CTF-MW3 (SNL/NM June 2010) that was subsequently approved (with modifications) by the NMED (December 2010).

The NMED letter of April 8, 2010, also required work plans, installation of groundwater monitoring wells, and groundwater monitoring at the following SWMUs:

- SWMUs 8/58—Two groundwater monitoring wells must be installed (CCBA-MW1 and CCBA-MW2) and sampled quarterly for a minimum of eight quarters.
- SWMU 68—Three groundwater monitoring wells must be installed (OBS-MW1, OBS-MW2, and OBS-MW3) and sampled quarterly for a minimum of eight quarters.

To fulfill the requirements of the April 2010 NMED letter, DOE/Sandia submitted a Well Installation Plan/SAP for monitoring wells CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3 (SNL/NM September 2010) that was subsequently approved (with modification) by the NMED (January 2011).

4.0 **Monitoring Results**

Table II-3 summarizes the details of samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, CYN-MW6, OBS-MW1, OBS-MW2, and OBS-MW3 in the fourth quarter of CY 2012. Table II-4 summarizes current and historical perchlorate results for wells currently in the perchlorate-screening monitoring network. The analytical laboratory COA for the Fourth Quarter of CY 2012 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3. Also consistent with historical analytical results, perchlorate was detected above the screening level in the sample from monitoring well CYN-MW6.

As shown on Figure II-2, the October 2012 perchlorate concentration reported for monitoring well CYN-MW6 is 5.77 µg/L, which is consistent with the average concentration detected since sampling began in March 2006. The hydrograph for monitoring well CYN-MW6 (Figure II-2) shows that the water table is rapidly declining.

Table II-5 summarizes the stabilized water-quality values measured immediately before the groundwater samples were collected. The field water quality measurements include turbidity, pH, temperature, SC, ORP, and DO.

The analytical data were reviewed and validated in accordance with Administrative Operating Procedure 00-03, "Data Validation Procedure for Chemical and Radiochemical Data," Revision 3 (SNL/NM May 2011). No problems were identified with the analytical data that resulted in qualification of the data as unusable. The data are acceptable, and reported QC measures are adequate. The data validation sample findings summary sheets for the perchlorate data are provided in Appendix B.

No variances or nonconformances in perchlorate sampling field activities or field conditions from requirements in the groundwater monitoring Mini-SAPs (SNL/NM September 2012a, September 2012b, September 2012c, November 2012a, and November 2012b) were identified during the Fourth Quarter of CY 2012 sampling activities.

5.0 **Summary and Conclusions**

Based on the analytical data presented in Table II-4 and in previous reports, the following statements can be made:

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 µg/L.
- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate-screening monitoring well network.
- The perchlorate concentration for monitoring well CYN-MW6 for the Fourth Quarter of CY 2012 sampling event was 5.77 µg/L, which is consistent with the average concentration reported since the inception of perchlorate sampling at monitoring well CYN-MW6 in March 2006 (Figure II-2).
- A human health risk assessment was performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in monitoring well CYN-MW6 groundwater samples. The maximum concentration of perchlorate in monitoring well CYN-MW6 samples to date (8.93 µg/L) was used in the assessment. The calculated HQ of 0.35 is less than the NMED target level of a hazard index (the sum of all HQs) of 1.0 (NMED June 2006 and SNL/NM March 2008).

DOE/Sandia will continue annual monitoring of perchlorate for monitoring wells CTF-MW1 and CYN-MW5, semiannual monitoring for monitoring well CYN-MW6, and quarterly monitoring for monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3.

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Figures

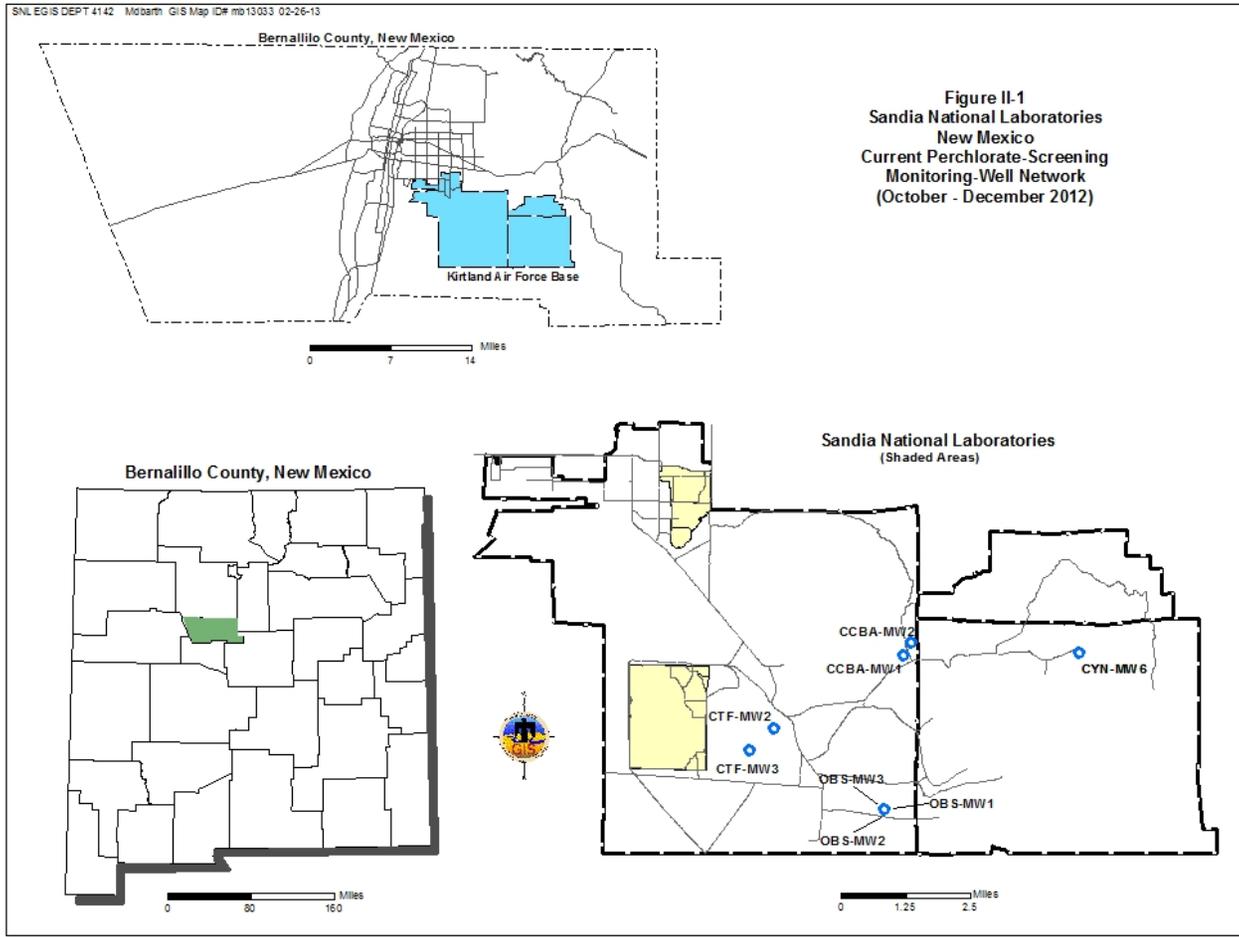


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate-Screening Monitoring Well Network, October – December 2012

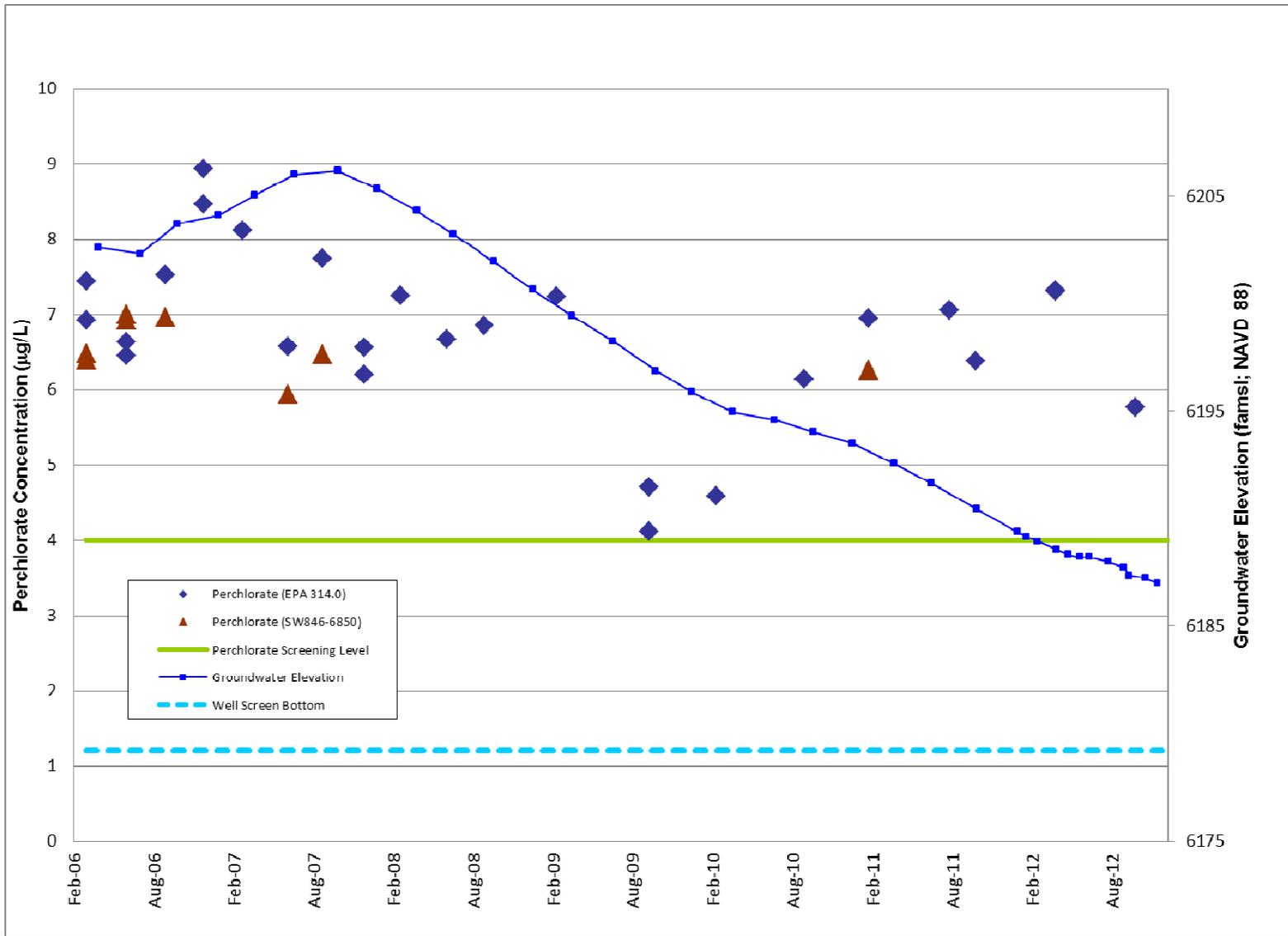


Figure II-2
Groundwater Elevations and Perchlorate Concentrations over Time in CYN-MW6

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
Fourth Quarter, CY 2012

Well	Date Sampled	Number of Consecutive Sampling Events ^a	Remaining Number of Sampling Events ^b	Sampling Equipment
CCBA-MW1	22-Oct-12	5	3	Bennett™ Pump
CCBA-MW2	23-Oct-12	5	3	Bennett™ Pump
CTF-MW2	18-Dec-12	8	TBD ^c	Bennett™ Pump
CTF-MW3	14-Dec-12	8	TBD ^c	Bennett™ Pump
CYN-MW6	15-Oct-12	20	TBD ^d	Bennett™ Pump
OBS-MW1	17-Oct-12	5	3	Bennett™ Pump
OBS-MW2	17-Oct-12	5	3	Bennett™ Pump
OBS-MW3	18-Oct-12	5	3	Bennett™ Pump

Notes

^aIncludes this sampling event.

^bPer the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate-screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 µg/L. However, the seven wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).

^cTBD = To be determined. This well has been sampled for the eight supplemental rounds of groundwater sampling required by NMED (NMED April 2010). However, DOE/Sandia will continue to sample this well quarterly until NMED has determined that characterization is complete at this SWMU.

^dTBD = To be determined. This well has been sampled for the required initial four quarters. Because perchlorate concentrations in this well have exceeded the screening level, DOE/Sandia and the NMED have agreed to further characterization requirements in the BSG study area (NMED February 2010).

- µg/L = Microgram(s) per liter.
- BSG = Burn Site Groundwater.
- CCBA = Coyote Canyon Blast Area.
- CTF = Coyote Test Field.
- CY = Calendar Year.
- CYN = Canyons (Burn Site).
- MDL = Method detection limit.
- MW = Monitoring well.
- NMED = New Mexico Environment Department.
- OBS = Old Burn Site.
- The Order = The Compliance Order on Consent.
- SWMU = Solid Waste Management Unit.

Table II-2
Wells Discussed in Previous Perchlorate-Screening Reports

Well
CYN-MW1D
CYN-MW5
CYN-MW7
CYN-MW8
CYN-MW9
CYN-MW10
CYN-MW11
CYN-MW12
LWDS-MW1
MRN-2
MRN-3D
MWL-BW1
MWL-BW2
MWL-MW1
MWL-MW7
MWL-MW8
MWL-MW9
NWT3-MW2
SWTA3-MW4
TA1-W-03
TA1-W-06
TA1-W-08
TA2-W-01
TA2-W-27
TAV-MW11
TAV-MW12
TAV-MW13
TAV-MW14

Notes

- BW = Background well.
- CYN = Canyons (Burn Site).
- LWDS = Liquid Waste Disposal System.
- MRN = Magazine Road North.
- MW = Monitoring well.
- NWTA = Northwest Technical Area (III).
- SWTA = Southwest Technical Area (III).
- TA = Technical Area.
- W = Well.

**Table II-3
Sample Details for Fourth Quarter, CY 2012 Perchlorate Sampling**

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	093013-020	614466	SWMUs 8/58
CCBA-MW2	093018-020 093019-020	614468	SWMUs 8/58
CTF-MW2	093251-020	614541	SWMU 154
CTF-MW3	093249-020	614540	SWMU 149
CYN-MW6	092977-020	614446	BSG
OBS-MW1	093003-020	614462	SWMU 68
OBS-MW2	093007-020 093008-020	614464	SWMU 68
OBS-MW3	093010-020	614465	SWMU 68

Notes

AR/COC = Analysis Request/Chain of Custody.
 BSG = Burn Site Groundwater.
 CCBA = Coyote Canyon Blast Area.
 CTF = Coyote Test Field.
 CY = Calendar Year.
 CYN = Canyons (Burn Site).
 MW = Monitoring Well.
 OBS = Old Burn Site.
 SWMU = Solid Waste Management Unit.

Table II-4
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Fourth Quarter, CY 2012

Well	Sample Date	AR/COC Number	Sample Number	Perchlorate Result ^a (µg/L)	MDL ^b (µg/L)	PQL ^c (µg/L)	MCL ^d (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical Method ^g	Comments
CCBA-MW1	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-12	613958	091615-020	ND	4.0	12	NE	U		EPA 314.0	
			091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
			092616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
22-Oct-12	614466	093013-020	ND	4.0	12	NE	U		EPA 314.0		
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092296-020	ND	4.0	12	NE	U		EPA 314.0	
			092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jul-12	614286	092610-020	ND	4.0	12	NE	U		EPA 314.0	
23-Oct-12	614468	093018-020	ND	4.0	12	NE	U		EPA 314.0		
		093019-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
CTF-MW2	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
			091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0		
18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0		
CTF-MW3	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
			091943-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092536-020	ND	4.0	12	NE	U		EPA 314.0	
16-Jun-12	614254	092536-020	ND	4.0	12	NE	U		EPA 314.0		
21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0		
14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0		

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Fourth Quarter, CY 2012

Well ID	Sample Date	AR/COC Number	Sample Number	Perchlorate Result ^a (µg/L)	MDL ^b (µg/L)	PQL ^c (µg/L)	MCL ^d (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical Method ^g	Comments	
CYN-MW6	23-Mar-06	609578	075985-020	6.92	4.0	12	NE	J		EPA 314.0		
			075986-020	7.44	4.0	12	NE	J		EPA 314.0	Duplicate sample	
			075985-R20	6.39	0.50	2.0	NE	Hh	HT, J	EPA 6850M	Verification/Reanalysis	
			075986-R20	6.48	0.50	2.0	NE	Hh	HT, J	EPA 6850M	Verification/Reanalysis	
	22-Jun-06	609929	078687-020	6.63	4.0	12	NE	J		EPA 314.0		
			078688-020	6.45	4.0	12	NE	J		EPA 314.0	Duplicate sample	
			078687-021	6.99	1.0	4.0	NE			EPA 6850M	Verification	
	20-Sep-06	610652	081626-020	7.52	4.0	12	NE	J		EPA 314.0		
			081626-R20	6.96	1.0	4.0	NE		P2	EPA 6850M	Verification/Reanalysis	
	15-Dec-06	611057	083858-020	8.46	4.0	12	NE	J		EPA 314.0		
			083859-020	8.93	4.0	12	NE	J		EPA 314.0	Duplicate sample	
	14-Mar-07	611200	084237-020	8.12	4.0	12	NE	J		EPA 314.0		
	27-Jun-07	611399	084833-020	6.57	4.0	12	NE	J		J-, X1	EPA 314.0	
			084833-R20	5.94	0.5	2.0	NE			EPA 6850M	Verification/Reanalysis	
	12-Sep-07	611581	085249-020	7.74	4.0	12	NE	J		EPA 314.0		
			085249-R20	6.46	0.5	2.0	NE	Hh	J	EPA 6850M	Verification/Reanalysis	
	18-Dec-07	611668	085446-020	6.20	4.0	12	NE	J		EPA 314.0		
			085447-020	6.56	4.0	12	NE	J		EPA 314.0	Duplicate sample	
	10-Mar-08	611749	085661-020	7.25	4.0	12	NE	J		EPA 314.0		
	23-Jun-08	611912	086280-020	6.67	4.0	12	NE	J		EPA 314.0		
	17-Sep-08	612004	086782-020	6.85	4.0	12	NE	J		EPA 314.0		
	02-Mar-09	612120	087047-020	7.24	4.0	12	NE	J		EPA 314.0		
	30-Sep-09	612392	087734-020	4.12	4.0	12	NE	J		J-	EPA 314.0	
			087735-020	4.71	4.0	12	NE	J		J-	EPA 314.0	Duplicate sample
	03-Mar-10	612580	088180-020	4.59	4.0	12	NE	J		EPA 314.0		
	20-Sep-10	613279	089659-020	6.14	4.0	12	NE	J		EPA 314.0		
	14-Feb-11	613413	090000-020	6.95	4.0	12	NE	J		J-	EPA 314.0	
				6.26	0.5	2.0	NE	Hh		EPA 6850M	Verification/Reanalysis	
	18-Aug-11	613723	091035-020	7.06	4.0	12	NE	J		EPA 314.0		
	17-Oct-11	613871	091320-020	6.38	4.0	12	NE	J		EPA 314.0		
16-Apr-12	614071	091990-020	7.31	4.0	12	NE	J		EPA 314.0			
		091991-020	7.32	4.0	12	NE	J		EPA 314.0	Duplicate sample		
15-Oct-12	614446	092977-020	5.77	4.0	12	NE	J		EPA 314.0			

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring-Well Network as of Fourth Quarter, CY 2012

Well	Sample Date	AR/COC Number	Sample Number	Perchlorate Result ^a (µg/L)	MDL ^b (µg/L)	PQL ^c (µg/L)	MCL ^d (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical Method ^g	Comments
OBS-MW1	25-Oct-11	613879	091335-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Jan-12	613952	091600-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	614081	092022-020	ND	4.0	12	NE	U		EPA 314.0	
			092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
16-Oct-12	614462	093003-020	ND	4.0	12	NE	U		EPA 314.0		
OBS-MW2	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
			091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093007-020	ND	4.0	12	NE	U		EPA 314.0	
093008-020			ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
OBS-MW3	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
			091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
			092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0		

Notes

^aResult

Bold = Result exceeds the 4 µg/L screening level for perchlorate.

ND = Not detected (at MDL).

µg/L = Micrograms per liter.

^bMDL

Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.

^cPQL

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

^dMCL

Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11, Subpart B) and subsequent amendments or Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code, incorporating 40 CFR 141.

NE = Not established.

Table II-4 (Concluded)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring-Well Network as of Fourth Quarter, CY 2012

Notes (continued)

^eLaboratory Qualifier

- H = Analytical holding time was exceeded.
- h = Preparation holding time was exceeded.
- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- U = Analyte is absent or below the method detection limit.

^fValidation Qualifier

If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples and no qualifier was assigned.

- H1 = The holding time criteria was exceeded by >1X but <2X.
- HT = The holding time was exceeded for the associated sample analysis.
- J = The associated value is an estimated quantity.
- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- P2 = Insufficient Quality control data to determine laboratory precision.
- UJ = The analyte was analyzed for but not detected. The associated value is an estimate and may be inaccurate or imprecise.
- X1 = General data quality is suspect.

^gAnalytical Method

- EPA 314.0: EPA, November 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014 (EPA November 1999).
- EPA 6850M: U.S. Environmental Protection Agency, April 2005, "Perchlorate in Water, Soils, and Solids Using High Performance Liquid Chromatography/Electrospray Ionization/Mass Spectrometry (HPLC/ESI/MS)," draft, Method 6850 (EPA April 2005).

- AR/COC = Analysis Request and Chain of Custody.
- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- CY = Calendar Year.
- CYN = Canyons (Burn Site).
- EPA = U.S. Environmental Protection Agency.
- MW = Monitoring well.
- OBS = Old Burn Site.

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements^a, Fourth Quarter, CY 2012

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation-Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	22-Oct-12	16.63	492	159.0	6.29	0.64	36.2	3.51
CCBA-MW2	23-Oct-12	17.67	577	159.0	7.22	0.46	63.6	6.02
CTF-MW2	18-Dec-12	14.62	3340	59.0	5.75	3.44	2.1	0.21
CTF-MW3	14-Dec-12	16.41	1538	207.9	6.70	0.48	81.7	7.97
CYN-MW6	15-Oct-12	13.60	935	190.2	7.19	1.54	18.2	1.89
OBS-MW1	16-Oct-12	16.87	502	203.3	7.10	0.43	37.8	3.66
OBS-MW2	17-Oct-12	18.97	500	186.7	7.11	0.37	38.5	3.56
OBS-MW3	18-Oct-12	16.82	502	167.5	7.14	0.66	44.9	4.34

Notes

^aField measurements obtained immediately before the groundwater sample was collected.

- °C = Degrees Celsius.
- % Sat = Percent saturation.
- µmhos/cm = Micromhos per centimeter.
- CCBA = Coyote Canyon Blast Area.
- CTF = Coyote Test Field.
- CY = Calendar Year.
- CYN = Canyons (Burn Site).
- mg/L = Milligrams per liter.
- mV = Millivolt(s).
- MW = Monitoring well.
- NTU = Nephelometric turbidity unit.
- OBS = Old Burn Site.
- pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

Appendix A
Analytical Laboratory Certificates of
Analysis for the Perchlorate Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

313267

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614446**

Project Name: <u>Burn Site GWM</u>	Date Samples Shipped: <u>10/15/12</u>	SMO Authorization: <u>Donald Jackson SMO</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Mike Skelly</u>	Carrier/Waybill No. <u>147208</u>	SMO Contact Phone: <u>see bottle note</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>146422.10.11.01</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF058-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <u>Rita Kavanaugh/505-284-2553</u>	
Contract No.: <u>PO 691436</u>			

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____
 Bill to: Sandia National Laboratories (Accounts Payable),
 P.O. Box 6800, MS-0154
 Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 092977	-005	CYN-MW6	164	10/15/12 8:57	GW	AG	4x1L	None	G	SA	TPH DRO SVOC (SW846-8015A/B)	313267-001
✓ 092977	-006	CYN-MW6	164	10/15/12 8:59	GW	AG	3x40ml	None	G	SA	TPH GRO VOC (SW846-8015A/B)	002
✓ 092977	-018	CYN-MW6	164	10/15/12 9:00	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	003
✓ 092977	-020	CYN-MW6	164	10/15/12 9:01	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	004
✓ 092978	-006	CYN-TB10	na	10/15/12 8:59	DIW	AG	3x40ml	None	G	TB	TPH GRO VOC (SW846-8015A/B)	005

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal	Return Samples By:	Comments:
	Robert Lynch	<i>RL</i>	<i>[Signature]</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
Alfred Santillanes		<i>[Signature]</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710			
William Gibson		<i>[Signature]</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367			

1. Relinquished by <i>[Signature]</i> Org. <u>4142</u> Date <u>10/15/12</u> Time <u>10:57</u>	6. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <u>4142</u> Date <u>10/15/12</u> Time <u>10:57</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. <u>4142</u> Date <u>10/15/12</u> Time <u>9:57a</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. <u>GEL</u> Date <u>10-16-12</u> Time <u>1100</u>	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

0745

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 13, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID:	092977-020	Project:	SNLSGWater
Sample ID:	313267004	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	15-OCT-12 09:01		
Receive Date:	16-OCT-12	Client Desc.:	CYN-MW6
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	J	0.00577	0.004	0.012	mg/L	1	MAR1	10/29/12	1452	1255975	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Page 1 of 2

Batch No. NA		SMO Use		AR/COC 614462								
Project Name: SWMU 68 GW Char		Date Samples Shipped: 10/16/12		SMO Authorization: Don W. [Signature]								
Project/Task Manager: Clinton Lum		Carrier/Waybill No. 147 669		SMO Contact Phone: See below								
Project/Task Number: 98026.01.13		Lab Contact: Edie Kent/803.556.8171		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.								
Service Order: CF 0263-13		Lab Destination: GEL		<input checked="" type="checkbox"/> 4° Celsius Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
Contract No.: PO 691436		Send Report to SMO:		Lorraine Herrera 505-844-3199								
Tech Area:		Operational Site:		Albuquerque, NM 87185-0154								
Building:	Room:											
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093003	-001	OBS-MW1	153	10/16/12 9:34	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093003	-002	OBS-MW1	153	10/16/12 9:36	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093003	-009	OBS-MW1	153	10/16/12 9:37	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
093003	-014	OBS-MW1	153	10/16/12 9:38	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
093003	-016	OBS-MW1	153	10/16/12 9:39	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093003	-017	OBS-MW1	153	10/16/12 9:40	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	
093003	-018	OBS-MW1	153	10/16/12 9:41	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
093003	-020	OBS-MW1	153	10/16/12 9:42	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
093003	-022	OBS-MW1	153	10/16/12 9:43	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093003	-024	OBS-MW1	153	10/16/12 9:45	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
Confirmatory: <input type="checkbox"/> Yes		QC Inits.:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Return to Client		<input checked="" type="checkbox"/> Disposal by Lab		
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-260-7090		Return Samples By:						
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547						
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-844-5130/505-228-0710		If perchlorate detected, then perform verification analysis using SW846-6850. Report anions (as Br, Cl, F, SO4), Metals (as Ca, Mg, K, Na), alkalinity (as Total bicarbonate and carbonate), and gamma spectroscopy (short list isotopes)						
1. Relinquished by [Signature] Org. 4142 Date 10/16/12 Time 1016		3. Relinquished by		Org.		Date		Time				
1. Received by [Signature] Org. 4142 Date 10/16/12 Time 1016		3. Received by		Org.		Date		Time				
2. Relinquished by [Signature] Org. 4142 Date 10/16/12 Time 1100		4. Relinquished by		Org.		Date		Time				
2. Received by		Org.		Date		Time		Org.		Date		

*Prior confirmation with SMO required for 7 and 15 day TAT

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 14, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID:	093003-020	Project:	SNLSGWater
Sample ID:	313354007	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	16-OCT-12 09:42		
Receive Date:	17-OCT-12	Client Desc.:	OBS-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	0851	1255975	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

313454
313456

Internal Lab

Batch No. *NA*

SMO Use

AR/COG **614464**

Page 1 of 2

Project Name: SWMU 68 GW Char	Date Samples Shipped: 10/17/12	SMO Authorization: <i>Donald Stangor</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 147725	SMO Contact Phone: <i>see bottle order</i>	
Project/Task Number: 98026.01.13	Lab Contact: Edie Kent/803.556.8171	Send Report to SMO:	
Service Order: CF 263-13	Lab Destination: GEL	Lorraine Herrera 505-844-3199	
Contract No.: PO 691436			

Tech Area:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87186-0154	
Building:	Room:	Operational Site:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
093007	-001	OBS-MW2	252	10/17/12 9:50	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	313454 001
093007	-002	OBS-MW2	252	10/17/12 9:53	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
093007	-009	OBS-MW2	252	10/17/12 9:54	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-8010/8020/7470)	003
093007	-014	OBS-MW2	252	10/17/12 9:55	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	004
093007	-016	OBS-MW2	252	10/17/12 9:56	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	005
093007	-017	OBS-MW2	252	10/17/12 9:58	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	313456 001
093007	-018	OBS-MW2	252	10/17/12 9:59	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	313454 006
093007	-020	OBS-MW2	252	10/17/12 10:00	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	007
093007	-022	OBS-MW2	252	10/17/12 10:01	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
093007	-024	OBS-MW2	252	10/17/12 10:04	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	009

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:	Special Instructions/QC Requirements:	
Background: <input type="checkbox"/> Yes	Entered by:	EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367	Return Samples By:
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	
					Comments:
					If perchlorate detected, then perform verification analysis using SW846-6850. Report anions (as Br, Cl, F, SO4), Metals (as Ca, Mg, K, Na), alkalinity (as total bicarbonate and carbonate), and gamma spec (short list isotopes). FGW (filtered in field w/0.45 micron filter)

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 10/17/12 Time 10:03	3. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>Donald Stangor</i> Org. 4142 Date 10/17/12 Time 11:03	4. Received by _____ Org. _____ Date _____ Time _____
1. Relinquished by <i>Donald Stangor</i> Org. 4142 Date 10/17/12 Time 12:00	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>William Gibson</i> Org. GEL Date 10-18-12 Time 07:50	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614464

Project Name: SWMU 68 GW Char		Project/Task Manager: Clinton Lum		Project/Task No.: 98026.01.13								Lab use	
Tech Area:													
Building:		Room:											
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab	
						Type	Volume					Sample ID	Sample ID
093007	-027	OBS-MW2	252	10/17/12 10:05	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010	
093007	-033	OBS-MW2	252	10/17/12 10:07	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	011	
093007	-034	OBS-MW2	252	10/17/12 10:09	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	012	
093007	-035	OBS-MW2	252	10/17/12 10:10	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	013	
093008	-001	OBS-MW2	252	10/17/12 9:50	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	014	
093008	-002	OBS-MW2	252	10/17/12 9:53	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	015	
093008	-009	OBS-MW2	252	10/17/12 9:54	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	016	
093008	-014	OBS-MW2	252	10/17/12 9:55	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-719)	017	
093008	-016	OBS-MW2	252	10/17/12 9:56	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	018	
093008	-017	OBS-MW2	252	10/17/12 9:58	FGW	P	250 ⁵⁰⁰ ml	HNO3	G	DU	Metals (SW846-6020)	313456 002	
093008	-018	OBS-MW2	252	10/17/12 9:59	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	313454 019	
093008	-020	OBS-MW2	252	10/17/12 10:00	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	020	
093008	-022	OBS-MW2	252	10/17/12 10:01	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	021	
093008	-024	OBS-MW2	252	10/17/12 10:04	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	022	
093008	-027	OBS-MW2	252	10/17/12 10:05	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	023	
093008	-033	OBS-MW2	252	10/17/12 10:07	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	024	
093008	-034	OBS-MW2	252	10/17/12 10:09	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	025	
093008	-035	OBS-MW2	252	10/17/12 10:10	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	026	
093009	-001	OBS-TB3	N/A	10/17/12 9:50	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	027	

Recipient Initials MK

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 16, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID:	093007-020	Project:	SNLSGWater
Sample ID:	313454007	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	17-OCT-12 10:00		
Receive Date:	18-OCT-12	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	1007	1255975	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
I	EPA 314.0 DOE-AL	

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 16, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID:	093008-020	Project:	SNLSGWater
Sample ID:	313454020	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	17-OCT-12 10:00		
Receive Date:	18-OCT-12	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	1026	1255975	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

313563
313564

Internal Lab

Batch No.

SMO Use

AR/COC **614465**

Project Name: SWMU 68 GW Char	Date Samples Shipped: 10/18/12	SMO Authorization: Don Walarney	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 147458	SMO Contact Phone: See Bottle order	<input type="checkbox"/> RMMA
Project/Task Number: 98026.01.13	Lab Contact: Edie Kent/803.556.8171	Send Report to SMO:	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF 0263-13	Lab Destination: GEL	Lorraine Herrera 505-844-3199	
	Contract No.: PO 691436		

Tech Area:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable),
Building:		P.O. Box 5800, MS-0154
Room:		Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
093010	-001	OBS-MW3	208	10/18/12 9:17	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	313563 001
093010	-002	OBS-MW3	208	10/18/12 9:19	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
093010	-009	OBS-MW3	208	10/18/12 9:20	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/8020/7470)	003
093010	-014	OBS-MW3	208	10/18/12 9:21	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	004
093010	-016	OBS-MW3	208	10/18/12 9:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	005
093010	-017	OBS-MW3	208	10/18/12 9:24	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	313564 001
093010	-018	OBS-MW3	208	10/18/12 9:25	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	313563 006
093010	-020	OBS-MW3	208	10/18/12 9:26	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	007
093010	-022	OBS-MW3	208	10/18/12 9:27	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
093010	-024	OBS-MW3	208	10/18/12 9:29	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	009

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC initials:		Negotiated TAT <input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 if perchlorate detected, then perform verification analysis using SW846-6850. Report anions (as Br, Cl, F, SO4), Metals (as Ca, Mg, K, Na), alkalinity (as total bicarbonate and carbonate), and gamma spectroscopy (short list isotopes). FGW (filtered in field w/ 0.45 micron filter)					Lab Use

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 10/18/12 Time 10:08	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Walarney</i> Org. 4142 Date 10/18/12 Time 10:08	3. Received by	Org.	Date	Time
2. Relinquished by <i>Don Walarney</i> Org. 4142 Date 10/18/12 Time 1100	4. Relinquished by	Org.	Date	Time
2. Received by <i>Mike Embury</i> Org. GEL Date 10-19-12 Time 0715	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 16, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID: 093010-020 Project: SNLSGWater
Sample ID: 313563007 Client ID: SNLS003
Matrix: AQUEOUS
Collect Date: 18-OCT-12 09:26
Receive Date: 19-OCT-12 Client Desc.: OBS-MW3
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	1046	1255975	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

313787 / 313791

Internal Lab

Batch No. NA		SMO Use		AR/COC 614466	
Project Name: SWMU 8/58 GWM		Date Samples Shipped: <u>10/22/12</u>		SMO Authorization: <u>Don Jackson</u>	
Project/Task Manager: Clinton Lum		Carrier/Waybill No. <u>147910</u>		SMO Contact Phone: <u>see bottle over</u>	
Project/Task Number: 98026 01.12		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199	
Service Order: CF 262-13		Lab Destination: GEL		Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
		Contract No.: PO 691436		Lorraine Herrera/505-844-3199	
Tech Area:		Building:		Room:	
		Operational Site:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
093013	-001	CCBA-MW1	79	10/22/12 9:20	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	313787 001
093013	-002	CCBA-MW1	79	10/22/12 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	313787 002
093013	-009	CCBA-MW1	79	10/22/12 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	313787 003
093013	-016	CCBA-MW1	79	10/22/12 9:24	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	313787 004
093013	-017	CCBA-MW1	79	10/22/12 9:25	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	313791 001
093013	-018	CCBA-MW1	79	10/22/12 9:26	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	313787 005
093013	-020	CCBA-MW1	79	10/22/12 9:27	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	313787 006
093013	-022	CCBA-MW1	79	10/22/12 9:28	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	313787 007
093013	-024	CCBA-MW1	79	10/22/12 9:29	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	313787 008
093013	-027	CCBA-MW1	79	10/22/12 9:30	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	313787 009

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090		Return Samples By:		
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FVV (Filtered in field with micron filter), Anions (B, Cl, F, SO4), Metals (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M)		
	William J. Gibson	<i>[Signature]</i>		SNL/4142/844-4013/239-7367 RL				

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/22/12</u> Time <u>1005</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Don Jackson</u> Org. <u>4142</u> Date <u>10/22/12</u> Time <u>1005</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>Don Jackson</u> Org. <u>4142</u> Date <u>10/22/12</u> Time <u>1150</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>Me Jackson</u> Org. <u>GEL</u> Date <u>10-23-12</u> Time <u>0740</u>	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 20, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID: 093013-020 Project: SNLSGWater
Sample ID: 313787006 Client ID: SNLS003
Matrix: AQUEOUS
Collect Date: 22-OCT-12 09:27
Receive Date: 23-OCT-12 Client Desc.: CCBA-MW1
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	0520	1257525	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. *NA*

AR/COC **614468**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>10/23/12</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>147954</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 98026 01.12	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	
Service Order: CF 262-13	Lab Destination: GEL	Send Report to SMO: Lorraine Herrera/505-844-3199	
Contract No.: PO 691436			

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____
 Bill to: Sandia National Laboratories (Accounts Payable),
 P.O. Box 5800, MS-0154
 Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093018	-001	CCBA-MW2	117	10/23/12 9:38	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	<i>313787 028</i>
✓ 093018	-002	CCBA-MW2	117	10/23/12 9:40	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	<i>313787 029</i>
✓ 093018	-009	CCBA-MW2	117	10/23/12 9:41	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	<i>313787 030</i>
✓ 093018	-016	CCBA-MW2	117	10/23/12 9:42	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	<i>313787 031</i>
✓ 093018	-017	CCBA-MW2	117	10/23/12 9:44	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	<i>313791 003</i>
✓ 093018	-018	CCBA-MW2	117	10/23/12 9:45	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	<i>313787 032</i>
✓ 093018	-020	CCBA-MW2	117	10/23/12 9:46	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	<i>313787 033</i>
✓ 093018	-022	CCBA-MW2	117	10/23/12 9:47	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	<i>313787 034</i>
✓ 093018	-024	CCBA-MW2	117	10/23/12 9:50	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	<i>313787 035</i>
✓ 093018	-027	CCBA-MW2	117	10/23/12 9:51	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	<i>313787 036</i>

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 GWM (Filtered in field with inorganic nitrate), Anions (Cl, F, SO4), Metals (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710	
	William J. Gibson	<i>[Signature]</i>	WJG	SNL/4142/844-4013/239-7367	
					Lab Use

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date <i>10/23/12</i> Time <i>10:39</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Edie Kent</i> Org. 4142 Date <i>10/23/12</i> Time <i>10:39</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date <i>10/23/12</i> Time <i>11:30</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>Edie Kent</i> Org. <i>GEL</i> Date <i>10/23/12</i> Time <i>07:40</i>	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614468

Project Name:		SWMU 8/58 GWM		Project/Task Manager:		Clinton Lum		Project/Task No.:		98026 01.12		Lab use	
Tech Area:													
Building:													
Room:													
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
✓ 093018	-033	CCBA-MW2	117	10/23/12 9:52	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	313787 037	
✓ 093018	-034	CCBA-MW2	117	10/23/12 9:54	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	313787 038	
✓ 093018	-035	CCBA-MW2	117	10/23/12 9:56	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	313787 039	
✓ 093019	-001	CCBA-MW2	117	10/23/12 9:38	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	313787 040	
✓ 093019	-002	CCBA-MW2	117	10/23/12 9:40	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	313787 041	
✓ 093019	-009	CCBA-MW2	117	10/23/12 9:41	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	313787 042	
✓ 093019	-016	CCBA-MW2	117	10/23/12 9:42	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	313787 043	
✓ 093019	-017	CCBA-MW2	117	10/23/12 9:44	FGW	P	500 ml	HNO3	G	DU	Metals (SW846-6020)	313791 004	
✓ 093019	-018	CCBA-MW2	117	10/23/12 9:45	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	313787 044	
✓ 093019	-020	CCBA-MW2	117	10/23/12 9:46	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	313787 045	
✓ 093019	-022	CCBA-MW2	117	10/23/12 9:47	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	313787 046	
✓ 093019	-024	CCBA-MW2	117	10/23/12 9:50	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	313787 047	
✓ 093019	-027	CCBA-MW2	117	10/23/12 9:51	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	313787 048	
✓ 093019	-033	CCBA-MW2	117	10/23/12 9:52	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	313787 049	
✓ 093019	-034	CCBA-MW2	117	10/23/12 9:54	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	313787 050	
✓ 093019	-035	CCBA-MW2	117	10/23/12 9:56	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	313787 051	
✓ 093020	-001	CCBA-TB3	N/A	10/23/12 9:38	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	313787 052	
Recipient Initials <i>M/L</i>													

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 20, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID: 093018-020 Project: SNLSGWater
Sample ID: 313787033 Client ID: SNLS003
Matrix: AQUEOUS
Collect Date: 23-OCT-12 09:46
Receive Date: 24-OCT-12 Client Desc.: CCBA-MW2
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	0637	1257525	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: November 20, 2012

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID:	093019-020	Project:	SNLSGWater
Sample ID:	313787045	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	23-OCT-12 09:46		
Receive Date:	24-OCT-12	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/27/12	0656	1257525	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA* SMO Use *AR/COC* **614540**

Project Name: SWMU 149 GWM	Date Samples Shipped: <i>12/18/12</i>	SMO Authorization: <i>Don W. Lynch</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>49559</i>	SMO Contact Phone: <i>see Rottland</i>	
Project/Task Number: 98026.01.14	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF 250-13	Lab Destination: GEL	Send Report to SMO: Lorraine Herrera/505-844-3199	
Contract No.: PO 691436			

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____
 Bill to: Sandia National Laboratories (Accounts Payable),
 P.O. Box 5800, MS-0154
 Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093249	-001	CTF-MW3	359	12/14/12 9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	316970 001
✓ 093249	-009	CTF-MW3	359	12/14/12 9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	316970 002
✓ 093249	-010	CTF-MW3	359	12/14/12 9:40	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	316970 001
✓ 093249	-016	CTF-MW3	359	12/14/12 9:41	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	316970 003
✓ 093249	-018	CTF-MW3	359	12/14/12 9:42	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	316970 004
✓ 093249	-020	CTF-MW3	359	12/14/12 9:43	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	316970 005
✓ 093249	-022	CTF-MW3	359	12/14/12 9:44	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	316970 006
✓ 093250	-001	CTF-TB1	na	12/14/12 9:37	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	316970 007

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC Inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cel	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Rob Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/264-2547 Report alkalinity (as Total CaCO3, HCO3, CO3). Anions (as Br, Cl, F, SO4) If Perchlorate detected, perform verification analysis using SW846-6850M
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>12/17/12</i> Time <i>0906</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don W. Lynch</i> Org. <i>4142</i> Date <i>12/17/12</i> Time <i>0906</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>Edie Kent</i> Org. <i>4142</i> Date <i>12/18/12</i> Time <i>0630</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>Edie Kent</i> Org. _____ Date <i>12-19-12</i> Time <i>8:10</i>	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *WA* SMO Use AR/COC **614541**

Project Name: SWMU 154 GWM	Date Samples Shipped: <i>12/18/12</i>	SMO Authorization: <i>Donal Thompson</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>149559</i>	SMO Contact Phone: <i>See both ends</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026.01.15	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No.
Service Order: CF0251-13	Lab Destination: GEL	Send Report to SMO:	<input checked="" type="checkbox"/> 4° Celsius
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093251	-001 ✓	CTF-MW2	129	12/18/12 10:00 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	316965 001
✓ 093251	-002 ✓	CTF-MW2	129	12/18/12 10:02 ✓	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	316965 002
✓ 093251	-009 ✓	CTF-MW2	129	12/18/12 10:03 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	316965 003
✓ 093251	-010 ✓	CTF-MW2	129	12/18/12 10:05 ✓	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	316965 001
✓ 093251	-016 ✓	CTF-MW2	129	12/18/12 10:06 ✓	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	316965 004
✓ 093251	-018 ✓	CTF-MW2	129	12/18/12 10:07 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	316965 005
✓ 093251	-020 ✓	CTF-MW2	129	12/18/12 10:08 ✓	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	316965 006
✓ 093251	-022 ✓	CTF-MW2	129	12/18/12 10:09 ✓	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	316965 007
✓ 093251	-024 ✓	CTF-MW2	129	12/18/12 10:11 ✓	GW	AG	<i>4x1L</i> 3x40ml	4C	G	SA	High Explosives (SW846-8321A Mod.)	316965 008
✓ 093251	-033 ✓	CTF-MW2	129	12/18/12 10:12 ✓	GW	P	<i>4x1L</i> 3x40ml	HNO3	G	SA	Gamma Spectroscopy(short list)(901.0)	316965 009

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Report alkalinity (as Total CaCO3,HCO3,CO3). Anions (as Br,Cl,F,SO4) If Perchlorate detected, perform verification analysis using SW846-6850M
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date <i>12/18/12</i> Time <i>10:48</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>Donal Thompson</i> Org. 4142 Date <i>12/18/12</i> Time <i>10:48</i>	3. Received by	Org.	Date	Time
2. Relinquished by <i>Donal Thompson</i> Org. 4142 Date <i>12/18/12</i> Time <i>11:30</i>	4. Relinquished by	Org.	Date	Time
2. Received by <i>Donal Thompson</i> Org. Date <i>12/18/12</i> Time <i>8:10</i>	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: January 17, 2013

Company : Sandia National Laboratories
Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276
1515 Eubank SE
Albuquerque, New Mexico 87123
Contact: Ms. Pamela M. Puissant
Project: Level C, Groundwater Monitoring

Client Sample ID:	093251-020	Project:	SNLS00307
Sample ID:	316965006	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	18-DEC-12 10:08		
Receive Date:	19-DEC-12	Client Desc.:	CTF-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/12/13	0519	1272008	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Appendix B
Data Validation Sample Findings
Summary Sheets for the Perchlorate Data

Memorandum

Date: November 24, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: Burn Site GWM
AR/COC: 614446
SDG: 313267
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA353.2 (nitrate/nitrite as nitrogen) and EPA314.0 (Perchlorate). Data were reported for all required analytes. No problems were identified with the data package that result in the qualification of data.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The sample was analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met all QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

Laboratory Control Sample (LCS)

The LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

The MS recoveries met QC acceptance criteria. It should be noted that the MS analysis for Perchlorate was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria. It should be noted that the Replicate analysis for Perchlorate was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported. The sample was diluted 50X for nitrate/nitrite as nitrogen due to a high concentration.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 11/25/12



Sample Findings Summary



AR/COC: 614446

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: November 30, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The CCB concentration was negative, and the absolute value was > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,B4**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except for the following.

Anions & Perchlorate:

The CCV %Ds for perchlorate and chloride (sample -010 only) were >110%. However, the associated sample results were all NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Chloride was detected in the EB. However, this EB was not associated with any samples in this data package therefore no sample data in this data package were qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Alkalinity:

It should be noted that the MS analysis was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Alkalinity:

It should be noted that the Replicate analysis was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted with the following exceptions.

Anions & Nitrate/Nitrite:

Sample -005 was diluted 5X for chloride and sulfate, and samples -006 and -020 were diluted 10X and 5X, respectively, for nitrate/nitrite due to over-range concentrations or matrix interference. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/03/12



Sample Findings Summary



AR/COC: 614462, 614463

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093003-035/OBS-MW1	Uranium-235/236 (13982-70-2)	J, FR7
	093005-035/OBS-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093005-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093005-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	093003-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093003-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	093005-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093005-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	093003-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093003-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093003-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093003-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093005-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	093005-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093005-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093005-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093003-009/OBS-MW1	Copper (7440-50-8)	0.00386U, B
	093005-009/OBS-EB1	Copper (7440-50-8)	0.00386U, B
SW846 3535/8321A Modified			
	093003-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093003-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093003-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093005-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093005-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093005-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093003-001/OBS-MW1	Chloromethane (74-87-3)	UJ, I5
	093003-001/OBS-MW1	Ethylbenzene (100-41-4)	UJ, MS5
	093003-001/OBS-MW1	Methylene chloride (75-09-2)	UJ, I5
	093003-001/OBS-MW1	Styrene (100-42-5)	UJ, MS5
	093003-001/OBS-MW1	Xylenes (total) (1330-20-7)	UJ, MS5
	093004-001/OBS-TB1	Chloromethane (74-87-3)	UJ, I5
	093004-001/OBS-TB1	Ethylbenzene (100-41-4)	UJ, MS5
	093004-001/OBS-TB1	Methylene chloride (75-09-2)	UJ, I5
	093004-001/OBS-TB1	Styrene (100-42-5)	UJ, MS5
	093004-001/OBS-TB1	Xylenes (total) (1330-20-7)	UJ, MS5
	093005-001/OBS-EB1	Chloromethane (74-87-3)	UJ, I5
	093005-001/OBS-EB1	Ethylbenzene (100-41-4)	UJ, MS5
	093005-001/OBS-EB1	Methylene chloride (75-09-2)	UJ, I5
	093005-001/OBS-EB1	Styrene (100-42-5)	UJ, MS5
	093005-001/OBS-EB1	Xylenes (total) (1330-20-7)	UJ, MS5
	093006-001/OBS-TB2	Chloromethane (74-87-3)	UJ, I5
	093006-001/OBS-TB2	Ethylbenzene (100-41-4)	UJ, MS5
	093006-001/OBS-TB2	Methylene chloride (75-09-2)	UJ, I5
	093006-001/OBS-TB2	Styrene (100-42-5)	UJ, MS5
	093006-001/OBS-TB2	Xylenes (total) (1330-20-7)	UJ, MS5
SW846 9012B			
	093003-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, B4
	093005-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, B4

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: December 10, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614464
SDG: 313454
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but <2X the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,I5**.
2. The CCB concentration was negative, and the absolute value was > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,B4**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted in the Summary section and as follows.

Perchlorate:

The CCV %D for was >110%. However, the associated sample results were all NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

Anions:

Chloride was detected in the EB (COC 614463). However, all associated sample results were >5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, Nitrate/Nitrite, Alkalinity:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, Nitrate/Nitrite, Alkalinity:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted with the following exceptions.

Anions & Nitrate/Nitrite:

The samples were diluted 10X for chloride and sulfate and 5X for nitrate/nitrite due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on AR/COC 614463. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/11/12



Sample Findings Summary



AR/COC: 614464

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	093007-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	093007-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	093008-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	093008-034/OBS-MW2	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093007-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	093007-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093007-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093007-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093008-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	093008-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093008-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093008-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093007-009/OBS-MW2	Antimony (7440-36-0)	0.01075U, B
	093007-009/OBS-MW2	Copper (7440-50-8)	0.00437U, B
	093008-009/OBS-MW2	Copper (7440-50-8)	0.00437U, B
SW846 3535/8321A Modified			
	093007-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093007-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093007-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093008-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093008-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093008-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093007-001/OBS-MW2	Chloromethane (74-87-3)	UJ, I5
	093007-001/OBS-MW2	Methylene chloride (75-09-2)	UJ, I5
	093008-001/OBS-MW2	Chloromethane (74-87-3)	UJ, I5
	093008-001/OBS-MW2	Methylene chloride (75-09-2)	UJ, I5
	093009-001/OBS-TB3	Chloromethane (74-87-3)	UJ, I5
	093009-001/OBS-TB3	Methylene chloride (75-09-2)	UJ, I5
SW846 9012B			
	093007-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	093008-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: December 17, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614465
SDG: 313563
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but <2X the PQL. The associated sample result was ND and, therefore, will be **qualified UJ,I5**.
2. The CCB concentration was negative, and the absolute value was > the MDL but < the PQL. The associated sample result was ND and, therefore, will be **qualified UJ,B4**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted in the Summary section and as follows.

Anions:

The ICAL intercepts were > the MDL for fluoride, chloride, and sulfate. However, the associated sample results were all >3X the associated intercept values and, therefore, will not be qualified.

Perchlorate:

The CCV %D for was >110%. However, the associated sample results were all NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, Nitrate/Nitrite, Anions:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, Nitrate/Nitrite, Anions:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported. The sample was not diluted with the following exceptions.

Anions & Nitrate/Nitrite:

The sample was diluted 10X for chloride, sulfate, and nitrate/nitrite due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors ≤5X those of the samples.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/18/12



Sample Findings Summary



AR/COC: 614465

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	093010-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	093010-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093010-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	093010-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	093010-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	093010-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093010-009/OBS-MW3	Copper (7440-50-8)	0.00437U, B
SW846 3535/8321A Modified			
	093010-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	093010-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	093010-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093010-001/OBS-MW3	Chloromethane (74-87-3)	UJ, I5
	093010-001/OBS-MW3	Methylene chloride (75-09-2)	UJ, I5
	093011-001/OBS-TB4	Chloromethane (74-87-3)	UJ, I5
	093011-001/OBS-TB4	Methylene chloride (75-09-2)	UJ, I5
	093012-001/OBS-FB1	Chloromethane (74-87-3)	UJ, I5
	093012-001/OBS-FB1	Methylene chloride (75-09-2)	UJ, I5
SW846 9012B			
	093010-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: December 21, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but <2X the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,I5**.
2. The ICB and CCB concentrations were negative, and the absolute values were > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,B4**.

Anions:

1. The ICAL intercept for chloride was > the MDL. The associated result of sample 313787-018 was a detect <3X the intercept and, therefore, will be **qualified J+,I5**.
2. The MS %Rs for fluoride and bromide were >125%. The associated results of all samples, except -018 were detects and, therefore, will be **qualified J+,MS2**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section and the following.

Anions:

The ICAL intercepts were > the MDL for fluoride, chloride, and sulfate. However, the associated sample results not qualified above in the Summary section were all either >3X the associated intercept or NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and the following.

Anions:

Chloride was detected in the EB. However, the associated sample results were all >5X the blank concentration and, therefore, will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

The MS recoveries met QC acceptance criteria except as noted above in the Summary section and the following.

Anions:

The MS %Rs for fluoride and bromide were >125%. The associated results of sample -018 were NDs and, therefore, will not be qualified.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted except for the following.

Anions & Nitrate/Nitrite:

Samples -004, -031, & -043 were diluted 10X for chloride and sulfate, and samples -032 & -044 were diluted 5X for nitrate/nitrite due to over-range concentrations. Samples -005 & -019 were diluted 5X for nitrate/nitrite due to matrix interference. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on the AR/COC. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/26/12



Sample Findings Summary



AR/COC: 614466, 614467, 614468

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093013-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	093016-035/CCBA-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093016-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093016-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	093018-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	093013-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	093013-034/CCBA-MW1	BETA (12587-47-2)	J, MS1
	093016-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093016-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093018-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093018-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	093019-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093019-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	093013-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	093013-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093013-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093013-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093016-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	093016-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093016-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093016-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	093018-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	093018-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093018-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093018-033/CCBA-MW2	Potassium-40 (13966-00-2)	R, Z2
	093019-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	093019-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093019-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093019-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093013-009/CCBA-MW1	Aluminum (7429-90-5)	J+, DL2
	093013-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	093016-009/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
	093018-009/CCBA-MW2	Copper (7440-50-8)	0.012UJ, B,B2
	093018-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	093019-009/CCBA-MW2	Antimony (7440-36-0)	0.0078U, B
	093019-009/CCBA-MW2	Copper (7440-50-8)	0.012UJ, B,B2
	093019-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
SW846 3535/8321A Modified			
	093013-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093013-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093013-024/CCBA-MW1	PETN (78-11-5)	UJ, MS3,MS5
	093013-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093013-024/CCBA-MW1	Tetryl (479-45-8)	UJ, MS5
	093016-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093016-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093016-024/CCBA-EB1	PETN (78-11-5)	UJ, MS3,MS5
	093016-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093016-024/CCBA-EB1	Tetryl (479-45-8)	UJ, MS5
	093018-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093018-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093018-024/CCBA-MW2	PETN (78-11-5)	UJ, MS3,MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093018-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093018-024/CCBA-MW2	Tetryl (479-45-8)	UJ, MS5
	093019-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093019-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093019-024/CCBA-MW2	PETN (78-11-5)	UJ, MS3,MS5
	093019-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093019-024/CCBA-MW2	Tetryl (479-45-8)	UJ, MS5
SW846 7470A			
	093013-009/CCBA-MW1	Mercury (7439-97-6)	UJ, I5,B4
	093016-009/CCBA-EB1	Mercury (7439-97-6)	UJ, I5,B4
	093018-009/CCBA-MW2	Mercury (7439-97-6)	UJ, I5,B4
	093019-009/CCBA-MW2	Mercury (7439-97-6)	UJ, I5,B4
SW846 8260B DOE-AL			
	093013-001/CCBA-MW1	1,4-Dioxane (123-91-1)	R, I4
	093014-001/CCBA-TB1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, I3,C2
	093014-001/CCBA-TB1	1,4-Dioxane (123-91-1)	R, I4
	093014-001/CCBA-TB1	Bromoform (75-25-2)	UJ, I3,C2
	093015-001/CCBA-FB1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, I3,C2
	093015-001/CCBA-FB1	1,4-Dioxane (123-91-1)	R, I4
	093015-001/CCBA-FB1	Bromoform (75-25-2)	J+, I3,C2
	093016-001/CCBA-EB1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, I3,C2
	093016-001/CCBA-EB1	1,4-Dioxane (123-91-1)	R, I4
	093016-001/CCBA-EB1	Bromoform (75-25-2)	J+, I3,C2
	093017-001/CCBA-TB2	1,4-Dioxane (123-91-1)	R, I4
	093018-001/CCBA-MW2	1,4-Dioxane (123-91-1)	R, I4
	093018-001/CCBA-MW2	Toluene (108-88-3)	1.0U, B2
	093019-001/CCBA-MW2	1,4-Dioxane (123-91-1)	R, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093019-001/CCBA-MW2	Toluene (108-88-3)	1.0U, B2
	093020-001/CCBA-TB3	1,4-Dioxane (123-91-1)	R, I4
SW846 8270C			
	093013-002/CCBA-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	093016-002/CCBA-EB1	4-Nitrophenol (100-02-7)	UJ, MS5
	093018-002/CCBA-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	093019-002/CCBA-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
SW846 9012B			
	093013-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093016-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093018-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	093019-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
SW846 9056			
	093013-016/CCBA-MW1	Bromide (24959-67-9)	J+, MS2
	093013-016/CCBA-MW1	Fluoride (16984-48-8)	J+, MS2
	093016-016/CCBA-EB1	Chloride (16887-00-6)	J+, I5
	093018-016/CCBA-MW2	Bromide (24959-67-9)	J+, MS2
	093018-016/CCBA-MW2	Fluoride (16984-48-8)	J+, MS2
	093019-016/CCBA-MW2	Bromide (24959-67-9)	J+, MS2
	093019-016/CCBA-MW2	Fluoride (16984-48-8)	J+, MS2

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: February 1, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614540
SDG: 316970
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate by IC), and SM2320B (total alkalinity). Data were reported for all required analytes. A problem was identified with the data package that resulted in the qualification of data.

Perchlorate:

The holding time criteria was exceeded by >1X but <2X. The associated sample result was ND and will be **qualified UJ,H1**.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate, Anions, and Alkalinity:

The MS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, Anions, and Alkalinity:

The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Anions:

The sample was diluted 50X for chloride and sulfate.

Nitrate/Nitrite:

The sample was diluted 25X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/03/13



Sample Findings Summary



AR/COC: 614540

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 314.0 DOE-AL			
	093249-020/CTF-MW3	Perchlorate (14797-73-0)	UJ, H1
SW846 3005/6020 DOE-AL			
	093249-009/CTF-MW3	Antimony (7440-36-0)	UJ, MS3
	093249-009/CTF-MW3	Arsenic (7440-38-2)	UJ, MS3
	093249-009/CTF-MW3	Selenium (7782-49-2)	J+, MS2
	093249-009/CTF-MW3	Thallium (7440-28-0)	UJ, MS3
	093249-010/CTF-MW3	Copper (7440-50-8)	0.00285U, B
SW846 8260B DOE-AL			
	093249-001/CTF-MW3	1,4-Dioxane (123-91-1)	R, I4
	093249-001/CTF-MW3	Dibromochloromethane (124-48-1)	J, I3
	093250-001/CTF-TB1	1,4-Dioxane (123-91-1)	R, I4

All other analyses met QC acceptance criteria; no further data should be qualified.

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SECTION III

SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, OCTOBER – DECEMBER 2012

1.0 Introduction

This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) has been prepared pursuant to the “U.S. Department of Energy (DOE)/Sandia Corporation (Sandia) Response to the New Mexico Environment Department (NMED) letter of April 8, 2010, entitled, *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories EPA ID #NM5890110518 HWB-SNL-06-007 and HWB-SNL-08-001*” (SNL/NM June 2010). The activities associated with the groundwater monitoring task for Solid Waste Management Units (SWMUs) 149 and 154 at Sandia National Laboratories, New Mexico (SNL/NM) are summarized in this section.

Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the December 2012 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 18 and 19 times, respectively, for a variety of constituents. Monitoring well CTF-MW3 is located approximately 290 feet to the west and downgradient of SWMU 149 (Figure III-1). Monitoring well CTF-MW2 is located approximately 260 feet to the southwest and downgradient of SWMU 154 (Figure III-2). Both wells are screened in Precambrian bedrock.

This report summarizes the eighth of eight quarterly groundwater sampling events for Coyote Test Field (CTF) monitoring well CTF-MW3, located near SWMU 149 (Building 9930 Septic System), and monitoring well CTF-MW2, located near SWMU 154 (Building 9960 Septic System and Seepage Pits). This groundwater characterization at the two SWMUs is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010). This is the final supplemental quarterly groundwater sampling event required by the April 8, 2010 letter from NMED.

The analytical results discussed in this section correspond to the reporting period of October through December 2012. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on December 14 and December 18, 2012, respectively.

This groundwater sampling event was conducted in conformance with procedures outlined in the “Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW3, Located Near SNL/NM SWMU 149” (SNL/NM June 2010, Attachment 1) and “Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW2, Located Near SNL/NM SWMU 154” (SNL/NM June 2010, Attachment 2). These Sampling and Analysis Plans (SAPs) were approved by the NMED in December 2010 (NMED December 2010).

The samples from monitoring well CTF-MW3 were analyzed for the required constituents, consisting of general chemistry parameters, volatile organic compounds (VOCs), perchlorate, Target Analyte List (TAL) metals, and nitrate plus nitrite (NPN). The samples from monitoring well CTF-MW2 were analyzed for the required constituents, consisting of general chemistry parameters, VOCs, semivolatile organic compounds (SVOCs), high explosive (HE) compounds, perchlorate, TAL metals, NPN, gross alpha/beta activity, radionuclides by gamma spectroscopy, and uranium.

Analytical results for the December 2012 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). No analytical results for the monitoring well CTF-MW3 groundwater samples exceed the corresponding MCLs. Except for arsenic, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples at concentrations of 0.0516 mg/L in the unfiltered sample and 0.0536 mg/L in the filtered sample. These values are comparable to previous sampling results for this monitoring well. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. Because of the fine-grained nature and disrupted texture of the rock surrounding monitoring well CTF-MW2, naturally occurring arsenic may be more likely to be present in the local groundwater.

Quality control (QC) samples consisting of two trip blank (TB) samples were also submitted for analysis during this quarterly sampling event. The following sections provide descriptions of the field methods used and discussions of the analytical and QC sampling results.

2.0 **Field Methods and Measurements**

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM June 2010). Groundwater monitoring at monitoring wells CTF-MW3 and CTF-MW2 was performed according to the SAPs submitted as Attachments 1 and 2 to the DOE/Sandia Response (SNL/NM June 2010) and SNL/NM Administrative Operating Procedures (AOPs) (SNL/NM May 2011) and Field Operating Procedures (FOPs) (SNL/NM January 2012a and January 2012b). Groundwater samples were analyzed for relevant parameters, listed in Table III-1. Table III-2 presents the details for groundwater samples collected from monitoring wells CTF-MW3 and CTF-MW2 during the Fourth Quarter of Calendar Year (CY) 2012.

2.1 **Equipment Decontamination**

A portable Bennett™ groundwater sampling system was used to collect the groundwater samples from both wells. The Bennett™ sampling pump and tubing bundle were decontaminated prior to installation into the monitoring wells in accordance with the procedures described in SNL/NM FOP 05-03, “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a).

2.2 **Well Evacuation**

In accordance with procedures described in SNL/NM FOP 05-01, “Groundwater Monitoring Well Sampling and Field Analytical Measurements” (SNL/NM January 2012b), all wells were purged a minimum of one saturated casing volume (the volume of one length of the saturated screen plus the borehole annulus around the saturated screen interval) and monitored for stability of water quality parameters.

Field water-quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the wells prior to collecting groundwater samples. Groundwater temperature, SC, ORP, DO, and pH were measured with a YSI™ Model 6920 water quality meter. Turbidity was measured with a HACH™ Model 2100P turbidity meter. Purging continued until four stable measurements for turbidity, pH, temperature, and SC were obtained. Groundwater stability is considered acceptable when the following parameters are achieved:

- Turbidity measurements are within 10 percent, or less than 5 nephelometric turbidity units
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5 percent as micromhos per centimeter

Table III-3 summarizes the temperature, pH, SC, and turbidity measurements, which are discussed in Section III.3.1. Field Measurement Logs (Appendix A) documenting details of well purging and water quality measurements have been submitted to the SNL/NM Records Center.

2.3 **Groundwater Sample Collection**

All groundwater samples were collected directly from the sample discharge tubing into laboratory-prepared sample containers. Chemical preservatives for samples intended for chemical analyses were added to the sample containers at the laboratory prior to shipment to SNL/NM. The groundwater samples were submitted to GEL Laboratories LLC (GEL) for chemical analysis using methods outlined in Table III-1. Table III-1 also lists the sample containers and preservation requirements. Section III.3.0 summarizes the analytical results.

The sample identification number, Analysis Request/Chain-of-Custody form number, and the associated groundwater investigation are provided in Table III-2. Chain-of-custody forms are provided in Appendix B.

3.0 **Analytical Results**

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al. 1998; DOE 1990). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009).

Analytical results and method detection limits (MDLs) for samples collected from monitoring wells CTF-MW3 and CTF-MW2 are shown in tabulated form in Tables III-4 through III-15. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits,

dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center.

The analytical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data," Revision 3 (SNL/NM May 2011). Other than the rejected results for cesium-137 in the sample from monitoring well CTF-MW2 (SWMU 154), no problems were identified with the analytical data that resulted in qualification of the data as unusable. Cesium-137 was qualified as unusable during data validation because it did not meet identification criteria for cesium-137. The data are acceptable, and reported QC measures are adequate. The data validation sample findings summary sheets are provided in Appendix C.

3.1 **Field Water Quality Measurements**

SWMU 149, Monitoring Well CTF-MW3. Table III-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to monitoring well CTF-MW3.

SWMU 154, Monitoring Well CTF-MW2. Table III-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to monitoring well CTF-MW2.

3.2 **Volatile Organic Compounds**

SWMU 149, Monitoring Well CTF-MW3. No VOCs were detected at concentrations above established MCLs. The compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs, but below the practical quantitation limit for the analytical method. Table III-4 summarizes detected VOCs in environmental groundwater samples, and Table III-5 lists the VOC MDLs.

SWMU 154, Monitoring Well CTF-MW2. No VOCs were detected at concentrations above established MCLs in the monitoring well CTF-MW2 environmental sample. No VOCs were reported above laboratory MDLs. Table III-6 lists the VOC MDLs.

3.3 **Semivolatile Organic Compounds**

SWMU 149, Monitoring Well CTF-MW3. Analysis of SVOCs is not required for monitoring well CTF-MW3.

SWMU 154, Monitoring Well CTF-MW2. No SVOCs were reported above laboratory MDLs; therefore, no SVOCs were detected at concentrations above established MCLs in the monitoring well CTF-MW2 environmental sample. Table III-6 lists the SVOC MDLs.

3.4 High Explosive Compounds

SWMU 149, Monitoring Well CTF-MW3. Analysis of HE compounds is not required for monitoring well CTF-MW3.

SWMU 154, Monitoring Well CTF-MW2. No HE compounds were detected in the monitoring well CTF-MW2 groundwater sample at concentrations above laboratory MDLs, except RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine). RDX was detected in the environmental sample collected from monitoring well CTF-MW2 at a concentration of 0.170 micrograms per liter ($\mu\text{g/L}$). This is an estimate value because the analyte concentration falls above the effective MDL and below the effective practical quantitation limit. This is a valid result for risk evaluation purposes. The EPA does not have an MCL of RDX. NMED does have a tap water screening level for RDX of 6.11 $\mu\text{g/L}$ (NMED 2012), which is 36 times greater than the estimate monitoring well CTF-MW2 analytical concentration. Table III-4 summarizes the HE compounds detected in the environmental groundwater sample, and Table III-7 lists the HE compound MDLs.

3.5 Nitrate Plus Nitrite

SWMU 149, Monitoring Well CTF-MW3. Table III-8 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. No NPN was detected above the nitrate MCL. The result for NPN was reported at a concentration of 5.23 mg/L in the monitoring well CTF-MW3 environmental sample.

SWMU 154, Monitoring Well CTF-MW2. Table III-8 summarizes NPN results for monitoring well CTF-MW2. NPN values were compared with the nitrate MCL of 10 mg/L. No NPN was detected above the nitrate MCL. NPN was not detected above the MDL in the monitoring well CTF-MW2 environmental sample.

3.6 Anions and Alkalinity

SWMU 149, Monitoring Well CTF-MW3. Table III-9 summarizes alkalinity and major anion (as bromide, chloride, fluoride, and sulfate) results for monitoring well CTF-MW3. No parameters were detected above established MCLs.

SWMU 154, Monitoring Well CTF-MW2. Table III-9 summarizes alkalinity and major anion (as bromide, chloride, fluoride, and sulfate) results for monitoring well CTF-MW2. No parameters were detected above established MCLs.

3.7 **Perchlorate**

SWMU 149, Monitoring Well CTF-MW3. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in the sample from monitoring well CTF-MW3. Table III-10 presents the perchlorate results.

SWMU 154, Monitoring Well CTF-MW2. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in the sample from monitoring well CTF-MW2. Table III-10 presents the perchlorate results.

Perchlorate results are discussed in more detail in Section II of this ER Quarterly Report.

3.8 **Metals**

Metal analyses were conducted for filtered and unfiltered groundwater samples. Groundwater samples obtained for total metal analyses are collected without filtering, and dissolved metal samples are collected by filtering the sample prior to analysis. TAL metals in both the unfiltered and filtered fractions were analyzed for all samples. The sample from monitoring well CTF-MW2 also included analysis of uranium in both the unfiltered and filtered fractions.

SWMU 149, Monitoring Well CTF-MW3. No metal parameters were detected above established MCLs in any groundwater sample. Metal results for both unfiltered and filtered samples from monitoring well CTF-MW3 are summarized in Tables III-11 and III-12, respectively.

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic was detected above the MCL of 0.010 mg/L with total arsenic reported at a concentration of 0.0516 mg/L, and dissolved arsenic at 0.0536 mg/L. The elevated concentrations of arsenic in the groundwater sample are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite, as noted in Section III.1.0. Arsenic concentrations since March

2002 are plotted on Figure III-3. Unfiltered and filtered metal results for monitoring well CTF-MW2 are summarized in Tables III-13 and III-14, respectively.

3.9 **Gamma Spectroscopy and Radioisotopic Analyses**

SWMU 149, Monitoring Well CTF-MW3. Gamma spectroscopy analysis is not required for monitoring well CTF-MW3.

SWMU 154, Monitoring Well CTF-MW2. The monitoring well CTF-MW2 groundwater sample was screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table III-15.

Gamma spectroscopy activities for short-list radionuclides are less than the associated MDAs.

Radioisotopic analyses included gross alpha, gross beta, and isotopic uranium analyses. Gross alpha activity is measured as a screening tool and, according to Title 40, Code of Federal Regulations, Parts 9, 141, and 142, Table I-4, does not include uranium, which is measured independently. Therefore, gross alpha activity measurements were corrected by subtracting out the uranium activity.

The corrected gross alpha activity for the initial analysis was reported above the MCL of 15 pico-curies per liter (pCi/L) at an activity of 25.96 pCi/L. The laboratory recounted the gross alpha and beta sample due to high recovery, and the isotopic uranium sample due to low carrier/tracer yield. Both original results and re-analysis are reported. The corrected gross alpha activity for the reanalysis was reported below the MCL and is comparable to previous corrected values. Gross beta results do not exceed established MCLs. Isotopic uranium-233/234 was reported at 51.8 ± 7.79 pCi/L, uranium-235/236 at 0.438 ± 0.190 pCi/L, and uranium-238 at 7.50 ± 1.26 pCi/L (Table III-15). In this region, naturally occurring uranium in groundwater is elevated due to contact with bedrock, which contains minerals high in uranium.

3.10 **Sample Results Exceeding Maximum Contaminant Levels**

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. The only

constituent exceeding MCLs in samples collected during this quarter consists of arsenic, which was detected in the monitoring well CTF-MW2 samples. Figure III-3 shows the concentrations of arsenic and groundwater elevations over time for monitoring well CTF-MW2. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite.

4.0 **Quality Control Samples**

Field and laboratory QC samples are prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. The following sections discuss each sample type.

4.1 **Field Quality Control Samples**

Field QC samples included TB samples. According to the approved SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2), QC samples for environmental duplicate, field blank, and equipment blank samples were not required during this sampling event. The TB samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the SAPs.

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

TB samples were submitted with the samples collected during the December 2012 sampling event. No VOCs were detected above associated laboratory MDLs in the TB samples.

4.2 **Laboratory Quality Control Samples**

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with all groundwater samples. All chemical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM May 2011).

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern. The data validation sample findings summary sheets are provided in Appendix C. The data are acceptable, and reported QC measures are adequate.

4.3 **Variations and Nonconformances**

No variations or nonconformances from the requirements in the Groundwater Monitoring SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2) issues were identified during the December 2012 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

5.0 **Summary**

During the Fourth Quarter of CY 2012, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154, representing the eighth of eight required quarterly groundwater sampling events. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring well CTF-MW3 samples include VOCs, NPN, major anions, alkalinity, TAL total metals, and perchlorate. No parameters were detected above established MCLs. All groundwater monitoring data for monitoring well CTF-MW3 are comparable to previous results.

Analytical parameters for monitoring well CTF-MW2 include VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for arsenic. Arsenic detections exceed the MCL of 0.010 mg/L in the monitoring well CTF-MW2 groundwater sample at concentrations of 0.0516 mg/L in the unfiltered sample and 0.0536 mg/L in the filtered samples. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. These values are comparable to previous results.

6.0 References

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DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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Figures

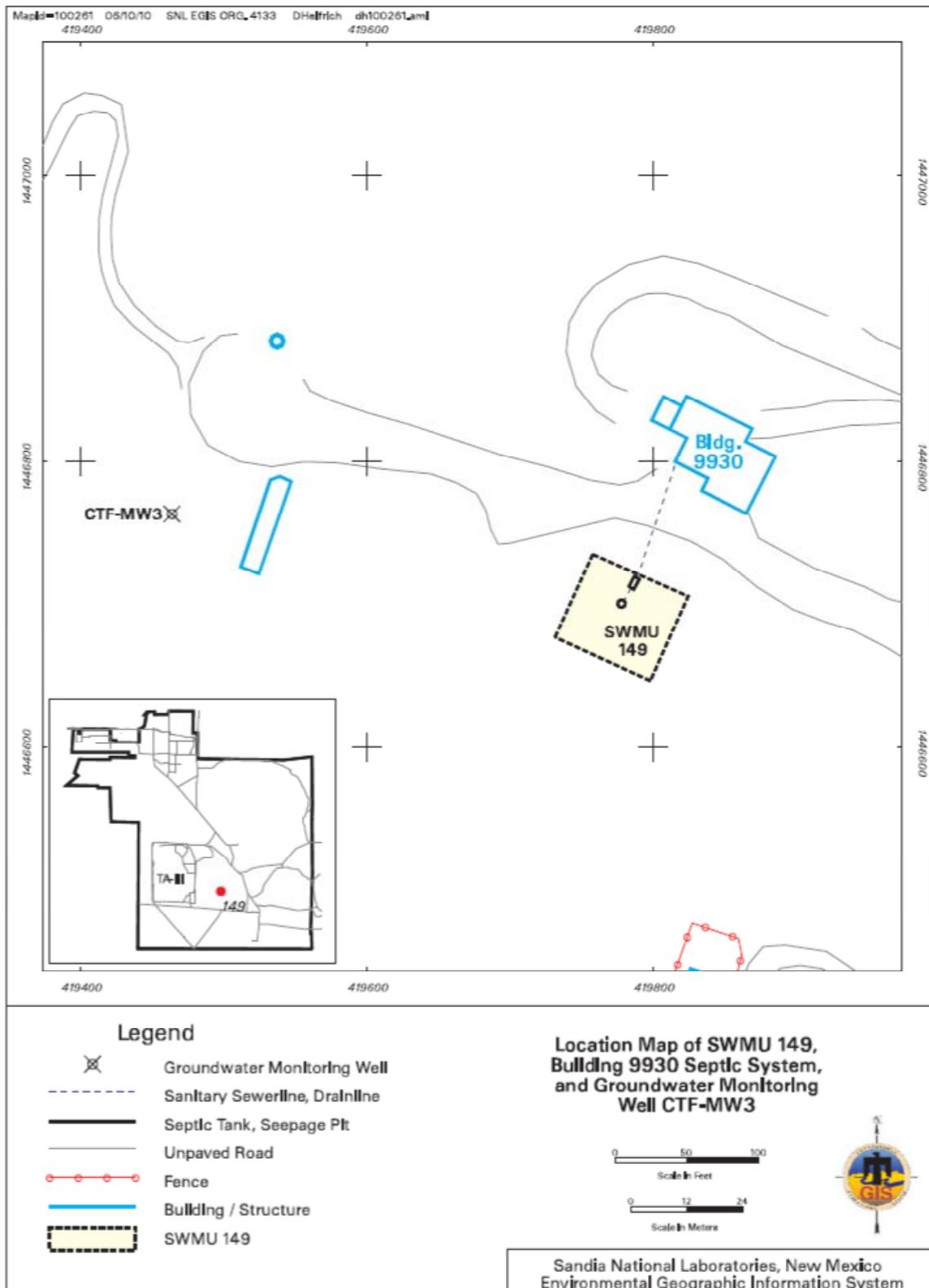


Figure III-1
Location of Monitoring Well CTF-MW3 near SWMU 149

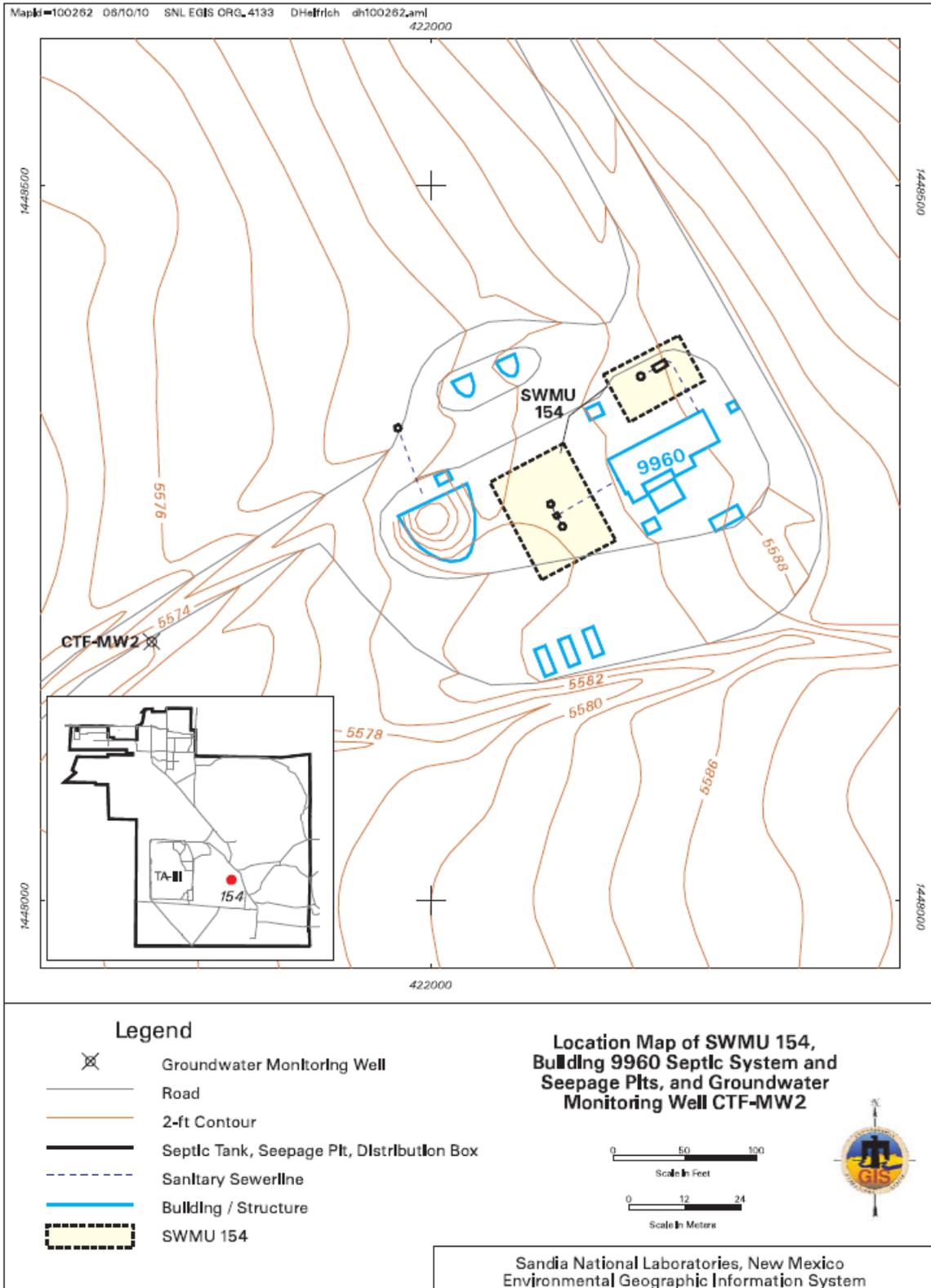


Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

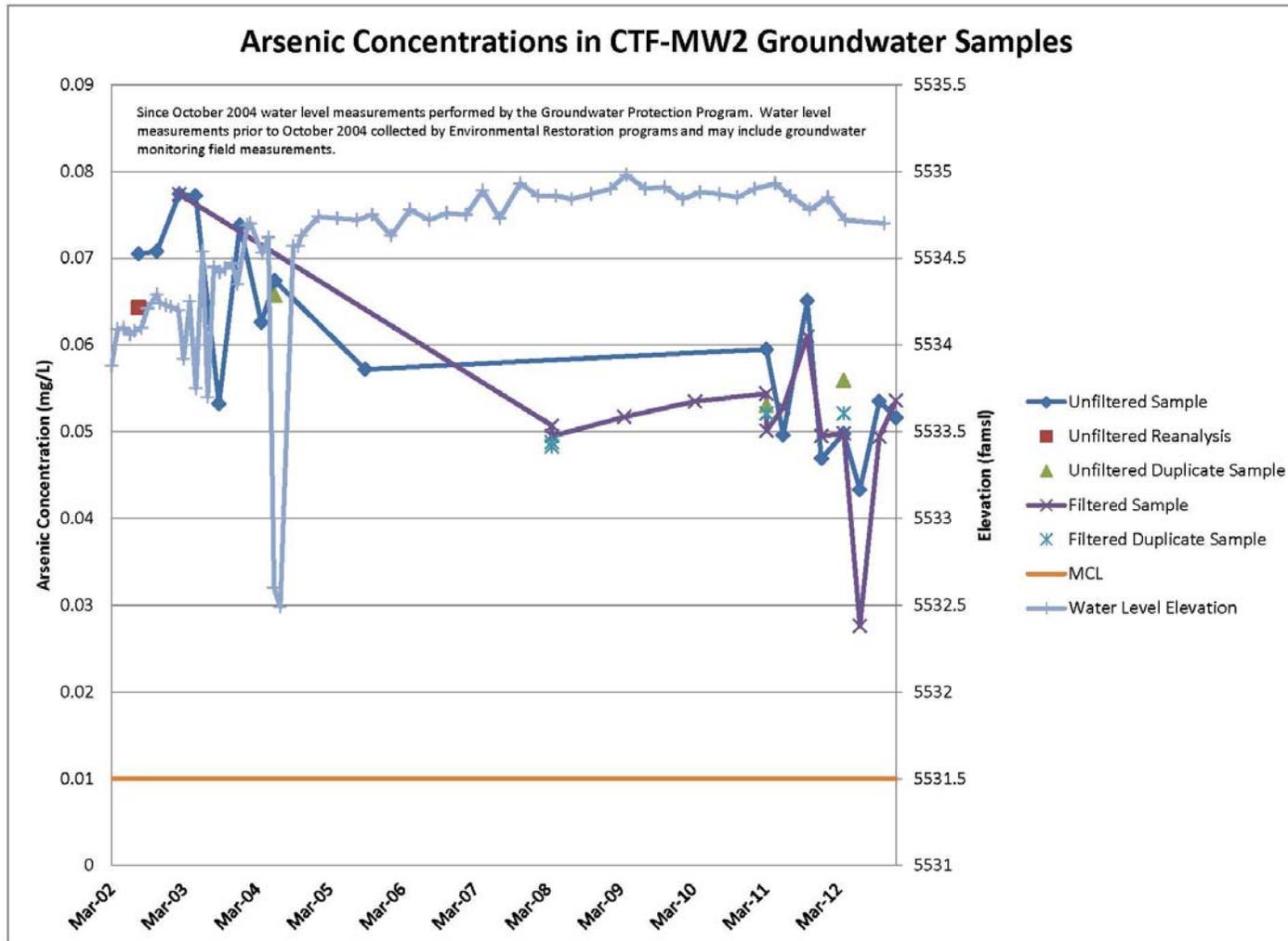


Figure III-3

Concentrations of Arsenic and Groundwater Elevations over Time in Monitoring Well CTF-MW2 near SWMU 154

Tables

Table III-1

Laboratory Analytical Methods, Container Types, and Preservation Requirements for SWMUs 149 and 154 Groundwater Samples

Analysis	Analytical Method^a	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCl, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals ^b	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO ₃ , 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations ^c	EPA 6020/7470/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H ₂ SO ₄ , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Gamma Spectroscopy ^d	EPA 901.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Isotopic Uranium	ASTM D3972-09	1 x 1-L polyethylene, HNO ₃ , 4°C

Notes

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

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ASTM International (ASTM), 2009. "Standard Test Method for Isotopic Uranium in Water by Radiochemistry," ASTM D3972-09, ASTM, West Conshohocken, Pennsylvania.

^bMetals = filtered and unfiltered samples, TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

^cMajor anions include bromide, chloride, fluoride, and sulfate.

^dGamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric acid.

HCl = Hydrochloric acid.

HNO₃ = Nitric acid.

L = Liter.

mL = Milliliter(s).

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

Table III-2
Sample Details for Fourth Quarter, CY 2012 Groundwater Sampling
SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment
October – December 2012

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	14-Dec-12	093249	614540	SWMU 149
CTF-MW2	18-Dec-12	093251	614541	SWMU 154

Notes

AR/COC = Analysis Request/Chain of Custody.
CTF = Coyote Test Field.
CY = Calendar Year.
MW = Monitoring well.
SWMU = Solid Waste Management Unit.

Table III-3
Summary of Field Water Quality Measurements^a
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 149								
CTF-MW3	14-Dec-12	16.41	1538	207.9	6.70	0.48	81.7	7.97
SWMU 154								
CTF-MW2	18-Dec-12	14.62	3340	59.0	5.75	3.44	2.1	0.21

Notes

^aField measurements collected prior to sampling.

- °C = Degrees Celsius.
- % Sat = Percent saturation.
- µmhos/cm = Micromhos per centimeter.
- CTF = Coyote Test Field.
- mg/L = Milligrams per liter.
- mV = Millivolts.
- MW = Monitoring well.
- NTU = Nephelometric turbidity units.
- pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
- SWMU = Solid Waste Management Unit.

Table III-4
Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 14-Dec-12	Bromodichloromethane	0.570	0.300	1.00	NE	J		093249-001	EPA-8260B
	Chloroform	0.780	0.300	1.00	NE	J		093249-001	EPA-8260B
	Dibromochloromethane	0.380	0.300	1.00	NE	J	J	093249-001	EPA-8260B
SWMU 154									
CTF-MW2 18-Dec-12	RDX	0.170	0.0879	0.275	NE	J		093251-024	EPA-8321A

Notes

^aLaboratory Qualifier

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

^bValidation Qualifier

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

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

µg/L = Micrograms per liter.

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 CFR 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).

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

MW = Monitoring well.

NE = Not established.

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

RDX = Hexahydro-trinitro-triazine.

SWMU = Solid Waste Management Unit.

Table III-5
Method Detection Limits for Volatile Organic Compounds (EPA Method 8260)
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October - December 2012

Analyte	MDL (µg/L)
1,1,1-Trichloroethane	0.300
1,1,2,2-Tetrachloroethane	0.300
1,1,2-Trichloroethane	0.300
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2,3-Trichlorobenzene	0.300
1,2,4-Trichlorobenzene	0.300
1,2-Dibromo-3-chloropropane	0.300
1,2-Dibromoethane	0.300
1,2-Dichlorobenzene	0.300
1,2-Dichloroethane	0.300
1,2-Dichloropropane	0.300
1,3-Dichlorobenzene	0.300
1,4-Dichlorobenzene	0.300
1,4-Dioxane	15.0
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50
2-Butanone	2.00
2-Hexanone	2.20
4-methyl-, 2-Pentanone	1.50
Acetone	3.00
Benzene	0.300
Bromochloromethane	0.300
Bromodichloromethane	0.300
Bromoform	0.300
Bromomethane	0.300
Carbon disulfide	1.50
Carbon tetrachloride	0.300
Chlorobenzene	0.300
Chloroethane	0.300
Chloroform	0.300
Chloromethane	0.300
Cyclohexane	0.300
Dibromochloromethane	0.300
Dichlorodifluoromethane	0.300
Ethyl benzene	0.300
Isopropylbenzene	0.300
Methyl acetate	1.50
Methylcyclohexane	3.00
Methylene chloride	3.00
Styrene	0.300
Tert-butyl methyl ether	0.300
Tetrachloroethene	0.300

Notes

µg/L = Micrograms per liter.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
SWMU = Solid Waste Management Unit.

Table III-6
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

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	0.300	EPA 8260B	4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,1,1,2-Tetrachloroethane	0.300	EPA 8260B	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dioxane	15.0	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Ethyl benzene	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B			

Table III-6 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00	EPA 8270C	Acenaphthene	0.300	EPA 8270C	Diphenyl amine	3.00	EPA 8270C
1,2,4-Trichlorobenzene	3.00	EPA 8270C	Acenaphthylene	0.300	EPA 8270C	Fluoranthene	0.300	EPA 8270C
2,4,5-Trichlorophenol	3.00	EPA 8270C	Acetophenone	3.00	EPA 8270C	Fluorene	0.300	EPA 8270C
2,4,6-Trichlorophenol	3.00	EPA 8270C	Anthracene	0.300	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
2,4-Dichlorophenol	3.00	EPA 8270C	Atrazine	3.00	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
2,4-Dimethylphenol	3.00	EPA 8270C	Benzaldehyde	5.00	EPA 8270C	Hexachlorocyclopentadiene	3.00	EPA 8270C
2,4-Dinitrophenol	5.00	EPA 8270C	Benzo(a)anthracene	0.300	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
2,4-Dinitrotoluene	3.00	EPA 8270C	Benzo(a)pyrene	0.440	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
2,6-Dinitrotoluene	3.00	EPA 8270C	Benzo(b)fluoranthene	0.300	EPA 8270C	Isophorone	3.00	EPA 8270C
2-Chloronaphthalene	0.300	EPA 8270C	Benzo(ghi)perylene	0.300	EPA 8270C	Naphthalene	0.300	EPA 8270C
2-Chlorophenol	3.00	EPA 8270C	Benzo(k)fluoranthene	0.300	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
2-Methylnaphthalene	0.300	EPA 8270C	Butylbenzyl phthalate	3.00	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
2-Nitroaniline	3.00	EPA 8270C	Caprolactam	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
2-Nitrophenol	3.00	EPA 8270C	Carbazole	0.300	EPA 8270C	Phenol	3.00	EPA 8270C
3,3'-Dichlorobenzidine	3.00	EPA 8270C	Chrysene	0.300	EPA 8270C	Pyrene	0.300	EPA 8270C
3-Nitroaniline	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
4-Bromophenyl phenyl ether	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C	bis(2-Chloroethyl)ether	3.00	EPA 8270C
4-Chloro-3-methylphenol	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00	EPA 8270C
4-Chlorobenzeneamine	3.30	EPA 8270C	Dibenzofuran	3.00	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Diethylphthalate	3.00	EPA 8270C	m,p-Cresol	3.00	EPA 8270C
4-Nitroaniline	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
4-Nitrophenol	3.00	EPA 8270C	Dinitro-o-cresol	3.00	EPA 8270C	o-Cresol	3.00	EPA 8270C

Notes

^a**Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600/4-79-020.

µg/L = Micrograms per liter.

EPA = U.S. Environmental Protection Agency.

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

SWMU = Solid Waste Management Unit.

Table III-7
Method Detection Limits for High Explosive Compounds (EPA Method 8321A)
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Analyte	MDL ($\mu\text{g/L}$)
1,3,5-Trinitrobenzene	0.0879
1,3-Dinitrobenzene	0.0879
2,4,6-Trinitrotoluene	0.0879
2,4-Dinitrotoluene	0.0879
2,6-Dinitrotoluene	0.0879
2-Amino-4,6-dinitrotoluene	0.0879
2-Nitrotoluene	0.0901
3-Nitrotoluene	0.0879
4-Amino-2,6-dinitrotoluene	0.0879
4-Nitrotoluene	0.165
HMX	0.0879
Nitro-benzene	0.0879
Pentaerythritol tetranitrate	0.110
RDX	0.0879
Tetryl	0.0879

Notes

$\mu\text{g/L}$ = Micrograms per liter.
EPA = U.S. Environmental Protection Agency.
HMX = Tetrahexamine tetranitramine.
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
RDX = Hexahydro-trinitro-triazine.
SWMU = Solid Waste Management Unit.
Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Table III-8
Summary of Nitrate Plus Nitrite Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 14-Dec-12	Nitrate plus nitrite as N	5.23	0.425	1.25	10.0			093249-018	EPA 353.2
SWMU 154									
CTF-MW2 18-Dec-12	Nitrate plus nitrite as N	ND	0.017	0.050	10.0	U		093251-018	EPA 353.2

Notes

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 CFR 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2009).

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

mg/L = Milligrams per liter.

MW = Monitoring well.

N = Nitrogen.

ND = Not detected (at MDL).

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

SWMU = Solid Waste Management Unit.

Table III-9
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 14-Dec-12	Bicarbonate Alkalinity	338	0.725	1.00	NE	B		093249-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093249-022	SM2320B
	Bromide	1.26	0.067	0.200	NE			093249-016	EPA 9056
	Chloride	112	3.35	10.0	NE			093249-016	EPA 9056
	Fluoride	2.43	0.033	0.100	4.0			093249-016	EPA 9056
	Sulfate	463	6.65	20.0	NE			093249-016	EPA 9056
SWMU 154									
CTF-MW2 18-Dec-18	Bicarbonate Alkalinity	1580	1.45	2.00	NE	B		093251-022	SM2320B
	Carbonate Alkalinity	ND	1.45	2.00	NE	U		093251-022	SM2320B
	Bromide	1.57	0.670	2.00	NE	J		093251-016	EPA 9056
	Chloride	406	3.35	10.0	NE			093251-016	EPA 9056
	Fluoride	2.51	0.033	0.100	4.0			093251-016	EPA 9056

Notes

^aLaboratory Qualifier

- U = Analyte is absent or below the method detection limit.
- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020, 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.

Table III-9 (Concluded)
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes (continued)

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 CFR 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).

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

mg/L = Milligrams per liter.

MW = Monitoring well.

ND = Not detected (at MDL).

NE = Not established.

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

SM = Standard Method.

SWMU = Solid Waste Management Unit.

Table III-10
Summary of Perchlorate Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149								
CTF-MW3 14-Dec-12	ND	0.004	0.012	NE	H, U	UJ	093249-020	EPA 314.0
SWMU 154								
CTF-MW2 18-Dec-12	ND	0.004	0.012	NE	U		093251-020	EPA 314.0

Notes

^aLaboratory Qualifier

H = Analytical holding time was exceeded.
U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 1999 (and updates), *"Perchlorate in Drinking Water Using Ion Chromatography,"* EPA 815/R-00-014.

CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table III-11
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 14-Dec-12	Aluminum	ND	0.015	0.050	NE	U		093249-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U	UJ	093249-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U	UJ	093249-009	EPA 6020
	Barium	0.0281	0.0006	0.002	2.00			093249-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004			093249-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093249-009	EPA 6020
	Calcium	189	0.600	2.00	NE			093249-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093249-009	EPA 6020
	Cobalt	0.000327	0.0001	0.001	NE	J		093249-009	EPA 6020
	Copper	0.00264	0.00035	0.001	NE			093249-009	EPA 6020
	Iron	0.374	0.033	0.100	NE			093249-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093249-009	EPA 6020
	Magnesium	45.3	0.100	0.300	NE			093249-009	EPA 6020
	Manganese	0.00108	0.001	0.005	NE	J		093249-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093249-009	EPA 7470
	Nickel	0.00483	0.0005	0.002	NE			093249-009	EPA 6020
	Potassium	11.3	0.800	3.00	NE			093249-009	EPA 6020
	Selenium	0.0261	0.0015	0.005	0.050		J+	093249-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093249-009	EPA 6020
	Sodium	150	0.800	2.50	NE			093249-009	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U	UJ	093249-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093249-009	EPA 6010	
Zinc	0.00507	0.0035	0.010	NE	J		093249-009	EPA 6020	

Table III-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

^aLaboratory Qualifier

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, *“Methods for Chemical Analysis of Water and Wastes,”* EPA 600-4-79-020.

CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table III-12
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 14-Dec-12	Aluminum	ND	0.015	0.050	NE	U		093249-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093249-010	EPA 6020
	Arsenic	0.00191	0.0017	0.005	0.010	J		093249-010	EPA 6020
	Barium	0.0305	0.0006	0.002	2.00			093249-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093249-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093249-010	EPA 6020
	Calcium	203	0.600	2.00	NE			093249-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093249-010	EPA 6020
	Cobalt	0.000263	0.0001	0.001	NE	J		093249-010	EPA 6020
	Copper	0.00252	0.00035	0.001	NE	B	0.00285U	093249-010	EPA 6020
	Iron	0.425	0.033	0.100	NE			093249-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093249-010	EPA 6020
	Magnesium	48.8	0.010	0.030	NE			093249-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093249-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093249-010	EPA 7470
	Nickel	0.00403	0.0005	0.002	NE			093249-010	EPA 6020
	Potassium	11.2	0.080	0.300	NE			093249-010	EPA 6020
	Selenium	0.0309	0.0015	0.005	0.050			093249-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093249-010	EPA 6020
	Sodium	192	0.800	2.50	NE			093249-010	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U		093249-010	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093249-010	EPA 6010	
Zinc	0.00628	0.0035	0.010	NE	J		093249-010	EPA 6020	

Table III-12 (Concluded)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

^aLaboratory Qualifier

- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

- U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, *“Methods for Chemical Analysis of Water and Wastes,”* EPA 600-4-79-020.

- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- mg/L = Milligrams per liter.
- MW = Monitoring well.
- ND = Not detected (at MDL).
- NE = Not established.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

Table III-13
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2 18-Dec-12	Aluminum	0.133	0.015	0.050	NE			093251-009	EPA 6020
	Antimony	0.00109	0.001	0.003	0.006	B, J	0.0086UJ	093251-009	EPA 6020
	Arsenic	0.0516	0.0017	0.005	0.010		J-	093251-009	EPA 6020
	Barium	0.0718	0.0006	0.002	2.00			093251-009	EPA 6020
	Beryllium	0.00219	0.0002	0.0005	0.004			093251-009	EPA 6020
	Cadmium	0.000145	0.00011	0.001	0.005	J	J+	093251-009	EPA 6020
	Calcium	386	0.600	2.00	NE			093251-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093251-009	EPA 6020
	Cobalt	0.00992	0.0001	0.001	NE			093251-009	EPA 6020
	Copper	0.00202	0.00035	0.001	NE			093251-009	EPA 6020
	Iron	2.82	0.033	0.100	NE			093251-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093251-009	EPA 6020
	Magnesium	84.5	0.100	0.300	NE			093251-009	EPA 6020
	Manganese	2.83	0.040	0.200	NE			093251-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093251-009	EPA 7470
	Nickel	0.0251	0.0005	0.002	NE			093251-009	EPA 6020
	Potassium	50.2	0.800	3.00	NE			093251-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		093251-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093251-009	EPA 6020
	Sodium	487	0.800	2.50	NE			093251-009	EPA 6020
	Thallium	0.00126	0.00045	0.002	0.002	J	J-	093251-009	EPA 6020
Uranium	0.0274	0.00067	0.0002	0.03			093251-009	EPA 6020	
Vanadium	0.00121	0.001	0.005	NE	J		093251-009	EPA 6010	
Zinc	0.183	0.0035	0.010	NE			093251-009	EPA 6020	

Table III-13 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

^aLaboratory Qualifier

- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

- J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.
 U.S. Environmental Protection Agency, 1984, *“Methods for Chemical Analysis of Water and Wastes,”* EPA 600-4-79-020.

- Bold** = Indicates that a result exceeds the MCL.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- mg/L = Milligrams per liter.
- MW = Monitoring well.
- ND = Not detected (at MDL).
- NE = Not established.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

Table III-14
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2 18-Dec-12	Aluminum	0.115	0.015	0.050	NE			093251-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U	UJ	093251-010	EPA 6020
	Arsenic	0.0536	0.0017	0.005	0.010		J-	093251-010	EPA 6020
	Barium	0.0706	0.0006	0.002	2.00			093251-010	EPA 6020
	Beryllium	0.00211	0.0002	0.0005	0.004			093251-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093251-010	EPA 6020
	Calcium	375	0.600	2.00	NE			093251-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093251-010	EPA 6020
	Cobalt	0.00964	0.0001	0.001	NE			093251-010	EPA 6020
	Copper	0.00159	0.00035	0.001	NE			093251-010	EPA 6020
	Iron	2.72	0.033	0.100	NE			093251-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093251-010	EPA 6020
	Magnesium	84.3	0.100	0.300	NE			093251-010	EPA 6020
	Manganese	2.65	0.040	0.200	NE			093251-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093251-010	EPA 7470
	Nickel	0.0244	0.0005	0.002	NE			093251-010	EPA 6020
	Potassium	50.1	0.800	3.00	NE			093251-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		093251-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093251-010	EPA 6020
	Sodium	485	0.800	2.50	NE			093251-010	EPA 6020
	Thallium	0.00121	0.00045	0.002	0.002	J	J-	093251-010	EPA 6020
Uranium	0.0284	0.000067	0.0002	0.03			093251-010	EPA 6020	
Vanadium	0.00102	0.001	0.005	NE	J		093251-010	EPA 6010	
Zinc	0.182	0.0035	0.010	NE			093251-010	EPA 6020	

Table III-14 (Concluded)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

^aLaboratory Qualifier

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

J- = The associated numerical value is an estimated quantity with a suspected negative bias.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, *“Methods for Chemical Analysis of Water and Wastes,”* EPA 600-4-79-020.

Bold = Indicates that a result exceeds the MCL.
CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table III-15
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL (pCi/L)	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
CTF-MW2 18-Dec-12	Americium-241	-3.52 ± 10.5	15.2	7.42	NE	U	BD	093251-033	EPA 901.1
	Cesium-137	4.05 ± 4.03	3.32	1.60	NE	X	R	093251-033	EPA 901.1
	Cobalt-60	0.769 ± 1.99	3.56	1.69	NE	U	BD	093251-033	EPA 901.1
	Potassium-40	19.2 ± 34.9	30.6	14.4	NE	U	BD	093251-033	EPA 901.1
	Gross Alpha	25.96	NA	NA	15	NA	None	093251-034	EPA 900.0
	Gross Alpha	-3.83	NA	NA	15	NA	None	093251-R34	EPA 900.0
	Gross Beta	68.5 ± 16.4	16.8	8.15	4 mrem/yr			093251-034	EPA 900.0
	Gross Beta	61.3 ± 12.9	9.26	4.42	4 mrem/yr			093251-R34	EPA 900.0
	Uranium-233/234	51.8 ± 7.79	0.270	0.118	NE			093251-035	HASL-300
	Uranium-235/236	0.438 ± 0.190	0.201	0.0792	NE			093251-035	HASL-300
	Uranium-238	7.50 ± 1.26	0.210	0.0881	NE			093251-035	HASL-300
	Uranium-233/234	56.8 ± 7.98	0.199	0.0866	NE			093251-R35	HASL-300
	Uranium-235/236	1.07 ± 0.267	0.115	0.0417	NE			093251-R35	HASL-300
	Uranium-238	8.86 ± 1.35	0.0856	0.030	NE			093251-R35	HASL-300

Notes

^aActivities of zero or less are considered to be not detected. Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Parts 9, 141, and 142, Table I-4).

^bThe lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions. The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.

^c**Laboratory Qualifier**

NA = Not applicable.
U = Analyte is absent or below the method detection limit.
X = Data rejected due to peak not meeting identification criteria.

^d**Validation Qualifier**

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
None = No data validation for corrected gross alpha activity.
R = The data are unusable. Resampling and reanalysis are necessary for verification.

Table III-15 (Concluded)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes (continued)

°Analytical Method

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

U.S. Department of Energy, 1990, "EML Procedures Manual," 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.

CFR = Code of Federal Regulations

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

HASL = Health and Safety Laboratory.

MCL = Maximum contaminant level. The following are the MCLs for gross alpha particles and beta particles in community water systems:

15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table I-4)

4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).

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

mrem/yr = Millirem per year.

MW = Monitoring well.

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

NE = Not established.

pCi/L = Picocuries per liter.

SWMU = Solid Waste Management Unit.

Table III-16
Summary of Constituents Detected above Established MCLs
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments through December 2012

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 154								
CTF-MW2	08-Mar-11	Arsenic—Filtered	0.0544 mg/L	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	0.0528 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	0.0610 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	0.0495 mg/L	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Filtered	0.0498 mg/L	0.010 mg/L			091949-010	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			091950-010	EPA 6020
CTF-MW2	19-June-12	Arsenic—Filtered	0.0276 mg/L	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Filtered	0.0494 mg/L	0.010 mg/L			092862-010	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Filtered	0.0536 mg/L	0.010 mg/L		J-	093251-010	EPA 6020
CTF-MW2	08-Mar-11	Arsenic—Unfiltered	0.0595 mg/L	0.010 mg/L			090237-009	EPA 6020
CTF-MW2	31-May-11	Arsenic—Unfiltered	0.0496 mg/L	0.010 mg/L			090670-009	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Unfiltered	0.0651 mg/L	0.010 mg/L			091259-009	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Unfiltered	0.0469 mg/L	0.010 mg/L			091525-009	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Unfiltered	0.0498 mg/L	0.010 mg/L			091949-009	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Unfiltered	0.0559 mg/L	0.010 mg/L			091950-009	EPA 6020
CTF-MW2	19-June-12	Arsenic—Unfiltered	0.0433 mg/L	0.010 mg/L			092538-009	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Unfiltered	0.0535 mg/L	0.010 mg/L			092862-009	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Unfiltered	0.0516 mg/L	0.010 mg/L		J-	093251-009	EPA 6020
CTF-MW2	31-May-11	Gross Alpha	23.38 pCi/L	15 pCi/L			090670-010	EPA 900.0
CTF-MW2	08-Mar-11	Thallium—Unfiltered	0.00249 mg/L	0.002 mg/L	J		090237-009	EPA 6020

Notes

^a**Laboratory Qualifier**

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

^b**Validation Qualifier**

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

J- = The associated numerical value is an estimated quantity with a suspected negative bias.

Table III-16 (Concluded)
Summary of Constituents Detected above Established MCLs
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments through December 2012

Notes (continued)

°Analytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, *“Methods for Chemical Analysis of Water and Wastes,”* EPA 600-4-79-020.

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

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).

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

mg/L = Milligrams per liter.

MW = Monitoring well.

pCi/L = Picocuries per liter.

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

SWMU = Solid Waste Management Unit.

Appendix A
Field Measurement Logs for Monitoring
Wells CTF-MW3 and CTF-MW2

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10.11.01
Well I.D.: CTF-MW2	Date: 12/18/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump _____ Pump depth: 129'	

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments
43.87	0802	/	START						DO mg/L
46.32	0827	5	13.64	2727	132.4	5.92	5.87	5.3	0.54
46.59	0839	10	14.58	2757	125.9	5.87	2.88	3.9	0.40
46.87	0851	15	15.06	3271	84.4	5.70	2.86	2.8	0.28
46.97	0902	20	15.07	3305	64.0	5.70	2.43	2.4	0.24
47.06	0914	25	14.18	3332	62.3	5.73	2.97	2.3	0.23
47.14	0926	30	14.58	3332	60.5	5.73	3.40	2.2	0.22
47.18	0934	34	14.55	3336	59.6	5.74	3.25	2.2	0.22
47.20	0938	36	14.55	3337	59.8	5.74	3.69	2.1	0.21
47.21	0942	38	14.56	3336	59.6	5.74	3.62	2.1	0.21
47.21	0948	40	14.60	3333	59.5	5.74	3.17	2.1	0.21
47.21	0953	42	14.61	3339	58.9	5.75	3.58	2.1	0.21
47.21	0959	44	14.62	3340	59.0	5.75	3.44	2.1	0.21
	1000	/	SAMPLING						
									~4.00 gals purged from tubing 0814

IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page

Appendix B
Analytical Laboratory
Certificates of Analysis for Monitoring
Wells CTF-MW3 and CTF-MW2
Groundwater Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614540**

Project Name: SWMU 149 GWM	Date Samples Shipped: _____	SMO Authorization: <i>Don Watson</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. _____	SMO Contact Phone: <i>see below</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026.01.14	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF 250-13	Lab Destination: GEL	Send Report to SMO: _____	
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093249	-001	CTF-MW3	359	12/14/12 9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093249	-009	CTF-MW3	359	12/14/12 9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
✓ 093249	-010	CTF-MW3	359	12/14/12 9:40	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
✓ 093249	-016	CTF-MW3	359	12/14/12 9:41	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
✓ 093249	-018	CTF-MW3	359	12/14/12 9:42	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 093249	-020	CTF-MW3	359	12/14/12 9:43	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
✓ 093249	-022	CTF-MW3	359	12/14/12 9:44	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 093250	-001	CTF-TB1	na	12/14/12 9:37	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt															
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered: _____		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																
Background: <input type="checkbox"/> Yes	Entered by: _____		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day																
Confirmatory: <input type="checkbox"/> Yes	QC inits.: _____		Negotiated TAT <input type="checkbox"/>																
Sample Team Members <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>Robert Lynch</td> <td><i>Robert Lynch</i></td> <td>RL</td> <td>SNL/4142/505-844-4013/505-250-7090</td> </tr> <tr> <td>Alfred Santillanes</td> <td><i>Alfred Santillanes</i></td> <td>AS</td> <td>SNL/4142/505-844-5130/505-228-0710</td> </tr> <tr> <td>William Gibson</td> <td><i>William Gibson</i></td> <td>WG</td> <td>SNL/4142/505-284-3307/505-239-7367</td> </tr> </table>	Name	Signature	Init.		Company/Organization/Phone/Cell	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	Name	Signature	Init.	Company/Organization/Phone/Cell															
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090															
Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710																
William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367																
			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Report alkalinity (as Total CaCO3, HCO3, CO3). Anions (as Br, Cl, F, SO4) If Perchlorate detected, perform verification analysis using SW846-6850M																

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 12/17/12 Time 0906	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don Watson</i> Org. 4142 Date 12/17/12 Time 0906	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *WA*

SMO Use

AR/COC **614541**

Project Name: SWMU 154 GWM	Date Samples Shipped:	SMO Authorization: <i>Don Watson</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone: <i>See Both ends</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026.01.15	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF0251-13	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154

Tech Area:	Room:	Operational Site:
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093251	-001 ✓	CTF-MW2	129	12/18/12 10:00 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093251	-002 ✓	CTF-MW2	129	12/18/12 10:02 ✓	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
✓ 093251	-009 ✓	CTF-MW2	129	12/18/12 10:03 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
✓ 093251	-010 ✓	CTF-MW2	129	12/18/12 10:05 ✓	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
✓ 093251	-016 ✓	CTF-MW2	129	12/18/12 10:06 ✓	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
✓ 093251	-018 ✓	CTF-MW2	129	12/18/12 10:07 ✓	GW	P	125 ml	H2SO4	G	SA	NPñ (EPA 353.2)	
✓ 093251	-020 ✓	CTF-MW2	129	12/18/12 10:08 ✓	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
✓ 093251	-022 ✓	CTF-MW2	129	12/18/12 10:09 ✓	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 093251	-024 ✓	CTF-MW2	129	12/18/12 10:11 ✓	GW	AG	<i>4x1L</i> 3x40ml	4C	G	SA	High Explosives (SW846-8321A Mod.)	
✓ 093251	-033 ✓	CTF-MW2	129	12/18/12 10:12 ✓	GW	P	<i>4x1L</i>	HNO3	G	SA	Gamma Spectroscopy(short list)(901.0)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt															
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day																
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>																
Sample Team Members <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>Robert Lynch</td> <td><i>Robert Lynch</i></td> <td><i>RL</i></td> <td>SNL/4142/505-844-4013/505-250-7090</td> </tr> <tr> <td>Alfred Santillanes</td> <td><i>Alfred Santillanes</i></td> <td><i>AS</i></td> <td>SNL/4142/505-844-5130/505-228-0710</td> </tr> <tr> <td>William Gibson</td> <td><i>William Gibson</i></td> <td><i>WG</i></td> <td>SNL/4142/505-284-3307/505-239-7367</td> </tr> </table>	Name	Signature	Init.		Company/Organization/Phone/Cell	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	Return Samples By:
	Name	Signature	Init.	Company/Organization/Phone/Cell															
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090															
Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710																
William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367																

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>12/18/12</i> Time <i>1048</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don Watson</i> Org. <i>4142</i> Date <i>12/18/12</i> Time <i>1048</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>NA</i>	SMO Use	AR/COC	614542 ✓
Project Name: SWMU 154 GWM	Date Samples Shipped:	SMO Authorization: <i>Don Jackson</i>	<input checked="" type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone:	
Project/Task Number: 98026.01.15	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF0251-13	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154

Tech Area:	Operational Site:	
Building:	Room:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093253	-011	CTF-MW2 PW	NA	12/18/12 9:28	FPW	P	500 ml	HNO3	G	SA	Arsenic (SW846-6020)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>Alfred Santillanes</i>	Org. 4142	Date 12/18/12	Time 10:49	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Jackson</i>	Org. 4142	Date 12/18/12	Time 10:49	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT

Appendix C
Data Validation Sample Findings
Summary Sheets for Monitoring Wells
CTF-MW3 and CTF-MW2
Groundwater Data



Sample Findings Summary



AR/COC: 614540

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 314.0 DOE-AL			
	093249-020/CTF-MW3	Perchlorate (14797-73-0)	UJ, H1
SW846 3005/6020 DOE-AL			
	093249-009/CTF-MW3	Antimony (7440-36-0)	UJ, MS3
	093249-009/CTF-MW3	Arsenic (7440-38-2)	UJ, MS3
	093249-009/CTF-MW3	Selenium (7782-49-2)	J+, MS2
	093249-009/CTF-MW3	Thallium (7440-28-0)	UJ, MS3
	093249-010/CTF-MW3	Copper (7440-50-8)	0.00285U, B
SW846 8260B DOE-AL			
	093249-001/CTF-MW3	1,4-Dioxane (123-91-1)	R, I4
	093249-001/CTF-MW3	Dibromochloromethane (124-48-1)	J, I3
	093250-001/CTF-TB1	1,4-Dioxane (123-91-1)	R, I4

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: February 1, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614540
SDG: 316970
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate by IC), and SM2320B (total alkalinity). Data were reported for all required analytes. A problem was identified with the data package that resulted in the qualification of data.

Perchlorate:

The holding time criteria was exceeded by >1X but <2X. The associated sample result was ND and will be **qualified UJ,H1**.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate, Anions, and Alkalinity:

The MS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, Anions, and Alkalinity:

The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Anions:

The sample was diluted 50X for chloride and sulfate.

Nitrate/Nitrite:

The sample was diluted 25X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/03/13

Memorandum

Date: February 1, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614540
SDG: 316970 and 316971
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES), and EPA 7470A (CVAA mercury). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

ICP-MS:

SDG 316970

1. The MS %Rs for Sb, As, and Tl were < LAL. All associated sample results were ND and will be **qualified UJ,MS3**.
2. The MS %R for Se was > UAL. The associated result was a detect and will be **qualified J+,MS2**.

SDG 316971

1. Cu was detected in the MB at > MDL and <PQL. The associated sample result was a detect <5X the MB concentration and will be **qualified 0.00285U,B** at 5X the MB value.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

ICP-MS:

SDG 316970: Sb was detected in the MB at > MDL and < PQL. The associated result was ND and will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as noted above in the Summary section and as follows.

ICP-MS:

SDG 316970: The parent sample concentrations for Ca, Mg, K, and/or Na were >4X the spike. However, an MS analysis is not required for these analytes. Therefore, no sample data will be qualified.

The MS %R for Cd was > UAL. The associated sample result was ND and will not be qualified.

ICP and CVAA:

SDG 316970: The MS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicates met QC acceptance criteria.

ICP and CVAA:

SDG 316970: The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:

SDG 316970: The sample was diluted 10X for Ca, Mg, K, and Na.

SDG 316971: The sample was diluted 10X for Ca and Na.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the concentrations of Al, Ca, Fe, and Mg in the samples were < those in the ICS solutions. No sample data will be qualified as a result.

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria.

ICP:

SDG 316970: The serial dilution analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/03/13

Memorandum

Date: February 1, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614540
SDG: 316970
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. A problem was identified with the data package that resulted in the qualification of data.

1. The initial calibration RF for 1,4-dioxane was < 0.01 . All associated sample results were ND and will be **qualified R,I4**.
2. The initial calibration %RSD for dibromochloromethane was $>15\%$ but $<40\%$. The associated result for sample 316970-001 was a detect and will be **qualified J,I3**.

Data are acceptable except as noted above, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows.

The initial calibration %RSDs for bromoform; 1,2-dibromo-3-chloropropane; and dibromochloromethane were >15% but < 40%. The CCV %Ds for 2-hexanone, methyl acetate, and 1,1,2,2-tetrachloroethane were >20% with negative bias and no other associated calibration infractions. All associated results that were ND will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that neither trichlorotrifluoroethane nor 1,4-dioxane were included in the MS/MSD solution. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/03/13



Sample Findings Summary



AR/COC: 614541

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	093251-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	093251-033/CTF-MW2	Cesium-137 (10045-97-3)	R, Z2
	093251-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093251-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093251-009/CTF-MW2	Antimony (7440-36-0)	0.0086UJ, B, MS3
	093251-009/CTF-MW2	Arsenic (7440-38-2)	J-, MS3
	093251-009/CTF-MW2	Cadmium (7440-43-9)	J+, MS2
	093251-009/CTF-MW2	Thallium (7440-28-0)	J-, MS3
	093251-010/CTF-MW2	Antimony (7440-36-0)	UJ, MS3
	093251-010/CTF-MW2	Arsenic (7440-38-2)	J-, MS3
	093251-010/CTF-MW2	Thallium (7440-28-0)	J-, MS3
SW846 3535/8321A Modified			
	093251-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093251-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093251-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093251-001/CTF-MW2	1,4-Dioxane (123-91-1)	R, I4
	093252-001/CTF-TB2	1,4-Dioxane (123-91-1)	R, I4
SW846 8270C			
	093251-002/CTF-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093251-002/CTF-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3
	093251-002/CTF-MW2	Hexachloroethane (67-72-1)	UJ, MS5

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: January 30, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614541, -542
SDG: 316965
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate by IC), and SM2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/nitrite:

The MS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/nitrite:

The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Anions:

The sample was diluted 50X for chloride and sulfate, and 10X for bromide.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/12/13

Memorandum

Date: January 29, 2013
To: File
From: Marcia Hilchey
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614541, -542
SDG: 316965
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: High Explosives (HE) by LCMSMS

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using method EPA 8321A Mod (HE by LCMSMS). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

- 1) The ICAL RFs for m-nitrotoluene, o-nitrotoluene, and p-nitrotoluene were < 0.01 but > 0.05 . All associated sample results were ND and will be **qualified UJ,I4**.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The sample was extracted and analyzed within the prescribed holding time and properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria except as noted above in the Summary section.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD QC acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. According to laboratory procedure, all sample and QC extracts were diluted 2X with HPLC grade water.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/12/13

Memorandum

Date: January 30, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614541, -542
SDG: 316965 and 316967
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES), and EPA 7470A (CVAA mercury). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

ICP-MS:

1. Sb was detected in the MB at > MDL and < PQL. The associated result for sample 316965-003 was a detect < 5X the MB concentration and will be **qualified 0.0086U,B** at 5X the MB value.
2. The MS %Rs for Sb, As, and Tl were < LAL. The associated ND results will be **qualified UJ,MS3**, and associated detected results will be **qualified J-,MS3**.
3. The MS %R for Cd was > UAL. The associated result for sample 316965-003 was a detect and will be **qualified J+,MS2**.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

ICP-MS:

Sb was detected in the MB at > MDL and < PQL. The associated result for sample 316967-001 was ND and will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as noted above in the Summary section and as follows.

ICP-MS:

The parent sample concentrations for Ca, Mg, K, and/or Na were >4X the spike. However, an MS analysis is not required for these analytes. Therefore, no sample data will be qualified.

The MS %Rs for Cd and Se were > UAL. Associated ND results will not be qualified.

The MS analysis for SDG 316965 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Batch 316965

ICP-AES and CVAA:

The MS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result

Laboratory Replicate

All replicates met QC acceptance criteria.

Batch 316965

ICP-MS, ICP-AES, and CVAA:

The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:

Both samples were diluted 10X for Ca, Mg, K, and Na; and 40X for Mn.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the concentrations of Al, Ca, Fe, and Mg in the samples were < those in the ICS solutions. No sample data will be qualified as a result.

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria.

Batch 316965

ICP-MS and ICP-AES:

The serial dilution analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/12/13

Memorandum

Date: January 12, 2013

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614541, -542
SDG: 316965 and 319293
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with approved procedures using methods HASL 300 (isotopic U), EPA 901.1 (gamma spec), and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that result in the qualification of data.

Gamma Spec:

1. The Cs-137 sample result was 'X' flagged by the lab due to peak not meeting identification criteria, and will be **qualified R,Z2**.
2. The gamma spectroscopy Am-241, Co-60, and K-40 sample results were either < the associated 2-sigma TPU and/or < the associated MDA and, therefore, will be **qualified BD,FR3**.

Data are acceptable except as noted above, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

It should be noted that the sample was re-logged for iso-U and gross alpha/beta analyses at the client's request. The re-log data were reported in a package addendum and were evaluated for validation. The data for the original iso-U and gross alpha/beta analyses were not validated.

Holding Times and Preservation

The sample was analyzed within the prescribed holding times and properly preserved.

Quantification

Quantification criteria were met except as noted above in the Summary section.

Calibration

The case narratives stated that the instruments used were properly calibrated.

Blanks

No target analytes were detected in the blanks at concentrations > the MDA and 2-sigma TPU.

Tracer/Carrier Recovery

All tracer/carrier acceptance criteria were met.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Replicate

All replicate error ratios met QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All required detection limits were met. The sample was not diluted.

Other QC

No other specific issues that affect data quality were identified except as noted above in the Summary section.

Reviewed by: Monica Dymerski

Level I

Date: 02/12/13

Memorandum

Date: January 29, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614541,-542
SDG: 316965
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

One sample was prepared and analyzed with accepted procedures using method EPA 8270C (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. MS and MSD %Rs for hexachlorocyclopentadiene were < the LAL. The associated sample result was ND and will be **qualified UJ,MS3**.
2. The MS/MSD RPD was > the UAL for hexachloroethane and hexachlorobutadiene. The associated sample results were ND and will be **qualified UJ,MS5**.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The sample was extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows.

The ICAL y-intercept values for 2,4-dinitrotoluene and p-nitroaniline were > the MDL. The associated sample results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exception. The LCS %R for hexachlorocyclopentadiene was < UAL. However this is within the allowable number of LCS infractions, therefore the associated sample result was not qualified.

Detection Limits/Dilutions

All detection limits were properly reported. The sample was not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/12/13

Memorandum

Date: January 29, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614541, -542
SDG: 316965
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. A problem was identified with the data package that resulted in the qualification of data.

1. The initial calibration RF for 1,4-dioxane was < 0.01 . All associated sample results were ND and will be **qualified R,I4**.

Data are acceptable except as noted above, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows.

The initial calibration %RSDs for bromoform; 1,2-dibromo-3-chloropropane; and dibromochloromethane were >15% but < 40%. The CCV %Ds for 2-hexanone, methyl acetate, and 1,1,2,2-tetrachloroethane were >20% with negative bias and no other associated calibration infractions. All associated results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that neither trichlorotrifluoroethane nor 1,4-dioxane were included in the MS/MSD solution. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COCs.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 02/12/13

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SECTION IV

SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, OCTOBER – DECEMBER 2012

1.0 Introduction

This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) has been prepared pursuant to the “SWMU 68 and SWMUs 8/58 Groundwater Characterization Work Plans – U.S. Department of Energy (DOE)/Sandia Corporation (Sandia) Response to the New Mexico Environment Department (NMED) letter of April 8, 2010, entitled, *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-06-007 and HWB-SNL-08-001*” (SNL/NM September 2010) and the NMED approval of “Solid Waste Management Units 8 and 58, Proposed Groundwater Monitoring Well Location Adjustment” (NMED June 2011). The activities associated with the groundwater monitoring task for Solid Waste Management Units (SWMUs) 8/58 and 68 at Sandia National Laboratories, New Mexico (SNL/NM) are summarized in this section.

The fifth of eight quarterly groundwater sampling events occurred in October 2012 for Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58, and monitoring wells at the Old Burn Site (OBS), OBS-MW1, OBS-MW2, and OBS-MW3, located within SWMU 68. These monitoring wells were installed in August 2011 (SNL/NM November 2011). Monitoring well CCBA-MW1 is located at the southwestern corner of SWMU 8 (Figure IV-1). Monitoring well CCBA-MW2 is located near the center of SWMU 58 (Figure IV-1). Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are located at SWMU 68 in the Coyote Test Field (CTF) (Figure IV-2).

The supplemental groundwater monitoring at these monitoring wells is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010). The analytical results discussed in this report correspond to the Fourth Quarter, Calendar Year (CY) 2012 reporting period (October – December 2012).

This groundwater sampling event was conducted in conformance with procedures outlined in the “Groundwater Characterization Work Plan for SWMU 8 – Open Dump (Coyote Canyon Blast Area) and SWMU 58 – Coyote Canyon Blast Area, Foothills Test Area” and “Groundwater Characterization Work Plan for SWMU 68, Old Burn Site” (SNL/NM September 2010). These Work Plans were approved by the NMED in January 2011 (NMED January 2011).

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on October 22 and October 23, 2012, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from October 16 to October 18, 2012, respectively. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in the monitoring well CCBA-MW1 environmental sample with a concentration of 5.32 mg/L. Fluoride in the monitoring well CCBA-MW2 environmental sample and the duplicate environmental sample exceed the method detection limit (MDL) with concentrations of 1.62 mg/L and 1.61 mg/L, respectively. No analytical results for the SWMU 68 groundwater samples exceed the corresponding MCLs.

Quality control (QC) samples consisting of duplicate environmental, equipment blank (EB), trip blank (TB), and field blank (FB) samples were also submitted for analysis during this quarterly sampling event. The following sections provide descriptions of the field methods used and discussions of the analytical and QC sampling results.

This groundwater sampling event represents the fifth of eight supplemental quarterly events for the five monitoring wells. The sixth of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (January through March 2013).

2.0 **Field Methods and Measurements**

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM September 2010). Groundwater monitoring at SWMUs 8/58 and 68 was performed according to the Work Plans submitted as Attachments A and B to the DOE/Sandia Response (SNL/NM September 2010) and SNL/NM Administrative Operating Procedures (AOPs) (SNL/NM May 2011) and Field Operating Procedures (FOPs) (SNL/NM January 2012a and January 2012b). Groundwater samples were analyzed for relevant parameters, listed in Table IV-1. Table IV-2 presents the details for groundwater samples collected from all five monitoring wells during Fourth Quarter, CY 2012.

2.1 **Equipment Decontamination**

A portable Bennett™ groundwater sampling system was used to collect the groundwater samples from both wells. The Bennett™ sampling pump and tubing bundle were decontaminated prior to installation into the monitoring wells in accordance with the procedures described in SNL/NM FOP 05-03, “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a). Section IV.4.1.2 discusses the QC results for the EB samples.

2.2 **Well Evacuation**

In accordance with procedures described in SNL/NM FOP 05-01, “Groundwater Monitoring Well Sampling and Field Analytical Measurements” (SNL/NM January 2012b), all wells were purged a minimum of one saturated casing volume (the volume of one length of the saturated screen plus the borehole annulus around the saturated screen interval) and monitored for stability of water quality parameters, if applicable.

Field water-quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the wells prior to collecting groundwater samples. Groundwater temperature, SC, ORP, DO, and pH were measured with a YSI™ Model 6920 water quality meter.

Turbidity was measured with a HACH™ Model 2100P turbidity meter. Purging continued until four stable measurements for turbidity, pH, temperature, and SC were obtained. Groundwater stability is considered acceptable when the following parameters are achieved:

- Turbidity measurements are within 10 percent, or less than 5 nephelometric turbidity units
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5 percent as micromhos per centimeter

Table IV-3 summarizes the temperature, pH, SC, and turbidity measurements, which are discussed in Section IV.3.1. Field Measurement Logs (Appendix A) documenting details of well purging and water quality measurements have been submitted to the SNL/NM Records Center.

2.3 **Groundwater Sample Collection**

All groundwater samples were collected directly from the sample discharge tubing into laboratory-prepared sample containers. Chemical preservatives for samples intended for chemical analyses were added to the sample containers at the laboratory prior to shipment to SNL/NM. The groundwater samples were submitted to GEL Laboratories LLC (GEL) for chemical analysis using methods outlined in Table IV-1. Table IV-1 also lists the sample containers and preservation requirements. Section IV.3.0 summarizes the analytical results.

The sample identification number, Analysis Request/Chain-of-Custody form number, and the associated groundwater investigation are provided in Table IV-2. Chain-of-custody forms are included in Appendix B.

3.0 **Analytical Results**

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al. 1998; DOE 1990). Table IV-4 lists the MDLs

for VOCs and SVOCs analyzed and Table IV-5 lists the MDLs for HE compounds analyzed. Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results for samples collected from all five monitoring wells are shown in tabulated form in Tables IV-6 through IV-13. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Records Center.

The analytical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data," Revision 3 (SNL/NM May 2011). No problems were identified with the analytical data that resulted in qualification of the data as unusable. The data are acceptable, and reported QC measures are adequate. The data validation sample findings summary sheets are provided as Appendix C.

3.1 **Field Water Quality Measurements**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to sampling.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to sampling.

3.2 **Volatile Organic Compounds**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. No VOCs were detected above laboratory MDLs in any groundwater sample from SWMUs 8/58, except for toluene. Toluene was reported below the MCL of 1,000 micrograms per liter ($\mu\text{g/L}$) in monitoring well CCBA-MW1 at a concentration of 0.530 $\mu\text{g/L}$. Toluene was qualified as not detected during data validation in monitoring well CCBA-MW2 samples, since this compound was detected at concentrations less than 10 times the associated equipment blank sample result. Table IV-4 lists MDLs for associated VOCs analyzed.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. No VOCs were detected above laboratory MDLs in any groundwater sample from SWMU 68. Table IV-4 lists MDLs for associated VOCs analyzed.

3.3 Semivolatile Organic Compounds

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. No SVOCs were detected above laboratory MDLs in any groundwater sample from SWMUs 8/58. Table IV-4 lists MDLs for associated SVOCs analyzed.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. No SVOCs were detected above laboratory MDLs in any groundwater sample from SWMU 68. Table IV-4 lists MDLs for associated SVOCs analyzed.

3.4 High Explosive Compounds

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. No HE compounds were detected above laboratory MDLs in any groundwater sample from SWMUs 8/58. Table IV-5 lists MDLs for associated HE compounds analyzed.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. No HE compounds were detected above laboratory MDLs in any groundwater sample from SWMU 68. Table IV-5 lists MDLs for associated HE compounds analyzed.

3.5 Nitrate Plus Nitrite

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-6 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at a maximum concentration of 3.39 mg/L in the monitoring well CCBA-MW2 duplicate environmental sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-6 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at a maximum concentration of 1.83 mg/L in the monitoring well OBS-MW1 environmental sample.

3.6 Anions and Alkalinity

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-7 summarizes alkalinity, major anion (i.e., bromide, chloride, fluoride, and sulfate), and total cyanide results. Fluoride was detected above the established MCL of 4.0 mg/L in the environmental sample from monitoring well CCBA-MW1 at a concentration of

5.32 mg/L. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities. Fluoride was reported in the monitoring well CCBA-MW2 environmental sample and duplicate at concentrations of 1.62 mg/L and 1.61 mg/L, respectively. Both values are below the MCL. No other anions or total cyanide were detected above established MCLs. There are no established MCLs for bromide, chloride, sulfate, or alkalinity.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-7 summarizes alkalinity, major anion (i.e., bromide, chloride, fluoride, and sulfate) and total cyanide results. No parameters were detected above established MCLs in groundwater samples from the SWMU 68 monitoring wells.

3.7 **Perchlorate**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Perchlorate was not detected above the NMED-specified screening level/MDL of 4.0 µg/L (0.004 mg/L) in any groundwater sample from SWMUs 8/58. Table IV-8 presents perchlorate results.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3.

Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in any groundwater sample from SWMU 68. Table IV-8 presents perchlorate results.

Perchlorate results are discussed in more detail in Section II of this ER Quarterly Report.

3.8 **Hexavalent Chromium**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Analysis of hexavalent chromium is not required for SWMUs 8/58.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Hexavalent chromium results for SWMU 68 are summarized in Table IV-9. No hexavalent chromium was detected above laboratory MDLs. No MCL is established for this analyte.

3.9 **Metals**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. TAL metals plus uranium were analyzed in samples from both monitoring wells at SWMUs 8/58. Metal

results for SWMUs 8/58 are summarized in Table IV-10. No metal parameters were detected above established MCLs in any groundwater sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. TAL metals plus uranium were analyzed in samples from all SWMU 68 monitoring wells. No metal parameters were detected above established MCLs in any groundwater sample. Metal results for SWMU 68 are summarized on Table IV-11.

3.10 **Cations**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Filtered fractions for major cations as calcium, magnesium, potassium, and sodium were analyzed in all groundwater samples from SWMUs 8/58. There are no established MCLs for these analytical parameters. The results are presented in Table IV-12.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Filtered fractions for major cations as calcium, magnesium, potassium, and sodium were analyzed in all SWMU 68 groundwater samples. There are no established MCLs for these analytical parameters. The results are presented in Table IV-12.

3.11 **Gamma Spectroscopy and Radioisotopic Analyses**

All groundwater samples collected from SWMUs 8/58 and 68 were screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). Additional samples for isotopic uranium were collected to support evaluation of gross alpha activity results. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table IV-13.

Radioisotopic analyses included gross alpha, gross beta, and isotopic uranium analyses. Gross alpha activity is measured as a screening tool and, according to Title 40, Code of Federal Regulations, Parts 9, 141, and 142, Table I-4, does not include uranium, which is measured independently. Therefore, gross alpha activity measurements were corrected by subtracting out the uranium activity.

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Gamma spectroscopy activity results for short-list radionuclides are less than the associated MDAs for all groundwater samples. The result for potassium-40 activity was qualified as unusable during data validation in the monitoring well CCBA-MW2 environmental sample because the laboratory was unable to meet peak identification criteria. The

potassium-40 peak was classified as unusable because it could not be differentiated from the background.

The corrected gross alpha activity was reported below the MCL of 15 picocuries per liter (pCi/L) in all samples. Gross beta activity results do not exceed established MCLs. Isotopic uranium activities ranged from less than the MDA for uranium-235/236 to 7.59 ± 0.972 pCi/L of uranium-233/234.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Gamma spectroscopy activity results for short-list radionuclides are less than or equal to the associated MDAs.

The corrected gross alpha activity reported is below the MCL of 15 pCi/L in all samples. Gross beta activity results do not exceed established MCLs. Isotopic uranium activities range from 0.168 ± 0.0704 pCi/L for uranium-235/236 to 22.0 ± 2.79 pCi/L for uranium-233/234. In this region, groundwater contacts bedrock, which contains minerals high in naturally occurring uranium.

3.12 **Sample Results Exceeding Maximum Contaminant Levels**

Table IV-14 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during the quarterly sampling events at SWMUs 8/58 and 68. The only constituent exceeding the MCL in samples collected during this quarter consists of fluoride, which was detected in the monitoring well CCBA-MW1 environmental sample from SWMUs 8/58. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities.

4.0 **Quality Control Samples**

Field and laboratory QC samples are prepared to determine the accuracy of the methods used and to detect inadvertent sample contamination that may have occurred during the sampling and analysis process. The following sections discuss each sample type.

4.1 **Field Quality Control Samples**

Field QC samples for this sampling event included duplicate environmental, EB, TB, and FB samples. The field QC samples were submitted for analysis along with the

groundwater samples in accordance with QC procedures specified in the Groundwater Characterization Work Plans for SWMUs 8/58 and 68 (SNL/NM September 2010).

4.1.1 **Duplicate Environmental Samples**

Duplicate environmental samples were collected from monitoring wells CCBA-MW2 and OBS-MW2 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate environmental samples were collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. Duplicate environmental samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW2 and OBS-MW2. RPD values were calculated only for detected chemical parameters. The Work Plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate environmental sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all calculated parameters.

4.1.2 **Equipment Blank Samples**

A portable Bennett[™] groundwater sampling system was used to collect groundwater samples from all wells. The sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in SNL/NM FOP 05-03 “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a). In accordance with SNL/NM FOP 05-03, the following solutions were pumped through the sampling system: 5 gallons of deionized (DI) water mixed with 20 milliliters (mL) nonphosphate laboratory detergent, 5 gallons of DI water, 5 gallons of DI water mixed with 20 mL reagent-grade nitric acid, and 15 gallons of DI water. In addition, the outside of the pump tubing was rinsed with DI water. EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW3 and were submitted for all analyses.

SWMUs 8/58, Monitoring Well CCBA-MW2. Bromodichloromethane, bromoform, chloroform, chloride, dibromochloromethane, and toluene were detected above the laboratory MDLs. Toluene in monitoring well CCBA-MW2 samples were detected at concentrations less than 10 times the associated equipment blank result, and qualified as not detected during data validation. No corrective action was necessary for bromodichloromethane, bromoform, chloroform, chloride, or dibromochloromethane

since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

SWMU 68, Monitoring Well OBS-MW2. Bromodichloromethane, bromoform, chloroform, chloride, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

4.1.3 **Trip Blank Samples**

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

SWMUs 8/58. A total of three trip blanks were submitted with the October 2012 samples. No VOCs were detected above associated laboratory MDLs.

SWMU 68. A total of four trip blanks were submitted with the October 2012 samples. No VOCs were detected above associated laboratory MDLs.

4.1.4 **Field Blank Samples**

FB samples were collected for VOC analysis to assess whether contamination of the samples resulted from ambient field conditions. FB samples are prepared by pouring DI water into sample containers at the sampling point (monitoring wells CCBA-MW1 and OBS-MW3) to simulate the transfer of environmental samples from the sampling system to the sample container.

SWMUs 8/58, Monitoring Well CCBA-MW1. The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

SWMU 68, Monitoring Well OBS-MW3. The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above laboratory

MDLs. No corrective action was necessary, since these compounds were not detected in the associated environmental samples.

4.2 **Laboratory Quality Control Samples**

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with all groundwater samples. All chemical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM May 2011).

Some analytical results were qualified during the data validation process; however, no significant data quality problems were noted. The data validation sample findings summary sheets are provided in Appendix C.

4.3 **Variations and Nonconformances**

No variations or nonconformances from requirements in the Groundwater Characterization Work Plans for SWMUs 8/58 and 68 (SNL/NM September 2010) occurred during the October 2012 sampling activities. Project-specific issues during sampling activities are identified below.

SWMUs 8/58. Toluene was detected at low-level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new sample truck and equipment. Modifications to the water truck and equipment have been completed and additional decontaminations have been performed since this sampling event. The modifications include a more direct sampling output collection point, removal of the flow meter to the discharge line, changes to the decontamination process, and collection of more quality control samples. These modifications appear to be working as the trace toluene concentrations detected are decreasing over time.

5.0 **Summary**

During the Fourth Quarter of CY 2012, samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58; and monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3, located within SWMU 68. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 environmental sample at a concentration of 5.32 mg/L. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities.

Analytical parameters for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs in groundwater samples collected from SWMU 68 monitoring wells.

6.0 **References**

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Figures

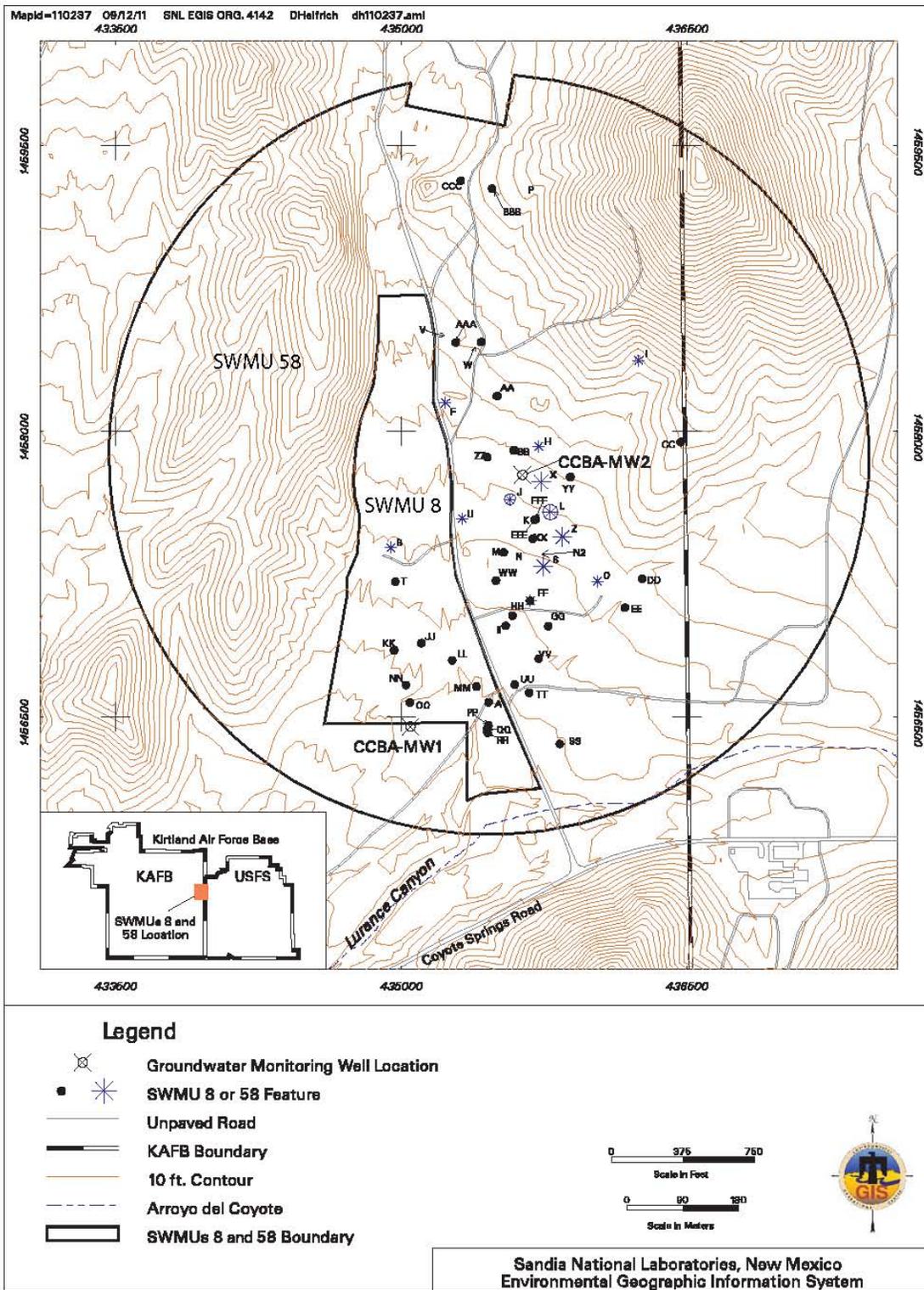


Figure IV-1

Location of Monitoring Wells CCBA-MW1 and CCBA-MW2 within SWMUs 8/58

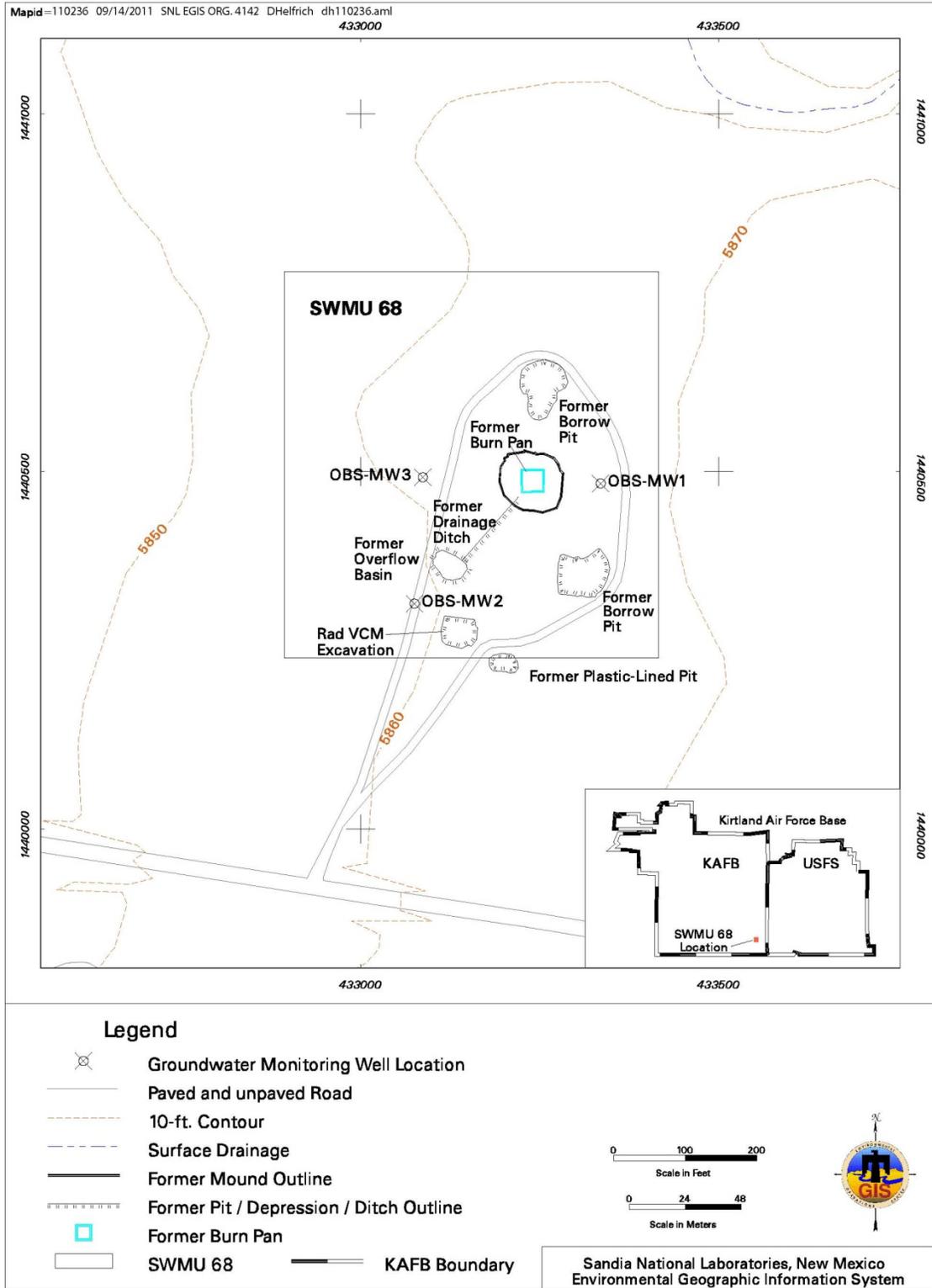


Figure IV-2

Location of Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 within SWMU 68

Tables

Table IV-1

Laboratory Analytical Methods, Container Types, and Preservation Requirements for SWMUs 8/58 and 68 Groundwater Samples

Analysis	Analytical Method^a	Volume and Container Type/Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals ^b	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO ₃ , 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations ^c	EPA 6020/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Total Cyanide	EPA 9012	1 x 250-ML polyethylene, NaOH, 4°C
Nitrate plus Nitrite as Nitrogen	EPA 353.2	1 x 250-mL polyethylene, H ₂ SO ₄ , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Gamma Spectroscopy ^d	EPA 901.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO ₃ , 4°C

Notes

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

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

U.S. Department of Energy, 1990, "EML Procedures Manual," 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.

^bMetals = TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

^cMajor anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.

^dGamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric acid.

HASL = Health and Safety Laboratory.

HCL = Hydrochloric acid.

HNO₃ = Nitric acid.

L = Liter.

mL = Milliliter(s).

NaOH = Sodium Hydroxide.

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

Table IV-2
Sample Details for Fourth Quarter, CY 2012 Groundwater Sampling
SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment
October – December 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	093013	614466	SWMUs 8/58
CCBA-MW2	093018	614468	
CCBA-MW2 (duplicate)	093019		
OBS-MW1	093003	614462	SWMU 68
OBS-MW2	093007	614464	
OBS-MW2 (duplicate)	093008		
OBS-MW3	093010	614465	

Notes

AR/COC = Analysis Request/Chain of Custody.
 CCBA = Coyote Canyon Blast Area.
 CY = Calendar Year.
 MW = Monitoring well.
 OBS = Old Burn Site.
 SWMU = Solid Waste Management Unit.

Table IV-3
Summary of Field Water Quality Measurements^a
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMUs 8/58								
CCBA-MW1	22-Oct-12	16.63	492	159.0	6.29	0.64	36.2	3.51
CCBA-MW2	23-Oct-12	17.67	577	159.0	7.22	0.46	63.6	6.02
SWMU 68								
OBS-MW1	16-Oct-12	16.87	502	203.3	7.10	0.43	37.8	3.66
OBS-MW2	17-Oct-12	18.97	500	186.7	7.11	0.37	38.5	3.56
OBS-MW3	18-Oct-12	16.82	502	167.5	7.14	0.66	44.9	4.34

Notes

^aField measurements collected prior to sampling.

- °C = Degrees Celsius.
- % Sat = Percent saturation.
- µmhos/cm = Micromhos per centimeter.
- CCBA = Coyote Canyon Blast Area.
- mg/L = Milligrams per liter.
- mV = Millivolts.
- MW = Monitoring well.
- NTU = Nephelometric turbidity units.
- OBS = Old Burn Site.
- pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
- SWMU = Solid Waste Management Unit.

Table IV-4
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

SWMU 8/58								
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	0.300	EPA 8260B	4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,1,1,2-Tetrachloroethane	0.300	EPA 8260B	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dioxane	15.0	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Ethyl benzene	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B			

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

SWMU 8/58					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 - 3.16	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.16	EPA 8270C
1,2,4-Trichlorobenzene	3.00 - 3.16	EPA 8270C	Caprolactam	3.00 – 3.16	EPA 8270C
2,4,5-Trichlorophenol	3.00 - 3.16	EPA 8270C	Carbazole	0.300 – 0.316	EPA 8270C
2,4,6-Trichlorophenol	3.00 - 3.16	EPA 8270C	Chrysene	0.300 – 0.316	EPA 8270C
2,4-Dichlorophenol	3.00 - 3.16	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.16	EPA 8270C
2,4-Dimethylphenol	3.00 - 3.16	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.16	EPA 8270C
2,4-Dinitrophenol	5.00 - 5.26	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.316	EPA 8270C
2,4-Dinitrotoluene	3.00 - 3.16	EPA 8270C	Dibenzofuran	3.00 – 3.16	EPA 8270C
2,6-Dinitrotoluene	3.00 - 3.16	EPA 8270C	Diethylphthalate	3.00 – 3.16	EPA 8270C
2-Chloronaphthalene	0.300 - 0.316	EPA 8270C	Dimethylphthalate	3.00 – 3.16	EPA 8270C
2-Chlorophenol	3.00 - 3.16	EPA 8270C	Dinitro-o-cresol	3.00 – 3.16	EPA 8270C
2-Methylnaphthalene	0.300 - 0.316	EPA 8270C	Diphenyl amine	3.00 – 3.16	EPA 8270C
2-Nitroaniline	3.00 - 3.16	EPA 8270C	Fluoranthene	0.300 – 0.316	EPA 8270C
2-Nitrophenol	3.00 - 3.16	EPA 8270C	Fluorene	0.300 – 0.316	EPA 8270C
3,3'-Dichlorobenzidine	3.00 - 3.16	EPA 8270C	Hexachlorobenzene	3.00 – 3.16	EPA 8270C
3-Nitroaniline	3.00 - 3.16	EPA 8270C	Hexachlorobutadiene	3.00 – 3.16	EPA 8270C
4-Bromophenyl phenyl ether	3.00 - 3.16	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.16	EPA 8270C
4-Chloro-3-methylphenol	3.00 - 3.16	EPA 8270C	Hexachloroethane	3.00 – 3.16	EPA 8270C
4-Chlorobenzeneamine	3.30 - 3.47	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.316	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 - 3.16	EPA 8270C	Isophorone	3.00 – 3.16	EPA 8270C
4-Nitroaniline	3.00 - 3.16	EPA 8270C	Naphthalene	0.300 – 0.316	EPA 8270C
4-Nitrophenol	3.00 - 3.16	EPA 8270C	Nitro-benzene	3.00 – 3.16	EPA 8270C
Acenaphthene	0.300 - 0.316	EPA 8270C	Pentachlorophenol	3.00 – 3.16	EPA 8270C
Acenaphthylene	0.300 - 0.316	EPA 8270C	Phenanthrene	0.300 – 0.316	EPA 8270C
Acetophenone	3.00 - 3.16	EPA 8270C	Phenol	3.00 – 3.16	EPA 8270C
Anthracene	0.300 - 0.316	EPA 8270C	Pyrene	0.300 – 0.316	EPA 8270C
Atrazine	3.00 - 3.16	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.16	EPA 8270C
Benzaldehyde	5.00 - 5.26	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.16	EPA 8270C
Benzo(a)anthracene	0.300 - 0.316	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.16	EPA 8270C
Benzo(a)pyrene	0.440 - 0.463	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.16	EPA 8270C
Benzo(b)fluoranthene	0.300 - 0.316	EPA 8270C	m,p-Cresol	3.00 – 3.16	EPA 8270C
Benzo(ghi)perylene	0.300 - 0.316	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.16	EPA 8270C
Benzo(k)fluoranthene	0.300 - 0.316	EPA 8270C	o-Cresol	3.00 – 3.16	EPA 8270C

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

SWMU 68								
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	0.300	EPA 8260B	1,2,4-Trichlorobenzene	3.00 – 3.30	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.30	EPA 8270C
1,1,1,2-Tetrachloroethane	0.300	EPA 8260B	1,2-Dichlorobenzene	3.00 – 3.30	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.30	EPA 8270C
1,1,2-Trichloroethane	0.300	EPA 8260B	1,3-Dichlorobenzene	3.00 – 3.30	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.330	EPA 8270C
1,1-Dichloroethane	0.300	EPA 8260B	1,4-Dichlorobenzene	3.00 – 3.30	EPA 8270C	Dibenzofuran	3.00 – 3.30	EPA 8270C
1,1-Dichloroethene	0.300	EPA 8260B	2,4,5-Trichlorophenol	3.00 – 3.30	EPA 8270C	Diethylphthalate	3.00 – 3.30	EPA 8270C
1,2-Dichloroethane	0.300	EPA 8260B	2,4,6-Trichlorophenol	3.00 – 3.30	EPA 8270C	Dimethylphthalate	3.00 – 3.30	EPA 8270C
1,2-Dichloropropane	0.300	EPA 8260B	2,4-Dichlorophenol	3.00 – 3.30	EPA 8270C	Dinitro-o-cresol	3.00 – 3.30	EPA 8270C
2-Butanone	2.00	EPA 8260B	2,4-Dimethylphenol	3.00 – 3.30	EPA 8270C	Diphenyl amine	3.00 – 3.30	EPA 8270C
2-Hexanone	2.22	EPA 8260B	2,4-Dinitrophenol	5.00 – 5.49	EPA 8270C	Fluoranthene	0.300 – 0.330	EPA 8270C
4-methyl-, 2-Pentanone	1.50	EPA 8260B	2,4-Dinitrotoluene	3.00 – 3.30	EPA 8270C	Fluorene	0.300 – 0.330	EPA 8270C
Acetone	3.00	EPA 8260B	2,6-Dinitrotoluene	3.00 – 3.30	EPA 8270C	Hexachlorobenzene	3.00 – 3.30	EPA 8270C
Benzene	0.300	EPA 8260B	2-Chloronaphthalene	0.300 – 0.330	EPA 8270C	Hexachlorobutadiene	3.00 – 3.30	EPA 8270C
Bromodichloromethane	0.300	EPA 8260B	2-Chlorophenol	3.00 – 3.30	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.30	EPA 8270C
Bromoform	0.300	EPA 8260B	2-Methylnaphthalene	0.300 – 0.330	EPA 8270C	Hexachloroethane	3.00 – 3.30	EPA 8270C
Bromomethane	0.300	EPA 8260B	2-Nitroaniline	3.00 – 3.30	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.330	EPA 8270C
Carbon disulfide	1.50	EPA 8260B	2-Nitrophenol	3.00 – 3.30	EPA 8270C	Isophorone	3.00 – 3.30	EPA 8270C
Carbon tetrachloride	0.300	EPA 8260B	3,3'-Dichlorobenzidine	3.00 – 3.30	EPA 8270C	Naphthalene	0.300 – 0.330	EPA 8270C
Chlorobenzene	0.300	EPA 8260B	3-Nitroaniline	3.00 – 3.30	EPA 8270C	Nitro-benzene	3.00 – 3.30	EPA 8270C
Chloroethane	0.300	EPA 8260B	4-Bromophenyl phenyl ether	3.00 – 3.30	EPA 8270C	Pentachlorophenol	3.00 – 3.30	EPA 8270C
Chloroform	0.300	EPA 8260B	4-Chloro-3-methylphenol	3.00 – 3.30	EPA 8270C	Phenanthrene	0.300 – 0.330	EPA 8270C
Chloromethane	0.300	EPA 8260B	4-Chlorobenzenamine	3.30 – 3.63	EPA 8270C	Phenol	3.00 – 3.30	EPA 8270C
Dibromochloromethane	0.300	EPA 8260B	4-Chlorophenyl phenyl ether	3.00 – 3.30	EPA 8270C	Pyrene	0.300 – 0.330	EPA 8270C
Ethyl benzene	0.300	EPA 8260B	4-Nitroaniline	3.00 – 3.30	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.30	EPA 8270C
Methylene chloride	3.00	EPA 8260B	4-Nitrophenol	3.00 – 3.30	EPA 8270C	bis(1-Chloroisopropyl)ether	3.00 – 3.30	EPA 8270C
Styrene	0.300	EPA 8260B	Acenaphthene	0.300 – 0.330	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.30	EPA 8270C
Tetrachloroethene	0.300	EPA 8260B	Acenaphthylene	0.300 – 0.330	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.30	EPA 8270C
Toluene	0.300	EPA 8260B	Anthracene	0.300 – 0.330	EPA 8270C	m,p-Cresol	3.00 – 3.30	EPA 8270C
Trichloroethene	0.300	EPA 8260B	Benzo(a)anthracene	0.300 – 0.330	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.30	EPA 8270C
Vinyl acetate	1.50	EPA 8260B	Benzo(a)pyrene	0.440 – 0.484	EPA 8270C	o-Cresol	3.00 – 3.30	EPA 8270C
Vinyl chloride	0.300	EPA 8260B	Benzo(b)fluoranthene	0.300 – 0.330	EPA 8270C			
Xylene	0.300	EPA 8260B	Benzo(ghi)perylene	0.300 – 0.330	EPA 8270C			
cis-1,2-Dichloroethene	0.300	EPA 8260B	Benzo(k)fluoranthene	0.300 – 0.330	EPA 8270C			
cis-1,3-Dichloropropene	0.300	EPA 8260B	Butylbenzyl phthalate	3.00 – 3.30	EPA 8270C			
trans-1,2-Dichloroethene	0.300	EPA 8260B	Carbazole	0.300 – 0.330	EPA 8270C			
trans-1,3-Dichloropropene	0.300	EPA 8260B	Chrysene	0.300 – 0.330	EPA 8270C			

Table IV-4 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

µg/L = Micrograms per liter.

EPA = U.S. Environmental Protection Agency.

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

SWMU = Solid Waste Management Unit.

Table IV-5
Method Detection Limits for High Explosive Compounds (EPA Method 8321A)
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0825 – 0.0851	0.0816 – 0.086
1,3-Dinitrobenzene	0.0825 – 0.0851	0.0816 – 0.086
2,4,6-Trinitrotoluene	0.0825 – 0.0851	0.0816 – 0.086
2,4-Dinitrotoluene	0.0825 – 0.0851	0.0816 – 0.086
2,6-Dinitrotoluene	0.0825 – 0.0851	0.0816 – 0.086
2-Amino-4,6-dinitrotoluene	0.0825 – 0.0851	0.0816 – 0.086
2-Nitrotoluene	0.0845 – 0.0872	0.0837 – 0.0882
3-Nitrotoluene	0.0825 – 0.0851	0.0816 – 0.086
4-Amino-2,6-dinitrotoluene	0.0825 – 0.0851	0.0816 – 0.086
4-Nitrotoluene	0.155 – 0.160	0.153 – 0.161
HMX	0.0825 – 0.0851	0.0816 – 0.086
Nitro-benzene	0.0825 – 0.0851	0.0816 – 0.086
Pentaerythritol tetranitrate	0.103 – 0.106	0.102 – 0.108
RDX	0.0825 – 0.0851	0.0816 – 0.086
Tetryl	0.0825 – 0.0851	0.0816 – 0.086

Notes

- µg/L = Micrograms per liter.
- EPA = U.S. Environmental Protection Agency.
- HMX = Tetrahexamine tetranitramine.
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- RDX = Hexahydro-1,3,5-trinitro-1.3.5-triazine.
- SWMU = Solid Waste Management Unit.
- Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Table IV-6
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 22-Oct-12	Nitrate plus nitrite as N	1.45	0.085	0.250	10.0			093013-018	EPA 353.2
CCBA-MW2 23-Oct-12	Nitrate plus nitrite as N	3.38	0.085	0.250	10.0			093018-018	EPA 353.2
CCBA-MW2 (Duplicate) 23-Oct-12	Nitrate plus nitrite as N	3.39	0.085	0.250	10.0			093019-018	EPA 353.2
SWMU 68									
OBS-MW1 16-Oct-12	Nitrate plus nitrite as N	1.83	0.170	0.500	10.0			093003-018	EPA 353.2
OBS-MW2 17-Oct-12	Nitrate plus nitrite as N	1.56	0.085	0.250	10.0			093007-018	EPA 353.2
OBS-MW2 (Duplicate) 17-Oct-12	Nitrate plus nitrite as N	1.58	0.085	0.250	10.0			093008-018	EPA 353.2
OBS-MW3 18-Oct-12	Nitrate plus nitrite as N	1.70	0.170	0.500	10.0			093010-018	EPA 353.2

Notes

- CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
N = Nitrogen.
OBS = Old Burn Site.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table IV-6 (Concluded)
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes (continued)

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

Table IV-7
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 22-Oct-12	Bicarbonate Alkalinity	186	0.725	1.00	NE			093013-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093013-022	SM2320B
	Bromide	0.278	0.067	0.200	NE		J+	093013-016	EPA 9056
	Chloride	27.3	0.670	2.00	NE			093013-016	EPA 9056
	Fluoride	5.32	0.033	0.100	4.0		J+	093013-016	EPA 9056
	Sulfate	54.2	1.33	4.00	NE			093013-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093013-027	EPA 9012
CCBA-MW2 23-Oct-12	Bicarbonate Alkalinity	183	0.725	1.00	NE			093018-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093018-022	SM2320B
	Bromide	0.570	0.067	0.200	NE		J+	093018-016	EPA 9056
	Chloride	36.6	0.670	2.00	NE			093018-016	EPA 9056
	Fluoride	1.62	0.033	0.100	4.0		J+	093018-016	EPA 9056
	Sulfate	94.7	1.33	4.00	NE			093018-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093018-027	EPA 9012
CCBA-MW2 (Duplicate) 23-Oct-12	Bicarbonate Alkalinity	185	0.725	1.00	NE			093019-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093019-022	SM2320B
	Bromide	0.571	0.067	0.200	NE		J+	093019-016	EPA 9056
	Chloride	36.4	0.670	2.00	NE			093019-016	EPA 9056
	Fluoride	1.61	0.033	0.100	4.0		J+	093019-016	EPA 9056
	Sulfate	94.2	1.33	4.00	NE			093019-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093019-027	EPA 9012

Table IV-7 (Continued)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 68									
OBS-MW1 16-Oct-12	Bicarbonate Alkalinity	194	0.725	1.00	NE			093003-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093003-022	SM2320B
	Bromide	0.411	0.067	0.200	NE			093003-016	EPA 9056
	Chloride	22.3	0.670	2.00	NE			093003-016	EPA 9056
	Fluoride	2.19	0.033	0.100	4.00			093003-016	EPA 9056
	Sulfate	77.6	1.33	4.00	NE			093003-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093003-027	EPA 9012
	OBS-MW2 17-Oct-12	Bicarbonate Alkalinity	183	0.725	1.00	NE			093007-022
Carbonate Alkalinity		ND	0.725	1.00	NE	U		093007-022	SM2320B
Bromide		0.329	0.067	0.200	NE			093007-016	EPA 9056
Chloride		22.2	0.670	2.00	NE			093007-016	EPA 9056
Fluoride		2.32	0.033	0.100	4.00			093007-016	EPA 9056
Sulfate		85.0	1.33	4.00	NE			093007-016	EPA 9056
Total Cyanide		ND	0.00167	0.005	0.200	U	UJ	093007-027	EPA 9012
OBS-MW2 (Duplicate) 17-Oct-12	Bicarbonate Alkalinity	194	0.725	1.00	NE			093008-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093008-022	SM2320B
	Bromide	0.383	0.067	0.200	NE			093008-016	EPA 9056
	Chloride	22.1	0.670	2.00	NE			093008-016	EPA 9056
	Fluoride	2.34	0.033	0.100	4.00			093008-016	EPA 9056
	Sulfate	84.7	1.33	4.00	NE			093008-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093008-027	EPA 9012
OBS-MW3 18-Oct-12	Bicarbonate Alkalinity	181	0.725	1.00	NE			093010-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093010-022	SM2320B
	Bromide	0.386	0.067	0.200	NE			093010-016	EPA 9056
	Chloride	23.3	0.670	2.00	NE			093010-016	EPA 9056
	Fluoride	2.36	0.033	0.100	4.00			093010-016	EPA 9056
	Sulfate	86.2	1.33	4.00	NE			093010-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093010-027	EPA 9012

Table IV-7 (Concluded)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

- Bold** = Indicates that a result exceeds the MCL.
CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
ND = Not detected (at MDL).
NE = Not established.
OBS = Old Burn Site.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SM = Standard Method.
SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

J+ = The associated numerical value is an estimated quantity with a suspected positive bias.

UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020, 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.

Table IV-8
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1 22-Oct-12	ND	0.004	0.012	NE	U		093013-020	EPA 314.0
CCBA-MW2 23-Oct-12	ND	0.004	0.012	NE	U		093018-020	EPA 314.0
CCBA-MW2 (Duplicate) 23-Oct-12	ND	0.004	0.012	NE	U		093019-020	EPA 314.0
SWMU 68								
OBS-MW1 16-Oct-12	ND	0.004	0.012	NE	U		093003-020	EPA 314.0
OBS-MW2 17-Oct-12	ND	0.004	0.012	NE	U		093007-020	EPA 314.0
OBS-MW2 (Duplicate) 17-Oct-12	ND	0.004	0.012	NE	U		093008-020	EPA 314.0
OBS-MW3 18-Oct-12	ND	0.004	0.012	NE	U		093010-020	EPA 314.0

Notes

- CCBA = Coyote Canyon Blast Area.
- EPA = U.S. Environmental Protection Agency.
- MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- mg/L = Milligrams per liter.
- MW = Monitoring well.
- ND = Not detected (at MDL).
- NE = Not established.
- OBS = Old Burn Site.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

Table IV-8 (Concluded)
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes (continued)

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1999 (and updates), *“Perchlorate in Drinking Water Using Ion Chromatography,”* EPA 815/R-00-014.

Table IV-9
Summary of Hexavalent Chromium Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Hexavalent Chromium Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 16-Oct-12	ND	0.0033	0.010	NE	U		093003-014	EPA 7196A
OBS-MW2 17-Oct-12	ND	0.0033	0.010	NE	U		093007-014	EPA 7196A
OBS-MW2 (Duplicate) 17-Oct-12	ND	0.0033	0.010	NE	U		093008-014	EPA 7196A
OBS-MW3 18-Oct-12	ND	0.0033	0.010	NE	U		093010-014	EPA 7196A

Notes

- EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
ND = Not detected (at MDL).
NE = Not established.
OBS = Old Burn Site.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

Table IV-10
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW1 22-Oct-12	Aluminum	0.0232	0.015	0.050	NE	J	J+	093013-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093013-009	EPA 6020
	Arsenic	0.00178	0.0017	0.005	0.010	J		093013-009	EPA 6020
	Barium	0.00273	0.0006	0.002	2.00			093013-009	EPA 6020
	Beryllium	0.000501	0.0002	0.0005	0.004			093013-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093013-009	EPA 6020
	Calcium	43.5	0.060	0.200	NE			093013-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093013-009	EPA 6020
	Cobalt	0.000165	0.0001	0.001	NE	J		093013-009	EPA 6020
	Copper	0.00286	0.00035	0.001	NE	B		093013-009	EPA 6020
	Iron	0.121	0.033	0.100	NE			093013-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093013-009	EPA 6020
	Magnesium	9.64	0.010	0.030	NE		J	093013-009	EPA 6020
	Manganese	0.00519	0.001	0.005	NE			093013-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093013-009	EPA 7470
	Nickel	0.0023	0.0005	0.002	NE			093013-009	EPA 6020
	Potassium	4.05	0.080	0.300	NE			093013-009	EPA 6020
	Selenium	0.00205	0.0015	0.005	0.050	J		093013-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093013-009	EPA 6020
	Sodium	66.0	0.400	1.25	NE			093013-009	EPA 6020
	Thallium	0.000551	0.00045	0.002	0.002	J		093013-009	EPA 6020
Uranium	0.00203	0.000067	0.0002	0.03			093013-009	EPA 6020	
Vanadium	0.00145	0.001	0.005	NE	J		093013-009	EPA 6010	
Zinc	0.00854	0.0035	0.010	NE	J		093013-009	EPA 6020	

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW2 23-Oct-12	Aluminum	ND	0.015	0.050	NE	U		093018-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093018-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093018-009	EPA 6020
	Barium	0.0433	0.0006	0.002	2.00			093018-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093018-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093018-009	EPA 6020
	Calcium	76.8	0.300	1.00	NE			093018-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093018-009	EPA 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		093018-009	EPA 6020
	Copper	0.000893	0.00035	0.001	NE	B, J	0.012UJ	093018-009	EPA 6020
	Iron	0.185	0.033	0.100	NE			093018-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093018-009	EPA 6020
	Magnesium	13.9	0.010	0.030	NE		J	093018-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093018-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093018-009	EPA 7470
	Nickel	0.00146	0.0005	0.002	NE	J		093018-009	EPA 6020
	Potassium	1.29	0.080	0.300	NE			093018-009	EPA 6020
	Selenium	0.00393	0.0015	0.005	0.050	J		093018-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093018-009	EPA 6020
	Sodium	46.0	0.080	0.250	NE			093018-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093018-009	EPA 6020
Uranium	0.00516	0.000067	0.0002	0.03			093018-009	EPA 6020	
Vanadium	0.0103	0.001	0.005	NE			093018-009	EPA 6010	
Zinc	0.00436	0.0035	0.010	NE	J		093018-009	EPA 6020	

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW2 (Duplicate) 23-Oct-12	Aluminum	ND	0.015	0.050	NE	U		093019-009	EPA 6020
	Antimony	0.00112	0.001	0.003	0.006	B, J	0.0078U	093019-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093019-009	EPA 6020
	Barium	0.0434	0.0006	0.002	2.00			093019-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093019-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093019-009	EPA 6020
	Calcium	73.3	0.300	1.00	NE			093019-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093019-009	EPA 6020
	Cobalt	0.000107	0.0001	0.001	NE	J		093019-009	EPA 6020
	Copper	0.000948	0.00035	0.001	NE	B, J	0.012UJ	093019-009	EPA 6020
	Iron	0.199	0.033	0.100	NE			093019-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093019-009	EPA 6020
	Magnesium	15.4	0.010	0.030	NE		J	093019-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093019-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093019-009	EPA 7470
	Nickel	0.00155	0.0005	0.002	NE	J		093019-009	EPA 6020
	Potassium	1.32	0.080	0.300	NE			093019-009	EPA 6020
	Selenium	0.00405	0.0015	0.005	0.050	J		093019-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093019-009	EPA 6020
	Sodium	48.6	0.080	0.250	NE			093019-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093019-009	EPA 6020
Uranium	0.00514	0.000067	0.0002	0.03			093019-009	EPA 6020	
Vanadium	0.0113	0.001	0.005	NE			093019-009	EPA 6010	
Zinc	0.0044	0.0035	0.010	NE	J		093019-009	EPA 6020	

Table IV-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

CCBA	= Coyote Canyon Blast Area.
EPA	= U.S. Environmental Protection Agency.
MCL	= Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL	= Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L	= Milligrams per liter.
MW	= Monitoring well.
ND	= Not detected (at MDL).
NE	= Not established.
PQL	= Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU	= Solid Waste Management Unit.

^aLaboratory Qualifier

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

B	= The analyte was detected in the blank above the effective method detection limit (MDL).
J	= Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U	= Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

J	= The associated value is an estimated quantity.
J+	= The associated numerical value is an estimated quantity with a suspected positive bias.
U	= The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ	= The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.

Table IV-11
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 16-Oct-12	Aluminum	0.0337	0.015	0.050	NE	J		093003-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093003-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093003-009	EPA 6020
	Barium	0.0181	0.0006	0.002	2.00			093003-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093003-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093003-009	EPA 6020
	Calcium	87.1	0.600	2.00	NE			093003-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093003-009	EPA 6020
	Cobalt	0.000103	0.0001	0.001	NE	J		093003-009	EPA 6020
	Copper	0.00112	0.00035	0.001	NE	B	0.00386U	093003-009	EPA 6020
	Iron	0.216	0.033	0.100	NE			093003-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093003-009	EPA 6020
	Magnesium	18.7	0.010	0.030	NE			093003-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093003-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093003-009	EPA 7470
	Nickel	0.0013	0.0005	0.002	NE	J		093003-009	EPA 6020
	Potassium	1.64	0.080	0.300	NE			093003-009	EPA 6020
	Selenium	0.00273	0.0015	0.005	0.050	J		093003-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093003-009	EPA 6020
	Sodium	25.4	0.080	0.250	NE			093003-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093003-009	EPA 6020
Uranium	0.0102	0.000067	0.0002	0.03			093003-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093003-009	EPA 6010	
Zinc	ND	0.0035	0.010	NE	U		093003-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW2 17-Oct-12	Aluminum	ND	0.015	0.050	NE	U		093007-009	EPA 6020
	Antimony	0.0011	0.001	0.003	0.006	B, J	0.01075U	093007-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093007-009	EPA 6020
	Barium	0.0198	0.0006	0.002	2.00			093007-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093007-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093007-009	EPA 6020
	Calcium	77.3	0.300	1.00	NE			093007-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093007-009	EPA 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		093007-009	EPA 6020
	Copper	0.00133	0.00035	0.001	NE	B	0.00437U	093007-009	EPA 6020
	Iron	0.193	0.033	0.100	NE			093007-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093007-009	EPA 6020
	Magnesium	17.8	0.010	0.030	NE			093007-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093007-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093007-009	EPA 7470
	Nickel	0.00148	0.0005	0.002	NE	J		093007-009	EPA 6020
	Potassium	1.64	0.080	0.300	NE			093007-009	EPA 6020
	Selenium	0.00369	0.0015	0.005	0.050	J		093007-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093007-009	EPA 6020
	Sodium	24.1	0.080	0.250	NE			093007-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093007-009	EPA 6020
	Uranium	0.0135	0.000067	0.0002	0.03			093007-009	EPA 6020
	Vanadium	0.00124	0.001	0.005	NE	J		093007-009	EPA 6010
Zinc	ND	0.0035	0.010	NE	U		093007-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW2 (Duplicate) 17-Oct-12	Aluminum	ND	0.015	0.050	NE	U		093008-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093008-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093008-009	EPA 6020
	Barium	0.019	0.0006	0.002	2.00			093008-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093008-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093008-009	EPA 6020
	Calcium	77.2	0.300	1.00	NE			093008-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093008-009	EPA 6020
	Cobalt	0.000109	0.0001	0.001	NE	J		093008-009	EPA 6020
	Copper	0.000718	0.00035	0.001	NE	B, J	0.00437U	093008-009	EPA 6020
	Iron	0.200	0.033	0.100	NE			093008-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093008-009	EPA 6020
	Magnesium	15.7	0.010	0.030	NE			093008-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093008-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093008-009	EPA 7470
	Nickel	0.00148	0.0005	0.002	NE	J		093008-009	EPA 6020
	Potassium	1.56	0.080	0.300	NE			093008-009	EPA 6020
	Selenium	0.00373	0.0015	0.005	0.050	J		093008-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093008-009	EPA 6020
	Sodium	21.6	0.080	0.250	NE			093008-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093008-009	EPA 6020
	Uranium	0.0129	0.000067	0.0002	0.03			093008-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		093008-009	EPA 6010
Zinc	ND	0.0035	0.010	NE	U		093008-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW3 18-Oct-12	Aluminum	ND	0.015	0.050	NE	U		093010-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093010-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093010-009	EPA 6020
	Barium	0.0246	0.0006	0.002	2.00			093010-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093010-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093010-009	EPA 6020
	Calcium	76.1	0.300	1.00	NE			093010-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093010-009	EPA 6020
	Cobalt	0.000116	0.0001	0.001	NE	J		093010-009	EPA 6020
	Copper	0.000871	0.00035	0.001	NE	B, J	0.00437U	093010-009	EPA 6020
	Iron	0.206	0.033	0.100	NE			093010-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093010-009	EPA 6020
	Magnesium	16.1	0.010	0.030	NE			093010-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093010-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093010-009	EPA 7470
	Nickel	0.0015	0.0005	0.002	NE	J		093010-009	EPA 6020
	Potassium	1.62	0.080	0.300	NE			093010-009	EPA 6020
	Selenium	0.00466	0.0015	0.005	0.050	J		093010-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093010-009	EPA 6020
	Sodium	21.5	0.080	0.250	NE			093010-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093010-009	EPA 6020
	Uranium	0.0117	0.000067	0.0002	0.03			093010-009	EPA 6020
	Vanadium	0.00117	0.001	0.005	NE	J		093010-009	EPA 6010
Zinc	ND	0.0035	0.010	NE	U		093010-009	EPA 6020	

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

EPA	= U.S. Environmental Protection Agency.
MCL	= Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL	= Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L	= Milligrams per liter.
MW	= Monitoring well.
ND	= Not detected (at MDL).
NE	= Not established.
OBS	= Old Burn Site.
PQL	= Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU	= Solid Waste Management Unit.

^aLaboratory Qualifier

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

B	= The analyte was detected in the blank above the effective method detection limit (MDL).
J	= Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U	= Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

U	= The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
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^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3rd ed.

Table IV-12
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 22-Oct-12	Calcium	44.7	0.060	0.200	NE			093013-017	EPA 6020
	Magnesium	9.97	0.010	0.030	NE			093013-017	EPA 6020
	Potassium	4.15	0.080	0.300	NE			093013-017	EPA 6020
	Sodium	64.2	0.400	1.25	NE			093013-017	EPA 6020
CCBA-MW2 23-Oct-12	Calcium	76.6	0.300	1.00	NE			093018-017	EPA 6020
	Magnesium	15.2	0.010	0.030	NE			093018-017	EPA 6020
	Potassium	1.35	0.080	0.300	NE			093018-017	EPA 6020
	Sodium	46.1	0.080	0.250	NE			093018-017	EPA 6020
CCBA-MW2 (Duplicate) 23-Oct-12	Calcium	76.8	0.300	1.00	NE			093019-017	EPA 6020
	Magnesium	14.9	0.010	0.030	NE			093019-017	EPA 6020
	Potassium	1.28	0.080	0.300	NE			093019-017	EPA 6020
	Sodium	47.1	0.080	0.250	NE			093019-017	EPA 6020
SWMU 68									
OBS-MW1 16-Oct-12	Calcium	82.4	0.600	2.00	NE			093003-017	EPA 6020
	Magnesium	17.1	0.010	0.030	NE			093003-017	EPA 6020
	Potassium	1.70	0.080	0.300	NE			093003-017	EPA 6020
	Sodium	22.8	0.080	0.250	NE			093003-017	EPA 6020
OBS-MW2 17-Oct-12	Calcium	75.3	0.300	1.00	NE			093007-017	EPA 6020
	Magnesium	15.6	0.010	0.030	NE			093007-017	EPA 6020
	Potassium	1.50	0.080	0.300	NE			093007-017	EPA 6020
	Sodium	21.1	0.080	0.250	NE			093007-017	EPA 6020
OBS-MW2 (Duplicate) 17-Oct-12	Calcium	75.8	0.300	1.00	NE			093008-017	EPA 6020
	Magnesium	15.9	0.010	0.030	NE			093008-017	EPA 6020
	Potassium	1.51	0.080	0.300	NE			093008-017	EPA 6020
	Sodium	21.7	0.080	0.250	NE			093008-017	EPA 6020
OBS-MW3 18-Oct-12	Calcium	74.4	0.300	1.00	NE			093010-017	EPA 6020
	Magnesium	16.6	0.010	0.030	NE			093010-017	EPA 6020
	Potassium	1.67	0.080	0.300	NE			093010-017	EPA 6020
	Sodium	22.7	0.080	0.250	NE			093010-017	EPA 6020

Table IV-12 (Concluded)
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes

CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
NE = Not established.
OBS = Old Burn Site.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

Table IV-13
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
SWMUs 8/58									
CCBA-MW1 22-Oct-12	Americium-241	13.3 ± 15.2	21.5	10.5	NE	U	BD	093013-033	EPA 901.1
	Cesium-137	-3.75 ± 2.59	3.17	1.52	NE	U	BD	093013-033	EPA 901.1
	Cobalt-60	2.24 ± 2.26	3.86	1.83	NE	U	BD	093013-033	EPA 901.1
	Potassium-40	18.6 ± 45.2	37.0	17.5	NE	U	BD	093013-033	EPA 901.1
	Gross Alpha	0.38	NA	NA	15 pCi/L	NA	None	093013-034	EPA 900.0
	Gross Beta	3.65 ± 0.964	1.10	0.532	4mrem/yr		J	093013-034	EPA 900.0
	Uranium-233/234	1.88 ± 0.343	0.127	0.0538	NE			093013-035	HASL-300
	Uranium-235/236	0.0358 ± 0.0432	0.0923	0.0341	NE	U	BD	093013-035	HASL-300
	Uranium-238	0.716 ± 0.172	0.0865	0.0335	NE			093013-035	HASL-300
CCBA-MW2 23-Oct-12	Americium-241	4.84 ± 6.70	9.93	4.88	NE	U	BD	093018-033	EPA 901.1
	Cesium-137	1.62 ± 1.94	3.28	1.59	NE	U	BD	093018-033	EPA 901.1
	Cobalt-60	2.85 ± 2.22	3.49	1.66	NE	U	BD	093018-033	EPA 901.1
	Potassium-40	33.6 ± 37.5	28.0	13.2	NE	X	R	093018-033	EPA 901.1
	Gross Alpha	-0.46	NA	NA	15 pCi/L	NA	None	093018-034	EPA 900.0
	Gross Beta	4.17 ± 1.22	1.49	0.723	4mrem/yr		J	093018-034	EPA 900.0
	Uranium-233/234	7.11 ± 0.921	0.0495	0.0209	NE			093018-035	HASL-300
	Uranium-235/236	0.0974 ± 0.0404	0.0359	0.0133	NE		J	093018-035	HASL-300
	Uranium-238	1.68 ± 0.247	0.0337	0.013	NE			093018-035	HASL-300
CCBA-MW2 (Duplicate) 23-Oct-12	Americium-241	-5.9 ± 12.9	21.2	10.4	NE	U	BD	093019-033	EPA 901.1
	Cesium-137	-1.69 ± 2.33	3.68	1.77	NE	U	BD	093019-033	EPA 901.1
	Cobalt-60	1.19 ± 2.41	4.29	2.03	NE	U	BD	093019-033	EPA 901.1
	Potassium-40	-39.2 ± 50.5	50.4	24.0	NE	U	BD	093019-033	EPA 901.1
	Gross Alpha	2.00	NA	NA	15 pCi/L	NA	None	093019-034	EPA 900.0
	Gross Beta	2.43 ± 0.825	1.05	0.504	4mrem/yr		J	093019-034	EPA 900.0
	Uranium-233/234	7.59 ± 0.972	0.0462	0.0195	NE			093019-035	HASL-300
	Uranium-235/236	0.107 ± 0.0418	0.0335	0.0124	NE			093019-035	HASL-300
	Uranium-238	1.80 ± 0.258	0.0314	0.0122	NE			093019-035	HASL-300

Table IV-13 (Continued)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
SWMU 68									
OBS-MW1 16-Oct-12	Americium-241	7.84 ± 9.60	14.3	7.00	NE	U	BD	093003-033	EPA 901.1
	Cesium-137	-1.76 ± 2.92	4.82	2.30	NE	U	BD	093003-033	EPA 901.1
	Cobalt-60	2.16 ± 3.42	6.14	2.89	NE	U	BD	093003-033	EPA 901.1
	Potassium-40	6.81 ± 49.1	67.0	31.7	NE	U	BD	093003-033	EPA 901.1
	Gross Alpha	1.01	NA	NA	15 pCi/L		J	093003-034	EPA 900.0
	Gross Beta	5.18 ± 1.30	1.38	0.669	4 mrem/yr		J	093003-034	EPA 900.0
	Uranium-233/234	17.7 ± 2.31	0.0921	0.039	NE			093003-035	HASL-300
	Uranium-235/236	0.168 ± 0.0704	0.0669	0.0247	NE		J	093003-035	HASL-300
Uranium-238	3.12 ± 0.468	0.0627	0.0242	NE			093003-035	HASL-300	
OBS-MW2 17-Oct-12	Americium-241	4.20 ± 9.57	13.8	6.78	NE	U	BD	093007-033	EPA 901.1
	Cesium-137	2.19 ± 2.64	3.73	1.81	NE	U	BD	093007-033	EPA 901.1
	Cobalt-60	-0.785 ± 2.14	3.69	1.77	NE	U	BD	093007-033	EPA 901.1
	Potassium-40	18.1 ± 46.9	37.0	17.7	NE	U	BD	093007-033	EPA 901.1
	Gross Alpha	5.32	NA	NA	15 pCi/L		J	093007-034	EPA 900.0
	Gross Beta	6.11 ± 1.44	1.42	0.687	4 mrem/yr		J	093007-034	EPA 900.0
	Uranium-233/234	21.8 ± 2.80	0.0601	0.0254	NE			093007-035	HASL-300
	Uranium-235/236	0.334 ± 0.0856	0.0437	0.0161	NE			093007-035	HASL-300
Uranium-238	4.15 ± 0.573	0.0409	0.0158	NE			093007-035	HASL-300	
OBS-MW2 (Duplicate) 17-Oct-12	Americium-241	11.2 ± 19.4	27.5	13.6	NE	U	BD	093008-033	EPA 901.1
	Cesium-137	2.79 ± 3.01	4.30	2.09	NE	U	BD	093008-033	EPA 901.1
	Cobalt-60	1.34 ± 2.61	4.62	2.21	NE	U	BD	093008-033	EPA 901.1
	Potassium-40	-24.2 ± 51.7	53.0	25.5	NE	U	BD	093008-033	EPA 901.1
	Gross Alpha	3.81	NA	NA	15 pCi/L		J	093008-034	EPA 900.0
	Gross Beta	6.69 ± 1.51	1.40	0.677	4 mrem/yr		J	093008-034	EPA 900.0
	Uranium-233/234	22.0 ± 2.79	0.0539	0.0228	NE			093008-035	HASL-300
	Uranium-235/236	0.379 ± 0.0892	0.0391	0.0144	NE			093008-035	HASL-300
Uranium-238	4.01 ± 0.545	0.0367	0.0142	NE			093008-035	HASL-300	

Table IV-13 (Continued)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
SWMU 68									
OBS-MW3 18-Oct-12	Americium-241	-3.54 ± 11.8	19.3	9.47	NE	U	BD	093010-033	EPA 901.1
	Cesium-137	-1.59 ± 2.69	3.75	1.82	NE	U	BD	093010-033	EPA 901.1
	Cobalt-60	1.39 ± 2.24	3.94	1.88	NE	U	BD	093010-033	EPA 901.1
	Potassium-40	23.5 ± 54.7	33.9	16.0	NE	U	BD	093010-033	EPA 901.1
	Gross Alpha	-2.86	NA	NA	15 pCi/L		J	093010-034	EPA 900.0
	Gross Beta	5.72 ± 1.33	1.26	0.612	4 mrem/yr		J	093010-034	EPA 900.0
	Uranium-233/234	19.9 ± 2.52	0.0529	0.0224	NE			093010-035	HASL-300
	Uranium-235/236	0.267 ± 0.0709	0.0384	0.0141	NE			093010-035	HASL-300
	Uranium-238	3.59 ± 0.490	0.036	0.0139	NE			093010-035	HASL-300

Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- HASL = Health and Safety Laboratory.
- MCL = Maximum contaminant level. The following are the MCLs for gross alpha particles and beta particles in community water systems:
15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table I-4)
4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).
- MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.
- mrem/yr = Millirem per year.
- MW = Monitoring well.
- NA = Not applicable for gross alpha activities. The MDA or critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.
- NE = Not established.
- OBS = Old Burn Site.
- pCi/L = Picocuries per liter.
- SWMU = Solid Waste Management Unit.

^aActivities of zero or less are considered to be not detected. Gross alpha activity measurements were corrected by subtracting out the total uranium activity (40 CFR Parts 9, 141, and 142, Table I-4).

^bThe lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions. The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
NA = Not applicable.

Table IV-13 (Concluded)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Notes (continued)

^cLaboratory Qualifier

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

NA = Not applicable.

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

X = Data rejected due to peak not meeting identification criteria.

^dValidation Qualifier

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

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.

J = The associated value is an estimated quantity.

R = The data are unusable, and resampling or reanalysis are necessary for verification.

None = No data validation for corrected gross alpha activity.

^eAnalytical Method

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

U.S. Department of Energy, 1990, "*EML Procedures Manual*," 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.

Table IV-14
Summary of Constituents Detected above Established MCLs
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessments through December 2012

Well	Date	Analyte	Result (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36	4.0			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94	4.0			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94	4.0			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	4.93	4.0			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	5.03	4.0			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	5.00	4.0			092616-016	EPA 9056
CCBA-MW1	22-Oct-12	Fluoride	5.32	4.0			093013-016	EPA 9056

Notes

Bold = Indicates that a result exceeds the MCL.

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).

mg/L = Milligrams per liter.

MW = Monitoring well.

SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

Table IV-15
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
CCBA-MW2			
Nitrate plus Nitrite as Nitrogen	3.38	3.39	< 1
Bicarbonate Alkalinity	183	185	1
Bromide	0.570	0.571	< 1
Chloride	36.6	36.4	1
Fluoride	1.62	1.61	1
Sulfate	94.7	94.2	1
Barium	0.0433	0.0434	< 1
Calcium	76.8	73.3	5
Cobalt	0.000111	0.000107	4
Iron	0.185	0.199	7
Magnesium	13.9	15.4	10
Nickel	0.00146	0.00155	6
Potassium	1.29	1.32	2
Selenium	0.00393	0.00405	3
Sodium	46.0	48.6	5
Uranium	0.00516	0.00514	< 1
Vanadium	0.0103	0.0113	9
Zinc	0.00436	0.0044	1
Filtered Calcium	76.6	76.8	< 1
Filtered Magnesium	15.2	14.9	2
Filtered Potassium	1.35	1.28	5
Filtered Sodium	46.1	47.1	2
Gross Alpha (pCi/L)	-0.46	2.00	NC
Gross Beta (pCi/L)	4.17 ± 1.22	2.43 ± 0.825	NC
Uranium-233/234 (pCi/L)	7.11 ± 0.921	7.59 ± 0.972	NC
Uranium-236/236 (pCi/L)	0.0974 ± 0.0404	0.107 ± 0.0418	NC
Uranium-238 (pCi/L)	1.68 ± 0.247	1.80 ± 0.258	NC
OBS-MW2			
Nitrate plus Nitrite as Nitrogen	1.56	1.58	1
Bicarbonate Alkalinity	183	194	6
Bromide	0.329	0.383	15
Chloride	22.2	22.1	< 1
Fluoride	2.32	2.34	1
Sulfate	85.0	84.7	< 1
Barium	0.0198	0.019	4
Calcium	77.3	77.2	< 1
Cobalt	0.000108	0.000109	1
Iron	0.193	0.200	4
Magnesium	17.8	15.7	13
Nickel	0.00148	0.00148	< 1
Potassium	1.64	1.56	5

Table IV-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2012

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
OBS-MW3			
Selenium	0.00369	0.00373	1
Sodium	24.1	21.6	11
Uranium	0.0135	0.0129	5
Vanadium	0.00124	ND	NC
Filtered Calcium	75.3	75.8	1
Filtered Magnesium	15.6	15.9	2
Filtered Potassium	1.50	1.51	1
Filtered Sodium	21.1	21.7	3

Notes

CCBA = Coyote Canyon Blast Area.
mg/L = Milligrams per liter.
MW = Monitoring well.
NC = Not calculated.
ND = Not detected (at method detection limit).
OBS = Old Burn Site.
pCi/L = Picocuries per liter.
SWMU = Solid Waste Management Unit.

^aRPD

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: R₁ = analysis result
R₂ = duplicate analysis result

Appendix A
Field Measurement Logs
for SWMUs 8/58 and 68 Groundwater
Monitoring Data

Appendix B
Analytical Laboratory Certificates of
Analysis for SWMUs 8/58 and 68
Groundwater Monitoring Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab *NA*

Batch No. _____ SMO Use _____

AR/COC **614466**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: _____	SMO Authorization: <i>Don't stamp</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. _____	SMO Contact Phone: <i>see bottle over</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026 01.12	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF 262-13	Lab Destination: GEL	Send Report to SMO: Lorraine Herrera/505-844-3199	
	Contract No.: PO 691436		

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____
 Bill to: Sandia National Laboratories (Accounts Payable),
 P.O. Box 5800, MS-0154
 Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093013	-001	CCBA-MW1	79	10/22/12 9:20 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B) ✓	
✓ 093013	-002	CCBA-MW1	79	10/22/12 9:22 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093013	-009	CCBA-MW1	79	10/22/12 9:23 ~	GW	P	500 ml ~	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093013	-016	CCBA-MW1	79	10/22/12 9:24 ~	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093013	-017	CCBA-MW1	79	10/22/12 9:25 ✓	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093013	-018 ~	CCBA-MW1	79	10/22/12 9:26 ✓	GW	P	125 ml ~	H2SO4	G	SA	NPN (353.2)	
✓ 093013	-020	CCBA-MW1	79	10/22/12 9:27 ~	GW	P	250 ml ~	None	G	SA	Perchlorate (314.0)	
✓ 093013	-022	CCBA-MW1	79	10/22/12 9:28 ~	GW	P	500 ml ~	None	G	SA	Alkalinity (SM2320B)	
✓ 093013	-024 ~	CCBA-MW1	79	10/22/12 9:29 ✓	GW	AG	4x1L ~	None	G	SA	HE (SW846-8321A)	
✓ 093013	-027	CCBA-MW1	79	10/22/12 9:30 ~	GW	P	250 ml ✓	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered: _____		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by: _____		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.: _____		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/844-4013/250-7090	Return Samples By:
	Alfred Santillanes	<i>Alfred Santillanes</i>		SNL/4142/844-5130/228-0710	
William J. Gibson	<i>William J. Gibson</i>		SNL/4142/844-4013/239-7387 RL		
					Comments: <small>Send report to Tim Jackson/4142/MS 0729/284-2547</small> FGWV (Filtered in field w/40 micron filter), ANIONS (B, Cl, F, SO4), METALS (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M)

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>10/22/12</i> Time <i>1005</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don't stamp</i> Org. <i>4142</i> Date <i>10/22/12</i> Time <i>1005</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614468**

Project Name: SWMU 8/58 GWM	Date Samples Shipped:	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone: <i>[Signature]</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026 01.12	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF 262-13	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154

Tech Area:	Operational Site:	
Building:	Room:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093018	-001	CCBA-MW2	117	10/23/12 9:38	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093018	-002	CCBA-MW2	117	10/23/12 9:40	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093018	-009	CCBA-MW2	117	10/23/12 9:41	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093018	-016	CCBA-MW2	117	10/23/12 9:42	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093018	-017	CCBA-MW2	117	10/23/12 9:44	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093018	-018	CCBA-MW2	117	10/23/12 9:45	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093018	-020	CCBA-MW2	117	10/23/12 9:46	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093018	-022	CCBA-MW2	117	10/23/12 9:47	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093018	-024	CCBA-MW2	117	10/23/12 9:50	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
✓ 093018	-027	CCBA-MW2	117	10/23/12 9:51	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt															
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day																
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>																
Sample Team Members	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td>RL</td> <td>SNL/4142/844-4013/250-7090</td> </tr> <tr> <td>Alfred Santillanes</td> <td><i>[Signature]</i></td> <td>AS</td> <td>SNL/4142/844-5130/228-0710</td> </tr> <tr> <td>William J. Gibson</td> <td><i>[Signature]</i></td> <td>WJG</td> <td>SNL/4142/844-4013/239-7367</td> </tr> </table>		Name		Signature	Init.	Company/Organization/Phone/Cell	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710	William J. Gibson	<i>[Signature]</i>	WJG	SNL/4142/844-4013/239-7367
Name	Signature	Init.	Company/Organization/Phone/Cell																
Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090																
Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710																
William J. Gibson	<i>[Signature]</i>	WJG	SNL/4142/844-4013/239-7367																
			Return Samples By:	Lab Use															
			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (Filtered in field w/40 micron filter), Anions (Cl, O, F, SO4), Metals (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M																

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/23/12 Time 10:39	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 10/23/12 Time 10:39	3. Received by	Org.	Date	Time
2. Relinquished by	4. Relinquished by	Org.	Date	Time
2. Received by	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC **614468**

Project Name:		SWMU 8/58 GWM		Project/Task Manager:		Clinton Lum		Project/Task No.:		98026 01.12				Lab use	
Tech Area:															
Building:		Room:													
Sample No.	Fraction	Sample Location Detail		Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested		Lab Sample ID
								Type	Volume						
✓ 093018	-033	CCBA-MW2		117	10/23/12	9:52	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)		
✓ 093018	-034	CCBA-MW2		117	10/23/12	9:54	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)		
✓ 093018	-035	CCBA-MW2		117	10/23/12	9:56	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)		
✓ 093019	-001	CCBA-MW2		117	10/23/12	9:38	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 093019	-002	CCBA-MW2		117	10/23/12	9:40	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)		
✓ 093019	-009	CCBA-MW2		117	10/23/12	9:41	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)		
✓ 093019	-016	CCBA-MW2		117	10/23/12	9:42	GW	P	125 ml	None	G	DU	Anions (SW846-9056)		
✓ 093019	-017	CCBA-MW2		117	10/23/12	9:44	FGW	P	500 ml	HNO3	G	DU	Metals (SW846-6020)		
✓ 093019	-018	CCBA-MW2		117	10/23/12	9:45	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)		
✓ 093019	-020	CCBA-MW2		117	10/23/12	9:46	GW	P	250 ml	None	G	DU	Perchlorate (314.0)		
✓ 093019	-022	CCBA-MW2		117	10/23/12	9:47	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
✓ 093019	-024	CCBA-MW2		117	10/23/12	9:50	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)		
✓ 093019	-027	CCBA-MW2		117	10/23/12	9:51	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 093019	-033	CCBA-MW2		117	10/23/12	9:52	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)		
✓ 093019	-034	CCBA-MW2		117	10/23/12	9:54	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)		
✓ 093019	-035	CCBA-MW2		117	10/23/12	9:56	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)		
✓ 093020	-001	CCBA-TB3		N/A	10/23/12	9:38	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)		

Recipient Initials _____

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to CCBA-mwz

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614467**

Project Name: SWMU 8/58 GWM	Date Samples Shipped:	SMO Authorization: <i>Don Wilton</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Cilnton Lum	Carrier/Waybill No.:	SMO Contact Phone: <i>See Bottle Label</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026 01.12	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No.
Service Order: CF 262-13	Lab Destination: GEL	Send Report to SMO:	<input checked="" type="checkbox"/> 4° Celsius
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154

Tech Area:	Operational Site:	
Building:	Room:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093016	-001	CCBA-EB1	N/A	10/22/12 10:37	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 093016	-002	CCBA-EB1	N/A	10/22/12 10:39	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 093016	-009	CCBA-EB1	N/A	10/22/12 10:40	DIW	P	500 ml	HNO3	G	EB	TAL Metals + U (SW846-6020/7470)	
✓ 093016	-016	CCBA-EB1	N/A	10/22/12 10:41	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
✓ 093016	-017	CCBA-EB1	N/A	10/22/12 10:42	FDIW	P	500 ml	HNO3	G	EB	Metals (SW846-6020)	
✓ 093016	-018	CCBA-EB1	N/A	10/22/12 10:43	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
✓ 093016	-020	CCBA-EB1	N/A	10/22/12 10:44	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)	
✓ 093016	-022	CCBA-EB1	N/A	10/22/12 10:45	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
✓ 093016	-024	CCBA-EB1	N/A	10/22/12 10:47	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)	
✓ 093016	-027	CCBA-EB1	N/A	10/22/12 10:48	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC initials:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/844-4013/250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FDIVV (Filtered in field w/40 micron filter), Anions (Br, Cl, F, SO4), metals (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M)
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/844-5130/228-0710	
William J. Gibson	<i>William J. Gibson</i>	WJG	SNL/4142/844-4013/239-7367		

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>10/23/12</i> Time <i>10:33</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Wilton</i> Org. <i>4142</i> Date <i>10/23/12</i> Time <i>10:23</i>	3. Received by	Org.	Date	Time
2. Relinquished by	4. Relinquished by	Org.	Date	Time
2. Received by	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614462**

Project Name: SWMU 68 GW Char	Date Samples Shipped:	SMO Authorization: <i>Don W. Stangor</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone: <i>see bottle over</i>	
Project/Task Number: 98026.01.13	Lab Contact: Edie Kent/803.556.8171	Send Report to SMO: Lorraine Herrera 505-844-3199	
Service Order: CF 0263-13	Lab Destination: GEL		
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
093003	-001	OBS-MW1	153	10/16/12 9:34	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093003	-002	OBS-MW1	153	10/16/12 9:36	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093003	-009	OBS-MW1	153	10/16/12 9:37	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
093003	-014	OBS-MW1	153	10/16/12 9:38	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
093003	-016	OBS-MW1	153	10/16/12 9:39	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093003	-017	OBS-MW1	153	10/16/12 9:40	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	
093003	-018	OBS-MW1	153	10/16/12 9:41	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
093003	-020	OBS-MW1	153	10/16/12 9:42	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
093003	-022	OBS-MW1	153	10/16/12 9:43	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093003	-024	OBS-MW1	153	10/16/12 9:45	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367	
Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547	
					Lab Use

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>10/16/12</i> Time <i>1016</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don W. Stangor</i> Org. <i>4142</i> Date <i>10/16/12</i> Time <i>1016</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA

SMO Use

AR/COC **614464**

Project Name: <u>SWMU 68 GW Char</u>	Date Samples Shipped: <u>10/17/12</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.:	SMO Contact Phone: <u>see bottle order</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026.01.13</u>	Lab Contact: <u>Edie Kent/803.556.8171</u>		<input type="checkbox"/> Released by COC No.
Service Order: <u>CF 263-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO:	<input type="checkbox"/> 4° Celsius
	Contract No.: <u>PO 691436</u>	Lorraine Herrera 505-844-3199	

Tech Area: _____

Building: _____ **Room:** _____ **Operational Site:** _____

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093007	-001	OBS-MW2	252	10/17/12 9:50 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093007	-002	OBS-MW2	252	10/17/12 9:53 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093007	-009	OBS-MW2	252	10/17/12 9:54 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 093007	-014	OBS-MW2	252	10/17/12 9:55 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 093007	-016	OBS-MW2	252	10/17/12 9:56 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093007	-017	OBS-MW2	252	10/17/12 9:58 ✓	FGW	P	250 500 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093007	-018	OBS-MW2	252	10/17/12 9:59 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093007	-020	OBS-MW2	252	10/17/12 10:00 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093007	-022	OBS-MW2	252	10/17/12 10:01 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093007	-024	OBS-MW2	252	10/17/12 10:04 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/505-844-4013/505-250-7090	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	William Gibson	<u>[Signature]</u>	WG	SNL/4142/505-284-3307/505-239-7367	Return Samples By:
	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/505-844-5130/505-228-0710	
					Comments:
					If perchlorate detected, then perform verification analysis using SW846-6850. Report anions (as Br, Cl, F, SO4), Metals (as Ca, Mg, K, Na), alkalinity (as total bicarbonate and carbonate), and gamma spec (short list isotopes). FGW (filtered in field w/0.45 micron filter)

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/17/12</u> Time <u>1103</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/17/12</u> Time <u>1103</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COG **614464**

Project Name: SWMU 68 GW Char		Project/Task Manager: Clinton Lum			Project/Task No.: 98026.01.13								
Tech Area:													
Building:		Room:										Lab use	
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
✓ 093007	-027	OBS-MW2	252	10/17/12 10:05	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		
✓ 093007	-033	OBS-MW2	252	10/17/12 10:07	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)		
✓ 093007	-034	OBS-MW2	252	10/17/12 10:09	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)		
✓ 093007	-035	OBS-MW2	252	10/17/12 10:10	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)		
✓ 093008	-001	OBS-MW2	252	10/17/12 9:50	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 093008	-002	OBS-MW2	252	10/17/12 9:53	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)		
✓ 093008	-009	OBS-MW2	252	10/17/12 9:54	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)		
✓ 093008	-014	OBS-MW2	252	10/17/12 9:55	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-719)		
✓ 093008	-016	OBS-MW2	252	10/17/12 9:56	GW	P	125 ml	None	G	DU	Anions (SW846-9056)		
✓ 093008	-017	OBS-MW2	252	10/17/12 9:58	FGW	P	500 250 ml	HNO3	G	DU	Metals (SW846-6020)		
✓ 093008	-018	OBS-MW2	252	10/17/12 9:59	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)		
✓ 093008	-020	OBS-MW2	252	10/17/12 10:00	GW	P	250 ml	None	G	DU	Perchlorate (314.0)		
✓ 093008	-022	OBS-MW2	252	10/17/12 10:01	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
✓ 093008	-024	OBS-MW2	252	10/17/12 10:04	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)		
✓ 093008	-027	OBS-MW2	252	10/17/12 10:05	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 093008	-033	OBS-MW2	252	10/17/12 10:07	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)		
✓ 093008	-034	OBS-MW2	252	10/17/12 10:09	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)		
✓ 093008	-035	OBS-MW2	252	10/17/12 10:10	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)		
✓ 093009	-001	OBS-TB3	N/A	10/17/12 9:50	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)		
Recipient Initials _____													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *20*

SMO Use

AR/COC **614465**

Project Name: <u>SWMU 68 GW Char</u>	Date Samples Shipped: _____	SMO Authorization: <u>Don Walsburg</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. _____	SMO Contact Phone: <u>See Bottle order</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026.01.13</u>	Lab Contact: <u>Edie Kent/803.556.8171</u>	Send Report to SMO: _____	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF 0263-13</u>	Lab Destination: <u>GEL</u>		Lorraine Herrera 505-844-3199
Contract No.: <u>PO 691436</u>		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	

Tech Area: _____	Building: _____	Room: _____	Operational Site: _____
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
093010	-001	OBS-MW3	208	10/18/12 9:17	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093010	-002	OBS-MW3	208	10/18/12 9:19	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093010	-009	OBS-MW3	208	10/18/12 9:20	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
093010	-014	OBS-MW3	208	10/18/12 9:21	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
093010	-016	OBS-MW3	208	10/18/12 9:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093010	-017	OBS-MW3	208	10/18/12 9:24	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	
093010	-018	OBS-MW3	208	10/18/12 9:25	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
093010	-020	OBS-MW3	208	10/18/12 9:26	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
093010	-022	OBS-MW3	208	10/18/12 9:27	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093010	-024	OBS-MW3	208	10/18/12 9:29	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered: _____		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by: _____		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.: _____		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: _____
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If perchlorate detected, then perform verification analysis using SW846-6850. Report anions (as Br, Cl, F, SO4), Metals (as Ca, Mg, K, Na), alkalinity (as total bicarbonate and carbonate), and gamma spectroscopy (short list isotopes). FGW (filtered in field w/ 0.45 micron filter)
Lab Use					

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/18/12</u> Time <u>10:08</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Don Walsburg</u> Org. <u>4142</u> Date <u>10/18/12</u> Time <u>10:08</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to OBS-mw2

Internal Lab

Page 1 of 2

Batch No. <i>✓</i>	SMO Use	AR/COC	614463
Project Name: SWMU 68 GW Char	Date Samples Shipped: <i>10/16/12</i>	SMO Authorization: <i>Don W. Stinson</i>	
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>147669</i>	SMO Contact Phone: <i>See B. Hecker</i>	
Project/Task Number: 98026.01.13	Lab Contact: Edie Kent/803.556.8171	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.	
Service Order: CF 0263-13	Lab Destination: GEL		
	Contract No.: PO 691436	Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 093005	-001	OBS-EB1	N/A	10/16/12 10:35	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 093005	-002	OBS-EB1	N/A	10/16/12 10:37	DIW	AG	4x1L	NONE	G	EB	TCL SVOC (SW846-8270C)	
✓ 093005	-009	OBS-EB1	N/A	10/16/12 10:38 ✓	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
✓ 093005	-014	OBS-EB1	N/A	10/16/12 10:39 ✓	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
✓ 093005	-016	OBS-EB1	N/A	10/16/12 10:40 ✓	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
✓ 093005	-017	OBS-EB1	N/A	10/16/12 10:41 ✓	FDIW	P	500 ml	HNO3	G	EB	Metals (SW846-6020)	
✓ 093005	-018	OBS-EB1	N/A	10/16/12 10:42 ✓	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
✓ 093005	-020 ✓	OBS-EB1	N/A	10/16/12 10:43 ✓	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)	
✓ 093005	-022	OBS-EB1	N/A	10/16/12 10:44 ✓	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
✓ 093005	-024	OBS-EB1	N/A	10/16/12 10:46 ✓	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC initials:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367	
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	
					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
					If perchlorate detected perform verification analysis using SW846-6850.FDIW (filtered in field w/40 micron filter) Metals (Ca,Mg,K,Na). Alkalinity (total,bicarbonate,carbonate)

1. Relinquished by <i>[Signature]</i>	Org. <i>4142</i>	Date <i>10-16-12</i>	Time <i>11:24</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i>	Org. <i>4142</i>	Date <i>10-16-12</i>	Time <i>11:24</i>	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT

Appendix C

Data Validation Sample Findings Summary
Sheets for SWMUs 8/58 and 68
Groundwater Monitoring Data



Sample Findings Summary



AR/COC: 614466, 614467, 614468

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093013-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	093016-035/CCBA-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093016-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093016-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	093018-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	093013-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	093013-034/CCBA-MW1	BETA (12587-47-2)	J, MS1
	093016-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093016-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093018-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093018-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	093019-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093019-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	093013-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	093013-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093013-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093013-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093016-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	093016-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093016-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093016-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	093018-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	093018-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093018-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093018-033/CCBA-MW2	Potassium-40 (13966-00-2)	R, Z2
	093019-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	093019-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093019-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093019-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093013-009/CCBA-MW1	Aluminum (7429-90-5)	J+, DL2
	093013-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	093016-009/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
	093018-009/CCBA-MW2	Copper (7440-50-8)	0.012UJ, B,B2
	093018-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	093019-009/CCBA-MW2	Antimony (7440-36-0)	0.0078U, B
	093019-009/CCBA-MW2	Copper (7440-50-8)	0.012UJ, B,B2
	093019-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
SW846 3535/8321A Modified			
	093013-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093013-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093013-024/CCBA-MW1	PETN (78-11-5)	UJ, MS3,MS5
	093013-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093013-024/CCBA-MW1	Tetryl (479-45-8)	UJ, MS5
	093016-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093016-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093016-024/CCBA-EB1	PETN (78-11-5)	UJ, MS3,MS5
	093016-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093016-024/CCBA-EB1	Tetryl (479-45-8)	UJ, MS5
	093018-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093018-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093018-024/CCBA-MW2	PETN (78-11-5)	UJ, MS3,MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093018-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093018-024/CCBA-MW2	Tetryl (479-45-8)	UJ, MS5
	093019-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093019-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093019-024/CCBA-MW2	PETN (78-11-5)	UJ, MS3,MS5
	093019-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093019-024/CCBA-MW2	Tetryl (479-45-8)	UJ, MS5
SW846 7470A			
	093013-009/CCBA-MW1	Mercury (7439-97-6)	UJ, I5,B4
	093016-009/CCBA-EB1	Mercury (7439-97-6)	UJ, I5,B4
	093018-009/CCBA-MW2	Mercury (7439-97-6)	UJ, I5,B4
	093019-009/CCBA-MW2	Mercury (7439-97-6)	UJ, I5,B4
SW846 8260B DOE-AL			
	093013-001/CCBA-MW1	1,4-Dioxane (123-91-1)	R, I4
	093014-001/CCBA-TB1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, I3,C2
	093014-001/CCBA-TB1	1,4-Dioxane (123-91-1)	R, I4
	093014-001/CCBA-TB1	Bromoform (75-25-2)	UJ, I3,C2
	093015-001/CCBA-FB1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, I3,C2
	093015-001/CCBA-FB1	1,4-Dioxane (123-91-1)	R, I4
	093015-001/CCBA-FB1	Bromoform (75-25-2)	J+, I3,C2
	093016-001/CCBA-EB1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, I3,C2
	093016-001/CCBA-EB1	1,4-Dioxane (123-91-1)	R, I4
	093016-001/CCBA-EB1	Bromoform (75-25-2)	J+, I3,C2
	093017-001/CCBA-TB2	1,4-Dioxane (123-91-1)	R, I4
	093018-001/CCBA-MW2	1,4-Dioxane (123-91-1)	R, I4
	093018-001/CCBA-MW2	Toluene (108-88-3)	1.0U, B2
	093019-001/CCBA-MW2	1,4-Dioxane (123-91-1)	R, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093019-001/CCBA-MW2	Toluene (108-88-3)	1.0U, B2
	093020-001/CCBA-TB3	1,4-Dioxane (123-91-1)	R, I4
SW846 8270C			
	093013-002/CCBA-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	093016-002/CCBA-EB1	4-Nitrophenol (100-02-7)	UJ, MS5
	093018-002/CCBA-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	093019-002/CCBA-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
SW846 9012B			
	093013-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093016-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093018-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	093019-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
SW846 9056			
	093013-016/CCBA-MW1	Bromide (24959-67-9)	J+, MS2
	093013-016/CCBA-MW1	Fluoride (16984-48-8)	J+, MS2
	093016-016/CCBA-EB1	Chloride (16887-00-6)	J+, I5
	093018-016/CCBA-MW2	Bromide (24959-67-9)	J+, MS2
	093018-016/CCBA-MW2	Fluoride (16984-48-8)	J+, MS2
	093019-016/CCBA-MW2	Bromide (24959-67-9)	J+, MS2
	093019-016/CCBA-MW2	Fluoride (16984-48-8)	J+, MS2

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: December 21, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but <2X the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,I5**.
2. The ICB and CCB concentrations were negative, and the absolute values were > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,B4**.

Anions:

1. The ICAL intercept for chloride was > the MDL. The associated result of sample 313787-018 was a detect <3X the intercept and, therefore, will be **qualified J+,I5**.
2. The MS %Rs for fluoride and bromide were >125%. The associated results of all samples, except -018 were detects and, therefore, will be **qualified J+,MS2**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section and the following.

Anions:

The ICAL intercepts were > the MDL for fluoride, chloride, and sulfate. However, the associated sample results not qualified above in the Summary section were all either >3X the associated intercept or NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and the following.

Anions:

Chloride was detected in the EB. However, the associated sample results were all >5X the blank concentration and, therefore, will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

The MS recoveries met QC acceptance criteria except as noted above in the Summary section and the following.

Anions:

The MS %Rs for fluoride and bromide were >125%. The associated results of sample -018 were NDs and, therefore, will not be qualified.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted except for the following.

Anions & Nitrate/Nitrite:

Samples -004, -031, & -043 were diluted 10X for chloride and sulfate, and samples -032 & -044 were diluted 5X for nitrate/nitrite due to over-range concentrations. Samples -005 & -019 were diluted 5X for nitrate/nitrite due to matrix interference. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on the AR/COC. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/26/12

Memorandum

Date: December 20, 2012

To: File

From: Ken Salaz

Subject: Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: High Explosives (HE)

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with accepted procedures using method EPA 8321A Mod (HE by LCMSMS). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. The ICAL RFs for p-nitrotoluene, o-nitrotoluene, and m-nitrotoluene were <0.05 but >0.01 . The associated sample results were all NDs and, therefore, will be **qualified UJ,I4**.
2. The MSD %R for PETN was $>$ the laboratory QC acceptance limit. The associated sample results were all NDs and, therefore, will be **qualified UJ,MS3**.
3. The MS/MSD RPDs for PETN and Tetryl were $>$ the laboratory QC acceptance limits. The associated sample results were all NDs and, therefore, will be **qualified UJ,MS5**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. According to laboratory procedure, all sample and QC extracts were diluted 2X with HPLC grade water.

Other QC

One EB was submitted on the AR/COC. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/26/12

Memorandum

Date: December 21, 2012
To: File
From: Ken Salaz
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA6020 (ICP-MS), and EPA 7470A (CVAA mercury). Another fraction of the samples was prepared and analyzed with approved procedures using method EPA 6020A (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

CVAA:

1. The ICAL intercept was negative with an absolute value > the MDL but <3X the MDL. The associated sample results were all NDs and, therefore, will be **qualified UJ,I5**.
2. The CCB concentration was negative with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,B4**.

ICP-MS:

1. In the MB, Cu and Sb were detected at concentrations > the MDL but < the PQL. The Cu results of samples 313787-030 & -042 and the Sb result of sample -042 were detects <5X the associated blank concentration and, therefore, will be **qualified 0.0018U,B** and **0.0078U,B**, respectively, at 5X the blank concentration.
2. In the EB, Cu was detected at a concentration > the PQL. The associated results of samples 313787-030 & -042 were detects <5X the EB concentration and, therefore, will be **qualified 0.012UJ,B2**, at 5X the EB value.

3. The CRI %R for Al was >130%. The associated result of sample 313787-003 was a detect < 5X PQL and, therefore, will be **qualified J+,DL2**.
4. The serial dilution %D for Mg was >10% for batch #1258267, and the parent sample concentration was >50X the MDL. The associated result of sample 313787-017 was ND and, therefore, will be **qualified UJ,D1**. The other associated sample results were all detects and, therefore, will be **qualified J,D1**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

The instrument tunes met all QC requirements.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section.

Reporting Limit Verification

The CRA/CRI recoveries met QC acceptance criteria except as noted above in the Summary section and the following. The CRI %R for Al was >130%. However, the associated sample results not qualified above were all NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and the following. In the MB, Cu and Sb were detected. However, the associated sample results not qualified above were all either NDs or >5X the blank concentration and, therefore, will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted except for the following.

ICP-MS:

Sample 313787-003 and 313791-001 were diluted 5X for Na, and samples 313787-030 & -042 and 313791-003 & -004 were diluted 5X for Ca due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the concentrations of Al, Ca, Fe, and Mg in the samples were $<$ those in the ICS solutions. No sample data will be qualified as a result.

ICP Serial Dilution

The serial dilution %Ds met QC acceptance criteria except as noted above in the Summary section.

Other QC

One EB was submitted on the AR/COC. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/26/12

Memorandum

Date: December 23, 2012

To: File

From: Ken Salaz

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec), EPA 900.0 (gross alpha/beta), and HASL300 (Iso-U). Problems were identified with the data package that result in the qualification of data.

Gamma Spec:

1. The peak for K-40 in sample 313787-037 did not meet identification criteria. Therefore, this result will be **qualified R,Z2**.

Gamma Spec, Iso-U, Gross Alpha/Beta:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

Gross Alpha/Beta, Iso-U:

1. The gross alpha result of sample -011, the gross beta results of samples -038 & -050, and the U-235/236 result of sample -039 were > the MDA but <3X the MDA and, therefore, will be **qualified J,FR7**.
2. The relative dilution factor between the samples and the gross alpha/beta MS/MSD was >5X. Therefore, the MS/MSD %Rs were not applicable, and the associated sample results will be **qualified J,MS1** due to lack of matrix-specific accuracy data.

Data are acceptable except as noted above, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were analyzed within the prescribed holding times and properly preserved.

Quantification

Quantification criteria were met except as noted above in the Summary section.

Calibration

The case narratives stated that the instruments used were properly calibrated.

Blanks

No target analytes were detected in the blanks at concentrations > the MDA and 2-sigma TPU.

Tracer/Carrier Recovery

All tracer recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as noted above in the Summary section.

Laboratory Replicate

All replicate error ratios met QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All required detection limits were met. The samples were not diluted.

Other QC

One EB was submitted on the AR/COC. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified except as noted above in the Summary section.

Reviewed by: Marcia Hilchey

Date: 12/26/12

Memorandum

Date: December 20, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with accepted procedures using method EPA 8270B (SVOCs). All compounds were successfully analyzed. A problem was identified with the data package that results in the qualification of data.

1. The MS/MSD RPD for 4-nitrophenol was > the laboratory QC acceptance limit. The associated sample results were all NDs and, therefore, will be **qualified UJ,MS5**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were prepared and analyzed within the prescribed holding time and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial and continuing calibrations met QC acceptance criteria except for the following. The ICV %D for hexachlorocyclopentadiene was >20% but <40% with negative bias. However, the associated sample

results were all NDs, and there were no other calibration outliers. Therefore, no sample results will be qualified.

Blanks

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met QC acceptance criteria except as noted above in the Summary section.

Laboratory Control Sample (LCS)

The LCS recoveries met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One EB was submitted on the AR/COC. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/26/12

Memorandum

Date: December 20, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614466, 614467, 614468
SDG: 313787
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Eight samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. The ICAL RF for 1,4-dioxane was <0.005 . The associated sample results were all NDs and, therefore, will be **qualified R,I4**.
2. The ICAL RSDs for bromoform and 1,2-dibromo-3-chloropropane were $>15\%$ but $<40\%$. The bromoform results of samples 313787-014 and -015 were detects and, therefore, will be **qualified J,I3**. The other associated sample results were NDs, and there were %D outliers for these analytes in the CCV that applies to samples -013 to -015. Therefore, the associated sample results will be **qualified UJ,I3**.
3. The %Ds for bromoform and 1,2-dibromo-3-chloropropane in the CCV associated with samples -013 to -015 were $>20\%$ but $<40\%$ with positive bias. The associated bromoform results of samples -014 and -015 were detects and, therefore, will be **qualified J+,C2**. The other associated sample results were all NDs, and there were ICAL %RSD outliers for these analytes. Therefore, the associated sample results will be **qualified UJ,C2**.

4. In the EB associated with samples -028 and -040, toluene was detected. The associated sample results were all detects, <10X the blank concentration, and < the PQL. Therefore, these sample results will be **qualified 1.0U,B2** at the PQL.

Data are acceptable except as noted above, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section and the following.

The initial calibration RSDs for bromoform, dibromochloromethane, and 1,2-dibromo-3-chloropropane were >15% but <40%. The associated sample results not qualified above in the Summary section were all NDs, and there were no other calibration outliers associated with these sample results. Therefore, no sample results will be qualified.

Blanks

No target analytes were detected in the blanks except for the following.

In the FB and EB, dibromochloromethane, bromodichloromethane, bromoform, and chloroform were detected. However, the associated sample results were all NDs and, therefore, will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria. It should be noted that neither trichlorotrifluoromethane nor 1,4-dioxane were included in the MS/MSD solution. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

The LCS recoveries met QC acceptance criteria except for the following. The LCS %R for bromoform was > the laboratory QC acceptance limit. However, this is within the allowable number of marginal LCS outliers based on the number of target analytes. Therefore, no sample data will be qualified.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs, one EB, and one FB were submitted on the AR/COCs. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/26/12



Sample Findings Summary



AR/COC: 614462, 614463

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093003-035/OBS-MW1	Uranium-235/236 (13982-70-2)	J, FR7
	093005-035/OBS-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093005-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093005-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	093003-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093003-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	093005-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093005-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	093003-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093003-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093003-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093003-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093005-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	093005-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093005-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093005-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093003-009/OBS-MW1	Copper (7440-50-8)	0.00386U, B
	093005-009/OBS-EB1	Copper (7440-50-8)	0.00386U, B
SW846 3535/8321A Modified			
	093003-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093003-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093003-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093005-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093005-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093005-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093003-001/OBS-MW1	Chloromethane (74-87-3)	UJ, I5
	093003-001/OBS-MW1	Ethylbenzene (100-41-4)	UJ, MS5
	093003-001/OBS-MW1	Methylene chloride (75-09-2)	UJ, I5
	093003-001/OBS-MW1	Styrene (100-42-5)	UJ, MS5
	093003-001/OBS-MW1	Xylenes (total) (1330-20-7)	UJ, MS5
	093004-001/OBS-TB1	Chloromethane (74-87-3)	UJ, I5
	093004-001/OBS-TB1	Ethylbenzene (100-41-4)	UJ, MS5
	093004-001/OBS-TB1	Methylene chloride (75-09-2)	UJ, I5
	093004-001/OBS-TB1	Styrene (100-42-5)	UJ, MS5
	093004-001/OBS-TB1	Xylenes (total) (1330-20-7)	UJ, MS5
	093005-001/OBS-EB1	Chloromethane (74-87-3)	UJ, I5
	093005-001/OBS-EB1	Ethylbenzene (100-41-4)	UJ, MS5
	093005-001/OBS-EB1	Methylene chloride (75-09-2)	UJ, I5
	093005-001/OBS-EB1	Styrene (100-42-5)	UJ, MS5
	093005-001/OBS-EB1	Xylenes (total) (1330-20-7)	UJ, MS5
	093006-001/OBS-TB2	Chloromethane (74-87-3)	UJ, I5
	093006-001/OBS-TB2	Ethylbenzene (100-41-4)	UJ, MS5
	093006-001/OBS-TB2	Methylene chloride (75-09-2)	UJ, I5
	093006-001/OBS-TB2	Styrene (100-42-5)	UJ, MS5
	093006-001/OBS-TB2	Xylenes (total) (1330-20-7)	UJ, MS5
SW846 9012B			
	093003-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, B4
	093005-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, B4

All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: November 30, 2012
To: File
From: Ken Salaz
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The CCB concentration was negative, and the absolute value was > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,B4**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except for the following.

Anions & Perchlorate:

The CCV %Ds for perchlorate and chloride (sample -010 only) were >110%. However, the associated sample results were all NDs and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Chloride was detected in the EB. However, this EB was not associated with any samples in this data package therefore no sample data in this data package were qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Alkalinity:

It should be noted that the MS analysis was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Alkalinity:

It should be noted that the Replicate analysis was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted with the following exceptions.

Anions & Nitrate/Nitrite:

Sample -005 was diluted 5X for chloride and sulfate, and samples -006 and -020 were diluted 10X and 5X, respectively, for nitrate/nitrite due to over-range concentrations or matrix interference. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/03/12

Memorandum

Date: November 29, 2012
To: File
From: Ken Salaz
Subject: Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: High Explosives (HE)

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8321A Mod (HE by LCMSMS). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. The ICAL RFs for p-nitrotoluene, o-nitrotoluene, and m-nitrotoluene were <0.05 but >0.01 . The associated sample results were all NDs and, therefore, will be **qualified UJ,I4**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. According to laboratory procedure, all sample and QC extracts were diluted 2X with HPLC grade water.

Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/03/12

Memorandum

Date: November 30, 2012
To: File
From: Ken Salaz
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA6020 (ICP-MS), and EPA 7470A (CVAA mercury). Another fraction of the samples was prepared and analyzed with approved procedures using method EPA 6020A (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

ICP-MS batch 1255426:

1. In the MB, Cu was detected but < the PQL. The associated results of samples 313354-003 were all detects <5X the MB concentration and, therefore, will be **qualified 0.00386U,B** at 5X the MB value.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

The instrument tunes met all QC requirements.

Calibration

The initial and continuing calibrations met all QC acceptance criteria.

Reporting Limit Verification

The CRA/CRI recoveries met QC acceptance criteria except for the following. The CRI %R for Mg was >130%. However, the associated sample results were all >5X the PQL and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and the following.

ICP-MS:

In the EB, Cu was detected. However, this EB was not associated with any samples in this data package therefore no sample data in this data package were qualified as a result.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted with the following exceptions.

ICP-MS:

Samples 313354-003 and 31335-001 were diluted 10X for Ca due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the concentrations of Al, Ca, Fe, and Mg in the samples were < those in the ICS solutions. No sample data will be qualified as a result.

ICP Serial Dilution

All serial dilution %Ds met QC acceptance criteria.

Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/03/12

Memorandum

Date: November 30, 2012
To: File
From: Ken Salaz
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec), EPA 900.0 (gross alpha/beta), and HASL300 (Iso-U). Problems were identified with the data package that result in the qualification of data.

Gamma Spec:

1. All gamma spec sample results were either < the associated 2-sigma TPU or < the associated MDA and, therefore, will be **qualified BD,FR3**.

Gross Alpha/Beta:

1. The results of sample 313354-026 were either < the associated 2-sigma TPU or < the associated MDA and, therefore, will be **qualified BD,FR3**.
2. The relative dilution factor between the samples and the MS/MSD was >5X. Therefore, the MS/MSD %Rs were not applicable, and the associated sample results will be **qualified J,MS1** due to lack of matrix-specific accuracy data.

Iso-U:

1. The results of sample -027 were either < the associated 2-sigma TPU or < the associated MDA and, therefore, will be **qualified BD,FR3**.
2. The U-235/236 result of sample -013 was > the associated MDA but <3X the MDA. Therefore, this result will be **qualified J,FR7**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times and Preservation

The samples were analyzed within the prescribed holding times and properly preserved.

Quantification

Quantification criteria were met except as noted above in the Summary section.

Calibration

The case narratives stated that the instruments used were properly calibrated.

Blanks

No target analytes were detected in the blanks at concentrations > the MDA and 2-sigma TPU, except as noted above in the Summary Section.

Tracer/Carrier Recovery

All tracer recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as noted above in the Summary section.

Gross Alpha/Beta:

It should be noted that the MS analysis was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicate error ratios met QC acceptance criteria.

Gross Alpha/Beta & Iso-U:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All required detection limits were met. The samples were not diluted.

Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified except as noted above in the Summary section.

Reviewed by: Marcia Hilchey

Date: 12/03/12

Memorandum

Date: November 29, 2012
To: File
From: Ken Salaz
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8270B (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that result in the qualification of data.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were prepared and analyzed within the prescribed holding time and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial and continuing calibrations met all QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS recoveries met QC acceptance criteria except for the following. The LCS %R for pentachlorophenol was > the QC acceptance limit. However, the associated sample result was ND and, therefore, will not be qualified.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/03/12

Memorandum

Date: November 29, 2012
To: File
From: Ken Salaz
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614462 and -463
SDG: 313354
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

Summary

Four samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. The ICAL intercepts for methylene chloride and chloromethane were negative, and the absolute values were > the MDL but <3X the MDL. The associated sample results were all NDs and therefore, will be **qualified UJ,I5**.
2. The MSD RPDs for ethylbenzene, styrene, and xylenes (total) were > the QC acceptance limits. The associated sample results were all NDs and therefore, will be **qualified UJ,MS5**.

Data are acceptable, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary section and the following.

The initial calibration RSD for bromoform was >15% but <40%. The CCV %Ds for acetone, 2-butanone, and 2-hexanone were >20% but <40% with negative bias. However, the associated sample results were all NDs, and there were no other calibration outliers. Therefore, no sample results were qualified.

Blanks

No target analytes were detected in the blanks except for the following.

In the EB, dibromochloromethane, bromodichloromethane, bromoform, and chloroform were detected. However, the EB was associated with samples on a COC that was not in this data package (614464), therefore no sample results in this data package will be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs and one EB were submitted on the AR/COCs.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 12/03/12