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Hazardous Waste Bureau

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

Subject: Department of Energy/National Nuclear Security Administration Sandia National Laboratories *Environmental Restoration Operations Consolidated Quarterly Report, July 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 National Laboratories that addresses all quarterly reporting (January through March 2013) 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

See Page 2

cc w/enclosure:

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

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

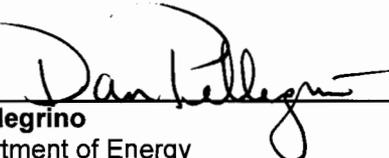
Document author: John Cochran, Department 06234

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: 
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July 16, 2013
Date

and

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

7/25/13
Date

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

January – March 2013



July 2013



United States Department of Energy
Sandia Field Office

CONSOLIDATED QUARTERLY REPORT

July 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: 33

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

REPORTING PERIOD: January – March 2013

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 33 sites in the Corrective Action regulatory process are listed in Table I-1. The 33 sites consist of 25 Solid Waste Management Units and 8 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, January – March 2013

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, January – March 2013

SECTION III: Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, January – March 2013

SECTION IV: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, January – March 2013

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AGMR	Annual Groundwater Monitoring Report
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
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
LTMMP	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
PAH	polycyclic aromatic hydrocarbon
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, JANUARY – MARCH 2013

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 January, February, and March 2013 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 the 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.

Planning for restoration field work at the MWL Borrow Pit in Technical Area (TA) III occurred during the December reporting period. 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.

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**

No MWL evapotranspirative cover (ET Cover) maintenance activities were performed during the reporting period.

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). The four SWMUs and one AOC included in the January 2008 permit modification request are:

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

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]).

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. The NMED stated in their September 17, 2012 solicitation of public comments that persons who previously provided public comment, in response to the “Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the RCRA Permit for Sandia National Laboratories” for the 26 SWMUs/AOCs (NMED December 2007), before the public review and comment period ended on February 8, 2008, do not need to resubmit their comments. However, they 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 submit a new hearing request.

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 Section I.2.3), 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. An additional challenge was the 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).

The NEPA checklist for “SWMU 52 – Liquid Waste Disposal Tanks 2 and 4, TA-V” was approved by DOE/SFO on February 4, 2013. The letter providing a schedule for filling Tanks 2 and 4 with a permanent insoluble material by July 31, 2013 was submitted to NMED on February 26, 2013 (Beausoleil February 2013). The letter also stated that a written report will be submitted to NMED by October 11, 2013.

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 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) 2013 Annual Groundwater Monitoring Report (AGMR), which is an anticipated submittal to the NMED in summer 2014. Also, analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2013.

Perchlorate analysis of groundwater samples for SWMUs 8/58, 49, 68, 116, 149, and 154 is discussed in Section II of this ER Quarterly Report.

Analytical results for the January 2013 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 March 2013 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 February and March.

2.3.2 **Burn Site Groundwater**

No BSG groundwater monitoring activities were performed during this reporting period; semiannual sampling events will be discussed in future quarterly reports. A report describing the decommissioning of BSG monitoring wells 12AUP01, CYN-MW1D, and CYN-MW2S, and the installation of replacement well CYN-MW13 was submitted to NMED in March 14, 2013 (SNL/NM March 2013a).

2.3.3 **Tijeras Arroyo Groundwater**

Groundwater sampling for the TAG investigation was conducted in March 2013.

2.3.4 **Mixed Waste Landfill Groundwater**

MWL groundwater monitoring activities were performed from January 29 through February 11, 2013; this sampling event represents annual groundwater monitoring required under the Compliance Order on Consent (the Order). All MWL groundwater monitoring results will be included in the CY 2013 AGMR (anticipated submittal to the NMED in summer 2014).

2.3.5 **Chemical Waste Landfill Groundwater**

CWL groundwater monitoring activities were performed from January 8 through 14, 2013. Semi-annual sampling events and results will be presented in the CWL Annual Post-Closure Care Report for CY 2013 that will be submitted to the NMED by March 31, 2014.

2.3.6 **SWMUs 8/58 Groundwater**

Groundwater sampling for SWMUs 8/58 was conducted in January 2013.

2.3.7 **SWMU 68 Groundwater**

Groundwater sampling for SWMU 68 was conducted in January 2013.

2.3.8 **SWMU 49 Groundwater**

Groundwater sampling for SWMU 49 was conducted in January 2013. The results for the perchlorate analysis will be discussed in the CY 2013 AGMR (anticipated submittal to the NMED in summer 2014).

2.3.9 **SWMU 116 Groundwater**

Groundwater sampling for SWMU 116 was conducted in January 2013. The results for the perchlorate analysis are discussed in Section II of this ER Quarterly Report. Analytical results will be discussed in the CY 2013 AGMR (anticipated submittal to the NMED in summer 2014).

2.3.10 **SWMU 149 Groundwater**

Groundwater sampling for SWMU 149 was conducted in March 2013.

2.3.11 **SWMU 154 Groundwater**

Groundwater sampling for SWMU 154 was conducted in March 2013.

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)
- Report of the Installation and Decommissioning of BSG Monitoring Wells, Decommissioning of CWL Monitoring Wells and the Decommissioning of Drain and Septic System Monitoring Wells submitted to the NMED on March 14, 2013 (SNL/NM March 2013a)

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 March 15, 2013. No maintenance or repairs were required.

- The CWL Annual Post-Closure Care Report for CY 2012 was submitted to the NMED on March 27, 2013 (SNL/NM March 2013b).
- A permit modification request was submitted to NMED on February 11, 2013 to make several minor changes to Attachments 1 through 4 (SNL/NM February 2013).
- The SNL/NM analytical laboratories statement of work was revised and submitted to the NMED on January 24, 2013 (SNL/NM January 2013).
- Cover maintenance to remove four-wing saltbush plants, clear the fence line, and remove annual weed species was performed February 4-5, 2013. Approximately 60 cubic yards of green waste was disposed of at the Kirtland Air Force Base Landfill.

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 (January through March 2013) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in March 2013. 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 February 28, 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 March 7 and March 29, 2013, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings are as follows:
 - Excess accumulation of tumbleweeds along the site boundary fence were removed by SNL/NM Facilities on March 25 and March 26, 2013.

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 January 1, 2013 – 0 gallons
- Leachate and rinsate waste generated on site during the reporting period – 118 gallons of leachate and 2 gallons of rinsate
- Leachate and rinsate waste removed from the site by Hazardous Waste Handling Facility personnel on March 18, 2013 – 88 gallons of leachate, 2 gallons of rinsate
- Leachate and rinsate waste remaining on site at the end of this reporting period – 30 gallons of leachate, 0 gallons of rinsate

3.2.2 **CAMU Regulatory Activities**

There were no regulatory activities during this quarter.

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

The CWL Annual Post-Closure Care Report for CY 2012 was submitted to the NMED on March 27, 2013 (SNL/NM March 2013b).

4.0 References

Brandwein, S. (New Mexico Environment Department), December 2009a. “Re: LWDS tanks status,” e-mail correspondence to M. Sanders (Sandia National Laboratories, New Mexico), December 14, 2009.

Brandwein, S. (New Mexico Environment Department), December 2009b. “RE: LWDS holding tanks in TA-V (ER Site 52),” e-mail correspondence to J. Cochran (Sandia National Laboratories, New Mexico), December 17, 2009.

Beausoleil, G. (U.S. Department of Energy NNSA/Sandia Field Office), December 2012. Letter to J. Keiling (New Mexico Environment Department). “Extension Request for Providing a Schedule for Filling or Removing Tanks at Solid Waste Management Unit 52, Department of Energy/ National Nuclear Security Administration, Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-06-007 and HWB-08-001,” December 10, 2012.

Kieling, J.E. (New Mexico Environment Department), June 2011. Letter to P. Wagner (U.S. Department of Energy NNSA/Sandia Site Office) and S.A. Orrell (Sandia National Laboratories, New Mexico), “Approval, Closure of Chemical Waste Landfill and Post-Closure Care Permit in Effect, Sandia National Laboratories, EPA ID# NM5890110518, HWB SNL-10-013,” June 2, 2011.

Kieling, J.E. (New Mexico Environment Department), October 2012. Letter to G. Beausoleil (U.S. Department of Energy NNSA/Sandia Site Office) and S. Orrell (Sandia National Laboratories/New Mexico), “Solid Waste Management Unit 52, Sandia National Laboratories, EPA ID # NM5890110518 HWB-SNL-06-007 and HWB-08-001,” October 10, 2012.

Kieling, J.E. (New Mexico Environment Department), December 2012a. Letter to G. Beausoleil (U.S. Department of Energy NNSA/Sandia Site Office) and S. Orrell (Sandia National Laboratories/New Mexico), “Solid Waste Management Unit 52, Sandia National Laboratories, EPA ID # NM5890110518 HWB-SNL-06-007 and HWB-08-001,” December 12, 2012.

New Mexico Environment Department (NMED), December 2007. “Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the RCRA Permit for Sandia National Laboratories,” Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), October 2009. “Resource Conservation and Recovery Act, Post-Closure Care Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Chemical Waste Landfill,” New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, October 15, 2009.

New Mexico Environment Department (NMED), April 2010. Letter to K. Davis (U.S. Department of Energy NNSA/Sandia Site Office) and M. Walck (Sandia National Laboratories, New Mexico). "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," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, April 8, 2010.

New Mexico Environment Department (NMED), July 2012. Letter to R. Sena (Sandia National Laboratories, New Mexico) and A. Orrell (Sandia National Laboratories, New Mexico). "March 2006 Petition for Corrective Action Complete SWMUs 233 and 234 and AOC 1115, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-007," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, July 27, 2012.

New Mexico Environment Department (NMED), September 2012. Letter to G. Beausoleil and M. Hazen (U.S. Department of Energy NNSA/Sandia Site Office). "Notice of Public Comment Period and Opportunity to Request a Public Hearing on Draft Hazardous Waste Permit for Sandia National Laboratories and Proposed Granting of Corrective Action Complete Status for 24 Solid Waste Management Units of Concern," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, September 17, 2012.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), April 2004. "Corrective Measures Evaluation Work Plan, Technical Area V Groundwater," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2005. "Burn Site Groundwater Interim Measures Work Plan," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2005. "Corrective Measures Evaluation Report for Tijeras Arroyo Groundwater," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2008. "Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2010. "Technical Area V Geophysical Logs and Slug Test Results," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2011. "Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2011. "Mixed Waste Landfill Groundwater Monitoring Report, Calendar Year 2010," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2011, "LWDS info and proposal submitted to the NMED," Sandia National Laboratories, Albuquerque, New Mexico, December 13, 2011.

Sandia National Laboratories, New Mexico (SNL/NM), March 2012. "Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), February 2013. "Request for Modification to Hazardous Waste Post-Closure Care Permit for the Chemical Waste Landfill at Sandia National Laboratories/New Mexico, Environmental Protection Agency Identification Number NM5890110518," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), January 2013. "Submittal of Updated Reference Document Cited in the Chemical Waste Landfill Post Closure Care Permit for the Department of Energy National Nuclear Security Administration/Sandia Site Office and Sandia National Laboratories/New Mexico (SNL/NM), Environmental Protection Agency Identification Number NM5890110518," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2013a. "Installation of Replacement Monitoring Well CYN MW13 at the Burn Site Groundwater Study Area and the Decommissioning of Three Groundwater Monitoring Wells at the Burn Site, Eight Groundwater and Soil-Vapor Monitoring Wells at the Chemical Waste Landfill, and Eight FLUTE™ Soil Vapor Monitoring Wells at Various SWMUs and DSS Sites," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2013b. "Chemical Waste Landfill Annual Post-Closure Care Report for Calendar Year 2012," Sandia National Laboratories, Albuquerque, New Mexico.

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

Wagner, P. (U.S. Department of Energy NNSA/Sandia Site Office), March 2006. Letter to J.P. Bearzi (New Mexico Environment Department) initiating a Class 3 Modification for the Designation of Twenty-Six (26) Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) as "approved for No Further Action."

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."

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, JANUARY – MARCH 2013

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 First Quarter of Calendar Year (CY) 2013 (January, February, and March) 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-ninth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Fourth Quarter of CY 2012 (SNL/NM February 2006 and April 2013).

Groundwater at monitoring well CYN-MW5 has been sampled seven times; Coyote Test Field (CTF) monitoring well CTF-MW1 has been sampled three times and monitoring wells CTF-MW2 and CTF-MW3 have been sampled nine times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled six times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled six 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 2013 (January, February, and March) 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 nine 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 Second Quarter, Fiscal Year 2013” (SNL/NM December 2012a)
- “SWMU 68 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013” (SNL/NM December 2012b)
- “SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2013 Annual Sampling” (SNL/NM December 2012c)
- “SWMU 149 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013” (SNL/NM March 2013a)
- “SWMU 154 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013” (SNL/NM March 2013b)

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). 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).

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-MW1, CTF-MW2, CTF-MW3, CYN-MW6, OBS-MW1, OBS-MW2, and OBS-MW3 in the first quarter of CY 2013. Table II-4 summarizes current and historical perchlorate results for wells currently in the perchlorate-screening monitoring network. The analytical laboratory COA for the first quarter of CY 2013 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-MW1, CTF-MW2, CTF-MW3, CYN-MW5, OBS-MW1, OBS-MW2, or OBS-MW3.

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 (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 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 December 2012a,

December 2012b, December 2012c, March 2013a, and March 2013b) were identified during the first quarter of CY 2013 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-MW1, CTF-MW2, CTF-MW3, CYN-MW5, 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.

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.

6.0 References

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act 74-4-10: Sandia National Laboratories Consent Order," New Mexico Environment Department. April 24, 2004.

New Mexico Environment Department (NMED), January 2006. "RE: Monitoring Groundwater for Perchlorate, Report of November 22, 2005. Sandia National Laboratories EPA ID# NM5890110518." Letter to P. Wagner (SSO/NNSA) and P. Davies (SNL/NM) from J. Bearzi (NMED/HWB), January 27, 2006.

New Mexico Environment Department (NMED) June 2006. "Technical Background Document for Development of Soil Screening Levels, Revision 4.0," New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico.

New Mexico Environment Department (NMED) March 2007. "RE: Notice of Approval: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2006 (April, May, and June), September 20, 2006, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-011." Letter to P. Wagner (SSO/NNSA) and P. Davies (SNL/NM) from J. Bearzi (NMED/HWB), March 23, 2007.

New Mexico Environment Department (NMED), November 2008. "RE: Perchlorate Issues." E-mail correspondence to J. Cochran (SNL/NM) from S. Brandwein (NMED), November 7, 2008.

New Mexico Environment Department (NMED), April 2009. "RE: Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID# NM5890110518." Letter to K. Davis (SSO/NNSA) and F. Nimick (SNL/NM) from J. Bearzi (NMED/HWB), April 30, 2009.

New Mexico Environment Department (NMED), February 2010. "RE: Notice of Conditional Approval, Burn Site Groundwater Characterization Work Plan, November 2009, Sandia National Laboratories, EPA ID# NM5890110518, SNL-09-017." Letter to P. Wagner (SSO/NNSA) and M. Walck (SNL/NM) from J. Bearzi (NMED/HWB), February 12, 2010.

New Mexico Environment Department (NMED), April 2010. "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," April 8, 2010.

New Mexico Environment Department (NMED), December 2010. "Approval with Modifications, Response to April 8, 2010 Letter, Groundwater Monitoring Plan for SWMUs 149 and 154," December 21, 2010.

New Mexico Environment Department (NMED), January 2011. "Notice of Approval with Modification: Groundwater Monitoring Well Installation Work Plans for SWMUs 8/58 and 68, September 2010," January 28, 2011.

New Mexico Environment Department (NMED), September 2011. "RE: Request to Modify Schedule for Reporting of Activities and Groundwater Data in Future Consolidated Quarterly Reports for Environmental Restoration Operations, Sandia National Laboratories, EPA ID# NM5890110518," September 15, 2011.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), November 2005. Letter Report to J. Bearzi (New Mexico Environment Department), "Letter Report on the Status of Perchlorate Screening in Groundwater at Sandia Monitoring Wells," Environmental Restoration Project, Sandia National Laboratories, New Mexico, November 22, 2005.

Sandia National Laboratories, New Mexico (SNL/NM), June 2006. "Perchlorate Screening Quarterly Monitoring Report, First Quarter of Calendar Year 2006 (January, February, and March 2006)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), February 2006. "Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2005 (October, November, and December 2005)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2007. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2006 (October, November, and December 2006)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM) April 2007. Letter to J. Bearzi (New Mexico Environment Department [NMED] Hazardous Waste Bureau) from P. Wagner (Sandia Site Office/NNSA), "Response to NMED approval letter of March 23, 2007, entitled RE: Notice of Approval: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2006 (April, May, and June) September 20, 2006. Sandia National Laboratories, EPA ID# NM5890110518. HWB-SNL-06-011," Environmental Restoration Project, Sandia National Laboratories, New Mexico, April 19, 2007.

Sandia National Laboratories, New Mexico (SNL/NM), March 2008. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2007 (October, November, and December 2007)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2009. "Burn Site Groundwater Characterization Work Plan: Installation of Groundwater Monitoring Wells CYN-MW9, CYN-MW10, CYN-MW11 and Collection of Subsurface Soil Samples, November 2009," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2010. "U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department 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*," Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010. “SWMU 68 and SWMUs 8/58 Groundwater Characterization Work Plans – U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department 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,” Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. “Data Validation Procedure for Chemical and Radiochemical Data,” Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2011. “Request to Modify Schedule for Reporting of Activities and Groundwater Data in Future Consolidated Quarterly Reports for Environmental Restoration Operations,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012a. “Groundwater Monitoring Equipment Decontamination,” Field Operating Procedure 05-03, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012b. “Groundwater Monitoring Well Sampling and Field Analytical Measurements,” Field Operating Procedure 05-01, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2012a. “SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2012b. “SWMU 68 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2012c. “SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2013 Annual Sampling,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2013a. “SWMU 149 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2013b. “SWMU 154 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), April 2013. "Consolidated Quarterly Report, October through December 2012, Section II: Perchlorate Screening Quarterly Monitoring Report," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

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

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

Figures

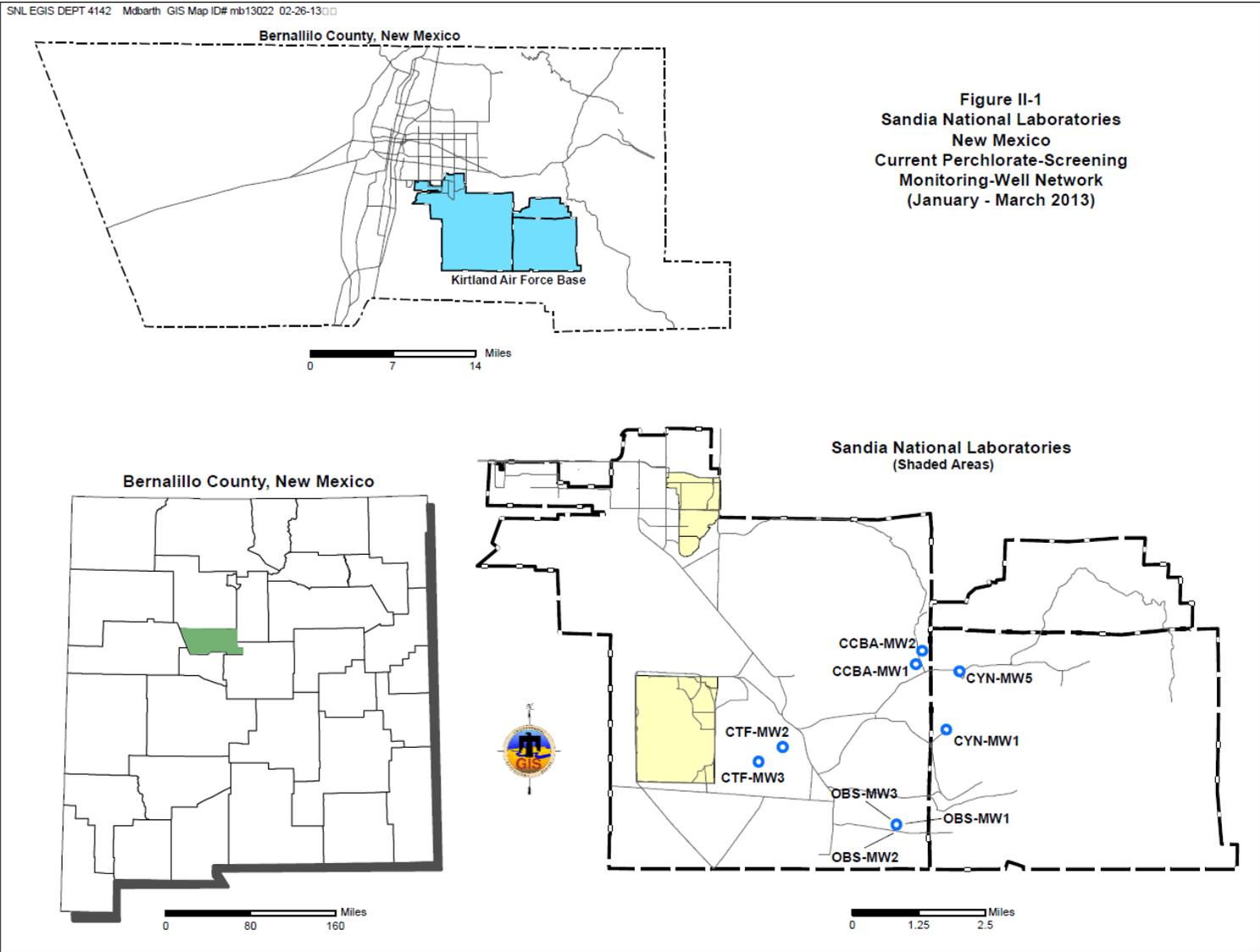


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate-Screening Monitoring Well Network, January – March 2013

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
First Quarter, CY 2013

Well	Date Sampled	Number of Consecutive Sampling Events ^a	Remaining Number of Sampling Events ^b	Sampling Equipment
CCBA-MW1	16-Jan-13	6	2	Bennett™ Pump
CCBA-MW2	15-Jan-13	6	2	Bennett™ Pump
CTF-MW1	28-Jan-13	3	TBD ^c	Bennett™ Pump
CTF-MW2	26-Mar-13	9	TBD ^d	Bennett™ Pump
CTF-MW3	22-Mar-13	9	TBD ^d	Bennett™ Pump
CYN-MW5	24-Jan-13	3	TBD ^c	Bennett™ Pump
OBS-MW1	22-Jan-13	6	2	Bennett™ Pump
OBS-MW2	21-Jan-13	6	2	Bennett™ Pump
OBS-MW3	23-Jan-13	6	2	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 monitors a Solid Waste Management Unit that is subject to groundwater monitoring controls and will be sampled annually per NMED requirements (NMED April 2010).

^dTBD = 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.

- 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-MW6
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
NWTA3-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 First Quarter, CY 2013 Perchlorate Sampling**

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	093341-020 093342-020	614567	SWMUs 8/58
CCBA-MW2	093336-020	614565	SWMUs 8/58
CTF-MW1	093359-020	614574	SWMU 116
CTF-MW2	093723-020 093724-020	614663	SWMU 154
CTF-MW3	093717-020 093718-020	614661	SWMU 149
CYN-MW5	093356-020 093357-020	614573	SWMU 49
OBS-MW1	093349-020 093350-020	614570	SWMU 68
OBS-MW2	093344-020	614568	SWMU 68
OBS-MW3	093352-020	614571	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 First Quarter, CY 2013

Well	Sample Date	AR/COC Number	Sample Number	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	
	16-Jan-13	614567	093341-020	ND	4.0	12	NE	U		EPA 314.0	
093342-020			ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
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	
			092296-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			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
15-Jan-13	614565	093336-020	ND	4.0	12	NE	U		EPA 314.0		
CTF-MW1	07-Mar-11	613444	090227-020	ND	4.0	12	NE	U		EPA 314.0	
	01-Feb-12	613981	091700-020	ND	4.0	12	NE	U		EPA 314.0	
			091701-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	28-Jan-13	614574	093359-020	ND	4.0	12	NE	U		EPA 314.0	
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	
			091949-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092538-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jun-12	614255	092862-020	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		
		093723-020	ND	4.0	12	NE	U		EPA 314.0		
26-Mar-13	614663	093724-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of First Quarter, CY 2013

Well ID	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL ^b (µg/L)	PQL ^c (µg/L)	MCL ^d (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical Method ^g	Comments
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	
	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
22-Mar-13	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0		
		093717-020	ND	4.0	12	NE	U		EPA 314.0		
		093718-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
CYN-MW5	26-May-04	607546	065032-044	ND	4.0	12	NE	U		EPA 314.0	
	16-Sep-04	607811	065738-016	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Nov-04	608047	066427-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Feb-05	608285	067442-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Mar-11	613446	090232-020	ND	4.0	12	NE	U		EPA 314.0	
			090232-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-Jan-12	613979	091692-020	ND	4.0	12	NE	U		EPA 314.0	
24-Jan-13	614573	093356-020	ND	4.0	12	NE	U		EPA 314.0		
		093357-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
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	
			092022-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	614081	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092618-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
22-Jan-13	614570	093003-020	ND	4.0	12	NE	U		EPA 314.0		
		093349-020	ND	4.0	12	NE	U		EPA 314.0		
		093350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
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
21-Jan-12	614568	093344-020	ND	4.0	12	NE	U		EPA 314.0		

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring-Well Network as of First Quarter, CY 2013

Well ID	Sample Date	AR/COC Number	Sample Number	Result (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-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	
			092625-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			093010-020	ND	4.0	12	NE	U		EPA 314.0	
23-Jan-12	614571	093352-020	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

^eLaboratory Qualifier

H = Analytical holding time was exceeded.
 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.
 UJ = The analyte was analyzed, but not detected. The associated value is an estimate and may be inaccurate or imprecise.
 X1 = General data quality is suspect.

Table II-4 (Concluded)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring-Well Network as of First Quarter, CY 2013

Notes (continued)

⁹Analytical 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, First Quarter, CY 2013

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	16-Jan-13	13.20	494	211.7	6.34	0.57	30.3	3.17
CCBA-MW2	15-Jan-13	12.34	573	178.3	7.28	0.40	57.4	6.13
CTF-MW1	28-Jan-13	15.24	614	211.9	7.08	0.66	68.5	6.85
CTF-MW2	26-Mar-13	16.46	3284	71.3	5.80	1.41	2.7	0.26
CTF-MW3	22-Mar-13	20.48	1557	228.9	6.72	0.70	84.5	7.56
CYN-MW5	24-Jan-13	16.18	347	230.0	5.71	0.87	48.0	4.71
OBS-MW1	22-Jan-13	16.19	505	190.4	7.13	0.66	37.3	3.66
OBS-MW2	21-Jan-13	17.07	501	200.8	7.11	0.52	37.0	3.56
OBS-MW3	23-Jan-13	15.29	501	189.5	7.14	0.54	44.2	4.42

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

Internal Lab

Batch No. NA

AR/COC **614567** ✓

Project Name: <u>SWMU 8/58 GWM</u>	Date Samples Shipped: <u>1/16/13</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. <u>150796</u>	SMO Contact Phone: <u>See B2/H6 order</u>	
Project/Task Number: <u>98026.01.12</u>	Lab Contact: <u>Edie Kent/803.556.8171</u>	Lorraine Herrera/505-844-3199	
Service Order: <u>CF262-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO:	
Contract No.: <u>PO 691436</u>		Lorraine Herrera/505-844-3199	<input checked="" type="checkbox"/> 4° Celsius

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					
✓ 093341	-001 ✓	CCBA MW1	79	1/16/13 9:26 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	318530 015
✓ 093341	-002 ✓	CCBA MW1	79	1/16/13 9:29 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	318530 016
✓ 093341	-009 ✓	CCBA MW1	79	1/16/13 9:30 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	318530 017
✓ 093341	-016 ✓	CCBA MW1	79	1/16/13 9:31 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	318530 018
✓ 093341	-017 ✓	CCBA MW1	79	1/16/13 9:32 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	318619 002
✓ 093341	-018 ✓	CCBA MW1	79	1/16/13 9:33 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	318530 019
✓ 093341	-020 ✓	CCBA MW1	79	1/16/13 9:34 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	318530 020
✓ 093341	-022 ✓	CCBA MW1	79	1/16/13 9:35 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	318530 021
✓ 093341	-024 ✓	CCBA MW1	79	1/16/13 9:38 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	318530 022
✓ 093341	-027 ✓	CCBA MW1	79	1/16/13 9:39 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	318530 023

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	[Signature]	RL	SNL/4142/844-4013/250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
	Alfred Santillanes	[Signature]	AS	SNL/4142/844-5130/228-0710	
	William J. Gibson	[Signature]	WJG	SNL/4142/844-4013/239-7367	
					FGW(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

1. Relinquished by	Org.	Date	Time	3. Relinquished by	Org.	Date	Time
1. Received by <u>[Signature]</u>	Org. 4142	Date 1/16/13	Time 1033	3. Received by	Org.	Date	Time
2. Relinquished by <u>[Signature]</u>	Org. 4142	Date 1/16/13	Time 1100	4. Relinquished by	Org.	Date	Time
2. Received by <u>[Signature]</u>	Org.	Date 1-17-13	Time 7:55	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 614567

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		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested		Lab Sample ID	
				↓	Collected		Type	Volume							
✓ 093341	-033 ✓	CCBA MW1	79	1/16/13	9:40 ✓	GW	P	1 L ✓	HNO3	G	SA	Gamma Spec (short list)(901.0)	318530 024		
✓ 093341	-034 ✓	CCBA MW1	79	1/16/13	9:42 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	318530 025		
✓ 093341	-035 ✓	CCBA MW1	79	1/16/13	9:44 ✓	GW	P	1 L	HNO3	G	SA	Isotopic U (HASL-300)	318530 026		
✓ 093342	-001 ✓	CCBA MW1	79	1/16/13	9:26 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	318530 027		
✓ 093342	-002	CCBA MW1	79	1/16/13	9:29 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	318530 028		
✓ 093342	-009 ✓	CCBA MW1	79	1/16/13	9:30 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	318530 029		
✓ 093342	-016 ✓	CCBA MW1	79	1/16/13	9:31 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	318530 030		
✓ 093342	-017 ✓	CCBA MW1	79	1/16/13	9:32 ✓	FGW	P	250 ml	HNO3	G	DU	Metals (SW846-6020)	318530 003		
✓ 093342	-018 ✓	CCBA MW1	79	1/16/13	9:33 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	318530 031		
✓ 093342	-020 ✓	CCBA MW1	79	1/16/13	9:34 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	318530 032		
✓ 093342	-022 ✓	CCBA MW1	79	1/16/13	9:35 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	318530 033		
✓ 093342	-024 ✓	CCBA MW1	79	1/16/13	9:38 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	318530 034		
✓ 093342	⁰²⁷ -026 ✓	CCBA MW1	79	1/16/13	9:39 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	318530 035		
✓ 093342	-033 ✓	CCBA MW1	79	1/16/13	9:40 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	318530 036		
✓ 093342	-034 ✓	CCBA MW1	79	1/16/13	9:42 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	318530 037		
✓ 093342	-035 ✓	CCBA MW1	79	1/16/13	9:44 ✓	GW	P	1 L	HNO3	G	DU	Isotopic U (HASL-300)	318530 038		
✓ 093343	-001 ✓	CCBA TB3 ✓	N/A	1/16/13	9:26 ✓	DIW	P	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	318530 039		
Recipient Initials															

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 11, 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: Groundwater, Level C Package

Client Sample ID: 093341-020
Sample ID: 318530020
Matrix: AQUEOUS
Collect Date: 16-JAN-13 09:34
Receive Date: 17-JAN-13
Collector: Client

Project: SNLSGWater
Client ID: SNLS004
Client Desc.: CCBA MW1
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	MARI	01/31/13	1505	1277269	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 11, 2013

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

Client Sample ID: 093342-020	Project: SNLSGWater
Sample ID: 318530032	Client ID: SNLS004
Matrix: AQUEOUS	
Collect Date: 16-JAN-13 09:34	
Receive Date: 17-JAN-13	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	01/31/13	1524	1277269	I

The following Analytical Methods were performed:

Method	Description	Analyst Comments
I	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

Project Name: SWMU 8/58 GWM
 Project/Task Manager: Clinton Lum
 Project/Task Number: 98026.01.12
 Service Order: CF262-13

Date Samples Shipped: 1/15/13
 Carrier/Waybill No. 150745
 Lab Contact: Edie Kent/803.556.8171
 Lab Destination: GEL
 Contract No.: PO 691436

SMO Authorization: *[Signature]*
 SMO Contact Phone: *see below*
 Lorraine Herrera/505-844-3199
 Send Report to SMO: Lorraine Herrera/505-844-3199

AR/COC **614565**

Waste Characterization
 RMMA
 Released by COC No. 4° Celsius

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____
 Bill to: Sandia National Laboratories (Accounts Payable),
 P.O. Box 5800, MS-0154
 Albuquerque, NM 87185-0154 *318530*

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					
093336	-001	CCBA MW2	117	1/15/13 9:15	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	318530 001
093336	-002	CCBA MW2	117	1/15/13 9:17	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	318530 002
093336	-009	CCBA MW2	117	1/15/13 9:18	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	318530 003
093336	-016	CCBA MW2	117	1/15/13 9:19	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	318530 004
093336	-017	CCBA MW2	117	1/15/13 9:21	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	318619 001
093336	-018	CCBA MW2	117	1/15/13 9:22	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	318530 005
093336	-020	CCBA MW2	117	1/15/13 9:23	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	318530 006
093336	-022	CCBA MW2	117	1/15/13 9:24	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	318350 007
093336	-024	CCBA MW2	117	1/15/13 9:26	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	318350 008
093336	-027	CCBA MW2	117	1/15/13 9:27	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	318350 009

Last Chain: Yes No
 Validation Req'd: Yes No
 Background: Yes No
 Confirmatory: Yes No

Sample Tracking SMO Use
 Date Entered: _____
 Entered by: _____
 QC inits.: _____

Special Instructions/QC Requirements:
 EDD Yes No
 Turnaround Time 7 Day* 15 Day* 30 Day
 Negotiated TAT

Sample Disposal Return to Client Disposal by Lab
 Return Samples By: _____

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
 FGW (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

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 1/15/13 Time 10:00	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>John W. [Signature]</i> Org. 4142 Date 1/15/13 Time 10:00	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>John W. [Signature]</i> Org. 4142 Date 1/15/13 Time 11:00	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>John W. [Signature]</i> Org. _____ Date 1-16-13 Time 8:50	4. Received by _____ Org. _____ Date _____ Time _____

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

318530
1/17/13

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 11, 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: Groundwater, Level C Package

Client Sample ID: 093336-020
 Sample ID: 318530006
 Matrix: AQUEOUS
 Collect Date: 15-JAN-13 09:23
 Receive Date: 16-JAN-13
 Collector: Client

Project: SNLSGWater
 Client ID: SNLS004
 Client Desc.: CCBA MW2
 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	01/31/13	1408	1277269	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. *NL*

Page 1 of 2

Project Name: SWMU 49/116 GWM		Date Samples Shipped: <i>1/28/13</i>		SMO Authorization: <i>Don W. Stuyvesant</i>		AR/COC 614574 <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: Mike Skelly		Carrier/Waybill No. <i>200137</i>		SMO Contact Phone: <i>see Bob Gank</i>			
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-8443199		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Service Order: CF 249-13		Lab Destination: GEL		Send Report to SMO: Lorraine Herrera/505-8443199			
Tech Area:		Contract No.: PO 1303873					
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					
093359	-001	CTF-MW1	260	1/28/13 9:51	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	319234 001
093359	-009	CTF-MW1	260	1/28/13 9:52	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	319234 002
093359	-016	CTF-MW1	260	1/28/13 9:53	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	319234 003
093359	-017	CTF-MW1	260	1/28/13 9:54	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	319235 001
093359	-018	CTF-MW1	260	1/28/13 9:55	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	319234 004
093359	-020	CTF-MW1	260	1/28/13 9:56	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	319234 005
093359	-022	CTF-MW1	260	1/28/13 9:57	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	319234 006
093359	-024	CTF-MW1	260	1/28/13 9:59	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	319234 007
093359	-027	CTF-MW1	260	1/28/13 10:00	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	319234 008
093359	-033	CTF-MW1	260	1/28/13 10:01	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	319234 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 initials:				Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell				
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/844-4013/250-7090				
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/844-5130/228-0710				
	William J. Gibson	<i>William J. Gibson</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367				
						Return Samples By:		Lab Use
						Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
						Comments: Send report to Tim Jackson/4142/MS 0729/284-2547		
						FGW (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		

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>1/28/13</i> Time <i>10:27</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don W. Stuyvesant</i> Org. <i>4142</i> Date <i>1/28/13</i> Time <i>10:27</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>Don W. Stuyvesant</i> Org. <i>4142</i> Date <i>1/28/13</i> Time <i>11:00</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>Don W. Stuyvesant</i> Org. _____ Date <i>1-29-13</i> Time <i>11:45</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: February 20, 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: Groundwater, Level C Package

Client Sample ID: 093359-020 Project: SNLSGWater
Sample ID: 319234005 Client ID: SNLS004
Matrix: AQUEOUS
Collect Date: 28-JAN-13 09:56
Receive Date: 29-JAN-13 Client Desc.: CTF-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	01/31/13	1914	1277269	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*

Project Name: SWMU 154 GWM		Date Samples Shipped: <i>3/26/13</i>		SMO Authorization: <i>Don Williams</i>		AR/COC 614663			
Project/Task Manager: Clinton Lum		Carrier/Waybill No. <i>202633</i>		SMO Contact Phone: <i>505-844-3199</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.			
Project/Task Number: 98026.01.15		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199		<input checked="" type="checkbox"/> 4° Celsius			
Service Order: CF251-13		Lab Destination: GEL		Send Report to SMO: Rita Kavanaugh/505-284-2553		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154			
Contract No.: PO 1303873		Tech Area:		Building:		Room:			
Operational Site:		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							
<input checked="" type="checkbox"/>	093723	-001	CTF-MW2	129	3/26/13 9:29	GW	G 3x40ml HCL G SA	TCL VOC (SW846-8260B)	322517 013
<input checked="" type="checkbox"/>	093723	-002	CTF-MW2	129	3/26/13 9:31	GW	AG 4x1L None G SA	TCL SVOC (SW846-8270C)	322517 014
<input checked="" type="checkbox"/>	093723	-009	CTF-MW2	129	3/26/13 9:34	GW	P 500 ml HNO3 G SA	TAL Metals+U(SW846-6010/6020/7470)	322517 015
<input checked="" type="checkbox"/>	093723	-010	CTF-MW2	129	3/26/13 9:35	FGW	P 500 ml HNO3 G SA	TAL Metals+U(SW846-6010/6020/7470)	322521 002
<input checked="" type="checkbox"/>	093723	-016	CTF-MW2	129	3/26/13 9:37	GW	P 125 ml None G SA	Anions (SW846-9056)	322517 016
<input checked="" type="checkbox"/>	093723	-018	CTF-MW2	129	3/26/13 9:38	GW	P 125 ml H2SO4 G SA	NPN (353.2)	322517 017
<input checked="" type="checkbox"/>	093723	-020	CTF-MW2	129	3/26/13 9:39	GW	P 250 ml None G SA	Perchlorate (314.0)	322517 018
<input checked="" type="checkbox"/>	093723	-022	CTF-MW2	129	3/26/13 9:40	GW	P 500 ml None G SA	Alkalinity (SM2320B)	322517 019
<input checked="" type="checkbox"/>	093723	-024	CTF-MW2	129	3/26/13 9:41	GW	AG 4x1L None G SA	High Explosives (SW846-8321A Mod)	322517 020
<input checked="" type="checkbox"/>	093723	-033	CTF-MW2	129	3/26/13 9:44	GW	P 1 L HNO3 G SA	Gamma Spec. (901.0)	322517 021
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>	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:			
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367		Send report to Tim Jackson/4142/MS 0729/284-2547			
CTF-MW2 water has high buffering capacity, check pH and add preservatives as needed. If Perchlorate detected, then perform verification analysis using SW846-6850. Report Anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, and CO3. Report Gamma Spec for short list isotopes. FGW, filtered in field w/ 40 micron filter.									
1. Relinquished by <i>Alfred Santillanes</i> Org. 4142		Date <i>3/26/13</i> Time <i>10:29</i>		3. Relinquished by		Org.		Date	
1. Received by <i>Don Williams</i> Org. 4142		Date <i>3/26/13</i> Time <i>10:29</i>		3. Received by		Org.		Date	
2. Relinquished by <i>Don Williams</i> Org. 4142		Date <i>3/26/13</i> Time <i>11:00</i>		4. Relinquished by		Org.		Date	
2. Received by <i>William Gibson</i> Org. GEL		Date <i>3-27-13</i> Time <i>0735</i>		4. Received by		Org.		Date	

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614663

Project Name: SWMU 154 GWM		Project/Task Manager: Clinton Lum		Project/Task No.: 98026.01.15									
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 use	
						Type	Volume					Lab Sample ID	
✓ 093723	-034 ✓	CTF-MW2	129	3/26/13 9:45 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (900.0)	322517 022	
✓ 093723	-035 ✓	CTF-MW2	129	3/26/13 9:46 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (ASTM D3972-09M)	322517 023	
✓ 093724	-001 ✓	CTF-MW2	129	3/26/13 9:29 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	322517 024	
✓ 093724	-002 ✓	CTF-MW2	129	3/26/13 9:31 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	322517 025	
✓ 093724	-009 ✓	CTF-MW2	129	3/26/13 9:34 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	322517 026	
✓ 093724	-010 ✓	CTF-MW2	129	3/26/13 9:35 ✓	FGW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	322521 003	
✓ 093724	-016 ✓	CTF-MW2	129	3/26/13 9:37 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	322517 027	
✓ 093724	-018 ✓	CTF-MW2	129	3/26/13 9:38 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	322517 028	
✓ 093724	-020 ✓	CTF-MW2	129	3/26/13 9:39 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	322517 029	
✓ 093724	-022 ✓	CTF-MW2	129	3/26/13 9:40 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	322517 030	
✓ 093724	-024 ✓	CTF-MW2	129	3/26/13 9:41 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod)	322517 031	
✓ 093724	-033 ✓	CTF-MW2	129	3/26/13 9:44 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec. (901.0)	322517 032	
✓ 093724	-034 ✓	CTF-MW2	129	3/26/13 9:45 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (900.0)	322517 033	
✓ 093724	-035 ✓	CTF-MW2	129	3/26/13 9:46 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (ASTM D3972-09M)	322517 034	
✓ 093725	-001 ✓	CTF-TB4	NA	3/26/13 9:29 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	322517 035	
✓ 093726	-001 ✓	CTF-FB2	NA	3/26/13 9:23 ✓	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	322517 036	
Recipient Initials <i>MK</i>													

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: April 23, 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: Groundwater, Level C Package

Client Sample ID: 093723-020	Project: SNLSGWater
Sample ID: 322517018	Client ID: SNLS004
Matrix: AQUEOUS	
Collect Date: 26-MAR-13 09:39	
Receive Date: 27-MAR-13	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	03/29/13	1250	1290590	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Certificate of Analysis

Report Date: April 23, 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: Groundwater, Level C Package

Client Sample ID: 093724-020
 Sample ID: 322517029
 Matrix: AQUEOUS
 Collect Date: 26-MAR-13 09:39
 Receive Date: 27-MAR-13
 Collector: Client

Project: SNLSGWater
 Client ID: SNLS004
 Client Desc.: CTF-MW2
 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	03/29/13	1309	1290590	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

Project Name: <u>SWMU 149 GWM</u>		Date Samples Shipped: <u>3/25/13</u>		SMO Authorization: <u>Don Valencia</u>		AR/COC 614661	
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No.: <u>202039</u>		SMO Contact Phone: <u>see bottle order</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.	
Project/Task Number: <u>98026.01.14</u>		Lab Contact: <u>Edie Kent/803-556-8171</u>		Lorraine Herrera/505-844-3199		<input checked="" type="checkbox"/> 4° Celsius	
Service Order: <u>CF250-13</u>		Lab Destination: <u>GEL</u>		Send Report to SMO:			
		Contract No.: <u>PO 1303873</u>		Rita Kavanaugh/505-284-2553			

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					
093717	-001	CTF-MW3	359	3/22/13 10:18	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	322514 001
093717	-009	CTF-MW3	359	3/22/13 10:19	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	322514 002
093717	-010	CTF-MW3	359	3/22/13 10:20	FGW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	322515 001
093717	-016	CTF-MW3	359	3/22/13 10:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	322514 003
093717	-018	CTF-MW3	359	3/22/13 10:23	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	322514 004
093717	-020	CTF-MW3	359	3/22/13 10:24	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	322514 005
093717	-022	CTF-MW3	359	3/22/13 10:25	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	322514 006
093718	-001	CTF-MW3	359	3/22/13 10:18	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	322514 007
093718	-009	CTF-MW3	359	3/22/13 10:19	GW	P	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	322514 008
093718	-010	CTF-MW3	359	3/22/13 10:20	FGW	P	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	322515 002

Last Chain: Yes
 Validation Req'd: Yes
 Background: Yes
 Confirmatory: Yes

Sample Tracking
 Date Entered:
 Entered by:
 QC inits.:

SMO Use
 Special Instructions/QC Requirements:
 EDD Yes No
 Turnaround Time 7 Day* 15 Day* 30 Day
 Negotiated TAT
 Sample Disposal Return to Client Disposal by Lab
 Return Samples By:

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
		Danielle Nieto	<i>[Signature]</i>	<i>[Init]</i>
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710
	William Gibson	<i>[Signature]</i>		SNL/4142/505-284-3307/505-239-7367

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
 Anions as Br, Cl, F, SO4. Alkalinity as total CaCO3, HCO3, CO3. if perchlorate detected, then perform verification analysis using SW846-6850M. FGW, filtered in field w/40 micron filtered.

Conditions on Receipt

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>3/25/13</u> Time <u>0936</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Don Valencia</u> Org. <u>4142</u> Date <u>3/25/13</u> Time <u>0936</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>Don Valencia</u> Org. <u>4142</u> Date <u>3/25/13</u> Time <u>1100</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>Edie Kent</u> Org. <u>GEL</u> Date <u>3-26-13</u> Time <u>0750</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: April 22, 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: Groundwater, Level C Package

Client Sample ID: 093717-020
 Sample ID: 322514005
 Matrix: AQUEOUS
 Collect Date: 22-MAR-13 10:24
 Receive Date: 26-MAR-13
 Collector: Client

Project: SNLSGWater
 Client ID: SNLS004
 Client Desc.: CTF-MW3
 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	MARJ	03/29/13	1114	1290590	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: April 22, 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: Groundwater, Level C Package

Client Sample ID: 093718-020
 Sample ID: 322514011
 Matrix: AQUEOUS
 Collect Date: 22-MAR-13 10:24
 Receive Date: 26-MAR-13
 Collector: Client

Project: SNLSGWater
 Client ID: SNLS004
 Client Desc.: CTF-MW3
 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	03/29/13	1211	1290590	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 *PK*

Batch No. SMO Use AR/COC **614573**

Project Name: SWMU 49/116 GWM	Date Samples Shipped: 1/24/13	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: Mike Skelly	Carrier/Waybill No.: 200150	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803.556.8171	Lorraine Hererra/505-8443199	
Service Order: CF 249-13	Lab Destination: GEL	Send Report to SMO: Lorraine Hererra/505-8443199	
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					
✓ 093356	-001	CYN-MW5	155	1/24/13 10:22	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	319064 001
✓ 093356	-009	CYN-MW5	155	1/24/13 10:23	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	319064 002
✓ 093356	-016	CYN-MW5	155	1/24/13 10:24	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	319064 003
✓ 093356	-017	CYN-MW5	155	1/24/13 10:26	FGW	P	500 ml	HNO3	G	SA	Metals (SW846-6020)	319073 001
✓ 093356	-018	CYN-MW5	155	1/24/13 10:27	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	319064 004
✓ 093356	-020	CYN-MW5	155	1/24/13 10:28	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	319064 005
✓ 093356	-022	CYN-MW5	155	1/24/13 10:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	319064 006
✓ 093356	-024	CYN-MW5	155	1/24/13 10:31	GW	AG	4x1L	None	G	SA	HE (SW846-8321A mod.)	319064 007
✓ 093356	-027	CYN-MW5	155	1/24/13 10:32	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	319064 008
✓ 093356	-033	CYN-MW5	155	1/24/13 10:33	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	319064 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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time		<input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes		Negotiated TAT		Sample Disposal		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Return Samples By:			
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (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>[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 1/24/13 Time 11:10	3. Relinquished by	Org.	Date	Time
1. Received by <i>Donna Blum</i> Org. 4142 Date 1/24/13 Time 11:10	3. Received by	Org.	Date	Time
2. Relinquished by <i>Donna Blum</i> Org. 4142 Date 1/24/13 Time 12:00	4. Relinquished by	Org.	Date	Time
2. Received by <i>Mike Skelly</i> Org. GEL Date 1-25-13 Time 0750	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: February 18, 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: Groundwater, Level C Package

Client Sample ID: 093356-020
Sample ID: 319064005
Matrix: AQUEOUS
Collect Date: 24-JAN-13 10:28
Receive Date: 25-JAN-13
Collector: Client

Project: SNLSGWater
Client ID: SNLS004
Client Desc.: CYN-MW5
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	MARI	01/31/13	1817	1277269	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: February 18, 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: Groundwater, Level C Package

Client Sample ID: 093357-020
 Sample ID: 319064015
 Matrix: AQUEOUS
 Collect Date: 24-JAN-13 10:28
 Receive Date: 25-JAN-13
 Collector: Client

Project: SNLSGWater
 Client ID: SNLS004
 Client Desc.: CYN-MW5
 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	01/31/13	1836	1277269	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

Project Name: <u>SWMU 68 GWM</u>		Date Samples Shipped: <u>1/22/13</u>		SMO Authorization: <u>Donald Lynch</u>		AR/COC 614570	
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No. <u>150963</u>		SMO Contact Phone: <u>See Bottle order</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.	
Project/Task Number: <u>98026 01.13</u>		Lab Contact: <u>Edie Kent/803.556.8171</u>		Lorraine Herrera/505-844-3199		<input checked="" type="checkbox"/> 4° Celsius	
Service Order: <u>CF 263-13</u>		Lab Destination: <u>GEL</u>		Send Report to SMO:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Contract No.: <u>PO 1303873</u>		Rita Kavanaugh/505.284.2553					

Tech Area: _____ 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					
093349	-001 ✓	OBS-MW1	153	1/22/13 9:34 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	318826 030
093349	-002	OBS-MW1	153	1/22/13 9:36 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	318826 031
093349	-009 ✓	OBS-MW1	153	1/22/13 9:37 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	318826 032
093349	-014 ✓	OBS-MW1	153	1/22/13 9:38 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	318826 033
093349	-016 ✓	OBS-MW1	153	1/22/13 9:39 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	318826 034
093349	-017 ✓	OBS-MW1	153	1/22/13 9:40 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	318826 003
093349	-018	OBS-MW1	153	1/22/13 9:41 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	318826 035
093349	-020	OBS-MW1	153	1/22/13 9:42 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	318826 036
093349	-022	OBS-MW1	153	1/22/13 9:43 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	318826 037
093349	-024 ✓	OBS-MW1	153	1/22/13 9:46 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	318826 038

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>	<i>[Init]</i>	SNL/4142/844-4013/250-7090		Return Samples By:	
	Alfred Santillanes		<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/844-5130/228-0710		Comments:	
	William J. Gibson		<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/844-4013/239-7367		Send report to Tim Jackson/4142/MS 0729/284-2547	
						FGW (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)		Lab Use

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>1/22/13</u> Time <u>10:32</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Donald Lynch</u> Org. <u>4142</u> Date <u>1/22/13</u> Time <u>10:32</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>Donald Lynch</u> Org. <u>4142</u> Date <u>1/22/13</u> Time <u>11:00</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>William J. Gibson</u> Org. <u>GEL</u> Date <u>1-23-13</u> Time <u>0730</u>	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)

Project Name: SWMU 68 GWM		Project/Task Manager: Clinton Lum			Project/Task No.: 98026 01.13			AR/COC		614570 ✓		
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 use
						Type	Volume					
093349	-027 ✓	OBS-MW1	153	1/22/13 9:47 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	318826 039
093349	-033 ✓	OBS-MW1	153	1/22/13 9:48 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	318826 040
093349	-034 ✓	OBS-MW1	153	1/22/13 9:50 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	318826 041
093349	-035 ✓	OBS-MW1	153	1/22/13 9:52 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	318826 042
093350	-001 ✓	OBS-MW1	153	1/22/13 9:34 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	318826 043
093350	-002 ✓	OBS-MW1	153	1/22/13 9:36 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	318826 044
093350	-009 ✓	OBS-MW1	153	1/22/13 9:37 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	318826 045
093350	-014 ✓	OBS-MW1	153	1/22/13 9:38 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	318826 046
093350	-016 ✓	OBS-MW1	153	1/22/13 9:39 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	318826 047
093350	-017 ✓	OBS-MW1	153	1/22/13 9:40 ✓	FGW	P	250 ml	HNO3	G	DU	Metals (SW846-6020)	318826 048
093350	-018 ✓	OBS-MW1	153	1/22/13 9:41 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	318826 048
093350	-020 ✓	OBS-MW1	153	1/22/13 9:42 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	318826 049
093350	-022 ✓	OBS-MW1	153	1/22/13 9:43 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	318826 050
093350	-024 ✓	OBS-MW1	153	1/22/13 9:46 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	318826 051
093350	-027 ✓	OBS-MW1	153	1/22/13 9:47 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	318826 052
093350	-033 ✓	OBS-MW1	153	1/22/13 9:48 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	318826 053
093350	-034 ✓	OBS-MW1	153	1/22/13 9:50 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	318826 054
093350	-035 ✓	OBS-MW1	153	1/22/13 9:52 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	318826 055
093351	-001 ✓	OBS-TB3	N/A	1/22/13 9:34 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	318826 056
Recipient Initials <i>ML</i>												

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 22, 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: Groundwater, Level C Package

Client Sample ID: 093349-020	Project: SNLSGWater
Sample ID: 318826036	Client ID: SNLS004
Matrix: AQUEOUS	
Collect Date: 22-JAN-13 09:42	
Receive Date: 23-JAN-13	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	01/31/13	1719	1277269	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 22, 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: Groundwater, Level C Package

Client Sample ID: 093350-020	Project: SNLSGWater
Sample ID: 318826049	Client ID: SNLS004
Matrix: AQUEOUS	
Collect Date: 22-JAN-13 09:42	
Receive Date: 23-JAN-13	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	I	MAR1	01/31/13	1738	1277269	I

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*

Page 1 of 2

Project Name: SWMU 68 GWM		Date Samples Shipped: 1/21/13		SMO Authorization: <i>Don Waterford</i>		AR/COC 614568 ✓	
Project/Task Manager: Clinton Lum		Carrier/Waybill No. 200126		SMO Contact Phone: <i>See Both Goals</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.	
Project/Task Number: 98026 01.13		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199		<input checked="" type="checkbox"/> 4° Celsius	
Service Order: CF 263-13		Lab Destination: GEL		Send Report to SMO:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Tech Area:		Contract No.: PO 1303873		Lorraine Herrera/505-844-3199			
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					
✓ 093344	-001 ✓	OBS-MW2	252	1/21/13 9:30 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	318826 001
✓ 093344	-002 ✓	OBS-MW2	252	1/21/13 9:32 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	318826 002
✓ 093344	-009 ✓	OBS-MW2	252	1/21/13 9:33 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	318826 003
✓ 093344	-014 ✓	OBS-MW2	252	1/21/13 9:34 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	318826 004
✓ 093344	-016 ✓	OBS-MW2	252	1/21/13 9:35 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	318826 005
✓ 093344	-017 ✓	OBS-MW2	252	1/21/13 9:36 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	318828 001
✓ 093344	-018 ✓	OBS-MW2	252	1/21/13 9:37 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	318826 006
✓ 093344	-020 ✓	OBS-MW2	252	1/21/13 9:38 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	318826 007
✓ 093344	-022 ✓	OBS-MW2	252	1/21/13 9:39 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	318826 008
✓ 093344	-024 ✓	OBS-MW2	252	1/21/13 9:41 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	318826 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		
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/844-4013/250-7090		Return Samples By:		
	William J. Gibson	<i>William J. Gibson</i>	<i>WJG</i>	SNL/4142/844-5130/228-0710		Comments:		
						Send report to Tim Jackson/4142/MS 0729/284-2547		Lab Use
						FGW (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		

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>3142</i> Date <i>1/21/13</i> Time <i>11:29</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Waterford</i> Org. <i>4142</i> Date <i>1/21/13</i> Time <i>11:29</i>	3. Received by	Org.	Date	Time
2. Relinquished by <i>Don Waterford</i> Org. <i>4142</i> Date <i>1/21/13</i> Time <i>12:00</i>	4. Relinquished by	Org.	Date	Time
2. Received by <i>Don Waterford</i> Org. <i>4142</i> Date <i>1-22-13</i> Time <i>07:25</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: February 22, 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: Groundwater, Level C Package

Client Sample ID: 093344-020 Project: SNLSGWater
Sample ID: 318826007 Client ID: SNLS004
Matrix: AQUEOUS
Collect Date: 21-JAN-13 09:38
Receive Date: 22-JAN-13 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	01/31/13	1603	1277269	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*

Page 1 of 2

Project Name: <u>SWMU 68 GWM</u>		Date Samples Shipped: <u>1/23/13</u>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No. <u>151020</u>		SMO Contact Phone: <u>See B #6 order</u>		
Project/Task Number: <u>98026 01.13</u>		Lab Contact: <u>Edie Kent/803.556.8171</u>		Lorraine Herrera/505-844-3199		
Service Order: <u>CF 263-13</u>		Lab Destination: <u>GEL</u>		Send Report to SMO: <u>Lorraine Herrera/505-844-3199</u>		
Tech Area:		Contract No.: <u>PO 1303873</u>		SMO Use		AR/COC 614571

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					
✓ 093352	-001	OBS-MW3	208	1/23/13 9:38	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	318826 057
✓ 093352	-002	OBS-MW3	208	1/23/13 9:40	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	318826 058
✓ 093352	-009	OBS-MW3	208	1/23/13 9:41	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	318826 059
✓ 093352	-014	OBS-MW3	208	1/23/13 9:42	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	318826 060
✓ 093352	-016	OBS-MW3	208	1/23/13 9:43	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	318826 061
✓ 093352	-017	OBS-MW3	208	1/23/13 9:44	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	318828 065
✓ 093352	-018	OBS-MW3	208	1/23/13 9:45	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	318826 062
✓ 093352	-020	OBS-MW3	208	1/23/13 9:46	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	318826 063
✓ 093352	-022	OBS-MW3	208	1/23/13 9:48	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	318826 064
✓ 093352	-024	OBS-MW3	208	1/23/13 9:50	GW	AG	4x1L	None	G	SA	HE (SW846-8321A Mod)	318826 065

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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		Negotiated TAT		
Confirmatory: <input type="checkbox"/> Yes		Name		Signature		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
Sample Team Members		William J. Gibson		<i>[Signature]</i>		Init.		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
		Robert Lynch		<i>[Signature]</i>		Company/Organization/Phone/Cell		
		Alfred Santillanes		<i>[Signature]</i>		SNL/4142/844-4013/250-7090		
						SNL/4142/844-5130/228-0710		Return Samples By:
						SNL/4142/844-5130/228-0710		
								Lab Use

1. Relinquished by <i>Alfred Santillanes</i> Org. <u>4142</u> Date <u>1/23/13</u> Time <u>10:20</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Clinton Lum</i> Org. <u>4142</u> Date <u>1/23/13</u> Time <u>10:20</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>Clinton Lum</i> Org. <u>4142</u> Date <u>1/23/13</u> Time <u>11:00</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>Clinton Lum</i> Org. <u>Gen</u> Date <u>1-24-13</u> Time <u>07:20</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: February 22, 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: Groundwater, Level C Package

Client Sample ID: 093352-020
 Sample ID: 318826063
 Matrix: AQUEOUS
 Collect Date: 23-JAN-13 09:46
 Receive Date: 24-JAN-13
 Collector: Client

Project: SNLSGWater
 Client ID: SNLS004
 Client Desc.: OBS-MW3
 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	I	MARI	01/31/13	1757	1277269	I

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: March 4, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530
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 EPA 9056 (anions by IC), EPA 9012A (perchlorate by IC), EPA 353.2 (nitrate/nitrite), SM2320B (total alkalinity), and EPA 9012A (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

Total cyanide was reported in a CCB at a negative value, with absolute value > MDL. All associated sample results were ND and will be **qualified UJ,B4**.

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL and < 3X MDL. The sulfate result for sample 318530-043 was ND and will be **qualified UJ,I5**. The chloride result for sample -043 was a detect <3X the intercept value and will be **qualified J-,I5**.

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

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

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL and < 3X MDL. All associated sample results that were > 3X the intercept value 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. All associated sample results were >5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide:

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.

Total cyanide:

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:

Sample -004 was diluted 5X, and samples -018 and -030 were diluted 2X for chloride and sulfate.

Nitrate/nitrite:

Sample -005 was diluted 10X, and samples -019 and -031 were diluted 5X.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/09/13



Sample Findings Summary



AR/COC: 614565, 614566, 614567

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093336-035/CCBA MW2	Uranium-235/236 (13982-70-2)	J, FR7
	093339-035/CCBA EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093339-035/CCBA EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093339-035/CCBA EB1	Uranium-238 (7440-61-1)	BD, FR3
	093341-035/CCBA MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	093342-035/CCBA MW1	Uranium-235/236 (13982-70-2)	BD, FR3
EPA 900.0/SW846 9310			
	093336-034/CCBA MW2	ALPHA (12587-46-1)	J, MS1
	093336-034/CCBA MW2	BETA (12587-47-2)	J, FR7,MS1
	093339-034/CCBA EB1	ALPHA (12587-46-1)	BD, FR3
	093339-034/CCBA EB1	BETA (12587-47-2)	BD, FR3
	093341-034/CCBA MW1	ALPHA (12587-46-1)	J, FR7,MS1
	093341-034/CCBA MW1	BETA (12587-47-2)	J, MS1
	093342-034/CCBA MW1	ALPHA (12587-46-1)	J, MS1
	093342-034/CCBA MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093336-033/CCBA MW2	Americium-241 (14596-10-2)	BD, FR3
	093336-033/CCBA MW2	Cesium-137 (10045-97-3)	BD, FR3
	093336-033/CCBA MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093336-033/CCBA MW2	Potassium-40 (13966-00-2)	BD, FR3
	093339-033/CCBA EB1	Americium-241 (14596-10-2)	BD, FR3
	093339-033/CCBA EB1	Cesium-137 (10045-97-3)	BD, FR3
	093339-033/CCBA EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093339-033/CCBA EB1	Potassium-40 (13966-00-2)	R, Z2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093341-033/CCBA MW1	Americium-241 (14596-10-2)	BD, FR3
	093341-033/CCBA MW1	Cesium-137 (10045-97-3)	BD, FR3
	093341-033/CCBA MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093341-033/CCBA MW1	Potassium-40 (13966-00-2)	BD, FR3
	093342-033/CCBA MW1	Americium-241 (14596-10-2)	BD, FR3
	093342-033/CCBA MW1	Cesium-137 (10045-97-3)	BD, FR3
	093342-033/CCBA MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093342-033/CCBA MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093336-009/CCBA MW2	Aluminum (7429-90-5)	J+, DL2
	093336-009/CCBA MW2	Barium (7440-39-3)	J, D1
	093336-009/CCBA MW2	Chromium (7440-47-3)	0.015U, B
	093336-009/CCBA MW2	Copper (7440-50-8)	0.0025U, B
	093336-009/CCBA MW2	Magnesium (7439-95-4)	J, D1
	093336-009/CCBA MW2	Sodium (7440-23-5)	J, D1
	093339-009/CCBA EB1	Chromium (7440-47-3)	0.015U, B
	093339-009/CCBA EB1	Copper (7440-50-8)	0.0025U, B
	093339-017/CCBA EB1	Calcium (7440-70-2)	0.44U, B
	093341-009/CCBA MW1	Aluminum (7429-90-5)	J+, DL2
	093341-009/CCBA MW1	Barium (7440-39-3)	J, D1
	093341-009/CCBA MW1	Chromium (7440-47-3)	0.015U, B
	093341-009/CCBA MW1	Copper (7440-50-8)	0.0025U, B
	093341-009/CCBA MW1	Magnesium (7439-95-4)	J, D1
	093341-009/CCBA MW1	Sodium (7440-23-5)	J, D1
	093342-009/CCBA MW1	Aluminum (7429-90-5)	J+, DL2
	093342-009/CCBA MW1	Barium (7440-39-3)	J, D1
	093342-009/CCBA MW1	Chromium (7440-47-3)	0.015U, B
	093342-009/CCBA MW1	Copper (7440-50-8)	0.0025U, B

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093342-009/CCBA MW1	Magnesium (7439-95-4)	J, D1
	093342-009/CCBA MW1	Sodium (7440-23-5)	J, D1
SW846 3535/8321A Modified			
	093336-024/CCBA MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093336-024/CCBA MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093336-024/CCBA MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093339-024/CCBA EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093339-024/CCBA EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093339-024/CCBA EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093341-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093341-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093341-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093342-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093342-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093342-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	093336-009/CCBA MW2	Mercury (7439-97-6)	UJ, B4
	093339-009/CCBA EB1	Mercury (7439-97-6)	UJ, B4
	093341-009/CCBA MW1	Mercury (7439-97-6)	UJ, B4
	093342-009/CCBA MW1	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093336-001/CCBA MW2	Acetone (67-64-1)	UJ, MS3
	093337-001/CCBA TB1	Acetone (67-64-1)	UJ, MS3
	093338-001/CCBA FB1	Acetone (67-64-1)	UJ, MS3
	093339-001/CCBA EB1	Acetone (67-64-1)	UJ, MS3
	093340-001/CCBA TB2	Acetone (67-64-1)	UJ, MS3
	093341-001/CCBA MW1	Acetone (67-64-1)	UJ, MS3
	093342-001/CCBA MW1	Acetone (67-64-1)	UJ, MS3
	093343-001/CCBA TB3	Acetone (67-64-1)	UJ, MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 9012B			
	093336-027/CCBA MW2	Cyanide, Total (57-12-5)	UJ, B4
	093339-027/CCBA EB1	Cyanide, Total (57-12-5)	UJ, B4
	093341-027/CCBA MW1	Cyanide, Total (57-12-5)	UJ, B4
	093342-027/CCBA MW1	Cyanide, Total (57-12-5)	UJ, B4
SW846 9056			
	093339-016/CCBA EB1	Chloride (16887-00-6)	J-, I5
	093339-016/CCBA EB1	Sulfate (14808-79-8)	UJ, I5

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

Memorandum

Date: March 7, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826
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

Five samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 9012A (perchlorate by IC), EPA 353.2 (nitrate/nitrite), SM2320B (total alkalinity), EPA 7196A (hexavalent chromium), and EPA 9012A (total cyanide). Data were reported for all required analytes. A problem was identified with the data package that resulted in the qualification of data.

Anions:

The ICAL intercept for chloride was > MDL. The associated result for sample 318826-020 was a detect <3X the intercept value and will be **qualified J+,I5**.

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

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

Anions:

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

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EB associated with samples -034 and -047. All associated sample results were >5X the EB concentration and will not be qualified.

Alkalinity:

Total and bicarbonate alkalinity were reported in the EB. Alkalinity is not evaluated for blank contamination; no sample data were qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/nitrite and Perchlorate:

The MS/PS 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 and Perchlorate:

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:

Samples -005, -034, -047, and -061 were diluted 10X for chloride and sulfate.

Nitrate/nitrite:

Samples -006, -035, -048, and -062 were diluted 5X.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13



Sample Findings Summary



AR/COC: 614568, 614569, 614570, 614571

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093347-035/OBS-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093347-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093347-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	093344-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	093344-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	093347-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093347-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093349-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093349-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	093350-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093350-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	093352-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	093352-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093344-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	093344-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093344-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093344-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093347-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	093347-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093347-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093347-033/OBS-EB1	Potassium-40 (13966-00-2)	R, Z2
	093349-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093349-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093349-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093349-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093350-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093350-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093350-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093350-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093352-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	093352-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	093352-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	093352-033/OBS-MW3	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	093344-009/OBS-MW2	Copper (7440-50-8)	NJ-, B4
	093344-017/OBS-MW2	Magnesium (7439-95-4)	J, D1
	093347-009/OBS-EB1	Chromium (7440-47-3)	0.013U, B
	093347-009/OBS-EB1	Copper (7440-50-8)	NJ-, B4
	093349-009/OBS-MW1	Copper (7440-50-8)	0.0064U, B4,B2
	093349-017/OBS-MW1	Magnesium (7439-95-4)	J, D1
	093350-009/OBS-MW1	Chromium (7440-47-3)	0.013U, B
	093350-009/OBS-MW1	Copper (7440-50-8)	0.0064U, B4,B2
	093350-017/OBS-MW1	Magnesium (7439-95-4)	J, D1
	093352-009/OBS-MW3	Chromium (7440-47-3)	0.013U, B
	093352-009/OBS-MW3	Copper (7440-50-8)	NJ-, B4
	093352-017/OBS-MW3	Magnesium (7439-95-4)	J, D1
SW846 3510C/8270D			
	093344-002/OBS-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093344-002/OBS-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	093347-002/OBS-EB1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093347-002/OBS-EB1	Hexachloroethane (67-72-1)	UJ, MS5
	093349-002/OBS-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093349-002/OBS-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	093350-002/OBS-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093350-002/OBS-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	093352-002/OBS-MW3	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093352-002/OBS-MW3	Hexachloroethane (67-72-1)	UJ, MS5
SW846 3535/8321A Modified			
	093344-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093344-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093344-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093347-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093347-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093347-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093349-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093349-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093349-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093350-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093350-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093350-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093352-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	093352-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	093352-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	093344-009/OBS-MW2	Mercury (7439-97-6)	UJ, B4
	093347-009/OBS-EB1	Mercury (7439-97-6)	UJ, B4
	093349-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	093350-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	093352-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093344-001/OBS-MW2	Acetone (67-64-1)	UJ, MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093345-001/OBS-TB1	Acetone (67-64-1)	UJ, MS3
	093346-001/OBS-FB1	Acetone (67-64-1)	UJ, MS3
	093347-001/OBS-EB1	Acetone (67-64-1)	UJ, MS3
	093348-001/OBS-TB2	Acetone (67-64-1)	UJ, MS3
	093349-001/OBS-MW1	Acetone (67-64-1)	UJ, MS3
	093350-001/OBS-MW1	Acetone (67-64-1)	UJ, MS3
	093351-001/OBS-TB3	Acetone (67-64-1)	UJ, MS3
	093352-001/OBS-MW3	Acetone (67-64-1)	UJ, MS3
	093353-001/OBS-TB4	Acetone (67-64-1)	UJ, MS3
SW846 9056			
	093347-016/OBS-EB1	Chloride (16887-00-6)	J+, I5

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

Memorandum

Date: March 21, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 49/116 GWM
AR/COC: 614572, -573
SDG: 319064
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

Three samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate by IC), and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Anions:

The ICAL intercept for chloride was > the MDL. The chloride result for sample 319064-024 was a detect < 3X the intercept value and will be **qualified J+,I5**.

The MS %R for bromide was < LAL. The associated ND results will be **qualified UJ,MS3**; the associated detected results will be **qualified J-,MS3**.

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

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

Anions:

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

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EB. All associated sample results were >5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

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

Perchlorate and Total Cyanide:

The MS analyses were 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 and Total Cyanide:

The replicate analyses were 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.

Nitrate/nitrite:

All samples were diluted 5X.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/22/13



Sample Findings Summary



AR/COC: 614572, 614573

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	093354-034/SWMU-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093354-034/SWMU-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093356-034/CYN-MW5	ALPHA (12587-46-1)	J, FR7,MS1
	093356-034/CYN-MW5	BETA (12587-47-2)	J, MS1
	093357-034/CYN-MW5	ALPHA (12587-46-1)	J, MS1
	093357-034/CYN-MW5	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093354-033/SWMU-EB1	Americium-241 (14596-10-2)	BD, FR3
	093354-033/SWMU-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093354-033/SWMU-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093354-033/SWMU-EB1	Potassium-40 (13966-00-2)	BD, FR3
	093356-033/CYN-MW5	Americium-241 (14596-10-2)	BD, FR3
	093356-033/CYN-MW5	Cesium-137 (10045-97-3)	BD, FR3
	093356-033/CYN-MW5	Cobalt-60 (10198-40-0)	BD, FR3
	093356-033/CYN-MW5	Potassium-40 (13966-00-2)	BD, FR3
	093357-033/CYN-MW5	Americium-241 (14596-10-2)	BD, FR3
	093357-033/CYN-MW5	Cesium-137 (10045-97-3)	BD, FR3
	093357-033/CYN-MW5	Cobalt-60 (10198-40-0)	BD, FR3
	093357-033/CYN-MW5	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093354-009/SWMU-EB1	Calcium (7440-70-2)	J+, D1,DL2
	093354-009/SWMU-EB1	Chromium (7440-47-3)	0.011U, B
	093354-009/SWMU-EB1	Copper (7440-50-8)	0.003U, B
	093356-009/CYN-MW5	Antimony (7440-36-0)	0.011U, B
	093356-009/CYN-MW5	Calcium (7440-70-2)	J, D1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093356-009/CYN-MW5	Chromium (7440-47-3)	0.011U, B
	093356-009/CYN-MW5	Copper (7440-50-8)	0.003U, B
	093357-009/CYN-MW5	Antimony (7440-36-0)	0.011U, B
	093357-009/CYN-MW5	Calcium (7440-70-2)	J, D1
	093357-009/CYN-MW5	Chromium (7440-47-3)	0.011U, B
	093357-009/CYN-MW5	Copper (7440-50-8)	0.003U, B
SW846 3535/8321A Modified			
	093354-024/SWMU-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093354-024/SWMU-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093354-024/SWMU-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093356-024/CYN-MW5	m-Nitrotoluene (99-08-1)	UJ, I4
	093356-024/CYN-MW5	o-Nitrotoluene (88-72-2)	UJ, I4
	093356-024/CYN-MW5	p-Nitrotoluene (99-99-0)	UJ, I4
	093357-024/CYN-MW5	m-Nitrotoluene (99-08-1)	UJ, I4
	093357-024/CYN-MW5	o-Nitrotoluene (88-72-2)	UJ, I4
	093357-024/CYN-MW5	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093354-001/SWMU-EB1	Acetone (67-64-1)	UJ, MS3
	093355-001/SWMU-TB1	Acetone (67-64-1)	UJ, MS3
	093356-001/CYN-MW5	Acetone (67-64-1)	UJ, MS3
	093357-001/CYN-MW5	Acetone (67-64-1)	UJ, MS3
	093358-001/SWMU-TB2	Acetone (67-64-1)	UJ, MS3
SW846 9056			
	093354-016/SWMU-EB1	Bromide (24959-67-9)	UJ, MS3
	093354-016/SWMU-EB1	Chloride (16887-00-6)	J+, I5
	093356-016/CYN-MW5	Bromide (24959-67-9)	J-, MS3
	093357-016/CYN-MW5	Bromide (24959-67-9)	J-, MS3

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

Memorandum

Date: March 6, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 49/116
AR/COC: 614574
SDG: 319234
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 EPA 9056 (anions by IC), EPA 9012A (perchlorate by IC), EPA 353.2 (nitrate/nitrite), SM2320B (total alkalinity), and EPA 9012A (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

Total cyanide was reported in the ICB and CCB at a negative value, with absolute value > MDL. The associated sample result was a ND and will be **qualified UJ,B4**.

Anions:

The MS %R for bromide was < LAL. The associated sample result was a detect and will be **qualified J-,MS3**.

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

Total cyanide:

The ICAL intercept was > MDL. The associated sample result was a ND and 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 acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/nitrite, Anions, Total Alkalinity:

The MS/PS 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, Anions, Total 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 10X for chloride and sulfate.

Nitrate/nitrite:

The sample was diluted 10X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/07/13



Sample Findings Summary



AR/COC: 614574

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: May 9, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614661
SDG: 322514
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

Two samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate) 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 samples were 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 and sulfate were > the MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EQB, sample 322402003, at a concentration > the PQL. The associated sample results were detects > the PQL and >5X the EQB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The samples were diluted 10X.

Anions:

The samples were diluted 25X for chloride and sulfate.

Other QC

The EB from COC 614660 applied to field samples in this package. Field duplicate pairs were submitted on this COC. There are no review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Level II

Date: 05/15/13



Sample Findings Summary



AR/COC: 614661

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6010B			
	093717-010/CTF-MW3	Vanadium (7440-62-2)	UJ, CK3
	093718-010/CTF-MW3	Vanadium (7440-62-2)	UJ, CK3
SW846 3005/6020 DOE-AL			
	093717-009/CTF-MW3	Copper (7440-50-8)	0.018UJ, B2,CK3
	093717-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	093717-009/CTF-MW3	Nickel (7440-02-0)	.027UJ, B,CK3
	093717-009/CTF-MW3	Zinc (7440-66-6)	0.034U, B2
	093717-010/CTF-MW3	Cadmium (7440-43-9)	UJ, CK3
	093717-010/CTF-MW3	Cobalt (7440-48-4)	J, D1
	093717-010/CTF-MW3	Copper (7440-50-8)	0.0084UJ, B2,CK3
	093717-010/CTF-MW3	Iron (7439-89-6)	J, D1
	093717-010/CTF-MW3	Magnesium (7439-95-4)	J, D1
	093717-010/CTF-MW3	Zinc (7440-66-6)	J, D1,MS1
	093718-009/CTF-MW3	Copper (7440-50-8)	0.018UJ, B2,CK3
	093718-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	093718-009/CTF-MW3	Nickel (7440-02-0)	.027UJ, B,CK3
	093718-009/CTF-MW3	Zinc (7440-66-6)	0.034U, B2
	093718-010/CTF-MW3	Cadmium (7440-43-9)	UJ, CK3
	093718-010/CTF-MW3	Cobalt (7440-48-4)	J, D1
	093718-010/CTF-MW3	Copper (7440-50-8)	0.0084UJ, B2,CK3
	093718-010/CTF-MW3	Iron (7439-89-6)	J, D1
	093718-010/CTF-MW3	Magnesium (7439-95-4)	J, D1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093718-010/CTF-MW3	Zinc (7440-66-6)	J, D1,MS1
SW846 7470A			
	093717-009/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
	093717-010/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
	093718-009/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
	093718-010/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
SW846 8260B DOE-AL			
	093717-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.0U, B2
	093717-001/CTF-MW3	Chloroform (67-66-3)	1.0U, B2
	093717-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.0U, B2
	093718-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.0U, B2
	093718-001/CTF-MW3	Chloroform (67-66-3)	1.0U, B2
	093718-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.0U, B2
	093720-001/CTF-FB1	Bromodichloromethane (75-27-4)	U, B2
	093720-001/CTF-FB1	Bromoform (75-25-2)	U, B2
	093720-001/CTF-FB1	Chloroform (67-66-3)	U, B2
	093720-001/CTF-FB1	Dibromochloromethane (124-48-1)	U, B2

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

Memorandum

Date: May 17, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614662 and 614663
SDG: 322517
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

Three samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate) 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.

Alkalinity:

1. The parent MS concentration for alkalinity was >4X the MS spike concentration and the MS %R was > the upper acceptance limit. Therefore, the %R was not used to evaluate the field sample data. The alkalinity result for sample 322517007 was ND and will be **qualified UJ, MS1**. All remaining associated sample results were detects and will be **qualified J,MS1** due to lack of matrix-specific accuracy information.

Anions:

1. The ICAL intercept for chloride was > the MDL. The chloride result for sample -004 was a detect <3X the value of the intercept and will be **qualified J+,I5**.

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

All initial and continuing calibration met QC acceptance criteria except as mentioned above in the summary section and as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL. The associated sample results that were either NDs or detects > 3X the intercept value will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EQB, sample -004, at a concentration > the PQL. The associated sample results were detects > the PQL and >5X the EQB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate:

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

Anions, Nitrate/Nitrite and alkalinity:

The MS analysis for SDG 614662 was performed on a sample of similar matrix from SNL SDG 614663. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate:

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

Anions, Nitrate/Nitrite and alkalinity:

The replicate analysis for SDG 614662 was performed on a sample of similar matrix from SNL SDG 614663. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The samples were diluted 5X.

Anions:

Samples -016 and -027 were diluted 10X for bromide and sulfate and 100X for chloride.

Other QC

The EB from COC 614662 was applied to field samples in COC 614663. A field duplicate pair was submitted on COC 614663. There are no review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/20/13



Sample Findings Summary



AR/COC: 614662, 614663, 614664

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093721-035/CTF-EB2	Uranium-233/234 (11-08-5)	BD, FR3
	093721-035/CTF-EB2	Uranium-235/236 (13982-70-2)	BD, FR3
	093721-035/CTF-EB2	Uranium-238 (7440-61-1)	BD, FR3
	093723-035/CTF-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	093724-035/CTF-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	093721-034/CTF-EB2	ALPHA (12587-46-1)	BD, FR3
	093721-034/CTF-EB2	BETA (12587-47-2)	J, FR7
	093724-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
	093724-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	093721-033/CTF-EB2	Americium-241 (14596-10-2)	BD, FR3
	093721-033/CTF-EB2	Cesium-137 (10045-97-3)	BD, FR3
	093721-033/CTF-EB2	Cobalt-60 (10198-40-0)	BD, FR3
	093721-033/CTF-EB2	Potassium-40 (13966-00-2)	BD, FR3
	093723-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	093723-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093723-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093723-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093724-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093724-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093724-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
SM 2320B			
	093721-022/CTF-EB2	Alkalinity, Total as CaCO3 (N44)	UJ, MS1
	093723-022/CTF-MW2	Alkalinity, Total as CaCO3 (N44)	J, MS1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-022/CTF-MW2	Alkalinity, Total as CaCO3 (N44)	J, MS1
SW846 3005/6010B			
	093721-009/CTF-EB2	Vanadium (7440-62-2)	UJ, CK3
	093721-010/CTF-EB2	Vanadium (7440-62-2)	UJ, CK3
	093723-009/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
	093723-010/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
	093724-009/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
	093724-010/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
SW846 3005/6020 DOE-AL			
	093721-009/CTF-EB2	Cobalt (7440-48-4)	UJ, D1
	093721-009/CTF-EB2	Copper (7440-50-8)	J-, CK3
	093721-009/CTF-EB2	Iron (7439-89-6)	UJ, D1
	093721-009/CTF-EB2	Magnesium (7439-95-4)	UJ, D1
	093721-009/CTF-EB2	Zinc (7440-66-6)	J, MS1,D1
	093721-010/CTF-EB2	Cobalt (7440-48-4)	UJ, D1
	093721-010/CTF-EB2	Iron (7439-89-6)	UJ, D1
	093721-010/CTF-EB2	Magnesium (7439-95-4)	UJ, D1
	093721-010/CTF-EB2	Zinc (7440-66-6)	UJ, MS1,D1
	093723-009/CTF-MW2	Aluminum (7429-90-5)	0.11U, B2
	093723-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093723-009/CTF-MW2	Copper (7440-50-8)	.015UJ, B2
	093723-009/CTF-MW2	Iron (7439-89-6)	J, D1
	093723-009/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093723-009/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1
	093723-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093723-010/CTF-MW2	Copper (7440-50-8)	.013UJ, B2
	093723-010/CTF-MW2	Iron (7439-89-6)	J, D1
	093723-010/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093723-010/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-009/CTF-MW2	Aluminum (7429-90-5)	0.11U, B2
	093724-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093724-009/CTF-MW2	Copper (7440-50-8)	.015UJ, B2
	093724-009/CTF-MW2	Iron (7439-89-6)	J, D1
	093724-009/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093724-009/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1
	093724-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093724-010/CTF-MW2	Copper (7440-50-8)	.013UJ, B2
	093724-010/CTF-MW2	Iron (7439-89-6)	J, D1
	093724-010/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093724-010/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1
SW846 3510C/8270D			
	093721-002/CTF-EB2	1,1'-Biphenyl (92-52-4)	UJ, MS5
	093721-002/CTF-EB2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	093721-002/CTF-EB2	1,4-Dioxane (123-91-1)	UJ, MS5
	093721-002/CTF-EB2	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	093721-002/CTF-EB2	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dichlorophenol (120-83-2)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	093721-002/CTF-EB2	2,6-Dinitrotoluene (606-20-2)	UJ, MS5
	093721-002/CTF-EB2	2-Chloronaphthalene (91-58-7)	UJ, MS5
	093721-002/CTF-EB2	2-Chlorophenol (95-57-8)	UJ, MS5
	093721-002/CTF-EB2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	093721-002/CTF-EB2	2-Methylnaphthalene (91-57-6)	UJ, MS5
	093721-002/CTF-EB2	2-Nitrophenol (88-75-5)	UJ, MS5
	093721-002/CTF-EB2	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-002/CTF-EB2	4-Bromophenylphenylether (101-55-3)	UJ, MS5
	093721-002/CTF-EB2	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	093721-002/CTF-EB2	4-Chloroaniline (106-47-8)	UJ, MS5
	093721-002/CTF-EB2	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	093721-002/CTF-EB2	4-Nitrophenol (100-02-7)	UJ, MS5
	093721-002/CTF-EB2	Acenaphthene (83-32-9)	UJ, MS5
	093721-002/CTF-EB2	Acenaphthylene (208-96-8)	UJ, MS5
	093721-002/CTF-EB2	Acetophenone (98-86-2)	UJ, MS5
	093721-002/CTF-EB2	Anthracene (120-12-7)	UJ, MS5
	093721-002/CTF-EB2	Atrazine (1912-24-9)	UJ, MS5
	093721-002/CTF-EB2	Benzaldehyde (100-52-7)	UJ, MS5
	093721-002/CTF-EB2	Benzo(a)anthracene (56-55-3)	UJ, MS5
	093721-002/CTF-EB2	Benzo(a)pyrene (50-32-8)	UJ, MS5
	093721-002/CTF-EB2	Benzo(b)fluoranthene (205-99-2)	UJ, MS5
	093721-002/CTF-EB2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	093721-002/CTF-EB2	Benzo(k)fluoranthene (207-08-9)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	093721-002/CTF-EB2	Butylbenzylphthalate (85-68-7)	UJ, MS5
	093721-002/CTF-EB2	Caprolactam (105-60-2)	UJ, MS5
	093721-002/CTF-EB2	Carbazole (86-74-8)	UJ, MS5
	093721-002/CTF-EB2	Chrysene (218-01-9)	UJ, MS5
	093721-002/CTF-EB2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	093721-002/CTF-EB2	Dibenzofuran (132-64-9)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-002/CTF-EB2	Diethylphthalate (84-66-2)	UJ, MS5
	093721-002/CTF-EB2	Dimethylphthalate (131-11-3)	UJ, MS5
	093721-002/CTF-EB2	Di-n-butylphthalate (84-74-2)	UJ, MS5
	093721-002/CTF-EB2	Di-n-octylphthalate (117-84-0)	UJ, MS5
	093721-002/CTF-EB2	Diphenylamine (122-39-4)	UJ, MS5
	093721-002/CTF-EB2	Fluoranthene (206-44-0)	UJ, MS5
	093721-002/CTF-EB2	Fluorene (86-73-7)	UJ, MS5
	093721-002/CTF-EB2	Hexachlorobenzene (118-74-1)	UJ, MS5
	093721-002/CTF-EB2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093721-002/CTF-EB2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3,MS5
	093721-002/CTF-EB2	Hexachloroethane (67-72-1)	UJ, MS5
	093721-002/CTF-EB2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	093721-002/CTF-EB2	Isophorone (78-59-1)	UJ, MS5
	093721-002/CTF-EB2	m,p-Cresol (N/A)	UJ, MS5
	093721-002/CTF-EB2	m-Nitroaniline (99-09-2)	UJ, MS5
	093721-002/CTF-EB2	Naphthalene (91-20-3)	UJ, MS5
	093721-002/CTF-EB2	Nitrobenzene (98-95-3)	UJ, MS5
	093721-002/CTF-EB2	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	093721-002/CTF-EB2	o-Cresol (95-48-7)	UJ, MS5
	093721-002/CTF-EB2	o-Nitroaniline (88-74-4)	UJ, MS5
	093721-002/CTF-EB2	Pentachlorophenol (87-86-5)	UJ, MS5
	093721-002/CTF-EB2	Phenanthrene (85-01-8)	UJ, MS5
	093721-002/CTF-EB2	Phenol (108-95-2)	UJ, MS5
	093721-002/CTF-EB2	p-Nitroaniline (100-01-6)	UJ, MS5
	093721-002/CTF-EB2	Pyrene (129-00-0)	UJ, MS5
	093723-002/CTF-MW2	1,1'-Biphenyl (92-52-4)	UJ, MS5
	093723-002/CTF-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	093723-002/CTF-MW2	1,4-Dioxane (123-91-1)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093723-002/CTF-MW2	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	093723-002/CTF-MW2	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dichlorophenol (120-83-2)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	093723-002/CTF-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, MS5
	093723-002/CTF-MW2	2-Chloronaphthalene (91-58-7)	UJ, MS5
	093723-002/CTF-MW2	2-Chlorophenol (95-57-8)	UJ, MS5
	093723-002/CTF-MW2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	093723-002/CTF-MW2	2-Methylnaphthalene (91-57-6)	UJ, MS5
	093723-002/CTF-MW2	2-Nitrophenol (88-75-5)	UJ, MS5
	093723-002/CTF-MW2	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5
	093723-002/CTF-MW2	4-Bromophenylphenylether (101-55-3)	UJ, MS5
	093723-002/CTF-MW2	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	093723-002/CTF-MW2	4-Chloroaniline (106-47-8)	UJ, MS5
	093723-002/CTF-MW2	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	093723-002/CTF-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	093723-002/CTF-MW2	Acenaphthene (83-32-9)	UJ, MS5
	093723-002/CTF-MW2	Acenaphthylene (208-96-8)	UJ, MS5
	093723-002/CTF-MW2	Acetophenone (98-86-2)	UJ, MS5
	093723-002/CTF-MW2	Anthracene (120-12-7)	UJ, MS5
	093723-002/CTF-MW2	Atrazine (1912-24-9)	UJ, MS5
	093723-002/CTF-MW2	Benzaldehyde (100-52-7)	UJ, MS5
	093723-002/CTF-MW2	Benzo(a)anthracene (56-55-3)	UJ, MS5
	093723-002/CTF-MW2	Benzo(a)pyrene (50-32-8)	UJ, MS5
	093723-002/CTF-MW2	Benzo(b)fluoranthene (205-99-2)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093723-002/CTF-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	093723-002/CTF-MW2	Benzo(k)fluoranthene (207-08-9)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	093723-002/CTF-MW2	Butylbenzylphthalate (85-68-7)	UJ, MS5
	093723-002/CTF-MW2	Caprolactam (105-60-2)	UJ, MS5
	093723-002/CTF-MW2	Carbazole (86-74-8)	UJ, MS5
	093723-002/CTF-MW2	Chrysene (218-01-9)	UJ, MS5
	093723-002/CTF-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	093723-002/CTF-MW2	Dibenzofuran (132-64-9)	UJ, MS5
	093723-002/CTF-MW2	Diethylphthalate (84-66-2)	UJ, MS5
	093723-002/CTF-MW2	Dimethylphthalate (131-11-3)	UJ, MS5
	093723-002/CTF-MW2	Di-n-butylphthalate (84-74-2)	UJ, MS5
	093723-002/CTF-MW2	Di-n-octylphthalate (117-84-0)	UJ, MS5
	093723-002/CTF-MW2	Diphenylamine (122-39-4)	UJ, MS5
	093723-002/CTF-MW2	Fluoranthene (206-44-0)	UJ, MS5
	093723-002/CTF-MW2	Fluorene (86-73-7)	UJ, MS5
	093723-002/CTF-MW2	Hexachlorobenzene (118-74-1)	UJ, MS5
	093723-002/CTF-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093723-002/CTF-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3,MS5
	093723-002/CTF-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	093723-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	093723-002/CTF-MW2	Isophorone (78-59-1)	UJ, MS5
	093723-002/CTF-MW2	m,p-Cresol (N/A)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093723-002/CTF-MW2	m-Nitroaniline (99-09-2)	UJ, MS5
	093723-002/CTF-MW2	Naphthalene (91-20-3)	UJ, MS5
	093723-002/CTF-MW2	Nitrobenzene (98-95-3)	UJ, MS5
	093723-002/CTF-MW2	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	093723-002/CTF-MW2	o-Cresol (95-48-7)	UJ, MS5
	093723-002/CTF-MW2	o-Nitroaniline (88-74-4)	UJ, MS5
	093723-002/CTF-MW2	Pentachlorophenol (87-86-5)	UJ, MS5
	093723-002/CTF-MW2	Phenanthrene (85-01-8)	UJ, MS5
	093723-002/CTF-MW2	Phenol (108-95-2)	UJ, MS5
	093723-002/CTF-MW2	p-Nitroaniline (100-01-6)	UJ, MS5
	093723-002/CTF-MW2	Pyrene (129-00-0)	UJ, MS5
	093724-002/CTF-MW2	1,1'-Biphenyl (92-52-4)	UJ, MS5
	093724-002/CTF-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	093724-002/CTF-MW2	1,4-Dioxane (123-91-1)	UJ, MS5
	093724-002/CTF-MW2	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	093724-002/CTF-MW2	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dichlorophenol (120-83-2)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	093724-002/CTF-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, MS5
	093724-002/CTF-MW2	2-Chloronaphthalene (91-58-7)	UJ, MS5
	093724-002/CTF-MW2	2-Chlorophenol (95-57-8)	UJ, MS5
	093724-002/CTF-MW2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	093724-002/CTF-MW2	2-Methylnaphthalene (91-57-6)	UJ, MS5
	093724-002/CTF-MW2	2-Nitrophenol (88-75-5)	UJ, MS5
	093724-002/CTF-MW2	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-002/CTF-MW2	4-Bromophenylphenylether (101-55-3)	UJ, MS5
	093724-002/CTF-MW2	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	093724-002/CTF-MW2	4-Chloroaniline (106-47-8)	UJ, MS5
	093724-002/CTF-MW2	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	093724-002/CTF-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	093724-002/CTF-MW2	Acenaphthene (83-32-9)	UJ, MS5
	093724-002/CTF-MW2	Acenaphthylene (208-96-8)	UJ, MS5
	093724-002/CTF-MW2	Acetophenone (98-86-2)	UJ, MS5
	093724-002/CTF-MW2	Anthracene (120-12-7)	UJ, MS5
	093724-002/CTF-MW2	Atrazine (1912-24-9)	UJ, MS5
	093724-002/CTF-MW2	Benzaldehyde (100-52-7)	UJ, MS5
	093724-002/CTF-MW2	Benzo(a)anthracene (56-55-3)	UJ, MS5
	093724-002/CTF-MW2	Benzo(a)pyrene (50-32-8)	UJ, MS5
	093724-002/CTF-MW2	Benzo(b)fluoranthene (205-99-2)	UJ, MS5
	093724-002/CTF-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	093724-002/CTF-MW2	Benzo(k)fluoranthene (207-08-9)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	093724-002/CTF-MW2	Butylbenzylphthalate (85-68-7)	UJ, MS5
	093724-002/CTF-MW2	Caprolactam (105-60-2)	UJ, MS5
	093724-002/CTF-MW2	Carbazole (86-74-8)	UJ, MS5
	093724-002/CTF-MW2	Chrysene (218-01-9)	UJ, MS5
	093724-002/CTF-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	093724-002/CTF-MW2	Dibenzofuran (132-64-9)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-002/CTF-MW2	Diethylphthalate (84-66-2)	UJ, MS5
	093724-002/CTF-MW2	Dimethylphthalate (131-11-3)	UJ, MS5
	093724-002/CTF-MW2	Di-n-butylphthalate (84-74-2)	UJ, MS5
	093724-002/CTF-MW2	Di-n-octylphthalate (117-84-0)	UJ, MS5
	093724-002/CTF-MW2	Diphenylamine (122-39-4)	UJ, MS5
	093724-002/CTF-MW2	Fluoranthene (206-44-0)	UJ, MS5
	093724-002/CTF-MW2	Fluorene (86-73-7)	UJ, MS5
	093724-002/CTF-MW2	Hexachlorobenzene (118-74-1)	UJ, MS5
	093724-002/CTF-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093724-002/CTF-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3,MS5
	093724-002/CTF-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	093724-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	093724-002/CTF-MW2	Isophorone (78-59-1)	UJ, MS5
	093724-002/CTF-MW2	m,p-Cresol (N/A)	UJ, MS5
	093724-002/CTF-MW2	m-Nitroaniline (99-09-2)	UJ, MS5
	093724-002/CTF-MW2	Naphthalene (91-20-3)	UJ, MS5
	093724-002/CTF-MW2	Nitrobenzene (98-95-3)	UJ, MS5
	093724-002/CTF-MW2	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	093724-002/CTF-MW2	o-Cresol (95-48-7)	UJ, MS5
	093724-002/CTF-MW2	o-Nitroaniline (88-74-4)	UJ, MS5
	093724-002/CTF-MW2	Pentachlorophenol (87-86-5)	UJ, MS5
	093724-002/CTF-MW2	Phenanthrene (85-01-8)	UJ, MS5
	093724-002/CTF-MW2	Phenol (108-95-2)	UJ, MS5
	093724-002/CTF-MW2	p-Nitroaniline (100-01-6)	UJ, MS5
	093724-002/CTF-MW2	Pyrene (129-00-0)	UJ, MS5
SW846 3535/8321A Modified			
	093721-024/CTF-EB2	m-Nitrotoluene (99-08-1)	UJ, I4
	093721-024/CTF-EB2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-024/CTF-EB2	p-Nitrotoluene (99-99-0)	UJ, I4
	093721-024/CTF-EB2	Tetryl (479-45-8)	UJ, MS5
	093723-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093723-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093723-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093723-024/CTF-MW2	RDX (121-82-4)	J+, C2
	093723-024/CTF-MW2	Tetryl (479-45-8)	UJ, MS5
	093724-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093724-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093724-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093724-024/CTF-MW2	RDX (121-82-4)	J+, C2
	093724-024/CTF-MW2	Tetryl (479-45-8)	UJ, MS5
SW846 7470A			
	093721-009/CTF-EB2	Mercury (7439-97-6)	UJ, B4
	093721-010/CTF-EB2	Mercury (7439-97-6)	UJ, B4
	093723-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	093723-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	093724-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	093724-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093721-001/CTF-EB2	Bromoform (75-25-2)	J+, C3
	093723-001/CTF-MW2	Acetone (67-64-1)	UJ, I3,C3
	093724-001/CTF-MW2	Acetone (67-64-1)	UJ, I3,C3
	093725-001/CTF-TB4	Acetone (67-64-1)	UJ, I3,C3
	093726-001/CTF-FB2	Acetone (67-64-1)	UJ, I3,C3
	093726-001/CTF-FB2	Bromodichloromethane (75-27-4)	U, B2
	093726-001/CTF-FB2	Bromoform (75-25-2)	1.0UJ, B2,I3,C2
	093726-001/CTF-FB2	Chloroform (67-66-3)	U, B2
	093726-001/CTF-FB2	Dibromochloromethane (124-48-1)	UJ, B2,I3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 9056	093721-016/CTF-EB2	Chloride (16887-00-6)	J+, I5

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

SECTION III

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SECTION III

SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, JANUARY – MARCH 2013

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 March 2013 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 19 and 20 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 ninth 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 first additional quarterly groundwater sampling event following the eight required by the April 8, 2010 letter from NMED.

The analytical results discussed in this section correspond to the reporting period of January through March 2013. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on March 22 and March 26, 2013, 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 March 2013 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 in both unfiltered and filtered samples. Arsenic was reported at concentrations of 0.0456 mg/L and 0.0444 mg/L in the unfiltered environmental and environmental duplicate samples, respectively. Filtered arsenic was reported at 0.0496 mg/L in the environmental sample and 0.0463 mg/L in the environmental duplicate 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 four trip blank (TB) samples, two for each well, 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 First Quarter of Calendar Year (CY) 2013.

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-16. 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). 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 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 at concentrations comparable to historical values. These compounds were qualified as not detected during data validation, since all compounds were detected in associated blank samples. The detection of these compounds at very low concentrations, which are all breakdown products of chlorine, in both equipment decontamination and environmental samples suggest the source is the deionized (DI) water used for decontamination of the sampling system. 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 hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). RDX was detected in the environmental and environmental duplicate samples collected from monitoring well CTF-MW2 at concentrations of 0.354 micrograms per liter ($\mu\text{g/L}$) and 0.352 $\mu\text{g/L}$, respectively. 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 February 2012), which is approximately 17 times greater than 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 5.54 mg/L and 5.66 mg/L in the monitoring well CTF-MW3 environmental and environmental duplicate samples.

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 duplicate samples.

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 0.0456 mg/L and 0.0444 mg/L in the unfiltered environmental and environmental duplicate samples, respectively. Dissolved arsenic was reported at a concentration of 0.0496 mg/L in the environmental sample and a 0.0463 mg/L in the environmental duplicate sample. 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 picocuries 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. In the environmental sample, isotopic uranium-233/234 was reported at 60.9 ± 8.15 pCi/L, uranium-235/236 at 0.822 ± 0.546 pCi/L, and uranium-238 at 10.9 ± 1.86 pCi/L.

(Table III-15). The duplicate environmental sample reported isotopic uranium-233/234 at 58.6 ± 7.61 pCi/L, uranium-235/236 at 0.629 ± 0.266 pCi/L, and uranium-238 at 8.24 ± 1.29 pCi/L. 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**

Based on the approved SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2) environmental duplicate, field blank (FB), and equipment blank (EB) samples were collected 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.

4.1.1 **Duplicate Environmental Samples**

Duplicate environmental samples were collected for CTF-MW3 and CTF-MW2 and analyzed in order to estimate the overall reproducibility of the sampling and analytical process. The duplicate samples were collected immediately after the original environmental samples in order to reduce variability caused by time and/or sampling mechanics. The duplicate sample was analyzed for all analytical parameters.

Table III-17 summarizes results of duplicate sample analyses and calculated relative percent difference (RPD) values. RPD values are only calculated for chemical parameters when detected above the MDL in both samples. The duplicate sample results show good agreement (RPD values < 20 percent for organic compounds and < 35 for inorganic analyses) for all calculated parameters, except bromide in CTF-MW2. In CTF-MW2 the bromide RPD was calculated at 77, but is considered an estimated value since both results are reported below the laboratory PQL.

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 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-MW1 and OBS-MW1 and were submitted for all analyses

SWMUs 149, Monitoring Well CTF-MW3. Alkalinity, bromodichloromethane, bromoform, chloroform, chloride, copper, dibromochloromethane, iron, selenium, sodium, and zinc were detected above laboratory MDLs. If a parameter is reported in the EB at a concentration less than five times the associated environmental samples, then the analyte was qualified as not detected during data validation.

SWMU 154, Monitoring Well CTF-MW2. Aluminum, bromodichloromethane, bromoform, chloroform, chloride, copper, dibromochloromethane, nickel, sodium, and zinc were detected above laboratory MDLs. No corrective action was necessary, for parameters except aluminum and copper, since these analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. Both aluminum and copper were detected in the EB sample at concentrations less than five times then the associated environmental samples. Therefore, aluminum and copper were qualified as not detected during data validation for both environmental and duplicate environmental samples.

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. The TB samples were brought to the field and accompanied each sample shipment.

SWMU 149, Monitoring Well CTF-MW3. A total of two TBs were submitted with the March 2013 samples. No VOCs were detected above associated laboratory MDLs in any of the TB samples.

SWMU 154, Monitoring Well CTF-MW2. A total of two TBs were submitted with the March 2013 samples. No VOCs were detected above associated laboratory MDLs in any of the TB samples.

4.1.4 Field Blank Samples

FB sample was collected for VOCs to assess whether contamination of the samples had resulted from ambient field conditions. The FB sample was prepared by pouring DI water into sample containers at the sample point to simulate the transfer of environmental samples from the sampling system to the sample container.

SWMU 149, Monitoring Well CTF-MW3. The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above the associated laboratory MDLs. No correction action was applied during data validation, since these compounds were also reported in the EB sample.

SWMU 154, Monitoring Well CTF-MW2. 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).

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 March 2013 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

5.0 **Summary**

During the first quarter of CY 2013, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154, representing the ninth and first additional sampling event following eight required quarterly groundwater sampling events. Sampling will continue at both wells until further guidance is provided by NMED. 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. In the unfiltered samples, arsenic concentrations were 0.0456 mg/L for the environmental

sample and -0.444 mg/L for the duplicate environmental sample. 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

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

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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

New Mexico Environment Department (NMED), April 2010. "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," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, April 8, 2010.

New Mexico Environment Department (NMED), December 2010. "Approval with Modifications, Response to April 8, 2010 Letter, Groundwater Monitoring Plan for SWMUs 149 and 154," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), February 2012. "Risk Assessment Guidance for Site Investigations and Remediation." New Mexico Environment Department Hazardous Waste Bureau and the Ground Water Quality Bureau's Voluntary Remediation Program, Santa Fe, New Mexico, Table A-1 updated June 2012.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), June 2010. "U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department 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*," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012a. "Groundwater Monitoring Equipment Decontamination," Field Operating Procedure 05-03, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012b. "Groundwater Monitoring Well Sampling and Field Analytical Measurements," Field Operating Procedure 05-01, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

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

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

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

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

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

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

U.S. Environmental Protection Agency (EPA), 2009, “National Primary Drinking Water Standards,” 40 Code of Federal Regulations 141.11, Subpart B, EPA 816-F-09-0004, U.S. Environmental Protection Agency, Washington, D.C.

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Figures

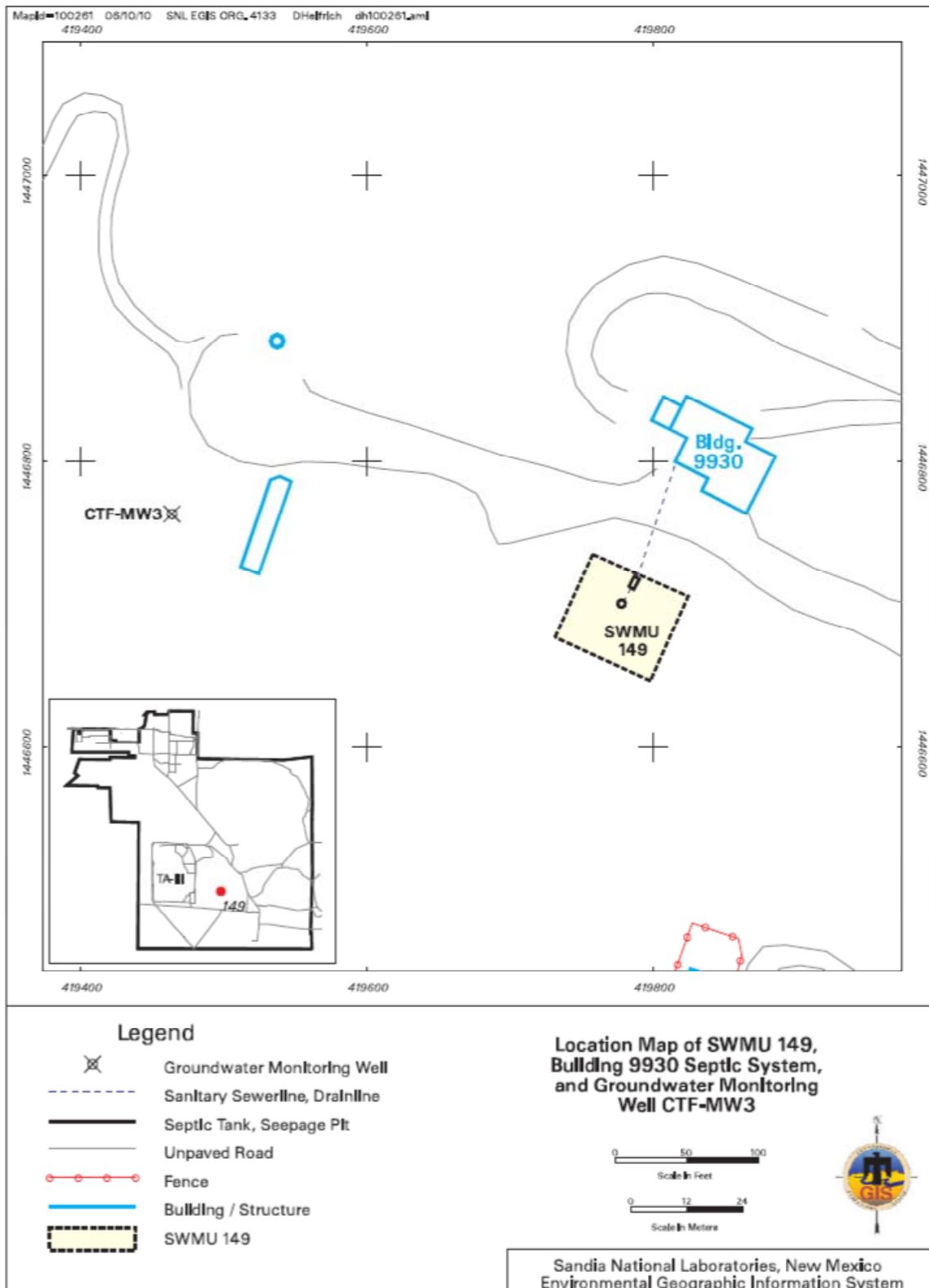


Figure III-1
Location of Monitoring Well CTF-MW3 near SWMU 149

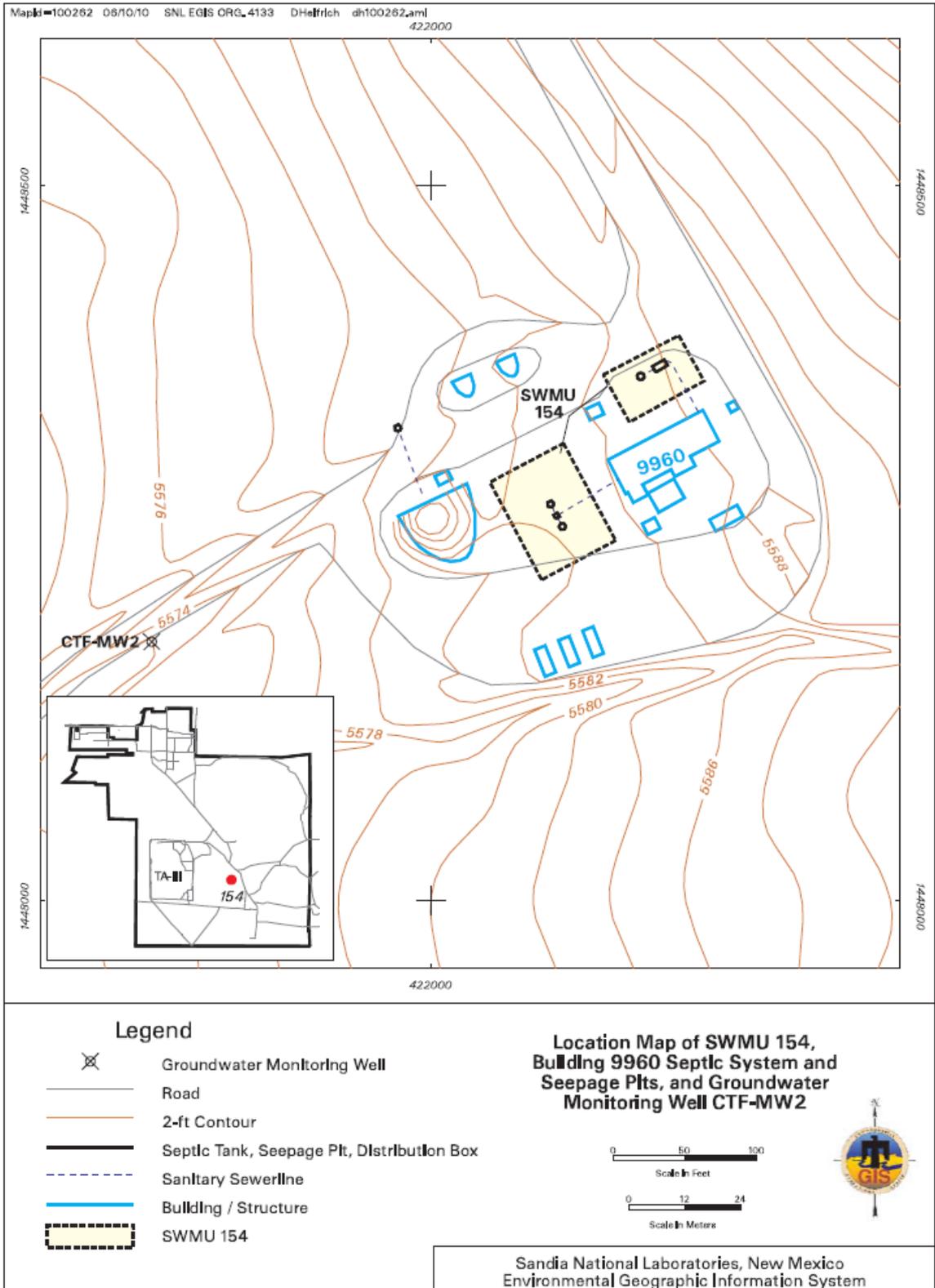


Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

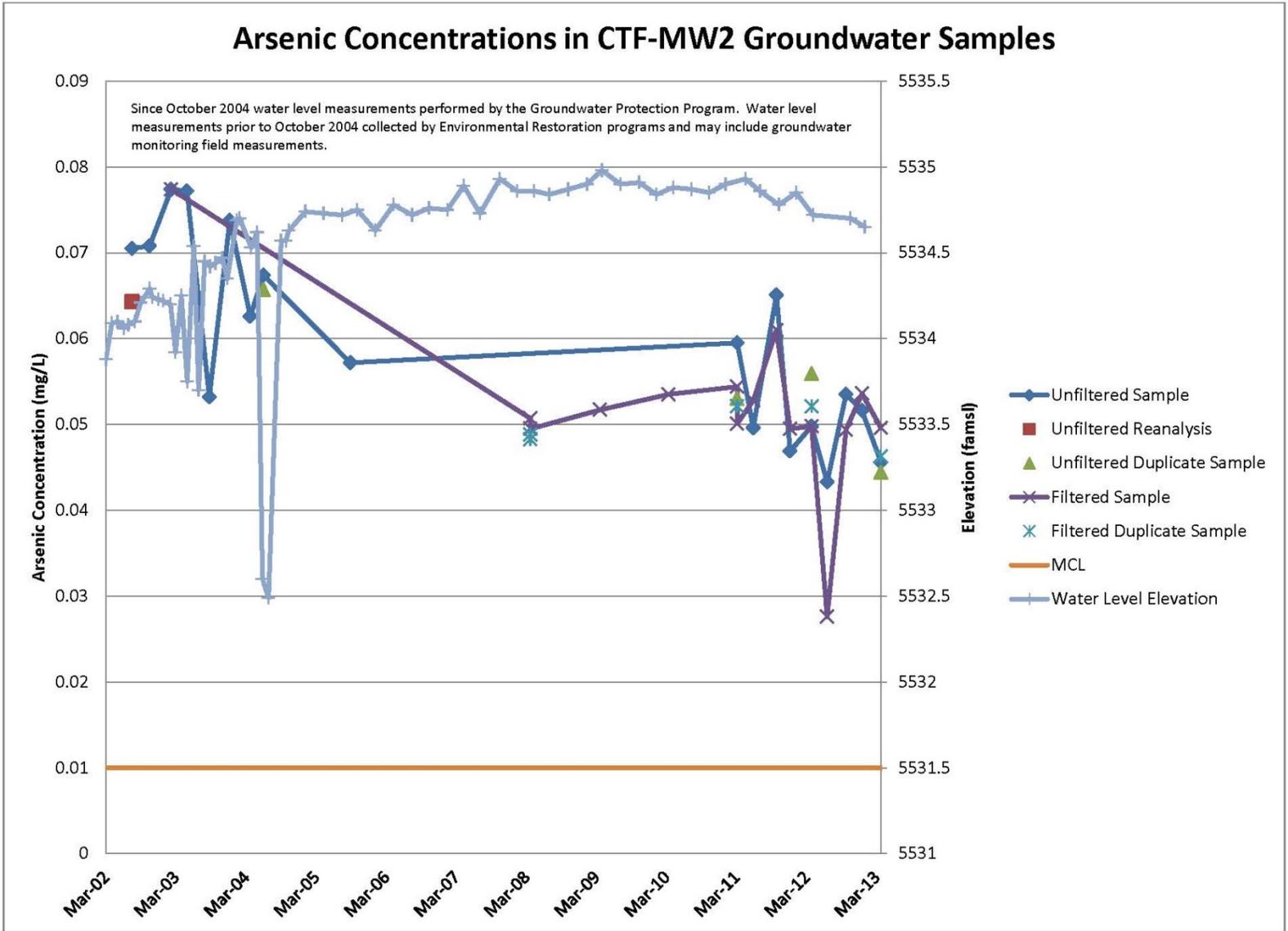


Figure III-3

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.

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

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

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.

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 First Quarter, CY 2013 Groundwater Sampling
SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment
January – March 2013

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	22-Mar-13	093717	614661	SWMU 149
CTF-MW3 (Duplicate)		093718	614661	
CTF-MW2	26-Mar-13	093723	614663	SWMU 154
CTF-MW2 (Duplicate)		093724	614663	

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, January – March 2013

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	22-Mar-13	20.48	1557	228.9	6.72	0.70	84.5	7.56
SWMU 154								
CTF-MW2	26-Mar-13	16.46	3284	71.3	5.80	1.41	2.7	0.26

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, January – March 2013

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 22-Mar-13	Bromodichloromethane	0.540	0.300	1.00	NE	J	1.0U	093717-001	EPA-8260B
	Chloroform	0.780	0.300	1.00	NE	J	1.0U	093717-001	EPA-8260B
	Dibromochloromethane	0.380	0.300	1.00	NE	J	1.0U	093717-001	EPA-8260B
CTF-MW3 (Duplicate) 22-Mar-13	Bromodichloromethane	0.520	0.300	1.00	NE	J	1.0U	093718-001	EPA-8260B
	Chloroform	0.690	0.300	1.00	NE	J	1.0U	093718-001	EPA-8260B
	Dibromochloromethane	0.390	0.300	1.00	NE	J	1.0U	093718-001	EPA-8260B
SWMU 154									
CTF-MW2 26-Mar-13	RDX	0.354	0.0889	0.278	NE		J+	093723-024	EPA-8321A
CTF-MW2 (Duplicate) 26-Mar-13	RDX	0.352	0.0879	0.275	NE		J+	093724-024	EPA-8321A

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 positive bias

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

^c**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.

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.

Table III-4 (Concluded)

Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, January – March 2013

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-1,3,5-trinitro-1,3,5-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, January – March 2013

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

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, January – March 2013

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	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	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			
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	EPA 8260B			

Table III-6 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 – 3.33	EPA 8270C	Acenaphthene	0.300 – 0.333	EPA 8270C	Diphenyl amine	3.00 – 3.33	EPA 8270C
1,4-Dioxane	3.00 – 3.33	EPA 8270C	Acenaphthylene	0.300 – 0.333	EPA 8270C	Fluoranthene	0.300 – 0.333	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.33	EPA 8270C	Acetophenone	3.00 – 3.33	EPA 8270C	Fluorene	0.300 – 0.333	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.33	EPA 8270C	Anthracene	0.300 – 0.333	EPA 8270C	Hexachlorobenzene	3.00 – 3.33	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.33	EPA 8270C	Atrazine	3.00 – 3.33	EPA 8270C	Hexachlorobutadiene	3.00 – 3.33	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.33	EPA 8270C	Benzaldehyde	5.00 – 5.56	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.33	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.33	EPA 8270C	Benzo(a)anthracene	0.300 – 0.333	EPA 8270C	Hexachloroethane	3.00 – 3.33	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.56	EPA 8270C	Benzo(a)pyrene	0.440 – 0.489	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.333	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.33	EPA 8270C	Benzo(b)fluoranthene	0.300 – 0.333	EPA 8270C	Isophorone	3.00 – 3.33	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.33	EPA 8270C	Benzo(ghi)perylene	0.300 – 0.333	EPA 8270C	Naphthalene	0.300 – 0.333	EPA 8270C
2-Chloronaphthalene	0.300 – 0.333	EPA 8270C	Benzo(k)fluoranthene	0.300 – 0.333	EPA 8270C	Nitro-benzene	3.00 – 3.33	EPA 8270C
2-Chlorophenol	3.00 – 3.33	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.33	EPA 8270C	Pentachlorophenol	3.00 – 3.33	EPA 8270C
2-Methylnaphthalene	0.300 – 0.333	EPA 8270C	Caprolactam	3.00 – 3.33	EPA 8270C	Phenanthrene	0.300 – 0.333	EPA 8270C
2-Nitroaniline	3.00 – 3.33	EPA 8270C	Carbazole	0.300 – 0.333	EPA 8270C	Phenol	3.00 – 3.33	EPA 8270C
2-Nitrophenol	3.00 – 3.33	EPA 8270C	Chrysene	0.300 – 0.333	EPA 8270C	Pyrene	0.300 – 0.333	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.33	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.33	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.33	EPA 8270C
3-Nitroaniline	3.00 – 3.33	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.33	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.33	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.33	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.333	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.33	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.33	EPA 8270C	Dibenzofuran	3.00 – 3.33	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.33	EPA 8270C
4-Chlorobenzeneamine	3.30 – 3.67	EPA 8270C	Diethylphthalate	3.00 – 3.33	EPA 8270C	m,p-Cresol	3.00 – 3.33	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.33	EPA 8270C	Dimethylphthalate	3.00 – 3.33	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.33	EPA 8270C
4-Nitroaniline	3.00 – 3.33	EPA 8270C	Dinitro-o-cresol	3.00 – 3.33	EPA 8270C	o-Cresol	3.00 – 3.33	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, January – March 2013

Analyte	MDL ($\mu\text{g/L}$)
1,3,5-Trinitrobenzene	0.0879 – 0.0889
1,3-Dinitrobenzene	0.0879 – 0.0889
2,4,6-Trinitrotoluene	0.0879 – 0.0889
2,4-Dinitrotoluene	0.0879 – 0.0889
2,6-Dinitrotoluene	0.0879 – 0.0889
2-Amino-4,6-dinitrotoluene	0.0879 – 0.0889
2-Nitrotoluene	0.0901 – 0.0911
3-Nitrotoluene	0.0879 – 0.0889
4-Amino-2,6-dinitrotoluene	0.0879 – 0.0889
4-Nitrotoluene	0.165 – 0.167
HMX	0.0879 – 0.0889
Nitro-benzene	0.0879 – 0.0889
Pentaerythritol tetranitrate	0.110 – 0.111
RDX	0.0879 – 0.0889
Tetryl	0.0879 – 0.0889

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-1,3,5-trinitro-1,3,5-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, January – March 2013

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 22-Mar-13	Nitrate plus nitrite as N	5.54	0.170	0.500	10.0			093717-018	EPA 353.2
CTF-MW3 (Duplicate) 22-Mar-13	Nitrate plus nitrite as N	5.66	0.170	0.500	10.0			093718-018	EPA 353.2
SWMU 154									
CTF-MW2 26-Mar-13	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		093723-018	EPA 353.2
CTF-MW2 (Duplicate) 26-Mar-13	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		093724-018	EPA 353.2

Notes

^a**Laboratory Qualifier**

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

^b**Validation Qualifier**

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

^c**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.

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, January – March 2013

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 22-Mar-13	Bicarbonate Alkalinity	331	0.725	1.00	NE			093717-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093717-022	SM2320B
	Bromide	1.15	0.067	0.200	NE			093717-016	EPA 9056
	Chloride	118	1.68	5.00	NE			093717-016	EPA 9056
	Fluoride	2.39	0.033	0.100	4.0			093717-016	EPA 9056
	Sulfate	487	3.33	10.0	NE			093717-016	EPA 9056
CTF-MW3 (Duplicate) 22-Mar-13	Bicarbonate Alkalinity	333	0.725	1.00	NE			093718-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093718-022	SM2320B
	Bromide	1.14	0.067	0.200	NE			093718-016	EPA 9056
	Chloride	120	1.68	5.00	NE			093718-016	EPA 9056
	Fluoride	2.39	0.033	0.100	4.0			093718-016	EPA 9056
	Sulfate	495	3.33	10.0	NE			093718-016	EPA 9056
SWMU 154									
CTF-MW2 18-Dec-18	Bicarbonate Alkalinity	1580	0.725	1.00	NE			093723-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093723-022	SM2320B
	Bromide	1.64	0.670	2.00	NE	J		093723-016	EPA 9056
	Chloride	380	6.70	20.0	NE			093723-016	EPA 9056
	Fluoride	2.28	0.033	0.100	4.0			093723-016	EPA 9056
	Sulfate	130	1.33	4.00	NE			093723-016	EPA 9056
CTF-MW2 (Duplicate) 18-Dec-18	Bicarbonate Alkalinity	1580	0.725	1.00	NE			093724-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093724-022	SM2320B
	Bromide	0.725	0.670	2.00	NE	J		093724-016	EPA 9056
	Chloride	414	6.70	20.0	NE			093724-016	EPA 9056
	Fluoride	2.30	0.033	0.100	4.0			093724-016	EPA 9056
	Sulfate	181	1.33	4.00	NE			093724-016	EPA 9056

Notes

^a**Laboratory Qualifier**

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

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.

Table III-9 (Concluded)
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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, Washington, D.C. or Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B.

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, January – March 2013

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 22-Mar-13	ND	0.004	0.012	NE	U		093717-020	EPA 314.0
CTF-MW3 (Duplicate) 22-Mar-13	ND	0.004	0.012	NE	U		093718-020	EPA 314.0
CTF-MW2 26-Mar-13	ND	0.004	0.012	NE	U		093723-020	EPA 314.0
CTF-MW2 26-Mar-13	ND	0.004	0.012	NE	U		093724-020	EPA 314.0

Notes

^a**Laboratory Qualifier**

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

^b**Validation Qualifier**

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

^c**Analytical 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, January – March 2013

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 22-Mar-13	Aluminum	0.0159	0.015	0.050	NE	J		093717-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093717-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093717-009	EPA 6020
	Barium	0.0316	0.0006	0.002	2.00			093717-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093717-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093717-009	EPA 6020
	Calcium	194	0.300	1.00	NE			093717-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093717-009	EPA 6020
	Cobalt	0.000289	0.0001	0.001	NE	J		093717-009	EPA 6020
	Copper	0.00221	0.00035	0.001	NE		0.018UJ	093717-009	EPA 6020
	Iron	0.557	0.033	0.100	NE			093717-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093717-009	EPA 6020
	Magnesium	46.8	0.010	0.030	NE		J	093717-009	EPA 6020
	Manganese	0.00197	0.001	0.005	NE	J		093717-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093717-009	EPA 7470
	Nickel	0.00369	0.0005	0.002	NE	B	0.027UJ	093717-009	EPA 6020
	Potassium	11.0	0.080	0.300	NE			093717-009	EPA 6020
	Selenium	0.0307	0.0015	0.005	0.050			093717-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093717-009	EPA 6020
	Sodium	166	0.400	1.25	NE			093717-009	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U		093717-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093717-009	EPA 6010	
Zinc	0.00552	0.0035	0.010	NE	J	0.034U	093717-009	EPA 6020	

Table III-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 (Duplicate) 22-Mar-13	Aluminum	0.0168	0.015	0.050	NE	J		093718-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093718-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093718-009	EPA 6020
	Barium	0.0339	0.0006	0.002	2.00			093718-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093718-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093718-009	EPA 6020
	Calcium	198	0.300	1.00	NE			093718-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093718-009	EPA 6020
	Cobalt	0.000296	0.0001	0.001	NE	J		093718-009	EPA 6020
	Copper	0.00266	0.00035	0.001	NE		0.018UJ	093718-009	EPA 6020
	Iron	0.697	0.033	0.100	NE			093718-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093718-009	EPA 6020
	Magnesium	46.7	0.010	0.030	NE		J	093718-009	EPA 6020
	Manganese	0.00198	0.001	0.005	NE	J		093718-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093718-009	EPA 7470
	Nickel	0.0037	0.0005	0.002	NE	B	0.027UJ	093718-009	EPA 6020
	Potassium	11.5	0.080	0.300	NE			093718-009	EPA 6020
	Selenium	0.0265	0.0015	0.005	0.050			093718-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093718-009	EPA 6020
	Sodium	167	0.400	1.25	NE			093718-009	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U		093718-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093718-009	EPA 6010	
Zinc	0.00761	0.0035	0.010	NE	J	0.034U	093718-009	EPA 6020	

Table III-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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.
- 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, January – March 2013

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 22-Mar-2013	Aluminum	ND	0.015	0.050	NE	U		093717-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093717-010	EPA 6020
	Arsenic	0.00194	0.0017	0.005	0.010	J		093717-010	EPA 6020
	Barium	0.0325	0.0006	0.002	2.00			093717-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093717-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U	UJ	093717-010	EPA 6020
	Calcium	196	1.20	4.00	NE			093717-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093717-010	EPA 6020
	Cobalt	0.000427	0.0001	0.001	NE	J	J	093717-010	EPA 6020
	Copper	0.00211	0.00035	0.001	NE		0.0084UJ	093717-010	EPA 6020
	Iron	0.747	0.033	0.100	NE		J	093717-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093717-010	EPA 6020
	Magnesium	49.5	0.200	0.600	NE		J	093717-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093717-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093717-010	EPA 7470
	Nickel	0.00613	0.0005	0.002	NE			093717-010	EPA 6020
	Potassium	11.4	0.080	0.300	NE			093717-010	EPA 6020
	Selenium	0.0272	0.0015	0.005	0.050			093717-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093717-010	EPA 6020
	Sodium	175	1.60	5.00	NE			093717-010	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U		093717-010	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U	UJ	093717-010	EPA 6010	
Zinc	0.00521	0.0035	0.010	NE	J	J	093717-010	EPA 6020	

Table III-12 (Continued)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 (Duplicate) 22-Mar-2013	Aluminum	ND	0.015	0.050	NE	U		093718-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093718-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093718-010	EPA 6020
	Barium	0.0318	0.0006	0.002	2.00			093718-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093718-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U	UJ	093718-010	EPA 6020
	Calcium	193	1.20	4.00	NE			093718-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093718-010	EPA 6020
	Cobalt	0.000424	0.0001	0.001	NE	J	J	093718-010	EPA 6020
	Copper	0.00245	0.00035	0.001	NE		0.0084UJ	093718-010	EPA 6020
	Iron	0.774	0.033	0.100	NE		J	093718-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093718-010	EPA 6020
	Magnesium	49.6	0.200	0.600	NE		J	093718-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093718-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093718-010	EPA 7470
	Nickel	0.00619	0.0005	0.002	NE			093718-010	EPA 6020
	Potassium	11.6	0.080	0.300	NE			093718-010	EPA 6020
	Selenium	0.0273	0.0015	0.005	0.050			093718-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093718-010	EPA 6020
	Sodium	168	1.60	5.00	NE			093718-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093718-010	EPA 6020
Vanadium	ND	0.001	0.005	NE	U	UJ	093718-010	EPA 6010	
Zinc	0.00547	0.0035	0.010	NE	J	J	093718-010	EPA 6020	

Table III-12 (Concluded)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 value is an estimated quantity.
U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^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, January – March 2013

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 26-Mar-2013	Aluminum	0.0957	0.015	0.050	NE		0.11U	093723-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093723-009	EPA 6020
	Arsenic	0.0456	0.0017	0.005	0.010			093723-009	EPA 6020
	Barium	0.0797	0.0006	0.002	2.00			093723-009	EPA 6020
	Beryllium	0.00228	0.0002	0.0005	0.004			093723-009	EPA 6020
	Cadmium	0.000163	0.00011	0.001	0.005	J		093723-009	EPA 6020
	Calcium	366	2.40	8.00	NE			093723-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093723-009	EPA 6020
	Cobalt	0.00872	0.0001	0.001	NE		J	093723-009	EPA 6020
	Copper	0.00155	0.00035	0.001	NE		0.015UJ	093723-009	EPA 6020
	Iron	2.95	0.033	0.100	NE		J	093723-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093723-009	EPA 6020
	Magnesium	76.2	0.400	1.20	NE		J	093723-009	EPA 6020
	Manganese	2.97	0.040	0.200	NE			093723-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093723-009	EPA 7470
	Nickel	0.0223	0.0005	0.002	NE			093723-009	EPA 6020
	Potassium	44.9	0.080	0.300	NE			093723-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		093723-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093723-009	EPA 6020
	Sodium	486	1.60	5.00	NE			093723-009	EPA 6020
	Thallium	0.00109	0.00045	0.002	0.002	J		093723-009	EPA 6020
Uranium	0.0242	0.00067	0.0002	0.03			093723-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U	UJ	093723-009	EPA 6010	
Zinc	0.405	0.0035	0.010	NE		J	093723-009	EPA 6020	

Table III-13 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 (Duplicate) 26-Mar-2013	Aluminum	0.0932	0.015	0.050	NE		0.11U	093724-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093724-009	EPA 6020
	Arsenic	0.0444	0.0017	0.005	0.010			093724-009	EPA 6020
	Barium	0.0805	0.0006	0.002	2.00			093724-009	EPA 6020
	Beryllium	0.00224	0.0002	0.0005	0.004			093724-009	EPA 6020
	Cadmium	0.000158	0.00011	0.001	0.005	J		093724-009	EPA 6020
	Calcium	365	2.40	8.00	NE			093724-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093724-009	EPA 6020
	Cobalt	0.0088	0.0001	0.001	NE		J	093724-009	EPA 6020
	Copper	0.0017	0.00035	0.001	NE		0.015UJ	093724-009	EPA 6020
	Iron	2.92	0.033	0.100	NE		J	093724-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093724-009	EPA 6020
	Magnesium	75.6	0.400	1.20	NE		J	093724-009	EPA 6020
	Manganese	2.94	0.040	0.200	NE			093724-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093724-009	EPA 7470
	Nickel	0.0224	0.0005	0.002	NE			093724-009	EPA 6020
	Potassium	45.1	0.080	0.300	NE			093724-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		093724-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093724-009	EPA 6020
	Sodium	491	1.60	5.00	NE			093724-009	EPA 6020
	Thallium	0.00105	0.00045	0.002	0.002	J		093724-009	EPA 6020
Uranium	0.0234	0.000067	0.0002	0.03			093724-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U	UJ	093724-009	EPA 6010	
Zinc	0.422	0.0035	0.010	NE		J	093724-009	EPA 6020	

Table III-13 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 value is an estimated quantity.
U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^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, January – March 2013

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 26-Mar-2013	Aluminum	0.0933	0.015	0.050	NE			093723-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093723-010	EPA 6020
	Arsenic	0.0496	0.0017	0.005	0.010			093723-010	EPA 6020
	Barium	0.0849	0.0006	0.002	2.00			093723-010	EPA 6020
	Beryllium	0.00233	0.0002	0.0005	0.004			093723-010	EPA 6020
	Cadmium	0.000155	0.00011	0.001	0.005	J		093723-010	EPA 6020
	Calcium	372	2.40	8.00	NE			093723-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093723-010	EPA 6020
	Cobalt	0.00921	0.0001	0.001	NE		J	093723-010	EPA 6020
	Copper	0.00141	0.00035	0.001	NE		0.013UJ	093723-010	EPA 6020
	Iron	3.08	0.033	0.100	NE		J	093723-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093723-010	EPA 6020
	Magnesium	81.6	0.400	1.20	NE		J	093723-010	EPA 6020
	Manganese	3.02	0.040	0.200	NE			093723-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093723-010	EPA 7470
	Nickel	0.0239	0.0005	0.002	NE			093723-010	EPA 6020
	Potassium	47.2	0.080	0.300	NE			093723-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		093723-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093723-010	EPA 6020
	Sodium	506	1.60	5.00	NE			093723-010	EPA 6020
	Thallium	0.0011	0.00045	0.002	0.002	J		093723-010	EPA 6020
Uranium	0.0241	0.000067	0.0002	0.03			093723-010	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U	UJ	093723-010	EPA 6010	
Zinc	0.343	0.0035	0.010	NE		J	093723-010	EPA 6020	

Table III-14 (Continued)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 (Duplicate) 26-Mar-2013	Aluminum	0.0937	0.015	0.050	NE			093724-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093724-010	EPA 6020
	Arsenic	0.0463	0.0017	0.005	0.010			093724-010	EPA 6020
	Barium	0.0813	0.0006	0.002	2.00			093724-010	EPA 6020
	Beryllium	0.00241	0.0002	0.0005	0.004			093724-010	EPA 6020
	Cadmium	0.000137	0.00011	0.001	0.005	J		093724-010	EPA 6020
	Calcium	298	2.40	8.00	NE			093724-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093724-010	EPA 6020
	Cobalt	0.00896	0.0001	0.001	NE		J	093724-010	EPA 6020
	Copper	0.00247	0.00035	0.001	NE		0.013UJ	093724-010	EPA 6020
	Iron	3.06	0.033	0.100	NE		J	093724-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093724-010	EPA 6020
	Magnesium	63.6	0.400	1.20	NE		J	093724-010	EPA 6020
	Manganese	2.44	0.040	0.200	NE			093724-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093724-010	EPA 7470
	Nickel	0.0244	0.0005	0.002	NE			093724-010	EPA 6020
	Potassium	43.9	0.080	0.300	NE			093724-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		093724-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093724-010	EPA 6020
	Sodium	474	1.60	5.00	NE			093724-010	EPA 6020
	Thallium	0.00106	0.00045	0.002	0.002	J		093724-010	EPA 6020
Uranium	0.0238	0.000067	0.0002	0.03			093724-010	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U	UJ	093724-010	EPA 6010	
Zinc	0.352	0.0035	0.010	NE		J	093724-010	EPA 6020	

Table III-14 (Concluded)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 value is an estimated quantity.
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, January – March 2013

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 26-Mar-2013	Americium-241	6.95 ± 18.1	23.0	11.2	NE	U	BD	093723-033	EPA 901.1
	Cesium-137	2.45 ± 2.69	4.51	2.17	NE	U	BD	093723-033	EPA 901.1
	Cobalt-60	-1.77 ± 2.55	4.02	1.87	NE	U	BD	093723-033	EPA 901.1
	Potassium-40	17.9 ± 63.5	40.3	18.7	NE	U	BD	093723-033	EPA 901.1
	Gross Alpha	-13.42	NA	NA	15 pCi/L	NA	None	093723-034	EPA 900.0
	Gross Beta	58.9 ± 13.2	11.2	5.37	4mrem/yr			093723-034	EPA 900.0
	Uranium-233/234	60.9 ± 8.15	0.905	0.402	NE			093723-035	HASL-300
	Uranium-235/236	0.822 ± 0.546	0.556	0.216	NE		J	093723-035	HASL-300
	Uranium-238	10.9 ± 1.86	0.508	0.204	NE			093723-035	HASL-300
CTF-MW2 (Duplicate) 26-Mar-2013	Americium-241	-28 ± 21.5	27.8	13.5	NE	U	BD	093724-033	EPA 901.1
	Cesium-137	0.613 ± 2.12	3.86	1.83	NE	U	BD	093724-033	EPA 901.1
	Cobalt-60	1.56 ± 2.66	3.82	1.76	NE	U	BD	093724-033	EPA 901.1
	Potassium-40	83.8 ± 44.7	38.0	17.5	NE		J	093724-033	EPA 901.1
	Gross Alpha	-39.77	NA	NA	15 pCi/L	NA	None	093724-034	EPA 900.0
	Gross Beta	35.2 ± 10.6	13.4	6.53	4mrem/yr		J	093724-034	EPA 900.0
	Uranium-233/234	58.6 ± 7.61	0.462	0.205	NE			093724-035	HASL-300
	Uranium-235/236	0.629 ± 0.266	0.284	0.110	NE		J	093724-035	HASL-300
	Uranium-238	8.24 ± 1.29	0.259	0.104	NE			093724-035	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.

Table III-15 (Concluded)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes (continued)

^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.

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.

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 March 2013

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	26-Mar-13	Arsenic—Filtered	0.0496 mg/L	0.010 mg/L			093723-010	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Filtered	0.0463 mg/L	0.010 mg/L			093724-010	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	26-Mar-13	Arsenic—Unfiltered	0.0456 mg/L	0.010 mg/L			093723-009	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Unfiltered	0.0444 mg/L	0.010 mg/L			093724-009	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 March 2013

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.

Table III-17
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, January – March 2013

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD
	mg/L unless otherwise noted		
CTF-MW3			
Nitrate plus Nitrite	5.54	5.66	2
Bicarbonate Alkalinity	331	333	1
Bromide	1.15	1.14	1
Chloride	118	120	2
Fluoride	2.39	2.39	< 1
Sulfate	487	495	2
Aluminum	0.0159	0.0168	6
Barium	0.0316	0.0339	7
Calcium	194	198	2
Cobalt	0.000289	0.000296	2
Iron	0.557	0.697	22
Magnesium	46.8	46.7	< 1
Manganese	0.00197	0.00198	1
Potassium	11.0	11.5	4
Selenium	0.0307	0.0265	15
Sodium	166	167	1
Filtered Barium	0.0325	0.0318	2
Filtered Calcium	196	193	2
Filtered Cobalt	0.000427	0.000424	1
Filtered Iron	0.747	0.774	4
Filtered Magnesium	49.5	49.6	< 1
Filtered Nickel	0.00613	0.00619	1
Filtered Potassium	11.4	11.6	2
Filtered Selenium	0.0272	0.0273	< 1
Filtered Sodium	175	168	4
Filtered Zinc	0.00521	0.00547	5

Table III-17 (Continued)
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, January – March 2013

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD
	mg/L unless otherwise noted		
CTF-MW2			
RDX	0.354	0.352	1
Bicarbonate Alkalinity	1580	1580	< 1
Bromide	1.64	0.725	77
Chloride	380	414	9
Fluoride	2.28	2.30	1
Sulfate	130	181	33
Arsenic	0.0456	0.0444	3
Barium	0.0797	0.0805	1
Beryllium	0.00228	0.00224	2
Cadmium	0.000163	0.000158	3
Calcium	366	365	< 1
Cobalt	0.00872	0.0088	1
Iron	2.95	2.92	1
Magnesium	76.2	75.6	1
Manganese	2.97	2.94	1
Nickel	0.0223	0.0224	< 1
Potassium	44.9	45.1	< 1
Sodium	486	491	1
Thallium	0.00109	0.00105	4
Uranium	0.0242	0.0234	3
Zinc	0.405	0.422	4
Filtered Aluminum	0.0933	0.0937	< 1
Filtered Arsenic	0.0496	0.0463	7
Filtered Barium	0.0849	0.0813	4
Filtered Beryllium	0.00233	0.00241	3
Filtered Cadmium	0.000155	0.000137	12
Filtered Calcium	372	298	22
Filtered Cobalt	0.00921	0.00896	3
Filtered Iron	3.08	3.06	1
Filtered Magnesium	81.6	63.6	25
Filtered Manganese	3.02	2.44	21
Filtered Nickel	0.0239	0.0244	2
Filtered Potassium	47.2	43.9	7
Filtered Sodium	506	474	7
Filtered Thallium	0.0011	0.00106	4
Filtered Uranium	0.0241	0.0238	1
Filtered Zinc	0.343	0.352	3

Table III-17 (Concluded)
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, January – March 2013

Notes

RPD = Relative percent difference is calculated with the following equation and rounded to nearest whole number.

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

where: R_1 = analysis result.
 R_2 = duplicate analysis result.

CTF = Coyote Test Field.
mg/L = Milligrams per liter.
MW = Monitoring well.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SWMU = Solid Waste Management Unit.

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

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 149			SNL/NM Project No.: 98026.01.14			
Calibrations done by: Alfred Santillanes			Date: 3/22/13			
Make & Model: YSI 6920V						
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033						
YSI 650 MDS (S/N): NA						
pH Calibration						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0640	4.01	19.8	7.00	19.8	10.00
2. Time:	1045	4.01	22.2	7.00	22.2	10.01
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	
SC Calibration						
Reference Value: 1278uS			Standard Lot No.: 2AG068			
	Value	Temp	Expiration Date: JUL-14			
1. Time:	0645	1283	19.8			
2. Time:	1050	1285	22.2			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200mV			Standard Lot No. 1301187			
	Value	Temp	Expiration Date: OCT-13			
1. Time:	0650	200.4	19.8			
2. Time:	1053	200.2	22.2			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0655	81.7	24.56			
2. Time:	1055	81.6	24.60			
3. Time:						
4. Time:						

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2

SNL/NM Project Name: SWMU 149		Project No.: 98026.01.14		
Calibration done by: Alfred Santillanes		Date: 3/22/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	710	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time	0657 10.1	20.0	101	799
2. Time	1057 10.0	20.3	100	801
3. Time				
4. Time				
Comments:				

**Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form**

Project Name: <u>SWMU 149</u>	Monitoring Well ID #: <u>CTF-MW3</u>	Date: <u>03-22-13</u> ^{25 WJA}
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1807-32</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> William Gibson _____ Print Name: <u>WJA</u> Initial:	<u>Personnel Performing Decontamination:</u> William Gibson _____ Print Name: <u>WJA</u> Initial:	
Alfred Santillanes _____ Print Name: <u>AS</u> Initial:	Alfred Santillanes _____ Print Name: <u>AS</u> Initial:	
Condition of Equipment		
Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deonized (circle one) Source: <u>Culligan</u> Lot Number: <u>03-18-13</u>	HNO ₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 149	SWMU 149	SWMU 149
Container ID # (site-date-sequence)	SWMU-CTF-MW3-032213-01	SWMU-CTF-MW3-032213-02	SWMU-032513
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~24 gal.	~18 gal.	35 gal.
Total Container Weight	~ 190 lbs.	~ 140 lbs.	~280 lbs.
COC#: Sample#-Fraction	CoC# 614661	CoC# 614661	CoC# 614661
	Sample # 093717, 093718	Sample # 093717, 093718	Sample # 093717, 093718
Accumulation Date	Start: 03-22-13	Start: 03-22-13	Start: 03-25-13
	Full: 03-22-13	Full: 03-22-13	Full: 03-25-13
Date Waste Moved to Accumulation Area	03-22-13	03-22-13	03-25-13
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW3 Date: 3/22/13 Time: 0800

Activities: Ground Water Monitoring and Sampling
 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
 Temp: _____ °F Wind Speed: _____ MPH Humidity: _____ % Wind Chill _____ °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules
 Other: _____

Safety Topics Presented

<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<input checked="" type="checkbox"/> Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
<input checked="" type="checkbox"/> Wear safety boots.	<input checked="" type="checkbox"/> Be aware of electrical hazards
<input checked="" type="checkbox"/> Use safe lifting practices. Wear leather gloves if necessary.	<input checked="" type="checkbox"/> Be aware of pressure hazards.
<input checked="" type="checkbox"/> Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	<input checked="" type="checkbox"/> No eating or drinking at sampling counter.
<input checked="" type="checkbox"/> Be aware of chemical hazards.	<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)
<input checked="" type="checkbox"/> Wear nitrile or latex gloves when sampling.	<input checked="" type="checkbox"/> Wear communication device (cell phone, EOC pager).
<input checked="" type="checkbox"/> Wear chemical safety goggles.	<input checked="" type="checkbox"/> Avoid spilling purge / decon water.

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

Attendees

William Gibson
 Printed Name

William Gibson
 Signature

ALFRED SANTILLANOS
 Printed Name

Alfred Santillanos
 Signature

Danielle Nieto
 Printed Name

Danielle Nieto
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG **Page 1 of 2**

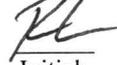
SNL/NM Project Name: SWMU 154			SNL/NM Project No.: 146422.10.11.01				
Calibrations done by: R Lynch			Date: 03/26/13				
Make & Model: YSI 6920V							
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033							
YSI 650 MDS (S/N): N/A							
pH Calibration							
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00				
Reference value:	4.00		7.00		10.00		
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0658	3.99	17.9	7.00	17.9	9.99	17.8
2. Time:	1040	4.01	18.6	7.01	18.6	10.00	18.6
3. Time:							
4. Time:							
Standard lot no.:	2AG653		2AH113		2AF557		
Expiration date:	JUL-14		AUG-14		JUL-14		
SC Calibration							
Reference Value: 1278 uS			Standard Lot No.: 2AG086				
	Value	Temp	Expiration Date: JUL-13				
1. Time:	0659	1277	17.9				
2. Time:	1042	1281	18.6				
3. Time:							
4. Time:							
ORP Calibration							
Reference Value: 200mV			Standard Lot No. 1301187				
	Value	Temp	Expiration Date: OCT-13				
1. Time:	0659	199.8	17.9				
2. Time:	1041	199.6	18.6				
3. Time:							
4. Time:							
DO Calibration							
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg				
1. Time:	0657	81.5	24.38				
2. Time:	1039	81.6	24.40				
3. Time:							
4. Time:							

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2

SNL/NM Project Name: SWMU 154		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 03/26/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	25 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time	0754 10.1	19.9	101	802
2. Time	0943 10.3	20.1	105	804
3. Time				
4. Time				
Comments:				

**Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form**

Project Name: <u>SWMU</u>	Monitoring Well ID #: <u>CTF-MW2</u>	Date: <u>03-26-13</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1807-32</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> William Gibson _____  Print Name: Initial: Robert Lynch _____  Print Name: Initial:	<u>Personnel Performing Decontamination:</u> William Gibson _____  Print Name: Initial: Robert Lynch _____  Print Name: Initial:	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
<p align="center">Distilled or Deionized (circle one)</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>3-18-13</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>AROC</u></p> <p>Lot Number: <u>A0305629</u></p>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU	SWMU	SWMU
Container ID # (site-date-sequence)	SWMU-CTF-MW2-032613-01	SWMU-CTF-MW2-032613-02	SWMU-032613
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~24 gal.	~24 gal.	30 gal.
Total Container Weight	~190 lbs.	~190 lbs.	~240 lbs.
COC#: Sample#-Fraction	<i>TJ</i>	<i>TJ</i>	<i>TJ</i>
	CoC# 614663, 614663/4	CoC# 614663, 614663/4	CoC# 614663, 614663/4
	Sample # 093723, 093724	Sample # 093723, 093724	Sample # 093723, 093724
	 		
Accumulation Date	Start: 03-26-13 Full: 03-26-13	Start: 03-26-13 Full: 03-26-13	Start: 03-26-13 Full: 03-26-13
Date Waste Moved to Accumulation Area	03-26-13	03-26-13	03-26-13
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 2 Date: 03/26/13 Time: 0747

Activities: GROUND WATER MONITORING AND SAMPLING
 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
 Temp: _____ °F Wind Speed: _____ MPH Humidity: _____ % Wind Chill _____ °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules
 Other: _____

Safety Topics Presented

<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<input checked="" type="checkbox"/> Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
<input checked="" type="checkbox"/> Wear safety boots.	<input checked="" type="checkbox"/> Be aware of electrical hazards
<input checked="" type="checkbox"/> Use safe lifting practices. Wear leather gloves if necessary.	<input checked="" type="checkbox"/> Be aware of pressure hazards.
<input checked="" type="checkbox"/> Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	<input checked="" type="checkbox"/> No eating or drinking at sampling counter.
<input checked="" type="checkbox"/> Be aware of chemical hazards.	<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)
<input checked="" type="checkbox"/> Wear nitrile or latex gloves when sampling.	<input checked="" type="checkbox"/> Wear communication device (cell phone, EOC pager).
<input checked="" type="checkbox"/> Wear chemical safety goggles.	<input checked="" type="checkbox"/> Avoid spilling purge / decon water.

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

ALFRED SANTILLANES
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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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. *N/A*

SMO Use

AR/COC 614660

Project Name: SWMU 149 GWM	Date Samples Shipped: <i>3/21/13</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>202359</i>	SMO Contact Phone: <i>910</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: CF250-13	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
	Contract No.: PO 1303873		

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

Tech Area:		Building:		Room:		Operational Site:						Parameter & Method Requested		Lab Sample ID
Sample No.	Fraction	Sample Location Detail		Depth (ft)	Date/Time Collected	Sample Matrix	Container Type Volume		Preservative	Collection Method	Sample Type			
093715	-001	CTF-EB1		NA	3/20/13 11:04	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)		
093715	-009	CTF-EB1		NA	3/20/13 11:05	DIW	P	500 ml	HNO3	G	EB	TAL Metals(SW846-6010/6020/7470)		
093715	-010	CTF-EB1		NA	3/20/13 11:06	FDIW	P	500 ml	HNO3	G	EB	TAL Metals(SW846-6010/6020/7470)		
093715	-016	CTF-EB1		NA	3/20/13 11:08	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)		
093715	-018	CTF-EB1		NA	3/20/13 11:09	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)		
093715	-020	CTF-EB1		NA	3/20/13 11:10	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)		
093715	-022	CTF-EB1		NA	3/20/13 11:11	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)		
093716	-001	CTF-TB1		NA	3/20/13 11:04	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 Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sample Team Members</th> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> </thead> <tbody> <tr> <td></td> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td>RL</td> <td>SNL/4142/505-844-4013/505-250-7090</td> </tr> <tr> <td></td> <td>Alfred Santillanes</td> <td><i>[Signature]</i></td> <td>AS</td> <td>SNL/4142/505-844-5130/505-228-0710</td> </tr> <tr> <td></td> <td>William Gibson</td> <td><i>[Signature]</i></td> <td>WG</td> <td>SNL/4142/505-284-3307/505-239-7367</td> </tr> </tbody> </table>		Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090		Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710		William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Anions as Br,Cl,F,SO4. Alkalinity as total CaCO3,HCO3,CO3. if perchlorate detected, then perform verification analysis using SW846-6850M. FDIW, filtered in field w/40 micron filter.		Lab Use
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell																				
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090																				
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710																				
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367																				

1. Relinquished by <i>[Signature]</i> Org. 4142 Date <i>3/21/13</i> Time <i>1005</i>	3. Relinquished by Org. Date Time
1. Received by <i>[Signature]</i> Org. 4142 Date <i>3/21/13</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 **614661**

Project Name: <u>SWMU 149 GWM</u>	Date Samples Shipped: _____	SMO Authorization: <u><i>Don Valencia</i></u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. _____	SMO Contact Phone: <u><i>see bottle order</i></u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026.01.14</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>CF250-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: _____	
	Contract No.: <u>PO 1303873</u>	Rita Kavanaugh/505-284-2553	

Tech Area: _____	Operational Site: _____	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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					
093717	-001	CTF-MW3	359	3/22/13	10:18	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093717	-009	CTF-MW3	359	3/22/13	10:19	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	
093717	-010	CTF-MW3	359	3/22/13	10:20	FGW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	
093717	-016	CTF-MW3	359	3/22/13	10:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093717	-018	CTF-MW3	359	3/22/13	10:23	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
093717	-020	CTF-MW3	359	3/22/13	10:24	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
093717	-022	CTF-MW3	359	3/22/13	10:25	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093718	-001	CTF-MW3	359	3/22/13	10:18	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
093718	-009	CTF-MW3	359	3/22/13	10:19	GW	P	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	
093718	-010	CTF-MW3	359	3/22/13	10:20	FGW	P	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	

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
	Danielle Nieto	<i>Danielle Nieto</i>	<i>DN</i>	SNL/4143/505-845-7706/505-239-3989	Return Samples By: _____
	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	
					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Anions as Br,Cl,F,SO4. Alkalinity as total CaCO3,HCO3,CO3. if perchlorate detected, then perform verification analysis using SW846-6850M. FGW, filtered in field w/40 micron filtered.

1. Relinquished by <u><i>Alfred Santillanes</i></u> Org. <u>4142</u> Date <u>3/25/13</u> Time <u>0936</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u><i>Don Valencia</i></u> Org. <u>4142</u> Date <u>3/25/13</u> Time <u>0936</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

Internal Lab

Batch No. *NK*

SMO Use

AR/COC

614662 ✓

Project Name: SWMU 154 GWM	Date Samples Shipped: _____	SMO Authorization: <i>Don't clean</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. _____	SMO Contact Phone: <i>see bottle one</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: CF251-13	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
	Contract No.: PO 1303873		

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					
✓ 093721	-001 ✓	CTF-EB2	NA	3/25/13 9:00 ✓	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 093721	-002 ✓	CTF-EB2	NA	3/25/13 9:01 ✓	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 093721	-009 ✓	CTF-EB2	NA	3/25/13 9:03 ✓	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
✓ 093721	-010 ✓	CTF-EB2	NA	3/25/13 9:04 ✓	FDIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
✓ 093721	-016 ✓	CTF-EB2	NA	3/25/13 9:05 ✓	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
✓ 093721	-018 ✓	CTF-EB2	NA	3/25/13 9:06 ✓	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
✓ 093721	-020 ✓	CTF-EB2	NA	3/25/13 9:07 ✓	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)	
✓ 093721	-022 ✓	CTF-EB2	NA	3/25/13 9:08 ✓	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
✓ 093721	-024 ✓	CTF-EB2	NA	3/25/13 9:09 ✓	DIW	AG	4x1L ✓	None	G	EB	High Explosives (SW846-8321A Mod)	
✓ 093721	-033 ✓	CTF-EB2	NA	3/25/13 9:11	DIW	P	1 L	HNO3	G	EB	Gamma Spec. (901.0)	

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>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	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	
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. Report Alkalinity as total CaCO3, HCO3, and CO3. Report Gamma Spec for short list isotopes. FDIW, filtered in field w/40 micron filter.					

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>3/25/13</i> Time <i>9:41</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don't clean</i> Org. <i>4142</i> Date <i>3/25/13</i> Time <i>9:41</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. *21*

SMO Use

AR/COC **614663**

Project Name: SWMU 154 GWM	Date Samples Shipped:	SMO Authorization: <i>Don Williams</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>505-844-3199</i>	
Project/Task Number: 98026.01.15	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF251-13	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	

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					
✓ 093723	-001 ✓	CTF-MW2	129	3/26/13 9:29 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093723	-002 ✓	CTF-MW2	129	3/26/13 9:31 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093723	-009	CTF-MW2	129	3/26/13 9:34 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 093723	-010	CTF-MW2	129	3/26/13 9:35 ✓	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 093723	-016	CTF-MW2	129	3/26/13 9:37 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093723	-018 ✓	CTF-MW2	129	3/26/13 9:38 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093723	-020 ✓	CTF-MW2	129	3/26/13 9:39 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093723	-022 ✓	CTF-MW2	129	3/26/13 9:40 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093723	-024 ✓	CTF-MW2	129	3/26/13 9:41 ✓	GW	AG	4x1L ✓	None	G	SA	High Explosives (SW846-8321A Mod)	
✓ 093723	-033 ✓	CTF-MW2	129	3/26/13 9:44 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec. (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	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	
	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 CTF-MW2 water has high buffering capacity, check pH and add preservatives as needed. If Perchlorate detected, then perform verification analysis using SW846-6850. Report Anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, and CO3. Report Gamma Spec for short list isotopes. FGW, filtered in field w/ 40 micron filter.					Lab Use

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 3/26/13 Time 10:29	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Williams</i> Org. 4142 Date 3/26/13 Time 10:29	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 **614663**

Project Name:		SWMU 154 GWM		Project/Task Manager:				Clinton Lum				Project/Task No.:			98026.01.15			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				
✓ 093723	-034 ✓	CTF-MW2		129	3/26/13	9:45 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (900.0)						
✓ 093723	-035 ✓	CTF-MW2		129	3/26/13	9:46 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (ASTM D3972-09M)						
✓ 093724 ¹	-001 ✓	CTF-MW2		129	3/26/13	9:29 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)						
✓ 093724	-002 ✓	CTF-MW2		129	3/26/13	9:31 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)						
✓ 093724	-009	CTF-MW2		129	3/26/13	9:34 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)						
✓ 093724	-010 ✓	CTF-MW2		129	3/26/13	9:35 ✓	FGW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)						
✓ 093724	-016 ✓	CTF-MW2		129	3/26/13	9:37 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)						
✓ 093724	-018	CTF-MW2		129	3/26/13	9:38 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)						
✓ 093724	-020 ✓	CTF-MW2		129	3/26/13	9:39 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)						
✓ 093724	-022	CTF-MW2		129	3/26/13	9:40 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)						
✓ 093724	-024	CTF-MW2		129	3/26/13	9:41 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod)						
✓ 093724	-033	CTF-MW2		129	3/26/13	9:44 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec. (901.0)						
✓ 093724	-034	CTF-MW2		129	3/26/13	9:45 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (900.0)						
✓ 093724	-035	CTF-MW2		129	3/26/13	9:46 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (ASTM D3972-09M)						
✓ 093725	-001	CTF-TB4		NA	3/26/13	9:29 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)						
✓ 093726	-001	CTF-FB2		NA	3/26/13	9:23 ✓	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)						
Recipient Initials _____																			

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC 614664

Project Name: SWMU 154 GWM	Date Samples Shipped:	SMO Authorization: <i>[Signature]</i>	<input checked="" type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone: Lorraine Herrera/505-844-3199	<input type="checkbox"/> RMMA
Project/Task Number: 98026.01.15	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF251-13	Lab Destination: GEL		
	Contract No.: PO 1303873		

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					
093723	-011	CTF-MW2	NA	3/26/13 9:19	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>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 CTF-MW2 water has high buffering capacity, check pH and add preservative as needed.
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 3/26/13 Time 10:31	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 3/26/13 Time 10:31	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

Appendix C

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

Memorandum

Date: May 7, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614660
SDG: 322402
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) 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.

Anions:

1. The ICAL intercept for chloride was > the MDL. The associated sample result was a detect < 3X the intercept value and will be **qualified J+,I5**.

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 noted above in the summary section and as follows.

Anions:

The ICAL intercept for sulfate was > the MDL. 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.

All Analyses:

The MS/PS analyses were performed on samples of similar matrix from other SNL SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

All Analyses:

The MS/PS analyses were performed on samples of similar matrix from other SNL SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The sample was diluted 5X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/13/13

Memorandum

Date: May 7, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614660
SDG: 322402 and 322404
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 method EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) 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. Ni was detected in the method blank at a concentration > MDL and < PQL. The associated sample results were detects > the MDL but <5X the MB value and will be **qualified 0.027U,B** at 5X the value of the MB
2. The serial dilution %D of Mg was >10% and the parent sample result was >50X the MDL. The associated sample results were NDs and will be **qualified UJ,D1**.

CVAA:

1. The MS and replicate analyses for Hg were performed on a non-SNL sample. The associated sample results were ND and will be **qualified UJ,MS1,RP1** due to lack of matrix specific accuracy and precision 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 samples were prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria. It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

Blanks

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

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

ICP-AES and ICP-MS:

The parent sample was from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicate acceptance criteria were met except as noted above in the summary section and as follows.

ICP-AES and ICP-MS:

The parent sample was 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. The samples were not diluted.

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 dilutions met all QC acceptance criteria except as noted above in the summary section and as follows.

ICP-AES and ICP-MS

The parent sample was 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: Marcia Hilchey **Level I** **Date:** 05/13/13



Sample Findings Summary



AR/COC: 614660

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	093715-009/CTF-EB1	Magnesium (7439-95-4)	UJ, D1
	093715-009/CTF-EB1	Nickel (7440-02-0)	0.027U, B
	093715-010/CTF-EB1	Magnesium (7439-95-4)	UJ, D1
	093715-010/CTF-EB1	Nickel (7440-02-0)	0.027U, B
SW846 7470A			
	093715-009/CTF-EB1	Mercury (7439-97-6)	UJ, MS1,RP1
	093715-010/CTF-EB1	Mercury (7439-97-6)	UJ, MS1,RP1
SW846 9056			
	093715-016/CTF-EB1	Chloride (16887-00-6)	J+, I5

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

Memorandum

Date: May 06, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614660
SDG: 322402
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. 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

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 follows. The ICAL %RSD was > 15% but ≤ 40% for acetone. The associated sample results were ND and no other calibration infractions occurred for this analyte. Therefore, the associated sample results 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 trichlorotrifluoroethane was not included in the MS/MSD spiking solution and the parent sample was from another SNL SDG. 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 trip blank was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Level I

Date: 05/13/13

Memorandum

Date: May 9, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614661
SDG: 322514
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

Two samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate) 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 samples were 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 and sulfate were > the MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EQB, sample 322402003, at a concentration > the PQL. The associated sample results were detects > the PQL and >5X the EQB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The samples were diluted 10X.

Anions:

The samples were diluted 25X for chloride and sulfate.

Other QC

The EB from COC 614660 applied to field samples in this package. Field duplicate pairs were submitted on this COC. There are no review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Level II

Date: 05/15/13

Memorandum

Date: May 8, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614661
SDG: 322514 and 322515
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 filtered and two unfiltered samples were prepared and analyzed with approved procedures using method EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) 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. Ni was detected in the MB associated with the unfiltered samples at > MDL and < PQL. Both associated sample results were detects > the MDL but <5X the MB value and will be **qualified 0.027U,B** at 5X the value of the MB.
2. Cu was detected at > the PQL in the unfiltered EB, sample 322402002, associated with samples 322514002 and -008. The associated sample results were detects > the PQL but <5X the EB concentration and will be **qualified 0.018UJ,B2** at 5X the EB value. Zinc was detected in the unfiltered EB at > the MDL but < the PQL. The associated sample results were detects > the MDL but < the PQL and will be **qualified 0.034U,B2** at 5X the EB value.
3. Cu was detected at > the PQL in the filtered EB, sample 322404001, associated with samples 322515001 and -002. The associated sample results were detects > the PQL but <5X the EQB concentration and will be **qualified 0.0084UJ,B2** at 5X the EB value.
4. The unfiltered serial dilution %D for Mg was >10% and the parent sample result was > 50X MDL. The filtered serial dilution %Ds for Zn, Co, Fe and Mg were >10%, and the parent sample results were > 50X MDL. All associated sample results were detects and will be **qualified J,D1**.

5. Cu and Cd were detected at negative value with an absolute value $>$ but $\leq 2X$ the MDL in the ICSA associated with the filtered samples. Cu and Ni were detected at negative value with absolute values $> 2X$ the MDL in the ICSA associated with the unfiltered samples. The associated results for Cu and Ni were detects $< 50X$ the absolute value of the ICS A and will be **qualified J-,CK3**. The associated results for Cd were ND and will be **qualified UJ,CK3**.
6. The filtered parent sample concentration for Zn was $> 4X$ the MS spike concentration and the MS %R was $>$ the upper acceptance limit. Therefore, the %R was not used to evaluate the field sample data. All associated sample results were detects and will be **qualified J,MS1** due to lack of matrix-specific accuracy information.

ICP-AES:

1. V was detected at a negative value with an absolute value $>$ but $\leq 2X$ the MDL in the ICSA associated with the filtered samples. The associated sample results were non-detects (NDs) and will be **qualified UJ,CK3**.

CVAA:

1. The initial calibration intercept for Hg was negative with an absolute value $>$ the MDL but $\leq 3X$ the MDL. All associated sample results were ND and will be **qualified UJ,I5**.
2. Hg was detected in the ICB/CCB at negative concentration with absolute values $>$ the MDL but \leq the PQL. All associated sample results were NDs and 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.

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

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

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria. It should be noted that the CRI was analyzed at the PQL and not at $2X$ the PQL for all target analytes.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Na and Fe were detected at concentrations $>$ the MDL but $<$ the PQL in the unfiltered EB, sample 322402002, associated with samples 322514002 and -008. The associated sample results were detects $>$ the PQL and $> 5X$ the EQB concentration and will not be qualified.

Na and Se were detected at concentration > the MDL but < the PQL in the filtered EQB, sample 322404001, associated with samples 322515001 and -002. The associated sample results were detects > the PQL and >5X the EQB concentration and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria except as noted above and as follows.

ICP-MS:

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

ICP-AES:

The MS analysis for SDG 322515 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

CVAA:

The MS analysis for SDG 322514 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicates met all QC acceptance criteria.

ICP-AES:

The replicate analysis for SDG 322515 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

CVAA:

The replicate analysis for SDG 322514 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)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The unfiltered samples were diluted 5X for Ca and Na and the filtered samples were diluted 20X for Na, Ca and Mg.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the concentrations of Ca in the undiluted samples were > those in the ICS solutions. The results met QC acceptance criteria except as noted above in the summary section and as follows. Cd was detected in the ICS A associated with the unfiltered samples. The associated sample results were NDs and will not be qualified. Several target analytes were



Sample Findings Summary



AR/COC: 614661

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6010B			
	093717-010/CTF-MW3	Vanadium (7440-62-2)	UJ, CK3
	093718-010/CTF-MW3	Vanadium (7440-62-2)	UJ, CK3
SW846 3005/6020 DOE-AL			
	093717-009/CTF-MW3	Copper (7440-50-8)	0.018UJ, B2,CK3
	093717-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	093717-009/CTF-MW3	Nickel (7440-02-0)	.027UJ, B,CK3
	093717-009/CTF-MW3	Zinc (7440-66-6)	0.034U, B2
	093717-010/CTF-MW3	Cadmium (7440-43-9)	UJ, CK3
	093717-010/CTF-MW3	Cobalt (7440-48-4)	J, D1
	093717-010/CTF-MW3	Copper (7440-50-8)	0.0084UJ, B2,CK3
	093717-010/CTF-MW3	Iron (7439-89-6)	J, D1
	093717-010/CTF-MW3	Magnesium (7439-95-4)	J, D1
	093717-010/CTF-MW3	Zinc (7440-66-6)	J, D1,MS1
	093718-009/CTF-MW3	Copper (7440-50-8)	0.018UJ, B2,CK3
	093718-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	093718-009/CTF-MW3	Nickel (7440-02-0)	.027UJ, B,CK3
	093718-009/CTF-MW3	Zinc (7440-66-6)	0.034U, B2
	093718-010/CTF-MW3	Cadmium (7440-43-9)	UJ, CK3
	093718-010/CTF-MW3	Cobalt (7440-48-4)	J, D1
	093718-010/CTF-MW3	Copper (7440-50-8)	0.0084UJ, B2,CK3
	093718-010/CTF-MW3	Iron (7439-89-6)	J, D1
	093718-010/CTF-MW3	Magnesium (7439-95-4)	J, D1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093718-010/CTF-MW3	Zinc (7440-66-6)	J, D1,MS1
SW846 7470A			
	093717-009/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
	093717-010/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
	093718-009/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
	093718-010/CTF-MW3	Mercury (7439-97-6)	UJ, I5,B4
SW846 8260B DOE-AL			
	093717-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.0U, B2
	093717-001/CTF-MW3	Chloroform (67-66-3)	1.0U, B2
	093717-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.0U, B2
	093718-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.0U, B2
	093718-001/CTF-MW3	Chloroform (67-66-3)	1.0U, B2
	093718-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.0U, B2
	093720-001/CTF-FB1	Bromodichloromethane (75-27-4)	U, B2
	093720-001/CTF-FB1	Bromoform (75-25-2)	U, B2
	093720-001/CTF-FB1	Chloroform (67-66-3)	U, B2
	093720-001/CTF-FB1	Dibromochloromethane (124-48-1)	U, B2

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

Memorandum

Date: May 07, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614661
SDG: 322514
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

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 resulted in the qualification of data.

1. Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the EB, sample 322402001 from ARCOG 614660, at concentrations > the PQL. The associated results for sample 322514-014 (FB) were detects > the PQL but <5X the EQB concentration and were **qualified U,B2** at the reported values. The bromodichloromethane, chloroform and dibromochloromethane results for samples -001 and -007 were detects < the PQL and <5X the EB concentrations and will be **qualified 1.0U,B2** at the PQL.

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 calibration and continuing calibration data met QC acceptance criteria except as follows. The ICAL %RSD was > 15% but ≤ 40% for acetone. The associated sample results were ND and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

Blanks

No target analytes were detected in the blanks except as mentioned above in the summary section and as follows. Trichloroethylene was detected in the FB at concentrations > the PQL. Bromoform was detected in the associated EB. The associated sample results that were ND will not be qualified.

Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the FB. Since these results were qualified U due to associated EB contamination, these FB results were not applied to associated field samples.

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 trichlorotrifluoroethane was not included in the MS/MSD spiking 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 trip blank, one field blank and a duplicate pair were submitted on the AR/COC. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Level II

Date: 05/14/13

Memorandum

Date: May 17, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614662 and 614663
SDG: 322517
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

Three samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate) 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.

Alkalinity:

1. The parent MS concentration for alkalinity was >4X the MS spike concentration and the MS %R was > the upper acceptance limit. Therefore, the %R was not used to evaluate the field sample data. The alkalinity result for sample 322517007 was ND and will be **qualified UJ, MS1**. All remaining associated sample results were detects and will be **qualified J,MS1** due to lack of matrix-specific accuracy information.

Anions:

1. The ICAL intercept for chloride was > the MDL. The chloride result for sample -004 was a detect <3X the value of the intercept and will be **qualified J+,I5**.

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

All initial and continuing calibration met QC acceptance criteria except as mentioned above in the summary section and as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL. The associated sample results that were either NDs or detects > 3X the intercept value will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EQB, sample -004, at a concentration > the PQL. The associated sample results were detects > the PQL and >5X the EQB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate:

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

Anions, Nitrate/Nitrite and alkalinity:

The MS analysis for SDG 614662 was performed on a sample of similar matrix from SNL SDG 614663. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate:

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

Anions, Nitrate/Nitrite and alkalinity:

The replicate analysis for SDG 614662 was performed on a sample of similar matrix from SNL SDG 614663. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The samples were diluted 5X.

Anions:

Samples -016 and -027 were diluted 10X for bromide and sulfate and 100X for chloride.

Other QC

The EB from COC 614662 was applied to field samples in COC 614663. A field duplicate pair was submitted on COC 614663. There are no review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/20/13

Memorandum

Date: May 15, 2013
To: File
From: Linda Thal
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614662 and 614663
SDG: 322517
Laboratory: GEL
Project/Task: 98026.01.15
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

Three 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 resulted in the qualification of data.

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.
2. The CCV %D was $>20\%$ for RDX. The associated results for samples 322517020 and -031 were detects and will be **qualified J+,C2**.
3. The MS/MSD RPD for tetryl was $>$ acceptance criteria. All associated sample results were NDs 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 samples were extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

The CCV %D was >20% for RDX. The RDX result for sample -008 was ND and will not be qualified.

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)

The MS/MSD analyses met 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 except as follows.

Other QC

An EB and field duplicate pair were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/20/13

Memorandum

Date: May 21, 2013
To: File
From: Linda Thal
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614662 and 614663
SDG: 322517
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

Three samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), DOE EML HASL 300 (alphaspec uranium) and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

Gross Alpha/Beta:

1. The gross beta result for sample 322517010 and the gross alpha and beta results for sample -033 were \geq but $<3X$ the MDA and will be **qualified J,FR7**.

Gamma Spec:

1. The K-40 result for sample -032 was \geq but $<3X$ the MDA and will be **qualified J,FR7**.

Isotopic U:

1. The U-235/236 results for samples -023 and -034 were \geq but $<3X$ the MDA and will be **qualified J,FR7**.

All Analyses:

1. All sample results which were either $<$ the associated 2-sigma TPU or $<$ the associated MDA will be **qualified BD,FR3**.

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 with the following exception.

The samples on AR/COC 614633 were received with a pH >3.0. The laboratory added nitric acid and the samples were allowed to equilibrate before analysis. No sample data were qualified as a result.

Quantification

All 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 follows.

Gross beta was detected in the EB, sample -010 at a concentration > the MDA. The associated sample results were detects >5X the EB concentration and will not be qualified.

Tracer/Carrier Recovery

The tracer/carrier recoveries met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS recoveries met QC acceptance criteria.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

No samples were diluted. All required detection limits were met.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Level I

Date: 05/20/13

Memorandum

Date: May 15, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614662 and 614663
SDG: 322517
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

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

1. The MSD %R for hexachlorocyclopentadiene was $<$ the LAL but $\geq 10\%$ and the MS/MSD RPD was above the acceptance limit. All associated sample results were NDs and will be **qualified UJ,MS3,MS5**.
2. The MS/MSD RPD for all remaining target analytes were above the acceptance limit. All remaining associated sample results were NDs 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 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 follows.

The ICAL intercept for 2,4-dinitrophenol was positive and $>$ the MDL. The associated sample results were NDs and will not be qualified.

The ICAL %RSD for p-nitroaniline was $>15\%$ but $\leq 40\%$. The associated sample results were NDs and since no other calibration infractions occurred for these analytes, will not be qualified.

The CCV %Ds for nitrobenzene; isophorone; 2,4-dinitrotoluene and 2,6-dinitrotoluene were $>20\%$. The associated sample results were NDs and will not be qualified.

The CCV %D for hexachlorocyclopentadiene was $> 20\%$ but $\leq 40\%$ with negative bias. The associated sample results were NDs and since no other calibration infractions occurred for this analyte, 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 except as follows.

The LCS %R for hexachlorocyclopentadiene was $<$ the LAL but $\geq 10\%$. Up to four LCS recovery infractions are allowed since 67 LCS analytes were reported, therefore, the associated sample results 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 equipment blank and one field duplicate pair were submitted on the AR/COC. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/20/13

Memorandum

Date: May 14, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614662 and 614663
SDG: 322517
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

Six 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 resulted in the qualification of data.

1. The %RSD of acetone was $>15\%$ but $\leq 40\%$ and the %D was $>20\%$ with negative bias for the ICAL and CCV associated with all samples *except* samples 322517001 and -012. All associated sample results were NDs and will be **qualified UJ,I3,C3**.
2. The %RSD of bromoform was $>15\%$ but $\leq 40\%$ and the %D was $>20\%$ with positive bias for the ICAL and CCV associated with all samples *except* samples -001 and -012. The associated result for sample -036 (FB) was a detect and will be **qualified J+,I3,C2**.
3. The %RSD of dibromochloromethane was $>15\%$ but $\leq 40\%$ for the ICAL associated with all samples *except* samples -001 and -012. The associated result for sample -036 (FB) was a detect and will be **qualified J,I3**.
4. The bromoform %D was $>20\%$ with positive bias for the CCV associated with samples -001 and -012. The associated result for sample -001 was a detect and will be **qualified J+,C3**.
5. Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the EQB, sample -001, at concentrations $>$ the PQL. The bromoform result for sample -036 was a detect $<$ the PQL and $<5X$ the EQB concentration and will be **qualified 1.0U,B2** at the PQL. The bromodichloromethane, chloroform and dibromochloromethane results for sample -036 were $>$ the PQL but $<5X$ the EQB concentration and will be **qualified U,B2** at their reported values.

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

The intercepts of bromodichloromethane; trans-1,3-dichloropropylene; cis-1,3-dichloropropylene and 1,2-dibromo-3-chloropropane were positive and > the MDL. The associated sample results were detects >3X the concentration of the intercept or NDs and will not be qualified.

The acetone %RSD was >15% but ≤40% for the ICAL associated with samples -001 and -012. The associated sample results were NDs and since no other calibration infractions occurred for these analytes, will not be qualified.

The %RSD of bromoform was >15% but ≤40% and the %D was >20% with positive bias for the ICAL and CCV associated with all samples *except* samples -001 and -012. The associated results for all samples *except* -036 were non- detect and will not be qualified

The %RSD of dibromochloromethane was >15% but ≤40% for the ICAL associated with all samples *except* samples -001 and -012. The associated results for all samples *except* -036 were ND and will not be qualified.

The bromoform %D was >20% with positive bias for the CCV associated with samples -001 and -012. The associated result for sample -012 was ND and will not be qualified.

The chloromethane and methyl acetate %Ds were >20% with positive bias for the CCV associated with all samples *except* -001 and -012. The associated sample results were NDs and will not be qualified.

The 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene %Ds were > 20% but ≤ 40% with negative bias for the CCV associated with all samples *except* -001 and -012. The associated sample results were ND and since no other calibration infractions occurred for these analytes, will not be qualified.

Blanks

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

Toluene and trichloroethylene were detected at concentrations < the PQL in the EQB (sample -001). All associated sample results were NDs and will not be qualified.

Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the EQB, sample -001, at concentrations > the PQL. The results for all associated samples excluding sample -036 were ND and will not be qualified.

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 trichlorotrifluoroethane was not included in the MS/MSD spiking solution. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows.

The LCS percent recovery (%R) of bromoform was > the UAL. Up to three LCS recovery infractions are allowed since 52 LCS analytes were reported, therefore, the associated sample results 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

Two trip blanks, one field blank, one equipment blank and one field duplicate pair were submitted on the AR/COC. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/20/13



Sample Findings Summary



AR/COC: 614662, 614663, 614664

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093721-035/CTF-EB2	Uranium-233/234 (11-08-5)	BD, FR3
	093721-035/CTF-EB2	Uranium-235/236 (13982-70-2)	BD, FR3
	093721-035/CTF-EB2	Uranium-238 (7440-61-1)	BD, FR3
	093723-035/CTF-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	093724-035/CTF-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	093721-034/CTF-EB2	ALPHA (12587-46-1)	BD, FR3
	093721-034/CTF-EB2	BETA (12587-47-2)	J, FR7
	093724-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
	093724-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	093721-033/CTF-EB2	Americium-241 (14596-10-2)	BD, FR3
	093721-033/CTF-EB2	Cesium-137 (10045-97-3)	BD, FR3
	093721-033/CTF-EB2	Cobalt-60 (10198-40-0)	BD, FR3
	093721-033/CTF-EB2	Potassium-40 (13966-00-2)	BD, FR3
	093723-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	093723-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093723-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093723-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093724-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093724-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093724-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
SM 2320B			
	093721-022/CTF-EB2	Alkalinity, Total as CaCO3 (N44)	UJ, MS1
	093723-022/CTF-MW2	Alkalinity, Total as CaCO3 (N44)	J, MS1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-022/CTF-MW2	Alkalinity, Total as CaCO3 (N44)	J, MS1
SW846 3005/6010B			
	093721-009/CTF-EB2	Vanadium (7440-62-2)	UJ, CK3
	093721-010/CTF-EB2	Vanadium (7440-62-2)	UJ, CK3
	093723-009/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
	093723-010/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
	093724-009/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
	093724-010/CTF-MW2	Vanadium (7440-62-2)	UJ, CK3
SW846 3005/6020 DOE-AL			
	093721-009/CTF-EB2	Cobalt (7440-48-4)	UJ, D1
	093721-009/CTF-EB2	Copper (7440-50-8)	J-, CK3
	093721-009/CTF-EB2	Iron (7439-89-6)	UJ, D1
	093721-009/CTF-EB2	Magnesium (7439-95-4)	UJ, D1
	093721-009/CTF-EB2	Zinc (7440-66-6)	J, MS1,D1
	093721-010/CTF-EB2	Cobalt (7440-48-4)	UJ, D1
	093721-010/CTF-EB2	Iron (7439-89-6)	UJ, D1
	093721-010/CTF-EB2	Magnesium (7439-95-4)	UJ, D1
	093721-010/CTF-EB2	Zinc (7440-66-6)	UJ, MS1,D1
	093723-009/CTF-MW2	Aluminum (7429-90-5)	0.11U, B2
	093723-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093723-009/CTF-MW2	Copper (7440-50-8)	.015UJ, B2
	093723-009/CTF-MW2	Iron (7439-89-6)	J, D1
	093723-009/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093723-009/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1
	093723-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093723-010/CTF-MW2	Copper (7440-50-8)	.013UJ, B2
	093723-010/CTF-MW2	Iron (7439-89-6)	J, D1
	093723-010/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093723-010/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-009/CTF-MW2	Aluminum (7429-90-5)	0.11U, B2
	093724-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093724-009/CTF-MW2	Copper (7440-50-8)	.015UJ, B2
	093724-009/CTF-MW2	Iron (7439-89-6)	J, D1
	093724-009/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093724-009/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1
	093724-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	093724-010/CTF-MW2	Copper (7440-50-8)	.013UJ, B2
	093724-010/CTF-MW2	Iron (7439-89-6)	J, D1
	093724-010/CTF-MW2	Magnesium (7439-95-4)	J, D1
	093724-010/CTF-MW2	Zinc (7440-66-6)	J, MS1,D1
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	093721-002/CTF-EB2	1,1'-Biphenyl (92-52-4)	UJ, MS5
	093721-002/CTF-EB2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	093721-002/CTF-EB2	1,4-Dioxane (123-91-1)	UJ, MS5
	093721-002/CTF-EB2	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	093721-002/CTF-EB2	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dichlorophenol (120-83-2)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	093721-002/CTF-EB2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	093721-002/CTF-EB2	2,6-Dinitrotoluene (606-20-2)	UJ, MS5
	093721-002/CTF-EB2	2-Chloronaphthalene (91-58-7)	UJ, MS5
	093721-002/CTF-EB2	2-Chlorophenol (95-57-8)	UJ, MS5
	093721-002/CTF-EB2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	093721-002/CTF-EB2	2-Methylnaphthalene (91-57-6)	UJ, MS5
	093721-002/CTF-EB2	2-Nitrophenol (88-75-5)	UJ, MS5
	093721-002/CTF-EB2	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-002/CTF-EB2	4-Bromophenylphenylether (101-55-3)	UJ, MS5
	093721-002/CTF-EB2	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	093721-002/CTF-EB2	4-Chloroaniline (106-47-8)	UJ, MS5
	093721-002/CTF-EB2	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	093721-002/CTF-EB2	4-Nitrophenol (100-02-7)	UJ, MS5
	093721-002/CTF-EB2	Acenaphthene (83-32-9)	UJ, MS5
	093721-002/CTF-EB2	Acenaphthylene (208-96-8)	UJ, MS5
	093721-002/CTF-EB2	Acetophenone (98-86-2)	UJ, MS5
	093721-002/CTF-EB2	Anthracene (120-12-7)	UJ, MS5
	093721-002/CTF-EB2	Atrazine (1912-24-9)	UJ, MS5
	093721-002/CTF-EB2	Benzaldehyde (100-52-7)	UJ, MS5
	093721-002/CTF-EB2	Benzo(a)anthracene (56-55-3)	UJ, MS5
	093721-002/CTF-EB2	Benzo(a)pyrene (50-32-8)	UJ, MS5
	093721-002/CTF-EB2	Benzo(b)fluoranthene (205-99-2)	UJ, MS5
	093721-002/CTF-EB2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	093721-002/CTF-EB2	Benzo(k)fluoranthene (207-08-9)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, MS5
	093721-002/CTF-EB2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	093721-002/CTF-EB2	Butylbenzylphthalate (85-68-7)	UJ, MS5
	093721-002/CTF-EB2	Caprolactam (105-60-2)	UJ, MS5
	093721-002/CTF-EB2	Carbazole (86-74-8)	UJ, MS5
	093721-002/CTF-EB2	Chrysene (218-01-9)	UJ, MS5
	093721-002/CTF-EB2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	093721-002/CTF-EB2	Dibenzofuran (132-64-9)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-002/CTF-EB2	Diethylphthalate (84-66-2)	UJ, MS5
	093721-002/CTF-EB2	Dimethylphthalate (131-11-3)	UJ, MS5
	093721-002/CTF-EB2	Di-n-butylphthalate (84-74-2)	UJ, MS5
	093721-002/CTF-EB2	Di-n-octylphthalate (117-84-0)	UJ, MS5
	093721-002/CTF-EB2	Diphenylamine (122-39-4)	UJ, MS5
	093721-002/CTF-EB2	Fluoranthene (206-44-0)	UJ, MS5
	093721-002/CTF-EB2	Fluorene (86-73-7)	UJ, MS5
	093721-002/CTF-EB2	Hexachlorobenzene (118-74-1)	UJ, MS5
	093721-002/CTF-EB2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093721-002/CTF-EB2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3,MS5
	093721-002/CTF-EB2	Hexachloroethane (67-72-1)	UJ, MS5
	093721-002/CTF-EB2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	093721-002/CTF-EB2	Isophorone (78-59-1)	UJ, MS5
	093721-002/CTF-EB2	m,p-Cresol (N/A)	UJ, MS5
	093721-002/CTF-EB2	m-Nitroaniline (99-09-2)	UJ, MS5
	093721-002/CTF-EB2	Naphthalene (91-20-3)	UJ, MS5
	093721-002/CTF-EB2	Nitrobenzene (98-95-3)	UJ, MS5
	093721-002/CTF-EB2	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	093721-002/CTF-EB2	o-Cresol (95-48-7)	UJ, MS5
	093721-002/CTF-EB2	o-Nitroaniline (88-74-4)	UJ, MS5
	093721-002/CTF-EB2	Pentachlorophenol (87-86-5)	UJ, MS5
	093721-002/CTF-EB2	Phenanthrene (85-01-8)	UJ, MS5
	093721-002/CTF-EB2	Phenol (108-95-2)	UJ, MS5
	093721-002/CTF-EB2	p-Nitroaniline (100-01-6)	UJ, MS5
	093721-002/CTF-EB2	Pyrene (129-00-0)	UJ, MS5
	093723-002/CTF-MW2	1,1'-Biphenyl (92-52-4)	UJ, MS5
	093723-002/CTF-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	093723-002/CTF-MW2	1,4-Dioxane (123-91-1)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093723-002/CTF-MW2	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	093723-002/CTF-MW2	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dichlorophenol (120-83-2)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	093723-002/CTF-MW2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	093723-002/CTF-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, MS5
	093723-002/CTF-MW2	2-Chloronaphthalene (91-58-7)	UJ, MS5
	093723-002/CTF-MW2	2-Chlorophenol (95-57-8)	UJ, MS5
	093723-002/CTF-MW2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	093723-002/CTF-MW2	2-Methylnaphthalene (91-57-6)	UJ, MS5
	093723-002/CTF-MW2	2-Nitrophenol (88-75-5)	UJ, MS5
	093723-002/CTF-MW2	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5
	093723-002/CTF-MW2	4-Bromophenylphenylether (101-55-3)	UJ, MS5
	093723-002/CTF-MW2	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	093723-002/CTF-MW2	4-Chloroaniline (106-47-8)	UJ, MS5
	093723-002/CTF-MW2	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	093723-002/CTF-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	093723-002/CTF-MW2	Acenaphthene (83-32-9)	UJ, MS5
	093723-002/CTF-MW2	Acenaphthylene (208-96-8)	UJ, MS5
	093723-002/CTF-MW2	Acetophenone (98-86-2)	UJ, MS5
	093723-002/CTF-MW2	Anthracene (120-12-7)	UJ, MS5
	093723-002/CTF-MW2	Atrazine (1912-24-9)	UJ, MS5
	093723-002/CTF-MW2	Benzaldehyde (100-52-7)	UJ, MS5
	093723-002/CTF-MW2	Benzo(a)anthracene (56-55-3)	UJ, MS5
	093723-002/CTF-MW2	Benzo(a)pyrene (50-32-8)	UJ, MS5
	093723-002/CTF-MW2	Benzo(b)fluoranthene (205-99-2)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093723-002/CTF-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	093723-002/CTF-MW2	Benzo(k)fluoranthene (207-08-9)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, MS5
	093723-002/CTF-MW2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	093723-002/CTF-MW2	Butylbenzylphthalate (85-68-7)	UJ, MS5
	093723-002/CTF-MW2	Caprolactam (105-60-2)	UJ, MS5
	093723-002/CTF-MW2	Carbazole (86-74-8)	UJ, MS5
	093723-002/CTF-MW2	Chrysene (218-01-9)	UJ, MS5
	093723-002/CTF-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	093723-002/CTF-MW2	Dibenzofuran (132-64-9)	UJ, MS5
	093723-002/CTF-MW2	Diethylphthalate (84-66-2)	UJ, MS5
	093723-002/CTF-MW2	Dimethylphthalate (131-11-3)	UJ, MS5
	093723-002/CTF-MW2	Di-n-butylphthalate (84-74-2)	UJ, MS5
	093723-002/CTF-MW2	Di-n-octylphthalate (117-84-0)	UJ, MS5
	093723-002/CTF-MW2	Diphenylamine (122-39-4)	UJ, MS5
	093723-002/CTF-MW2	Fluoranthene (206-44-0)	UJ, MS5
	093723-002/CTF-MW2	Fluorene (86-73-7)	UJ, MS5
	093723-002/CTF-MW2	Hexachlorobenzene (118-74-1)	UJ, MS5
	093723-002/CTF-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093723-002/CTF-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3,MS5
	093723-002/CTF-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	093723-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	093723-002/CTF-MW2	Isophorone (78-59-1)	UJ, MS5
	093723-002/CTF-MW2	m,p-Cresol (N/A)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093723-002/CTF-MW2	m-Nitroaniline (99-09-2)	UJ, MS5
	093723-002/CTF-MW2	Naphthalene (91-20-3)	UJ, MS5
	093723-002/CTF-MW2	Nitrobenzene (98-95-3)	UJ, MS5
	093723-002/CTF-MW2	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	093723-002/CTF-MW2	o-Cresol (95-48-7)	UJ, MS5
	093723-002/CTF-MW2	o-Nitroaniline (88-74-4)	UJ, MS5
	093723-002/CTF-MW2	Pentachlorophenol (87-86-5)	UJ, MS5
	093723-002/CTF-MW2	Phenanthrene (85-01-8)	UJ, MS5
	093723-002/CTF-MW2	Phenol (108-95-2)	UJ, MS5
	093723-002/CTF-MW2	p-Nitroaniline (100-01-6)	UJ, MS5
	093723-002/CTF-MW2	Pyrene (129-00-0)	UJ, MS5
	093724-002/CTF-MW2	1,1'-Biphenyl (92-52-4)	UJ, MS5
	093724-002/CTF-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	093724-002/CTF-MW2	1,4-Dioxane (123-91-1)	UJ, MS5
	093724-002/CTF-MW2	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	093724-002/CTF-MW2	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dichlorophenol (120-83-2)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	093724-002/CTF-MW2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	093724-002/CTF-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, MS5
	093724-002/CTF-MW2	2-Chloronaphthalene (91-58-7)	UJ, MS5
	093724-002/CTF-MW2	2-Chlorophenol (95-57-8)	UJ, MS5
	093724-002/CTF-MW2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	093724-002/CTF-MW2	2-Methylnaphthalene (91-57-6)	UJ, MS5
	093724-002/CTF-MW2	2-Nitrophenol (88-75-5)	UJ, MS5
	093724-002/CTF-MW2	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-002/CTF-MW2	4-Bromophenylphenylether (101-55-3)	UJ, MS5
	093724-002/CTF-MW2	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	093724-002/CTF-MW2	4-Chloroaniline (106-47-8)	UJ, MS5
	093724-002/CTF-MW2	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	093724-002/CTF-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	093724-002/CTF-MW2	Acenaphthene (83-32-9)	UJ, MS5
	093724-002/CTF-MW2	Acenaphthylene (208-96-8)	UJ, MS5
	093724-002/CTF-MW2	Acetophenone (98-86-2)	UJ, MS5
	093724-002/CTF-MW2	Anthracene (120-12-7)	UJ, MS5
	093724-002/CTF-MW2	Atrazine (1912-24-9)	UJ, MS5
	093724-002/CTF-MW2	Benzaldehyde (100-52-7)	UJ, MS5
	093724-002/CTF-MW2	Benzo(a)anthracene (56-55-3)	UJ, MS5
	093724-002/CTF-MW2	Benzo(a)pyrene (50-32-8)	UJ, MS5
	093724-002/CTF-MW2	Benzo(b)fluoranthene (205-99-2)	UJ, MS5
	093724-002/CTF-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	093724-002/CTF-MW2	Benzo(k)fluoranthene (207-08-9)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, MS5
	093724-002/CTF-MW2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	093724-002/CTF-MW2	Butylbenzylphthalate (85-68-7)	UJ, MS5
	093724-002/CTF-MW2	Caprolactam (105-60-2)	UJ, MS5
	093724-002/CTF-MW2	Carbazole (86-74-8)	UJ, MS5
	093724-002/CTF-MW2	Chrysene (218-01-9)	UJ, MS5
	093724-002/CTF-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	093724-002/CTF-MW2	Dibenzofuran (132-64-9)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093724-002/CTF-MW2	Diethylphthalate (84-66-2)	UJ, MS5
	093724-002/CTF-MW2	Dimethylphthalate (131-11-3)	UJ, MS5
	093724-002/CTF-MW2	Di-n-butylphthalate (84-74-2)	UJ, MS5
	093724-002/CTF-MW2	Di-n-octylphthalate (117-84-0)	UJ, MS5
	093724-002/CTF-MW2	Diphenylamine (122-39-4)	UJ, MS5
	093724-002/CTF-MW2	Fluoranthene (206-44-0)	UJ, MS5
	093724-002/CTF-MW2	Fluorene (86-73-7)	UJ, MS5
	093724-002/CTF-MW2	Hexachlorobenzene (118-74-1)	UJ, MS5
	093724-002/CTF-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093724-002/CTF-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3,MS5
	093724-002/CTF-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	093724-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	093724-002/CTF-MW2	Isophorone (78-59-1)	UJ, MS5
	093724-002/CTF-MW2	m,p-Cresol (N/A)	UJ, MS5
	093724-002/CTF-MW2	m-Nitroaniline (99-09-2)	UJ, MS5
	093724-002/CTF-MW2	Naphthalene (91-20-3)	UJ, MS5
	093724-002/CTF-MW2	Nitrobenzene (98-95-3)	UJ, MS5
	093724-002/CTF-MW2	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	093724-002/CTF-MW2	o-Cresol (95-48-7)	UJ, MS5
	093724-002/CTF-MW2	o-Nitroaniline (88-74-4)	UJ, MS5
	093724-002/CTF-MW2	Pentachlorophenol (87-86-5)	UJ, MS5
	093724-002/CTF-MW2	Phenanthrene (85-01-8)	UJ, MS5
	093724-002/CTF-MW2	Phenol (108-95-2)	UJ, MS5
	093724-002/CTF-MW2	p-Nitroaniline (100-01-6)	UJ, MS5
	093724-002/CTF-MW2	Pyrene (129-00-0)	UJ, MS5
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	093721-024/CTF-EB2	m-Nitrotoluene (99-08-1)	UJ, I4
	093721-024/CTF-EB2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-024/CTF-EB2	p-Nitrotoluene (99-99-0)	UJ, I4
	093721-024/CTF-EB2	Tetryl (479-45-8)	UJ, MS5
	093723-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093723-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093723-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093723-024/CTF-MW2	RDX (121-82-4)	J+, C2
	093723-024/CTF-MW2	Tetryl (479-45-8)	UJ, MS5
	093724-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093724-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093724-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093724-024/CTF-MW2	RDX (121-82-4)	J+, C2
	093724-024/CTF-MW2	Tetryl (479-45-8)	UJ, MS5
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	093721-009/CTF-EB2	Mercury (7439-97-6)	UJ, B4
	093721-010/CTF-EB2	Mercury (7439-97-6)	UJ, B4
	093723-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	093723-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	093724-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	093724-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093721-001/CTF-EB2	Bromoform (75-25-2)	J+, C3
	093723-001/CTF-MW2	Acetone (67-64-1)	UJ, I3,C3
	093724-001/CTF-MW2	Acetone (67-64-1)	UJ, I3,C3
	093725-001/CTF-TB4	Acetone (67-64-1)	UJ, I3,C3
	093726-001/CTF-FB2	Acetone (67-64-1)	UJ, I3,C3
	093726-001/CTF-FB2	Bromodichloromethane (75-27-4)	U, B2
	093726-001/CTF-FB2	Bromoform (75-25-2)	1.0UJ, B2,I3,C2
	093726-001/CTF-FB2	Chloroform (67-66-3)	U, B2
	093726-001/CTF-FB2	Dibromochloromethane (124-48-1)	UJ, B2,I3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 9056	093721-016/CTF-EB2	Chloride (16887-00-6)	J+, I5

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

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SECTION IV

SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, JANUARY – MARCH 2013

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 sixth of eight quarterly groundwater sampling events occurred in January 2013 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 First Quarter, Calendar Year (CY) 2013 reporting period (January – March 2013).

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 January 16 and January 15, 2013, 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 January 21 to January 23, 2013. 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 and benzo(a)pyrene, 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 and the duplicate environmental sample with concentrations of 4.97 mg/L and 5.00 mg/L, respectively. Fluoride in the monitoring well CCBA-MW2 environmental sample exceeded the method detection limit (MDL) with a concentration of 1.52 mg/L. Benzo(a)pyrene was detected above the established MCL of 0.200 µg/L in CCBA-MW2 with a concentration of 0.640 µg/L. This is the first initial detection of any SVOC from these monitoring wells. Benzo(b)pyrene and benzo(k)pyrene were also detected in both CCBA-MW1 and CCBA-MW2 environmental samples at concentrations ranging from 0.411 to 0.980 µg/L. These SVOCs are polycyclic aromatic hydrocarbons (PAHs) and their detection is likely due to a fuel source portable heater used inside the sampling vehicle due to the below freezing

temperatures. 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 sixth of eight supplemental quarterly events for the five monitoring wells. The seventh of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (April through June 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 First Quarter, CY 2013.

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 (Table IV-5). 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-6 summarizes the results. 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, except for benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene, as shown in Table IV-6. Benzo(a)pyrene was reported above the MCL of 0.200 micrograms per liter ($\mu\text{g/L}$) in CCBA-MW2 at a concentration of 0.640 $\mu\text{g/L}$. Benzo(b)fluoranthene and benzo(k)fluoranthene were detected in both CCBA-MW1 and CCBA-MW2 environmental samples at concentrations ranging from 0.411 $\mu\text{g/L}$ to 0.980 $\mu\text{g/L}$. No SVOCs were detected in the associated CCBA-MW1 duplicate environmental sample. This is the initial detection of any SVOC from these monitoring wells. These SVOCs are PAHs found in exhaust fumes and smoke associated with the burning of organic compounds. During this sampling event air temperatures were below freezing and the field team used fuel source portable heaters inside the sampling vehicle. 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-7 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 3.27 mg/L in the monitoring well CCBA-MW2 environmental sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-7 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 1.87 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-8 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 and duplicate environmental sample from monitoring well CCBA-MW1 at concentrations of 4.97 mg/L and 5.00 mg/L, respectively. 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 at a concentration of 1.52 mg/L. 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-8 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-9 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-9 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-10. 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-11. 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-12.

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-13.

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-13.

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-14.

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 7.02 ± 0.969 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 0.145 ± 0.0513 pCi/L for uranium-235/236 to 22.5 ± 2.87 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-15 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 constituents that exceeding the MCLs in samples collected during this quarter are fluoride, detected in the environmental sample and environmental duplicate sample from CCBA-MW1, and benzo(a)pyrene detected in the CCBA-MW2 environmental sample. The fluoride detected in CCBA-MW1 is most likely from to the mineralized Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities. The benzo(a)pyrene detected in the CCBA-

MW2 is most likely caused by use of a fuel sourced portable heater in the sampling vehicle due to the freezing outdoor air temperature.

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-MW1 and OBS-MW1 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-16 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW1 and OBS-MW1. 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, except aluminum for CCBA-MW1. The RPD for aluminum was calculated at 75 and is an estimated value, as aluminum was qualified as an estimated value during data validation for QC issues associated with verification of the reporting limit and aluminum is reported below the PQL in one sample.

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-MW1 and OBS-MW1 and were submitted for all analyses.

SWMUs 8/58, Monitoring Well CCBA-MW2. Bromodichloromethane, bromoform, chloroform, chloride, dibromochloromethane, and sodium were detected above the 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 EB result.

SWMU 68, Monitoring Well OBS-MW2. Alkalinity, bromodichloromethane, bromoform, calcium, chloroform, chloride, copper, dibromochloromethane, and sodium were detected above laboratory MDLs. No corrective action was necessary, for parameters except copper, since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the EB result. Copper was detected in the EB sample at concentration higher than values reported for the associated environmental samples. Therefore, copper was qualified as not detected during data validation for both environmental and duplicate environmental samples.

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 January 2013 samples. No VOCs were detected above associated laboratory MDLs.

SWMU 68. A total of four trip blanks were submitted with the January 2013 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**

Except for fluoride and benzo(a)pyrene, 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 and the duplicate environmental sample with concentrations of 4.97 mg/L and 5.00 mg/L, respectively. Fluoride in the monitoring well CCBA-MW2 environmental sample exceeded the method detection limit (MDL) with a concentration of 1.52 mg/L. Benzo(a)pyrene was detected above the established MCL of 0.200 µg/L in CCBA-MW2 with a concentration of 0.640 µg/L. This is the first initial detection of any SVOC from these monitoring wells. Benzo(b)pyrene and benzo(k)pyrene were also detected in both CCBA-MW1 and CCBA-MW2 environmental samples at concentrations ranging from 0.411 to 0.980 µg/L. These SVOCs are polycyclic aromatic hydrocarbons (PAHs) and their detection is likely due to a fuel source portable heater used inside the sampling vehicle due to below freezing temperatures.

No variances or nonconformances from requirements in the Groundwater Characterization Work Plans for SWMU 68 (SNL/NM September 2010) occurred during the January 2013 sampling activities.

5.0 Summary

During the First Quarter of CY 2013, 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 in CCBA-MW1 and benzo(a)pyrene in CCBA-MW2. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 environmental sample and environmental duplicate sample at concentrations of 4.97 mg/L and 5.00 mg/L, respectively. This detection is similar to historical concentrations and 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. Benzo(a)pyrene was reported above the MCL of 0.200 µg/L in CCBA-MW2 at a concentration of 0.640 µg/L. This detection is most likely due to the use of a fuel source heater inside the sampling vehicle. A fuel source heater will not be used during future sampling events to determine if benzo(a)pyrene is in the groundwater or is a one-time artifact of the sampling event.

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**

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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

New Mexico Environment Department (NMED), April 2010. "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," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, April 8, 2010.

New Mexico Environment Department (NMED), January 2011. "Notice of Approval with Modification: Groundwater Monitoring Well Installation Workplans for SWMUs 8/58 and 68, September 2010, Sandia National Laboratories, EPA ID# NM589011 0518, HWB-SNL-10-017," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), June 2011. "Approval: Solid Waste Management Units 8 and 58 Proposed Groundwater Monitoring Well Location Adjustment," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010. "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," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2011. "Groundwater Monitoring Well Installation Report for SWMU 8 (Open Dump, Coyote Canyon Blast Area)/SWMU 58 (Coyote Canyon Blast Area) and SWMU 68 (Old Burn Site); Installation of SWMU 8/58 Groundwater Monitoring Wells CCBA-MW1 and CCBA-MW2 and Installation of SWMU 68 Groundwater Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012a. "Groundwater Monitoring Equipment Decontamination," Field Operating Procedure 05-03, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012b. "Groundwater Monitoring Well Sampling and Field Analytical Measurements," Field Operating Procedure 05-01, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

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

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

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

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

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

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

U.S. Environmental Protection Agency (EPA), 2009, "National Primary Drinking Water Standards," 40 Code of Federal Regulations 141.11, Subpart B, EPA 816-F-09-0004, U.S. Environmental Protection Agency, Washington, D.C.

Figures

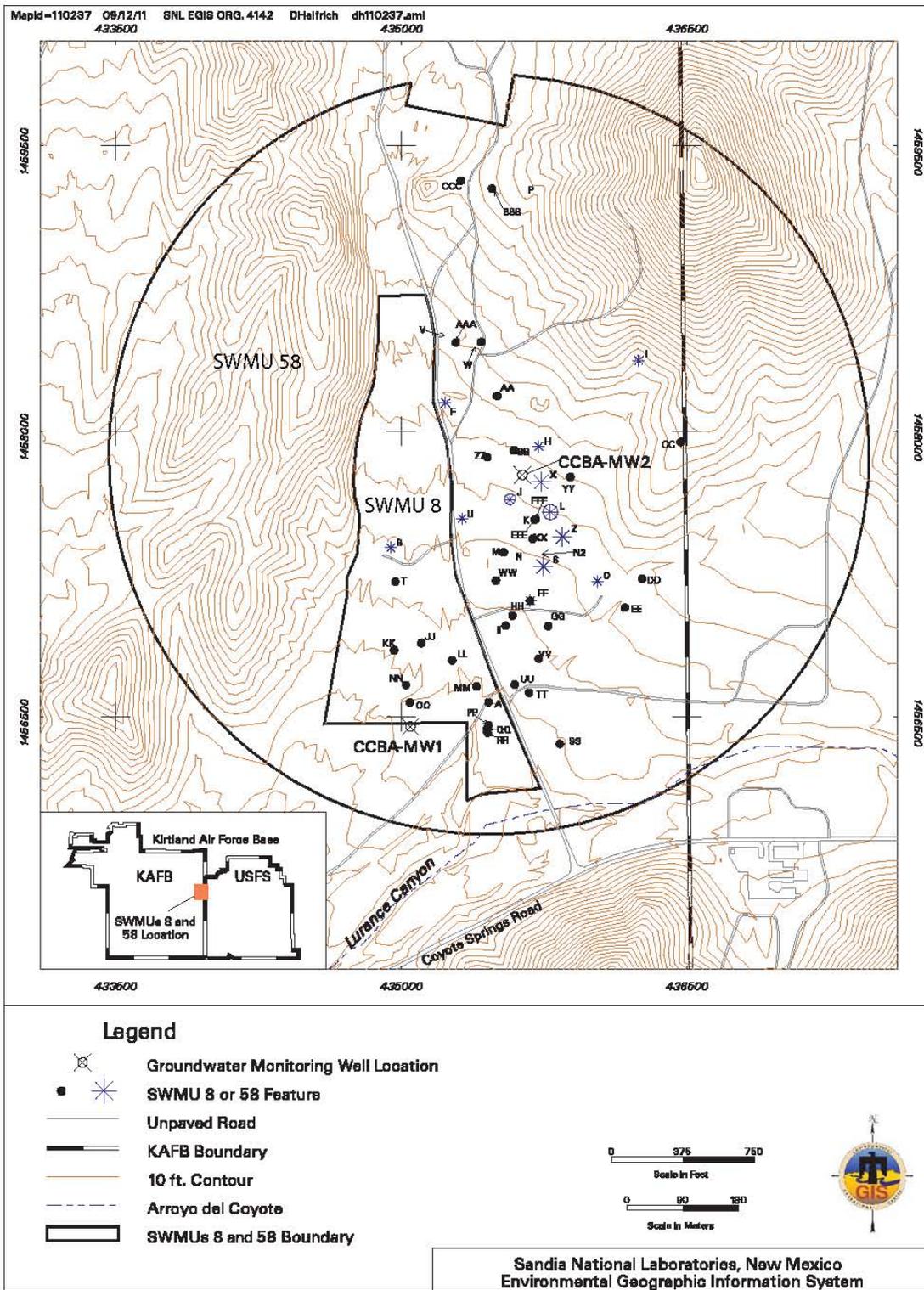


Figure IV-1

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

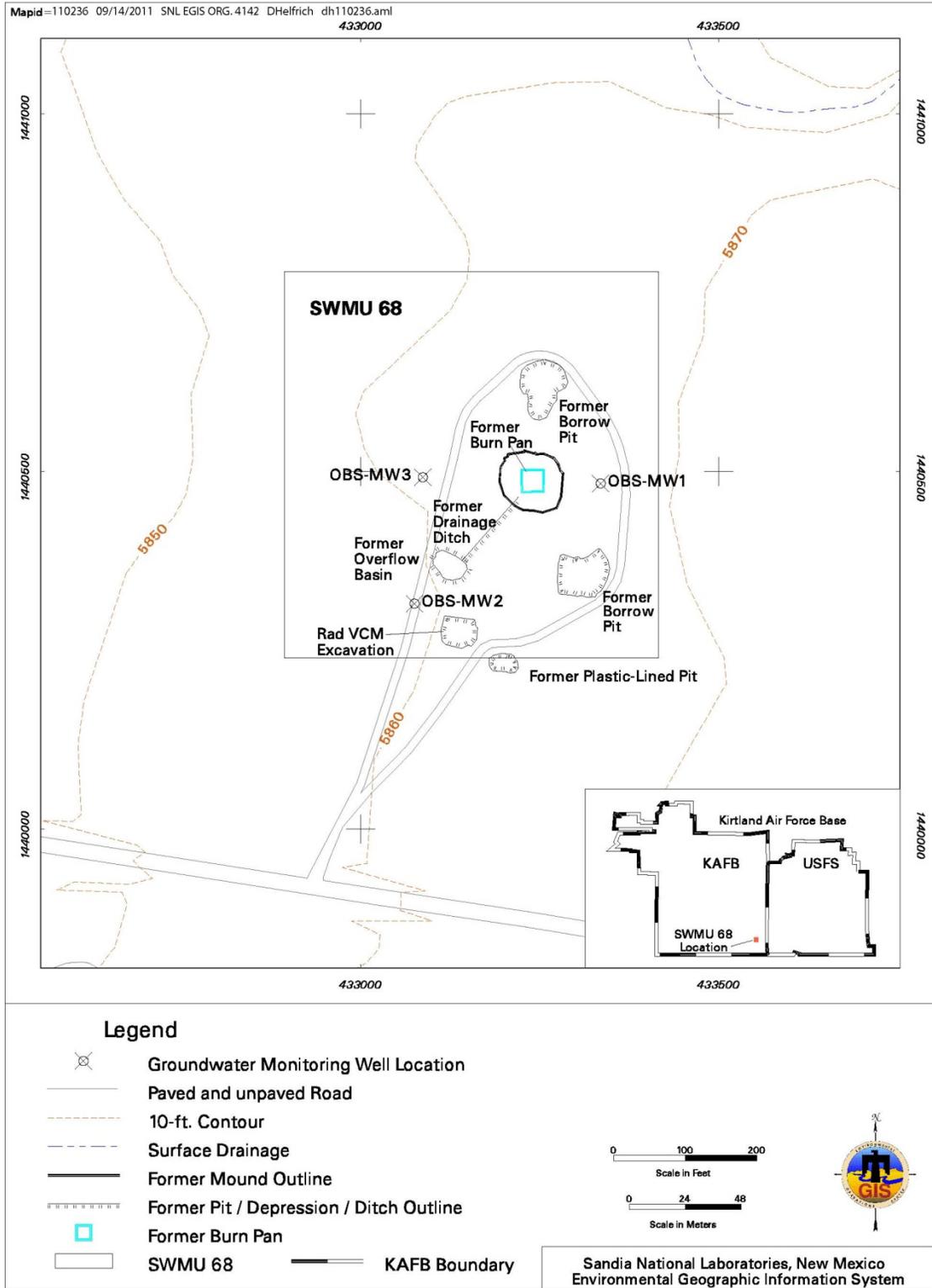


Figure IV-2

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.

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

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

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 First Quarter, CY 2013 Groundwater Sampling
SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment
January – March 2013

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	093341	614567	SWMUs 8/58
CCBA-MW1 (duplicate)	093342		
CCBA-MW2	093336	614565	
OBS-MW1	093349	614570	SWMU 68
OBS-MW1 (duplicate)	093350		
OBS-MW2	093344	614568	
OBS-MW3	093352	614571	

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, January – March 2013

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	16-Jan-13	13.20	494	211.7	6.34	0.57	30.3	3.17
CCBA-MW2	15-Jan-13	12.34	573	178.3	7.28	0.40	57.4	6.13
SWMU 68								
OBS-MW1	22-Jan-13	16.19	505	190.4	7.13	0.66	37.3	3.66
OBS-MW2	21-Jan-13	17.07	501	200.8	7.11	0.52	37.0	3.56
OBS-MW3	23-Jan-13	15.29	501	189.5	7.14	0.54	44.2	4.42

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, January – March 2013

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	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,1,2-Tetrachloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	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			
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	EPA 8260B			

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	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			
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	EPA 8260B			

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

SWMU 68					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	2.94 – 3.13	EPA 8270C	Butylbenzyl phthalate	2.94 – 3.13	EPA 8270C
1,2,4-Trichlorobenzene	2.94 – 3.13	EPA 8270C	Caprolactam	2.94 – 3.13	EPA 8270C
2,4,5-Trichlorophenol	2.94 – 3.13	EPA 8270C	Carbazole	0.294 – 0.313	EPA 8270C
1,4-Dioxane	2.94 – 3.13	EPA 8270C	Chrysene	0.294 – 0.313	EPA 8270C
2,4,6-Trichlorophenol	2.94 – 3.13	EPA 8270C	Di-n-butyl phthalate	2.94 – 3.13	EPA 8270C
2,4-Dichlorophenol	2.94 – 3.13	EPA 8270C	Di-n-octyl phthalate	2.94 – 3.13	EPA 8270C
2,4-Dimethylphenol	2.94 – 3.13	EPA 8270C	Dibenz[a,h]anthracene	0.294 – 0.313	EPA 8270C
2,4-Dinitrophenol	4.90 – 5.21	EPA 8270C	Dibenzofuran	2.94 – 3.13	EPA 8270C
2,4-Dinitrotoluene	2.94 – 3.13	EPA 8270C	Diethylphthalate	2.94 – 3.13	EPA 8270C
2,6-Dinitrotoluene	2.94 – 3.13	EPA 8270C	Dimethylphthalate	2.94 – 3.13	EPA 8270C
2-Chloronaphthalene	0.294 – 0.313	EPA 8270C	Dinitro-o-cresol	2.94 – 3.13	EPA 8270C
2-Chlorophenol	2.94 – 3.13	EPA 8270C	Diphenyl amine	2.94 – 3.13	EPA 8270C
2-Methylnaphthalene	0.294 – 0.313	EPA 8270C	Fluoranthene	0.294 – 0.313	EPA 8270C
2-Nitroaniline	2.94 – 3.13	EPA 8270C	Fluorene	0.294 – 0.313	EPA 8270C
2-Nitrophenol	2.94 – 3.13	EPA 8270C	Hexachlorobenzene	2.94 – 3.13	EPA 8270C
3,3'-Dichlorobenzidine	2.94 – 3.13	EPA 8270C	Hexachlorobutadiene	2.94 – 3.13	EPA 8270C
3-Nitroaniline	2.94 – 3.13	EPA 8270C	Hexachlorocyclopentadiene	2.94 – 3.13	EPA 8270C
4-Bromophenyl phenyl ether	2.94 – 3.13	EPA 8270C	Hexachloroethane	2.94 – 3.13	EPA 8270C
4-Chloro-3-methylphenol	2.94 – 3.13	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.294 – 0.313	EPA 8270C
4-Chlorobenzeneamine	3.24 – 3.44	EPA 8270C	Isophorone	2.94 – 3.13	EPA 8270C
4-Chlorophenyl phenyl ether	2.94 – 3.13	EPA 8270C	Naphthalene	0.294 – 0.313	EPA 8270C
4-Nitroaniline	2.94 – 3.13	EPA 8270C	Nitro-benzene	2.94 – 3.13	EPA 8270C
4-Nitrophenol	2.94 – 3.13	EPA 8270C	Pentachlorophenol	2.94 – 3.13	EPA 8270C
Acenaphthene	0.294 – 0.313	EPA 8270C	Phenanthrene	0.294 – 0.313	EPA 8270C
Acenaphthylene	0.294 – 0.313	EPA 8270C	Phenol	2.94 – 3.13	EPA 8270C
Acetophenone	2.94 – 3.13	EPA 8270C	Pyrene	0.294 – 0.313	EPA 8270C
Anthracene	0.294 – 0.313	EPA 8270C	bis(2-Chloroethoxy)methane	2.94 – 3.13	EPA 8270C
Atrazine	2.94 – 3.13	EPA 8270C	bis(2-Chloroethyl)ether	2.94 – 3.13	EPA 8270C
Benzaldehyde	4.90 – 5.21	EPA 8270C	bis(2-Chloroisopropyl)ether	2.94 – 3.13	EPA 8270C
Benzo(a)anthracene	0.294 – 0.313	EPA 8270C	bis(2-Ethylhexyl)phthalate	2.94 – 3.13	EPA 8270C
Benzo(a)pyrene	0.431 – 0.458	EPA 8270C	m,p-Cresol	2.94 – 3.13	EPA 8270C
Benzo(b)fluoranthene	0.294 – 0.313	EPA 8270C	n-Nitrosodipropylamine	2.94 – 3.13	EPA 8270C
Benzo(ghi)perylene	0.294 – 0.313	EPA 8270C	o-Cresol	2.94 – 3.13	EPA 8270C
Benzo(k)fluoranthene	0.294 – 0.313	EPA 8270C			

Table IV-4 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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, January – March 2013**

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0829 – 0.0879	0.0825 – 0.0874
1,3-Dinitrobenzene	0.0829 – 0.0879	0.0825 – 0.0874
2,4,6-Trinitrotoluene	0.0829 – 0.0879	0.0825 – 0.0874
2,4-Dinitrotoluene	0.0829 – 0.0879	0.0825 – 0.0874
2,6-Dinitrotoluene	0.0829 – 0.0879	0.0825 – 0.0874
2-Amino-4,6-dinitrotoluene	0.0829 – 0.0879	0.0825 – 0.0874
2-Nitrotoluene	0.0850 – 0.0901	0.0845 – 0.0896
3-Nitrotoluene	0.0829 – 0.0879	0.0825 – 0.0874
4-Amino-2,6-dinitrotoluene	0.0829 – 0.0879	0.0825 – 0.0874
4-Nitrotoluene	0.155 – 0.165	0.155 – 0.164
HMX	0.0829 – 0.0879	0.0825 – 0.0874
Nitro-benzene	0.0829 – 0.0879	0.0825 – 0.0874
Pentaerythritol tetranitrate	0.104 – 0.110	0.103 – 0.109
RDX	0.0829 – 0.0879	0.0825 – 0.0874
Tetryl	0.0829 – 0.0879	0.0825 – 0.0874

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 Detected Volatile Organic Compounds, Semi-Volatile Organic Compounds, and High Explosive Compounds
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2013**

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
CCBA-MW1 16-Jan-13	Benzo(b)fluoranthene	0.442	0.316	1.05	NE	J		093341-002	EPA 8270C
	Benzo(k)fluoranthene	0.411	0.316	1.05	NE	J		093341-002	EPA 8270C
CCBA-MW2 15-Jan-13	Benzo(a)pyrene	0.640	0.440	1.00	0.200	J		093336-002	EPA 8270C
	Benzo(b)fluoranthene	0.640	0.300	1.00	NE	J		093336-002	EPA 8270C
	Benzo(k)fluoranthene	0.980	0.300	1.00	NE	J		093336-002	EPA 8270C

Notes

^a**Laboratory Qualifier**

J = The associated value is an estimated quantity.

^b**Validation Qualifier**

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

^c**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.

Bold = Indicates that a result exceeds the MCL.

µg/L = Micrograms per liter.

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.

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.

SWMU = Solid Waste Management Unit.

Table IV-7
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 16-Jan-13	Nitrate plus nitrite as N	1.49	0.085	0.250	10.0			093341-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jan-13	Nitrate plus nitrite as N	1.50	0.085	0.250	10.0			093342-018	EPA 353.2
CCBA-MW2 15-Jan-13	Nitrate plus nitrite as N	3.27	0.170	0.500	10.0			093336-018	EPA 353.2
SWMU 68									
OBS-MW1 22-Jan-13	Nitrate plus nitrite as N	1.87	0.085	0.250	10.0			093349-018	EPA 353.2
OBS-MW1 (Duplicate) 22-Jan-13	Nitrate plus nitrite as N	1.84	0.085	0.250	10.0			093350-018	EPA 353.2
OBS-MW2 21-Jan-13	Nitrate plus nitrite as N	1.55	0.085	0.250	10.0			093344-018	EPA 353.2
OBS-MW3 23-Jan-13	Nitrate plus nitrite as N	1.70	0.085	0.250	10.0			093352-018	EPA 353.2

Notes

^a**Laboratory Qualifier**

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

^b**Validation Qualifier**

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

^c**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.

Table IV-7 (Concluded)
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes (continued)

- 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-8
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 16-Jan-13	Bicarbonate Alkalinity	185	0.725	1.00	NE			093341-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093341-022	SM2320B
	Bromide	0.284	0.067	0.200	NE			093341-016	EPA 9056
	Chloride	29.5	0.134	0.400	NE			093341-016	EPA 9056
	Fluoride	4.97	0.033	0.100	4.0			093341-016	EPA 9056
	Sulfate	56.6	0.266	0.800	NE			093341-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093341-027	EPA 9012
CCBA-MW1 (Duplicate) 16-Jan-13	Bicarbonate Alkalinity	183	0.725	1.00	NE			093342-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093342-022	SM2320B
	Bromide	0.285	0.067	0.200	NE			093342-016	EPA 9056
	Chloride	29.5	0.134	0.400	NE			093342-016	EPA 9056
	Fluoride	5.00	0.033	0.100	4.0			093342-016	EPA 9056
	Sulfate	56.7	0.266	0.800	NE			093342-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093342-027	EPA 9012
CCBA-MW2 15-Jan-13	Bicarbonate Alkalinity	180	0.725	1.00	NE			093336-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093336-022	SM2320B
	Bromide	0.508	0.067	0.200	NE			093336-016	EPA 9056
	Chloride	37.1	0.335	1.00	NE			093336-016	EPA 9056
	Fluoride	1.52	0.033	0.100	4.0			093336-016	EPA 9056
	Sulfate	95.3	0.665	2.00	NE			093336-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093336-027	EPA 9012

Table IV-8 (Continued)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 68									
OBS-MW1 22-Jan-13	Bicarbonate Alkalinity	186	0.725	1.00	NE			093349-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093349-022	SM2320B
	Bromide	0.336	0.067	0.200	NE			093349-016	EPA 9056
	Chloride	22.1	0.335	1.00	NE			093349-016	EPA 9056
	Fluoride	2.13	0.033	0.100	4.00			093349-016	EPA 9056
	Sulfate	76.5	0.665	2.00	NE			093349-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		093349-027	EPA 9012
OBS-MW1 (Duplicate) 22-Jan-13	Bicarbonate Alkalinity	186	0.725	1.00	NE			093350-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093350-022	SM2320B
	Bromide	0.345	0.067	0.200	NE			093350-016	EPA 9056
	Chloride	22.7	0.335	1.00	NE			093350-016	EPA 9056
	Fluoride	2.11	0.033	0.100	4.00			093350-016	EPA 9056
	Sulfate	78.4	0.665	2.00	NE			093350-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		093350-027	EPA 9012
OBS-MW2 21-Jan-13	Bicarbonate Alkalinity	179	0.725	1.00	NE			093344-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093344-022	SM2320B
	Bromide	0.322	0.067	0.200	NE			093344-016	EPA 9056
	Chloride	21.3	0.335	1.00	NE			093344-016	EPA 9056
	Fluoride	2.21	0.033	0.100	4.00			093344-016	EPA 9056
	Sulfate	83.0	0.665	2.00	NE			093344-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		093344-027	EPA 9012
OBS-MW3 23-Jan-13	Bicarbonate Alkalinity	178	0.725	1.00	NE			093352-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093352-022	SM2320B
	Bromide	0.344	0.067	0.200	NE			093352-016	EPA 9056
	Chloride	22.1	0.335	1.00	NE			093352-016	EPA 9056
	Fluoride	2.23	0.033	0.100	4.00			093352-016	EPA 9056
	Sulfate	83.3	0.665	2.00	NE			093352-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		093352-027	EPA 9012

Table IV-8 (Concluded)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes

^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.

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.

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.

Table IV-9
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Well	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 16-Jan-13	ND	0.004	0.012	NE	U		093341-020	EPA 314.0
CCBA-MW1 (Duplicate) 16-Jan-13	ND	0.004	0.012	NE	U		093342-020	EPA 314.0
CCBA-MW2 15-Jan-13	ND	0.004	0.012	NE	U		093336-020	EPA 314.0
SWMU 68								
OBS-MW1 22-Jan-13	ND	0.004	0.012	NE	U		093349-020	EPA 314.0
OBS-MW1 (Duplicate) 22-Jan-13	ND	0.004	0.012	NE	U		093350-020	EPA 314.0
OBS-MW2 21-Jan-13	ND	0.004	0.012	NE	U		093344-020	EPA 314.0
OBS-MW3 23-Jan-13	ND	0.004	0.012	NE	U		093352-020	EPA 314.0

Notes

^a**Laboratory 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.

^b**Validation Qualifier**

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

^c**Analytical Method**

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

Table IV-9 (Concluded)
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes (continued)

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-10
Summary of Hexavalent Chromium Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Well	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 22-Jan-13	ND	0.0033	0.010	NE	U		093349-014	EPA 7196A
OBS-MW1 (Duplicate) 22-Jan-13	ND	0.0033	0.010	NE	U		093350-014	EPA 7196A
OBS-MW2 21-Jan-13	ND	0.0033	0.010	NE	U		093344-014	EPA 7196A
OBS-MW3 23-Jan-13	ND	0.0033	0.010	NE	U		093352-014	EPA 7196A

Notes

^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.

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-11
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 16-Jan-13	Aluminum	0.0771	0.015	0.050	NE		J+	093341-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093341-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093341-009	EPA 6020
	Barium	0.00268	0.0006	0.002	2.00		J	093341-009	EPA 6020
	Beryllium	0.000406	0.0002	0.0005	0.004	J		093341-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093341-009	EPA 6020
	Calcium	41.9	0.060	0.200	NE			093341-009	EPA 6020
	Chromium	0.00237	0.002	0.010	0.100	B, J	0.015U	093341-009	EPA 6020
	Cobalt	0.000152	0.0001	0.001	NE	J		093341-009	EPA 6020
	Copper	0.000581	0.00035	0.001	NE	B, J	0.0025U	093341-009	EPA 6020
	Iron	0.156	0.033	0.100	NE			093341-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093341-009	EPA 6020
	Magnesium	8.93	0.010	0.030	NE		J	093341-009	EPA 6020
	Manganese	0.00421	0.001	0.005	NE	J		093341-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093341-009	EPA 7470
	Nickel	0.00201	0.0005	0.002	NE			093341-009	EPA 6020
	Potassium	3.78	0.080	0.300	NE			093341-009	EPA 6020
	Selenium	0.00224	0.0015	0.005	0.050	J		093341-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093341-009	EPA 6020
	Sodium	66.8	0.400	1.25	NE		J	093341-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093341-009	EPA 6020
Uranium	0.0021	0.000067	0.0002	0.03			093341-009	EPA 6020	
Vanadium	0.00106	0.001	0.005	NE	J		093341-009	EPA 6010	
Zinc	0.00485	0.0035	0.010	NE	J		093341-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 (Duplicate) 16-Jan-13	Aluminum	0.0351	0.015	0.050	NE	J	J+	093342-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093342-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093342-009	EPA 6020
	Barium	0.00253	0.0006	0.002	2.00		J	093342-009	EPA 6020
	Beryllium	0.00047	0.0002	0.0005	0.004	J		093342-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093342-009	EPA 6020
	Calcium	41.3	0.060	0.200	NE			093342-009	EPA 6020
	Chromium	0.00268	0.002	0.010	0.100	B, J	0.015U	093342-009	EPA 6020
	Cobalt	0.000141	0.0001	0.001	NE	J		093342-009	EPA 6020
	Copper	0.000496	0.00035	0.001	NE	B, J	0.0025U	093342-009	EPA 6020
	Iron	0.159	0.033	0.100	NE			093342-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093342-009	EPA 6020
	Magnesium	9.45	0.010	0.030	NE		J	093342-009	EPA 6020
	Manganese	0.00401	0.001	0.005	NE	J		093342-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093342-009	EPA 7470
	Nickel	0.00188	0.0005	0.002	NE	J		093342-009	EPA 6020
	Potassium	3.75	0.080	0.300	NE			093342-009	EPA 6020
	Selenium	0.00229	0.0015	0.005	0.050	J		093342-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093342-009	EPA 6020
	Sodium	61.7	0.400	1.25	NE		J	093342-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093342-009	EPA 6020
	Uranium	0.00201	0.000067	0.0002	0.03			093342-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		093342-009	EPA 6010
Zinc	ND	0.0035	0.010	NE	U		093342-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 15-Jan-13	Aluminum	0.0224	0.015	0.050	NE	J	J+	093336-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093336-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093336-009	EPA 6020
	Barium	0.0413	0.0006	0.002	2.00		J	093336-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093336-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093336-009	EPA 6020
	Calcium	75.4	0.300	1.00	NE			093336-009	EPA 6020
	Chromium	0.00274	0.002	0.010	0.100	B, J	0.015U	093336-009	EPA 6020
	Cobalt	0.000171	0.0001	0.001	NE	J		093336-009	EPA 6020
	Copper	0.000881	0.00035	0.001	NE	B, J	0.0025U	093336-009	EPA 6020
	Iron	0.244	0.033	0.100	NE			093336-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093336-009	EPA 6020
	Magnesium	13.8	0.010	0.030	NE		J	093336-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093336-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093336-009	EPA 7470
	Nickel	0.00269	0.0005	0.002	NE			093336-009	EPA 6020
	Potassium	1.21	0.080	0.300	NE			093336-009	EPA 6020
	Selenium	0.00433	0.0015	0.005	0.050	J		093336-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093336-009	EPA 6020
	Sodium	43.2	0.080	0.250	NE		J	093336-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093336-009	EPA 6020
Uranium	0.00533	0.000067	0.0002	0.03			093336-009	EPA 6020	
Vanadium	0.00988	0.001	0.005	NE			093336-009	EPA 6010	
Zinc	0.00366	0.0035	0.010	NE	J		093336-009	EPA 6020	

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes

^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.

- 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.

Table IV-12
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 22-Jan-13	Aluminum	ND	0.015	0.050	NE	U		093349-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093349-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093349-009	EPA 6020
	Barium	0.0182	0.0006	0.002	2.00			093349-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093349-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093349-009	EPA 6020
	Calcium	78.3	0.300	1.00	NE			093349-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093349-009	EPA 6020
	Cobalt	0.000133	0.0001	0.001	NE	J		093349-009	EPA 6020
	Copper	0.000494	0.00035	0.001	NE	J	0.0064U	093349-009	EPA 6020
	Iron	0.260	0.033	0.100	NE			093349-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093349-009	EPA 6020
	Magnesium	17.6	0.010	0.030	NE			093349-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093349-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093349-009	EPA 7470
	Nickel	0.00255	0.0005	0.002	NE			093349-009	EPA 6020
	Potassium	1.66	0.080	0.300	NE			093349-009	EPA 6020
	Selenium	0.00342	0.0015	0.005	0.050	J		093349-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093349-009	EPA 6020
	Sodium	22.9	0.080	0.250	NE			093349-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093349-009	EPA 6020
Uranium	0.00987	0.000067	0.0002	0.03			093349-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093349-009	EPA 6010	
Zinc	ND	0.0035	0.010	NE	U		093349-009	EPA 6020	

Table IV-12 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 (Duplicate) 22-Jan-13	Aluminum	ND	0.015	0.050	NE	U		093350-009	EPA 6020
	Antimony	0.00108	0.001	0.003	0.006	J		093350-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093350-009	EPA 6020
	Barium	0.0188	0.0006	0.002	2.00			093350-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093350-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093350-009	EPA 6020
	Calcium	84.5	0.300	1.00	NE			093350-009	EPA 6020
	Chromium	0.00234	0.002	0.010	0.100	B, J	0.013U	093350-009	EPA 6020
	Cobalt	0.000157	0.0001	0.001	NE	J		093350-009	EPA 6020
	Copper	0.000832	0.00035	0.001	NE	J	0.0064U	093350-009	EPA 6020
	Iron	0.294	0.033	0.100	NE			093350-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093350-009	EPA 6020
	Magnesium	17.5	0.010	0.030	NE			093350-009	EPA 6020
	Manganese	0.00127	0.001	0.005	NE	J		093350-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093350-009	EPA 7470
	Nickel	0.0027	0.0005	0.002	NE			093350-009	EPA 6020
	Potassium	1.65	0.080	0.300	NE			093350-009	EPA 6020
	Selenium	0.00425	0.0015	0.005	0.050	J		093350-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093350-009	EPA 6020
	Sodium	26.7	0.080	0.250	NE			093350-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093350-009	EPA 6020
	Uranium	0.0102	0.000067	0.0002	0.03			093350-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		093350-009	EPA 6010
Zinc	ND	0.0035	0.010	NE	U		093350-009	EPA 6020	

Table IV-12 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 21-Jan-13	Aluminum	ND	0.015	0.050	NE	U		093344-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093344-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093344-009	EPA 6020
	Barium	0.0196	0.0006	0.002	2.00			093344-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093344-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093344-009	EPA 6020
	Calcium	79.6	0.300	1.00	NE			093344-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093344-009	EPA 6020
	Cobalt	0.000146	0.0001	0.001	NE	J		093344-009	EPA 6020
	Copper	0.000427	0.00035	0.001	NE	J	NJ-	093344-009	EPA 6020
	Iron	0.253	0.033	0.100	NE			093344-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093344-009	EPA 6020
	Magnesium	17.0	0.010	0.030	NE			093344-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093344-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093344-009	EPA 7470
	Nickel	0.00267	0.0005	0.002	NE			093344-009	EPA 6020
	Potassium	1.54	0.080	0.300	NE			093344-009	EPA 6020
	Selenium	0.00399	0.0015	0.005	0.050	J		093344-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093344-009	EPA 6020
	Sodium	22.4	0.080	0.250	NE			093344-009	EPA 6020
	Thallium	0.000468	0.00045	0.002	0.002	J		093344-009	EPA 6020
Uranium	0.0132	0.000067	0.0002	0.03			093344-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		093344-009	EPA 6010	
Zinc	ND	0.0035	0.010	NE	U		093344-009	EPA 6020	

Table IV-12 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 23-Jan-13	Aluminum	ND	0.015	0.050	NE	U		093352-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093352-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093352-009	EPA 6020
	Barium	0.0261	0.0006	0.002	2.00			093352-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093352-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093352-009	EPA 6020
	Calcium	80.3	0.300	1.00	NE			093352-009	EPA 6020
	Chromium	0.00213	0.002	0.010	0.100	B, J	0.013U	093352-009	EPA 6020
	Cobalt	0.000148	0.0001	0.001	NE	J		093352-009	EPA 6020
	Copper	0.00042	0.00035	0.001	NE	J	NJ-	093352-009	EPA 6020
	Iron	0.255	0.033	0.100	NE			093352-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093352-009	EPA 6020
	Magnesium	16.2	0.010	0.030	NE			093352-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093352-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093352-009	EPA 7470
	Nickel	0.00267	0.0005	0.002	NE			093352-009	EPA 6020
	Potassium	1.63	0.080	0.300	NE			093352-009	EPA 6020
	Selenium	0.0041	0.0015	0.005	0.050	J		093352-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093352-009	EPA 6020
	Sodium	22.3	0.080	0.250	NE			093352-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093352-009	EPA 6020
	Uranium	0.0119	0.000067	0.0002	0.03			093352-009	EPA 6020
	Vanadium	0.001	0.001	0.005	NE	J		093352-009	EPA 6010
Zinc	ND	0.0035	0.010	NE	U		093352-009	EPA 6020	

Table IV-12 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes

^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.

- NJ- = Presumptive evidence of the presence of the material at an estimated quantity with a suspected negative bias.
- U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

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

- 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-13
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 16-Jan-13	Calcium	49.8	0.060	0.200	NE	B		093341-017	EPA 6020
	Magnesium	11.3	0.010	0.030	NE			093341-017	EPA 6020
	Potassium	4.84	0.080	0.300	NE			093341-017	EPA 6020
	Sodium	72.5	0.400	1.25	NE			093341-017	EPA 6020
CCBA-MW1 (Duplicate) 16-Jan-13	Calcium	49.6	0.300	1.00	NE	B		093342-017	EPA 6020
	Magnesium	11.4	0.010	0.030	NE			093342-017	EPA 6020
	Potassium	4.84	0.080	0.300	NE			093342-017	EPA 6020
	Sodium	68.8	0.400	1.25	NE			093342-017	EPA 6020
CCBA-MW2 15-Jan-13	Calcium	81.8	0.300	1.00	NE	B		093336-017	EPA 6020
	Magnesium	17.3	0.010	0.030	NE			093336-017	EPA 6020
	Potassium	1.54	0.080	0.300	NE			093336-017	EPA 6020
	Sodium	53.1	0.400	1.25	NE			093336-017	EPA 6020
SWMU 68									
OBS-MW1 22-Jan-13	Calcium	85.3	0.300	1.00	NE			093349-017	EPA 6020
	Magnesium	17.9	0.010	0.030	NE		J	093349-017	EPA 6020
	Potassium	1.74	0.080	0.300	NE			093349-017	EPA 6020
	Sodium	23.0	0.080	0.250	NE			093349-017	EPA 6020
OBS-MW1 (Duplicate) 22-Jan-13	Calcium	87.1	0.300	1.00	NE			093350-017	EPA 6020
	Magnesium	19.0	0.010	0.030	NE		J	093350-017	EPA 6020
	Potassium	1.89	0.080	0.300	NE			093350-017	EPA 6020
	Sodium	23.5	0.080	0.250	NE			093350-017	EPA 6020
OBS-MW2 21-Jan-13	Calcium	83.9	0.300	1.00	NE			093344-017	EPA 6020
	Magnesium	16.4	0.010	0.030	NE		J	093344-017	EPA 6020
	Potassium	1.58	0.080	0.300	NE			093344-017	EPA 6020
	Sodium	21.4	0.080	0.250	NE			093344-017	EPA 6020
OBS-MW3 23-Jan-13	Calcium	81.2	0.300	1.00	NE			093352-017	EPA 6020
	Magnesium	18.2	0.010	0.030	NE		J	093352-017	EPA 6020
	Potassium	1.74	0.080	0.300	NE			093352-017	EPA 6020
	Sodium	22.9	0.080	0.250	NE			093352-017	EPA 6020

Table IV-13 (Concluded)
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes

^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).

^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.

^cAnalytical Method

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

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.

Table IV-14
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 16-Jan-13	Americium-241	10.8 ± 11.7	17.0	8.30	NE	U	BD	093341-033	EPA 901.1
	Cesium-137	1.20 ± 4.12	2.92	1.41	NE	U	BD	093341-033	EPA 901.1
	Cobalt-60	-0.119 ± 1.79	3.15	1.49	NE	U	BD	093341-033	EPA 901.1
	Potassium-40	-6.29 ± 36.0	42.2	20.3	NE	U	BD	093341-033	EPA 901.1
	Gross Alpha	2.09	NA	NA	15 pCi/L	NA	None	093341-034	EPA 900.0
	Gross Beta	7.85 ± 1.80	1.80	0.873	4mrem/yr		J	093341-034	EPA 900.0
	Uranium-233/234	1.86 ± 0.332	0.158	0.0702	NE			093341-035	HASL-300
	Uranium-235/236	0.0314 ± 0.0489	0.0889	0.0338	NE	U	BD	093341-035	HASL-300
	Uranium-238	0.630 ± 0.155	0.0658	0.0243	NE			093341-035	HASL-300
CCBA-MW1 (Duplicate) 16-Jan-13	Americium-241	-3.53 ± 13.5	20.1	9.85	NE	U	BD	093342-033	EPA 901.1
	Cesium-137	0.0224 ± 2.21	3.85	1.85	NE	U	BD	093342-033	EPA 901.1
	Cobalt-60	-0.0698 ± 2.21	3.90	1.84	NE	U	BD	093342-033	EPA 901.1
	Potassium-40	-7.69 ± 46.7	51.8	24.7	NE	U	BD	093342-033	EPA 901.1
	Gross Alpha	0.98	NA	NA	15 pCi/L	NA	None	093342-034	EPA 900.0
	Gross Beta	6.89 ± 1.67	1.81	0.880	4mrem/yr		J	093342-034	EPA 900.0
	Uranium-233/234	1.72 ± 0.314	0.160	0.0714	NE			093342-035	HASL-300
	Uranium-235/236	-0.024 ± 0.052	0.0905	0.0344	NE	U	BD	093342-035	HASL-300
	Uranium-238	0.667 ± 0.158	0.067	0.0247	NE			093342-035	HASL-300
CCBA-MW2 15-Jan-13	Americium-241	0.904 ± 7.09	10.4	5.09	NE	U	BD	093336-033	EPA 901.1
	Cesium-137	-0.97 ± 2.21	3.08	1.49	NE	U	BD	093336-033	EPA 901.1
	Cobalt-60	0.836 ± 1.73	3.12	1.48	NE	U	BD	093336-033	EPA 901.1
	Potassium-40	-19 ± 34.4	44.3	21.4	NE	U	BD	093336-033	EPA 901.1
	Gross Alpha	0.15	NA	NA	15 pCi/L	NA	None	093336-034	EPA 900.0
	Gross Beta	5.00 ± 1.97	2.81	1.37	4mrem/yr		J	093336-034	EPA 900.0
	Uranium-233/234	7.02 ± 0.969	0.132	0.0586	NE			093336-035	HASL-300
	Uranium-235/236	0.151 ± 0.0671	0.0742	0.0282	NE		J	093336-035	HASL-300
	Uranium-238	1.70 ± 0.286	0.055	0.0203	NE			093336-035	HASL-300

Table IV-14 (Continued)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 22-Jan-13	Americium-241	-13.9 ± 19.4	30.8	15.1	NE	U	BD	093349-033	EPA 901.1
	Cesium-137	0.943 ± 2.87	3.78	1.82	NE	U	BD	093349-033	EPA 901.1
	Cobalt-60	1.04 ± 2.27	4.13	1.96	NE	U	BD	093349-033	EPA 901.1
	Potassium-40	15.6 ± 37.4	54.3	26.1	NE	U	BD	093349-033	EPA 901.1
	Gross Alpha	7.00	NA	NA	15 pCi/L			093349-034	EPA 900.0
	Gross Beta	4.81 ± 1.18	1.08	0.517	4 mrem/yr		J	093349-034	EPA 900.0
	Uranium-233/234	16.7 ± 2.13	0.0749	0.0334	NE			093349-035	HASL-300
	Uranium-235/236	0.172 ± 0.057	0.0422	0.0161	NE			093349-035	HASL-300
OBS-MW1 (Duplicate) 22-Jan-13	Uranium-238	3.03 ± 0.421	0.0313	0.0115	NE			093349-035	HASL-300
	Americium-241	2.22 ± 8.97	13.2	6.50	NE	U	BD	093350-033	EPA 901.1
	Cesium-137	0.502 ± 2.90	3.42	1.66	NE	U	BD	093350-033	EPA 901.1
	Cobalt-60	-0.0873 ± 2.04	3.62	1.73	NE	U	BD	093350-033	EPA 901.1
	Potassium-40	-14.5 ± 32.1	40.7	19.5	NE	U	BD	093350-033	EPA 901.1
	Gross Alpha	0.57	NA	NA	15 pCi/L			093350-034	EPA 900.0
	Gross Beta	5.67 ± 1.33	1.18	0.567	4 mrem/yr		J	093350-034	EPA 900.0
	Uranium-233/234	17.7 ± 2.26	0.0785	0.035	NE			093350-035	HASL-300
OBS-MW2 21-Jan-13	Uranium-235/236	0.145 ± 0.0513	0.0443	0.0168	NE			093350-035	HASL-300
	Uranium-238	3.39 ± 0.470	0.0328	0.0121	NE			093350-035	HASL-300
	Americium-241	14.9 ± 23.4	34.6	17.0	NE	U	BD	093344-033	EPA 901.1
	Cesium-137	-0.0433 ± 2.41	3.72	1.80	NE	U	BD	093344-033	EPA 901.1
	Cobalt-60	1.31 ± 2.35	4.06	1.93	NE	U	BD	093344-033	EPA 901.1
	Potassium-40	3.51 ± 33.2	50.6	24.3	NE	U	BD	093344-033	EPA 901.1
	Gross Alpha	7.22	NA	NA	15 pCi/L			093344-034	EPA 900.0
	Gross Beta	5.54 ± 1.30	0.994	0.474	4 mrem/yr		J	093344-034	EPA 900.0
	Uranium-233/234	22.5 ± 2.87	0.114	0.0507	NE			093344-035	HASL-300
	Uranium-235/236	0.267 ± 0.0848	0.0642	0.0244	NE			093344-035	HASL-300
	Uranium-238	4.01 ± 0.567	0.0476	0.0176	NE			093344-035	HASL-300

Table IV-14 (Continued)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

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 23-Jan-13	Americium-241	10.5 ± 12.9	18.2	8.92	NE	U	BD	093352-033	EPA 901.1
	Cesium-137	2.72 ± 3.53	3.67	1.78	NE	U	BD	093352-033	EPA 901.1
	Cobalt-60	1.22 ± 2.24	3.97	1.89	NE	U	BD	093352-033	EPA 901.1
	Potassium-40	78.2 ± 49.6	31.8	14.9	NE	X	R	093352-033	EPA 901.1
	Gross Alpha	14.68	NA	NA	15 pCi/L			093352-034	EPA 900.0
	Gross Beta	5.85 ± 1.36	0.994	0.470	4 mrem/yr		J	093352-034	EPA 900.0
	Uranium-233/234	19.9 ± 2.59	0.0899	0.040	NE			093352-035	HASL-300
	Uranium-235/236	0.215 ± 0.0691	0.0507	0.0193	NE			093352-035	HASL-300
	Uranium-238	3.81 ± 0.537	0.0376	0.0139	NE			093352-035	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.

NA = Not applicable.

^c**Laboratory 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.

^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.

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.

^e**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.

Table IV-14 (Concluded)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Notes (continued)

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.

Table IV-15
Summary of Constituents Detected above Established MCLs
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessments through March 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36 mg/L	4.0 mg/L			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	4.93 mg/L	4.0 mg/L			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	5.03 mg/L	4.0 mg/L			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	5.00 mg/L	4.0 mg/L			092616-016	EPA 9056
CCBA-MW1	22-Oct-12	Fluoride	5.32 mg/L	4.0 mg/L			093013-016	EPA 9056
CCBA-MW2	15-Jan-13	Benzo(a)pyrene	0.640 µg/L	0.440 µg/L	J		093336-002	EPA 8270C
CCBA-MW1	16-Jan-13	Fluoride	4.97 mg/L	4.00 mg/L			093341-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-13	Fluoride	5.00 mg/L	4.00 mg/L			093342-016	EPA 9056

Notes

^a**Laboratory Qualifier**

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

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

^b**Validation Qualifier**

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

^c**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.

Bold = Indicates that a result exceeds the MCL.

µg/L = Micrograms per liter.

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.

Table IV-16

Summary of Duplicate Samples
 SWMUs 8/58 and 68 Groundwater Monitoring
 Quarterly Assessment, January – March 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
CCBA-MW1			
Nitrate plus Nitrite	1.49	1.50	1
Bicarbonate Alkalinity	185	183	1
Bromide	0.284	0.285	< 1
Chloride	29.5	29.5	< 1
Fluoride	4.97	5.00	1
Sulfate	56.6	56.7	< 1
Aluminum	0.0771	0.0351	75
Barium	0.00268	0.00253	6
Beryllium	0.000406	0.00047	15
Calcium	41.9	41.3	1
Cobalt	0.000152	0.000141	8
Iron	0.156	0.159	2
Magnesium	8.93	9.45	6
Manganese	0.00421	0.00401	5
Nickel	0.00201	0.00188	7
Potassium	3.78	3.75	1
Selenium	0.00224	0.00229	2
Sodium	66.8	61.7	8
Uranium	0.0021	0.00201	4
Filtered Calcium	49.8	49.6	< 1
Filtered Magnesium	11.3	11.4	1
Filtered Potassium	4.84	4.84	< 1
OBS-MW1			
Nitrate plus Nitrite	1.87	1.84	2
Bicarbonate Alkalinity	186	186	< 1
Bromide	0.336	0.345	3
Chloride	22.1	22.7	3
Fluoride	2.13	2.11	1
Sulfate	76.5	78.4	2
Barium	0.0182	0.0188	3
Calcium	78.3	84.5	8
Cobalt	0.000133	0.000157	17
Iron	0.260	0.294	12
Magnesium	17.6	17.5	1
Nickel	0.00255	0.0027	6
Potassium	1.66	1.65	1

Table IV-16 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
OBS-MW1			
Selenium	0.00342	0.00425	22
Sodium	22.9	26.7	15
Uranium	0.00987	0.0102	3
Filtered Calcium	85.3	87.1	2
Filtered Magnesium	17.9	19.0	6
Filtered Potassium	1.74	1.89	8
Filtered Sodium	23.0	23.5	2

Notes

^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.

CCBA = Coyote Canyon Blast Area.
mg/L = Milligrams per liter.
MW = Monitoring well.
OBS = Old Burn Site.
SWMU = Solid Waste Management Unit.

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

Batch No. NA SMO Use AR/COC **614567**

Project Name: <u>SWMU 8/58 GWM</u>	Date Samples Shipped: <u>1/16/13</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.: <u>150796</u>	SMO Contact Phone: <u>See Bottle order</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026.01.12</u>	Lab Contact: <u>Edie Kent/803.556.8171</u>	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by CQC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF262-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <u>Lorraine Herrera/505-844-3199</u>	
	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: _____

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					
✓ 093341	-001 ✓	CCBA MW1	79	1/16/13 9:26 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093341	-002 ✓	CCBA MW1	79	1/16/13 9:29 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093341	-009 ✓	CCBA MW1	79	1/16/13 9:30 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093341	-016 ✓	CCBA MW1	79	1/16/13 9:31 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093341	-017 ✓	CCBA MW1	79	1/16/13 9:32 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093341	-018 ✓	CCBA MW1	79	1/16/13 9:33 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093341	-020 ✓	CCBA MW1	79	1/16/13 9:34 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093341	-022 ✓	CCBA MW1	79	1/16/13 9:35 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093341	-024 ✓	CCBA MW1	79	1/16/13 9:38 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
✓ 093341	-027 ✓	CCBA MW1	79	1/16/13 9:39 ✓	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
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/844-4013/250-7090	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/844-5130/228-0710	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
	William J. Gibson	<u>[Signature]</u>	<u>WJG</u>	SNL/4142/844-4013/239-7367	
					FGW(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

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>1/16/13</u> Time <u>1033</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/16/13</u> Time <u>1033</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/COC **614567**

Project Name: SWMU 8/58 GWM		Project/Task Manager: Clinton Lum			Project/Task No.: 98026.01.12									
Tech Area:												Lab use		
Building:	Room:													
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested		Lab Sample ID
				↓ Collected			Type	Volume						
✓ 093341	-033 ✓	CCBA MW1	79	1/16/13	9:40 ✓	GW	P	1 L ✓	HNO3	G	SA	Gamma Spec (short list)(901.0)		
✓ 093341	-034 ✓	CCBA MW1	79	1/16/13	9:42 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)		
✓ 093341	-035 ✓	CCBA MW1	79	1/16/13	9:44 ✓	GW	P	1 L	HNO3	G	SA	Isotopic U (HASL-300)		
✓ 093342	-001 ✓	CCBA MW1	79	1/16/13	9:26 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 093342	-002 ✓	CCBA MW1	79	1/16/13	9:29 ✓	GW	AG	4x1L	None	G	DU ✓	TCL SVOC (SW846-8270C)		
✓ 093342	-009 ✓	CCBA MW1	79	1/16/13	9:30 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)		
✓ 093342	-016 ✓	CCBA MW1	79	1/16/13	9:31 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)		
✓ 093342	-017 ✓	CCBA MW1	79	1/16/13	9:32 ✓	FGW	P	250 ml	HNO3	G	DU	Metals (SW846-6020)		
✓ 093342	-018 ✓	CCBA MW1	79	1/16/13	9:33 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)		
✓ 093342	-020 ✓	CCBA MW1	79	1/16/13	9:34 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)		
✓ 093342	-022 ✓	CCBA MW1	79	1/16/13	9:35 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
✓ 093342	-024 ✓	CCBA MW1	79	1/16/13	9:38 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)		
✓ 093342	⁰²⁷ -026 ✓	CCBA MW1	79	1/16/13	9:39 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 093342	-033 ✓	CCBA MW1	79	1/16/13	9:40 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)		
✓ 093342	-034 ✓	CCBA MW1	79	1/16/13	9:42 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)		
✓ 093342	-035 ✓	CCBA MW1	79	1/16/13	9:44 ✓	GW	P	1 L	HNO3	G	DU	Isotopic U (HASL-300)		
✓ 093343	-001 ✓	CCBA TB3 ✓	N/A	1/16/13	9:26 ✓	DIW	P	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)		

Recipient Initials _____

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614565**

Project Name: <u>SWMU 8/58 GWM</u>	Date Samples Shipped: _____	SMO Authorization: <i>Don Waterman</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. _____	SMO Contact Phone: <i>see below</i>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026.01.12</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>CF262-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: _____	
	Contract No.: <u>PO 691436</u>	Lorraine Herrera/505-844-3199	

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					
✓ 093336	-001	CCBA MW2	117	1/15/13 9:15	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093336	-002	CCBA MW2	117	1/15/13 9:17	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093336	-009	CCBA MW2	117	1/15/13 9:18	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093336	-016	CCBA MW2	117	1/15/13 9:19	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093336	-017	CCBA MW2	117	1/15/13 9:21	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093336	-018	CCBA MW2	117	1/15/13 9:22	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093336	-020	CCBA MW2	117	1/15/13 9:23	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093336	-022	CCBA MW2	117	1/15/13 9:24	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093336	-024	CCBA MW2	117	1/15/13 9:26	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
✓ 093336	-027	CCBA MW2	117	1/15/13 9:27	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 _____		
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: _____
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
	William J. Gibson	<i>[Signature]</i>	WJG	SNL/4142/844-4013/239-7367	FGW (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

1. Relinquished by <i>Alfred Santillanes</i> Org. <u>4142</u> Date <u>1/15/13</u> Time <u>10:00</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don Waterman</i> Org. <u>4142</u> Date <u>1/15/13</u> Time <u>1000</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 CCBA-MWI

Internal Lab

Batch No. <i>NA</i>	SMO Use	AR/COC	614566
Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>1/16/13</i>	SMO Authorization: <i>Don Wataupunt</i>	
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>156796</i>	SMO Contact Phone: <i>See bottle order</i>	
Project/Task Number: 98026.01.12	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	
Service Order: CF262-13	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 691436	Lorraine Herrera/505-844-3199	

<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> RMMA
<input type="checkbox"/> Released by COC No.
<input checked="" type="checkbox"/> 4° Celsius
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					
✓ 093339	-001 ✓	CCBA EB1	N/A	1/15/13 10:39	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 093339	-002 ✓	CCBA EB1	N/A	1/15/13 10:40	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 093339	-009 ✓	CCBA EB1	N/A	1/15/13 10:42	DIW	P	500 ml	HNO3	G	EB	TAL Metals + U (SW846-6020/7470)	
✓ 093339	-016 ✓	CCBA EB1	N/A	1/15/13 10:43	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
✓ 093339	-017 ✓	CCBA EB1	N/A	1/15/13 10:44	FDIW	P	250 ml	HNO3	G	EB	Metals (SW846-6020)	
✓ 093339	-018 ✓	CCBA EB1	N/A	1/15/13 10:45	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
✓ 093339	-020 ✓	CCBA EB1	N/A	1/15/13 10:46	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)	
✓ 093339	-022 ✓	CCBA EB1	N/A	1/15/13 10:47	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
✓ 093339	-024 ✓	CCBA EB1	N/A	1/15/13 10:48	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)	
✓ 093339	-027 ✓	CCBA EB1	N/A	1/15/13 10:50	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 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/4142/844-4013/250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FDIW (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>	<i>AS</i>	SNL/4142/844-5130/228-0710	
	William J. Gibson	<i>William J. Gibson</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367	

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date <i>1/16/13</i> Time <i>1024</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don Wataupunt</i> Org. 4142 Date <i>1/16/13</i> Time <i>1024</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 **614570** ✓

Project Name: <u>SWMU 68 GWM</u>	Date Samples Shipped: _____	SMO Authorization: <i>David 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: <u>Clinton Lum</u>	Carrier/Waybill No. <u>150963</u>	SMO Contact Phone: <i>See Bottle order</i>	
Project/Task Number: <u>98026 01.13</u>	Lab Contact: <u>Edie Kent/803.556.8171</u>	Lorraine Herrera/505-844-3199	
Service Order: <u>CF 263-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: _____	
Contract No.: <u>PO 1303873</u>		Rita Kavanaugh/505.284.2553	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					
✓ 093349	-001 ✓	OBS-MW1	153	1/22/13	9:34 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093349	-002	OBS-MW1	153	1/22/13	9:36 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093349	-009 ✓	OBS-MW1	153	1/22/13	9:37 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093349	-014 ✓	OBS-MW1	153	1/22/13	9:38 ✓	GW	P	250 ml ✓	None	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 093349	-016 ✓	OBS-MW1	153	1/22/13	9:39 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093349	-017 ✓	OBS-MW1	153	1/22/13	9:40 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093349	-018	OBS-MW1	153	1/22/13	9:41 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093349	-020	OBS-MW1	153	1/22/13	9:42 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093349	-022	OBS-MW1	153	1/22/13	9:43 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093349	-024 ✓	OBS-MW1	153	1/22/13	9:46 ✓	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 <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/4142/844-4013/250-7090</td> </tr> <tr> <td>Alfred Santillanes</td> <td><i>Alfred Santillanes</i></td> <td><i>AS</i></td> <td>SNL/4142/844-5130/228-0710</td> </tr> <tr> <td>William J. Gibson</td> <td><i>William J. Gibson</i></td> <td><i>WJG</i></td> <td>SNL/4142/844-4013/239-7367</td> </tr> </table>	Name	Signature	Init.	Company/Organization/Phone/Cell	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/844-4013/250-7090	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/844-5130/228-0710	William J. Gibson	<i>William J. Gibson</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By: _____	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (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)
	Name	Signature	Init.	Company/Organization/Phone/Cell																
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/844-4013/250-7090																
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/844-5130/228-0710																
William J. Gibson	<i>William J. Gibson</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367																	
1. Relinquished by <i>Alfred Santillanes</i> Org. <u>4142</u> Date <u>1/22/13</u> Time <u>10:32</u>		3. Relinquished by _____ Org. _____ Date _____ Time _____																		
1. Received by <i>David Lynch</i> Org. <u>4142</u> Date _____ Time _____		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)

Page 2 of 2AR/COG **614570**

Project Name:		SWMU 68 GWM		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 Sample ID	
							Type	Volume							
✓ 093349	-027 ✓	OBS-MW1	153	1/22/13	9:47 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)			
✓ 093349	-033 ✓	OBS-MW1	153	1/22/13	9:48 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)			
✓ 093349	-034 ✓	OBS-MW1	153	1/22/13	9:50 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)			
✓ 093349	-035 ✓	OBS-MW1	153	1/22/13	9:52 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)			
✓ 093350	-001 ✓	OBS-MW1	153	1/22/13	9:34 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)			
✓ 093350	-002 ✓	OBS-MW1	153	1/22/13	9:36 ✓	GW	AG	4x1L ✓	None	G	DU	TCL SVOC (SW846-8270C)			
✓ 093350	-009 ✓	OBS-MW1	153	1/22/13	9:37 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)			
✓ 093350	-014 ✓	OBS-MW1	153	1/22/13	9:38 ✓	GW	P	250 ml ✓	None	G	DU	Hexavalent Chromium (SW846-7196A)			
✓ 093350	-016 ✓	OBS-MW1	153	1/22/13	9:39 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056) ✓			
✓ 093350	-017 ✓	OBS-MW1	153	1/22/13	9:40 ✓	FGW	P	250 ml	HNO3	G	DU	Metals (SW846-6020) ✓			
✓ 093350	-018 ✓	OBS-MW1	153	1/22/13	9:41 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)			
✓ 093350	-020 ✓	OBS-MW1	153	1/22/13	9:42 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)			
✓ 093350	-022 ✓	OBS-MW1	153	1/22/13	9:43 ✓	GW	P	500 ml ✓	None	G	DU	Alkalinity (SM2320B)			
✓ 093350	-024 ✓	OBS-MW1	153	1/22/13	9:46 ✓	GW	AG	4x1L ✓	None	G	DU	HE (SW846-8321A)			
✓ 093350	-027 ✓	OBS-MW1	153	1/22/13	9:47 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)			
✓ 093350	-033 ✓	OBS-MW1	153	1/22/13	9:48 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)			
✓ 093350	-034 ✓	OBS-MW1	153	1/22/13	9:50 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)			
✓ 093350	-035 ✓	OBS-MW1	153	1/22/13	9:52 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)			
✓ 093351	-001 ✓	OBS-TB3	N/A	1/22/13	9:34 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)			
Recipient Initials _____															

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **614568** ✓

Project Name: <u>SWMU 68 GWM</u>	Date Samples Shipped: <u>1/21/13</u>	SMO Authorization: <u>Downwater pond</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.: <u>200126</u>	SMO Contact Phone: <u>See Bottle Labels</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026 01.13</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>CF 263-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <u>Lorraine Herrera/505-844-3199</u>	
	Contract No.: <u>PO 1303873</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					
✓ 093344	-001 ✓	OBS-MW2	252	1/21/13 9:30 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093344	-002 ✓	OBS-MW2	252	1/21/13 9:32 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093344	-009 ✓	OBS-MW2	252	1/21/13 9:33 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093344	-014 ✓	OBS-MW2	252	1/21/13 9:34 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	
✓ 093344	-016 ✓	OBS-MW2	252	1/21/13 9:35 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093344	-017 ✓	OBS-MW2	252	1/21/13 9:36 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093344	-018 ✓	OBS-MW2	252	1/21/13 9:37 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093344	-020 ✓	OBS-MW2	252	1/21/13 9:38 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093344	-022 ✓	OBS-MW2	252	1/21/13 9:39 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093344	-024 ✓	OBS-MW2	252	1/21/13 9:41 ✓	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	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:	
Name: Alfred Santillanes <i>Alfred Santillanes</i>	Init.: <i>AS</i>	Company/Org/Phone/Cell: SNL/4142/844-4013/250-7090	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547	Lab Use
Name: William J. Gibson <i>William Gibson</i>	Init.: <i>WJG</i>	Company/Org/Phone/Cell: SNL/4142/844-5130/228-0710	FGW(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	

1. Relinquished by <i>Alfred Santillanes</i> Org. <u>4142</u> Date <u>1/21/13</u> Time <u>11:29</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Downwater pond</i> Org. <u>4142</u> Date <u>1/21/13</u> Time <u>11:29</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

Internal Lab

Batch No. NA

SMO Use

AR/COC **614571**

Project Name: <u>SWMU 68 GWM</u>	Date Samples Shipped: <u>1/23/13</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.: <u>151020</u>	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>	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No.
Service Order: <u>CF 263-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO:	<input checked="" type="checkbox"/> Celsius
	Contract No.: <u>PO 1303873</u>	Lorraine Herrera/505-844-3199	

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					
✓ 093352	-001 ✓	OBS-MW3	208	1/23/13	9:38 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 093352	-002 ✓	OBS-MW3	208	1/23/13	9:40 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 093352	-009 ✓	OBS-MW3	208	1/23/13	9:41 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 093352	-014 ✓	OBS-MW3	208	1/23/13	9:42 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	
✓ 093352	-016 ✓	OBS-MW3	208	1/23/13	9:43 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 093352	-017 ✓	OBS-MW3	208	1/23/13	9:44 ✓	FGW	P	250 ml	HNO3	G	SA	Metals (SW846-6020)	
✓ 093352	-018 ✓	OBS-MW3	208	1/23/13	9:45 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 093352	-020 ✓	OBS-MW3	208	1/23/13	9:46 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 093352	-022 ✓	OBS-MW3	208	1/23/13	9:48 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 093352	-024 ✓	OBS-MW3	208	1/23/13	9:50 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A Mod)	

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 <table 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>William J. Gibson</td> <td><u>[Signature]</u></td> <td>WJG</td> <td>SNL/4142/844-4013/250-7090</td> </tr> <tr> <td>Robert Lynch</td> <td><u>[Signature]</u></td> <td>RL</td> <td>SNL/4142/844-5130/228-0710</td> </tr> <tr> <td>Alfred Santillanes</td> <td><u>[Signature]</u></td> <td>AS</td> <td>SNL/4142/844-5130/228-0710</td> </tr> </table>	Name	Signature	Init.	Company/Organization/Phone/Cell	William J. Gibson	<u>[Signature]</u>	WJG	SNL/4142/844-4013/250-7090	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/844-5130/228-0710	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/844-5130/228-0710	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (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
	Name	Signature	Init.	Company/Organization/Phone/Cell																
	William J. Gibson	<u>[Signature]</u>	WJG	SNL/4142/844-4013/250-7090																
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/844-5130/228-0710																
Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/844-5130/228-0710																	

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>1/23/13</u> Time <u>10:20</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/23/13</u> Time <u>10:20</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-MW1

Internal Lab

Batch No. NY

SMO Use

AR/COC **614569**

Project Name: <u>SWMU 68 GWM</u>	Date Samples Shipped: <u>1/21/13</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.: <u>200126</u>	SMO Contact Phone: <u>See bottle one</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>98026 01.13</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>CF 263-13</u>	Lab Destination: <u>GEL</u>	Send Report to SMO:	
	Contract No.: <u>PO 1303873</u>	Lorraine Herrera/505-844-3199	

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					
✓ 093347	-001 ✓	OBS-EB1	NA	1/21/13 10:53 ✓	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 093347	-002 ✓	OBS-EB1	NA	1/21/13 10:55 ✓	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 093347	-009 ✓	OBS-EB1	NA	1/21/13 10:56 ✓	DIW	P	500 ml	HNO3	G	EB	TAL Metals + U (SW846-6020/7470)	
✓ 093347	-014 ✓	OBS-EB1	NA	1/21/13 10:57 ✓	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
✓ 093347	-016 ✓	OBS-EB1	NA	1/21/13 10:58 ✓	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
✓ 093347	-017 ✓	OBS-EB1	NA	1/21/13 10:59 ✓	FDIW	P	250 ml	HNO3	G	EB	Metals (SW846-6020)	
✓ 093347	-018 ✓	OBS-EB1	NA	1/21/13 11:00 ✓	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2) ✓	
✓ 093347	-020 ✓	OBS-EB1	NA	1/21/13 11:01 ✓	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)	
✓ 093347	-022 ✓	OBS-EB1	NA	1/21/13 11:02 ✓	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
✓ 093347	-024 ✓	OBS-EB1 ✓	NA	1/21/13 11:04 ✓	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)	

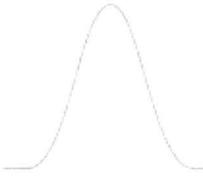
Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> 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 inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/844-4013/250-7090
	William J. Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/844-4013/239-7367
			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
			Return Samples By:	
			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547	
			FDIW (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	Lab Use

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>1/21/13</u> Time <u>11:36</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/21/13</u> Time <u>11:36</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

Appendix C

Data Validation Sample Findings Summary
Sheets for SWMUs 8/58 and 68
Groundwater Monitoring Data



Sample Findings Summary



AR/COC: 614565, 614566, 614567

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093336-035/CCBA MW2	Uranium-235/236 (13982-70-2)	J, FR7
	093339-035/CCBA EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093339-035/CCBA EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093339-035/CCBA EB1	Uranium-238 (7440-61-1)	BD, FR3
	093341-035/CCBA MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	093342-035/CCBA MW1	Uranium-235/236 (13982-70-2)	BD, FR3
EPA 900.0/SW846 9310			
	093336-034/CCBA MW2	ALPHA (12587-46-1)	J, MS1
	093336-034/CCBA MW2	BETA (12587-47-2)	J, FR7,MS1
	093339-034/CCBA EB1	ALPHA (12587-46-1)	BD, FR3
	093339-034/CCBA EB1	BETA (12587-47-2)	BD, FR3
	093341-034/CCBA MW1	ALPHA (12587-46-1)	J, FR7,MS1
	093341-034/CCBA MW1	BETA (12587-47-2)	J, MS1
	093342-034/CCBA MW1	ALPHA (12587-46-1)	J, MS1
	093342-034/CCBA MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093336-033/CCBA MW2	Americium-241 (14596-10-2)	BD, FR3
	093336-033/CCBA MW2	Cesium-137 (10045-97-3)	BD, FR3
	093336-033/CCBA MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093336-033/CCBA MW2	Potassium-40 (13966-00-2)	BD, FR3
	093339-033/CCBA EB1	Americium-241 (14596-10-2)	BD, FR3
	093339-033/CCBA EB1	Cesium-137 (10045-97-3)	BD, FR3
	093339-033/CCBA EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093339-033/CCBA EB1	Potassium-40 (13966-00-2)	R, Z2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093341-033/CCBA MW1	Americium-241 (14596-10-2)	BD, FR3
	093341-033/CCBA MW1	Cesium-137 (10045-97-3)	BD, FR3
	093341-033/CCBA MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093341-033/CCBA MW1	Potassium-40 (13966-00-2)	BD, FR3
	093342-033/CCBA MW1	Americium-241 (14596-10-2)	BD, FR3
	093342-033/CCBA MW1	Cesium-137 (10045-97-3)	BD, FR3
	093342-033/CCBA MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093342-033/CCBA MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	093336-009/CCBA MW2	Aluminum (7429-90-5)	J+, DL2
	093336-009/CCBA MW2	Barium (7440-39-3)	J, D1
	093336-009/CCBA MW2	Chromium (7440-47-3)	0.015U, B
	093336-009/CCBA MW2	Copper (7440-50-8)	0.0025U, B
	093336-009/CCBA MW2	Magnesium (7439-95-4)	J, D1
	093336-009/CCBA MW2	Sodium (7440-23-5)	J, D1
	093339-009/CCBA EB1	Chromium (7440-47-3)	0.015U, B
	093339-009/CCBA EB1	Copper (7440-50-8)	0.0025U, B
	093339-017/CCBA EB1	Calcium (7440-70-2)	0.44U, B
	093341-009/CCBA MW1	Aluminum (7429-90-5)	J+, DL2
	093341-009/CCBA MW1	Barium (7440-39-3)	J, D1
	093341-009/CCBA MW1	Chromium (7440-47-3)	0.015U, B
	093341-009/CCBA MW1	Copper (7440-50-8)	0.0025U, B
	093341-009/CCBA MW1	Magnesium (7439-95-4)	J, D1
	093341-009/CCBA MW1	Sodium (7440-23-5)	J, D1
	093342-009/CCBA MW1	Aluminum (7429-90-5)	J+, DL2
	093342-009/CCBA MW1	Barium (7440-39-3)	J, D1
	093342-009/CCBA MW1	Chromium (7440-47-3)	0.015U, B
	093342-009/CCBA MW1	Copper (7440-50-8)	0.0025U, B

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093342-009/CCBA MW1	Magnesium (7439-95-4)	J, D1
	093342-009/CCBA MW1	Sodium (7440-23-5)	J, D1
SW846 3535/8321A Modified			
	093336-024/CCBA MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093336-024/CCBA MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093336-024/CCBA MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093339-024/CCBA EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093339-024/CCBA EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093339-024/CCBA EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093341-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093341-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093341-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093342-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093342-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093342-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	093336-009/CCBA MW2	Mercury (7439-97-6)	UJ, B4
	093339-009/CCBA EB1	Mercury (7439-97-6)	UJ, B4
	093341-009/CCBA MW1	Mercury (7439-97-6)	UJ, B4
	093342-009/CCBA MW1	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093336-001/CCBA MW2	Acetone (67-64-1)	UJ, MS3
	093337-001/CCBA TB1	Acetone (67-64-1)	UJ, MS3
	093338-001/CCBA FB1	Acetone (67-64-1)	UJ, MS3
	093339-001/CCBA EB1	Acetone (67-64-1)	UJ, MS3
	093340-001/CCBA TB2	Acetone (67-64-1)	UJ, MS3
	093341-001/CCBA MW1	Acetone (67-64-1)	UJ, MS3
	093342-001/CCBA MW1	Acetone (67-64-1)	UJ, MS3
	093343-001/CCBA TB3	Acetone (67-64-1)	UJ, MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 9012B	093336-027/CCBA MW2	Cyanide, Total (57-12-5)	UJ, B4
	093339-027/CCBA EB1	Cyanide, Total (57-12-5)	UJ, B4
	093341-027/CCBA MW1	Cyanide, Total (57-12-5)	UJ, B4
	093342-027/CCBA MW1	Cyanide, Total (57-12-5)	UJ, B4
SW846 9056	093339-016/CCBA EB1	Chloride (16887-00-6)	J-, I5
	093339-016/CCBA EB1	Sulfate (14808-79-8)	UJ, I5

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

Memorandum

Date: March 4, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530
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 EPA 9056 (anions by IC), EPA 9012A (perchlorate by IC), EPA 353.2 (nitrate/nitrite), SM2320B (total alkalinity), and EPA 9012A (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

Total cyanide was reported in a CCB at a negative value, with absolute value > MDL. All associated sample results were ND and will be **qualified UJ,B4**.

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL and < 3X MDL. The sulfate result for sample 318530-043 was ND and will be **qualified UJ,I5**. The chloride result for sample -043 was a detect < 3X the intercept value and will be **qualified J-,I5**.

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

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

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL and < 3X MDL. All associated sample results that were > 3X the intercept value 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. All associated sample results were >5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide:

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.

Total cyanide:

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:

Sample -004 was diluted 5X, and samples -018 and -030 were diluted 2X for chloride and sulfate.

Nitrate/nitrite:

Sample -005 was diluted 10X, and samples -019 and -031 were diluted 5X.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 03/09/13

Memorandum

Date: March 1, 2013
To: File
From: Marcia Hilchey
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530
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 resulted in the qualification of data.

HE by LCMSMS:

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene, p-nitrotoluene were <0.05 but ≥ 0.01 . The associated sample results were NDs 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 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 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)

The MS/MSD analyses met 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 and one field duplicate pair were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/09/13

Memorandum

Date: March 1, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530 and 318619
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 6020 (ICP-MS), EPA 6010 (ICP-AES), and EPA 7471/7470B (CVAA). Four samples were prepared and analyzed with approved procedures using method EPA 6020 (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

CVAA:

1. Hg was reported at a negative value with absolute value > MDL in the ICB and CCBs. The associated results were ND and will be **qualified UJ,B4**.

ICP-MS:

1. Ca was detected in the MB associated with samples 318619-001, -002, -003, and -004. The associated result for sample -004 was a detect <5X the MB concentration and will be qualified **0.44U,B** at 5X the MB value.
2. Cr and Cu were detected in the MB associated with samples 318530-003, -017, -029, and -042. All associated sample results were detects <5X the MB concentration and will be qualified **U,B** at 5X the associated MB value.
3. The CRI %R for Al was > 130%, and the associated results for samples 318530-003, -017, and -029 were detects <5X PQL. These results will be **qualified J+,DL2**.

4. The serial dilution %Ds associated with samples 318530-003, -017, -029, and -042 were > 10% and the parent sample results were > 50X MDL for Na, Mg, and Ba. All associated sample results that were detects 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

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 except as noted above in the Summary section and as follows.

The CRI %Rs for Na and Al associated with samples 318530-003, -017, -029, and -042 were > 130%. All associated sample results that were ND or were > 5X PQL will not be qualified.

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 associated with samples 318530-003, -017, -029, and -042. Ca was detected in the MB associated with samples 318619-001, -002, -003, and -004. Na was detected in the EB associated with samples 318619-001, -002, and -003. All associated sample results that were ND or were > 5X the associated blank concentration will not be qualified.

Ca, Cr and Cu were detected in the EBs, but these results were qualified U due to MB contamination and will not be applied to associated field sample results.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as follows.

ICP-MS:

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

Laboratory Replicate

All replicates met QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:

Samples 318530-003, and 318619-001, and 003 were diluted 5X for Ca.

Samples 318619001, -002, and -003, and 318530-017 and -029 were diluted 5X for 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 except as noted above in the Summary section and as follows.

The serial dilution %Ds associated with samples 318530-003, -017, -029, and -042 were > 10% and the parent sample results were > 50X MDL for Na, Mg, and Ba. All associated sample results that were ND will not be qualified.

Other QC

Two EBs and two field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/09/13



Memorandum

Date: March 4, 2013
To: File
From: Marcia Hilchey
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530
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 – short list), HASL 300 (isotopic U), and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

All Analyses:

1. All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.
2. All sample results which were > but <3X the MDA will be **qualified J,FR7**.

Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5X and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. Associated detected sample results will be **qualified J,MS1**, and associated NDs will be **qualified UJ,MS1** due to lack of matrix-specific accuracy data.

Gamma Spec:

1. The K-40 result for sample 318530-049 was “X” flagged by the laboratory due to peak not meeting identification criteria, and will be **qualified R,Z2**.

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

All 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. It should be noted that the K-40 result for EB sample -049 was X-flagged by the laboratory and was therefore not applied to associated field sample results. No sample data will be qualified as a result.

Tracer/Carrier Recovery

Tracer/carrier acceptance criteria were met.

Matrix Spike (MS)

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

No samples were diluted. All required detection limits were met.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Memorandum

Date: March 8, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530
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 8270D (SVOCs). All compounds were successfully analyzed. 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

The samples were 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 %RSD was >15% and the CCV %D was >20% with positive bias for 2-methyl-4,6-dinitrophenol. The ICV %D was > 20% with negative bias and no other calibration infractions occurred for hexachlorocyclopentadiene. All 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/09/13

Memorandum

Date: February 27, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58
AR/COC: 614565, -566, -567
SDG: 318530
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. A problem was identified with the data package that resulted in the qualification of data.

1. The MS and MSD %Rs for acetone were < LAL. All associated sample results were ND and will be **qualified UJ,MS3**.

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

The CCV %Ds for acetone; 1,2-dichloroethane; 2-hexanone; and 1,2,3-trichlorobenzene were >20% with negative bias and no other associated calibration infractions. ICV and/or CCV %Ds for 2-hexanone and

carbon disulfide were > 20% but < 40% with positive bias. All associated results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks with the following exceptions.

Chloroform, dibromochloromethane, bromoform, and bromodichloromethane were detected in the FB and EB. The associated sample results were ND and will not be qualified.

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.

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

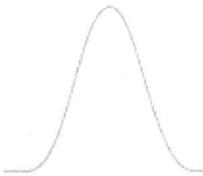
Three TBs, one EB, one FB, and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/09/13



Sample Findings Summary



AR/COC: 614568, 614569, 614570, 614571

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093347-035/OBS-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093347-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093347-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	093344-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	093344-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	093347-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093347-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093349-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093349-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	093350-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093350-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	093352-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	093352-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093344-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	093344-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093344-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093344-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093347-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	093347-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093347-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093347-033/OBS-EB1	Potassium-40 (13966-00-2)	R, Z2
	093349-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093349-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093349-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093349-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093350-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093350-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093350-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093350-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093352-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	093352-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	093352-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	093352-033/OBS-MW3	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	093344-009/OBS-MW2	Copper (7440-50-8)	NJ-, B4
	093344-017/OBS-MW2	Magnesium (7439-95-4)	J, D1
	093347-009/OBS-EB1	Chromium (7440-47-3)	0.013U, B
	093347-009/OBS-EB1	Copper (7440-50-8)	NJ-, B4
	093349-009/OBS-MW1	Copper (7440-50-8)	0.0064U, B4,B2
	093349-017/OBS-MW1	Magnesium (7439-95-4)	J, D1
	093350-009/OBS-MW1	Chromium (7440-47-3)	0.013U, B
	093350-009/OBS-MW1	Copper (7440-50-8)	0.0064U, B4,B2
	093350-017/OBS-MW1	Magnesium (7439-95-4)	J, D1
	093352-009/OBS-MW3	Chromium (7440-47-3)	0.013U, B
	093352-009/OBS-MW3	Copper (7440-50-8)	NJ-, B4
	093352-017/OBS-MW3	Magnesium (7439-95-4)	J, D1
SW846 3510C/8270D			
	093344-002/OBS-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093344-002/OBS-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	093347-002/OBS-EB1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093347-002/OBS-EB1	Hexachloroethane (67-72-1)	UJ, MS5
	093349-002/OBS-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093349-002/OBS-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	093350-002/OBS-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093350-002/OBS-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	093352-002/OBS-MW3	Hexachlorobutadiene (87-68-3)	UJ, MS5
	093352-002/OBS-MW3	Hexachloroethane (67-72-1)	UJ, MS5
SW846 3535/8321A Modified			
	093344-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093344-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093344-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093347-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093347-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093347-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093349-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093349-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093349-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093350-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093350-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093350-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093352-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	093352-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	093352-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	093344-009/OBS-MW2	Mercury (7439-97-6)	UJ, B4
	093347-009/OBS-EB1	Mercury (7439-97-6)	UJ, B4
	093349-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	093350-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	093352-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093344-001/OBS-MW2	Acetone (67-64-1)	UJ, MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093345-001/OBS-TB1	Acetone (67-64-1)	UJ, MS3
	093346-001/OBS-FB1	Acetone (67-64-1)	UJ, MS3
	093347-001/OBS-EB1	Acetone (67-64-1)	UJ, MS3
	093348-001/OBS-TB2	Acetone (67-64-1)	UJ, MS3
	093349-001/OBS-MW1	Acetone (67-64-1)	UJ, MS3
	093350-001/OBS-MW1	Acetone (67-64-1)	UJ, MS3
	093351-001/OBS-TB3	Acetone (67-64-1)	UJ, MS3
	093352-001/OBS-MW3	Acetone (67-64-1)	UJ, MS3
	093353-001/OBS-TB4	Acetone (67-64-1)	UJ, MS3
SW846 9056			
	093347-016/OBS-EB1	Chloride (16887-00-6)	J+, I5

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

Memorandum

Date: March 7, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826
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

Five samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 9012A (perchlorate by IC), EPA 353.2 (nitrate/nitrite), SM2320B (total alkalinity), EPA 7196A (hexavalent chromium), and EPA 9012A (total cyanide). Data were reported for all required analytes. A problem was identified with the data package that resulted in the qualification of data.

Anions:

The ICAL intercept for chloride was > MDL. The associated result for sample 318826-020 was a detect <3X the intercept value and will be **qualified J+,I5**.

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

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

Anions:

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

Blanks

No target analytes were detected in the blanks except as follows.

Anions:

Chloride was detected in the EB associated with samples -034 and -047. All associated sample results were >5X the EB concentration and will not be qualified.

Alkalinity:

Total and bicarbonate alkalinity were reported in the EB. Alkalinity is not evaluated for blank contamination; no sample data were qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/nitrite and Perchlorate:

The MS/PS 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 and Perchlorate:

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:

Samples -005, -034, -047, and -061 were diluted 10X for chloride and sulfate.

Nitrate/nitrite:

Samples -006, -035, -048, and -062 were diluted 5X.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13

Memorandum

Date: March 7, 2013
To: File
From: Marcia Hilchey
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826
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

Five 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 resulted in the qualification of data.

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene, p-nitrotoluene were <0.05 but ≥ 0.01 . The associated sample results were NDs 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 samples were extracted and analyzed within the prescribed holding times 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)

The MS/MSD analyses met 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 and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13

Memorandum

Date: March 7, 2013
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826 and 318828
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

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

CVAA:

1. Hg was reported in the ICB and CCBs at negative values with absolute values > MDL and < PQL. All associated sample results were ND and will be **qualified UJ,B4**.

ICP-MS:

1. Cu was reported in the CCBs at negative values with absolute values > MDL and < PQL. All associated sample results were detects < 5X the MDL and will be **qualified NJ-,B4**.
2. Cr was detected in the MB. The associated results for samples 318826-018, -045, and -059 were detects < 5X the MB concentration and will be qualified **0.013U,B** at 5X the MB value.
3. Cu was reported in the EB associated with samples 318826-032 and -045 at > MDL. All associated sample results were detects < 5X the EB concentration and will be **qualified 0.0064U,B2** at 5X the EB value.
4. The serial dilution %D associated with SDG 318828 was >10% for Mg and the parent sample result was > 50X MDL. The associated results for samples -001, -003, -004, and -005 were detects and 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

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 with the following exceptions.

ICP-MS:

The CRI %Rs for Al and As were > 130%. All associated sample results were ND and will not be qualified.

Blanks

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

ICP-MS:

Cr was detected in the MB. Ca was detected in the EB associated with samples 318826-032 and -045. Na was detected in the EB associated with samples 318826-003 and -004. All associated sample results were ND or > 5X the associated blank concentration and will not be qualified.

Cr was detected in the MB. The associated result for the EB was U qualified and therefore was not applied to associated field sample results.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as follows.

ICP-MS:

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

Laboratory Replicate

All replicates met QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:

All samples except 318826-018 and 318828-002 were diluted 5X for Ca.

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 except as noted above in the Summary section and as follows.

The serial dilution %D associated with SDG 318828 was >10% for Mg and the parent sample result was > 50X MDL. The associated result for sample 318828-002 was ND and will not be qualified.

Other QC

Two EBs and two field duplicate pairs were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13

Memorandum

Date: March 8, 2013
To: File
From: Marcia Hilchey
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826
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

Five samples were prepared and analyzed with approved procedures using methods HASL 300 (iso-U), EPA 901.1 (gamma spec – short list) and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

All Analyses:

1. All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5X and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. Associated ND sample results will be **qualified UJ,MS1**; associated detected results will be **qualified J,MS1**.

Gamma Spec:

1. The K-40 results for samples 318826-026 and -067 were “X” flagged by the laboratory due to peak not meeting identification criteria; these results will be **qualified R,Z2**.

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

All 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

Tracer/carrier recoveries met all QC acceptance criteria.

Matrix Spike (MS)

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

Gross alpha/beta:

The MS/MSD analyses were performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Gross alpha/beta:

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 recoveries met QC acceptance criteria.

Detection Limits/Dilutions

No samples were diluted. All required detection limits were met.

Other QC

One EB and one field duplicate pair for each analysis were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13

Memorandum

Date: March 7, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826
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

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

1. The MS/MSD RPDs for hexachloroethane and hexachlorobutadiene were > 20%. All 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 samples were 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 %RSD was >15% and the CCV %D was >20% with positive bias for 2-methyl-4,6-dinitrophenol. The ICV %D was >20% with positive bias for several target compounds. The ICV %D

was > 20% with negative bias and no other calibration infractions occurred for hexachlorocyclopentadiene. All 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 exceptions. The LCS %Rs for 1,4-dioxane and hexachlorocyclopentadiene were < LAL. However this is within the allowable number of LCS infractions, therefore the associated sample results were not qualified.

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13

Memorandum

Date: March 7, 2013
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614568, -569, -570, -571
SDG: 318826
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

Ten 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 MSD %R for acetone was <LAL. The associated sample results were ND and will be **qualified UJ,MS3**.

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

ICV %Ds for 2-hexanone and carbon disulfide were > 20% with positive bias. The CCV %D for acetone was >20% and < 40% with negative bias, and no other associated calibration infraction occurred. All associated results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks with the following exceptions.

Chloroform, dibromochloromethane, bromoform, and bromodichloromethane were detected in the FB and EB. All associated sample results were ND and will not be qualified.

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. It should be noted that trichlorotrifluoromethane was not included in the MS/MSD spiking 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

Four TBs, one EB, one FB, and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 03/08/13