

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



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

JUL 3 1 2013

NMED Hezerdous Waste Bureau

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

and

Owner and Co-Operator

Signature: **Daniel Pellegrino** U.S. Department of Energy National Nuclear Security Administration Sandia Site Office

July 11, 2013 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

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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:

<u>SECTION I</u> :	Environmental Restoration Operations Consolidated Quarterly Report, January – March 2013
<u>SECTION II</u> :	Perchlorate Screening Quarterly Groundwater Monitoring Report, January – March 2013
<u>SECTION III</u> :	Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, January – March 2013
<u>SECTION IV</u> :	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
ER Quarterly Report ET Cover	evapotranspirative cover
	-
ET Cover	evapotranspirative cover
ET Cover FB	evapotranspirative cover field blank
ET Cover FB FOP	evapotranspirative cover field blank Field Operating Procedure
ET Cover FB FOP GEL	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC
ET Cover FB FOP GEL HE	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC high explosive(s)
ET Cover FB FOP GEL HE HQ	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC high explosive(s) hazard quotient
ET Cover FB FOP GEL HE HQ LTMMP	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC high explosive(s) hazard quotient Long-Term Monitoring and Maintenance Plan
ET Cover FB FOP GEL HE HQ LTMMP LTS	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC high explosive(s) hazard quotient Long-Term Monitoring and Maintenance Plan Long-Term Stewardship
ET Cover FB FOP GEL HE HQ LTMMP LTS MCL	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC high explosive(s) hazard quotient Long-Term Monitoring and Maintenance Plan Long-Term Stewardship maximum contaminant level
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ET Cover FB FOP GEL HE HQ LTMMP LTS MCL MDA MDL	evapotranspirative cover field blank Field Operating Procedure GEL Laboratories LLC high explosive(s) hazard quotient Long-Term Monitoring and Maintenance Plan Long-Term Stewardship maximum contaminant level minimum detectable activity method detection limit
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NPDES	National Pollution Discharge Elimination System
NPN	nitrate plus nitrite
NTU	nephelometric turbidity units
OBS	Old Burn Site
ORP	oxidation-reduction potential
РАН	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
ТА	Technical Area
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
the Order	the Compliance Order on Consent
VOC	volatile organic compound

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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
 - 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).

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Tables

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

Solid Waste Management Units		
Site Number	Site Description	
4	LWDS Surface Impoundments (TA-V)	
5	LWDS Drainfield	
8	Open Dump (CCBA)	
28-2	Mine Shafts	
46	Old Acid Waste Line Outfall	
49	Building 9820 Drains (Lurance Canyon)	
52	LWDS Holding Tank	
58	ССВА	
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

Coyote Canyon Blast Area.
Coyote Test Field.
Liquid Waste Disposal System.
Mixed Waste Landfill.
Technical Area. CCBA CTF LWDS MWL ΤA TAG

= Tijeras Arroyo Groundwater.

Table I-2Site-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-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.

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APPENDICES

Appendix A. Analytical Laboratory Certificates of Analysis for the Perchlorate Data

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

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 (μ 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 μ g/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 μ g/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 μ g/L, DOE/Sandia will evaluate the nature and extent of perchlorate contamination, based on a screening level/MDL of 4 μ g/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 μ g/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**

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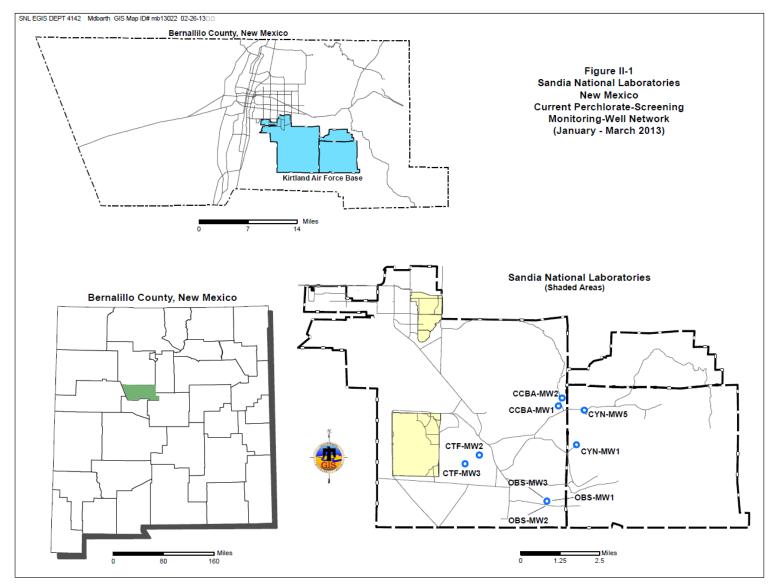


Figure II-1 Sandia National Laboratories, New Mexico Current Perchlorate-Screening Monitoring Well Network, January – March 2013

Tables

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 [℃]	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 [℃]	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.

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.

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

Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of First Quarter, CY 2013

NA7 . 11	Sample	AR/COC	Sample	Result ^a	MDL ^b	PQL ^c	MCLa	Laboratory	Validation	Analytical	•
Well	Date	Number	Number	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Qualifier ^e	Qualifier ^f	Method ⁹	Comments
	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	
	10-Jan-12	013930	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	
CBA-MW1	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jui-12		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	
	10-Jan-13	014307	093342-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	04 Nev 44	040005	091349-020	ND	4.0	12	NE	U		EPA 314.0	
	01-Nov-11	613885	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	
	04 4 40	04.44.57	092296-020	ND	4.0	12	NE	U		EPA 314.0	
CBA-MW2	24-Apr-12	614157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jul-12	614286	092610-020	ND	4.0	12	NE	U		EPA 314.0	••••
	00.0.1.40	011100	093018-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Oct-12	614468	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	
	07-Mar-11	613444	090227-020	ND	4.0	12	NE	U		EPA 314.0	
		040004	091700-020	ND	4.0	12	NE	U		EPA 314.0	
TF-MW1	01-Feb-12	613981	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	
		040440	090237-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Mar-11	613448	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	
	00.11 10	044055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
TF-MW2	30-Mar-12	614055	091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Dec-12	614541	093251-020	ND	4.0	12	NE	Ŭ		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	AR/COC	Sample	Result	MDL⁵	PQL ^c	MCL ^a	Laboratory	Validation	Analytical	Comments
	Date	Number	Number	(µg/L)	(μg/L)	(µg/L)	(µg/L)	Qualifier	Qualifier ^f	Method ⁹	Comments
	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	
CTF-MW3	26-Mar-12	614053	091943-020	ND	4.0	12	NE	U		EPA 314.0	
	20-10101-12		091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Jun-12	614254	092536-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	22-Mar-13	614661	093717-020	ND	4.0	12	NE	U		EPA 314.0	
	22-11/181-13	014001	093718-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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	
CYN-MW5	10 14-11	010110	090232-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Mar-11	613446	090232-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-Jan-12	613979	091692-020	ND	4.0	12	NE	U		EPA 314.0	•
	04 lan 40	044570	093356-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Jan-13	614573	093357-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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	
	40.4	04.400.4	092022-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW1	18-Apr-12	614081	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
OB2-INIMI	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Oct-12	614462	093003-020	ND	4.0	12	NE	U		EPA 314.0	
			093349-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-13	614570	093350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	· · ·
	40.1.40	040054	091604-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
OBS-MW2	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
003-101 002	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
			093007-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093008-020	ND	4.0	12	NE	Ű		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 theCurrent Monitoring-Well Network as of First Quarter, CY 2013

Well ID	Sample Date	AR/COC Number	Sample Number	Result (μg/L)	MDL [⊳] (µg/L)	PQL ^c (µg/L)	MCL ^α (μg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical Method ^g	Comments
	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
	24-001-11	013002	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	
OBS-MW3	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
003-111743	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	014292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	

Notes

^aResult

- **Bold** = Result exceeds the $4 \mu g/L$ screening level for perchlorate
- ND = Not detected (at MDL)
- μg/L = Micrograms per liter

[▶]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.

°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 the indicated method under routine laboratory operating conditions.

₫MCL

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 theCurrent Monitoring-Well Network as of First Quarter, CY 2013

Notes (continued)

^gAnalytical Method

EPA 314.0: EPA, November 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014 (EPA November 1999).

EPA 6850M: U.S. Environmental Protection Agency, April 2005, "Perchlorate in Water, Soils, and Solids Using High Performance Liquid Chromatography/Electrospray Ionization/Mass Spectrometry (HPLC/ESI/MS)," draft, Method 6850 (EPA April 2005).

AR/COC = Analysis Request and Chain of Custody.

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

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)	рН	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				SMO Use								AR/COC 61	4567
Project Name		SWMU 8/58 GWM	Date Samples		11161			SMO A	uthorization:	On	da		Waste Characterization	100.
		Clinton Lum	Carrier/Waybi	II No.	1507			SMO C	ontact Phone	: See B	the one	lan		
1		98026.01.12	Lab Contact		Edie Kent/8	303.556.8	171	12.12	Lorraine H	lererra/505	-844-3199		Released by COC No.	
Service Order	r:	CF262-13	Lab Destinatio		GEL			Send R	eport to SMC					4º Celsit
Tech Area:			Contract No.:		PO 691436				Lorraine H	lererra/505	-844-3199	i	Bill to: Sandia National Laboratories (Acc	
Building:		Room:	Operational	Sita									P.O. Box 5800, MS-0154	and year
- enemg,	1		operational	Depth	Date/1	Time	Comple	0		-			Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Locati	on Detail	(ft)			Sample Matrix	Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab
093341	-001 1	CCBA MW1		79	1/16/13	9:26	GW	G	3x40mĺ	HCL	G	SA	TCL VOC (SW846-8260B)	Sample 3/853
093341	-002 1	CCBA MW1		79	1/16/13	9:29V	GW	AG	4x1L	0.000			a second of the second s	3185
093341	-009 /	0.87.57		-	1.00.000					None	G	SA	TCL SVOC (SW846-8270C)	016
		CCBA MW1		79	1/16/13	9;30	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470	
093341	-016	CCBA MW1		79	1/16/13	9;31 1	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	3185
093341	-017 r	CCBA MW1		79	1/16/13	9:32	FGW	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)	31860
093341	-018 1	CCBA MW1		79	1/16/13	9;33	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	3185
093341	-020 🖍	CCBA MW1		79	1/16/13	9:34 /	GW	Ρ	250 ml	None	G	SA	Perchlorate (314.0)	3/853
093341	-022 1	CCBA MW1		79	1/16/13	9:35	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	31853
093341	-024 -	CCBA MW1		79	1/16/13	9:38	GW	AG	4x1L	None	G		HE (SW846-8321A)	3185
093341	-027 1	CCBA MW1		79	1/16/13	9:39	GW	Р	250 ml	NaOH	G	SA		31853
.ast Chain:		Yes		Sample	Tracking		SMO		Special Ins		-		Total Cyanide (SW846-9012)	023
/alidation F	Req'd:	⊻ Yes		Date Ent	ered:				EDD		☑ Yes			ditions on Receipt
Background		Yes		Entered I	by:				Turnaroun	d Time	7 Day		15 Day* 30 Day	receipt
Confirmato	ry:	└─ Yes		QC inits.				213	Negotiated	TAT				
Sample			gnature	Init.		/Organizat		e/Cell	Sample Dis	sposal	Return	to Client	Disposal by Lab	
	Robert Ly	AA	man		SNL/4142/84				Return Sar	nples By:			2100000101 200	
	Alfred Sa	a li for	fille		SNL/4142/84				Comments	• I	Send report to	Tim Jackson/	/4142/MS 0729/284-2547	
	William J	Gibson Willia	affelt	WA	SNL/4142/84	4-4013/23	9-7367							
			111	0 .					FGW(Filtered)Alkalinity(tota	in field w/40 r	nicron filter)A	nions (Br Cl.	F,SO4)Metals(Ca,Mg,K,Na	
D. F	. 1	10 00 100			. 1. 1				detected,perfo	orm verificatio	on analysis us	ing SW846-6	850M	ab Use
		InSatell	- Org. 4142		1/16/13			3.Relinc	uished by			Org.	Date Time	
1. Received by	· · A	hugenpart	Org. 4142		1/16/13			3. Rece				Org.	Date Time	
2.Relinguished	a by 1/0	neclassed	Org. 4/47	Date	1/16/13	Time /	100	A Poline	uished by			Org.	Date Time	

Date 1-17-13 Time 7:55 4. Received by

Org.

Date

Time

2. Received by Org. *Prior confirmation with SMO required for 7 and 15 day TAT

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Project Nam ech Area:	e:	SWMU 8/58 GWM	Project/	Task Manag	jer:	Clinton Lur	n		Project/Ta	sk No.:	98026.01.1	2		4567
Building:		Room:	-											100
Sample No.	Fraction	Sample Location	Detail	Depth Detail (ft)		Date/Time ↓ Collected		Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample II
093341				79	1/16/13 9:40	9:40	GW	P	1L -	HNO3	G	SA	Gamma Spec (short list)(901.0)	3185 0 24
093341	-034	CCBA MW1		79	1/16/13	9:42	GW	Р	1L	HNO3	G	SA	Gross Alpha/Beta (900.0)	3185
093341	-035 -	CCBA MW1		79	1/16/13	9:44 🛩	GW	Р	1 L	HNO3	G	SA	Isotopic U (HASL-300)	3185
093342 ~	-001 -	CCBA MW1		79	1/16/13	9:26	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	026
093342	-002	CCBA MW1		79	1/16/13	9:29	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	3185
093342	-009	CCBA MW1		79	1/16/13	9:30-	GW	Р	500 ml	HNO3	G	DU		3/85
093342	-016 1	CCBA MW1		79	1/16/13	9:31	GW	Р	125 ml	None	G	DU	TAL Metals + U (SW846-6020/7470)	3185
093342*	-017	CCBA MW1		79	1/16/13	9:32	FGW	Р	250 ml	HNO3	G		Anions (SW846-9056) Metals (SW846-6020)	3186
093342	-018	CCBA MW1		79	1/16/13	9:33-	GW	Р	125 ml	H2SO4	G		NPN (353.2)	3186
093342	-020 🖌	CCBA MW1		79	1/16/13	9:34 🖌	GW	Р	250 ml	None	G	1.040 500		3185
093342	-022 1	CCBA MW1		79	1/16/13	9:35	GW	Р	500 ml	None	G	-	Perchlorate (314.0)	3185
093342 -		CCBA MW1		79	1/16/13	9:38	GW	AG	4x1L	None	G		Alkalinity (SM2320B)	03
093342	027 2	CCBA MW1		79	1/16/13	9:39 /	GW	P	250 ml	NaOH	G	DU	HE (SW846-8321A)	3185
093342	-033 -	CCBA MW1		79	1/16/13	9:40	GW	P	1L	HNO3	G		Total Cyanide (SW846-9012)	3185
093342	-034 ۲	CCBA MW1		79	1/16/13	9:42	GW	P	1L	HNO3	G	DU	Gamma Spec (short list)(901.0)	030
093342	-035 -	CCBA MW1		79	1/16/13	9:44 -	GW	P	1L	HNO3		DU	Gross Alpha/Beta (900.0)	3185
093343	-001 /	ССВА ТВЗ 🗸		N/A	1/16/13	9:26	DIW	P	3x40ml	HCL	G	100 million	Isotopic U (HASL-300)	3185 03 3185
								·	UNTUIN	HOL	G	TB	TCL VOC (SW846-8260B)	239

Page 2 of 2

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

Certificate of Analysis

Report Date: February 11, 2013

	Company : Address : Contact: Project:	MS 15) Alt Ms	ndia National Lab 5-0756, Org. 0676 5 Eubank SE 5 Eubank SE 9-04 9-04 9-04 9-04 9-04 9-04 9-04 9-04	55, Bldg. 823/Rm Mexico 87123 sant	4276						
	Client Sample ID:	093	341-020			Proje	ct:	SNLSG	Water		_
	Sample ID:	318	530020			Clien	t ID:	SNLS0	04		
	Matrix:	AQ	UEOUS								
	Collect Date:	16-	JAN-13 09:34								
	Receive Date:	17	IAN-13			Clien	t Desc.	CCBA	MWI		
	Collector:	Clie	ent				Recv.:				
Parameter	Qualif	ier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chroma	itography							, may be	Dure	Time Duten	Mictilou
	Perchlorate by IC "A	s Re	ceived"								
Perchlorate		U	ND	0.004	0.012	mg/L	1	MARI 01	/31/13	1505 1277269	1
The follow	ing Analytical Metho	ods w	vere performed:							1200 1211207	
Method	Descrip	otion				Ana	lyst Co	mments			
1	EPA 314	.0 DC	E-AL								

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

Certificate of Analysis

Report Date: February 11, 2013

	Company : Address : Contact: Project:	MS 151 Alt Ms	idia National Lab 5-0756, Org. 0676 5 Eubank SE 5 Eubank New M 9 Pamela M. Puiss 5 Sundwater, Level	5, Bldg. 823/Rm. Aexico 87123 ant	4276						
	Client Sample ID:	093	342-020			Proje	ct:	SNLSG	Water		
	Sample ID:	318	530032			Clien	t ID:	SNLS00	04		
	Matrix:	AQ	UEOUS								
	Collect Date:	16-	JAN-13 09:34								
	Receive Date:	17-	JAN-13			Clien	t Desc.:	CCBA I	MW1		
	Collector:	Clie	ent			Vol. I	Recv.:				
Parameter	Quali	fier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chroma	atography										
EPA 314.0	Perchlorate by IC "A	As Re	ceived"								
Perchlorate		U	ND	0.004	0.012	mg/L	1	MARI 01	/31/13	1524 1277269	Ē
The follow	ing Analytical Meth	ods v	vere performed:								
Method	Descri	ption				Ana	lyst Co	mments		-	
1	EPA 31	4.0 DC	DE-AL								

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Project Nan	ne:	SWMU 8/58 GWM	Date Samples	01-1	SMO Use					0	1 .		AR/COC		e_1_of_
project/Tas	K Manager	Clinton Lum	Carrier/Waybill					SMO A	Authorization:	Om	Jata				4565
roject/Tasl	Number:	98026.01.12	Lab Contact:	NO.	15070		1.1.5	SMO	Contact Phon	e: cee	Rotte	The second	Waste Characterization	1	
Service Ord	er:	CF262-13	Lab Destination		Edie Kent	/803.556.8	3171	-	Lorraine	Hererra/50	5-844-3199	-			
1.			Contract No.:	1.	GEL			Send F	Report to SM	0:			Released by COC No.	-	1
ech Area:			Contract NO		PO 69143	6			Lorraine I	Hererra/50	5-844-3199		Bill to: Condin the	2	4º Celsiu
Building:	1.0	Room:	Operational							1.000			Bill to: Sandia National Laborato	ories (Acco	ounts Payable
1000			Operational	_					Constant in the				P.O. Box 5800, MS-0154		
Sample No.	Fraction	Sample Location	Detail	Depth	Date/	C. Services	Sample	C	ontainer	Preserv-	Collection	Sample	Albuquerque, NM 87185-0154		31853
002220	004/	1.000 000000000000000000000000000000000	Detail	(ft)	Colle	ected	Matrix	Type	Volume	ative	Method	Type	i incuro	d	Lab
093336	-001	CCBA MW2		117	1/15/13	9:15	GW	G	3x40ml	1101		1.0	Requested		Sample I
093336	-002	CCBA MW2		117	1/15/13	9:17	- 2.5	100	1	HCL	G	SA	TCL VOC (SW846-8260E	37850 3)	318350
093336	-009	CCBA MW2				9.17	GW	AG	4x1L'	None	G	SA	TCL SVOC (SW846-8270		318350
000000	12 2 3 7 1			117	1/15/13	9:18	GW	P	500 ml	HNO3	G	SA			318350
093336	-016	CCBA MW2		117	1/15/13	9:19 -	GW	P	125 ml				TAL Metals + U (SW846-602	20/7470)	003
093336	-017	CCBA MW2		117	1/15/10				125 m	None	G	SA	Anions (SW846-9056)		318350
093336	-018 /	CCBA MW2		1000	1/15/13	9:21	FGW	Р	250 mF	HNO3	G	SA	Metals (SW846-6020)		318619
Contraction of the		173		117	1/15/13	9:22	GW	Р	125 ml	H2SO4	G	1	/		318350
093336	-020 🖌	CCBA MW2		117	1/15/13	9:23	GW	Р	1	and the second second		1.1.1.	NPN (353.2)		005
093336	-022	CCBA MW2		117	1/15/10	1	Contract	1	250 ml	None	G	SA	Perchlorate (314.0)		318350
093336	-024	CCBA MW2			1/15/13	9:24	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		318350
		CCBA MIVZ		117	1/15/13	9:26	GW	AG	4x1L /	None	G			-	007
093336		CCBA MW2		117	1/15/13	9:27 -	GW		1	18.000			HE (SW846-8321A)		008
ast Chain:		Yes			racking	5.21		P	250 ml	NaOH	G	SA	Total Cyanide (SW846-90	12)	318350
alidation F	Req'd:	⊻ Yes		te Ente			SMO	Use	Special Inst	tructions/0	C Require	ments:			009
ackground		Yes		tered b				_	EDD		✓ Yes		No		tions on
onfirmato	ry:	Yes		inits ::	y.				Turnaround		7 Day		15 Day* 30 Day	Re	ceipt
Sample	Na	me Ausignat		nit.	0			- 12	Negotiated '	TAT					
Team	Robert Lyr	ich 14 nd			Company/	Organizatio	n/Phone	/Cell	Sample Dis	posal		to Client	1210		
	Alfred San	Allen Alara	P	-	NL/4142/84	4-4013/250	-7090		Return Sam	ples By:		o onent	Disposal by Lab		
	William J.	- ALGENC IN	tille +	ZA S	NL/4142/84	4-5130/228-	-0710		Comments:		and const to T	al abrac stat			1.1
t	rundin J.	Sisson Minanen fa	eldt w	K S	NL/4142/844	4-4013/239-	-7367			-			142/MS 0729/284-2547		
- H		/`	/ /				2.22		FGW (Filtere	ed in field v	v/40 micron	filter), An	ions (Br Cl,F,SO4), Metals		
Polinguish	A	10			1.1.1.1.1	1000									
Relinquished		fel S. till	Org.4142	Date /	1/15/12	Time 10	100 3		ished by	form verific	ation analy	sis using	SW846-6850M	Lab	Use
Received by	600	Kudagent	Org. 41421	Date	intin	Time 10						Org.	Date	Time	000
Relinquished	by V		Org. 41421					Receiv				Org.	Date	Time	
Received by		Tren	Ora		-16-13	Time 8			ished by			Org.	Date	Time	
ior confirm	ation with	SMO required for 7 and	15 day TAT		1015	Tune 0	5 4	Receiv	ed by			Org.	Date	Time	

Page^{SMO} 2012-ARCOC (4-2012) of 1198

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Project Nam Tech Area:	1e:	SWMU 8/58 GWM	Project/Tasl	k Manag	ger:	Clinton Lur	n		Project/Ta	sk No.:	98026.01.	12	AR/COC 6	14565
Building:	1.00	Room:												
Sample No.	Fraction	Sample Location	n Detail	Depth (ft)	Date/ Colle		Sample Matrix		ntainer		Collection	Sample	Parameter & Method	Lab use Lab
093336	-033 <	CCBA MW2		117	1/15/13	9:28	GW	Туре	Volume	ative	Method	Туре	Requested	Sample ID
093336	-034 -	CCBA MW2		117	1/15/13	9:29	GW	P P	1L (HNO3	G		Gamma Spec (short list)(901.0)	318350
093336	-035 /	CCBA MW2	1	117	1/15/13	9:31	GW	P	1L	HNO3	G		Gross Álpha/Beta (900.0)	318350
093337 1	-001 /	ССВА ТВ1 🖌		N/A	1/15/13	9:15 <	DIW	P	1L	HNO3	G	SA	Isotopic U (HASL 300)	318350
093338 -	-001 1	CCBA FB1		N/A	1/15/13	9:10 /	DIW		3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	318350 013 318350 014
						5.10	DIVV-	G	3x40ml	HCL	G	FB	TCL VÓC (SW846-8260B)	014
									-					
										Section 1		-		
							-					-		
										<u> </u>				
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				-			-	-				-		
							-							
										_				
				-										
									-					

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 11, 2013 Sandia National Laboratories Company : 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 Project: SNLSGWater Sample ID: 318530006 Client ID: SNLS004 Matrix: AQUEOUS Collect Date: 15-JAN-13 09:23 Receive Date: 16-JAN-13 Client Desc.: CCBA MW2 Collector: Client Vol. Recv.: Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch Method Ion Chromatography EPA 314.0 Perchlorate by IC "As Received" Perchlorate Ū ND 0.004 0.012 mg/L 1 MAR1 01/31/13 1408 1277269 t The following Analytical Methods were performed:

Method Description I EPA 314.0 DOE-AL

Analyst Comments

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Project Nam	e:	SWMU 49/1	16 GWM	10-11-0	SMO Use					~	1		AR/COC	61	14574
		Mike Skelly	10 0000	Date Samples Shipp Carrier/Waybill No.		8/13			uthorization:	Done	ter	und	Waste Characterization		14014
Project/Task			1.01	Lab Contact:	200	13/	1474	SMO C	ontact Phone		e Batt	only			
Service Orde	er;	CF 249-13		Lab Destination:	GEL	003.000.0	5171	0.10	Lorraine	Hererra/50	5-8443199		Released by COC No.		
				Contract No .:	PO 13038	373		Send R	eport to SMC			1		4	4º Cels
Tech Area:								L	Lorraine	Hererra/50	5-8443199		Bill to: Sandia National Laborator	ies (Acc	ounts Paya
Building:		Room:		Operational Site:									P.O. Box 5800, MS-0154		
	1.00			Dept		/Time	Sample	0	ontainer	1.			Albuquerque, NM 87185-0154		
Sample No.	Fraction	Sampl	e Location D	Detail (ft)		ected	Matrix	Туре	Volume	Preserv- ative		Sample	- monto	t	Lab
093359	-001	CTF-MW1		260	1/28/13	9:51					Method	Туре	Requested		Sample
093359	-009 -	CTF-MW1					GW	Gʻ	3x40ml	HCL	G	SA	TCL VOC (SW846-8260E)	3192
7.0	-	1.1.1. A. 1.1.1.		260	1/28/13	9:52	GW	P'	500 ml	HNO3	G	SA	TAL Metals + U (SW846-602	0/7470	
093359	-016	CTF-MW1	_	260	1/28/13	9:53	GW	P	125 ml	None	G	SA	Anions (SW846-9056)		3192
093359	-017 1	CTF-MW1		260	1/28/13	9:54	FGW	P'	500 ml	HNO3	G		/		3192
093359	-018	CTF-MW1		260	1/28/13	9:55	GW	1 i i i i		1		SA	Metals (SW846-6020)		00
093359	-020/	CTF-MW1				/		Р	125 ml	H2SO4	G	SA	NPN (353.2)		3192
093359	1			260	1/28/13	9:56	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		3192
1		CTF-MW1		260	1/28/13	9:57	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		31923
093359	-024	CTF-MW1		260	1/28/13	9:59	GW	AG	4x1L	None	G				3192
093359	-027 🖌	CTF-MW1		260	1/28/13	10:00	GW	P	1				HE (SW846-8321A)		007
093359	-033	CTF-MW1			1	2 C 8 C 7 L			250 ml	NaOH	G	SA	Total Cyanide (SW846-90	12)	3192
ast Chain:		V Yes		260	1/28/13	10:01	GW	P	1L	HNO3	G	SA	Gamma Spec (short list)(9	01 0)	3.742
alidation F	Reg'd:	Yes		Date E	e Tracking		SMO	Use	Special Inst	tructions/	QC Require	ments:			ditions on
ackground	d:	Yes		Entere	11.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				EDD		Yes		No		eceipt
onfirmato	ry:	Yes		QC init					Turnaround		7 Day		15 Day* 30 Day		coopt
Sample	Na	me	18igratu		1	10	(5)		Negotiated						
Team	Robert Ly	nch	UMA	de PL		/Organizati			Sample Dis		Return	to Client	Disposal by Lab		
	Alfred Sar		1/5	Tile at	SNL/4142/8				Return Sam						
and the second	William J.		lia la	elit was					Comments:	5	end report to T	im Jackson/4	4142/MS 0729/284-2547		
t		qua	raugy	erer un	SNL/4142/8	44-4013/239	9-7367		FGW (Filtered i	n field w/40 n	nicron filter) Ar	ione /Pr CI	E SOU MAL		
	1								Ca,Mg,K,Na)All verification anal	calinity (Total	Bicarbonate C	arbonate) If	f Perchlorate detected, perform		
Relinguished	by 17	1. Sa	tile_	Om Lillio Di	1/20/10					iyona daniy an	4040-000UM			14	hller
Received by		Ilala	1	Org. 4142 Date	1.77	Time 10		B.Relingu	ished by			Org.	Date	1.33	b Use
Relinquished	100	all		Org. 4/42 Date	1-01	10		8. Receiv				Org.	Date	Time	
Received by	- 12	FER		Org. 4/4 2 Date	1	and the second se	100 4					Org.	Date	Time	_
		h SMO require	Ja and	Org. Date	1-29-13	Time 11	: 45 4	. Receiv	ed by			Org.	Date	Time	

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2 AR/COC 614574 Project Name: SWMU 49/116 GWM Project/Task Manager: Mike Skelly Project/Task No.: 146422.10.11.01 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Preserv- Collection Sample Sample No. Fraction Parameter & Method Sample Location Detail Lab (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 093359 -034 CTF-MW1 260 319239 010 319239 011 1/28/13 10:02 GW Ρ 1L HNO3 G Gross Alpha/Beta (900.0) SA 093360 -001 SWMU TB3 N/A 1/28/13 9:51 DIW G 3x40ml HCL G TCL VOC (SW846-8260B) TB 093361 -001 1 SWMU FB1 / N/A TCL VOC (SW846-8260B) 1/28/13 9:30 DIW 319239 012 G 3x40ml HCL G FB 12 Recipient Initials

AOP 95-16

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

Certificate of Analysis

Report Date: February 20, 2013

	Company : Address : Contact: Project:	MS- 151: Albi Ms.	dia National Labo 0756, Org. 0676 5 Eubank SE 1querque, New M Pamela M. Puiss undwater, Level (5, Bldg. 823/Rm. Iexico 87123 ant	4276							
	Client Sample ID:	0933	359-020			Proje	ct:	SNLSG	Water	51		
	Sample ID:	3192	234005			Clien	t ID:	SNLS0	04			
	Matrix:	AQU	JEOUS									
	Collect Date:	28-J	AN-13 09:56									
	Receive Date:	29-J.	AN-13			Clien	t Desc.:	CTF-M	WI			
	Collector:	Clier	nt			Vol. I	Recv.:					
Parameter	Quali	fier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chroma	atography							1000				
	Perchlorate by IC "A	As Rec	ceived"									
Perchlorate		U	ND	0.004	0.012	mg/L	1	MARI 01	/31/13	1914 1	277269	i
The follow	ing Analytical Meth	ods w	ere performed:									
Method	Descri	ption				Ana	lyst Co	mments				
1	EPA 31	4.0 DO	E-AL									

Pag BMO 2012-ARCOC (4-2012)

Internal Lab

of 1785

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 2 Batch No SMO Use Project Name: AR/COC SWMU 154 GWM 614663 Date Samples Shipped: 312613 SMO Authorization: Project/Task Manager: Clinton Lum Waste Characterization Carrier/Waybill No. 202633 SMO Contact Phone: Sa Bitlent Project/Task Number: 98026.01.15 RMMA Lab Contact: Edie Kent/803-556-8171 Lorraine Herrera/505-844-3199 Service Order: CF251-13 Released by COC No. Lab Destination: GEL Send Report to SMO: 4º Celsius Contract No. PO 1303873 Rita Kavanaugh/505-284-2553 Bill to:Sandia National Laboratories (Accounts Payable), Tech Area: Building: P.O. Box 5800, MS-0154 Room: **Operational Site:** Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Preserv Collection Sample No. Sample Fraction Sample Location Detail Parameter & Method (ft) Lab Collected Matrix Type Volume ative Method Type Requested Sample ID 093723 -001 CTF-MW2 129 3/26/13 9:29 GW G 3x40ml HCL 32251 G TCL VOC (SW846-8260B) SA 093723 -002 013 CTF-MW2 -129 3/26/13 9:31/ GW AG 4x1L-32251 None G SA TCL SVOC (SW846-8270C) 093723 014 -009 CTF-MW2 129 3/26/13 9:34 GW P 500 ml HNO3 32251 G SA TAL Metals+U(SW846-6010/6020/7470) 093723 -010 015 CTF-MW2 129 3/26/13 9:35-FGW P 32252 500 ml HNO3 G SA TAL Metals+U(SW846-6010/6020/7470) DOZ 093723 -016 CTF-MW2 129 3/26/13 9:37 GW P 125 ml None G 322517 SA Anions (SW846-9056) 016 093723 -018 CTF-MW2 129 3/26/13 9:38 GW P 125 ml 327517 H2SO4 G SA NPN (353.2) 093723 -020 1 CTF-MW2 129 3/26/13 9:39 GW P 250 ml 322517 None G SA Perchlorate (314.0) 093723 018 -022 . CTF-MW2 129 3/26/13 9:40 GW P 500 ml 322517 None G SA Alkalinity (SM2320B) 093723 -024 019 CTF-MW2 129 3/26/13 9:41 GW AG 4x1L 32251 None G SA High Explosives (SW846-8321A Mod 093723 -033 CTF-MW2 020 129 3/26/13 9:44 GW P 1L HNO3 322517 G Last Chain: SA Gamma Spec. (901.0) 5 Yes Sample Tracking 021 Special Instructions/QC Requirements: SMO Use Validation Reg'd: ✓ Yes Date Entered: Conditions on EDD 1 Yes Background: No Yes Receipt Entered by: **Turnaround Time** Confirmatory: 7 Day* 15 Day* Yes 30 Dav QC inits. Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client ✓ Disposal by Lab Team Robert Lynch 121 SNL/4142/505-844-4013/505-250-7090 Return Samples By: Members Alfred Santillanes SNL/4142/505-844-5130/505-228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 William Gibson MARA SNL/4142/505-284-3307/505-239-7367 CTF-MW2 water has high buffering capacity, check pH and add perservatives as needed. If Perchlorate detected, then perform verification analysis using SW846-6850. Report Anions as Br,CI,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 Relinquished by Teleora 4142 Date 3/2c/13 Time 10:29 3. Relinquished by Lab Use Received by Org. 1-Org. 4142 Date 3/26/17 Time 10 29 Time Date Received by 3 2. Relinguished by Org. Org. 4142 Date Date 3/26/13 Time /100 Time 4.Relinguished by 2. Received by Org. Date Org. 21 Time Date 3-17-13 Time 073 4. Received by Org. Date Time

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

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Page 2 of 2

Project Nam Tech Area:		SWMU 154 GWM	Frojecu	Task Mana	ger:	Clinton Lur	n		Project/Ta	isk No.:	98	026.01.15	and the second sec	
Building:		Room:												
Sample No.	Fraction	Sample Locatio	on Detail	Depth (ft)	Date/ Colle		Sample Matrix	Co Type	ntainer Volume		Collection		Parameter & Method	Lab u Lab
093723	-034 /	CTF-MW2		129	3/26/13	9:45 /	GW	P	1L	ative HNO3	Method	Туре	Requested	Sampl 3225
093723	-035 /	CTF-MW2		129	3/26/13	9:46/	GW	P	1L		G		Gross Alpha and Beta (900.0)	02
093724'	-001 /	CTF-MW2		129	3/26/13	9:29 /	GW	G		HNO3	G		Isotopic Uranium (ASTM D3972-09M	02
093724	-002 *	CTF-MW2		129	3/26/13	9:31 -	GW	AG	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	3225
093724	-009	CTF-MW2		129	3/26/13	9:34	GW	P	4x1L	None	G	8	TCL SVOC (SW846-8270C)	3220
093724	-010 /	CTF-MW2		129	3/26/13	9:35 1	FGW	P	500 mi	HNO3	G		TAL Metals+U(SW846-6010/6020/7470)	3225
093724	-016 /	CTF-MW2		129	3/26/13	9:37 >	GW	P	500 ml	HNO3	G	And the second second	TAL Metals+U(SW846-6010/6020/7470)	322:
093724	-018	CTF-MW2		129	3/26/13	9:38 -	GW		125 ml	None	G		Anions (SW846-9056)	322
093724	-020 -	CTF-MW2		129	3/26/13	9:39 /	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	3225
093724	-022	CTF-MW2		129	3/26/13	9:40	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	3225
093724	-024	CTF-MW2		129	3/26/13	9:41		P	500 ml	None	G	DU	Alkalinity (SM2320B)	3225
093724	-033	CTF-MW2		129	3/26/13	9:44	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod.	- 00
093724	-034	CTF-MW2		129	3/26/13		GW	Р	1L	HNO3	G	DU	Gamma Spec. (901.0)	3225
093724	-035	CTF-MW2	-	129		9:45	GW	Р	1L	HNO3	G	DU	Gross Alpha and Beta (900.0)	3225
093725	COLUMN 1	CTF-TB4		NA	3/26/13	9:46	GW	Р	1L	HNO3	G	DU	Isotopic Uranium (ASTM D3972-09M)	3225
093726		CTF-FB2		NA	3/26/13	9:29	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	3225
					3/26/13	9:23	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	3220
	-		_											
	/ A	1.					-							

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Certificate of Analysis

	Company : Address : Contact: Project:	MS-07 1515 E Albuqu Ms. Pa	National Labora 56, Org. 06765, ubank SE uerque, New Me mela M. Puissan water, Level C	Bldg. 823/Rm. 4 xico 87123 t	4276			Report D	ate: April	23, 2013
	Client Sample ID:	093723	-020			Proje	ct:	SNLSGWater		
	Sample ID:	322517	018			Clien		SNLS004		
	Matrix:	AQUE	OUS					51,25001		
	Collect Date:	26-MA	R-13 09:39							
	Receive Date:	27-MA	R-13			Client	Desc	CTF-MW2		
	Collector:	Client				Vol. F				
Parameter	Qualif	ier Re	esult	DL	RL	Units	DF	Analyst Date	Time Batch	Mathad
Ion Chroma	atography					Child		Analyst Date	Time Batch	Method
EPA 314.0	Perchlorate by IC "A	s Receiv	ed"							
Perchlorate		U	ND	0.004	0.012	mg/L	1	MAR1 03/29/13	1250 1290590	4
The follow	ing Analytical Metho	ods were	performed:		1000		1	manci 03/29/13	1230 1290590	1
Method	Descrip					Ana	lvet Co	mments		
t	EPA 314	.0 DOE-AI	1			Alla	ysi CO	mments		

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Certificate of Analysis

	Company : Address : Contact: Project:	Sandia National Lab MS-0756, Org. 0676 1515 Eubank SE Albuquerque, New M Ms. Pamela M. Puiss Groundwater, Level (5, Bldg. 823/Rm. Iexico 87123 ant	4276			Report I	Date: April	23, 2013
	Client Sample ID: Sample ID: Matrix: Collect Date:	093724-020 322517029 AQUEOUS 26-MAR-13 09:39	- unitige		Proje Clien		SNLSGWater SNLS004	r	
	Receive Date: Collector:	27-MAR-13 Client				t Desc. Recv.:	: CTF-MW2		
Parameter	Qualif	ier Result	DL	RL	TT 14				
Ion Chroma	itography		DL	KL	Units	DF	Analyst Date	Time Batch	Method
EPA 314.0 Perchlorate The follows	Perchlorate by IC "A	U ND	0.004	0.012	mg/L	i	MAR1 03/29/13	1309 1290590	1
Method I	Descrip				Anal	yst Co	mments		

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

of 1191 Internal Lah

2.Relinquished by

I. Received by

2. Received by

Project Nan		SWMU 149 GWM	Date Sampl	les Shipped	SMO Use	5113	-	ISMO	A		1 0	-	AR/COC		4661
Project/Tas	k Manager	Clinton Lum	Carrier/Way		- 44	02039		SMO	Authorization:		Lat	your	Waste Characterization	-	
Service Ord	k Number:		Lab Contact		Edie Kent	/803-556-8	8171		Contact Phon		Bitle	men			
OCIVICE OID		CF250-13	Lab Destina	tion:	GEL	1.1		Send F	Report to SM	Herrera/50	5-844-3199		Released by COC No.		
Tech Area:			Contract No	d	PO 13038	73					5-284-2553			2	4º Celsiu
Building:		In					_	-	Tota Mave	anaugn/50	5-284-2553		Bill to:Sandia National Laboratorie	s (Accou	ints Pavable
bunung.	1	Room:	Operation	al Site:									P.O. Box 5800, MS-0154		
Sample No.	Fraction	Course of the	SA.	Depth	Date	Time	Sample		ontainer	In			Albuquerque, NM 87185-0154		
- 100 M	17		n Detail	(ft)	1/ Colle	cted	Matrix	Type		Preserv- ative	Collection		a diameter & method		Lab
093717	-001	CTF-MW3		359	3/22/13	10:18	GW				Method	Туре	Requested		Sample I
093717	-009 /	CTF-MW3		0.50	11-12-12-12-12-12-12-12-12-12-12-12-12-1		GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		322514
000747	1			359	3/22/13	10:19 '	GW	P	500 ml	HNO3	G	SA		1280	322514
093717	-010	CTF-MW3		359	3/22/13	10:20 /	FGW	P	500 1			OA	TAL Metals(SW846-6010/602	0/7470	002
093717	-016	CTF-MW3		250	1			P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/602	0/7470	32251
093717				359	3/22/13	10:22	GW	Ρ	125 ml	None	G	SA		en no	3225/4
093717	-018	CTF-MW3		359	3/22/13	10:23	GW	P	125 ml	10001			Anions (SW846-9056)		003
093717	-020	CTF-MW3		359	3/22/13	to the Col			1	H2SO4	G	SA	NPN (353.2)		322514
093717	-022 -	CTF-MW3			The state of the second	10:24	GW	Ρ	250 ml	None	G	SA	Perchlorate (314.0)		322514
		NANDARY & FORMAT	and the second	359	3/22/13	10:25	GW	P	500 ml	None	G	192			322514
093718	-001 1	CTF-MW3		359	3/22/13	10:18	GW	~	1.15	1.5.0.0	0	SA	Alkalinity (SM2320B)		006
093718 -	-009 -	CTF-MW3				10.10	GVV	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		322514
1			_	359	3/22/13	10:19	GW	Р	500 mi	HNO3	G	DU'			322514
093718	-010	CTF-MW3		359	3/22/13	10:20	FGW	P		1	115-1	DU	TAL Metals(SW846-6010/6020	/7470)	008
ast Chain		J Yes		Sample 1		10.20	SMO		500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020	7470)	322515
alidation I		J Yes		Date Ente			SMO	use	Special Ins	tructions/(QC Require	ments:			tions on
ackgroun		Yes		Entered b					EDD		Yes		No		ceipt
onfirmato		∐ Yes		QC inits .:					Turnaround		7 Day		15 Day* 30 Day	inc.	ceipt
Sample	Na	- Olyric		Init.	Company	Organizatio	Do/Dhone	(C-1)	Negotiated						
and the second	Danielle N		Jus 1	at s	SNL/4143/50	5-845-7706	/505 220		Sample Dis		L Return	to Client	Disposal by Lab		
	Alfred San		tille	are	NL/4142/50	5-844-5130	1505-239-		Return Sam						
1	William Gi	bson Willingh	the		SNL/4142/50	5-284.3207	1505 228-		Comments:		end report to T	im Jackson/4	4142/MS 0729/284-2547		
-						204-0307	1505-239-	/36/	Allions as Br	ULF SOA	Alkalinity	a total O.	000 110 0 1		
	1	1	_Org. 4/4			-			6850M. FGW	CICCIED. II	len perform	Vontiooti	on evel 1 i e e		

3.Relinquished by

4.Relinquished by

3. Received by

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Date

Date

Date

Date

Org. 4/4 2 Date 3/25/13 Time 6936

2/25

3/25/12

113 Time 0936

1100

Time

Time

Org. 414 2 Date

Date

Org. 4142

Org. Ger Date 3-26-13 *Prior confirmation with SMO required for 7 and 15 day TAT

Lab Use

Time

Time

Time

Time

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

4.4

AOP 95-16

Project Nam Tech Area:	ie:	SWMU 149 GWM	Project/	Task Mana	ger:	Clinton Lu			1				AR/COC	Page 2 of _
Building:		Room:	-			Chinton Edi			Project/Ta	isk No.:	98	8026.01.14	<u> </u>	
Sample No.	Fraction		n Detail	Depth (ft)		Time	Sample		ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab use
093718		CTF-MW3		359	3/22/13	10:22	Matrix GW	Туре	Volume	ative	Method	Туре	Requested	Lab Sample I
093718	-018	CTF-MW3		359	3/22/13	10:23	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	1322514
093718	-020 -	CTF-MW3		359	3/22/13	10:24	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	3225/9
		CTF-MW3		359	3/22/13	10:24	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	322519
and a second	1 - C - C - C - C - C - C - C - C - C -	CTF-TB2		NA	3/22/13	10:18	DIW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	3225/9
093720 -	-001	CTF-FB1 1		NA	3/22/13	10:09	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	322514
									3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	322514
					_									
			-									1		
								_						
	M	12												
cipient Initia	ls_//	<u>IC</u>												

GEL LABORATORIES LLC

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

Certificate of Analysis

	Company : Address : Contact: Project:	MS-0 1515 Albu Ms. I	0756, Org. 0 Eubank SE querque, Nev Pamela M. Pr	Laboratories 6765, Bldg. 8 w Mexico 87 uissant /el C Package	123	4276			Re	eport E	Pate: April	22, 2013
	Client Sample ID: Sample ID: Matrix:	0937 3225 AQU	17-020 14005 EOUS				Proje Clien		SNLSC SNLSO			
	Collect Date: Receive Date: Collector:		AR-13 10:24 AR-13	ł				t Desc.: Recv.:	CTF-M	W3		
Parameter	Qualif	ier	Result		DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chroma EPA 314.0 Perchlorate	itography Perchlorate by IC "A	s Rece U	ived" ND		0.004	0.012	mg/L				1114 1200500	

The following Analytical Methods were performed:

Method Description I EPA 314.0 DOE-AL

Analyst Comments

GEL LABORATORIES LLC

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

Certificate of Analysis

					A			Re	eport I	Date: April	22, 2013
	Company : Address : Contact: Project:				-port I	sue, April	22, 2013				
	Client Sample ID: Sample ID: Matrix:	093 322 AQ	pundwater, Level C 718-020 514011 UEOUS			Proje Clien		SNLSC SNLSO		r	
	Collect Date: Receive Date: Collector:		MAR-13 10:24 MAR-13 ent				t Desc.: Recv.:	CTF-M	W3		
Parameter	Qualif	ier	Result	DL	RL	Units	DE	Analyst	Det	TT: D . I	
Ion Chroma	atography				TE	Onto	Dr	Analyst	Date	Time Batch	Method
EPA 314.0 Perchlorate	Perchlorate by IC "A	U	ND	0.004	0.012	mg/L	1	MAR1 03	/29/13	1211 1290590	r.
Method	Descrip					Ana	lyst Co	mmante			

EPA 314.0 DOE-AL

Analyst Comments

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Project Name	A.	SWMU 49/116 GW	M Data Sam	ples Shipped:	SMO Use	113		0110.1		1	+	1	r	AR/COC	01	4573	
		10.00 CV 10						thorization:		John	Waste Characterization						
Project/Task Number: 146422.10.11.01 Lab Contact							intact Phone			RMM	A						
Service Order: CF 249-13 Lab Destina			GEL	003.000.0	5171			Hererra/50	5-8443199	Released by COC No.							
		01 245-15		and a set of the set o	PO 130387	70		Send Re	eport to SM						4	4º Celsiu	
ech Area:			Contract M	NO.:	PU 13038	13			Lorraine	Hererra/50	5-8443199			a National Laboratorie	es (Accor	unts Payabl	
Building: Room: Operation		anal Site:	nal Site:								P.O. Box 580	00, MS-0154					
Sample No. Fraction		noom.	Toperation		Date/Time Sam		Sample	-	antoines D				Albuquerque, NM 87185-0154				
		Sample Locat	ion Detail	Depth Detail (ft)		v Collected		Container Type Volume		Preserv-	Collection		Pa		Lab		
		All shows the second second			GI		Matrix		volume	ative	Method	Туре		Requested	all i	Sample	
093356	-001	CYN-MW5	155	1/24/13	10:22	GW	G	3x40ml	HCL	G	SA	TCL VOC	(SW846-8260B)	if all a	318319		
093356	-009	CYN-MW5		155	1/24/13	10:23	TGW	Р	500 ml	HNO3	G	SA	TAL Metals	+ U (SW846-6020	(7470)	31406	
093356	-016	CYN-MW5		155	1/24/13	10:24	GW	Р	125 ml	None	G	SA	Anions (S		31906		
093356	-017	CYN-MW5		155	1/24/13	10:26	FGW	Р	500 ml	HNO3	G	SA	Metals (S		3190		
093356	-018 /	CYN-MW5		155	1/24/13	10:27	GW	Р	125 ml	H2SO4	G	SA	NPN (353			31906	
093356	-020	CYN-MW5		155	1/24/13	10:28	GW	Р	250 ml	None	G	SA	Perchlora	Station and Station		31900	
093356	-022 1	CYN-MW5		155	1/24/13	10;29	GW	Ρ	500 ml	None	G	SA	Alkalinity (SM2320B)			31900	
093356	-024	CYN-MW5		155	1/24/13	10:31	GW	AG	4x1L	None	G	SA	HE (SW8		31900		
093356	-027 1	CYN-MW5		155	1/24/13	10:32	GW	Р	250 ml	NaOH	G	SA	Total Cya	12)	31906		
093356		CYN-MW5		155	1/24/13	10:33	GW	Р	11	HNO3	G	SA	Gamma S		31900		
ast Chain:		Yes		Sample	Tracking		SMO	Use	Special In:	structions	QC Requir	rements:				litions on	
alidation F		Yes		Date Entered:					EDD Yes								
ackground	and the second se	Yes		Entered I	Entered by:			the second se			7 Da	Y*	15 Day*	2 30 Day		eceipt	
onfirmato	ry:	L Yes		QC inits.					Negotiated	TAT							
Sample Name Signature		Init. Company/Organization/Phone/Cell					Sample Di	sposal	Return	n to Client	nt Disposal by Lab						
Team						Return Samples By:											
lembers	Alfred Sa	ntillanes Hulle	Satilla	- COL SNL/4142/844-5130/228-0710					Comments	5:	Send report to	Tim Jackson	1/4142/MS 0729	284-2547			
	William J	Gibson Mille	W2X	4/7-X SNL/4142/844-4013/239-7367					d in field w/40			CI,F,SO4) Metal					
		1	1 /	1 V					(Ca, Mg, K, Na)	Alkalinity (Tot	al Bicarbonate	(Carbonate)	If Perchlorate	detected,perform			
	/	1	0	122243	1.000				verification ar	alysis using s	SW846-6850M					b Use	
Relinquished by Alfal Schilly Org. 414					2 Date 1/04/13 Time 11:10 3.Reli					nquished by Org				La Date Time			
Received b	y D	millegal	- Org. 4/4		1/24/13	Time /		3. Recei				Org.		Date	Time		
Relinquishe	d by D.	nultan	- Org. 4/	72 Date	1/24/13	Time /			uished by			Org.		Date	Time		
Received b	v	VII. LE	-Org. Ge	1_ Date	1-25-13	Time		4. Recei				Org.		Date	Time		

Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Page 2 of 2 AR/COC 614573 Project Name: SWMU 49/116 GWM Project/Task Manager: Mike Skelly Project/Task No.: 146422.10.11.01 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Preserv Collection Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 093356 -034 CYN-MW5 155 1/24/13 10:34 (GW P 1L HNO3 G SA Gross Alpha/Beta (900.0) 093357 -001 ' CYN-MW5 155 1/24/13 10:22 GW G 3x40ml HCL G DU TCL VOC (SW846-8260B) 093357 -009 CYN-MW5 155 1/24/13 10:23 GW P 500 ml HNO3 G DU TAL Metals + U (SW846-6020/7470) 093357 -016 CYN-MW5 155 1/24/13 10:24 P GW 125 ml None G DU Anions (SW846-9056) 093357 -017 CYN-MW5 155 1/24/13 10:26 FGW P 250 ml HNO3 G DU Metals (SW846-6020) 093357 -018 CYN-MW5 155 1/24/13 10:27 P GW 125 ml H2SO4 G DU NPN (353.2) 093357 -020-CYN-MW5 155 1/24/13 10:28 GW P 250 ml None G DU Perchlorate (314.0) 093357 -022 1 CYN-MW5 155 1/24/13 10;29 GW P 500 ml None G Alkalinity (SM2320M) DU 093357 -024 CYN-MW5 155 1/24/13 10:31 GW AG 4x1 L None G DU HE (SW846-8321A mod.) 093357 -027 (CYN-MW5 155 1/24/13 10:32 GW P 250 ml NaOH G DU Total Cyanide (SW846-9012) -033 093357 CYN-MW5 155 1/24/13 10:33 P 11' GW HNO3 G DU Gamma Spec (short list)(901.0) 1/24/13 74 093357 -034 CYN-MW5 155 10:34 GW P 1L HNO3 G Gross Alpha/Beta (900.0) DU 1/24/00 74 093358 -001 SWMU-TB2 N/A 10:22 DIW G 3x40ml HCL G TCL VOC (SW846-8260B) TB **Recipient Initials**

Page 8 of 901

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 18, 2013

	Company : Address : Contact: Project:	Sandia National Laboratories MS-0756, Org. 06765, Bldg. 823/Rm. 4276 1515 Eubank SE Albuquerque, New Mexico 87123 Ms. Pamela M. Puissant Groundwater, Level C Package														
	Client Sample ID: Sample ID: Matrix:	09335 31906 AQUE	4005 OUS					Project: Client ID:		LSC LS0	iWatei 04	r				
I	Collect Date: Receive Date: Collector:	24-JA1 25-JA1 Client	√-13 10:28 √-13				Client Desc Vol. Recv.:		CYN-MW5							
Parameter	Qualif	ier F	esult		DL	RL	Un	its DI	F Anal	yst	Date	Tim	e Batch	Method		
Perchlorate	atography Perchlorate by IC "A ing Analytical Metho	U	ND		004	0.012	mg/	L	I MAR	.1 01	/31/13	1817	1277269	1		
Method	Descrip	otion	1		_			Analyst C	ommer	nts						

EPA 314.0 DOE-AL

GEL LABORATORIES LLC

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

Certificate of Analysis

Sandia National Laboratories

Report Date: February 18, 2013

	Address : Contact: Project:	15 Alt Ms	S-0756, Org. 06765, I 15 Eubank SE 50uquerque, New Mex . Pamela M. Puissant 50undwater, Level C P	ico 87123	4276					
	Client Sample ID: Sample ID: Matrix: Collect Date:	319 AQ	357-020 064015 UEOUS JAN-13 10:28			Proje Clien		SNLSGWater SNLS004	r	
	Receive Date: Collector:		JAN-13				t Desc.: Recv.:	CYN-MW5		
Parameter	Qualif	ĩer	Result	DL	RL	Units	DF	Analyst Date	T: D + 1	Xr. 1. 1
Ion Chroma	tography					Olins		Analyst Date	Time Batch	Method
Perchlorate	Perchlorate by IC "A	U	ND	0.004	0.012	mg/L		MAR1 01/31/13	1836 1277269	
The follow	ing Analytical Metho	ods w	vere performed:						1030 1277209	<i>k</i> .
Method	Descrip EPA 314		E AY			Ana	lyst Co	mments		-

1 EPA 314.0 DOE-AL

Company :

· Page MO 2012-ARCOC (4-2012) /

Internal Lab

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Project Nam	ie:	SWMU 68 GWM	Date Samples Shipped	SMO Use	1 2		1		-0			AR/COC	614570
		Clinton Lum	Carrier/Waybill No.		113			uthorization:		Jely	L	Waste Characterization	
		98026 01.13	Lab Contact:	1509			SMO C	Contact Phon	e: See	Bottle	2 den		
Service Ord		CF 263-13	The second se	Edie Kent/	803.556.8	3171		Lorraine	Herrera/50	5-844-3199		Released by COC No.	
		01 200 10	Lab Destination:	GEL		-	Send F	Report to SM					⊡4º Celsiu
Tech Area:			Contract No.:	PO 13038	73			Rita Kava	anaugh/50	5.284.2553		Bill to: Sandia National Laboratorie	
Building:		Room:	1 Aller and a state of the									P.O. Box 5800, MS-0154	s (Accounts Payab
sunding.	1	Room	Operational Site:										
Sample No.	Fraction	Sample Location De	etail (ft)	Date/ Colle	1. C. S.	Sample Matrix	C	ontainer Volume	Preserv- ative	Collection Method	Sample		Lab
093349	-001	OBS-MW1	153	1/22/13	9:34	GW	G	3x40ml	HCL	1	Туре	Requested	Sample 37882
093349	-002	OBS-MW1	153	1/22/13	9:36	GW	AG	1		G	SA	TCL VOC (SW846-8260B)	030
093349	-009 /	OBS-MW1	153	1/22/13	9:37 /	GW	P	4x1L	None	G	SA	TCL SVOC (SW846-82700	
093349	-014 1	OBS-MW1	153	1/22/13	100.00			500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020	
093349	-016 V	OBS-MW1	153	100000	9:38 /	GW	Р	250 ml [•]	None	G	SA	Hexavalent Chromium (SW84	3188 6-7196A) 033
093349		OBS-MW1		1/22/13	9:39 /	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	31882
093349	Los and	OBS-MW1	153	1/22/13	9:40	FGW	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)	31882
093349		OBS-MW1	153	1/22/13	9:41	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	3/882
093349	-020	Second and the second	153	1/22/13	9:42 1	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	31882
/	1 /	OBS-MW1	153	1/22/13	9:43	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	3/882
093349 ast Chain		OBS-MW1	153	1/22/13	9:46	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	31882
alidation	Rea'd:	Yes	Sample			SMO	Use	Special Ins	structions/	QC Require	ements:		Conditions on
ackgroun		L Yes	Date Ente					EDD		V Yes		No	
onfirmato		U Yes	Entered t			-		Turnaroun	d Time	7 Day		15 Day* 30 Day	Receipt
Sample		The second se	QC inits.:					Negotiated	TAT			How Day	
Team	Robert Ly			Company.	/Organizati	ion/Phone	e/Cell	Sample Dis	_	Return	to Client	110:000	
		- PAL	- H	SNL/4142/84	4-4013/25	0-7090		Return San		riotan	to olient	⊡ Disposal by Lab	
lembers	Alfred Sar		in at	SNL/4142/84	4-5130/22	8-0710		Comments		Condesses			
	William J.	Gibson Wellen Re	la as	SNL/4142/84	4-4013/23	9-7367				Send report to	Im Jackson/	4142/MS 0729/284-2547	
			1 01					FGW (Filtered i	in field w/40 n	icron filter\An	ione (Pr Cl I	F,SO4) Metals (Ca,Mg,K,Na)	
	1	21						Fundaminty (1019)	Dicarbonate	Carbonatol			
Relinquishe	d by Al	pul Sytale_	Org. 4/14 2 Date	ilantis	7 Time 1	A: 20 1	Deline	If perchlorate d	letected,perfo	rm verification	analysis us	sing SW846-6850M)	Lab Use
Received b	y Joh		Org. 4 14 2 Date	1/22/13	Time /			uished by			Org.	Date	Time
Relinquishe	d by De		Org. 4142 Date	1122113			3. Recei				Org.	Date	Time
Received b	y 7							uished by			Org.	Date	Time
rior confir	nation wit	h SMO required for 7 and 15	Use Date	-13-13	Time C	730	4. Recei	ved by			Org.	Date	Time

AOP 95-16

Page MO 2012-ARCOC (4-2012)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Fech Area:		SWMU 68 GWM	Project/Tas	sk Mana	iger:	Clinton L	um		Project/Ta	ask No.:	98026 01.	13	AR/COC 6	14570
Building;	-	Room:												
Sample No	. Fractio	on Sample Locatio	n Detail	Depth (ft)		/Time ected	Sample		ontainer	and the second se	Collection	Sample	Parameter & Method	Lab us
093349	-027 1	OBS-MW1		153	1/22/13	9:47	Matrix GW	Туре	Volume	ative	Method	Туре	Requested	Lab Sample
093349	-033 /	OBS-MW1		153	1/22/13	9:48	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	31882
093349	-034	OBS-MW1		153	1/22/13	9:50	GW	P	1L	HNO3	G	SA	Gamma Spec (short list)(901.0)	3188
093349	-035	OBS-MW1		153	1/22/13	9:52	GW		1L	HNO3	G	SA	Gross Alpha/Beta (900.0)	31880
093350	-001	OBS-MW1		153	1/22/13	9:34	GW	P	1L	HNO3	G	SA	Isotopic Uranium (HASL 300)	31880
093350	-002 -	OBS-MW1		153	1/22/13	9:36	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	3185
093350 -	-009 -	OBS-MW1		153	1/22/13	9:37 -	GW	AG	4x1L	None	G		TCL SVOC (SW846-8270C)	3188
093350	-014	OBS-MW1		153	1/22/13	9:38	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	3188
093350	-016	OBS-MW1		153	1/22/13	9:39	GW	P	250 ml	None	G		Hexavalent Chromium (SW846-7196/	
093350	-017 -	OBS-MW1		153	1/22/13	9:40	FGW	P	125 ml	None	G		Anions (SW846-9056)	3188
093350	-018 -	OBS-MW1		153	1/22/13	9:41	GW	P	250 ml	HNO3	G	DU	Metals (SW846-6020) ~	3188
93350 -	-020	OBS-MW1		153	1/22/13	9:42	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	2188
093350	-022 1	OBS-MW1		153	1/22/13	9:43	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	31852
	-024 ~	OBS-MW1		153	1/22/13	9:46	GW		500 mľ	None	G	DU	Alkalinity (SM2320B)	31832
	-027 /	OBS-MW1		153	1/22/13	9:47	GW	AG	4x1L	None	G	DU H	HE (SW846-8321A)	31882 050 31882 051
	-033 1	OBS-MW1		153	1/22/13	9:48	GW	P	250 ml	NaOH	G	DU T	otal Cyanide (SW846-9012)	31882
	034 1	OBS-MW1			1/22/13	9:50	GW	P	1L	HNO3	G			3/882
	035 -	OBS-MW1			1/22/13	9:52	GW	P	1L	HNO3	G			31882
93351 -	001 1	OBS-TB3			1/22/13	9:34 -	DIW	P	T. T. P. 1911	HNO3	G	and the second		21852
						5.57	DIVV	G	3x40ml	HCL	G			318820
ipient Initia	. MI	1/		-										0-20

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 22, 2013

	Company : Address : Contact: Project:	MS 151 Alb Ms,	dia National Laborat -0756, Org. 06765, F 5 Eubank SE uquerque, New Mex Pamela M. Puissant undwater, Level C P	3ldg. 823/Rm. 4 ico 87123	276					
	Client Sample ID:	093	349-020			Proje	ct:	SNLSGWater		
	Sample ID:	318	826036			Clien	t ID:	SNLS004		
	Matrix:	AQ	UEOUS							
	Collect Date:	22-3	AN-13 09:42							
	Receive Date:	23-J	AN-13			Client	Desc.:	OBS-MW1		
	Collector:	Clie	nt			Vol. I	Recv.:			
Parameter	Quali	ier	Result	DL	RL	Units	DF	Analyst Date	Time Batch	Method
Ion Chroma	atography									
EPA 314.0	Perchlorate by IC "A	s Re	ceived"							
Perchlorate		U	ND	0.004	0.012	mg/L	1	MAR1 01/31/13	1719 1277269	i i
The follow	ing Analytical Meth	ods w	vere performed:							
Method	Descri	otion				Ana	lyst Co	mments		_
1	EPA 31	4.0 DC	E-AL							

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 22, 2013

	Company : Address : Contact: Project:	MS 151 Alb Ms.	dia National Lab -0756, Org. 0676 5 Eubank SE uquerque, New I Pamela M. Puis undwater, Level	55, Bldg. 823, Mexico 8712 sant		4276						
	Client Sample ID:	093	350-020				Proje	ct:	SNLSC	Water	5	
	Sample ID:	318	826049				Clien	t ID:	SNLS0	04		
	Matrix:	AQ	UEOUS									
	Collect Date:	22	IAN-13 09:42									
	Receive Date:	23-3	AN-13				Clien	t Desc.:	OBS-M	W1		
	Collector:	Clie	nt				Vol. I	Recv.:				
Parameter	Quali	ĩer	Result		DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chroma	atography											
EPA 314.0	Perchlorate by IC "A	s Re	ceived"									
Perchlorate		U	ND	0.	004	0.012	mg/L	1	MAR1 01	/31/13	1738 1277269	L
The follow	ing Analytical Meth	ods w	ere performed:									
Method	Descri	otion					Ana	lyst Co	mments			
1	EPA 31	1.0 DC	E-AL									

NA

Internal Lab

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. Page 1 of 2 SMO Use Project Name: SWMU 68 GWM AR/COC 614568 Date Samples Shipped: 1/21/13 SMO Authorization: Project/Task Manager: Clinton Lum te Waste Characterization Carrier/Waybill No. 200126 SMO Contact Phone: Project/Task Number: Ser Bottleon 98026 01 13 Lab Contact: RMMA Edie Kent/803.556.8171 e Lorraine Herrera/505-844-3199 Service Order: CF 263-13 Lab Destination: Released by COC No. GEL Send Report to SMO: PO 1303873 Contract No .: 4º Celsius Lorraine Herrera/505-844-3199 Tech Area: Bill to: Sandia National Laboratories (Accounts Payable) Building: Room: P.O. Box 5800, MS-0154 **Operational Site:** Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Sample No. Preserv-Fraction Sample Location Detail Collection Sample (ft) Parameter & Method Collected Matrix Lab Type Volume ative Method Type 093344 -001 Requested OBS-MW2 Sample ID 252 1/21/13 9:30 GW G 3x40ml 318826 HCL G SA TCL VOC (SW846-8260B) 093344 -002 OBS-MW2 252 1/21/13 9:32 GW AG 4x1L None G 318826 TCL SVOC (SW846-8270C) SA 093344 009 **OBS-MW2** 252 1/21/13 9:33 GW P 500 ml HNO3 G TAL Metals + U (SW846-6020/7470) SA 318826 093344 014 / **OBS-MW2** 003 252 1/21/13 9:34 * GW P 250 ml None G 318820 SA Hexavalent Chromium (SW846-7196 093344 -016 **OBS-MW2** 004 252 1/21/13 9:35 GW P 125 ml 318826 None G SA Anions (SW846-9056) 093344 017 OBS-MW2 005 252 1/21/13 9:36 FGW P 250 ml HNO3 G 318828 SA Metals (SW846-6020) 093344 018 OBS-MW2 252 001 1/21/13 9:37 GW P 318826 125 ml H2SO4 G SA NPN (353.2) 093344 020 OBS-MW2 252 1/21/13 9:38* GW P 250 ml 318826 None G SA Perchlorate (314.0) 093344 -022 OBS-MW2 009 252 1/21/13 9:39 GW P 500 ml None G 318826 SA Alkalinify (SM2320B) 093344 -024 OBS-MW2 008 252 1/21/13 9:41 GW AG 4x1L HE (SW846-8321A) 318536 Last Chain: None G Yes SA Sample Tracking SMO Use Special Instructions/QC Requirements: Validation Reg'd: V Yes Conditions on Date Entered: EDD V Yes Background: Yes No Entered by: Receipt **Turnaround Time** Confirmatory: 7 Day* 1 Yes 15 Day* - 30 Day QC inits. Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Team Return to Client Alfred Santillanes Disposal by Lab CA SNL/4142/844-4013/250-7090 Return Samples By: Members William J. Gibson SNL/4142/844-5130/228-0710 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 Relinquished by mille Org. 3/14 2 Date 1/21 2 Time Lab Use 11:29 3.Relinguished by . Received by Org Org. 4142 Date / Date 121/12 Time Time 1129 Received by 2.Relinguished by Org.4/42 Org. Date Date 1/2///2 Time 1200 Time 4. Relinguished by 2. Received by Org. -Date 1-12-13 Org. Cer Date Time Time *Prior confirmation with SMO required for 7 and 15 day TAT 4. Received by Org. Date Time

AOP 95-16

P g G GMO 2012-ARCOC (4-2012)

of 1289

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2 AR/COC 614568 Project Name: SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: Tech Area: 98026 01.13 **Building:** Room: Depth Date/Time Lab use Sample Container Sample No. Collection Fraction Preserv-Sample Sample Location Detail Parameter & Method (ft) Lab Collected Matrix Type Volume ative Method Type 093344 Requested -027 OBS-MW2 Sample ID 252 1/21/13 9:42 GW P 250 ml 318826 NaOH G SA Total Cyanide (SW846-9012) 093344 -033 OBS-MW2 252 1/21/13 9:43 GW P 1L HNO3 G Gamma Spec (short list)(901.0) SA 093344 -034 OBS-MW2 252 1/21/13 9:44 GW P 1L HNO3 G 318826 SA Gross Alpha/Beta (900.0) 093344 -035 OBS-MW2 012 318826 013 252 1/21/13 9:46 GW P 1 L HNO3 Isotopic Uranium (HASL 300) G SA 0933451 -001/ OBS-TB1 N/A 1/21/13 9:30 DIW G 3x40ml HCL G 318526 TB VOC (SW846-8260B) 093346 -001/ OBS-FB1 014 N/A 1/21/13 9:12 DIW G 3x40ml HCL G 318826 VOC (SW846-8260B) FB 015

AOP 95-16

En

12/13

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 22, 2013

	0	a data a data data data data data data					Re	port D	ate: Februar	22, 2013
	Company : Address :	Sandia National La	iboratories 765, Bldg. 823/Rm. 4	1376						
	riddross .	1515 Eubank SE	703, Blug. 823/Km. 4	+270						
		Albuquerque, New	Mexico 87123							
	Contact:	Ms. Pamela M. Pui								
	Project:	Groundwater, Leve	I C Package							
	Client Sample ID:	093344-020			Projec	t:	SNLSC	Water		
	Sample ID:	318826007			Client		SNLS0			
	Matrix:	AQUEOUS			6,081,9210	071	511200	01		
	Collect Date:	21-JAN-13 09:38								
	Receive Date:	22-JAN-13			Client	Desc .	OBS-M	W2		
	Collector:	Client			Vol. R		005-10	VV 2		
Parameter	Qualif	ier Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chroma	tography		DL	KL	Units	DF	Analyst	Date	Time Batch	Met
EPA 314.0 . Perchlorate	Perchlorate by IC "A	s Received"	0.004	0.012	max/T					

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 I EPA 314.0 DOE-AL

Analyst Comments

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Project Nam	e:	SWMU 6	8 GWM	Date Samples Ship		SMO Use	110		lave		- 1			AR/COC	614571
Project/Task	Manager			Carrier/Waybill No.		15102			SMO A	uthorization:	Inc	Jote	m	Waste Characterization	
Project/Task				Lab Contact:		die Kent/		174	SMOC	ontact Phone	e: See	Bitten	A		
Service Orde	er:	CF 263-1	3	Lab Destination:		BEL	100.000.0	217.1	Cardo			5-844-3199		Released by COC No.	
		1000		Contract No.:	-	0 130387	12		Send F	Report to SMO				1.20.2	Cels
Tech Area:						- 100001	<u> </u>			Lorraine	Herrera/50	5-844-3199		Bill to: Sandia National Laboratorie	es (Accounts Paya
Building:		Room:		Operational Site	T				,	1				P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sar	nple Location D	Dep Detail (ft)	10 C 1	Date/1 Collec		Sample Matrix	C Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type		Lab
093352	-001	OBS-MW	3	208	8	1/23/13	9:38	GW	G	3x40ml	HCL				Sample
093352	-002	OBS-MW	3	208		1/23/13	9:40	GW	AG	4x1L	None	G	SA SA	TCL VOC (SW846-8260B)	3/88
093352	-009	OBS-MW	3	208	2	1/23/13	9:41	0.44		1.			SA	TCL SVOC (SW846-82700	3/55
093352	-014	OBS-MW					1	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020	17470) 3755
093352	-016	OBS-MW		208	-	1/23/13	9:42	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW84	
093352	1			208		1/23/13	9:43*	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	3188
093352	-017	OBS-MW		208		1/23/13	9:44	FGW	Ρ	250 ml	HNO3	G	SA	Metals (SW846-6020)	3185
		OBS-MW:	3	208	3 1	1/23/13	9:45 /	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	3/852
093352	-020	OBS-MW:		208	3 1	1/23/13	9:46 1	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	3188
093352		OBS-MW:		208	3 1	1/23/13	9:48	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	3188.
093352		OBS-MW	3	208		/23/13	9:50 -	GW	AG	4x1L	None	G	1.	HE (SW846-8321A Mod)	3188
ast Chain:		J Yes		Samp	le Tra	acking		SMO	Use	Special Ins	and the second			112 (30040-032 TA MOD)	06
alidation I		⊻ Yes		Date I	Entere	ed:				EDD	0.030422	Yes		No	Conditions on
ackgroun		Yes	-	Entere	ed by:					Turnaround	d Time	7 Day		15 Day* 30 Day	Receipt
onfirmato		Yes		QC ini	its.:					Negotiated	TAT			10 bay 10 bay	
Sample		ame	Signatu	ure Init.		Company/			e/Cell	Sample Dis		Return	to Client	Disposal by Lab	
	William J.		Muni	Sull Jak		L/4142/84				Return San			to onem		
	Robert Ly		Kottyka		-	IL/4142/84			5.55	Comments		Send report to T	im Jackson/	4142/MS 0729/284-2547	
	Alfred Sa	ntillanes	Hos onthe	the a	SIN	L/4142/84	4-5130/228	8-0710						and the second	
			V			A				FGW(Filtered in	field w/40 m	icron filter) Ani	ons (Br,Cl,I	F,SO4)Metals (Ca,Mg,K,Na)	
Relinquished	A	100	+ 11-			1.22				If perchlorate d	Dicarbonate.c	arbonate)		sing SW846-6850M	
Received b	- 10 4		tille	Org. 4142 Dat	te /	123/1:	Time /	0:20	3.Reling	uished by			Org.		Lab Use
	V 71		april	Org 4/42 Dat	te /	123/13	Time /	020	3. Recei	ved by			Org.	Date	Time
Relinquished		spafe	april	Org. 4142 Dat	te /	1/23/13	Time /			uished by			Org.	Date	Time
Received by		la 1=	uired for 7 and	Org. Ger Dal	te 1-	-24-13	Time d		4. Recei				Org.	Date Date	Time

AOP 95-16

P 00 00 2012-ARCOC (4-2012) 5

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614571 Project Name: SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.13 Tech Area: **Building:** Room: Lab use Depth Date/Time Sample Container Preserv- Collection Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 093352 -0271 OBS-MW3 208 318526 1/23/13 9:51 GW P 250 ml NaOH G Total Cyanide (SW846-9012) SA 093352 -033 -OBS-MW3 318526 208 1/23/13 9:52/ GW P 1L HNO3 G SA Gamma Spec (short list)(901.0) 093352 -034 / OBS-MW3 208 1/23/13 9:53 GW P 1L HNO3 G SA Gross Alpha/Beta (900.0) 093352 -035 OBS-MW3 208 1/23/13 GW P 9:55 -11 HNO3 G Isotopic Uranium (HASL 300) 318826 SA 093353 -001 OBS-TB4 · NA 1/23/13 9:38 318526 DIW G 3x40ml HCL G TB VOC (SW846-8260B) Recipient Initials MK

Page 2 of 2

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: February 22, 2013

	Company : Address : Contact: Project:	MS 151 Alb Ms.	dia National La -0756, Org. 067 5 Eubank SE uquerque, New Pamela M. Puis undwater, Leve	65, Bldg. 823/Rr Mexico 87123 ssant	n. 4276							
	Client Sample ID:	093	352-020				Proje	ct:	SNLSO	GWater	·	
	Sample ID:	318	826063				Clien	t ID:	SNLSC	004		
	Matrix:	AQI	UEOUS									
	Collect Date:	23-J	AN-13 09:46									
	Receive Date:	24-J	AN-13				Client	t Desc.:	OBS-N	TW3		
	Collector:	Clie	nt					Recv.:				
Parameter	Qualit	ier	Result	DL	RL		Units	DF	Analyst	Date	Time Batch	Method
Ion Chroma	atography										Thire Butch	method
EPA 314.0	Perchlorate by IC "A	s Red	ceived"									
Perchlorate		U	ND	0.004	0.0	12	mg/L	I	MAR1 0	1/31/13	1757 1277269	1
The follow	ing Analytical Meth	ods w	ere performed:									
Method	Descri	otion	1				Ana	lyst Co	mments			
1	EPA 314	.0 DO	E-AL					10000	initionito			

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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Anions:</u> 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





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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 Modifi	ed		
	093336-024/CCBA MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	093336-024/CCBA MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	093336-024/CCBA MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	093339-024/CCBA EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	093339-024/CCBA EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	093339-024/CCBA EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	093341-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093341-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093341-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	093342-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093342-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093342-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, 14
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-, 15
	093339-016/CCBA EB1	Sulfate (14808-79-8)	UJ, 15

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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Alkalinity:</u>

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.

<u>Anions:</u> Samples -005, -034, -047, and -061were diluted 10X for chloride and sulfate.

<u>Nitrate/nitrite:</u> 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 D	merski Level I	Date: 03/08/13





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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	с		
	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

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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 Modifi	ed		
	093344-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	093344-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	093344-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	093347-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	093347-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	093347-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	093349-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093349-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093349-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	093350-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093350-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093350-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	093352-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	093352-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	093352-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
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.



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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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Nitrate/nitrite:</u> 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 D	ymerski	Level I	Date: 03/22/13





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

AR/COC: 614572, 614573

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 Modifi	ed		
	093354-024/SWMU-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	093354-024/SWMU-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	093354-024/SWMU-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	093356-024/CYN-MW5	m-Nitrotoluene (99-08-1)	UJ, 14
	093356-024/CYN-MW5	o-Nitrotoluene (88-72-2)	UJ, 14
	093356-024/CYN-MW5	p-Nitrotoluene (99-99-0)	UJ, 14
	093357-024/CYN-MW5	m-Nitrotoluene (99-08-1)	UJ, 14
	093357-024/CYN-MW5	o-Nitrotoluene (88-72-2)	UJ, 14
	093357-024/CYN-MW5	p-Nitrotoluene (99-99-0)	UJ, 14
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.



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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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Anions:</u> The sample was diluted 10X for chloride and sulfate.

<u>Nitrate/nitrite:</u> The sample was diluted 10X.

Other QC

No other specific issues that affect data quality were identified.

Kevieweu by: Wiolica Dyneiski Level I Date: 05/07/13	Reviewed by: Monica Dyme	rski Level I	Date: 03/07/13
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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.



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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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Nitrate/nitrite:</u> The samples were diluted 10X.

<u>Anions:</u> 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/





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, СКЗ
	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, 15,B4
	093717-010/CTF-MW3	Mercury (7439-97-6)	UJ, 15,B4
	093718-009/CTF-MW3	Mercury (7439-97-6)	UJ, 15,B4
	093718-010/CTF-MW3	Mercury (7439-97-6)	UJ, 15,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.



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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.

<u>Nitrate/nitrite:</u> The samples were diluted 5X.

<u>Anions:</u> 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 b	y: Marcia Hilchev	Level I	Date: 05/20/13





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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	с		
	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

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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

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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

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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

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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

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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 Modifi	ed		
	093721-024/CTF-EB2	m-Nitrotoluene (99-08-1)	UJ, 14

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093721-024/CTF-EB2	p-Nitrotoluene (99-99-0)	UJ, 14
	093721-024/CTF-EB2	Tetryl (479-45-8)	UJ, MS5
	093723-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	093723-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	093723-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	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, 14
	093724-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	093724-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	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, 13,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+, 15

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

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Appendix C. Data Validation Sample Findings Summary Sheets for Monitoring Well CTF-MW3 and CTF-MW2 Groundwater Data This page intentionally left blank.

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^{TM} Model 6920 water quality meter. Turbidity was measured with a HACHTM 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 (μ g/L) and 0.352 μ 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 μ 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 μ g/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 μ g/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 on 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 $58.6 \pm 7.61 \text{ pCi/L}$, uranium-235/236 at $0.629 \pm 0.266 \text{ pCi/L}$, and uranium-238 at $8.24 \pm 1.29 \text{ pCi/L}$. 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 Variances and Nonconformances

No variances 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**

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DOE, see U.S. Department of Energy.

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Figures

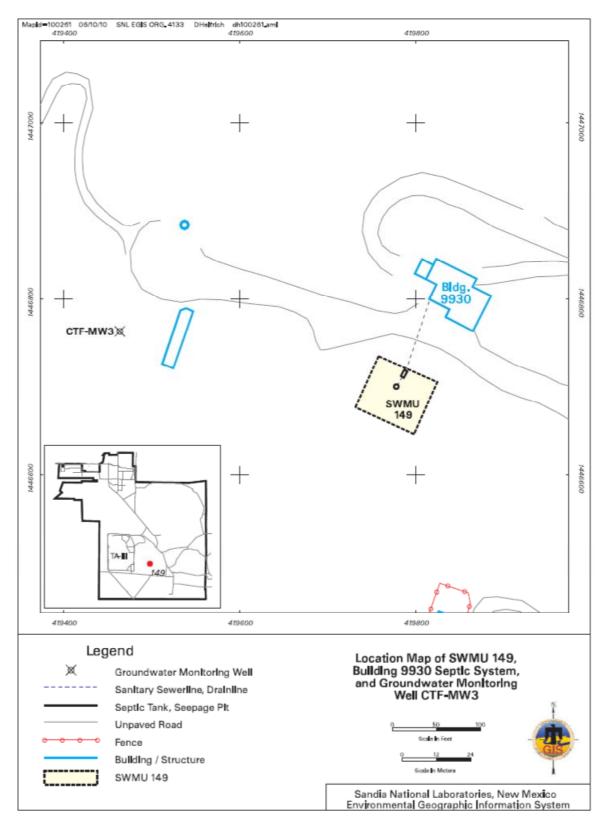


Figure III-1 Location of Monitoring Well CTF-MW3 near SWMU 149

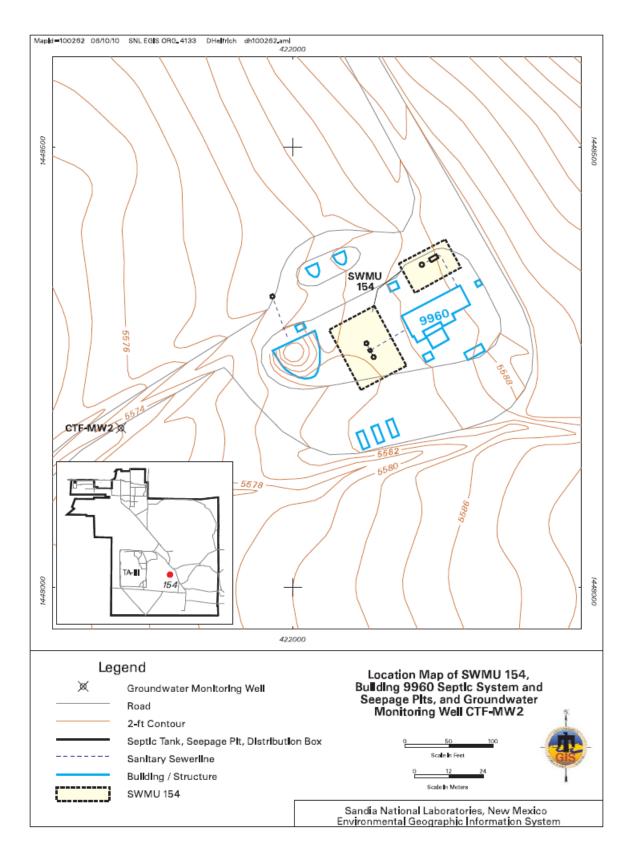


Figure III-2 Location of Monitoring Well CTF-MW2 near SWMU 154

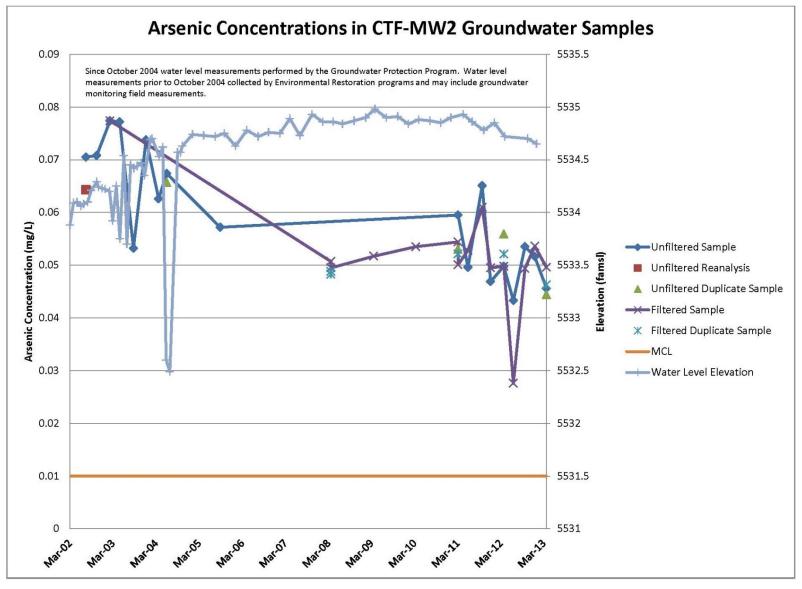


Figure III-3

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

Tables

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.
- H_2SO_4 = Sulfuric acid.
- HCI = Hydrochloric acid.
- HNO_3 = Nitric acid.
- L = Liter.
- mL = Milliliter(s).
- SM = Standard Method.
- SWMU = Solid Waste Management Unit.
- TAL = Target Analyte List.

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

Well	Date	Sample	AR/COC	Associated Groundwater
Weil	Sampled	Identification	Number	Investigation
CTF-MW3	22-Mar-13	093717	614661	SWMU 149
CTF-MW3 (Duplicate)	22-1VIAI-13	093718	614661	300100 149
CTF-MW2	26-Mar-13	093723	614663	SWMU 154
CTF-MW2 (Duplicate)	20-10181-13	093724	614663	3001010154

Notes

Analysis Request/Chain of Custody.
Coyote Test Field.
Calendar Year. AR/COC

CTF

CY

MW

= Monitoring well. = Solid Waste Management Unit. SWMU

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)	рН	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.
- μ mhos/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.

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	Bromodichloromethane	0.540	0.300	1.00	NE	J	1.0U	093717-001	EPA-8260B
22-Mar-13	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)	Bromodichloromethane	0.520	0.300	1.00	NE	J	1.0U	093718-001	EPA-8260B
22-Mar-13	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

^aLaboratory Qualifier

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

^bValidation Qualifier

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

- J+ = 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.

^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.

- μ g/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.

Method Detection Limits for Volatile Organic Compounds (EPA Method 8260)

SWMU 149 Groundwater Monitoring

Quarterly Assessment, January – March 2013

Analuta	MDL ^b	Analuta	MDL⁵
Analyte	(µg/L)	Analyte	(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-	1.50	Tetrachloroethene	0.300
Trichloro-1			
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 li	ter.
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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.

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

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-Chlorobenzenamine	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

^aAnalytical 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 EPA = Micrograms per liter.
- = 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.

Method Detection Limits for High Explosive Compounds (EPA Method 8321A)

SWMU 154 Groundwater Monitoring

Quarterly Assessment, January – March 2013

Analyte	MDL (μg/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

- 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.

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

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

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

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	Bicarbonate Alkalinity	331	0.725	1.00	NE			093717-022	SM2320B
22-Mar-13	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)	Bicarbonate Alkalinity	333	0.725	1.00	NE			093718-022	SM2320B
22-Mar-13	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	Bicarbonate Alkalinity	1580	0.725	1.00	NE			093723-022	SM2320B
18-Dec-18	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)	Bicarbonate Alkalinity	1580	0.725	1.00	NE			093724-022	SM2320B
18-Dec-18	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

^aLaboratory Qualifier

U

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

^bValidation 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)

^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.

- 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.

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	ND	0.004	0.012	NE	U		093717-020	EPA 314.0
22-Mar-13	ND	0.004	0.012		0		093717-020	
CTF-MW3 (Duplicate)	ND	0.004	0.012	NE	U		093718-020	EPA 314.0
22-Mar-13	ND	0.004	0.012		0		0337 10-020	LI A 314.0
				1			1	
CTF-MW2	ND	0.004	0.012	NE	U		093723-020	EPA 314.0
26-Mar-13	ND	0.004	0.012		0		000720 020	
CTF-MW2	ND	0.004	0.012	NE	U		093724-020	EPA 314.0
26-Mar-13	ND	0.004	0.012	INC	0		033724-020	LI A 314.0

Notes

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

- CTF = Coyote Test Field.
- EPA = U.Ś. 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.

Summary of Unfiltered Total Metal Results

SWMU 149 Groundwater Monitoring

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	Aluminum	0.0159	0.015	0.050	NE	J		093717-009	EPA 6020
22-Mar-13	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	В	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

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)	Aluminum	0.0168	0.015	0.050	NE	J		093718-009	EPA 6020
22-Mar-13	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	В	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.

Summary of Filtered Total Metal Results

SWMU 149 Groundwater Monitoring

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	Aluminum	ND	0.015	0.050	NE	U		093717-010	EPA 6020
22-Mar-2013	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

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)	Aluminum	ND	0.015	0.050	NE	U		093718-010	EPA 6020
22-Mar-2013	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.

Summary of Unfiltered Total Metal Results

SWMU 154 Groundwater Monitoring

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	Aluminum	0.0957	0.015	0.050	NE		0.11U	093723-009	EPA 6020
26-Mar-2013	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	0.000067	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

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)	Aluminum	0.0932	0.015	0.050	NE		0.11U	093724-009	EPA 6020
26-Mar-2013	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.Ś. 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.

Summary of Filtered Total Metal Results

SWMU 154 Groundwater Monitoring

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	Aluminum	0.0933	0.015	0.050	NE			093723-010	EPA 6020
26-Mar-2013	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

Wall	Analyta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
CTF-MW2 (Duplicate)	Aluminum	0.0937	0.015	0.050	NE			093724-010	EPA 6020
26-Mar-2013	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.

Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results

SWMU 154 Groundwater Monitoring

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	Americium-241	6.95 ± 18.1	23.0	11.2	NE	U	BD	093723-033	EPA 901.1
26-Mar-2013	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)	Americium-241	-28 ± 21.5	27.8	13.5	NE	U	BD	093724-033	EPA 901.1
26-Mar-2013	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

Quarterly Assessment, January – March 2013

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.

^cLaboratory 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.

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

^aLaboratory Qualifier

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

^bValidation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples. J- = The associated numerical value is an estimated quantity with a suspected negative bias.

Table III-16 (Concluded)

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through March 2013

Notes (continued)

^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, 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.Ś. 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 ot	herwise 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 oth	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.

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

 \mathbf{R}_1 where: = analysis result. = duplicate analysis result. R_2

CTF = Coyote Test Field. = Milligrams per liter.

mg/L = Monitoring well. MŴ

RDX

= Hexahydro-1,3,5-trinitro-1,3,5-triazine. = Solid Waste Management Unit. SWMU

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 149	Project No.: 98026.01.14			
Well I.D.: CTF-MW3	Date: 3/22/13			
Well Condition: Good	Weather Condition: Cool Clear Breezy			
Method: Portable pump X	Dedicated pump	Pump depth: <u>359</u> '		

	Depth to Water	Time 24 hr	Vol. (Lígal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments DO mg/L
	(ft)									07 -
	307.48	0812			Star					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	313,77	0236	5	17.98	1.530	222.7	6.2D	0.90	23.4	F.87
	316.73		10	12.50	1533	222.3	6.76	1.26	<u> </u>	J.72
	319.05		15	18,84	1536	223.6	6.75	1.42	83.0	7.69
	320.84	0917	20	19.01	1535	223,8	6.74	1.10	81.8	7.50
	322,27		25	19.49	1543	224,9	6.74	J.95	23.6	7.64
	323.02		30	19.85	1549	226.8	6.72	0.73	81.0	7.37
	323.28		32	19.99	1553	225.1	6.73	0.71	80.8	7.31
			34	20.15	1555	227.0	6.73	0.71	83.2	7. 48
d.	323.44 323.52	1009	36		1556	227.7	6.73	0.27	81.2	7.29
	323.55				1557	9,966	6.72	0.70	845	7.56
		1018			Sam	ple -				\rightarrow
					,	*				
										0823
							~			
										2 purged 4.00 gal

PURGE MEASUREMENTS

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU	SNL/NM Project No.: 98026.01.14							
Calibrations done by: Alfred Sar	Date: 3/22/13							
Make & Model: YSI 6920V								
YSI 6820 Sonde (S/N) with DO,	Ec, pH, ORP, and	temperature probes	s: 08H100033			_		
YSI 650 MDS (S/N): <u>NA</u>						_		
pH Calibration								
pH Calibrated to (std): 7.00			pH sloped to (s	std): 10.00				
Reference value:	4	00	-	7.00	10	0.00		
	Value	Temp	Value	Temp	Value	Temp		
1. Time: 0640	4.01	19.8	7.00	19.8	10.00	19.8		
2. Time: 1045	4.01	22.2	7.00	22.2	10.01	22.2		
3. Time:					1.2.01			
4. Time:								
Standard lot no.:	2AG653		2AH113		2AF557			
Expiration date:	JUL-14		AUG-14	1	JUL-14			
		SC Cal	ibration					
Reference Value: 1278uS Stan				Standard Lot No.: 2AG068				
	Value	Temp	Expiration Date: JUL-14					
1. Time: 0645	1283	19.8				A STATISTICS		
2. Time: 1050	1285	22.2						
3. Time:								
4. Time:						· · · · · · · · · · · · · · · · · · ·		
		ORP Ca	alibration					
Reference Value:	200mV		Standard Lot No. 1301187					
	Value	Temp	Expiration Date: OCT-13					
1. Time: 06 50	206.4	19.8						
2. Time: 1053	200.2	22.2						
3. Time:								
4. Time:								
		DO Ca	libration					
Calibration Value: 81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg					
1. Time: 0655	0455 81.7			56				
2. Time: 1655	31.6	24	56 .60					
3. Time:				1.00				
4. Time:								

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

SNL/NM Project Name: SWM	U 149	Project No.:	Project No.: 98026.01.14					
Calibration done by: Alfred San	tillanes	Date: 3/22/13						
	TURBIDIMETER							
Make & Model: HACH 2100	P HACH 2100Q	Serial No. S	S/N 10050C002897					
Reference Value	F.LO	20	100	800				
Standard Lot No.	6161	0168	6162	0161				
1. Time 0657	0.)	20.0	101	799				
2. Time 1657	10.0	20.3	100	801				
3. Time	ĸ			-				
4. Time								

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 149	Monitoring Well ID # : _	CTF-MW3		25 29 Date: 03-22-13			
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 #: 62187					
Personnel Performing Decontamination:William GibsonWYPrint Name:Initial:Alfred SantillanesUtoPrint Name:Initial:		Personnel Performing Decontamination: William Gibson Print Name: Alfred Santillanes Print Name:					
	Condition o	of Equipment					
Pump: Good Tub	ing Bundle: Good	Water Level Indicator: Good					
	List of Decontan	nination Materials					
Distilled or Deonized (circle	e one)	Grade:	HNO ₃ Reagent				
Source: Culligan		UN #:	2031				
Lot Number: <u>03-18-13</u>		Manufacturer:	AROC				
		Lot Number:	A0305629				

Waste Generator :	William Gibson Phone:	239-7367 project le	eader: Clinton Lum
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# 614661	CoC# 614661	CoC# 614661
COC#: Sample#- Fraction	Sample # 093717, 093718	Sample # 093717, 093718	Sample # 093717, 093718
Accumulation Date	Start: ⁰³⁻²²⁻¹³ Full: ⁰³⁻²²⁻¹³	Start: 03-22-13 Full: 03-22-13	Start: 03-25-13 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:			

Groundwater Monitoring Waste Generation Log

TAILGATE SAFETY MEETING FORM							
Dept: <u>4142</u> Well Location: <u>CTF-MW3</u>	Date: <u>3/22/13</u> Time: 0807						
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: <u>Acids in sample containers, stand</u> Other:	lard solutions, Hach ACCU-VAC ampules						
Safety	Topics Presented						
■ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	 Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. 						
x Wear safety boots.	Be aware of electrical hazards						
x Use safe lifting practices. Wear leather gloves if necessary.	R Be aware of pressure hazards.						

k No eating or drinking at sampling counter. k

E Be aware of biohazards (snakes, spiders,

★ Wear communication device (cell phone,

k Avoid spilling purge / decon water.

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

Re aware of pinch points on pump cable

★ Wear nitrile or latex gloves when

▼ Wear chemical safety goggles.

	Attendees
William Gibson Printed Name	- William Signapure
ALFRED SANTILLANDS Printed Name Danielle Nielo	Alfel Satilla Da G M Nut
Printed Name	Signature

Printed Name

sampling.

Signature

etc.)

EOC pager).

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10.11	.01
Well I.D.: CTF-MW 2	Date: 03/26/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: <u>129</u>

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	(µS/cm)	(mV)		(NTU)	(%)	DOng/1
(ft) 4 3.96	0758	/	STA	R+-					9/2
46.78		5	13.87	3041	110.6	5.86	5.54	5.2	0.53
47.32		10	14.56		93.8	5.80	1.81	4.2	0.40
47.56		15	15.09		25.5	5.78	1.38	3.6	0.36
47.62		20	,	3253	72.6	5.78	1.15	3.3	0.33
47.19		25		3314	73.3	5.81	1.09	3.1	0.30
	0905	30	16.00		71.0	5.79	1.47	2.9	0.28
47.91	0912	34	16.35	3224	71.8	5.79	1.37	3.0	0.29
47.97	0915	36	16.40	3263	70.8	5.79	1.71	2.9	0-28
	0919	38	16.43	3266	71.1	5.79	1.55		6·28
	0922	40	16.44	3280	71.0	5.79	1.47	2.8	0.27
48.05	0925	42	16:49	3286	71.7	580	1.27	2.8	6. <i>2</i> 7
48.07	0928	44	1646	3284	71.3	5.80	1.41	2.7	6.26
	0929		SAM	5204 p/ing					
				0					
				9					
								-	-4.00 gols puraed
									from tubing
				40.					0806

PURGE MEASUREMENTS

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project No.: 146422.10.11.01 Date 03/26/13 Calibrations done by: R Lynch Date 03/26/13 Calibrations done by: R Lynch Date 03/26/13 Make & Model: YSI 69200V YSI 69200 K YSI 6920 K <th <="" colspan="4" th=""><th></th><th>154</th><th></th><th></th><th></th><th>0.11.01</th><th></th></th>	<th></th> <th>154</th> <th></th> <th></th> <th></th> <th>0.11.01</th> <th></th>					154				0.11.01	
Make & Model: YSI 6920V YSI 6820 Sonde (S/N) with DO, Ee, pH, ORP, and temperature probes: 08H100033 YSI 6820 Sonde (S/N) with DO, Ee, pH, ORP, and temperature probes: 08H100033 YSI 6820 Sonde (S/N) with DO, Ee, pH, ORP, and temperature probes: 08H100033 YSI 693 MDS (S/N): NA PH Calibrated to (std) 7.00 10.00 Reference value: 4.00 7.00 10.00 Temp Value Temp Standard Lot No. 120108 Value Temp Standard Lot No. 1301187	Calibrations done by: R Lynch			00/00/4							
Number of the transmission of the transmission of the transmission of the transmission of transmis				Date: 03/26/1	3						
NIA PH Calibrated to (std): 7,00 PH Soloped to (std): 7,00 Temp Value Temp Value Temp Value Temp I Time: QG SS 3.9 99 J.7.9 7.00 I Temp Value Temp I Time: QG SS 3.9 99 J.7.9 7.00 I Temp Value Temp Value Temp JII.14 AUG-14 JUL-13 Standard Lot No.: 2AG066 Standard Lot No.: 2AG066 Standard Lot No.: 2AG066 I Time: JUL-13 J Temp Standard Lot No.: 32AG06 I Time: J Temp Standard Lot No. 1301187 COUDY J Temp Standard Lot No. 1301187 Standard Lot No. 1301187 COCT-13 <th< td=""><td>Make & Model: YSI 6920V</td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Make & Model: YSI 6920V										
NIA PH Calibrated to (std): 7,00 PH Soloped to (std): 7,00 Temp Value Temp Value Temp Value Temp I Time: QG SS 3.9 99 J.7.9 7.00 I Temp Value Temp I Time: QG SS 3.9 99 J.7.9 7.00 I Temp Value Temp Value Temp JII.14 AUG-14 JUL-13 Standard Lot No.: 2AG066 Standard Lot No.: 2AG066 Standard Lot No.: 2AG066 I Time: JUL-13 J Temp Standard Lot No.: 32AG06 I Time: J Temp Standard Lot No. 1301187 COUDY J Temp Standard Lot No. 1301187 Standard Lot No. 1301187 COCT-13 <th< td=""><td>YSI 6820 Sonde (S/N) with DO.</td><td>Ec. pH. ORP. and</td><td>temperature probe</td><td>_{s:} 08H100033</td><td></td><td></td><td></td></th<>	YSI 6820 Sonde (S/N) with DO.	Ec. pH. ORP. and	temperature probe	_{s:} 08H100033							
pH Calibrated to (std) 7,00 Reference value: 4 ∪0 FM sloped to (std). 10.00 Reference value: 4 ∪0 Temp Value Temp Value Temp 1. Time: D & S & S & 9 & 1 / 7. 9 7. 00 1 / 7. 9 9. 9 & 9 & 1 / 7. 8 2. Time: D & G & S & S & 9 & 1 / 7. 9 7. 00 1 / 7. 9 9. 9 & 9 & 1 / 7. 8 2. Time: D & G & S & S & 9 & 1 / 7. 9 7. 00 1 / 7. 9 9. 9 & 1 / 7. 8 3. Time: A A I & S & 2 I & S & 2 4. Time: JUL - 14 A UG - 14 JUL - 14 JUL - 14 Standard lot no.: 2AG 653 Standard Lot No.: 2AG 0686 Expiration date: JUL - 14 A UG - 14 JUL - 14 Standard Lot No.: 2AG 0686 I mere 0 6 5 9 1 / 2 7 7 2 7 4 9 1. Time: O 6 5 9 1 / 2 7 7 2 7 4 9 2 Standard Lot No.: 2 AG 0686 I mere: JUL - 14 I S 8 1 L8 & C 3. Time: Q 0 Temp			1								
pH Calibrated to (std): 7,00 pH sloped to (std): 10,00 Reference value: 4.00 7.00 10.00 I. Time: D & S & 3:99 J. 7.9 7.00 L 7.9 9.99 I.T. % 2. Time: I.O.40 H.O.1 I.S.L 7.00 L 7.9 9.99 I.T. % 2. Time: I.O.40 H.O.1 I.S.L 7.00 L 7.9 9.99 I.T. % 3. Time: I.O.1 I.S.L 7.01 I.S. I.O.00 I.S. % 3. Time: I.O.1 I.S.L 7.01 I.S.% I.S. % 4. Time: JUL-14 AUG-14 JUL-14 JUL-14 Standard Lot No.: 2AG086 Standard Lot No.: 2AG086 Calibration Reference Value: 1278 uS Standard Lot No.: 2AG086 Standard Lot No.: 2AG086 Calibration Date: JUL-13 JUL-13 I.S. 6 Standard Lot No. 1301187 CREFerence Value: 200mV Standard Lot No. 1301187 Value Temp E	YSI 650 MDS (S/N): NA]				
Reference value:4.007.0010.001. Time:ValueTempValueTempValueTemp1. Time:D \bigcirc S3.999J.7.97.00L7.99.995I.7.82. Time:I \bigcirc II \bigcirc II.00I \bigcirc II.8.63. Time:II.00I \bigcirc II.00I \bigcirc I4. Time:III.00I \bigcirc II.8.63. Time:IIIIIIIIIIII4. Time:IIIIIIIIIIIIIIIIIIIStandard lot no:2A66532AH1132AF557IIIIIIIStandard lot no:2A6653IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII			pH Cal	libration							
ValueTempValueTempValueTemp1. Time: $0 & 6 & 5 & 3 \cdot 9 & 1 / 7 \cdot 9 & 7 \cdot 0 & 1 / 7 \cdot 9 & 9 \cdot 9 & 1 / 7 \cdot 8 & 1 / 7 \cdot 9 & 1 / 7 \cdot 9 & 1 / 7 \cdot 8 & 1 / 7 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0 \cdot 0 & 1 / 8 \cdot 6 & 1 / 0$	pH Calibrated to (std): 7.00			pH sloped to (s	std): 10.00		ă				
1. Time: \bigcirc	Reference value:	4									
2. Time: 040 4.01 18.6 7.01 18.6 10.00 18.6 3. Time:Image:Image:Image:Image:Image:Image:Image:Image:4. Time:Image:Image:Image:Image:Image:Image:Image:Image:Standard lot no:2AG653Image:Image:Image:Image:Image:Image:Image:Image:Standard lot no:Image:Im		5 E. C.			· · · · · ·		-				
3. Time: Image: Constraint of the second secon						· · · /					
4. Time: Image: Constraint of the second secon	1010	4.01	18.6	7.01	18.6	10.00	18.6				
Standard lot no.: 2AG653 2AH113 2AF557 Expiration date: JUL-14 AUG-14 JUL-14 SC Calibration SC Calibration SC Calibration SC Calibration Date: JUL-14 Standard Lot No.: 2AG086 Calibration Date: JUL-13 1. Time: OG 5 9 / 2 7 7 / 7 . 9 ////////////////////////////////////											
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 12297 2749 Expiration Date: JUL-13 1. Time: 0659 12291 L%40 Expiration Date: JUL-13 1. Time: 0422 1281 L%40 Expiration Date: JUL-13 3. Time: 12801 L%40 Expiration Date: JUL-13 ORP Calibration Reference Value: 200mV Standard Lot No. 1301187 Value Temp Expiration Date: OCT-13 1. Time: 06599 199.6 17.9 Expiration Date: OCT-13 1. Time: 199.6 18.6 Image: Image: Image: DO Calibration Value: 81% air saturation @ 5200 ft. Atmospheric Pressure in Hg				244112		045557					
SC Calibration SC Calibration SC Calibration Reference Value: 1278 uS Standard Lot No.: 2AG086 Value Temp Expiration Date: JUL-13 I. Time: 0659 J 2 7 7 J 7 9 J I. Time: 0659 J 2 8 J LS 6 ORP Calibration Reference Value: 200mV Standard Lot No. 1301187 CRP Calibration OCT-13 Imme: 0659 J 99.6 I.7.9 I. Time: 1041 I.99.6 I.7.9 I. Time: 1041 I.99.6 I.7.9 I. Time: 1041 <th colspan="2" iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii<="" td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th>	<td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>										
Standard Lot No.: 2AG086 Reference Value: 1278 uS Standard Lot No.: 2AG086 1. Time: 0659 12277 17.9 2. Time: 040 1281 1864 3. Time: 1281 1864 4. Time: 1281 1864 4. Time: 1281 1864 ORP Calced and Lot No. 1301187 Reference Value: 200mV Standard Lot No. 1301187 ORP Calced and Lot No. 1301187 2. Time: 049.6 17.9 1. Time: 0659 199.6 17.9 2. Time: 041 18.6 3. Time: 199.6 18.6 3. Time: 18.6 18.6 3. Time: 199.6 18.6 3. Time: 199.6	Expiration date.	JUL-14				100-14					
Value Temp Expiration Date: JUL-13 1. Time: 0659 1277 27.9 27.9 2. Time: 1040 1281 18.6 4.1 3. Time: 0 0 0 0 4. Time: 0 0 0 0 0 ORP Calibration Reference Value: 200mV Standard Lot No. 1301187 Value Temp Expiration Date: 0CT-13 1. Time: 06559 199.6 17.9 199.6 2. Time: 041 199.6 18.6 0 3. Time: 199.6 18.6 0 0 3. Time: 041 199.6 18.6 0 3. Time: 0 0 0 0 0 4. Time: 0 0 0 0 0 0 2. Time: 041 199.6 18.6 0 0 0 0 0 0 4. Time: <			SC Cal	1							
1. Time: 0659 1277 27.9 2. Time: 1281 18.6 3. Time:	Reference Value: 1278 uS			Standard Lot N	Jo.: 2AG086						
2. Time: 12.81 18.6 3. Time:		Value	Temp	Expiration Dat	e:	JUL-13					
3. Time: Image: Ima	1. Time: 0659	1277	17.9		A BARRIER AND	and the second					
4. Time: Image: Constraints ORP Calibration Reference Value: 200mV Standard Lot No. 1301187 Value Temp Expiration Date: OCT-13 1. Time: 06559 199.8 17.9 2. Time: 041 18.6 3. Time: 199.6 18.6 4. Time: DO Calibration DO Calibration		1281	18.6								
ORP Calibration Reference Value: 200mV Standard Lot No. 1301187 Value Temp Expiration Date: OCT-13 1. Time: 06 5 9 19 9. 6 17. 9 2. Time: 19 9. 6 18. 6 3. Time: 3. Time: 19 9. 6 18. 6 1000000000000000000000000000000000000											
Reference Value: 200mV Standard Lot No. 1301187 Value Temp Expiration Date: OCT-13 1. Time: 06 5 9 199.8 17.9 2. Time: 199.6 18.6 3. Time: 199.6 18.6 4. Time: DO Calibration DO Calibration Calibration @ 5200 ft.	4. Time:										
Value Temp Expiration Date: OCT-13 1. Time: 0659 199.6 17.9 2. Time: 041 199.6 18.6 3. Time: 1 199.6 18.6 4. Time: DO Calibration			ORP Ca	libration							
1. Time: 06 5 9 199.8 17.9 2. Time: 199.6 18.6 3. Time:	Reference Value:	200mV		Standard Lot N	No. 1301187						
2. Time: 199.6 18.6 3. Time: 4. Time: 100 4. Time: 100 100 DO Calibration Calibration Value: 81% air saturation @ 5200 ft. Atmospheric Pressure in Hg		Value	Temp	Expiration Dat	e:	OCT-13					
3. Time: Image: Control of the contr	1. Time: 0659	199.8	17.9								
3. Time: Image: Constraint of the second s	2. Time: 1041	199.6	18.6								
DO Calibration Calibration Value: 81% air saturation @ 5200 ft. Atmospheric Pressure in Hg	3. Time:										
Calibration Value: 81% air saturation @ 5200 ft. Atmospheric Pressure in Hg	4. Time:										
			DO Ca	libration							
1. Time: 0(057 81.5 21.38	Calibration Value:	81% air satura	tion @ 5200 ft.		Atmospheric	Pressure in Hg					
	1. Time: 0(057	81.5	5	-	14.38						
2. Time: 1039 81.6 24.40	2. Time: 1039	41.6			24.40						
3. Time:											
	4. Time:										

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

SNL/NM Project Name: SWM	/IU 154		Project No.: 1	46422.10.11.01	
Calibration done by: R Lynch			Date: 03/26/13		
		TURBID	IMETER		
Make & Model: HACH 210	0P HACH 2100Q		Serial No. S/	N 10050C002897	
Reference Value	Rt 10		20	100	800
Standard Lot No.	0161		0168	0162	0161
^{1. Time} 67.54	10.1	10	9.9	101	802
2. Time 0943	10.3	2	0.1	105	804
3. Time	·9,				
4. Time					
Comments:					

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU	Monitoring Well ID # :	CTF-MW2		Date: 03-26-13
The following equipment wa	s decontaminated at comp	letion of sampling a	ctivities in accordance with FC	DP-05-03
Pump and Tubing Bundle ID #: <u>1807-32</u>	_	Water Level Indi	cator ID #: <u>62187</u>	
Personnel Performing Decontamination: William Gibson Print Name: Robert Lynch Print Name:		Personnel Perform William Gibson Print Name: Robert Lynch Print Name:	ming Decontamination:	tial. tial:
	Condition	of Equipment		
Pump: Good Tub	ing Bundle: Good		_Water Level Indicator: <u>Go</u>	ood
	List of Deconta	amination Materials		
Distilled or Deonized (circl	e one)	Grade:	HNO ₃ Reagent	
Source: Culligan		UN #:	2031	
Lot Number: <u>3-18-13</u>		Manufacturer:	AROC	
		Lot Number:	A0305629	

		ing waste Generation Log	
Waste Generator :	William Gibson Phone:	project lo	eader: Clinton Lum
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	T1 CoC# 614663, 614663/4 Sample # 093723, 093724		T 7 CoC# 614663, 614663 € Sample # 093723, 093724
Accumulation Date Date Waste	Start: 03-26-13 Full: 03-26-13	Start: 03-26-13 Full: 03-26-13	Start: 03-26-13 Full: 03-26-13
Moved to Accumulation Area	03-26-13	03-26-13	03-26-13
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

TAILGATE SA	AFETY MEETING FORM
Dept: <u>4142</u> Well Location: <u>CTF-MW 2</u>	Date: 03/26/13 Time: 0747
Activities: GROUND WATER MONITORING AND SA (Anyone has the right to cease field activities for s	AMPLING safety concerns. The buddy system will be used when needed.)
Weather Conditions: Temp: °F Wind Speed: MPH Chemicals Used: <u>Acids in sample containers, stan</u> Other:	
Safety	Topics Presented
■ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	 Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
🗷 Wear safety boots.	Be aware of electrical hazards
x Use safe lifting practices. Wear leather gloves if necessary.	Re aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	■ No eating or drinking at sampling counter.

X Be aware of chemical hazards.
 X Wear nitrile or latex gloves when sampling.
 X Wear chemical safety goggles.
 X Wear chemical safety goggles.
 X Wear chemical safety goggles.

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

Printed Name

Printed Name

Attendees Signature

Signature

Printed Name

Signature

Printed Name

Signature

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab														Page _	<u>1</u> of <u>1</u>
	Batch No. /	VA				SMO Uşe						1 2	-	AR/COC	614	660
Г	Project Name:		SWMU 149 GWM	Date Samples	Shipped [.]	32	1/13		SMO Au	thorization:	Derle	1.		Waste Characterization		
			Clinton Lum	Carrier/Waybill	-		2359			ntact Phone		مريدة المحافظ	91110			
	Project/Task N		98026.01.14	Lab Contact:		Edie Kent/8						-844-3199	100	Released by COC No.		
	Service Order		CF250-13	Lab Destination	-	GEL			Send Re	port to SMC					√ 4°	^o Celsius
	Service Order	•		Contract No.:		PO 130387	3			• • • • • • • • • • • • • • • • • • •	naugh/505	-284-2553		Bill to:Sandia National Laboratories	(Accounts	s Payable),
ł	Tech Areas			Contract No										P.O. Box 5800, MS-0154	1	
	Tech Area:		2	Omenational	Citer									Albuquerque, NM 87185-0154		
	Building:		Room:	Operational	T	Dete /7		Comula	<u> </u>	- Join or	Preserv-	Collection	Sample	Parameter & Method		Lab
					Depth	Date/T		Sample		ntainer Volume	ative	Method	Type	Requested		Sample ID
	Sample No.	Fraction	Sample Location D	etail	(ft)	Collec	ctea	Matrix	Туре	volume	alive	Wethou	Type	Requested		Jampie ib
ß	093715	-001	CTF-EB1		NA	3/20/13	11:04	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)		
ş	093715	-009	CTF-EB1		NA	3/20/13	11:05	DIW	Р	500 ml	HNO3	G	EB	TAL Metals(SW846-6010/6020)/7470)	
1	093715	-010	CTF-EB1		NA	3/20/13	11:06	FDIW	Р	500 ml	HNO3	G	EB	TAL Metals(SW846-6010/6020)/7470)	
	093715	-016	CTF-EB1		NA	3/20/13	11:08	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)		
1	093715	-018	CTF-EB1		NA	3/20/13	11:09	DIW	Р	125 ml	H2SO4	G	EB	NPN (353.2)		
0	093715	-020	CTF-EB1		NA	3/20/13	11:10	DIW	Р	250 ml	None	G	EB	Perchlorate (314.0)		
0	093715	-020	CTF-EB1		NA	3/20/13	11:11	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)		
1					NA	3/20/13	11:04	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)		
ŕ	093716	-001	CTF-TB1			5/20/15	11.04			0,40111						۰.
						L		1	<u> </u>	0		I /QC Requi	l	1	Condi	tions on
	Last Chain:		Yes		Contraction of the Contraction of the	Tracking		SMC) Use	3.50	structions	and	rements.			ceipt
	Validation	Req'd:	⊻ Yes		Date En	tered:				EDD				No	Re	ceipt
	Backgroun	d:	Yes	1	Entered	by:				Turnarour	id Time	<u>7 Da</u>	<u>v*</u>] <u>15 Day*</u>		
	Confirmato	ory:	Yes		QC inits	.:				Negotiated	TAT L					
	Sample	N	Name Signal	tate	Init.	Compan	y/Organiza	ation/Phor	ne/Cell	Sample Di	sposal	Retur	n to Clien	t 🔄 Disposal by Lab		
	Team	Robert L	vnch Karlin	al	ZL	SNL/4142/5	05-844-40	13/505-25	50-7090	Return Sa	mples By:					
	Members		antillanes Hyrd Sec	tillen	Att	SNL/4142/5	05-844-51	30/505-22	28-0710	Comment				n/4142/MS 0729/284-2547		
	Members	William	AV.1.17	70 -	000	SNL/4142/5				Anions as	Br,Cl,F,SC	04. Alkalinity	as total	CaCO3,HCO3,CO3. if		
		vvillari	Gibson animaly	und 1	ngy									ation analysis using SW846-		
			1							6850M. FC	NW, filtere	d in field w/	40 micron	ı filter.	Lat	b Use
	4 Delineurich	d hu	Mu Soufill-	-Org. 4142	[†] Date	3/21/1	7 Time	1005	3.Relin	uished by			Org	J. Date	Time	A
	1.Relinquishe	a by	M. G. J. Gun	90rg. 4142	Date			1005	3. Rece				Org	. Date	Time	5
	1. Received I		The firs 400	Org.	Date	7 -11	Time	100		uished by			Orc		Time	
	2.Relinquishe			Org.	Date		Time		4. Rece			Υ.	Org		Time	
	2. Received I		with SMO required for 7 an				Time		17. 11000							

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page <u>1</u> of <u>2</u>
Batch No.	NA					SMO Use								AR/COC	614661
Project Name	e:	SWMU 14	49 GWM	Date Samples	s Shipped:				SMO A	uthorization:	And	Jeta	- and	Waste Characterization	
Project/Task	Manager:	Clinton Lu	um	Carrier/Wayb	ill No.				1	ontact Phone	: CP2	Bothe	20		
Project/Task	Number:	98026.01	.14	Lab Contact:		Edie Kent/	303-556-8	171			-	5-844-3199		Released by COC No.	
Service Orde	er:	CF250-13	3	Lab Destination	on:	GEL			Send R	eport to SMC):				✓ 4º Celsius
				Contract No.:		PO 130387	73			Rita Kava	naugh/505	-284-2553		Bill to:Sandia National Laboratories (A	
Tech Area:														P.O. Box 5800, MS-0154	
Building:		Room:		Operationa	I Site:									Albuquerque, NM 87185-0154	
					Depth	Date/	Гime	Sample	Co	ontainer	Preserv-	Collection		Parameter & Method	Lab
Sample No.	Fraction	Sar	mple Location D	etail	(ft)	_{f/} Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
093717	-001	CTF-MW	3		359	3/22/13	10:18	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093717	-009 🗸	CTF-MW	3		359	3/22/13	10:19 1	GW	Р	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7	(470)
093717	-010 1	CTF-MW3	3		359	3/22/13	10:20 /	FGW ²	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7	(470)
093717	-016 /	CTF-MW3	3		359	3/22/13	10:22	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	
v 093717	-018 1	CTF-MW3	3		359	3/22/13	10:23 ′	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	
v 093717	-020	CTF-MW	3		359	3/22/13	10:24 -	GW	Р	250 mĺ	None	G	SA	Perchlorate (314.0)	
093717	-022 -	CTF-MW3	3		359	3/22/13	10:25	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
µ́ 093718	-001 🖌	CTF-MW3	3		359	3/22/13	10:18	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
093718	-009 -	CTF-MW3	3		359	3/22/13	10:19	GW	Р	500 ml	HNO3	G	DU 1	TAL Metals(SW846-6010/6020/7	(470)
093718	-010 ′	CTF-MW3	3		359	3/22/13	10:20	FGW	Р	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7	(470)
Last Chain	_	√ Yes			Sample	Tracking		SMO	Use	Special Ins	tructions		ements:		Conditions on
Validation		✓ Yes			Date Ent	ered:				EDD		🗹 Yes		No	Receipt
Backgroun		Yes			Entered	by:				Turnaroun	d Time	<u>7 Day</u>	¥	15 Day* 30 Day	
Confirmato	ory:	∐ Yes			QC inits.	:				Negotiated	TAT				
Sample	N	ame	Signatu		Init.	Company	//Organizat	ion/Phon	e/Cell	Sample Dis	sposal	Return	n to Client	Disposal by Lab	
Team	Danielle I	Processes -	DaliMN	120	a	SNL/4143/50	05-845-770	6/505-23	9-3989	Return San	nples By:		1		
Members	Alfred Sa	ntillanes	Alton	fillen	at	SNL/4142/50	05-844-513	0/505-22	8-0710	Comments	:	Send report to	Tim Jackson	/4142/MS 0729/284-2547	
	William G	Bibson	Millich.	h h		SNL/4142/50	05-284-330	7/505-23	9-7367	Anions as E	Br,CI,F,SO	4. Alkalinity	as total C	aCO3,HCO3,CO3. if	
			<i></i>							perchlorate	detected,	then perform	m verificat	ion analysis using SW846-	
		11.				,				6850M. FG	W, filtered	in field w/40	0 micron f	iltered.	Lab Use
1.Relinquishe	d by	lpses	salle_	Org. 4/4	2 Date	3/25/1	3 Time 6	936	3.Relind	uished by			Org.	Date	Time
1. Received b	by D	the		Org. 414		3/25/1.	-		3. Rece				Org.		Time
2.Relinquishe	ed by			Org.	Date		Time		4.Relind	uished by			Org.		Time
2. Received b				Org.	Date		Time		4. Rece				Org.		Time
*Prior confirm	mation wi	th SMO rec	quired for 7 and	15 day TAT						,					

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page <u>2</u> of <u>2</u>

													AR/COC	614661
Project Nam	e:	SWMU 149 GWM	Project/Ta	sk Manag	ger:	Clinton Lun	n		Project/Ta	sk No.:	98	026.01.14		
Tech Area:		T	4											
Building:		Room:		r			1							Lab use
Sample No.	Fraction	Sample Location	Detail	Depth	Date/ ⁻ Colle		Sample Matrix		ntainer		Collection		Parameter & Method	Lab
			Detan	(ft)		1		Туре	Volume	ative	Method	Туре	Requested	Sample I
093718		CTF-MW3		359	3/22/13	10:22	GW	P	125 ml	None	G		Anions (SW846-9056)	
093718	-018	CTF-MW3		359	3/22/13	10:23	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
093718	-020 *	CTF-MW3		359	3/22/13	10:24	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	
093718 -	-022 ′	CTF-MW3		359	3/22/13	10:25	GW	Р	500 ml	None	G	DÚ	Alkalinity (SM2320B)	
093719	-001 1	CTF-TB2		NA	3/22/13	10:18	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
093720 -	-001	CTF-FB1 🗸		NA	3/22/13	10:09	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
												1		
												1		
												ì		
		3												
			0											
		S C	n =											
	l	I					L							
Recipient Ini	tials													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	-													_	Page <u>1</u> of _	2
Batch No.	M					SMO Use								AR/COC	614662	
Project Name		SWMU 15	54 GWM	Date Sample	s Shipped:			2	SMO Au	thorization:	Done	Inte	an	Waste Characterization		-
Project/Task I		and the second se		Carrier/Wayb		and the second second second second				ontact Phone			2l	RMMA		
Project/Task I	-	98026.01.		Lab Contact:		Edie Kent/8	03-556-8	171		Lorraine H	lerrera/505	5-844-3199		Released by COC No.		
Service Order	r:	CF251-13		Lab Destinati	on:	GEL			Send Re	eport to SMC):			1	🗹 4º Celsi	ius
				Contract No.:		PO 130387	3			Rita Kava	naugh/505	-284-2553		Bill to:Sandia National Laboratories	s (Accounts Payabl	le),
Tech Area:														P.O. Box 5800, MS-0154		
Building:		Room:		Operationa	al Site:									Albuquerque, NM 87185-0154		
					Depth	Date/T	ime	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab	,
Sample No.	Fraction	San	nple Location D	etail	(ft)	L Collec	ted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample	e ID
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 (SW846-8270	C)	
093721	-009 🦯	CTF-EB2			NA	3/25/13	9:03 -	DIW	Р	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/	/7470)	
093721	-010	CTF-EB2			NA	3/25/13	9:04	FDIW	Р	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/	/7470)	
093721-	-016	CTF-EB2			NA	3/25/13	9:05	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)		
093721	-018 🖊	CTF-EB2			NA	3/25/13	9:06	DIW	Р	125 ml	H2SO4	G	EB	NPN (353.2)		
093721	-020 🖊	CTF-EB2			NA	3/25/13	9:07 🛩	DIW	Р	250 ml	None	G	EB	Perchlorate (314.0)		
093721	-022 🦯	CTF-EB2			NA	3/25/13	9:08	DIW	Р	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 (SW846-832	1A Mod.	
093721	-033 🥤	CTF-EB2			NA	3/25/13	9:11	DIW	Р	1 L	HNO3	G	EB	Gamma Spec. (901.0)		
Last Chain:		Yes			• •	Tracking		SMC) Use	Special Ins	structions		rements:		Conditions on	ו ו
Validation I		✓ Yes	-		Date Ent	ered:				EDD		Ves		No	Receipt	
Backgroun		Yes			Entered	by:				Turnaroun	d Time	<u>7 Da</u>	y <u>*</u>	<u>15 Day*</u>		
Confirmato	ry:	L Yes			QC inits.	:				Negotiated	I TAT					
Sample	N	ame	Signati	ure	Init.	Company	/Organizat	tion/Phon	e/Cell	Sample Dis	sposal		n to Client	t 🔄 Disposal by Lab		
Team	Robert L	ynch	ANT4N	ch	RE	SNL/4142/50	5-844-401	3/505-25	0-7090	Return Sar	nples By:					
Members	Alfred Sa	antillanes	Hlandsin	ile_	100	SNL/4142/50	5-844-513	80/505-22	8-0710	Comments				n/4142/MS 0729/284-2547		
	William (Gibson	Willingse	LA.	ans	SNL/4142/50	5-284-330	7/505-23	9-7367					halysis using SW846-6850.		
														s total CaCO3,HCO3,and DIW, filtered in field w/40 micron		
		1								filter.				, morea in neid w/+o microff	Lab Use	
1.Relinquishe	d by	love	Sontill	Org. 414	2 Date	3/25/13	Time 9	:41	3.Relinc	uished by			Org.	Date	Time	
1. Received b	by Po	the	lim	Org. 4/4	12 Date	3/25113	Time 🦌	41	3. Rece	ived by			Org.	Date	Time	
2.Relinquishe	ed by			Org.	Date		Time		4.Relinc	uished by			Org.	Date	Time	\neg
2. Received b	ру			Org.	Date		Time		4. Rece	ived by			Org.	. Date	Time	
*Prior confir	mation w	ith SMO re	quired for 7 and	15 day TAT	г						A REAL PROPERTY AND A REAL PROPERTY.					

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

															662
Project Name	e:	SWMU 154 GWM	Project/Ta	sk Manag	ger:	Clinton Lun	ı		Project/Tas	sk No.:	98	026.01.15			
Tech Area:															
Building:		Room:													Lab use
				Depth	Date/		Sample		ntainer		Collection		Parameter & Method		Lab
Sample No.		Sample Location D	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	S	Sample ID
093721	-034 🤇	CTF-EB2		NA	3/25/13	9:12	DIW	Р	1 L	HNO3	G	EB	Gross Alpha and Beta (900.0))	
093721	-035	CTF-EB2		NA	3/25/13	9:13 🖌	DIW	Р	1 L	HNO3	G	EB	Isotopic Uranium (ASTM D3972-	09M)	
093722	-001 ″	СТҒ-ТВЗ 🖊		NA	3/25/13	9:00	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)		
-															
Recipient In	itials						50 50 51							1	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page <u>1</u> of <u>2</u>
Batch No.	51					SMO Use								AR/COC	614663
Project Name:		SWMU 154	GWM	Date Samples	Shipped:				SMO Au	thorization:	Dona	Jam	~	Waste Characterization	
Project/Task N	Anager:	Clinton Lun	1	Carrier/Waybi	ll No.					ontact Phone	: 50	Bitle	nl		
Project/Task N	lumber:	98026.01.1	5	Lab Contact:		Edie Kent/8	03-556-8	171		Lorraine H	lerrera/505	5-844-3199		Released by COC No.	
Service Order:		CF251-13		Lab Destinatio	on:	GEL			Send Re	eport to SMC):				✓ 4º Celsiu
				Contract No.:		PO 130387	3			Rita Kava	naugh/505	-284-2553		Bill to:Sandia National Laboratories	Accounts Payable)
Tech Area:														P.O. Box 5800, MS-0154	
Building:		Room:		Operationa	I Site:									Albuquerque, NM 87185-0154	
					Depth	Date/T	ïme	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Samp	ole Location D	etail	(ft)	, Collec	ted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample I
093723	-001 1	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	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7-	470)
093723	-010	CTF-MW2			129	3/26/13	9:35	FGW*	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7	470)
093723	-016 -	CTF-MW2			129	3/26/13	9:37	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	
093723	-018 1	CTF-MW2			129	3/26/13	9:38	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	
093723	-020 <	CTF-MW2			129	3/26/13	9:39	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
093723	-022 🗸	CTF-MW2			129	3/26/13	9:40 🗸	GW	Р	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 (SW846-8321	A Mod.
093723	-033 1	CTF-MW2			129	3/26/13	9:44	GW	Р	1 L	HNO3	G	SA	Gamma Spec. (901.0)	
Last Chain:		✓ Yes			Sample	Tracking		SMC) Use	Special Ins	structions		rements:		Conditions on
Validation F	Req'd:	🔄 Yes			Date En	tered:				EDD		✓ Yes		No	Receipt
Background	d:	Yes			Entered	by:				Turnaroun	d Time	<u>7 Da</u>	<u>y*</u>	15 Day* 30 Day	
Confirmator	ry:	Yes			QC inits	.:				Negotiated	TAT				
Sample	N	ame	Signat	ure	Init.	Company	/Organiza	tion/Phon	e/Cell	Sample Di	sposal	L Retur	n to Client	t 🔄 Disposal by Lab	
	Robert L	ynch	Kert Li	nch	RL	SNL/4142/50	05-844-401	13/505-25	0-7090	Return Sa	mples By:				
- F	Alfred Sa	antillanes	Alpils	telle	att	SNL/4142/50	05-844-513	30/505-22	8-0710	Comments		2.22		n/4142/MS 0729/284-2547	
	William (Gibson	Villiand	FALL	wyh	SNL/4142/50	05-284-330	07/505-23	9-7367					nd add perservatives as needed. If using SW846-6850. Report Anions as	
				,,,,,										CO3.Report Gamma Spec for short	
										list isotopes. F	GW, filtered in	n field w/ 40 mic	cron filter.		Lab Use
1.Relinguished	d by	Thats	attle	Org 414:	2 Date	3/26/1	F Time	10:29	3.Relind	uished by			Org.	. Date	Time
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*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

APICOC 614663

Project Nam	ie:	SWMU 154 GWM	Project/T	ask Manag	ger:	Clinton Lun	n		Project/Tas	sk No.:	980	026.01.15		
Tech Area:		••••••••••••••••••••••••••••••••••••••												
Building:		Room:												Lab us
Sample No.	Fraction	Sample Location	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
093723	-034 /	CTF-MW2		129	3/26/13	9:45 /	GW	Ρ	1 L	HNO3	G	SA	Gross Alpha and Beta (900.0)	
093723	-035 /	CTF-MW2		129	3/26/13	9:46/	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (ASTM D3972-09M)	
0937241	-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	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
093724	-010 1	CTF-MW2		129	3/26/13	9:35 <	FGW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
093724	-016 /	CTF-MW2		129	3/26/13	9:37 🧳	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
093724	-018	CTF-MW2		129	3/26/13	9:38 -	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
093724	-020 1	CTF-MW2		129	3/26/13	9:39 /	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	
093724	-022	CTF-MW2		129	3/26/13	9:40	GW	Р	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	Р	1 L	HNO3	G	DU	Gamma Spec. (901.0)	
093724	-034	CTF-MW2		129	3/26/13	9:45 /	GW	Р	1 L	HNO3	G	DU	Gross Alpha and Beta (900.0)	
093724	-035	CTF-MW2		129	3/26/13	9:46	GW	Р	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	ТВ	TCL VOC (SW846-8260B)	
093726	-001	CTF-FB2		NA	3/26/13	9:23	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab																Page	<u>1</u> of <u>1</u>
Batch No.	NA					SMO Use									AR/COC	614	1664
Project Name	:	SWMU 154 GV	νM	Date Samples	Shipped:				SMO Au	thorization:	Ann	Iti		Va Wa	ste Characterization		
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		98026.01.15		Lab Contact:		Edie Kent/	803-556-	8171		Lorraine H	Herrera/50	5-844-3199		Rel	leased by COC No.		
Service Order: CF251-13				GEL			Send Report to SMO:				1		4	^o Celsius			
				Contract No.:		PO 13038	73		1			5-284-2553		Bill to:Sand	dia National Laboratories	(Accoun	ts Payable),
Tech Area:								and an order of the						P.O. Box 5	5800, MS-0154		
Building:		Room:		Operational	Site:									Albuquerq	ue, NM 87185-0154		
Dunung					Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection			arameter & Method		Lab
Sample No.	Fraction	Sample	e Location D	etail	(ft)	/ Colle		Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
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	Robert L	vnch	V AN AST	rch	RL	SNL/4142/	505-844-40	013/505-25	50-7090	Return Sa	mples By:	:					
Members			Flores	al.10.	asi	SNL/4142/	505-844-51	130/505-22	28-0710	Comment	s:	Send report to	Tim Jackson	n/4142/MS 07	729/284-2547		
Weinbers	William (1801	Mil B	l	UNS	SNL/4142/						high buffer	ng capaci	ty, check	pH and add		
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*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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Nitrate/nitrite:</u> 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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>ICP-AES and ICP-MS:</u> 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.

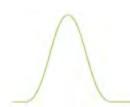
ICP-AES and ICP-MS

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.



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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 \leq 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.

<u>Blanks</u>

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.

<u>Summary</u>

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.

<u>Blanks</u>

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.

<u>Nitrate/nitrite:</u> The samples were diluted 10X.

<u>Anions:</u> 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



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.

<u>Summary</u>

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 ≤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.

<u>CVAA</u>:

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

reported as > the MDL for ICS A. It was determined from the ICS AB true concentration that these detects were attributed to ICS A contamination and not interference. No 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.

ICP-AES:

The SD 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.

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.

Some filtered sample results were slightly > the unfiltered sample results. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilcher	Level II	Date: 05/14/13





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, 15,B4
	093717-010/CTF-MW3	Mercury (7439-97-6)	UJ, 15,B4
	093718-009/CTF-MW3	Mercury (7439-97-6)	UJ, 15,B4
	093718-010/CTF-MW3	Mercury (7439-97-6)	UJ, 15,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.

Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the EB, sample 322402001 from ARCOC 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 \leq 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.

<u>Blanks</u>

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
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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.

<u>Blanks</u>

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.

<u>Nitrate/nitrite:</u> The samples were diluted 5X.

<u>Anions:</u> 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 b	y: Marcia Hilcher	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.

<u>Summary</u>

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.

<u>Blanks</u>

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: 05/2



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.

<u>Summary</u>

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 \ge 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.

<u>Summary</u>

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 hexachlorocylcopentadiene was < the LAL but ≥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.

<u>Blanks</u>

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 ≤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 ≤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 ≤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 \leq 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 \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 results for all samples *except* -036 were non- detect and will not be qualified

The %RSD of dibromochloromethane was >15% but \leq 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 \geq 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 $\le 40\%$ 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)

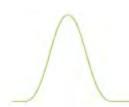
TIC reports were not required.

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





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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	с		
	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

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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

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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

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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

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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

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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, 14

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC	
	093721-024/CTF-EB2	p-Nitrotoluene (99-99-0)	UJ, 14	
	093721-024/CTF-EB2	Tetryl (479-45-8)	UJ, MS5	
	093723-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, 14	
	093723-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, 14	
	093723-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14	
	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, 14	
	093724-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, 14	
	093724-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14	
	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, 13,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	

AR/COC: 614662, 614663, 614664

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 9056			
	093721-016/CTF-EB2	Chloride (16887-00-6)	J+, 15

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 μ g/L in CCBA-MW2 with a concentration of 0.640 μ g/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 μ g/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 (μ g/L) in CCBA-MW2 at a concentration of 0.640 μ 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 μ g/L to 0.980 μ 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 μ g/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 Variances 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 μ g/L in CCBA-MW2 with a concentration of 0.640 μ g/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 μ g/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 μ g/L in CCBA-MW2 at a concentration of 0.640 μ g/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**

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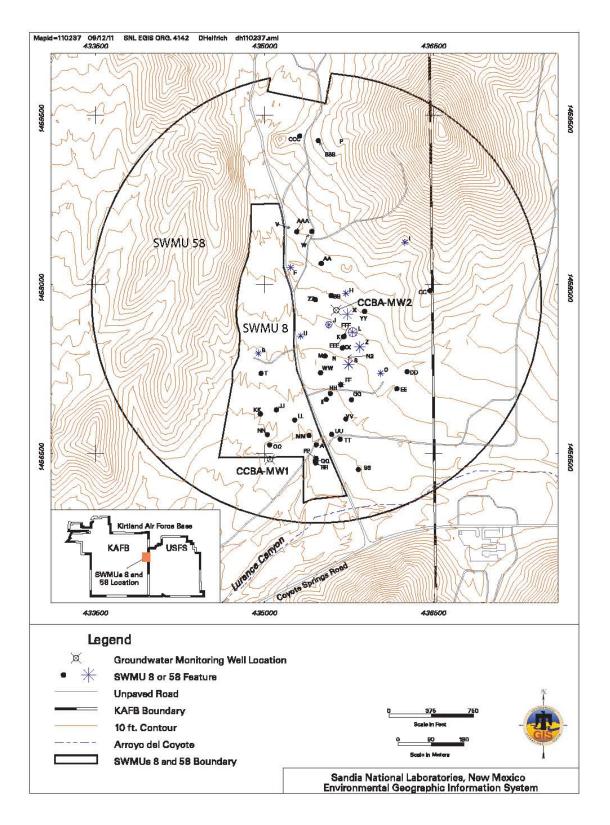
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Figures





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

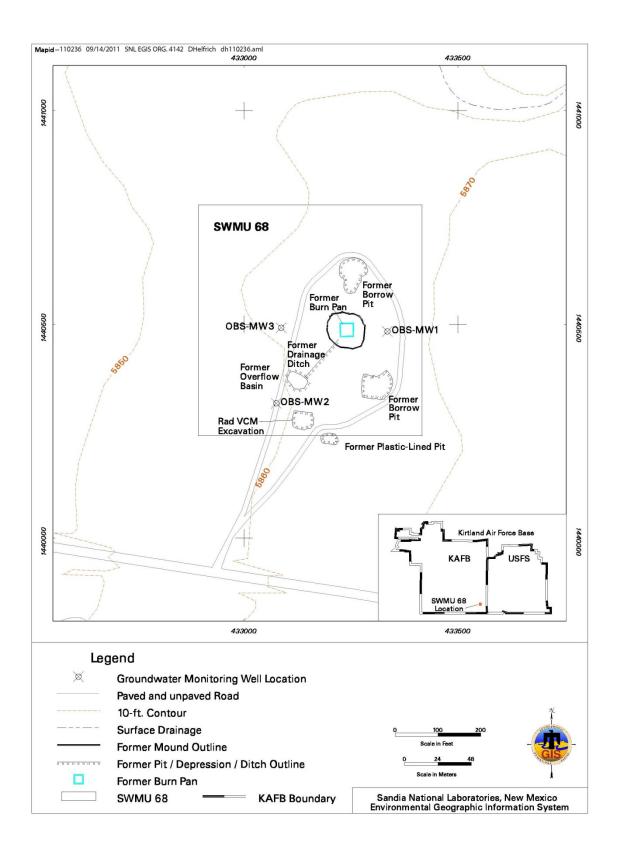


Figure IV-2

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

Tables

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

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

Notes

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

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U.S. 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.

⁶Major 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.
- H_2SO_4 = 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.

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	
CCBA-MW1 (duplicate)	093342	014507	SWMUs 8/58
CCBA-MW2	093336	614565	
OBS-MW1	093349	614570	
OBS-MW1 (duplicate)	093350	614570	SWALL 69
OBS-MW2	093344	614568	SWMU 68
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.

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

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

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	
1,1,2,2-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

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

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

SWMU 68							
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a EPA 8270C		
1'-Biphenyl 1	2.94 - 3.13	EPA 8270C	Butylbenzyl phthalate	2.94 - 3.13			
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-Chlorobenzenamine	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.

= Micrograms per liter.

μg/L EPA = U.S. Environmental Protection Agency.

= 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. MDL

SWMU = Solid Waste Management Unit.

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.
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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.

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

^aLaboratory Qualifier

J = The associated value is an estimated quantity.

^bValidation Qualifier

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

^cAnalytical Method

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

- **Bold** = Indicates that a result exceeds the MCL.
- $\mu g/L$ = 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.

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

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-7 (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.

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Mall	Analyta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
SWMUs 8/58									
CCBA-MW1	Bicarbonate Alkalinity	185	0.725	1.00	NE			093341-022	SM2320B
16-Jan-13	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)	Bicarbonate Alkalinity	183	0.725	1.00	NE			093342-022	SM2320B
16-Jan-13	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	Bicarbonate Alkalinity	180	0.725	1.00	NE			093336-022	SM2320B
15-Jan-13	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

NA/ - 11	Australia	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
SWMU 68									
OBS-MW1	Bicarbonate Alkalinity	186	0.725	1.00	NE			093349-022	SM2320B
22-Jan-13	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)	Bicarbonate Alkalinity	186	0.725	1.00	NE			093350-022	SM2320B
22-Jan-13	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	Bicarbonate Alkalinity	179	0.725	1.00	NE			093344-022	SM2320B
21-Jan-13	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	0.0665	2.00	NE			093344-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		093344-027	EPA 9012
OBS-MW3	Bicarbonate Alkalinity	178	0.725	1.00	NE			093352-022	SM2320B
23-Jan-13	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.

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

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-9 (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.

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.

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

	Ameliate	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
CCBA-MW1	Aluminum	0.0771	0.015	0.050	NE		J+	093341-009	EPA 6020
16-Jan-13	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

\A/!!	A va a la sta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
CCBA-MW1 (Duplicate)	Aluminum	0.0351	0.015	0.050	NE	J	+L	093342-009	EPA 6020
16-Jan-13	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

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	Aluminum	0.0224	0.015	0.050	NE	J	J+	093336-009	EPA 6020
15-Jan-13	Antimony	ND	0.001	0.003	0.006	Ŭ	-	093336-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	Ŭ		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.

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

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	Aluminum	ND	0.015	0.050	NE	U		093349-009	EPA 6020
22-Jan-13	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

M /all	Amaluta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
OBS-MW1 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		093350-009	EPA 6020
22-Jan-13	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

Well.	Analuta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		093344-009	EPA 6020
21-Jan-13	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

NA/ e II	Analysia	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		093352-009	EPA 6020
23-Jan-13	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.

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

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		(((g, =)	(119/2)	Quantor	quainor	Humbol	mounou
CCBA-MW1	Calcium	49.8	0.060	0.200	NE	В		093341-017	EPA 6020
16-Jan-13	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)	Calcium	49.6	0.300	1.00	NE	В		093342-017	EPA 6020
16-Jan-13	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	Calcium	81.8	0.300	1.00	NE	В		093336-017	EPA 6020
15-Jan-13	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		•	L	•		•			
OBS-MW1	Calcium	85.3	0.300	1.00	NE			093349-017	EPA 6020
22-Jan-13	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)	Calcium	87.1	0.300	1.00	NE			093350-017	EPA 6020
22-Jan-13	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	Calcium	83.9	0.300	1.00	NE			093344-017	EPA 6020
21-Jan-13	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	Calcium	81.2	0.300	1.00	NE			093352-017	EPA 6020
23-Jan-13	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.

Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results

SWMUs 8/58 and 68 Groundwater Monitoring

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 8/5	8			• •	
CCBA-MW1	Americium-241	10.8 ± 11.7	17.0	8.30	NE	U	BD	093341-033	EPA 901.1
16-Jan-13	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)	Americium-241	-3.53 ± 13.5	20.1	9.85	NE	U	BD	093342-033	EPA 901.1
16-Jan-13	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	Americium-241	0.904 ± 7.09	10.4	5.09	NE	U	BD	093336-033	EPA 901.1
15-Jan-13	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

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	Americium-241	-13.9 ± 19.4	30.8	15.1	NE	U	BD	093349-033	EPA 901.1
22-Jan-13	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
	Uranium-238	3.03 ± 0.421	0.0313	0.0115	NE			093349-035	HASL-300
OBS-MW1 (Duplicate)	Americium-241	2.22 ± 8.97	13.2	6.50	NE	U	BD	093350-033	EPA 901.1
22-Jan-13	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
	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
OBS-MW2	Americium-241	14.9 ± 23.4	34.6	17.0	NE	U	BD	093344-033	EPA 901.1
21-Jan-13	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 [®]		
	SWMU 68										
OBS-MW3	Americium-241	10.5 ± 12.9	18.2	8.92	NE	U	BD	093352-033	EPA 901.1		
23-Jan-13	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	Х	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.

^cLaboratory Qualifier

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

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

^dValidation Qualifier

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

- BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
- J = The associated value is an estimated quantity.
- R = The data are unusable, and resampling or reanalysis are necessary for verification.
- None = No data validation for corrected gross alpha activity.

^eAnalytical Method

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

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

Table IV-14 (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.

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

^aLaboratory 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.

^bValidation Qualifier

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

^cAnalytical Method

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

- **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.

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 othe	rwise 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 othe	erwise 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. = duplicate analysis result. R_2
- = Coyote Canyon Blast Area.= Milligrams per liter. CCBA
- mg/L MW
- = Monitoring well. = Old Burn Site.
- OBS
- SWMU = Solid Waste Management Unit.

Appendix A Field Measurement Logs for SWMUs 8/58 and 68 Groundwater Monitoring Data

Project Name: SWMU 8/58	vject Name: SWMU 8/58 Project No.: 146422.10.11.01			
Well I.D.: CCBA-MW1	Date: 01/16/13			
Well Condition:	Weather Condition:			
Method: Portable pump X	Dedicated pump	Pump depth: 79'		

									~
Depth to	Time 24	Vol. (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	Comments
Water (ft)	hr		(0)	(µS/em)	(((((()))))	(, ,	DOmg/L
48.07	M59		51	ART					
	0821	5	10.21	540	239.4	6.38	1.43	17.4	1.96
49.41		10	12.25	521	227.0		1.26	20.5	2.19
49.56	0838	15	12.82	497	220.2	6.42	1.06	28.1	2.97
49.38		20	12.53	497	219.4	6.35	0.93	29.1	3.09
49.38		24	12.61	503	218.3	6.31	0.79	25.6	2.74
49.37		26	12.92	495	216.4	6.33	0.79	29.4	3.10
49.37		28	12.96	493	214.2	6.35	0.87	29.9	3.14
49.36		30	13.04	494	213.7	6.35	0.69	29.8	3.12
49.36	0915	32	13.09	493	213.6	6.34	0.69	29.8	3.13
49.35	0920	34	13.17	493	213.5	6.33	0.60	29.8	3.12
	0925	36	13.20	494	211.7	6.34	0.57	30.3	3.17
	0926		SAM	pling	ē ———				
				10					
								~	-4.00 gals purged
									From Tubing
									0810

PURGE MEASUREMENTS

0908

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8/58	Project No.: 146422.10.11.01			
Well I.D.: CCBA-MW2	Date: 01/15/13			
Well Condition:	Weather Condition:			
Method: Portable pump X	Dedicated pump	Pump depth: 117'		

Depth to		Vol.	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	Comments
Water (ft)	hr	(Lgal)		(µ5/cm)	(111)		(1110)	(70)	DOmg/2
	0755		STA	4K+-					
72.06	0816	5	12.50	569	190.1	7.11	0.99	47.2	5.02
72.08		10	12.64	570	184.1	7.23	0.70	57.5	5.46
	0836	15	12.72	571	181.0	7.26	0.64	55.4	5.86
72.10	0846	20	12.59	572	179.7	7.27	0.52	56.3	
72.10	0854	24	12.53	572	179.3	7.27	0,50	57.1	6.07
	0858	26	12.45	572	178.7	7.27	0.44	57.1	6.09
	0904	28	12.51	573	178.1	7.28	0.43	57.9	
72.11	2900	30	12.40	573	178.6	7.28	0.42	57.9	6.18
72.11	0913	32	12.41	573	1789	7.28		57.6	6.14
72.11	0919	34	12.36	573	178.5	7.28	8.45	57.7	6.16
72.10	6914	36	12.34	573	178.3	7.28	0.40	57.4	6.13
	0915		SAT	np/ing					
				<i>· · ·</i>					
								~	4.00 gals purged from tubing
									from tubing
									0805

PURGE MEASUREMENTS

Project Name: SWMU 68 GWM	Project No.: 146422.10.1	Project No.: 146422.10.11.01			
Well I.D.: OBS-MW1	Dete: 01/22/13				
Well Condition: Good	Vell Condition: Good Weather Condition: Cool Fair Sunny				
Method: Portable pump X	Dedicated pump	Pump depth: 153			

$\begin{array}{c c c c c c c c c c c c c c c c c c c $	nments
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72.72 0812 Start - <t< td=""><td>~~~></td></t<>	~~~>
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72.7708491515.58505191.57.161.0536.83.6672.7708592015.80505192.57.140.7736.93.6772.7509092515.96505191.57.140.6337.03.65	
72.77 0859 20 15.80 505 192.5 7.14 0.77 369 3.67 72.75 0909 25 15.96 505 191.5 7.14 0.63 37.0 3.65	
72.75 0909 25 15.96 505 191 5 7.14 0.63 37.0 3.65	
12.75 0909 25 15.96 505 191.5 7.14 0.65 31.0 3.65	
72,76 0919 30 6.09 505 189.8 7.13 0.7' 31.2 3.66	
72.76 0923 32 16.07 505 189.8 7.14 0.60 37.1 3.66	
72.76 0928 34 16.16 505 190.3 7.13 0.60 37.3 3.66	
72.76 0933 36 16.19 505 190.4 7.13 0.66 37.3 3.66	
0934 Sample	$ \rightarrow $
0820	
	, ,
prior to	measuremen

PURGE MEASUREMENTS

Project Name: SWMU 68 GWM	Project No.: 146422.10.11.0	1
Well I.D.: OBS-MW2	Date: 1/21/2013	
Well Condition: Good	Weather Condition: Fair, Co	bol
Method: Portable pump X	Dedicated pump	Pump depth: 252

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments
173.58	0806		5	tart -					~~~~>
	0822	5	13.77	498	216.0	6.97	0.76	36.7	3.79
174.58	0832	10	15.03	500	210.1	1.10	0.54	36.5	3.67
	0843	15	16.09	500	206.1	7.13	0.52		3.62
174.59	0853	20	16.30	501	205.6	7.11	0.59	36.7	
174.54	0904		16.64	501	203.2	7.11	0.61	36.8	3.58
174.51	0915	30	16.90	501	201.6	7.11	0.55	36.8	3.56
174.50	0920	32	16.89	501	201.5	7.11	0.51	36.9	3.57
174.49	0924	34	17.08	501	201.0	7.11	0.53	37.0	3.56
	0929	36	17.07	501	200.8	7.11	0.52	37.0	3.56
	0930			mple					·····>
	- 12								
									0812
									0812 2 4.00 gal purged prior to measurement
									printo measurement

PURGE MEASUREMENTS

Project Name: SWMU 68	Project No.: 146422.10.	11.01
Well I.D.: OBS-MW3	Date: 01/23/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 208

		200 fbit 10							-
Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	(µS/cm)	(mV)	1	(NTU)	(%)	
(ft)				-					Dong/L
69.75	0805		STA	Kt -					
74,13	0824	5	15.12	501	187.9	7.27	0.93	45.1	4.54
75.57	0833	10	15.73	501	187.4	7.22	0.96	451	4.47
76.38	0842	15	16.08	501	185.9	7.19	0.68	45.2	4.44
75.38	6855	20	16.09	501	188.2	7.15	0.58	45.3	4.45
74.95	0906	24	15.62	501	190.0	7.13	0.61	44.7	4.45
74.88	0912	26	15.39	501	190.6	7.12	0.55	44.5	4.44
74.70	0917	28	15.42	501	190.9	7.13	0.56	44.5	4-44
74.62	0922	30	15,30	561	189.9	7.13	0.55	44.3	4.43
	0927	32	15.16	501	190.4	7.13	0.52	44.1	4.42
74.51	0932	34	15.31	501	189.9	7.14	0.59	44.2	4.42
74.44	0937	36	15.29	501	189.5	7.14	0.54	44.2	4.42
	0938					·			
								/	
									-4.00 gals. pursed
									-4.00 gals. purged From tubing
									0814

PURGE MEASUREMENTS

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													Pa	ge <u>1</u> of <u>2</u>
Batch No.	NA				SMO Use								AR/COC 6	14567
Project Name	э:	SWMU 8/58 GWM	Date Samples	Shipped:	11161	13		SMO AL	thorization:	Don	du	-	Waste Characterization	
Project/Task Manager: Clinton Lum Carrier/Way					15079			SMO Contact Phone: See Rottle orden					RMMA	
Project/Task Number: 98026.01.12 Lab Contact					Edie Kent/80	03.556.8	171		Lorraine H	lererra/505	5-844-3199		Released by COC No.	
Service Orde	Service Order: CF262-13 Lab Destina							Send Re	eport to SMC):				√4º Celsius
			Contract No.:		PO 691436				Lorraine H	lererra/505	5-844-3199		Bill to: Sandia National Laboratories (Ac	counts Payable),
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operational	Site:									Albuquerque, NM 87185-0154	
				Depth	Date/Ti	me	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Sample Location D	Detail	(ft)	Collect	ted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
₽ 093341	-001 🥤	CCBA MW1		79	1/16/13	9:26	GW	G	3x40mĺ	HCL	G	SA	TCL VOC (SW846-8260B)	
V 093341	-002 🗸	CCBA MW1		79	1/16/13	9:29V	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093341	-009 🖌	CCBA MW1		79	1/16/13	9;30	GW	Р	500 ml	HNO3	G	SA	TÁL Metals + U (SW846-6020/747	0)
v 093341	-016 ^	CCBA MW1		79	1/16/13	9;31 🖍	GW	Р	125 ml	None	G	SA	Ańions (SW846-9056)	
V 093341	-017 🖌	CCBA MW1		79	1/16/13	9:32	FGW	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)	
r 093341	-018 🗸	CCBA MW1		79	1/16/13	9;33	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	
093341	-020 🛩	CCBA MW1		79	1/16/13	9:34 /	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
093341	-022 1	CCBA MW1		79	1/16/13	9:35	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
4 093341	-024 🛩	CCBA MW1		79	1/16/13	9:38	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
v 093341	-027 🗸	CCBA MW1		79	1/16/13	9:39 🗸	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
Last Chain	:	Yes	:	Sample	Tracking		SMC) Use	Special Ins	tructions	/QC Requir	ements:	Co	onditions on
Validation	Req'd:	∠ Yes	1	Date Ent	ered:				EDD Yes				No	Receipt
Backgroun	d:	Yes	1	Entered	by:				Turnaroun	d Time	<u>7 Da</u>	<u>γ*</u>] <u>15 Day*</u>	
Confirmato	ory:	Yes	(QC inits.	:				Negotiated	TAT				
Sample	N	ame Signat	ure	Init.	Company/	Organizat	ion/Phon	e/Cell	Sample Dis	sposal	Return	n to Client	Disposal by Lab	
Team	Robert L	1.1.41		RL	SNL/4142/844	4-4013/25	0-7090		Return Sar	nples By:				
Members	Alfred Sa	antillanes Alles	Tille	NA	SNL/4142/844	4-5130/22	8-0710		Comments	:	Send report to	Tim Jacksor	n/4142/MS 0729/284-2547	
	William J	. Gibson And Ing	Sille		SNL/4142/844	4-4013/23	9-7367		1					
	frinder of Choose African Array												,F,SO4)Metals(Ca,Mg,K,Na	
	1									e, carbonate) li ion analysis us	•		Lab Use	
1.Relinquishe	ed by H.	Mal Satille	Org. 4142	Date	1/16/13	Time /	03.3	3.Relind	uished by			Org.	Date Ti	me
1. Received b	by OJ	h Velagent	Org. 4142			Time /		3. Rece	ived by			Org.	Date Ti	me
2.Relinquishe			Org.	Date		Time		4.Reling	uished by			Org.	Date Ti	me
2. Received b	ру		Org.	Date		Time		4. Rece	ived by			Org.	Date Ti	me
*Drior confir	mationw	ith SMO required for 7 and	15 day TAT											

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

															ge <u>2</u> of <u>2</u>
	Project Nam	e:	SWMU 8/58 GWM	Project/Tas	sk Manag	ger:	Clinton Lun	ı		Project/Tas	sk No.:	98026.01.1	12		
F	Building:		Room:												Lab use
F					Depth	Date/	Гime	Sample	Cor	ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
	Sample No.	Fraction	Sample Location D	Detail	(ft)	🖞 Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
1	093341	-033 🗸	CCBA MW1		79	1/16/13	9:40	GW	Р	1 L 🥤	HNO3	G	SA	Gamma Spec (short list)(901.0)	
1	093341	-034 🗸	CCBA MW1		79	1/16/13	9:42	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
ił	093341	-035 🚩	CCBA MW1		79	1/16/13	9:44 🛩	GW	Р	1 L	HNO3	G	SA	Isotopic U (HASL-300)	
ł	093342 <	-001 ^	CCBA MW1		79	1/16/13	9:26	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
ł	093342	-002	CCBA MW1		79	1/16/13	9:29 🖌	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
Ŧ	093342	-009	CCBA MW1		79	1/16/13	9:30	GW	Р	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	
ł	093342	-016 /	CCBA MW1		79	1/16/13	9:31 🚧	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
ł	093342	-017	CCBA MW1		79	1/16/13	9:32	FGW	Р	250 ml	HNO3	G	DU	Metals (SW846-6020)	
f	093342	-018	CCBA MW1		79	1/16/13	9:33 -	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
Ŧ	093342	-020 🗸	CCBA MW1		79	1/16/13	9:34 🗸	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	
F	093342	-022 -	CCBA MW1		79	1/16/13	9:35	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	
ſ	093342 ~	-024	CCBA MW1		79	1/16/13	9:38	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	
1	093342	027 20 -026 -	CCBA MW1		79	1/16/13	9:39 🖌	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
4	093342	-033 🛩	CCBA MW1		79	1/16/13	9:40	GW	Р	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	
F	093342	-034 🛩	CCBA MW1		79	1/16/13	9:42	GW	Р	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	
Ŧ	093342	-035 🖌	CCBA MW1		79	1/16/13	9:44	GW	Р	1 L	HNO3	G	DU	Isotopic U (HASL-300)	
ł	093343	-001 🗸	ССВА ТВЗ 🗸		N/A	1/16/13	9:26	DIW	Р	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
ľ															
ſ															
	Recipient Ini	tials													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. SMO Use AR/COC C14265 C14265 Project Natk Manager. SMU B/SB GWM. Date Sampees Support. SMO Authorization. American Support. Watch Cartex-Induces Nature Nateness Nature Nature Natenes Nature Nature Nature Nat	Internal Lab														Page <u>1</u> of <u>2</u>
Project Name: SWMU B25 GVM Date Simple Simplet SM0 AuthorIzing: Sm1 to Sandia National Liboratorie (Accounts Pealed) P 2 SouthorI Izing: Sm1 to Sandia National Liboratorie (Accounts Pealed) P 2 SouthorI Izing: Sm1 to Sandia National Liboratorie (Accounts Pealed) P 2 SouthorI Izing: Sm1 to Sandia National Liboratorie (Accounts Pealed) P 2 SouthorI Izing: Sm1 to Sandia National Liboratorie (Accounts Pealed) P 2 SouthorI III Sm1 to Sandia National Liboratorie (Accounts Pealed) P 2 SouthorI III P 2 SouthorI IIII P 2 SouthorIIIIIII	Batch No.	NA				SMO Use					1	1 /		AR/COC	614565
Project/Task Manager Clinton Lum CarnerWapel No. SMO Contact Prof. Curraine Herrar/3005-844-3199 Rature Service Order. G2522-13 Lab Destinator. GEL Send Report to SMO Polest/Task Manager. Data Destinator. Polest/Task Manager. Polest/Task Manager	Project Nam	ne:	SWMU 8/58 GWM	Date Sample	s Shipped:				SMO Au	uthorization:	In	Jeta	m		
Project/Task.Number: B9028.01.12 Lab Contact: Edic Kent/803.556.8171 Centration Hereira/505-844.3199 Released by Coc No. Let Celsius Service Order: Contract No: PD 691436 Loraine Hereira/505-844.3199 Bito: Sanda Report to SMO: PO 891436 Loraine Hereira/505-844.3199 Bito: Sanda Report to SMO: PO 8091436 PO 809140	Project/Tas	k Manager											5		
Constract No: PO 691436 Lorraine Herera/505-844-3199 Bit ic: Sandia National Laborationes Accounts Psychols P.O. Box 5800, MS-0164 Building: Room: Operational Site: End of the second s	Project/Tas/	k Number:	98026.01.12	-		Edie Kent/8	303.556.8		1					Released by CQC No.	
Constract No: PO 691436 Lorraine Herera/505-844-3199 Bit ic: Sandia National Laborationes Accounts Psychols P.O. Box 5800, MS-0164 Building: Room: Operational Site: End of the second s	Service Ord	er:	CF262-13	Lab Destinati					Send Re	eport to SMC):	8			✓4º Celsius
Building: Room: Operational Site: Alboquerque. NM 87185-0154 Sample No. Fraction Sample Location Detail Depth Date/Time Collected Matrix Type Voice Parameter & Method Sample 093336 -001 CCBA MW2 117 1/15/13 9:15 GW G 3x40ml HCL G SA TCL VOC (SW846-8260B) Image: Sample Dipole 093336 -002 CCBA MW2 117 1/15/13 9:16 GW P 500 ml HNO3 G SA TCL VOC (SW846-8260P) Image: Sample Dipole 093336 -009 CCBA MW2 117 1/15/13 9:16 GW P 125 ml None G SA Anions (SW846-8020) Image: Sample Dipole Image: Sample Dipole<				Contract No.:	1	PO 691436	j		1	Lorraine F	lererra/505	5-844-3199	,	Bill to: Sandia National Laboratories (
Sample No. Fraction Sample Location Detail Depth (ft) DateTime Collected Sample Matrix Container Preserv- Method Collection Sample ID Requested Sample	Tech Area:												,	P.O. Box 5800, MS-0154	
Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 093336 -001 CCBA MW2 117 1/15/13 9:15 GW G 3x40ml HCL G SA TCL VOC (SW846-8220B) ID 093336 -009 CCBA MW2 117 1/15/13 9:17 GW AG 4x1L None G SA TCL SVOC (SW846-8220C) ID 093336 -0016 CCBA MW2 117 1/15/13 9:19 GW P 125 ml None G SA Anions (SW846-9020) ID ID<	Building:		Room:	Operationa	al Site:									Albuquerque, NM 87185-0154	
093336 001 CCBA MW2 117 11/5/13 9:15 GW G 3x40ml HCL G SA TCL VOC (SW846-8260B) 093336 002 CCBA MW2 117 11/15/13 9:17 GW AG 4x1L None G SA TCL VOC (SW846-8260B) 093336 009 CCBA MW2 117 11/15/13 9:18 GW P 500 ml HN03 G SA TAL Metals + U (SW846-8020/7470) 093336 -016 CCBA MW2 117 11/15/13 9:19 GW P 125 ml None G SA Anions (SW846-8020)						Date/T	ſime	Sample		ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab
V 093336 -002 ⁷ CCBA MW2 117 11/15/13 9:17 GW AG 4x1L ⁷ None G SA TCL SVOC (SW846-82270C) V 093336 -009 CCBA MW2 117 11/15/13 9:18 GW P 500 ml HN03 G SA TAL Metals + U (SW846-60207470) V 093336 -016 CCBA MW2 117 11/15/13 9:19 GW P 125 ml None G SA Anions (SW846-9056) V 093336 -017 CCBA MW2 117 11/15/13 9:21 FGW P 250 ml HN03 G SA Metals (SW846-6020) V 093336 -017 CCBA MW2 117 11/15/13 9:22 GW P 125 ml H2SO4 G SA Netals (SW846-6020) 093336 -022 CCBA MW2 117 11/15/13 9:23 GW P 250 ml None G SA Hkalinity (SM2320B) Goddddddddddddddddddddddddddddddddddd	Sample No	. Fraction	Sample Location D	vetail	(ft)	Coller	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
093336 009 CCBA MW2 117 1/15/13 9:18 GW P 500 ml HNO3 G SA TAL Metals * U (SW846-602077470) 093336 -016 CCBA MW2 117 1/15/13 9:19 GW P 125 ml None G SA Anions (SW846-6020) Image: SW846-6020) Image:	v 093336	-001	CCBA MW2		117	1/15/13	9:15	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093336 -009 CCBA MW2 117 1/15/13 9:18 GW P 500 ml HN03 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 (SW846-6020) 093336 -016 CCBA MW2 117 1/15/13 9:27 FGW P 250 ml HN03 G SA Anions (SW846-6020) 093336 -018 CCBA MW2 117 1/15/13 9:22 GW P 125 ml H2SO4 G SA Netals (SW846-6020) 093336 -020 CCBA MW2 117 1/15/13 9:22 GW P 250 ml None G SA Relration (SW846-6020) 093336 -020 CCBA MW2 117 1/15/13 9:23 GW P 250 ml None G SA Alkalinity (SM2320B) Image: Signation (SW846-6020) Sa 093336 -020 CCBA MW2 117 1/15/13 9:24 GW P 250 ml	093336	-002	CCBA MW2	1	117	1/15/13	9:17	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093336 017 CCBA MW2 117 1/15/13 9:21 FGW P 250 m/ HNO3 G SA Metals (SW846-6020) 093336 0.018 CCBA MW2 117 1/15/13 9:22 GW P 125 ml H2SO4 G SA Netals (SW846-6020) 093336 0.02 CCBA MW2 117 1/15/13 9:22 GW P 250 ml None G SA Perchlorate (314.0) G 093336 0.02 CCBA MW2 117 1/15/13 9:23 GW P 500 ml None G SA Alkalinity (SM2320B) G 093336 0.02 CCBA MW2 117 1/15/13 9:26 GW AG 4x1L None G SA HE (SW846-8021A) 093336 0.027 CCBA MW2 117 1/15/13 9:27 GW P 250 ml NoH G SA Total Cyanide (SW846-9012) G Last Chain: Yes Date Entered: EDD Yes No G G Total Cyanide (SW846-9012) </td <td>v 093336</td> <td>-009 /</td> <td>CCBA MW2</td> <td></td> <td>117</td> <td></td> <td>9:18</td> <td></td> <td></td> <td></td> <td>HNO3</td> <td></td> <td>SA</td> <td>-</td> <td>470)</td>	v 093336	-009 /	CCBA MW2		117		9:18				HNO3		SA	-	470)
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 Perchorate (314.0) ^{*/*} 093336 -022 CCBA MW2 117 1/15/13 9:24 GW P 500 ml None G SA Alkalinity (SM2320B) Image: Comparison of the comparison of	093336	-016 /	CCBA MW2		117	1/15/13	9:19	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	
093336 -020 CCBA MW2 117 1/15/13 9:23 GW P 250 ml None G SA Perchlorate (314.0)* Image: constraints of the second seco	093336	-017 /	CCBA MW2		117	1/15/13	9:21	FGW	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)	
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 HE (SW846-8321A) Validation Req'd: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on Validation Req'd: Yes Date Entered: EDD Yes No Receipt Confirmatory: Yes QC inits.: Negotiated TAT Turnaround Time Z Day* 30 Day Members Alfred Santillanes Alfred Santillanes SNL/4142/844-4013/250-7090 Return Samples By: Comments: Sendrepot to Tim Jackson/4142/MS 0728/284-2547 William J. Gibson JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ	093336	-018 /	CCBA MW2		117	1/15/13	9:22 🖌	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	
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 HE (SW846-8321A) Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on Validation Req'd: Yes Date Entered: EDD Yes No Receipt Background: Yes Oc inits: Negotiated TAT Conditions on the context of the conte	093336	-020 /	CCBA MW2		117	1/15/13	9:23 /	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
093336 -027 CCBA MW2 117 1/15/13 9:27 GW P 250 ml NaOH G SA Total Cyanide (SW846-9012) Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on Validation Req'd: Yes Date Entered: EDD Yes No Receipt Background: Yes Qc inits: Negotiated TAT Sample Turnaround Time 7 Day* 15 Day* 30 Day Receipt Confirmatory: Yes Qc inits: Negotiated TAT Sample Turnaround Time 7 Day* 15 Day* 30 Day Members Alfred Santillanes Made Sul/141/2/844-4013/250-7090 Return Sample Sy: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (Filtered in field w/40 micron filter), Anions (Br CI, 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 Multion Org. Date Time A.Received by Org. Date Time 2.Received by Org. Date Time A.God	v 093336	-022	CCBA MW2		117	1/15/13	9:24	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on Validation Req'd: Yes Date Entered: EDD Yes No Receipt Background: Yes Entered by: Turnaround Time 7 Day* 15 Day* 30 Day Confirmatory: Yes QC inits.: Negotiated TAT	093336	-024	CCBA MW2		117	1/15/13	9:26	GW	AG	4x1L /	None	G	SA	HE (SW846-8321A)	
Validation Req'd: Yes Date Entered: EDD Yes No Receipt Background: Yes Ocinits.: Turnaround Time 7 Day* 15 Day* 30 Day Confirmatory: Yes Ocinits.: Negotiated TAT Image: Company Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Members Alfred Santillanes Members Alfred Santillanes Members SNL/4142/844-5130/228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 William J. Gibson Members Alfred Santillanes Members 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 Lab Use 1.Received by Members Members Sml/4142/2 Date ///5//3 Time /0.00 3.Received by Org. Date Time 2.Received by Org. Date Time 4.Received by Org. Date Time	093336	-027	CCBA MW2		117	1/15/13	9:27 🥤	GW	Р	250 mĺ	NaOH	G	SA	Total Cyanide (SW846-9012	.)
Background: Yes Entered by: Turnaround Time 7 Day* 15 Day* 30 Day Confirmatory: Yes QC inits.: Negotiated TAT Image: Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Sample Name SNL/4142/844-4013/250-7090 Return Samples By: Image: Signature Signature Signature	Last Chair	n:			Sample	Tracking		SMO	Use	Special Ins	structions		rements:		Conditions on
Confirmatory: Yes QC inits: Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Reading Robert Lynch Image: Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Members Alfred Santillanes Image: Signature Image: Signature SNL/4142/844-4013/250-7090 Return Samples By: Members Alfred Santillanes Image: Signature SNL/4142/844-5130/228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 William J. Gibson Image: Signature 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 Lab Use 1. Relinquished by Image: Signature Image: Signature Image: Signature Signature Image: Signature 2. Received by Org. Date Image: Signature Signature Signature Signature 2. Received by Org. Date Time Alfred Signature Time Signature	Validation	Req'd:	⊻ Yes		Date Ent	tered:				EDD		🗹 Yes		No	Receipt
Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Ream Robert Lynch Image: Company	Backgrou	nd:	Yes		Entered	by:				Turnaroun	d Time	<u>7 Dav</u>	<u>y*</u>	15 Day* 30 Day	
Team Robert Lynch Image: Sint/4142/844-4013/250-7090 Return Samples By: Members Alfred Santillanes Image: Sint/4142/844-5130/228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 William J. Gibson Image: Sint/4142/844-5130/228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Members Alfred Santillanes Image: Sint/4142/844-4013/239-7367 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 William J. Gibson Image: Sint/4142/844-4013/239-7367 FGW (Filtered in field w/40 micron filter), Anions (Br CI, F, SO4), Metals (Ca, Mg, K, Na) Alkalinity (total bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M Lab Use 1. Received by Image: Sint/4142/2000 Image: Sint/4142/2000 Image: Sint/4142/844-4013/239-7367 Image: Sint/4142/MS 0729/284-2547 1. Received by Image: Sint/4142/844-4013/239-7367	Confirmat	ory:	Yes		QC inits	.:			-	Negotiated	TAT				
Members Alfred Santillanes Santillanes Santillanes Santillanes Santillanes Santillanes Santillanes Lab Use 1. Received by Org. Org. Org. <t< td=""><td>Sample</td><td>N</td><td>lame Assignat</td><td>ure</td><td></td><td>Company</td><td>/Organizat</td><td>tion/Phon</td><td>e/Cell</td><td>Sample Dir</td><td>sposal</td><td>Return</td><td>n to Client</td><td>i Disposal by Lab</td><td></td></t<>	Sample	N	lame Assignat	ure		Company	/Organizat	tion/Phon	e/Cell	Sample Dir	sposal	Return	n to Client	i Disposal by Lab	
William J. Gibson William J. Gibson William J. Gibson William J. Gibson SNL/4142/844-4013/239-7367 FGW (Filtered in field w/40 micron filter), Anions (Br CI, F, SO4), Metals (Ca, Mg, K, Na) Alkalinity (total bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M Lab Use 1. Received by August Augus August Augus Augus August August Augus August Augus August August	Team	Robert L	ynch ynd	~	RL	SNL/4142/84	44-4013/25	0-7090	'	Return Sar	nples By:				
William J. Gibson William J. Gibson William J. Gibson William J. Gibson SNL/4142/844-4013/239-7367 FGW (Filtered in field w/40 micron filter), Anions (Br CI, F, SO4), Metals (Ca, Mg, K, Na) Alkalinity (total bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M Lab Use 1. Received by August Augus August Augus Augus August August Augus August Augus August August	Members	Alfred Sa	antillanes Alled Sa	tille	Att	SNL/4142/84	44-5130/22	28-0710	,	Comments	<i>s</i> :	Send report to	Tim Jacksor	n/4142/MS 0729/284-2547	
1.Relinquished by 0rg. 4/14/2 Date 1/15/13 Time 10:00 3.Relinquished by 0rg. Date Time 1.Received by 0rg. 4/14/2 Date 1/15/13 Time 10:00 3.Relinquished by 0rg. Date Time 1.Received by 0rg. 0rg. 0rg. 0rg. 0rg. 0rg. 0rg. 0rg.		William 、	J. Gibson Millheurs	1 101 10	U18	SNL/4142/84	44-4013/23	9-7367		EGW (Filte	ared in field	d w/40 micro	on filter) /	Anions (Br CI F SO4) Metals	
I.Relinquished by <i>All Constraints All Constratits All Constraints A</i>					1										
1. Received byOrg.Org.V/42DateI/15Time10003. Received byOrg.DateTime2. Received byOrg.Org.DateTime4. Received byOrg.DateTime2. Received byOrg.Org.DateTime4. Received byOrg.DateTime			1		· · ·						,			<i>i</i>	Lab Use
2.Relinquished byOrg.DateTime4.Relinquished byOrg.DateTime2. Received byOrg.Org.DateTime4. Received byOrg.DateTime	1.Relinquish	ied by	U.L.S. tille	_Org.414	2 Date	1/15/1	3 Time /	0:00	3.Relino	uished by			Org	. Date	Time
2. Received by Org. Date Time 4. Received by Org. Date Time	1. Received	by de	of Walaquet	Org. 414	2 Date	1/15-11	3 Time /	1000	3. Recei	ived by			Org.	. Date	Time
	2.Relinquish	ied by		Org.	Date		Time		4.Relina	uished by			Org.	. Date	Time
*Drive confirmation with SMO required for 7 and 15 day TAT				the second se			Time		4. Recei	ived 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} <u>2</u> of <u>2</u> 614565
Project Nam Tech Area: Building:	e:	SWMU 8/58 GWM	Project/Ta	ask Manaç	ger:	Clinton Lun	ו		Project/Tas	sk No.:	98026.01.	12		Lab use
Sample No.	Fraction		Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093336		CCBA MW2		117	1/15/13	9:28	GW	Р	1 L 🤇	HNO3	G	SA	Gamma Spec (short list)(901.	0)
093336	-034 <	CCBA MW2		117	1/15/13	9:29	GW	Р	1 L	HNO3	G	SA	Gross Álpha/Beta (900.0)	
093336	-035 🗸	CCBA MW2		117	1/15/13	9:31 🕤	GW	Р	1 L	HNO3	G	SA	Isotopic U (HASL 300)	
093337	-001 (ССВА ТВ1 🧹		N/A	1/15/13	9:15 <	DIW	Р	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
093338 -	-001 1	CCBA FB1		N/A	1/15/13	9:10 1	DIW 4	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
						.e.								
Recipient In	itials													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to CCBA-MWI

													//	101 40 00111	
Internal Lab															Page <u>1</u> of <u>2</u>
Batch No.	NA					SMO Use								AR/COC	614566
Project Name	e:	SWMU 8/	58 GWM	Date Sample	es Shipped:	1/16/1	3		SMO A	uthorization:	Done	Istans	ant	Waste Characterization	Contraction of the second second second
Project/Task	Manager:	Clinton Lu	um	Carrier/Wayt	bill No.	1567	96		SMO Co	ontact Phone		Bottleo	de		
Project/Task	Number:			Lab Contact:		Edie Kent/8		171		Lorraine H		5-844-3199		Released by COC No.	
Service Orde	r:	CF262-13	}	Lab Destinat	ion:	GEL			Send Re	eport to SMC):			1	⊡4º Celsiu
				Contract No.	:	PO 691436	3			Lorraine H	lererra/50	5-844-3199		Bill to: Sandia National Laboratories	(Accounts Payable
Tech Area:														P.O. Box 5800, MS-0154	
Building:		Room:		Operation	al Site:									Albuquerque, NM 87185-0154	
					Depth	Date/1		Sample		ontainer		Collection		Parameter & Method	Lab
Sample No.	Fraction	San	nple Location D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample
093339	-001 🐔	ССВА ЕВ	1		N/A	1/15/13	10:39	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
093339	-002	ССВА ЕВ	1		N/A	1/15/13	10:40 -	DIW	AG	4x1L ~	None	G	EB	FCL SVOC (SW846-8270C)
093339	-009 🗸	ССВА ЕВ	1		N/A	1/15/13	10:42	DIW	Р	500 ml	HNO3	G	EB	TAL Metals + U (SW846-6020/	7470)
093339	-016 🛩	ССВА ЕВ	1		N/A	1/15/13	10:43 4	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
093339	-017 🖌	ССВА ЕВ	1	-	N/A	1/15/13	10:44 🗸	FDIW	P	250 ml ์	HNO3	G	EB	Metals (SW846-6020)	
093339	-018 🖍	ССВА ЕВ	1		N/A	1/15/13	10:45	DIW	Р	125 ml [*]	H2SO4	G	EB	NPN (353.2)	
093339	-020 V	ССВА ЕВ	1		N/A	1/15/13	10:46	DIW	Р	250 mĺ	None	G	EB	Perchlorate (314.0)	
093339	-022 🗸	ССВА ЕВ	1		N/A	1/15/13	10:47	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)	
093339	-024 🗸	ССВА ЕВ	1		N/A	1/15/13	10:48	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)	
093339	-027 🗸	ССВА ЕВ	1		N/A	1/15/13	10:50	DIW	P	250 mĺ	NaOH	G	EB	Total Cyanide (SW846-901	2)
Last Chain:		Yes	1		Sample	Tracking		SMC) Use	Special Ins	structions		rements:		Conditions on
Validation F	Req'd:	🗹 Yes			Date En	tered:				EDD		V Yes	the second s	No	Receipt
Backgroun		Yes			Entered	by:				Turnaroun	d Time	<u>7 Da</u>	<u>IV*</u>] <u>15 Day*</u>	
Confirmato	ry:	L Yes			QC inits.	:				Negotiated					
Sample	N	ame	Signat		Init.	Company	//Organizat	ion/Phon	e/Cell	Sample Dis	sposal	Retur	n to Client	Disposal by Lab	
Team	Robert Ly	ynch	14/10/10	na	RE	SNL/4142/84				Return Sar	nples By:				
Members	Alfred Sa	Intillanes		tille	100	SNL/4142/84	44-5130/22	8-0710		Comments	:	Send report to	Tim Jacksor	n/4142/MS 0729/284-2547	
	William J	.Gibson 🧃	Wille J.S.l	1/2	KU1X	SNL/4142/84	44-4013/23	9-7367		FDIW (Filte	ered in fiel	d w/40 micr	ron filter).	Anions (Br CI,F,SO4), Metals	
			//	/	0									carbonate) If perchlorate	
	1	100								detected,p	erform ver	ification and	alysis usin	g SW846-6850M	Lab Use
1.Relinquishe			atille	Org.414.		1/16/13			3.Relind	quished by			Org.	Date	Time
1. Received b		hVa	lapert	Org. 414		1/16/1		024	3. Rece	ived by			Org.	Date	Time
2.Relinquishe	· · · · · · · · · · · · · · · · · · ·				Date		Time			uished by			Org.	Date	Time
2. Received b	У			Org.	Date		Time		4. Rece	ived 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 <u>2</u> of <u>2</u> AR/COC 614566 SWMU 8/58 GWM **Project Name:** Project/Task Manager: Project/Task No.: Clinton Lum 98026.01.12 Tech Area: Room: Building: Lab use Preserv- Collection Sample Depth Date/Time Sample Container Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Requested Type Sample ID Gamma Spec (short list)(901.0) 1 L ′ Ρ 093339 -033 < CCBA EB1 N/A 1/15/13 10:52 DIW HNO3 G EB Gross Alpha/Beta (900.0) CCBA EB1 Ρ G EB 093339 -034 < N/A 1/15/13 10:53 DIW 1 L HNO3 1 L 1 G EB Isotopic Ur (HASL -300) -035 🖌 DIW Ρ HNO3 093339 CCBA EB1 N/A 10:54 1/15/13 TCL VOC (SW846-8260B) 093340 -001 ССВА ТВ2 🖌 N/A 1/15/13 10:39 DIW Ρ 3x40ml HCL G TB **Recipient Initials**

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														Page _	1_of_2_
Batch No.	NA				SMO Use					2			AR/COC	614	570
Project Name	e:	SWMU 68 GWM	Date Samples	Shipped:				SMO Au	thorization:	Done	Lelin	L	Waste Characterization		
Project/Task I	Manager:	Clinton Lum	Carrier/Waybill	I No.	1509	6.3	0	SMO Co	ntact Phone	: See	Bottleo	refer			
		98026 01.13	Lab Contact:		Edie Kent/8						5-844-3199	,	Released by COC No.		
Service Order	r:	CF 263-13	Lab Destination	n:	GEL			Send Re	port to SMC):				√ 4°	Celsius
			Contract No.:		PO 130387	3					5.284.2553		Bill to: Sandia National Laboratorie	and the second	
Tech Area:										<u> </u>			P.O. Box 5800, MS-0154		
Building:		Room:	Operational	Site:									Albuquerque, NM 87185-0154		
				Depth	Date/T	ime	Sample	Co	ntainer	Preserv-	Collection	Sample	Parameter & Method		Lab
Sample No.	Fraction	Sample Location De		(ft)	Collec	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	s	Sample ID
093349	001/			450	4/00/40	0.04	014/	0	0		0	<u> </u>	TCL VOC (SW846-8260B)		
093349	-001 🖌	OBS-MW1		153	1/22/13	9:34	GW	G	3x40ml	HCL	G	SA	TCL VUC (SVV840-8260B)		
093349	-002	OBS-MW1		153	1/22/13	9:36 🖌	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-82700	C)	
093349	-009 🗸	OBS-MW1		153	1/22/13	9:37 /	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020	/7470)	
√ 093349	-014 🖌	OBS-MW1		153	1/22/13	9:38 /	GW	Р	250 ml ′	None	G	SA	Hexavalent Chromium (SW84	6-7196A))
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	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)		
093349	-018	OBS-MW1		153	1/22/13	9:41	GW	Р	125 ml [′]	H2SO4	G	SA	NPN (353.2)		5
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:		Yes	5	Sample	Tracking		SMC) Use	Special Ins	structions		rements:		Conditi	tions on
Validation F	Req'd:	⊻ Yes		Date Ent	tered:				EDD		🗹 Yes		No	Rec	ceipt
Background	d:	Yes	1	Entered	by:		(****)		Turnaroun	d Time	<u>7 Da</u>	у* [15 Day* 30 Day		
Confirmato		Yes	(QC inits.	:				Negotiated	TAT					
Sample		ame Signaty	e e	Init.	Company	/Organiza	tion/Phon	e/Cell	Sample Dis	sposal	Retur	n to Client	⊡ Disposal by Lab		
	Robert L		-	ZL	SNL/4142/84	44-4013/25	50-7090		Return Sar	nples By:					
		antillanes Alled Solta	O	cor	SNL/4142/84	44-5130/22	28-0710		Comments	5:	Send report to	Tim Jackson	n/4142/MS 0729/284-2547		
		J. Gibson	.en	INS	SNL/4142/84	44-4013/23	39-7367								
		printing for	ap	94								nions (Br,C	I,F,SO4) Metals (Ca,Mg,K,Na)		
	/	1.							Alkalinity (tota			on analysis i	using SW846-6850M)	Lab	Use
1.Relinguishe	d by A	Mark Satale_	Org. 2/14	2 Date	1/22/11	3 Time	0:30	3.Reling	uished by			Org		Time	
1. Received b	- 174	Sulamuch	Org. 4 140			Time	- 2	3. Rece				Org		Time	
2.Relinguishe			Org.	Date		Time			uished by			Org		Time	
2. Received b			Org.	Date		Time		4. Recei	ived by			Org	Date	Time	
	-	ith OMO an animal fam 7 and 4	C Jaw TAT												

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

														e_2_of_2 4570 ∕
Project Nam	e:	SWMU 68 GWM	Project/Tas	sk Manag	ger:	Clinton Lu	m		Project/Tas	sk No.:	98026 01.1	13		
Tech Area:		•												
Building:		Room:												Lab use
Sample No.	Fraction	Sample Location E	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093349	-027 ′	OBS-MW1		153	1/22/13	9:47	GW	Ρ	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
093349	-033 /	OBS-MW1		153	1/22/13	9:48	GW	Р	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
093349	-034	OBS-MW1		153	1/22/13	9:50	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
093349	-035	OBS-MW1		153	1/22/13	9:52	GW	Р	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	Р	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	
093350	-014	OBS-MW1		153	1/22/13	9:38 🛩	GW	Р	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196	A)
093350	-016	OBS-MW1		153	1/22/13	9:39 -	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
093350	-017 🖍	OBS-MW1		153	1/22/13	9:40	FGW	Р	250 ml	HNO3	G	DU	Metals (SW846-6020) ~	
093350	-018 -	OBS-MW1		153	1/22/13	9:41	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
093350 -	-020 ~	OBS-MW1		153	1/22/13	9:42	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	
093350	-022 1	OBS-MW1		153	1/22/13	9:43	GW	Р	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	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
093350	-033 ′	OBS-MW1		153	1/22/13	9:48 /	GW	Р	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	
093350	-034 <	OBS-MW1		153	1/22/13	9:50 -	GW	Р	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	
093350	-035 -	OBS-MW1		153	1/22/13	9:52	GW	Р	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	ТВ	TCL VOC (SW846-8260B)	
		×												
Recipient Ini	tials						7							

1	nternal Lab	• A /												Р	age <u>1</u> of <u>2</u>
I	Batch No.	NA				SMO Use								AR/COC	614568
Г	Project Name		SWMU 68 GWM	Date Samples	Shipped:	1121/	13		SMO Au	thorization:	Doni	Jata	mit	Waste Characterization	NORMAL TRANSPORTATION OF TRANSPORT
	,		Clinton Lum	Carrier/Waybi		2001	the second se			ntact Phone		Bo HI.	0	RMMA	
			98026 01.13	Lab Contact:		Edie Kent/8		171		Lorraine H	lerrera/505	5-844-3199	24	Released by COC No.	
	Service Order		CF 263-13	Lab Destinatio		GEL			Send Re	port to SMC);				⊿ 4º Celsius
				Contract No.:		PO 1303873	3			Lorraine H	lerrera/505	5-844-3199		Bill to: Sandia National Laboratories (A	and the second
-	Tech Area:											and a start of the start of the		P.O. Box 5800, MS-0154	
-	Building:		Room:	Operationa	I Site:									Albuquerque, NM 87185-0154	
F	Junung.				Depth	Date/Ti	ime	Sample	Co	ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
	Sample No.	Fraction	Sample Location D)etail	(ft)	Collec		Matrix	Туре	Volume	ative	Method	Type	Requested	Sample ID
F				otun			1								
V -	093344	-001	OBS-MW2		252	1/21/13	9:30	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
V	093344	-002 /	OBS-MW2		252	1/21/13	9:32	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
r	093344	-009 🥜	OBS-MW2		252	1/21/13	9:33	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/74	70)
1	093344	-014 /	OBS-MW2		252	1/21/13	9:34	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-7	1964
4	093344	-016 ′	OBS-MW2		252	1/21/13	9:35	GW	·P	125 ml	None	G	SA	Anions (SW846-9056)	
J	093344	-017 ~	OBS-MW2		252	1/21/13	9:36	FGW	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)	
V	093344	-018 ′	OBS-MW2		252	1/21/13	9:37 /	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	
4	093344	-020	OBS-MW2		252	1/21/13	9:38	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
1	093344	-022 /	OBS-MW2		252	1/21/13	9:39	GW	Р	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)	
ŀ	Last Chain:		T Yes	X		Tracking	0.11	1) Use	Special Ins					Conditions on
	Validation F		Yes		Date Ent	-		Onic	030	EDD	a doctorio.	⊻ Yes		No	Receipt
- F										Turnaroun	d Timo	7 Da		15 Dav* 30 Dav	Receipt
	Background		Yes		Entered							<u> </u>	<u> </u>		
ľ	Confirmato		└ Yes		QC inits.		0	in a l'Dhan	-/0	Negotiated		Detur	n to Client	Disposal by Lab	
	Sample		ame Signat		Init.	Company			e/Cell	Sample Dis			Tto Client		
			antillanes Hyster	fla	111	SNL/4142/84		and the second second		Return Sar					
	Members	William .	J. Gibson Mulium	fill 1	WA	SNL/4142/84	4-5130/22	8-0710		Comments		Send report to	Tim Jacksor	n/4142/MS 0729/284-2547	
	-		0		· ·					EGW/Filtered	in field w/40 i	micron filter)A	nions/Br Cl	F,SO4) Metals(Ca,Mg,K,Na	
)Alkalinity(tota	al bicarbonat	e,carbonate)	•		
			100					1. 00	1		detected,per	form verification		using SW846-6850M	Lab Use
Ŀ	1.Relinquishe	d by H	yol Sortille	Org. 3/14		111.1				uished by			Org.		ime
Ŀ	1. Received b	y Do	hadenfor	Org. 414 2		1/21/13	Time 4	129	3. Rece				Org		ime
1	2.Relinquishe	d by	,	Org.	Date		Time		4.Relinc	uished by			Org		Time
1	2. Received b	5	111 0110	Org.	Date		Time		4. Rece	ived by			Org	. Date	ime

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614568 SWMU 68 GWM Project/Task No.: 98026 01.13 Project Name: Project/Task Manager: Clinton Lum Tech Area: Lab use Building: Room: **Collection** Sample Parameter & Method Lab Depth Date/Time Sample Container Preserv Sample ID Method Requested Sample Location Detail (ft) Collected Matrix Type Volume ative Туре Sample No. Fraction 252 9:42 GW P 250 ml NaOH G SA Total Cyanide (SW846-9012) 093344 -027 **OBS-MW2** 1/21/13 G Gamma Spec (short list)(901.0) Ρ HNO3 SA GW 1 L -033 OBS-MW2 252 1/21/13 9:43 093344 Gross Alpha/Beta (900.0) Ρ G SA -034 OBS-MW2 252 1/21/13 9:44 GW 1 L HNO3 093344 Isotopic Uranium (HASL 300) Ρ G SA GW HNO3 -035 **OBS-MW2** 252 1/21/13 9:46 1 L 093344 G OBS-TB1 9:30 DIW G 3x40ml HCL TB VOC (SW846-8260B) 093345' -001 N/A 1/21/13 OBS-FB1 G 9:12 G HCL FB VOC (SW846-8260B) 093346 DIW 3x40ml -001 N/A 1/21/13 **Recipient Initials**

Page 2 of 2

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal L	ab														Page <u>1</u> of _
Batch No	NA					SMO Use								AR/COC	614571
Project N	ame:	SWMU 68 G	νM	Date Sample	s Shipped:	1/2:	3/13		SMO AL	thorization:	Doni) te	me	Waste Characterization	
		r: Clinton Lum		Carrier/Wayb	ill No.	1510			SMO CO	ontact Phone					
		98026 01.13		Lab Contact:		Edie Kent/	803.556.8	171	1			5-844-3199		Released by COC No.	
Service C		CF 263-13		Lab Destinati		GEL			Send Re	eport to SMC):				⊡lº Celsi
				Contract No.:		PO 13038	73			Lorraine H	errera/50	5-844-3199		Bill to: Sandia National Laboratories	
Tech Are	a:							enter en average værdere en av						P.O. Box 5800, MS-0154	
Building		Room:		Operationa	al Site:									Albuquerque, NM 87185-0154	
					Depth	Date/	Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample I	lo. Fractio	n Sample	e Location D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample
09335	2 -001 "	OBS-MW3			208	1/23/13	9:38	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
09335	2 -002	OBS-MW3			208	1/23/13	9:40 /	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-82700	3)
09335		OBS-MW3			208	1/23/13	9:41	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020)	(7470)
09335	2 -014	OBS-MW3			208	1/23/13	9:42	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846	
× 09335		OBS-MW3			208	1/23/13	9:43 *	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	
v 09335	2 -017	OBS-MW3			208	1/23/13	9:44	FGW	Р	250 ml	HNO3	G	SA	Metals (SW846-6020)	
L 09335	2 -018 -	OBS-MW3			208	1/23/13	9:45 /	GW	Р	125 ml	H2SÓ4	G	SA	NPN (353.2)	
09335	2 -020	OBS-MW3			208	1/23/13	9:46 1	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
09335	2 -022	OBS-MW3			208	1/23/13	9:48	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
09335	2 -024	OBS-MW3			208	1/23/13	9:50 <	GW	AG	4x1L	None	G	SA	HE (SW846-8321A Mod)	
Last Ch	ain:	✓ Yes			Sample	Tracking		SMC) Use	Special Ins	structions	QC Requi	ements:		Conditions on
Validati	on Req'd:	⊻ Yes			Date Ent	ered:				EDD		✓ Yes		No	Receipt
Backgro	and the second se	Yes			Entered	by:				Turnaroun	d Time	7 Da	γ*	15 Day* 30 Day	
Confirm		Yes			QC inits.	:				Negotiated	TAT				
Samp		Name	Signațı	ıre	Init.		v/Organizat	tion/Phon	e/Cell	Sample Dis	sposal	Retur	n to Client	t Disposal by Lab	
Team	the second se	J. Gibson	Ilin.A.	B.l.M.	and	SNL/4142/8	<u> </u>			Return Sar					
	rs Robert		Mahr	1 f	12	SNL/4142/8				Comments			Tim Jacksor	n/4142/MS 0729/284-2547	
		Santillanes	1. Sate	11.		SNL/4142/8									
	/ III OU C		mora	ne	-000								nions (Br,C	I,F,SO4)Metals (Ca,Mg,K,Na)	
		1.								Alkalinity(tota			on analysis i	using SW846-6850M	Lab Use
1.Relingu	shed by	ThelSai	10-	.Org. 4/14	/ 2 Date	1/23/1	Time /	10:20	3.Relind	uished by			Org	and the second	Time
and the second se	ceived by Imulalunt Org4/42					1/23/1		1020	3. Rece				Org		Time
				Date		Time			uished by			Org		Time	
2. Receiv				Org.	Date		Time		4. Rece				Org		Time
									1				0		

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

AR/COC 614571

													/	and the second
Project Nan	ne:	SWMU 68 GWM	Project/Ta	sk Manag	jer:	Clinton Lun	n		Project/Ta	sk No.:	98026 01.1	13		
Tech Area:									×					
Building:		Room:	1											Lab use
				Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No	. Fraction	Sample Location E	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample II
093352	-027 ⁽	OBS-MW3		208	1/23/13	9:51	GW	Р	250 mĺ	NaOH	G	SA	Total Cyanide (SW846-9012)	
093352	-033 -	OBS-MW3		208	1/23/13	9:52 🗸	GW	Р	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
093352	-034 /	OBS-MW3		208	1/23/13	9;53 🗸	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
093352	-035 🐔	OBS-MW3		208	1/23/13	9:55 🗸	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
093353	-001	OBS-TB4 ·		NA	1/23/13	9:38	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	
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		_												
											1			
Recipient I								L	I				1	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to 085-Mul

Internal Lab	.10																e_1_of_2
Batch No.	NN					SMO Use									AR/COC	614	1569 1
Project Nam Project/Task	Manager Number:	SWMU 68 GV Clinton Lum 98026 01.13 CF 263-13	VM	Date Sample Carrier/Wayb Lab Contact: Lab Destinati	ill No.	ZODI Edie Kent/ GEL	26 803.556.8		SMO Co	thorization: ontact Phone Lorraine H eport to SMC	e: See				te Characterization IA ased by COC No.		4º Celsiu
				Contract No.:	i e se sobre	PO 13038	73			Lorraine H	lerrera/505	5-844-3199			ndia National Laborato	ries (Acco	unts Payable
Tech Area:		L													00, MS-0154		
Building:	1	Room:		Operationa		D.(.)		0	0		Brocory	Collection	Comple		e, NM 87185-0154	4	Lab
Sample No.	Fraction	Sample	Location D	etail	Depth (ft)	Date/ Colle		Sample Matrix	Туре	ntainer Volume	ative	Method	Sample Type	Pa	Requested		Sample I
093347	-001	OBS-EB1			NA	1/21/13	10:53 V	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 SVO	C (SW846-8270	C)	
093347	-009 ~	OBS-EB1			NA	1/21/13	10:56 🗸	DIW	Р	500 ml	HNO3	G	EB	TAL Metal	s + U (SW846-6020	0/7470)	17
093347	-014	OBS-EB1			NA	1/21/13	10:57	DIW	P	250 ml	None	G	EB	Hexavalen	t Chromium (SW84	16-7196A	
093347	-016	OBS-EB1			NA	1/21/13	10:58	DIW	P	125 ml	None	G	EB	Anions (S	SW846-9056)		
093347	-017	OBS-EB1			NA	1/21/13	10:59 ″	FDIW	Р	250 ml	HNO3	G	EB	Metals (S	SW846-6020)		
093347	-018 /	OBS-EB1			NA	1/21/13	11:00 -	DIW	Р	125 ml	H2SO4	G	EB	NPN (353	3.2)		
093347	-020	OBS-EB1			NA	1/21/13	11:01	DIW	Р	250 ml	None	G	EB	Perchlora	ate (314.0)		
093347	-022	OBS-EB1			NA	1/21/13	11:02	DIW	Р	500 ml	None	G	EB	Alkalinity	(SM2320B)		
093347	-024	OBS-EB1			NA	1/21/13	11:04	DIW	AG	4x1L	None	G	EB	HE (SWE	346-8321A)		
Last Chair	1	☐ Yes			Sample	Tracking	1999 - 1999 -	SMC	Use	Special In	structions	/QC Requi	rements:			Cond	litions on
Validation		✓ Yes			Date En	tered:				EDD		🗹 Yes		No		R	eceipt
Backgrou		Yes			Entered	by:				Turnaroun	nd Time	7 Da	<u>iy*</u>	15 Day*	☑ 30 Day		
Confirmat		Yes			QC inits	·		Galdel ()		Negotiated	TAT b			1			
Sample		Jame	A Signat	ure	Init.	Compan	y/Organiza	tion/Phor	ne/Cell	Sample Di	sposal	□ Retur	n to Clien	t 🗸	Disposal by Lab		
Team	Alfred S	antillanes	UM Sa	tila	1An	SNL/4142/8	44-4013/2	50-7090		Return Sa	mples By:						
Members	William	J. Gibson	Multe	W.	WYA	SNL/4142/8	344-4013/23	39-7367		Comments	s:	Send report to	o Tim Jackso	n/4142/MS 072	9/284-2547		
			01	V						EDWA//Eiltered	in field w/40	micron filtor)	Anione (Br (LE SOA) Metal	ls (Ca,Mg,K,Na)		
										Alkalinity(tota	al,bicarbonate	e,carbonate)					
		1.0 0	2					1	· 8		detected,per	form verificati	on analysis	using SW846-6		and the second second	ab Use
1.Relinquish	ned by	Mak San	tilla	-Org. 2/14		1/21/1	3 Time			quished by			Org		Date	Tim	Concerned of the origination
1. Received	by P	om ala	m	Org. 414	Z Date	1/2/11	🗴 Time	1136	3. Rece				Org		Date	Tim	
2.Relinquish	ned by			Org.	Date)	Time		-	quished by			Org		Date	Tim	
2. Received		with SMO roqui		Org.	Date)	Time		4. Rece	eived by			Org		Date	Tim	e

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2 AR/COC 614569 Project Name: SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.13 Tech Area: **Building:** Room: Lab use Preserv- Collection Sample Depth Date/Time Sample Container Parameter & Method Lab Method Sample ID Sample No. Fraction Sample Location Detail (ft) Collected Matrix Туре Volume ative Туре Requested OBS-EB1 Ρ G EB Total Cyanide (SW846-9012) 093347 -027 🗸 NA 1/21/13 11:05 / DIW 250 ml NaOH Ρ G EΒ Gamma Spec (short list)(901.0) 093347 -033 OBS-EB1 NA 1/21/13 11:06 DIW 1 L HNO3 G EB -034 / OBS-EB1 NA 11:07 DIW Ρ 1 L HNO3 Gross Alpha/Beta (900.0) 093347 1/21/13 OBS-EB1 093347 -035 NA Ρ 1 L HNO3 G EΒ Isotopic Uranium (HASL 300) 1/21/13 11:08 DIW OBS-TB2 ' VOC (SW846-8260B) G TB 093348 -001 NA 10:53 DIW G 3x40ml HCL 1/21/13 **Recipient Initials**

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



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 Modifie	ed		
	093336-024/CCBA MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	093336-024/CCBA MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	093336-024/CCBA MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	093339-024/CCBA EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	093339-024/CCBA EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	093339-024/CCBA EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	093341-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093341-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093341-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	093342-024/CCBA MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093342-024/CCBA MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093342-024/CCBA MW1	p-Nitrotoluene (99-99-0)	UJ, 14
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

6

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-, 15
	093339-016/CCBA EB1	Sulfate (14808-79-8)	UJ, 15

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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447

www.aqainc.net

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.

<u>Blanks</u>

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.

<u>Anions:</u> Sample -004 was diluted 5X, and samples -018 and -030 were diluted 2X for chloride and sulfate.

<u>Nitrate/nitrite:</u> 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



PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

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



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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.

<u>Blanks</u>

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.

<u>ICP-MS:</u> 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



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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.

<u>Blanks</u>

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.

Reviewed by: Monica Dymerski	Level I	Date: 03/09/13
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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-4,6dinitrophenol. 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



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Memorandum

Date:February 27, 2013To:FileFrom:Marcia HilcheySubject: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.

<u>Blanks</u>

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

AR/COC: 614568, 614569, 614570, 614571

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Page 1 of 4

nalytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	c		
	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

AR/COC: 614568, 614569, 614570, 614571

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 Modifi	ied		
	093344-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	093344-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	093344-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	093347-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	093347-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	093347-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	093349-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093349-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093349-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	093350-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	093350-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	093350-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	093352-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	093352-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	093352-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
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

AR/COC: 614568, 614569, 614570, 614571

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+, 15

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



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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+,15**.

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.

<u>Anions:</u> Samples -005, -034, -047, and -061were 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.



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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.



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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.



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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.



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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-4,6dinitrophenol. 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.



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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.