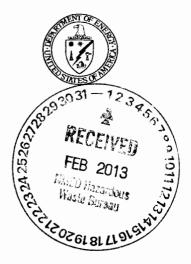




JAN 2 5 2013 CERTIFIED MAIL-RETURN RECEIPT REQUESTED



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

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

Dear Mr. Kieling:

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

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

Sincerely,

Daniel Pellegrino Assistant Manager for Environment, Safety and Health

Enclosure

cc: See Page 2 cc w/enclosure: William Moats, NMED-HWB 5500 San Antonio Dr., NE Albuquerque, NM 87109

Laurie King, EPA, Region 6 1445 Ross Ave., Ste. 1200 Dallas, TX 75202

cc w/enclosure: Thomas Skibitski, NMED-OB, MS-1396 SNL ES&H Records Center, SNL/NM, MS-0718 Zimmerman Library, UNM MSC05 3020 1 University of New Mexico Albuquerque, NM 87101-0001

cc w/o enclosure: Robert Fleming, NA-173, HQ/GTN Joanna Serra, NA-173, HQ/Cloverleaf Amy Blumberg, SNL/NM, MS-0141 Andrew Orrell, SNL/NM, MS-0711 David R. Miller, SNL/NM, MS-0718 John Cochran, SNL/NM, MS-0719 Sarah Summers, SNL/NM, MS-0727 Daniel Pellegrino, SSO/ESH, MS-0184 Joe Estrada, SSO/FP, MS-0184 John Weckerle, SSO/ESH, MS-0184 13-170-490786

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: Environmental Restoration Operations Consolidated Quarterly Report, January 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:

18/13

Date `

S. Andrew Orrell, Director Nuclear Energy & Fuel Cycle Programs Center 6200 Sandia National Laboratories/New Mexico Albuquerque, New Mexico 87185 Operator

and

Sandia Site Office Owner and Co-Operator

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



Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

July – September 2012



January 2013



United States Department of Energy Sandia Site Office

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CONSOLIDATED QUARTERLY REPORT

January 2013

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY: CONTRACTOR: PROJECT MANAGER: SANDIA SITE OFFICE SANDIA CORPORATION John Cochran

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 36

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

REPORTING PERIOD: July – September 2012

OVERVIEW

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

<u>SECTION I</u> :	Environmental Restoration Operations Consolidated Quarterly Report, July – September 2012
<u>SECTION II</u> :	Perchlorate Screening Quarterly Groundwater Monitoring Report, July – September 2012
<u>SECTION III</u> :	Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, July – September 2012
SECTION IV:	Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, July – September 2012

ABBREVIATIONS AND ACRONYMS

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

ND	nondetect
NMED	New Mexico Environment Department
NPDES	National Pollution Discharge Elimination System
NPN	nitrate plus nitrite
NTU	nephelometric turbidity units
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
pCi/L	picocuries per liter
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RPD	relative percent difference
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
ТА	Technical Area
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
ТВ	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, JULY – SEPTEMBER 2012

1.0 Introduction

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

2.0 Environmental Restoration Operations Work Completed

2.1 Mixed Waste Landfill

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

A final plan was completed in August 2012 for reclamation of the MWL Borrow Pit in Technical Area (TA) III (Figure I-1). It defines the scope of work required to adequately stabilize the site and close the National Pollution Discharge Elimination System (NPDES) Construction Permit. The NPDES Permit was established through a Storm Water Pollution Prevention Plan submitted to the U.S. Environmental Protection Agency (EPA) in 2006 as part of the MWL evapotranspirative cover (ET



Figure I-1 View to the North of MWL Borrow Pit, June 2012

Cover) project. Restoration field work is planned for May through June 2013 and will be completed just prior to the 2013 monsoon season (July 2013).

Groundwater monitoring activities for the MWL are discussed in Section I.2.3.4 of this ER Quarterly Report.

2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities

Supplemental watering is performed during extended periods of dry weather to help establish and maintain vegetation on the MWL evapotranspirative cover. Seven supplemental watering events were performed for the MWL ET Cover this reporting period during the month of June. For each watering event, approximately 56,000 gallons of water was applied over a three-day period to stimulate a ¹/₂-inch rainfall event. Water was applied during the morning hours to minimize evaporation.

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

2.1.2 MWL Evapotranspirative Cover Maintenance Activities

Removal of Russian thistle and other common invasive annual weed species from the MWL ET Cover and fenced perimeter was initiated on September 14, 2012. The weed removal work should be completed in October, 2012.

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 in process with the NMED at this time are summarized in Sections I.2.2.1 through I.2.2.3.

2.2.1 Permit Modification Request Submitted in March 2006

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

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

2.2.2 Permit Modification Request Submitted in January 2008

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

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

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

In April 2010, DOE/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 are summarized as follows:

- The section titled, "SWMUs Requiring Additional Corrective Action," specifies additional characterization requirements for:
 - 1. SWMU 68 Old Burn Site
 - 2. SWMU 149 Building 9930 Septic System
 - 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 System (Coyote Test Field [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
 - 2. SWMU 46 Old Acid Waste Line Outfall
 - 3. SWMU 91 Lead Firing Site
 - 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 Building 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
- 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)

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 status are as follows:

- SWMUs 233, 234
- AOC 1115

In a Public Notice and in a letter (both dated September 17, 2012), the NMED solicited public comments, and began a 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 includes SWMU 52. Twenty-three of these 24 SWMUs/AOCs were from the March 2006 and January 2008 requests. In the September 17, 2012, solicitation of public comments, the NMED states that persons who provided public comment by the February 8, 2008, deadline (for the 26 SWMUs/AOCs submitted in March 2006) do not need to resubmit their comments, and may submit additional comments concerning any of the 24 SWMUs/AOCs currently being proposed for CAC status. However, those who requested a public hearing by the February 8, 2008, deadline must request a hearing again.

In summary, of the original 31 SWMUs/AOCs submitted for CAC status (26 in 2006 and 5 in 2008), 5 are undergoing additional groundwater investigations (summarized in Sections I.2.3.8 and I.2.3.9), 3 were granted CAC status, and 23 are still in the CAC

regulatory process (one site, not under the responsibility of 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

The NMED requested additional information on SWMU 52 (Brandwein December 2009a and 2009b, and NMED April 2010). 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 SWMU site (SNL/NM December 2011).

2.3 Site-Wide Hydrogeologic Characterization

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

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

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

Analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2012.

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

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

2.3.1 Technical Area V Groundwater

Groundwater sampling at TA-V was conducted in July and August 2012.

2.3.2 Burn Site Groundwater

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

2.3.3 Tijeras Arroyo Groundwater

Groundwater sampling for the TAG investigation was conducted in August and September 2012.

2.3.4 Mixed Waste Landfill Groundwater

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

2.3.5 Chemical Waste Landfill Groundwater

Groundwater sampling for the CWL was performed in July 2012.

2.3.6 SWMUs 8/58 Groundwater

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

2.3.7 SWMU 68 Groundwater

Groundwater sampling for SWMU 68 was conducted in July 2012.

2.3.8 SWMU 49 Groundwater

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

2.3.9 SWMU 116 Groundwater

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

2.3.10 SWMU 149 Groundwater

Groundwater sampling for SWMU 149 was conducted in September 2012.

2.3.11 SWMU 154 Groundwater

Groundwater sampling for SWMU 154 was conducted in September 2012.

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

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

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

3.0 Long-Term Stewardship Work Completed

3.1 Chemical Waste Landfill

The CWL Post-Closure Care Permit (PCCP) (NMED October 2009) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011), transitioning the CWL from SNL/NM ER to LTS. A summary of post-closure care activities at the CWL for this reporting period is provided in this ER Quarterly Report. More detailed documentation of ongoing activities under the PCCP will be reported in the CWL Annual Post-Closure Care Report (due to the NMED in March 2013).

- NMED approved the CWL Annual Post-Closure Care Report for Calendar Year 2011 (SNL/NM March 2012b) on July 18, 2012 (Kieling July 2012).
- Quarterly inspection of the CWL ET Cover surface, storm-water diversion structures, and security fence was performed on September 14, 2012. Repair work to clear a storm water drainage channel of debris (primarily accumulated weeds) that was blocking more than 1/3 of the drainage channel, noted during the June 20 inspection, was completed on August 13, 2012. No other maintenance or repairs were required.
- The second semiannual groundwater monitoring event and groundwater monitoring well inspection were performed July 5 through 11, 2012. All wells were inspected and no maintenance or repairs were required.
- The annual Biology Inspection of the CWL ET Cover was performed September 18, 2012. No maintenance or repair issues were identified.
- Removal of weeds (dominantly Russian thistle) from the CWL ET Cover, perimeter fence, and surrounding area was performed from September 10 through 13, 2012. Because of the dry conditions, small Fourwing saltbush plants could not be removed with the roots intact, so they will be clipped later in the winter season to ensure a higher mortality rate. Approximately 32 cubic yards of compressed weeds were removed from the CWL and 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 (July through September 2012) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in September 2012. The results will be presented in the 2013 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2013).
- Composite leachate sampling for waste characterization was conducted on July 31, 2012.
- 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 September 7 and September 19, 2012, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. Any findings not already dealt with will be addressed during the next reporting period. The inspection findings are as follows:
 - Excess and undesirable vegetation identified for removal between the site-boundary fence and the base of the containment cell.
 - A few plants that can develop extensive root systems and potentially damage the high-density polyethylene fabric that is part of the cover system were identified growing on the containment cell vegetative cover.
 - The bases of the five primary subliner access tubes on the north side of the containment cell need to be painted.
 - Rope boundary around the RCRA less-than-90-day accumulation area is deteriorating and needs to be replaced.

All excess and undesirable vegetation is scheduled for removal in October by contractor Sequoia Landscaping with oversight from the SNL/NM staff biologist.

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 July 1, 2012 37 gallons
- Leachate waste generated on site during the reporting period 95 gallons
- Leachate waste removed from the site by Hazardous Waste Handling Facility personnel on August 6, 2012 71 gallons
- Leachate waste remaining on site at the end of this reporting period 61 gallons

3.2.2 CAMU Regulatory Activities

On September 27, 2012, DOE/Sandia submitted the 2012 "Corrective Action Management Unit Vadose Zone Monitoring System Annual Monitoring Results Report," to the NMED. It included the results for data collected from July 2011 through June 2012 (SNL/NM September 2012. CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for Calendar Year 2012 was submitted to the NMED on September 27, 2012 (SNL/NM September 2012)

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

CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for Calendar Year 2012 was submitted to the NMED on September 27, 2012 (SNL/NM September 2012)

4.0 **References**

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

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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 Building 6585			
116	Building 9990 Septic System (CTF)			
138	Building 6630 Septic System (TA-III)			
140	Building 9965 Septic System (Thunder Range)			
147	Building 9925 Septic System (CTF)			
149	Building 9930 Septic System (CTF)			
150	Buildings 9939/9939A Septic System and Drain Field (CTF)			
154	9960 Septic System and Seepage Pits (CTF)			
161	Building 6636 Septic System (TA-III)			
196	Building 6597 Cistern (TA-V)			
233	Storm Drain System Outfall			
234	Storm Drain System Outfall			
240	Short Sled Track			
Total	27			
	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)			
1115	Former Offices Septic System (Solar Tower Complex)			
1116	Building 9981 Seepage Pit (Solar Tower Complex			
1117	Building 9982 Drywell (Solar Tower Complex)			
Total	9			

Notes

MWL

ΤA TAG

CCBA	= Coyote Canyon Blast Area.
CTF	= Coyote Test Field.
LWDS	= Liquid Waste Disposal Syst

Coyote Carlyon Blast Area.
 Coyote Test Field.
 Liquid Waste Disposal System.
 Mixed Waste Landfill.

= Technical Area.

= 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
TA-V 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	CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12,
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.

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, JULY – SEPTEMBER 2012

1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Order), between the New Mexico Environment Department (NMED); the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), hereafter 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 Third Quarter of Calendar Year (CY) 2012 (July, August, and September) 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-seventh to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Second Quarter of CY 2012 (SNL/NM February 2006 and October 2012).

Groundwater at Coyote Test Field (CTF) wells CTF-MW2 and CTF-MW3 have been sampled seven times; Solid Waste Management Units (SWMUs) 8/58 wells CCBA-MW1 and CCBA-MW2 have been sampled four times; and SWMU 68 wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled four times (Table II-2). (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 Third Quarter of CY 2012 (July, August, and September) for the wells currently active in the perchlorate-screening program as shown on Figure II-1 and listed in Table II-2. 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 Figure II-2. CYN-MW1D and CYN-MW5 were recently reinstated and are discussed in Section II.3.0.

SNL/NM personnel performed groundwater sampling for perchlorate at seven wells on the dates listed in Table II-2. Several of the wells were installed after the Order was finalized 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 Fourth Quarter, Fiscal Year 2012" (SNL/NM June 2012a).
- "SWMU 68 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012" (SNL/NM June 2012b).
- "SWMU 149 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012" (SNL/NM August 2012a).
- "SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012" (SNL/NM August 2012b).

As described in the Mini-SAPs, groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship 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.

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. 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.

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 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, 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 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 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-4 summarizes current and historical perchlorate results for wells currently in the perchlorate-screening monitoring network. The analytical laboratory COA for the Third Quarter of CY 2012 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, 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 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 June 2012a, June 2012b, August 2012a, August 2012b) were identified during the Third Quarter of CY 2012 sampling activities.

5.0 Summary and Conclusions

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

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 µg/L.
- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate-screening monitoring well network.

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

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Sandia National Laboratories, New Mexico (SNL/NM), August 2012a. "SWMU 149 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2012b. "SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

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

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

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

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Figures



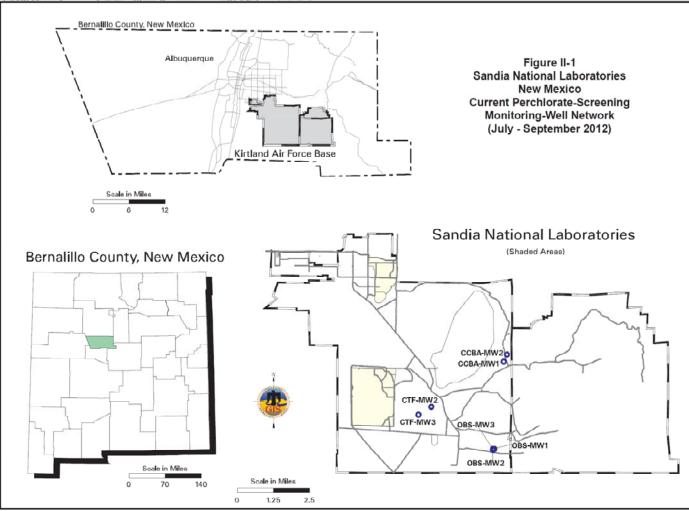


Figure II-1 Sandia National Laboratories, New Mexico Current Perchlorate-Screening Monitoring Well Network, July – September 2012

Tables

Wells Discussed in Previous Perchlorate-Screening Reports

Well
CYN-MW1D
CYN-MW5
CYN-MW7
CYN-MW8
CYN-MW9
CYN-MW10
CYN-MW11
CYN-MW12
LWDS-MW1
MRN-2
MRN-3D
MWL-BW1
MWL-BW2
MWL-MW1
MWL-MW7
MWL-MW8
MWL-MW9
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.

Current Perchlorate Screening Monitoring Well Network Third Quarter, CY 2012

Well	Date Sampled	Number of Consecutive Sampling Events ^a	Remaining Number of Sampling Events ^b	Sampling Equipment
CCBA-MW1	16-Jul-12	4	4	Bennett™ Pump
CCBA-MW2	12-Jul-12	4	4	Bennett™ Pump
CTF-MW2	25-Sep-12	7	1	Bennett [™] Pump
CTF-MW3	21-Sep-12	7	1	Bennett [™] Pump
OBS-MW1	17-Jul-12	4	4	Bennett [™] Pump
OBS-MW2	18-Jul-12	4	4	Bennett™ Pump
OBS-MW3	19-Jul-12	4	4	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).

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

Sample Details for Third Quarter, CY 2012 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	092615-020 092616-020	614288	SWMUs 8/58
CCBA-MW2	092610-020	614286	
CTF-MW2	092862-020	614391	SWMU 154
CTF-MW3	092860-020	614390	SWMU 149
OBS-MW1	092618-020	614289	SWMU 68
OBS-MW2	092620-020	614290	
OBS-MW3	092625-020	614292	
063-10103	092626-020	014292	

Notes

AR/COC	= Analysis Request/Chain of Custody.
CCBA	= Coyote Canyon Blast Area.
CTF	= Coyote Test Field.
CY	= Calendar Year.

Coyote Canyon Blast Area.
Coyote Test Field.
Calendar Year.
Monitoring Well.
Old Burg Site

MW OBS = Old Burn Site.

SWMU = Solid Waste Management Unit.

Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Third Quarter, CY 2012

Well	Sample Date	AR/COC Number	Sample Number	Perchlorate Result ^ª (μg/L)	MDL [♭] (µg/L)	PQL ^c (µg/L)	MCL ^d (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical 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	
CCBA-MW1	10-Jan-12	013930	091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
CCBA-IVIVVI	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jui-12	014200	092616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
	01-1000-11	013003	091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
CCBA-MW2	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-IVIVVZ	24 Apr 12	614157	092296-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jul-12	614286	092610-020	ND	4.0	12	NE	U		EPA 314.0	
	00 Max 11	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	
CTF-MW2	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	20 Mar 12	C1 40EE	091949-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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	
	09-Mar-11	040450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Iviar-11	613450	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	
CTF-MW3	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
	OG Mar 10	614050	091943-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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	

Table II-4 (Continued)

Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network, as of Third Quarter, CY 2012

Well	Sample Date	AR/COC Number	Sample Number	Perchlorate Result ^a (μg/L)	MDL [♭] (µg/L)	PQL ^c (µg/L)	MCL ^d (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f	Analytical Method ⁹	Comments
	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	
OBS-MW1	18-Apr-12	614081	092022-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Api-12	014001	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW2	10-Jan-12	013934	091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	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
OBS-MW3	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
003-101003	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
	19-JUI-12	014292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

Notes

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.
- EPA = U.S. Environmental Protection Agency.
- MW = Monitoring well.
- OBS = Old Burn Site.

^aResult

ND = Not detected (at MDL).

 μ g/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.

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

Notes (continued)

₫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

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.

⁹Analytical Method

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

Perchlorate Screening Groundwater Monitoring Field Water Quality Measurements^a, Third Quarter, CY 2012

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-Jul-12	18.81	482	173.9	6.46	0.33	31.6	2.92
CCBA-MW2	12-Jul-12	18.39	569	141.0	7.37	0.41	62.4	5.86
CTF-MW2	25-Sep-12	18.61	3551	58.6	5.90	0.68	2.0	0.19
CTF-MW3	21-Sep-12	22.11	1653	193.9	6.89	0.34	88.9	7.72
OBS-MW1	17-Jul-12	17.99	498	151.1	7.28	0.41	38.1	3.59
OBS-MW2	18-Jul-12	20.84	494	153.2	7.25	0.32	39.6	3.53
OBS-MW3	19-Jul-12	18.82	537	179.9	7.29	0.37	46.2	4.27

Notes

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

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

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Appendix A Analytical Laboratory Certificates of Analysis for the Perchlorate Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

E	Batch No.	NØ				SMO Use						1		AR/COC	61	4286 -
F	Project/Task I	Manager: Number:	SWMU 8/58 GWM Clinton Lum 98026 01.12 CF 262-12	Date Samples Carrier/Waybi Lab Contact: Lab Destinatio	ill No.	7/(2.1) /4/374 Edie Kent/8 GEL	46	171	SMO Co	ithorization: ontact Phone Lorraine H	lerrera/505		~	Waste Characterization RMMA Released by COC No.		₄º Celsius
	Service Order			Contract No.:		PO 691436			Senu Re		naugh/505	.284.2553		Bill to: Sandia National Laborato		
H	Building:		Room:	Operationa	al Site:									Albuquerque, NM 87185-0154		
F		Fraction		<u>.</u>	Depth (ft)	Date/T Collec		Sample Matrix	Сс Туре	ontainer Volume	Preserv- ative	Collection Method	Sample Type		d	Lab Sample ID
F	092610	-001	CCBA-MW2		117	7/12/12	9:05 🖌	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260	3) 1	307745
F	092610	-002	CCBA-MW2		117	7/12/12	9:07 -	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-827)C)	002
1	092610	-009 ″	CCBA-MW2		117	7/12/12	9:08	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-60)	20/7470)	003
5	092610	-016	CCBA-MW2		117	7/12/12	9:09 1	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)		004
F	092610	-017	CCBA-MW2		117	7/12/12	9:11	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)		307755
F	092610	-018 -	CCBA-MW2		117	7/12/12	9:12 🐔	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)		307745
1	092610	-020 *	CCBA-MW2		117	7/12/12	9:13 1	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		006
F	092610	-022	CCBA-MW2		117	7/12/12	9:14	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		007
F	092610	-024 -	CCBA-MW2		117	7/12/12	9:16 -	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)		008
J	092610	-027 1	CCBA-MW2		117	7/12/12	9:17 🖍	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9	012)	009
Ĩ	_ast Chain	:	Yes		Sample	Tracking		SMC) Use	Special Ins	structions	QC Requir	ements:		Children and a	ditions on
Ŀ	Validation	Req'd:	✓ Yes		Date En	ered:				EDD		✓ Yes	L	No	P R	Receipt
1	Backgroun	d:	Yes		Entered	and the second	<u>ha saist s</u> i			Turnaroun		<u>7 Day</u>	<u>*</u>	15 Day*		
4	Confirmato	ry:	Yes		QC inits	reason and the second se	<u>. 1997 - 1997</u>		소신하는	Negotiated		<u> </u>				
	Sample		Name Signa	ture	Init.		/Organiza		e/Cell	Sample Di			to Client	tisposal by Lab		
	Team	Robert L		10h	EL.	SNL/4142/84			P.0. (100) (100) (100) (100)	Return Sa						
	Members		J. Gibson	AII -	SNL/4142/844-5130/228-0710 Comments: Send report to FGVV (Filtered in field W/40 micr Cations (Ca,Mg,K,Na) Alkalinity If perchlorate detected, perform 1 6850M)							n niter), / total, bic	arbonate,carbonate)		ab Use	
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			with SMO required for 7 an			· () //										Radisconsistent (1999), 64 (1999), 84 (1999)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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Project Nam Tech Area:	e:	SWMU 8/58 GWM	Project/Ta	isk Mana	ger:	Clinton Lur	n		Project/Tas	sk No.:	98026 01.	12		
Building:		Room:												Lab use
Sample No.	Fraction	Sample Location	Detail	Depth (ft)		/Time ected	Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample I
092610	-033-	CCBA-MW2		117	7/12/12	9:18 -	- GW	Р	1L/	HNO3	G	SA	Gamma Spec (short list)(901.0)	010
092610	-034 -	CCBA-MW2	Anna and a second second second	117	7/12/12	9:20	GW	Р	1L 🗸	HNO3	G	SA	Gross Alpha/Beta (900.0) -	011
092610	-035 -	CCBA-MW2		117	7/12/12	9:22 🧹	GW	Р	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	012
092611*	-001	CCBA-TB1 •		117	7/12/12	9:05	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	013
092612	-001	CCBA-FB1 -		117	7/12/12	8:58 1	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	014
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GEL LABORATORIES LLC 2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

			Certificate o	I Alla	<u>17818</u>		Repo	rt Da	te: August	8, 2012
	Company : Address : Contact: Project:	Sandia National Labo MS-0756, Org. 0676 1515 Eubank SE Albuquerque, New M Ms. Pamela M. Puiss Level C, Groundwate	5, Bldg. 823/Rm. 4276 1exico 87123 ant						C	
	Client Sample ID:	092610-020			Project	:	SNLSGW	Vater		
	Sample ID:	307745006			Client l	D:	SNLS003	;		
	Matrix:	AQUEOUS								
	Collect Date:	12-JUL-12 09:13								
	Receive Date:	13-JUL-12			Client l	Desc.:	CCBA-M	[W2		
	Collector:	Client			Vol. Re	ecv.:				
Parameter	Quali	fier Result	DL	RL	Units	DF	Analyst I	Date	Time Batch	Method
Ion Chroma	atography									
	Perchlorate by IC "A	As Received"								
Perchlorate		U ND	0.004	0.012	mg/L	1	MAR1 07/1	9/12	0422 1229390	1
The follow	ring Analytical Meth	ods were performed:								
Method	Descri	ption			Anal	yst Cc	mments			
1	EPA 31	4.0 DOE-AL								

Internal Lab

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

307912 307969

Batch No.	NA				SMO Use								AR/COC	614288 -
Project Name Project/Task Project/Task Service Orde	Manager: Number:	SWMU 8/58 GWM Clinton Lum 98026 01.12 CF 262-12	Date Sample Carrier/Wayt Lab Contact: Lab Destinati	oill No.	7/16/12 14382 Edie Kent/8 GEL	A company	171	SMO Co	uthorization: ontact Phone Lorraine H eport to SMC	lerrera/50	Jolin Bottle 5-844-3199	one	Waste Characterization RMMA Released by COC No.	⊡‡º Celsius
Tech Area: Building:		Room:	Contract No.		PO 691436		a sain di	1	-		5.284.2553	*** ***	Bill to: Sandia National Laboratorie P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Sample No.	Fraction		Detail	Depth (ft)	Date/T Collec		Sample Matrix	Co Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092615	-001 ′	CCBA-MW1		79	7/16/12	9:08 🖌	GW	G	3x40mi	HCL	G	SA	TCL VOC (SW846-8260B)	001
092615	-002	CCBA-MW1	ana ing ang ang ang ang ang ang ang ang ang a	79	7/16/12	9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-82700	C) 602
₽ <u>092615</u>	-009	CCBA-MW1		79	7/16/12	9:12 🖌	GW	Р	500 ml*	HNO3	G	SA	TAL Metals + U (SW846-6020	17470) 003
4 092615	-016	CCBA-MW1		79	7/16/12	9:13-	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	004
₽ <u>092615</u>	-017	CCBA-MW1		79	7/16/12	9:15 🖊	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)	30 469 00 1
092615	-018	CCBA-MW1	a la companya da companya d	79	7/16/12	9:16 -	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	307912
092615	-020	CCBA-MW1		79	7/16/12	9:17	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	007
092615	-022	CCBA-MW1	an an a suite an ann an	79	7/16/12	9:18 -	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	008
092615	-024	CCBA-MW1		79	7/16/12	9:20 -	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	009
4 092615	-027	CCBA-MW1	****	79	7/16/12	9:21	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-90	12) 010
Last Chain: Validation I		✓ Yes ✓ Yes	eutre many and by the decision of the second	Sample Date En	Tracking		SMC) Use	Special Ins	structions	/QC Requi	rements:	No	Conditions on Receipt
Backgroun		Yes	a ann an t-thaile an t-thaile an t-thaile an t-thaile an t-thaile an t-thaile an t-thail and t-thail and t-thai	Entered		<u>an an an an an</u> An tha tha tha		e <u>n an an a</u> Secondaria	Turnaroun	d Time	7 Da	<u>y*</u>	15 Day* JDay	Receipt
Confirmato	ory:	Yes		QC inits.			9424489	jelinenski	Negotiated	TAT				
Sample	N		ature,	Init.	Company	~~~~~		e/Cell	Sample Di	sposal	Retur	n to Client	isposal by Lab	
Team	Robert L	ynch Lavign	sh-	RL	SNL/4142/84	The second se	and the second se		Return Sar	nples By:	Malada and a start of the state			
Members	William J. Gibson William August William J. Gibson William J. Gibson William August SNL/4142/844-4013/239-7367								Cations (Ca	ireo in rieio a,Mg,K,Na) w/40 imcn)Alkalinity (on men, A (total, bica	v4142/MS 0729/284-2547 Anions (۲, ۵, ۲, ۵, ۷4), Irbonate,carbonate) analysis using SW846-	Lab Use
1.Relinquishe	d by	at Satella	_ Org -/14	2 Date	7/16/12	Time 🖊	024	3.Relinc	uished by			Org.	Date	Time
1. Received b	y cher	Valans.	Org. 4/4	2 Date	5/16/12	Time 🖌	024	3. Rece	ived by			Org.	Date	Time
2.Relinquishe	X	quatural	Org.4/4	AND DESCRIPTION OF THE OWNER OF THE OWNER OF	11.01.0		130	4.Relind	uished by			Org.	Date	Time
2. Received b	y h	ke ban how	- Org. Cer	Date	7-17-12	Time C	740	4. Rece	ived by			Org.	Date	Time

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

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Page 1 of 2

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

307912 307969

Project Nam	e:	SWMU 8/58 GWM	Project/T	ask Mana	ger: (Clinton Lun	n	we want an a star with data	Project/Tas	sk No.:	98026 01.1	12		
Tech Area:	6-18-18-18-18-18-18-18-18-18-18-18-18-18-		_											
Building: Sample No.	Fraction	Room: Sample Location	n Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab us Lab Sample
092615	-033	CCBA-MW1		79	7/16/12	9:23	GW	Р	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	011
092615	-034	CCBA-MW1		79	7/16/12	9:25 -	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	012
~ 092615	-035	CCBA-MW1		79	7/16/12	9:27 -	GW	Р	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	013
092616	-001	CCBA-MW1		79	7/16/12	9:08 🖍	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	014
092616	-002	CCBA-MW1		79	7/16/12	9:11	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	019
092616	-009	CCBA-MW1		79	7/16/12	9:12	GW	Р	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	016
092616	-016	CCBA-MW1		79	7/16/12	9:13 -	GW	Р	125 ml	None	G	DU	Anions (SW846-9056) -	01
092616	-017	CCBA-MW1		79	7/16/12	9:15 -	FGW	Р	500 ml	HNO3	G	DU	Cations (SW846-6020)	3079
092616	-018	CCBA-MW1		79	7/16/12	9:16 -	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	30791
092616	-020	CCBA-MW1		79	7/16/12	9:17	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	02
092616	-022	CCBA-MW1		79	7/16/12	9:18-	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	02
092616	-024	CCBA-MW1		79	7/16/12	9:20	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	02
092616	-027	CCBA-MW1		79	7/16/12	9:21	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	02
092616	-033	CCBA-MW1		79	7/16/12	9:23	GW	Р	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	02
092616	-034	CCBA-MW1		79	7/16/12	9:25	f gw	Р	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	02
092616	-035	CCBA-MW1		79	7/16/12	9:27 -	GW	Р	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	02
- 092617	-001	ССВА-ТВЗ		N/A	7/16/12	9:08	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	02
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	1													

Page 2 of 2

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GEL LABORATORIES LLC

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

Certificate of Analysis

				<u>UI I MIU</u>	19515		Report Da	ite: Ai	igust 11	3, 2012
	Company : Address : Contact:	Sandia National Labor MS-0756, Org. 06765, 1515 Eubank SE Albuquerque, New Me Ms, Pamela M, Puissar	Bldg. 823/Rm. 42' exico 87123	76						
	Project:	Level C, Groundwater	Monitoring							
	Client Sample ID:	092615-020			Project	t:	SNLSGWater			
	Sample ID:	307912007			Client	ID:	SNLS003			
	Matrix:	AQUEOUS								
	Collect Date:	16-JUL-12 09:17								
	Receive Date:	17-JUL-12			Client	Desc.:	CCBA-MW1			
	Collector:	Client			Vol. R	ecv.:				
Parameter	Quali	fier Result	DL	RL	Units	DF	Analyst Date	Time	Batch	Method
Ion Chrom	atography									
	Perchlorate by IC "	As Received"								
Perchlorate	•	U ND	0.004	0.012	mg/L	1	MAR1 07/19/12	0539 12	229390	1
The follow	ving Analytical Meth	ods were performed:								
Method 1	Descri EPA 31	ption 4.0 DOE-AL			Anal	yst Co	omments			

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 13, 2012 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: Level C, Groundwater Monitoring Client Sample ID: 092616-020 Project: **SNLSGWater** Client ID: Sample ID: 307912020 SNLS003 Matrix: AQUEOUS Collect Date: 16-JUL-12 09:17 Client Desc.: CCBA-MW1 Receive Date: 17-JUL-12 Collector: Client Vol. Recv.: Qualifier Result RL Units DF Analyst Date Time Batch Method Parameter DL Ion Chromatography EPA 314.0 Perchlorate by IC "As Received" 1 MAR1 07/19/12 0558 1229390 1 Perchlorate U ND 0.004 0.012 mg/L

Analyst Comments

The following Analytical Methods were performed:MethodDescription

- Method 1
 - EPA 314.0 DOE-AL

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	nternal Lab	NA															Page	_1_of_2
I	Batch No.	NA					SMO Use						1			AR/COC	614	4289 -
	Project Name Project/Task I Project/Task I	Manager: Number:	98026 01.	ım 13	Date Samples Carrier/Waybill Lab Contact:	No.	143950 Edie Kent/8)		SMO Co		Errera/505	B.716 an			Characterization		
1	Service Order		CF 263-12	2	Lab Destination		GEL PO 691436	<u> </u>		Send Re	eport to SMC		004 0550					
-	ech Area:				Contract No.:	n de chélaist	PU 091430		ti sedina di	L	Rita Kava	naugh/505	5.284.2553	n Við sland an de de skrift stærara	Bill to: Sandia P.O. Box 5800	National Laboratorie MS-0154		
ļ	Building:		Room:		Operational				1	r			r		f	IM 87185-0154		30798
	Sample No.	Fraction	San	nple Location D	1	Depth (ft)	Date/T Collec		Sample Matrix	Сс Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	1	meter & Method Requested		Lab Sample II
ł	092618	-0011	OBS-MW	1		154	7/17/12	9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		001
i	092618	-002 *	OBS-MW	1		154	7/17/12	9:29 <	GW	AG	4x1L	None	G	SA	TCL SVOC	(SW846-82700	C)	002
-	092618	-0091	OBS-MW	1		154	7/17/12	9:30 -	GW	Р	500 ml	^с нNO3	G	SA	TAL-Metals +	- U (SW846-6020	/7470)	003
4	092618	-014	OBS-MW	1		154	7/17/12	9:31 ~	GW	Р	250 ml	None	G	SA	Hexavalent C	hromium (SW84	6-7196	004
7	092618	-016	OBS-MW	1		154	7/17/12	9:32	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)			005
J	092618	-017	OBS-MW	1		154	7/17/12	9:34 -	FGW	Р	500 ml	HNO3	G	SA	Cations (S)	V846-6020)		30799 001
J	092618	-018	OBS-MW	1							H2SO4	G	SA ·	NPN (353.2	2)		30798 006	
J	092618	-020	OBS-MW	1		154	7/17/12	9:36	GW	Р	250 ml	None	G	SA	Perchlorate	(314.0)		007
-	092618	-022 -	OBS-MW	1		154	7/17/12	9:37	GW	Р	500 ml	None	G·	SA	Alkalinity (S		008	
J	092618	-024	OBS-MW			154	7/17/12	9:39 -	GW	AG	4x1L -	None	G	SA		5-8321A Mod)		009
-	ast Chain:		☐ Yes		5		Tracking		SMC) Use		L	/QC Requir	ements:		/_	Cond	itions on
ŀ	/alidation F	Reg'd:	V Yes	A & C & C & C & C & C & C & C & C & C &	; [Date Ent	ered:				EDD		Yes		0		Re	eceipt
ſ	Background	d:	Yes		E	Entered	oy:	- 130 a ga	and dager	Sectoria	Turnaroun	d Time	7 Day	Ċ	5 Day*	3(√ay		
Ī	Confirmato	ry:	Yes			QC inits.	Nga katakatang katakatang katakatang katakatang katakatang katakatang katakatang katakatang katakatang katakat Nga katakatang katakatang katakatang katakatang katakatang katakatang katakatang katakatang katakatang katakata		in de la seconda d Seconda de la seconda de la second seconda de la seconda de		Negotiated	TAT			Analy and Alan are service advantation and an and a state			
ſ	Sample	N	ame	Signat	ure	Injt.	Company	Organizat	tion/Phon	e/Cell	Sample Dis	sposal	Return	to Client	Ŀ	sposal by Lab		
	Team	William J	. Gibson 🤺	Willington	In 2	UB	SNL/4142/84	4-4013/25	60-7090		Return Sar	nples By:						
	Members	Robert L	/nch	Wayno	he 1	el'	SNL/4142/84	4-5130/22	8-0710		Comments	:	Send report to	Tim Jacksor	V4142/MS 0729/28	4-2547		
		Alfred Sa	ntillanes	Alle Sale	le-	the-	SNL/4142/84	4-5130/22	8-0710							(4), Cations		
				· <i>V</i>			7/17/1	2		(Ca,Mg,K,Na) Alkalinity (total,bicarbonate,ca If perchlorate detected,perform verification ar 6850M						3 SW846-	la	b Use
ŀ	.Relinguishe	d by	Val Sa	tille	-Org. 414	2 Date	1 1 1 1 1 1		0:10	3.Relinc	uished by			Org.	E)ate	Time	- <u>17. (1966</u>)
H	. Received b		h.	1	Org 44 6 2		7/11/12			3. Rece		and a constant of the second secon		Org.		ate	Time	
H	Relinquishe	· v ·	mit	the ?	Org. 414	-	7/11/12		100		uished by			Org.		Jate	Time	ana atap da kata da ka
ţ,	. Received b	V /	The	V. V.	Org. Gel						ived by			Org.		ate	Time	labilatik menangkan menangkan kemana

Page 60 2012-ARCOC (4-2012) 60 of 1103

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Project Nam Tech Area:	e:	SWMU 68 GWM	Project/T	ask Mana	ger:	Clinton Lur	n	an a	Project/Ta	sk No.:	98026 01.1	13		
Building:		Room:	-											Lab us
Sample No.	Fraction	Sample Location	n Detail	Depth (ft)	Date/ Colle		Sample Matrix	Co Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Lab Sample
092618	-027 •	OBS-MW1		154	7/17/12	9:40 丶	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010
092618	-033 、	OBS-MW1		154	7/17/12	9:42	GW	Р	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	011
- 092618	-034	OBS-MW1		154	7/17/12	9:43	GW	Р	1 L	HNO3	G	SA 🗂	Gross Alpha/Beta (900.0)	012
092618	-035	OBS-MW1		154	7/17/12	9:45	GW	Р	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	013
092619	-001	OBS-TB1	an constant of the state of the	NA	7/17/12	9:27	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	014
			CONTROLS IN A CONTRACT OF CONTRACT, A CONTRACT, A		*****									
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		and a state of the second state of the state of the state of the second state of the second state of the second												
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Page <u>2</u> of <u>2</u>

AOP 95-16

GEL LABORATORIES LLC

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

Certificate of Analysis

				Certificate	of Alla	<u>lysis</u>		Rep	ort Da	ite: A	August 1	5, 2012
	Company : Address : Contact: Project:	MS-07 1515 E Albuqu Ms. Pa	National Labo 56, Org. 06765 Jubank SE Jerque, New M mela M. Puissa C, Groundwater	, Bldg. 823/Rm. 42 exico 87123 nt	76							
****	Client Sample ID:	092618		Wontoring		Project	:	SNLSG	Water			
	Sample ID:	307980				Client l		SNLS00				
	Matrix:	AQUE										
	Collect Date:	17-JUI	2-12 09:36									
	Receive Date:	18-JUI	L-12			Client l	Desc.:	OBS-M	W1			
	Collector:	Client				Vol. Re	ecv.:					
Parameter	Quali	fier	Result	DL	RL	Units	DF	Analyst	Date	Tim	e Batch	Method
Ion Chrom	atography				k							
	Perchlorate by IC "	As Recei	ved"									
Perchlorate		U	ND	0.004	0.012	mg/L	1	MAR1 07	/19/12	0617	1229390	1
The follow	ving Analytical Meth	ods wer	e performed:									
Method	Descri					Anal	yst Co	mments		-		
1	EPA 31	4.0 DOE-	AL									

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal	Lab		
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Page <u>1</u> of <u>2</u>

Batch No.	1 1				SMO Upe	í.					10	1	AR/COC	614290
Project Name		SWMU 68 GWM	12 法公司公司提供	oles Shipped:			inesin Silke	-	uthorization:	01	491	1~	Waste Characterization	nan anang sana banyan muta mananan san arga
	-	Clinton Lum 98026 01.13	Carrier/Wa	다 나라는 것 같아?	14			SMO C	ontact Phone		<i>i i i</i>	SMO		
Service Orde		CF 263-12	Lab Conta		Edie Kent/8 GEL	303.556.8	8171				5-844-3199		Released by COC No.	
		01 200-12	Lab Destir Contract N	2012년 1월 1942년	GEL PO 691436			Send R	eport to SMC					⊡ º Cels
Tech Area:			Contractin	0	1.0.031430			L	Rita Kava	inaugh/50	5.284.2553	i i si successi a consequenza da successi da successi da successi da successi da successi da successi da succe	Bill to: Sandia National Laboratories (Accounts Paya
Building:	***********************	Room:	Operatio	nal Site									P.O. Box 5800, MS-0154	20103
		n an	Topoldad	Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample	Albuquerque, NM 87185-0154 30	1
Sample No.	Fraction	Sample Locat	ion Detail	(ft)	Colle		Matrix	Туре	Volume	ative	Method	Type	Parameter & Method Requested	Lab Sample
092620	-001	OBS-MW2		253	7/18/12	9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	00
092620	-002	OBS-MW2		253	7/18/12	9:21	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	000
092620	-009	OBS-MW2		253	7/18/12	9:22	GW	Р	500 ml	НNОЗ	G	SA	TAL Metals + U (SW846-6020/74	
092620	-014	OBS-MW2		253	7/18/12	9:23	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-7	196/ 004
092620	-016	OBS-MW2		253	7/18/12	9:24	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	00
092620	-017	OBS-MW2		253	7/18/12	9:26	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020) 30%	104001
092620	-018	OBS-MW2	a Malana ka sa	253	7/18/12	9:27	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	0(
092620	-020	OBS-MW2		253	7/18/12	9:28	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	0
092620		OBS-MW2		253	7/18/12	9:29	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	00
	-024	OBS-MW2		253	7/18/12	9:32	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	00
ast Chain:		Yes		Sample	Tracking		SMO	Use	Special Ins	tructions	-	ements:		Conditions or
/alidation F		⊻ Yes		Date Ent					EDD		✓ Yes	[lo	Receipt
Background		Yes		Entered					Turnaroun		<u>7 Dav</u>	Ľ	<u>5 Daγ*</u> 3√⊃ay	
Confirmato		L Yes		QC inits.		en en statel.			Negotiated					
Sample		111 112	ignature	Init.			tion/Phone	e/Cell	Sample Dis		Return	to Client	isposal by Lab	
	Robert Ly Alfred Sa		4 nch	10-1	SNL/4142/84			N Waller of Landson and Property	Return San					
	William J		gulle	11.10	SNL/4142/84				Comments	: rea in neia	Send report to W/4U MICIC	Tim Jackson	1/4142/MS 0729/284-2547 AMIONS (UI, SU4), Cations	
	vvillari J.	GIUSOIT WALK	Aug -	(Ca,Mg,K,Na) Alkalinity (total,bicarbonat						arbonate,	carbonate)			
		100000	<i>e</i>	If perchlorate detecte 6850M					l,perform ve	erification	analysis using SW846-	Lab Use		
.Relinquished		Upil scater	17 Date	7/18/12	Contraction of the second s		3.Reling	uished by			Org.	Date 7	ïme	
. Received by	- Y	· · · · · · · · · · · · · · · · · · ·	Mun Org. 41	and the second se	7/18/12	AND ADDRESS OF ADDRESS		3. Rece	,			Org.	Date 1	ïme
2.Relinquished		4NY GERAG	M17 Org. 4/ 4	R	7118/12		1130					Org.	Date 1	ïme
. Received by	/ // /	th SMO required for 7	- Org.	L Date	7-19-10	Time i	0730	4. Recei	ved by			Org.	Date 7	ime

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

			Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.13											4290
Project Nam Fech Area:	e:	SWMU 68 GWM	Project/	Fask Mana	ger:	Clinton Lu	m		Project/Tas	sk No.:	98026 01.1	13		
Building:		Room:												Lab use
Sample No.			n Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample II
092620	-027	OBS-MW2		253	7/18/12	9:33	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010
092620	-033	OBS-MW2	Ni (anno 1997) ann an Anna Anna Anna Anna Anna Anna A	253	7/18/12	9:34	GW	Р	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	011
092620	-034	OBS-MW2		253	7/18/12	9:36	GW	Р	1 L	HNO3	G		Gross Alpha/Beta (900.0)	012
092620	-035	OBS-MW2		253	7/18/12	9:37	GW	Р	1 L	HNO3	G		Isotopic Ur (ASTM D3972-09M)	013
092621	-001	OBS-TB2		N/A	7/18/12	9:19	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	014
092622	-001	OBS-FB1		N/A	7/18/12	9:10	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	015
			ulaus ou Room (Statistic Contract Statistics)											
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arman an a						1014.004.000.000.000.000.000.000.000.000					L			
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Page <u>2</u> of <u>2</u>

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 16, 2012 Sandia National Laboratories Company : MS-0756, Org. 06765, Bldg. 823/Rm. 4276 Address : 1515 Eubank SE Albuquerque, New Mexico 87123 Contact: Ms. Pamela M. Puissant Project: Level C, Groundwater Monitoring Project: **SNLSGWater** Client Sample ID: 092620-020 Client ID: SNLS003 Sample ID: 308103007 Matrix: AQUEOUS Collect Date: 18-JUL-12 09:28 Client Desc.: OBS-MW2 19-JUL-12 Receive Date: Client Vol. Recv.: Collector: Qualifier Result DL RL Units DF Analyst Date Time Batch Method Parameter Ion Chromatography EPA 314.0 Perchlorate by IC "As Received" 0.012 1 MAR1 07/19/12 1744 1230925 1 Perchlorate ND 0.004 mg/L U The following Analytical Methods were performed: Analyst Comments Method Description EPA 314.0 DOE-AL 1

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	Page <u>1</u> of 614292
Project Name		SWMU 68	GWM	Date Samples	Shipped.		2	an an an Sta	SMO A	thorization:	De 1	Sele	1	Wasta	Characterization	0142.32
Project/Task N				Carrier/Waybil		14406			-	ontact Phone	- Can	Patte in	- 0 .		Characterization	
Project/Task N		98026 01.		Lab Contact:		Edie Kent/8		171				5-844-3199	~~		ed by COC No.	
Service Order		CF 263-12	AND MADE AND ADDRESS OF TAXABLE AND ADDRESS OF TAXABLE ADDRESS	- Lab Destinatio	120 M A. A. A. A. A. A.	GEL	estari kut		Send Re	eport to SMC						⊡º Cels
				Contract No.:		PO 691436			1			5.284.2553		Bill to: Sandia	National Laboratorie	
Tech Area:	carocan in its Altra Million (Million)								A					P.O. Box 5800		- (
Building:		Room:		Operational	Site:										IM 87185-0154	3081
Sample No.	Fraction		nple Location E	Detail	Depth (ft)	Date/T Collec		Sample Matrix	Co Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Para	meter & Method Requested	Lat
092625	-001	OBS-MW:	3		209	7/19/12	9:22 🗸	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	00
092625	-002	OBS-MW	3		209	7/19/12	9:25	GW	AG	4x1L ·	None	G	SA	TCL SVOC	(SW846-82700	c) 00
092625	-009	OBS-MW	3		209	7/19/12	9:26	GW	Р	500 ml	HNO3	G	SA	TAL Metals	- U (SW846-6020	17470) 00
092625	-014	OBS-MW:	3		209	7/19/12	9:27 -	GW	Р	250 ml	None	G	SA	Hexavalent	- hromium (SW84	6-7196A) 00
092625	-016	OBS-MW	3		209	7/19/12	9:28-	GW	P	125 ml	None	G	SA	Anions (SW846-9056)		00
092625	-017	OBS-MW	3		209	7/19/12	9:30 •	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)		3081
092625	-018	OBS-MW	3		209	7/19/12	9:31 1	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2	2)	3081
092625	-020	OBS-MW	3		209	7/19/12	9:32 🐔	GW	Р	250 ml	None	G	SA	Perchlorate	(314.0)	00
092625	-022	OBS-MW	3		209	7/19/12	9:34 -	GW	Р	500 ml	None	G	SA	Alkalinity (S	M2320B)	00
092625	-024	OBS-MW	3		209	7/19/12	9:37 🛩	GW	AG	4x1L	None	G	SA	HE (SW846	5-8321A)	04
Last Chain:		✓ Yes			de Charles	Tracking		SMC) Use		structions	/QC Requir	ements:			Conditions or
Validation F		Yes	e save a second construction of the second		Date Ent	ered:				EDD		Yes		lo		Receipt
Background		Yes			Entered		star i se si	h is died	<u>te à étà</u>	Turnaroun	d Time	<u>7 Da</u>	<u>y*</u>	5 Day*	3⊡Day	
Confirmato					QC inits.		an an the second se		1996 - Sa	Negotiated		<u> </u>				
Sample		ame	Signat		Init.	Company			e/Cell	Sample Di			n to Client	L_	isposal by Lab	
	Robert L		full 4m	n	RV	SNL/4142/84				Return Sar	nples By:					
	Alfred Sa		Helson	Gla	SNL/4142/844-5130/228-0710						s: Neo in neir	Send report to	Tim Jackson	√4142/MS 0729/28 ANIONS (€1,5€	34-2547	
	William J		Will A the	ha l	(Ca,Mg,K,Na) Alkalin									iji oddono		
	Jessica S	Salazar ((fersæte	seliga	105	SNL/4142/28	4-6517		ester rotorondea	If perchlora 6850M)	te detected	d,perform ve	erification	analysis using	g SW846-	Lab Use
1.Relinguishe	d by	Mule	etill	Org. 4142	7 Date	7/19/12	Time /	028	3.Relino	uished by			Org.	Г)ate	Time
1. Received b		nud	way the	Org. 4/42	7	5/15/12	Time /	and the second	3. Rece				Org.		late	Time
2.Relinguishe				Org. 414		7/19/17				Org.		Pate	Time			
0. Detailed to	Received by Man Law Org. C										ate	Time				

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614292 SWMU 68 GWM Project Name: Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.13 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Collection Sample Parameter & Method Lab Preserv Collected Matrix Type Method Sample No. Fraction Sample Location Detail (ft) Volume ative Type Requested Sample ID Ρ NaOH 092625 -027 OBS-MW3 209 7/19/12 9:38 / GW 250 ml G SA Total Cyanide (SW846-9012) 010 Ρ G 092625 -033 OBS-MW3 209 7/19/12 9:40 GW 1 L HNO3 SA Gamma Spec (short list)(901.0) 011 1Ĺ Ρ 092625 -034 OBS-MW3 209 HNO3 G Gross Alpha/Beta (900.0) 7/19/12 9:41 GW SA 012 013 Ρ G 092625 -035 OBS-MW3 209 7/19/12 9:43 GW 11.1 HNO3 SA Isotopic U (ASTM D3972-09M) 209 G HCL G TCL VOC (SW846-8260B) 014 092626 -001 OBS-MW3 7/19/12 9:22 / GW 3x40ml DU 015 -002 lobs-mw3 209 7/19/12 9:25 4 GW AG 4x1L None G DU TCL SVOC (SW846-8270C) 092626 Ρ G 092626 -009 OBS-MW3 209 7/19/12 9:26 GW 500[°]ml HNO3 DU TAL Metals + U (SW846-6020/7470) 016 Hexavalent Chromium (SW846-7196A) 017 Ρ G 092626 -014 OBS-MW3 209 7/19/12 9:27 GW 250 ml None DU 018 Ρ G 209 9:28 GW 125 ml None DU Anions (SW846-9056) 092626 -016 OBS-MW3 7/19/12 308186 Ρ G Cations (SW846-6020) DU 092626 -017 OBS-MW3 209 7/19/12 9:30 FGW 500 ml HNO3 002 30818 Ρ H2SO4 G DU -018 OBS-MW3 209 7/19/12 9:31 / GW 125 ml NPN (353.2) 092626 G 020 209 GW Ρ 250 ml None DU Perchlorate (314.0) -020 OBS-MW3 7/19/12 9:32 092626 Ρ None G DU 021 -022 OBS-MW3 209 7/19/12 9:34 GW 500 ml Alkalinity (SM2320B) 092626 022 AG G DU HE (SW846-8321A) 092626 -024 OBS-MW3 209 7/19/12 9:37 GW 4x1L None Ρ 023 250 ml G DU Total Cyanide (SW846-9012) OBS-MW3 209 7/19/12 9:38 GW NaOH 092626 -027 024 209 9:40 GW Ρ 11-HNO3 G DU Gamma Spec (short list)(901.0) 092626 -033 OBS-MW3 7/19/12 025 -034 OBS-MW3 209 7/19/12 9:41 GW Ρ 11 HNO3 G DU Gross Alpha/Beta (900.0) 092626 209 GW Ρ 1L HNO3 G DU Isotopic U (ASTM D3972-09M) 026 092626 -035 OBS-MW3 7/19/12 9:43 ~ DIW G 3x40ml HCL G TCL VOC (SW846-8260B) 027 N/A 9:22 TB 092627 -001 OBS-TB4 7/19/12 Recipient Initials_M

AOP 95-16

Page 2 of 2

GEL LABORATORIES LLC

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

Certificate of Analysis

			Certificate	n Alla	<u>1y 515</u>		Report Da	ate: A	ugust 1′	7, 2012
	Company : Address : Contact:	Sandia National Labo MS-0756, Org. 06765 1515 Eubank SE Albuquerque, New M Ms. Pamela M. Puissa	, Bldg. 823/Rm. 427 exico 87123	6						
	Project:	Level C, Groundwate	r Monitoring							
	Client Sample ID:	092625-020			Projec	t:	SNLSGWater			
	Sample ID:	308184007			Client	ID:	SNLS003			
	Matrix:	AQUEOUS								
	Collect Date:	19-JUL-12 09:32								
	Receive Date:	20-JUL-12			Client	Desc.:	OBS-MW3			
	Collector:	Client			Vol. R	ecv.:				
Parameter	Quali	fier Result	DL	RL	Units	DF	Analyst Date	Time	Batch	Method
Ion Chroma	atography									
	Perchlorate by IC "A	As Received"								
Perchlorate	i cremonate og re	U ND	0.004	0.012	mg/L	1	MAR1 07/26/12	1800 1	232563	1
The follow	ving Analytical Meth	ods were performed:								
Method	Descri	iption			Ana	lyst Co	omments			
1	EPA 31	4.0 DOE-AL								

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

Certificate of Analysis

Report Date: August 17, 2012

	Company : Address : Contact:	MS-0756, 1515 Euba Albuquero Ms. Pame	tional Laboratorie Org. 06765, Bldg ank SE que, New Mexico la M. Puissant Groundwater Mon	. 823/Rm. 427 87123	6					
	Project:	092626-02		normg		Project	:	SNLSGWater		
	Client Sample ID: Sample ID:	30818402				Client I		SNLS003		
	Matrix:	AQUEOU								
	Collect Date:	19-JUL-1								
	Receive Date:	20-JUL-1	2			Client	Desc.:	OBS-MW3		
	Collector:	Client				Vol. R	ecv.:			
Parameter	Qual	ifier Res	sult	DL	RL	Units	DF	Analyst Date	Time Batch	Method
	`									
Ion Chrom) Perchlorate by IC ".	As Receive	d"							
Perchlorate	Teremorate by re	U	ND	0.004	0.012	mg/L	1	MAR1 07/26/12	1857 1232563	1
The follow	wing Analytical Metl	nods were p	erformed:							
Method		ription				Anal	lyst Co	omments		
1	EPA 3	14.0 DOE-AL								

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

-	Internal Lab	.11														Pag	e <u>1</u> of <u>1</u>
	Batch No.	NA					SMO Use	/				-			AR/COO	61	4390
- 1	Project Name		SWMU 14		Date Samples	Shipped:	9/2	4/12		SMO A	uthorization:	Dow	tem	~	Waste Characterizatio	n	CONTRACTOR OF STREET, S
	Project/Task	•			Carrier/Waybi	ll No.	14			SMO C	ontact Phone	: see	Bottle o	2-1	RMMA		
	Project/Task				Lab Contact:		Edie Kent/	803-556-8	171		Lorraine H		5-844-3199		Released by COC No.		
	Service Order	r:	CF0250-	13	Lab Destination	n:	GEL			Send R	eport to SMC):				1	4º Celsius
Ļ					Contract No.:		PO 691436	6			Rita Kava	naugh/505	-284-2553		Bill to:Sandia National Laborate	The second s	And the supervised states and the supervised
Ľ	Tech Area:														P.O. Box 5800, MS-0154		
	Building:		Room:		Operationa	I Site:									Albuquerque, NM 87185-0154		
						Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample			Lab
Ŀ	Sample No.	Fraction	Sa	mple Location D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Type	Requested	lou	Sample ID
Å	092860	-001 -	CTF-MW	3		359	0/01/10	10.05 -	0.44	0	0.40.1						311781
1	032000	-001		J		309	9/21/12	10:25	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-826	<u>)</u> B)	001
1	092860	-009 🖍	CTF-MW	3		359	9/21/12	10:26 -	GW	Р	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/	6020/7470	311781
~	092860	-010 -	CTF-MW	<u>́</u>		250	0/04/40	40.00	50111	-			-				311783
"	092000	-010 -		3		359	9/21/12	10:28 -	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/	6020/7470	· · ·
N	092860	-016 1	CTF-MW	3		359	9/21/12	10:29 /	GW	Р	125 ml	4C	G	SA	Anions (SW846-9056)		311781 003
Ţ		040	OTT LAN	•											1		311781
1	092860	-018 -	CTF-MW	3		359	9/21/12	10:30	GW	Р	125 mľ	H2SO4	G	SA	NPN (EPA 353.2)		004
1	092860	-020 🕤	CTF-MW	3		359	9/21/12	10:31	GW	Р	250 ml	4C	G	SA	Perchlorate (314.0)		311787
	000000	000	OTE MAN	0		0.5.0									1		2005
×.	092860	-022 -	CTF-MW	3	NEX	359	9/21/12	10:32	GW	Р	500 ml	4C	G	SA	Alkalinity (SM2320B)		006
1	092861	-001 -	CTF-TB1			na	9/21/12	10:25 🤇	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260	ופו	311787
ſ															102 100 (011040-020)		007
ŀ				Constant of the second s													
Ī	Last Chain:		Yes			Sample	Tracking		SMO	Use	Special Ins	tructions	OC Requir	ements:	1	Con	L ditions on
5	Validation F	Req'd:	🗹 Yes			Date Ent	ered:				EDD		Yes	·	No		eceipt
h	Background	d:	Yes	an a		Entered I	bv:	antennen mit op Stanson womenten			Turnaroun	d Time	7 Dav		15 Day* 30 Day	ħ "	eceipt
-	Confirmato		Yes			QC inits.		**************************************			Negotiated				13 Day	+	
F	Sample		ame	Signatu		Init.		y/Organizat	ion/Phone	الم)	Sample Dis		Poture	to Client			
	• •	Robert Ly		the second s	ch		SNL/4142/5				Return San				Disposal by La	-	
	t i i	Alfred Sa		Allas	The l		SNL/4142/5	Production of the local division of the loca								-	
		William G		VILIT:NO	HA E	771771		The second s			Comments Report alka				/4142/MS 0729/284-2547		
		vvinarii e		MILL AND ALL	ap 4	V/A	SNL/4142/5	00-284-330	1/505-239	9-7367	RECIESO	innity (as 1)	orate dotool	HUU3,C	O3). Anions (as rm verification analysis		
				V /	/	<u> </u>					using SW84	6-6850M	FGW- Filto	red in field	d w/.45 micron filter.		
F		1	10 -		<u> </u>			and the state of the second	***************************************	-						La	ib Use
-	.Relinquishe		get y		Org. 4/4;		Sugar statements	2 Time / C		3.Reling	uished by		Second and a state of the second s	Org.	Date	Time	
-	. Received b		repals	The second s	Org. 4142	and the second se	9/21/2	and the later with the second data and the second se	interesting of the second states and the sec	3. Recei	ved by			Org.	Date	Time	
	Relinquishe	- All	14.99	ghales to a formation and a second	Org. 4147		9/24/12		800	4.Reling	uished by			Org.	Date	Time	
	. Received by	and the second se	Concession of the owner owner owner owner owner	to the second distance is not a second distance of the second distan	Org. Cel	Date	9-15-10	L Time d	2740	4. Recei	ved by			Org.	Date	Time	
*	Prior confirm	nation wi	ith SMO re	quired for 7 and	15 day TAT		•							<u>_</u>			

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

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

Certificate of Analysis

Report Date: October 22, 2012

	Company : Address : Contact: Project:	MS-0756, Org 1515 Eubank S Albuquerque, Ms. Pamela M	New Mexico 871	23	76					
	Client Sample ID:			115		Projec	:t:	SNLSGWater		
	Sample ID:	311781005				Client	ID:	SNLS003		
	Matrix:	AQUEOUS								
	Collect Date:	21-SEP-12 10:	31							
	Receive Date:	25-SEP-12				Client	Desc.:	CTF-MW3		
	Collector:	Client				Vol. F	lecv.:			
Parameter	Quali	fier Result		DL	RL	Units	DF	Analyst Date	Time Batch	Method
Ion Chroma	atography									
EPA 314.0	Perchlorate by IC "A	As Received"								
Perchlorate	-	U ND	0	.004	0.012	mg/L	1	MAR1 10/09/12	2256 1249257	1
The follow	ving Analytical Meth	ods were perfor	med:							
Method 1	Descri EPA 31	ption 4.0 DOE-AL				Ana	lyst Co	mments		

Page SMO 2012-ARCOC (4-2012) of 1427 Internal Lab

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab	.1													Page	e_1_of_2
	Batch No. /	VA				SMO Ușe)				đ	11		AR/COC	614	391
	Project Name	э: `	SWMU 154 GWM	Date Samples \$	Shipped:	9/2			SMO AL	thorization	RA	4-12	~	Waste Characterization	atindeticiai dell'hannely i annym oga	A (1944) FOI (1974) FOI (1974) FOI (1974)
- 1		0	: Clinton Lum	Carrier/Waybill	No.	14	6791	/	SMO Co	ontact Phon	e:	9	NED	RMMA		
	Project/Task	Number:	98026.01.15	Lab Contact:		Edie Kent/	803-556-8	8171]	Lorraine I	Herrera/50	5-844-3199		Released by COC No.		
	Service Orde	er:	CF0251-13	Lab Destination	1:	GEL			Send Re	eport to SM	0:	an an an an an Antala da Antala an an Antala da Antala	*****			4º Celsius
				Contract No.:		PO 691436	3		1	Rita Kava	anaugh/50	5-284-2553		Bill to:Sandia National Laboratorie		
	Tech Area:		ning and die fan de		indestrum consola	***********	Fleibill Blitis dan de la faceta de la companya cu	1994 - Harrison Carrowsky, 1994			in the state of the			P.O. Box 5800, MS-0154		
	Building:	and and any second office dependences of	Room:	Operational	Site:									Albuquerque, NM 87185-0154		
					Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection	Sample	Parameter & Metho	d	Lab
	Sample No.	Fraction	Sample Location D	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	-	Sample ID
,	000000	001	OTE MAND		100	0/05/40	0.07	0.01		0.0.10			0.4			311899
	092862	-001	CTF-MW2		129	9/25/12	9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
"	092862	-002	CTF-MW2		129	9/25/12	9:39	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270	C)	002
,	000000	000	OTE MINIO		400	0/05/40	0.40	GW	Р	500			<u> </u>			002
	092862	-009	CTF-MW2		129	9/25/12	9:40	GW	<u>Р</u>	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/60	20/7470)	003
•	092862	-010	CTF-MW2		129	9/25/12	9:42	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/60	20/7470)	001
,	000000	0.10	OTE MINIO		100	0105140	0.40	0111		105	10		~	A		311899
1	092862	-016	CTF-MW2		129	9/25/12	9:43	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)		311899
	092862	-018	CTF-MW2		129	9/25/12	9:44	GW	Р	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		005
	092862	-020	CTF-MW2		129	9/25/12	9:45	GW	Р	250 ml	4C	G	SA	Perchlorate (314.0)		311894
	092002	1-020			129	9123112	9.45	1 0 1		230 111			54	Ferciliorate (314.0)		311844
*	092862	-022	CTF-MW2		129	9/25/12	9:46	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)		007
,	092862	-024	CTF-MW2		129	9/25/12	9:48	GW	AG	4x1L	4C	G	. SA	High Explosives (SW846-	9221 A MA	311879
•	092862	1-024			129	9/20/12	9.40	Gvv	AG	4X1L	40	6	. 5A	Trigit Explosives (SVV040-	552 TA IVIC	311819
*	092862	-033	CTF-MW2		129	9/25/12	9:49	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy(short	ist)(901.0)	
	Last Chain	:	Ves	s	Sample	Tracking		SMC) Use	Special In	struction	s/QC Requ	irements:		Condit	tions on
	Validation	Req'd:	∠ Yes	C	Date Enf	ered:				EDD		🗹 Yes		No	Red	ceipt
	Backgroun	ıd:	Yes	E	Intered	by:				Turnarou	nd Time	7 Da	<u>у*</u>	<u>15 Day</u> *		
	Confirmato	ory:	Yes	G	C inits.					Negotiate	d TAT					
	Sample	l N	lame , Sigpat	ture /	Init.	Compan	y/Organiza	ation/Phon	e/Cell	Sample D	isposal	L Retur	n to Client	Disposal by Lab		
	Team	Robert L	ynch Certifi	sh 1	Z	SNL/4142/5	05-844-40	13/505-25	0-7090	Return Sa	mples By	:				
	Members	Alfred S	antillanes	T.A.	dr	SNL/4142/5	05-844-51	30/505-22	8-0710	Comment	s:	Send report to	Tim Jackson	n/4142/MS 0729/284-2547		
	members	William		B. Int	2. 5 17	SNL/4142/5				4				CO3). Anions (as		
		VVIniciti	and another	april the	4					Br,CI,F,SC	04) If Percl	hlorate dete	cted, perf	orm verification analysis		
					*					using SW8	846-6850N	1			lah	Use
	1.Relinguishe	d by	Apl Satille	Org. 4142	Date	9/25/12	Time 1	074	3 Relinc	L uished by			Org.	Date	Time	
	1. Received I			Org. 4142		9 25 13			3. Rece	·			Org.		Time	
	2.Relinguishe			Org. 4142		and a state of the	2		+	uished by			Org.		Time	
	2. Received t	States	Me oting	-Org. Ger				1	1	· · · · · · · · · · · · · · · · · · ·			Org.	allenanen och ander her ander som ander and and	Time	an a
- 1	2. RECEIVED I	Jy 🖌	ne Trins	Uly. Och	- Date	4706-10-	, nme (- 155 -	14. Rece	wea by			Urg.	Date	rime	1

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

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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

				-								+0	AR/COC 61	4391
Project Nam	e:	SWMU 154 GWM	Project/Ta	ask Manag	jer:	Clinton Lu	n		Project/Ta	sk No.:	980	026.01.15		
Tech Area:		•												
Building:		Room:			T Bit left sin Hanna an Konpoura, pour					*				Lab use
				Depth	Date/		Sample		ntainer		Collection		Parameter & Method	Lab
Sample No.			Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
092862	-034	CTF-MW2		129	9/25/12	9:50	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	311894 010 311899 011
092862	-035	CTF-MW2		129	9/25/12	9:51	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium(ASTM D3972-09M)	011
092863	-001	CTF-TB2		NA	9/25/12	9:37	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	311844 012
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AOP 95-16

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: October 18, 2012

	Company : Address :	MS-0756, Or 1515 Eubank Albuquerque	, New Mexico 871		76						
	Contact: Project:	Ms. Pamela l	undwater Monitori	na							
	Client Sample ID: Sample ID: Matrix: Collect Date: Receive Date: Collector:	092862-020 311894006 AQUEOUS 25-SEP-12 0 26-SEP-12 Client		пд		Projec Client Client Vol. R	ID: Desc.:	SNLSGWater SNLS003 CTF-MW2			
Parameter	Quali	fier Result		DL	RL	Units	DF	Analyst Date	Time	Batch	Method
Ion Chrom	atography										
	Perchlorate by IC "	As Received"									
Perchlorate		U NE	0	.004	0.012	mg/L	1	MAR1 10/09/12	2354 1	249257	1
The follow	ving Analytical Meth	ods were perfe	ormed:								
Method 1	Descr EPA 31	iption 4.0 DOE-AL	1			Ana	lyst Co	mments			

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





AR/COC: 614286, 614287

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC	2		
	092610-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	092613-035/CCBA-EB1	Uranium-233/234 (N/A)	BD, FR3
	092613-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092613-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	092610-034/CCBA-MW2	ALPHA (12587-46-1)	J, FR7
	092610-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
	092613-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3
	092613-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	092610-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	092610-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092610-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092610-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	092613-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	092613-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092613-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092613-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092610-009/CCBA-MW2	Copper (7440-50-8)	0.00285U, B
	092610-017/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	092613-009/CCBA-EB1	Copper (7440-50-8)	0.00285U, B
	092613-017/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
SW846 3535/8321A Modifie	ed		
	092610-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14

AR/COC: 614286, 614287

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092610-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	092610-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	092613-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	092613-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	092613-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8270C			
	092610-002/CCBA-MW2	2,4-Dinitrophenol (51-28-5)	UJ, C3
	092613-002/CCBA-EB1	2,4-Dinitrophenol (51-28-5)	UJ, C3
SW846 9012B			
	092610-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, B4, I5
	092613-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, B4, I5



Memorandum

Date: September 5, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GW Characterization AR/COC: 614286, 614287 SDG: 307745 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>

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

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

<u>Perchlorate</u>: The CCV %R was >110%. However, the associated sample results were all NDs and, therefore, will not be qualified.

<u>Blanks</u>

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

Anions:

In the EB, chloride, fluoride, and sulfate were detected. However, the EB was not associated with samples in this data package. Therefore, sample data will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN:

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

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted with the following exceptions.

Anions & Nitrate/Nitrite as Nitrogen:

Sample 307745-004 was diluted 5X for chloride and sulfate and sample -005 was diluted 5X for nitrate/nitrite as nitrogen due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

Other QC

One EB was submitted on the AR/COCs. The EB did not apply to any samples on these COCs.

No other specific issues that affect data quality were identified.



Memorandum-revised

Date: October 18, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 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

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

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were ND and will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

<u>Perchlorate</u>: The CCV %R was >110%. However, the associated sample result was ND and, therefore, 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 MB at < PQL. The associated sample results were > 5X the MB concentration and will not be qualified. Chloride, fluoride, and sulfate were detected in EB sample 307745-018 from COC 614287. All associated sample results were > 5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

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

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

Both samples were diluted 5X for chloride, sulfate, and nitrate/nitrite. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

Other QC

One EB was submitted on COC 614287 associated with this COC. Field duplicate pairs were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by:Monica DymerskiLevel IDate: 10/16/12





AR/COC: 614288

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RO	с		
	092615-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	092616-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
EPA 900.0/SW846 9310			
	092616-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	092615-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	092615-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092615-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092615-033/CCBA-MW1	Potassium-40 (13966-00-2)	R, Z2
	092616-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	092616-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092616-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092616-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3,RP1
SW846 3005/6020 DOE-AL			
	092615-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	092616-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
SW846 7470A			
	092615-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	092616-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	092615-001/CCBA-MW1	Toluene (108-88-3)	1.00U, B2
	092616-001/CCBA-MW1	Toluene (108-88-3)	1.00U, B2
SW846 8270C			
	092615-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, C3
	092615-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	R, 15
	092616-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, C3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092616-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	R, I5
SW846 9012B			
	092615-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	092616-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4



Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 307986 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>

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

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, 15, B4**.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

<u>Perchlorate</u>: The CCV %R was >110%. However, the associated sample result was ND and, therefore, 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 recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

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

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

The sample was diluted 10X for chloride and sulfate and 5X for nitrate/nitrite as nitrogen due to overrange concentrations. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/10/12





AR/COC: 614289

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
DUE EIVIL HASL-SUU, U-UZ-KC	092618-035/OBS-MW1	Uranium-235/236 (13982-70-2)	J, FR7
EPA 901.1	-		
	092618-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	092618-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092618-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092618-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092618-009/OBS-MW1	Copper (7440-50-8)	J+, DL2
	092618-009/OBS-MW1	Uranium (U)	J, D1
SW846 3535/8321A Modifie	d		
	092618-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	092618-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092618-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092618-009/OBS-MW1	Mercury (7439-97-6)	UJ, I5, B4
SW846 8270C			
	092618-002/OBS-MW1	2,4-Dinitrophenol (51-28-5)	UJ, C3
SW846 9012B			
	092618-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15, B4





AR/COC: 614290, 614291

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	С		
	092623-035/OBS-EB1	Uranium-233/234 (N/A)	BD, FR3
	092623-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092623-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	092623-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	092623-034/OBS-EB1	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092620-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	092620-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092620-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092620-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	092623-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	092623-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092623-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092623-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092620-009/OBS-MW2	Calcium (7440-70-2)	J, D1
	092620-009/OBS-MW2	Cobalt (7440-48-4)	0.0005U, B3
	092620-009/OBS-MW2	Uranium (U)	J, RP2
	092623-009/OBS-EB1	Calcium (7440-70-2)	UJ, D1
	092623-009/OBS-EB1	Sodium (7440-23-5)	UJ, B4
	092623-009/OBS-EB1	Uranium (U)	UJ, RP2
SW846 3535/8321A Modifi	ed		
	092620-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	092620-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14

AR/COC: 614290, 614291

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092620-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	092623-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	092623-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	092623-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092620-009/OBS-MW2	Mercury (7439-97-6)	UJ, 15,B4
	092623-009/OBS-EB1	Mercury (7439-97-6)	UJ, 15,B4
SW846 9012B			
	092620-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4
	092623-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4
SW846 9056			
	092623-016/OBS-EB1	Chloride (16887-00-6)	0.995UJ, B,I5



Memorandum

Date:	September 14, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614290, 604291 SDG: 308103 Laboratory: GEL Project/Task: 98026.01.13 Analysis: General Chemistry

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

Summary

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

Anions:

- 1. The ICAL intercept for chloride was > the MDL. The associated result of sample 308103-020 was a detect <3X the intercept and, therefore, will be **qualified J+,I5**. It should be noted that this sample result required further qualification for MB contamination.
- 2. In the MB, chloride was detected but < the PQL. The associated result of sample -020 was a detect <5X the blank concentration and, therefore, will be **qualified 0.995U,B** at 5X the MB value.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,I5,B4**.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

<u>Blanks</u>

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

Anions:

In the EB, chloride was detected. However, this sample was qualified ND due to MB contamination, and it also did not apply to any samples in this data package.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Anions & Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions & Nitrate/Nitrite:

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

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

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

Other QC

One EB was submitted on the AR/COC. No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey Date: 09/17/12



Memorandum

Date: September 21, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614292 SDG: 308184 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>

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

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. The associated sample results were all NDs and, therefore, will be **qualified UJ,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

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

Anions:

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

<u>Blanks</u>

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

Anions:

In the MB, chloride was detected but < the PQL. However, the associated sample results were all >5X the blank concentration and, therefore, will not be qualified. In the EB (COC 614291), chloride was detected. However, this sample was qualified ND due to MB contamination and, therefore, was not applied to associated field sample results.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Alkalinity, Anions, and Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Alkalinity, Anions, and Nitrate/Nitrite:

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

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite:

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

Other QC

One EB was submitted on COC 614291. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

Reviewed by: Marcia Hilchey

Date: 09/24/12





AR/COC: 614292

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	092625-034/OBS-MW3	BETA (12587-47-2)	NJ+, B7
	092626-034/OBS-MW3	BETA (12587-47-2)	NJ+, B7
EPA 901.1			
	092625-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	092625-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	092625-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	092625-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	092626-033/OBS-MW3	Americium-241 (14596-10-2)	BD, Z2
	092626-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	092626-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	092626-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	092625-009/OBS-MW3	Vanadium (7440-62-2)	0.0059U, B
	092626-009/OBS-MW3	Vanadium (7440-62-2)	0.0059U, B
SW846 3005/6020 DOE-AL			
	092625-009/OBS-MW3	Copper (7440-50-8)	0.0061UJ, B2
	092626-009/OBS-MW3	Copper (7440-50-8)	0.0061UJ, B2
SW846 3535/8321A Modifi			
	092625-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	092625-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	092625-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
	092626-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	092626-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	092626-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092625-009/OBS-MW3	Mercury (7439-97-6)	UJ, 15,B4
	092626-009/OBS-MW3	Mercury (7439-97-6)	UJ, 15,B4
SW846 8260B DOE-AL			
	092625-001/OBS-MW3	Toluene (108-88-3)	1.0U, B2
	092626-001/OBS-MW3	Toluene (108-88-3)	1.0U, B2
SW846 9012B			
	092625-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, 15
	092626-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, 15



Memorandum

Date: November 6, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614390 SDG: 311781 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 by IC), and SM2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

Perchlorate:

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

<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.

Anions:

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.

Anions:

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 20X for chloride and sulfate.

<u>Nitrate/nitrite:</u> The sample was diluted 25X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica D ⁴	ymerski Lev	el I Date: 11	/06/12



Sample Findings Summary



AR/COC: 614390

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	092860-009/CTF-MW3	Sodium (7440-23-5)	J, D1
	092860-010/CTF-MW3	Antimony (7440-36-0)	0.0058U, B
	092860-010/CTF-MW3	Sodium (7440-23-5)	J, D1
SW846 7470A			
	092860-009/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	092860-010/CTF-MW3	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	092860-001/CTF-MW3	2-Butanone (78-93-3)	UJ, 14
	092860-001/CTF-MW3	Vinyl acetate (108-05-4)	UJ, 14
	092861-001/CTF-TB1	2-Butanone (78-93-3)	UJ, 14
	092861-001/CTF-TB1	Vinyl acetate (108-05-4)	UJ, 14



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Memorandum

Date: November 8, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 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.

<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 by IC), and SM2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

Perchlorate:

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

<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.

<u>Anions and Perchlorate:</u> 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.

Anions 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> The sample was diluted 40X for chloride and sulfate.

<u>Nitrate/nitrite:</u> The sample was diluted 5X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica D	vmerski Level I	Date: 11/09/12



Sample Findings Summary



AR/COC: 614391

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	092862-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7,MS1
	092862-034/CTF-MW2	BETA (12587-47-2)	J, MS1
EPA 901.1			
	092862-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	092862-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092862-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092862-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	092862-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	092862-009/CTF-MW2	Copper (7440-50-8)	0.0019UJ, B,D1
	092862-009/CTF-MW2	Magnesium (7439-95-4)	J, D1
	092862-009/CTF-MW2	Zinc (7440-66-6)	J, MS1
	092862-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	092862-010/CTF-MW2	Copper (7440-50-8)	0.0019UJ, B,D1
	092862-010/CTF-MW2	Magnesium (7439-95-4)	J, D1
	092862-010/CTF-MW2	Zinc (7440-66-6)	J, MS1
SW846 3535/8321A Modifie	ed		
	092862-024/CTF-MW2	Tetryl (479-45-8)	UJ, MS5
SW846 7470A			
	092862-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	092862-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4

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

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APPENDICES

Appendix A.	Field Measurement Logs for Monitoring Wells CTF-MW3 and CTF-MW2
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SECTION III SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, JULY – SEPTEMBER 2012

1.0 Introduction

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

Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the September 2012 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 17 and 18 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 seventh of eight quarterly groundwater sampling events for Coyote Test Field (CTF) monitoring well CTF-MW3, located near SWMU 149 (Building 9930 Septic System), and monitoring well CTF-MW2, located near SWMU 154 (Building 9960 Septic System and Seepage Pits). This groundwater characterization at the two SWMUs is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010). The eighth and final supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (October through December 2012).

The analytical results discussed in this section correspond to the reporting period of July through September 2012. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on September 21 and September 25, 2012, respectively.

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

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

Analytical results for the September 2012 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). No analytical results for the monitoring well CTF-MW3 groundwater samples exceed the corresponding MCLs. Except for arsenic, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples at concentrations of 0.0535 mg/L in the unfiltered sample and 0.0494 mg/L in the filtered sample. These values are comparable to previous sampling results for this monitoring well. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. Because of the fine-grained nature and disrupted texture of the rock surrounding monitoring well CTF-MW2, naturally occurring arsenic may be more likely to be present in the local groundwater.

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

2.0 Field Methods and Measurements

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

2.1 Equipment Decontamination

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

2.2 Well Evacuation

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

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

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

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

2.3 Groundwater Sample Collection

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

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

3.0 Analytical Results

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri, et al. 1998; DOE 1990). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results and method detection limits (MDLs) for samples collected from monitoring wells CTF-MW3 and CTF-MW2 are shown in tabulated form in Tables III-4 through III-15. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center.

The analytical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data," Revision 3 (SNL/NM May 2011). Other than the rejected results for potassium-40 in the sample from monitoring well CTF-MW2 (SWMU 154), no problems were identified with the analytical data that resulted in qualification of the data as unusable. 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, dibromochloromethane, and toluene were detected above laboratory MDLs, but below the practical quantitation limit for the analytical method. Table III-4 summarizes detected VOCs in environmental groundwater samples, and Table III-5 lists the VOC MDLs.

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

3.3 Semivolatile Organic Compounds

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

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

3.4 High Explosive Compounds

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

SWMU 154, Monitoring Well CTF-MW2. No HE compounds were detected in the monitoring well CTF-MW2 groundwater sample at concentrations above laboratory MDLs, except RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine). RDX was detected in the environmental sample collected from monitoring well CTF-MW2 at a concentration of 0.295 micrograms per liter (μ g/L). 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 5.90 mg/L in the monitoring well CTF-MW3 environmental sample.

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

3.6 Anions and Alkalinity

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

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

3.7 Perchlorate

SWMU 149, Monitoring Well CTF-MW3. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 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 0.0535 mg/L, and dissolved arsenic at 0.0494 mg/L. The elevated concentrations of arsenic in the groundwater sample are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite, as noted in Section III.1.0. Arsenic concentrations since March 2002 are plotted on Figure III-3. Unfiltered and filtered metal results for monitoring well CTF-MW2 are summarized in Tables III-13 and III-14, respectively. Copper results for both unfiltered and filtered samples were qualified as not detected during data validation, since copper was reported at concentrations less than five times the associated laboratory method blank sample result.

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, except for potassium-40. The potassium-40 activity was qualified as unusable during data validation since the laboratory did not meet identification criteria. The potassium-40 peak was classified as unusable because it could not be differentiated from the background.

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 is below the MCL of 15 picocuries per liter (pCi/L). Gross beta results do not exceed established MCLs. Isotopic uranium-233/234 was reported at 59.5 ± 7.79 pCi/L, uranium-235/236 at 0.684 ± 0.173 pCi/L, and uranium-238 at 8.51 ± 1.19 pCi/L (Table III-15). In this region, naturally occurring uranium in groundwater is elevated due to contact with bedrock, which contains minerals high in uranium.

3.10 Sample Results Exceeding Maximum Contaminant Levels

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. The only constituent exceeding MCLs in samples collected during this quarter consists of arsenic, which was detected in the monitoring well CTF-MW2 samples. Figure III-3 shows the concentrations of arsenic and groundwater elevations over time for monitoring well CTF-MW2. The elevated concentrations of arsenic in the groundwater samples are most

likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite.

4.0 **Quality Control Samples**

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

4.1 Field Quality Control Samples

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

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

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

4.2 Laboratory Quality Control Samples

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

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern. The data

validation sample findings summary sheets are provided in Appendix C. The data are acceptable, and reported QC measures are adequate.

4.3 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 June 2012 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

A project-specific issue occurred during sampling:

• The field team added weight to the bottom of the sampling system, a second Bennett pump, to overcome buoyancy factors due to height of the water column. Upon completion of sampling the sampling system was removed from the well, and as the pump reached the surface the weight separated from the system and dropped down the well. A camera survey of the well was performed and no visible damage of the well was discovered. On October 5, 2012, the field team successfully removed the weight from the well

5.0 Summary

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

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

Analytical parameters for monitoring well CTF-MW2 include VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for arsenic. Arsenic detections exceed the MCL of 0.010 mg/L in the monitoring well CTF-MW2

groundwater sample at concentrations of 0.0535 mg/L in the unfiltered sample and 0.0494 mg/L in the filtered samples. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. These values are comparable to previous results.

6.0 **References**

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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

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

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

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

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

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

Figures

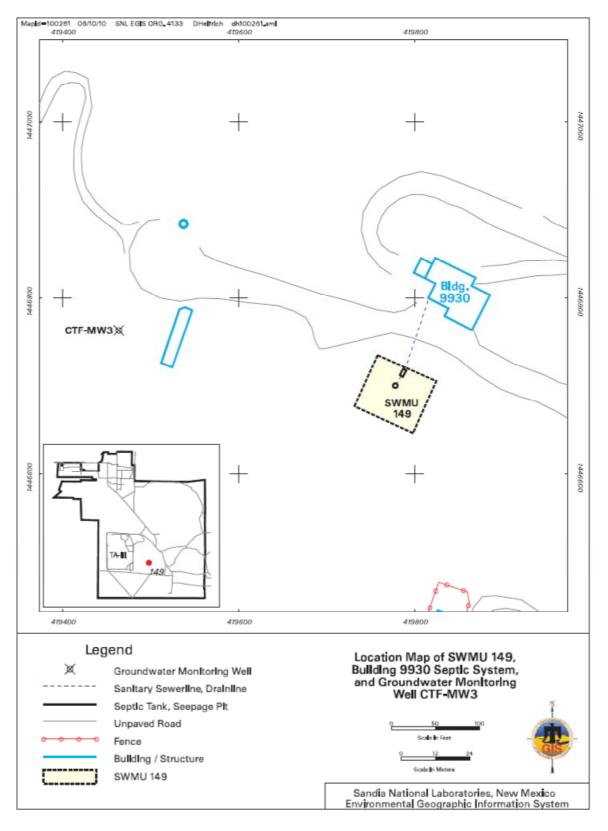


Figure III-1 Location of Monitoring Well CTF-MW3 near SWMU 149

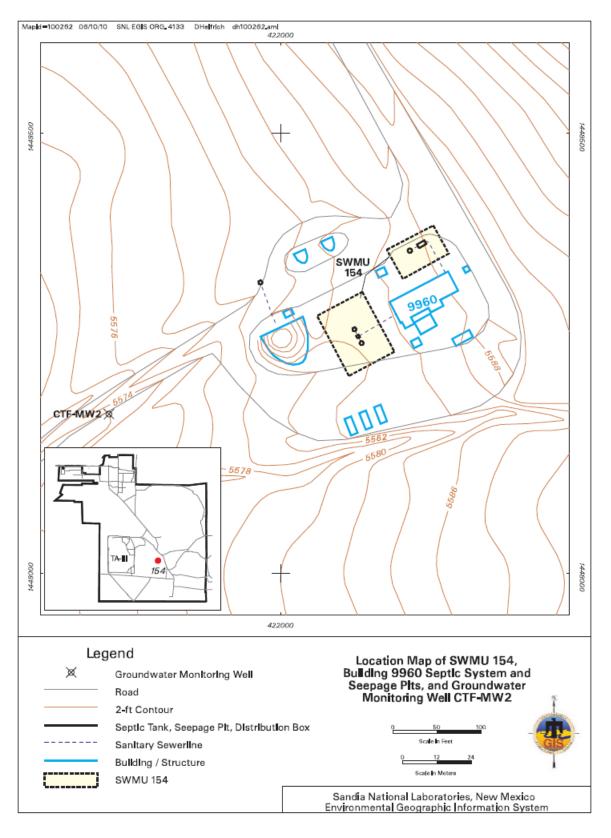


Figure III-2 Location of Monitoring Well CTF-MW2 near SWMU 154

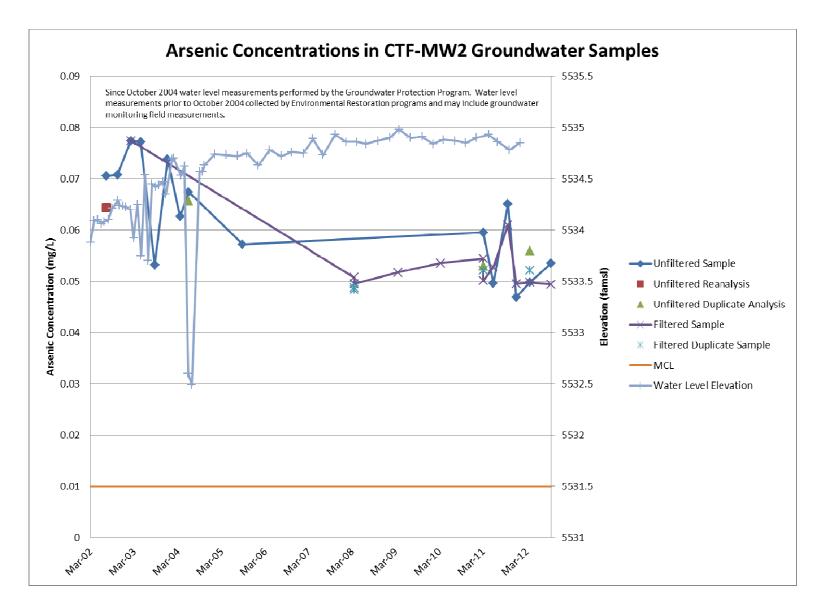


Figure III-3

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 Third Quarter, CY 2012 Groundwater Sampling SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment July – September 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	092860	614390	SWMU 149
CTF-MW2	092862	614391	SWMU 154

Notes

AR/COC	= Analysis Request/Chain of Custody.
OTE	- Covoto Tost Field

CTF CY = Coyote Test Field. = Calendar Year.

MW= Monitoring well.SWMU= Solid Waste Management Unit.

Summary of Field Water Quality Measurements^a

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

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	21-Sept-12	22.11	1653	193.9	6.89	0.34	88.9	7.72
SWMU 154								
CTF-MW2	25-Sept-12	18.61	3551	58.6	5.90	0.68	2.0	0.19

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, July – September 2012

Well	Analyte	Result (μg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3	Bromodichloromethane	0.630	0.300	1.00	NE	J		092860-001	EPA-8260B
21-Sep-12	Chloroform	0.850	0.300	1.00	NE	J		092860-001	EPA-8260B
	Dibromochloromethane	0.430	0.300	1.00	NE	J		092860-001	EPA-8260B
	Toluene	0.310	0.300	1.00	1000	J		092860-001	EPA-8260B
SWMU 154									
CTF-MW2 25-Sep-12	RDX	0.295	0.0847	0.265	NE			092862-024	EPA-8321A

Notes

μg/L = Micrograms per liter.

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

MW = Monitoring well.

NE = Not established.

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

RDX = Hexahydro-trinitro-triazine.

SWMU = Solid Waste Management Unit.

^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.

^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.

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

SWMU 149 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Analyte	MDL
Analyte	(μg/L)
1,1,1-Trichloroethane	0.300
1,1,2,2-Tetrachloroethane	0.300
1,1,2-Trichloroethane	0.300
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.300
1,2-Dichloropropane	0.300
2-Butanone	2.00
2-Hexanone	2.20
4-methyl-, 2-Pentanone	1.50
Acetone	3.00
Benzene	0.300
Bromodichloromethane	0.300
Bromoform	0.300
Bromomethane	0.300
Carbon disulfide	1.50
Carbon tetrachloride	0.300
Chlorobenzene	0.300
Chloroethane	0.300
Chloroform	0.300
Chloromethane	0.300
Dibromochloromethane	0.300
Ethyl benzene	0.300
Methylene chloride	3.00
Styrene	0.300
Tetrachloroethene	0.300
Toluene	0.300
Trichloroethene	0.300
Vinyl acetate	1.50
Vinyl chloride	0.300
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.300
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.300

Notes

- μg/L EPA = Micrograms per liter.
 - = 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; MDL analyte is matrix-specific. SWMU = Solid Waste Management Unit.

Table III-6Method Detection Limits for Volatile and Semivolatile Organic CompoundsSWMU 154 Groundwater MonitoringQuarterly Assessment, July – September 2012

Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1,1,1-Trichloroethane	0.300	EPA 8260B	1,2,4-Trichlorobenzene	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	1,2-Dichlorobenzene	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C
1,1,2-Trichloroethane	0.300	EPA 8260B	1,3-Dichlorobenzene	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C
1,1-Dichloroethane	0.300	EPA 8260B	1,4-Dichlorobenzene	3.00	EPA 8270C	Dibenzofuran	3.00	EPA 8270C
1,1-Dichloroethene	0.300	EPA 8260B	2,4,5-Trichlorophenol	3.00	EPA 8270C	Diethylphthalate	3.00	EPA 8270C
1,2-Dichloroethane	0.300	EPA 8260B	2,4,6-Trichlorophenol	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C
1,2-Dichloropropane	0.300	EPA 8260B	2,4-Dichlorophenol	3.00	EPA 8270C	4,6-Dinitro-o-cresol	3.00	EPA 8270C
2-Butanone	2.00	EPA 8260B	2,4-Dimethylphenol	3.00	EPA 8270C	Diphenyl amine	3.00	EPA 8270C
2-Hexanone	2.20	EPA 8260B	2,4-Dinitrophenol	5.00	EPA 8270C	Fluoranthene	0.300	EPA 8270C
4-methyl-, 2-Pentanone	1.50	EPA 8260B	2,4-Dinitrotoluene	3.00	EPA 8270C	Fluorene	0.300	EPA 8270C
Acetone	3.00	EPA 8260B	2,6-Dinitrotoluene	3.00	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
Benzene	0.300	EPA 8260B	2-Chloronaphthalene	0.300	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
Bromodichloromethane	0.300	EPA 8260B	2-Chlorophenol	3.00	EPA 8270C	Hexachlorocyclopentadiene	3.00	EPA 8270C
Bromoform	0.300	EPA 8260B	2-Methylnaphthalene	0.300	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
Bromomethane	0.300	EPA 8260B	2-Nitroaniline	3.00	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
Carbon disulfide	1.50	EPA 8260B	2-Nitrophenol	3.00	EPA 8270C	Isophorone	3.00	EPA 8270C
Carbon tetrachloride	0.300	EPA 8260B	3,3'-Dichlorobenzidine	3.00	EPA 8270C	Naphthalene	0.300	EPA 8270C
Chlorobenzene	0.300	EPA 8260B	3-Nitroaniline	3.00	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
Chloroethane	0.300	EPA 8260B	4-Bromophenyl phenyl ether	3.00	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
Chloroform	0.300	EPA 8260B	4-Chloro-3-methylphenol	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
Chloromethane	0.300	EPA 8260B	4-Chlorobenzenamine	3.30	EPA 8270C	Phenol	3.00	EPA 8270C
Dibromochloromethane	0.300	EPA 8260B	4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Pyrene	0.300	EPA 8270C
Ethyl benzene	0.300	EPA 8260B	4-Nitroaniline	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
Methylene chloride	3.00	EPA 8260B	4-Nitrophenol	3.00	EPA 8270C	bis(2-Chloroethyl)ether	3.00	EPA 8270C
Styrene	0.300	EPA 8260B	Acenaphthene	0.300	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00	EPA 8270C
Tetrachloroethene	0.300	EPA 8260B	Acenaphthylene	0.300	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
Toluene	0.300	EPA 8260B	Anthracene	0.300	EPA 8270C	m,p-Cresol	3.00	EPA 8270C
Trichloroethene	0.300	EPA 8260B	Benzo(a)anthracene	0.300	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
Vinyl acetate	1.50	EPA 8260B	Benzo(a)pyrene	0.440	EPA 8270C	o-Cresol	3.00	EPA 8270C
Vinyl chloride	0.300	EPA 8260B	Benzo(b)fluoranthene	0.300	EPA 8270C			
Xylene	0.300	EPA 8260B	Benzo(ghi)perylene	0.300	EPA 8270C			
cis-1,2-Dichloroethene	0.300	EPA 8260B	Benzo(k)fluoranthene	0.300	EPA 8270C			
cis-1,3-Dichloropropene	0.300	EPA 8260B	Butylbenzyl phthalate	3.00	EPA 8270C			
trans-1,2-Dichloroethene	0.300	EPA 8260B	Carbazole	0.300	EPA 8270C			
trans-1,3-Dichloropropene	0.300	EPA 8260B	Chrysene	0.300	EPA 8270C			

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

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.

EPA = U.S. Environmental Protection Agency.

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.

SWMU = Solid Waste Management Unit.

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Analyte	MDL (μg/L)
1,3,5-Trinitrobenzene	0.0847
1,3-Dinitrobenzene	0.0847
2,4,6-Trinitrotoluene	0.0847
2,4-Dinitrotoluene	0.0847
2,6-Dinitrotoluene	0.0847
2-Amino-4,6-dinitrotoluene	0.0847
2-Nitrotoluene	0.0868
3-Nitrotoluene	0.0847
4-Amino-2,6-dinitrotoluene	0.0847
4-Nitrotoluene	0.159
HMX	0.0847
Nitro-benzene	0.0847
Pentaerythritol tetranitrate	0.106
RDX	0.0847
Tetryl	0.0847

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-trinitro-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, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 21-Sep-12	Nitrate plus nitrite as N	5.90	0.425	1.25	10.0			092860-018	EPA 353.2
SWMU 154									
CTF-MW2 25-Sep-12	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		092862-018	EPA 353.2

Notes

- 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.

^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.

Summary of Anion and Alkalinity Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3	Bicarbonate Alkalinity	339	0.725	1.00	NE			092860-022	SM2320B
21-Sep-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092860-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			092860-016	EPA 9056
	Chloride	116	1.34	4.00	NE			092860-016	EPA 9056
	Fluoride	2.36	0.033	0.100	4.0			092860-016	EPA 9056
	Sulfate	493	2.66	8.00	NE			092860-016	EPA 9056
SWMU 154									
CTF-MW2	Bicarbonate Alkalinity	1560	0.725	1.00	NE			092862-022	SM2320B
25-Sep-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092862-022	SM2320B
	Bromide	ND	0.067	0.200	NE	U		092862-016	EPA 9056
	Chloride	468	2.68	8.00	NE			092862-016	EPA 9056
	Fluoride	2.15	0.033	0.100	4.0			092862-016	EPA 9056

Notes

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.

^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.

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

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.

Summary of Perchlorate Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149								
CTF-MW3	ND	0.004	0.012	NE			092860-020	EPA 314.0
21-Sep-12	ND	0.004	0.012		0		092000-020	EFA 314.0
SWMU 154								
CTF-MW2	ND	0.004	0.012	NE			092862-020	EPA 314.0
25-Sep-12	ND	0.004	0.012		0		092002-020	EFA 314.0

Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.Ś. 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.
- SWMU = Solid Waste Management Unit.

^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.

Summary of Unfiltered Total Metal Results

SWMU 149 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		092860-009	EPA 6020
21-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092860-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092860-009	EPA 6020
	Barium	0.0312	0.0006	0.002	2.00			092860-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092860-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092860-009	EPA 6020
	Calcium	193	0.600	2.00	NE	В		092860-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092860-009	EPA 6020
	Cobalt	0.000342	0.0001	0.001	NE	J		092860-009	EPA 6020
	Copper	0.00247	0.00035	0.001	NE	В		092860-009	EPA 6020
	Iron	0.464	0.033	0.100	NE			092860-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092860-009	EPA 6020
	Magnesium	49.3	0.010	0.030	NE			092860-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092860-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092860-009	EPA 7470
	Nickel	0.00471	0.0005	0.002	NE			092860-009	EPA 6020
	Potassium	10.7	0.080	0.300	NE			092860-009	EPA 6020
	Selenium	0.0257	0.0015	0.005	0.050			092860-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092860-009	EPA 6020
	Sodium	173	0.800	2.50	NE		J	092860-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092860-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092860-009	EPA 6010
	Zinc	0.0044	0.0035	0.010	NE	J		092860-009	EPA 6020

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

Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.Ś. 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.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

- J = The associated 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.

Summary of Filtered Total Metal Results

SWMU 149 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		092860-010	EPA 6020
21-Sep-12	Antimony	0.00137	0.001	0.003	0.006	B, J	0.0058U	092860-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092860-010	EPA 6020
	Barium	0.0337	0.0006	0.002	2.00			092860-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092860-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092860-010	EPA 6020
	Calcium	207	0.600	2.00	NE	В		092860-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092860-010	EPA 6020
	Cobalt	0.000409	0.0001	0.001	NE	J		092860-010	EPA 6020
	Copper	0.00282	0.00035	0.001	NE	В		092860-010	EPA 6020
	Iron	0.519	0.033	0.100	NE			092860-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092860-010	EPA 6020
	Magnesium	48.4	0.010	0.030	NE			092860-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092860-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092860-010	EPA 7470
	Nickel	0.0051	0.0005	0.002	NE			092860-010	EPA 6020
	Potassium	11.3	0.080	0.300	NE			092860-010	EPA 6020
	Selenium	0.0252	0.0015	0.005	0.050			092860-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092860-010	EPA 6020
	Sodium	173	0.800	2.50	NE		J	092860-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092860-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092860-010	EPA 6010
	Zinc	0.00486	0.0035	0.010	NE	J		092860-010	EPA 6020

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

Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.Ś. 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.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

- J = The associated 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.

Summary of Unfiltered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2	Aluminum	0.118	0.015	0.050	NE			092862-009	EPA 6020
25-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092862-009	EPA 6020
·	Arsenic	0.0535	0.0017	0.005	0.010			092862-009	EPA 6020
	Barium	0.081	0.0006	0.002	2.00			092862-009	EPA 6020
	Beryllium	0.00267	0.0002	0.0005	0.004			092862-009	EPA 6020
	Cadmium	0.000274	0.00011	0.001	0.005	J		092862-009	EPA 6020
	Calcium	390	1.20	4.00	NE			092862-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092862-009	EPA 6020
	Cobalt	0.00963	0.0001	0.001	NE		J	092862-009	EPA 6020
	Copper	0.00185	0.00035	0.001	NE	В	0.0019UJ	092862-009	EPA 6020
	Iron	2.78	0.033	0.100	NE			092862-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092862-009	EPA 6020
	Magnesium	88.7	0.200	0.600	NE		J	092862-009	EPA 6020
	Manganese	3.16	0.005	0.025	NE			092862-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092862-009	EPA 7470
	Nickel	0.0222	0.0005	0.002	NE			092862-009	EPA 6020
	Potassium	56.6	0.400	1.50	NE			092862-009	EPA 6020
	Selenium	0.00741	0.0015	0.005	0.050			092862-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092862-009	EPA 6020
	Sodium	538	1.60	5.00	NE			092862-009	EPA 6020
	Thallium	0.00115	0.00045	0.002	0.002	J		092862-009	EPA 6020
	Uranium	0.0281	0.000067	0.0002	0.03	В		092862-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092862-009	EPA 6010
	Zinc	0.0649	0.0035	0.010	NE		J	092862-009	EPA 6020

Table III-13 (Concluded)

Summary of Unfiltered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes

- **Bold** = Indicates that a result exceeds the MCL.
- 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.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

- If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
- J = The associated 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.

Summary of Filtered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2	Aluminum	0.088	0.015	0.050	NE			092862-010	EPA 6020
25-Sep-12	Antimony	ND	0.001	0.003	0.006	U		092862-010	EPA 6020
	Arsenic	0.0494	0.0017	0.005	0.010			092862-010	EPA 6020
	Barium	0.0774	0.0006	0.002	2.00			092862-010	EPA 6020
	Beryllium	0.00248	0.0002	0.0005	0.004			092862-010	EPA 6020
	Cadmium	0.000415	0.00011	0.001	0.005	J		092862-010	EPA 6020
	Calcium	373	1.20	4.00	NE			092862-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092862-010	EPA 6020
	Cobalt	0.00886	0.0001	0.001	NE		J	092862-010	EPA 6020
	Copper	0.00166	0.00035	0.001	NE	В	0.0019UJ	092862-010	EPA 6020
	Iron	2.58	0.033	0.100	NE			092862-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092862-010	EPA 6020
	Magnesium	77.4	0.200	0.600	NE		J	092862-010	EPA 6020
	Manganese	2.98	0.005	0.025	NE			092862-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092862-010	EPA 7470
	Nickel	0.0211	0.0005	0.002	NE			092862-010	EPA 6020
	Potassium	47.6	0.080	0.300	NE			092862-010	EPA 6020
	Selenium	0.0084	0.0015	0.005	0.050			092862-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092862-010	EPA 6020
	Sodium	503	1.60	5.00	NE			092862-010	EPA 6020
	Thallium	0.00114	0.00045	0.002	0.002	J		092862-010	EPA 6020
	Uranium	0.0271	0.000067	0.0002	0.03	В		092862-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092862-010	EPA 6010
	Zinc	0.259	0.0035	0.010	NE		J	092862-010	EPA 6020

Table III-14 (Concluded)

Summary of Filtered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes

- **Bold** = Indicates that a result exceeds the MCL.
- 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.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

- If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
- J = The associated 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.

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL (pCi/L)	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
CTF-MW2	Americium-241	6.89 ± 8.26	11.9	5.84	NE	U	BD	092862-033	EPA 901.1
25-Sep-12	Cesium-137	1.29 ± 1.83	3.07	1.48	NE	U	BD	092862-033	EPA 901.1
	Cobalt-60	0.0659 ± 1.69	2.99	1.40	NE	U	BD	092862-033	EPA 901.1
	Potassium-40	30.0 ± 44.6	29.5	13.8	NE	Х	R	092862-033	EPA 901.1
	Gross Alpha	7.21	NA	NA	15	NA	None	092862-034	EPA 900.0
	Gross Beta	45.2 ± 9.90	7.78	3.73	4mrem/yr		J	092862-034	EPA 900.0
	Uranium-233/234	59.5 ± 7.79	0.112	0.0473	NE			092862-035	HASL-300
	Uranium-235/236	0.684 ± 0.173	0.0812	0.0299	NE			092862-035	HASL-300
	Uranium-238	8.51 ± 1.19	0.0761	0.0294	NE			092862-035	HASL-300

Notes

- 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.

^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.

Table III-15 (Concluded)

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes (continued)

^cLaboratory Qualifier

- 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.
- None = No data validation for corrected gross alpha activity.
- R = The data are unusable. Resampling and reanalysis are necessary for verification.

^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.

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through September 2012

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 154		·						
CTF-MW2	08-Mar-11	Arsenic—Filtered	0.0544 mg/L	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	0.0528 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	0.0610 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	0.0495 mg/L	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Filtered	0.0498 mg/L	0.010 mg/L			091949-010	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			091950-010	EPA 6020
CTF-MW2	19-June-12	Arsenic—Filtered	0.0276 mg/L	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Filtered	0.0494 mg/L	0.010 mg/L			092862-010	EPA 6020
CTF-MW2	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	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

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

Notes (continued)

^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.

^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.

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														_	Page	1_of_1_
Batch No.	NA				SMO Use									AR/COC	614	390
Project Name	e:	SWMU 149 GWM	Date Sample	s Shipped:				SMO Au	thorization:	Pon .	tem	~	Was	te Characterization		7
		Clinton Lum	Carrier/Wayb	ill No.				SMO Co	ntact Phone	: see	Dottle o	n		AA		
		98026.01.14	Lab Contact:		Edie Kent/8	03-556-8	171	1	Lorraine H	lerrera/505	5-844-3199		Rele	eased by COC No.		
Service Orde	er:	CF0250-13	Lab Destinat	ion:	GEL			Send Re	port to SMC):					4	° Celsius
			Contract No.		PO 691436				Rita Kava	naugh/505	-284-2553		Bill to:Sand	ia National Laboratorie	s (Account	ts Payable),
Tech Area:													P.O. Box 58	800, MS-0154		
Building:		Room:	Operation	al Site:									Albuquerqu	e, NM 87185-0154		
				Depth	Date/T	ïme	Sample	Co	ntainer	Preserv-	Collection	Sample	Pa	arameter & Method		Lab
Sample No.	Fraction	Sample Location	Detail	(ft)	Collec	cted	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample II
092860	-001 1	CTF-MW3		359	9/21/12	10:25 1	GW	G	3x40ml	HCL	G	SA	TCL VOC	C (SW846-8260B))	
092860	-009 1	CTF-MW3		359	9/21/12	10:26	GW	Р	500 ml	HNO3	G	SA	TAL Meta	ls (SW846-6010/60	20/7470	
092860	-010 -	CTF-MW3		359	9/21/12	10:28 -	FGW	Р	500 ml	HNO3	G	SA	TAL Meta	ls (SW846-6010/60	20/7470	
092860	-016 ′	CTF-MW3		359	9/21/12	10:29 🗸	GW	Р	125 ml	4C	G	SA	Anions (SW846-9056)		
092860	-018 -	CTF-MW3		359	9/21/12	10:30	GW	Р	125 ml ʻ	H2SO4	G	SA	NPN (EF	A 353.2)		
092860	-020 <	CTF-MW3		359	9/21/12	10:31	GW	Р	250 ml	4C	G	SA	Perchlor	ate (314.0)		
092860	-022 -	CTF-MW3		359	9/21/12	10:32	GW	Р	500 ml	4C	G	SA	Alkalinity	(SM2320B)		
092861	-001 ~	CTF-TB1		na	9/21/12	10:25 🧹	DIW	G	3x40ml	HCL	G	ТВ	TCL VO	C (SW846-8260B)	×
	-															
					Turakina		CMC) Use	Special Ins	tructions		ements:			Condi	tions on
Last Chain	And and a second se	Yes			Tracking		SIVIC	JUSE	EDD	suucions	Yes		No			ceipt
Validation		⊻ Yes		Date En					Turnaroun	d Time	7 Da		15 Day*	✓ 30 Day	110	ooipt
Backgrour		Yes		Entered							<u>1 Da</u>	¥	15 Day	OU Day		
Confirmate	T	L Yes		QC inits	1	10		10 11	Negotiated			n to Client		Disposal by Lab		
Sample			ature	Init.		/Organizat			Sample Di			n to Clieni	. <u> </u>			
Team	Robert L	1101	noh	RL	SNL/4142/50				Return Sar					0/00 / 05 /7		
Members	Alfred S	antillanes	hell	PAS	SNL/4142/50				Comments Report alka				(4142/MS 072			
	William	Gibson	illy -	WA	SNL/4142/50	05-284-330	7/505-23	9-7367	Br CLE SO	annity (as 1 4) If Perch	lorate deter	ted perfo	rm verifica	tion analysis		
		//	/	0.					using SW8	46-6850M	FGW- Filte	ered in fiel	d w/.45 mi	cron filter.	Lat	b Use
1.Relinquish	ed by	Mal Sa T.D.	- Org. 4/14	17 Date	9/21/1-	Z Time /	2.53	3.Relind	uished by			Org		Date	Time	
1. Received	A 20	Dent	Org. 414			and the second se	and the second se	3. Rece				Org		Date	Time	
2.Relinguish	1 1/1	nhong	Org.	Date		Time			uished by			Org.		Date	Time	
2. Received			Org.	Date		Time		4. Rece				Org.		Date	Time	
	-	with SMO required for 7 a							,			0				

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

Groundwater Monitoring Well Sampling and Field Analytical Measurements January 2012

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 149 GW	M	Project No.: 146422.10.11.01 / 98026.01.14					
Well I.D.: CTF-MW3		Date: 9/21/12					
Well Condition:		Weather Condition:					
Method: Portable pump	X	Dedicated pump	Pump depth: 359				

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	Vol. (Lgal)	(°C)	(µS/cm)	(mV)	pm	(NTU)	(%)	DO /
(ft)				A. Car					Umg/L
307.45	0840		ST	TART					
313.98		5	20.27	1641	193.6	7.02	0.62	88.9	8.02
316.97		10	20.98	1643	191.5	\$ 6.96	0.60		7.79
318.93	0930	15	21.61	1647	190.8	6.93	0.69	86.9	7.64
320.73		20	21.91	1651	191.1	6.91	0.64	90.6	7.89
321.89		23	21.61	1651	191.9	6.90	0.68	88.6	
322.49		25	21.67	1649	192.0	6.90	0.70	90.1	7.88
323.02	1004	27	31.82	1648	192.0	1.90	0.41	88.8	7.77
323.33	1009	29	21.95	1651	191.9	6.90	0.45	90.5	7.88
323.71	1014	31	22.01	1651	192.4	6.90	0.33	87.7	7.65
324.02	1019	33	22.17	1653	193.2			89.0	7.71
324.59		35	22.11	1653	193.9	6.89	0.34	88.9	7.72
	1025	-	SA	mplin	10-				
				/	0				
			×						
				-			×		
							S		
								-	-4.00 gals. purged
									from tubing
									0848

PURGE MEASUREMENTS

SNL/NM Project	Name: SWM	U 149 GWM		SNL/NM Project No.: 146422.10.11.01 / 98026.01.14							
Calibrations done	by: Robert	Lynch		Date: 9/21/12							
Make & Model: \	YSI 6920 V	/2	Alan ya manga kana ya kata ya k	. /							
VSI 6820 Sonde (S/N) with DO	Ec, pH, ORP, and	temperature prob	es 08H10003	3						
		1.0, pri, ora , and	in a second s				_				
YSI 650 MDS (S/	N):			nin mane an anti-terrar miner-realization							
			рН Са	alibration							
pH Calibrated to ((std): 7.00			pH sloped to (s	td): 10.0						
Reference value:			.00		.00		0.00				
	20	Value	Temp	Value	Temp	Value	Temp				
1. Time: 0(2	25	4.02	21.5	7.01	21.3	10.07	21.3				
3. Time:	- 3		arrig	6.1-1		(0.01	avip				
4. Time:											
Standard lot no.:		2AA670		2AB299		1AK189					
Expiration date:		Jan-14		Feb-14	Nov-13						
			SC Ci	libration							
Reference Value:	1278 uS			Standard Lot N	o.: 2AB388						
		Value	Temp	Expiration Date: Feb-13							
1. Time: 0(34	1283	21.3								
2. Time: UI	27	1280	20.6								
3. Time:											
4. Time:											
		and the second	ORP C	alibration							
Reference Value:	220 mV			Standard Lot N	o. 1AL131						
		Value	Temp	Expiration Dat	e: Sep-12						
1. Time: 06	33	221.4	21.3								
	26	220.7	20.6	Take of the							
3. Time:		~									
4. Time:											
			DO Ca	libration							
Calibration Value	:	81% air satura	tion @ 5200 ft.		Atmospheric	Pressure in Hg	Ame				
1. Time: 06	31	81.7		21	1.44	ning finde of the second s					
2. Time: 113	24	81.8	, ,	24	.45		\$ ²				
2											
3. Time:											

Groundwater Monitoring Equipment Field Check For Water Quality Measurements January 2012 FOP 05-02, Revision 04 Page 22 of 22

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

SNL/NM Project Name: SW	MU 149 GWM	Project No.: 14	Project No.: 146422.10.11.01 / 98026.01.14					
Calibration done by: Robert	Lynch	Date: 9/:	Date: 9/21/12					
	÷	TURBIDIMETER	,					
Make & Model: HACH 210	9P 2100Q	Serial No. S/N	10050C002897	- 				
Reference Value	× 10	20	100	800				
Standard Lot No.	0161	0168	0162	0161				
1. Time 0833	9-96	19.7	101	794				
2. Time 1034	10.1	19-6	102	791				
3. Time								
4. Time								
Comments:								

Groundwater Monitoring Equipment Decontamination January 2012

FOP 05-03, Revision 04 Page 19 of 19

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 149 GWM M	Ionitoring Well ID # : <u>CTF - M</u>	#: <u>CTF-MW3</u> Date: <u>9/21/12</u>						
The following equipment was de	econtaminated at completion of sampling a	ctivities in accordance with FOP-05	5-03					
Pump and Tubing Bundle ID #: _GWM 1806-32	Water Level Indi	cator ID #:62088	· · · · · · · · · · · · · · · · · · ·					
Personnel Performing Decontamination: Robert Lynch Print Name: Print		Lynch PL Initial: Initial: Initial:	4					
	Condition of Equipment		Loo					
Pump: QOO Tubing	Bundle: geod	Water Level Indicator:	900					
	List of Decontamination Materials	•						
Distilled or Deonized (circle or	20)	HNO ₃						
		Reagent						
Source: Culligan	UN #:	UN #:2031						
Lot Number: 090412	Manufacturer:	r: _Fisher Scientific						
	Lot Number:	ot Number:002735						

Groundwater Monitoring Waste Management January 2012 FOP 05-04, Revision 04 Page 29 of 29

	Groundwater Monitori	ng waste Generation Log	
Waste Generator	Bill Gibson Phone:	239-7367 project le	eader: Clinton Lum
Project Name	SWMU 149 GWM	SWMU 149 GWM	SWMU 149 GWM
Container ID # (site-date-sequence)	CTF-MW3-092112-0)	CTF-mw3-092112-08	CTF-092112
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purgewater st9	Purgewater	Deconwoter
Container Type / Volume	55-gal CHPG	55-gal CHPD	55-gal CHPD
Volume of Waste	l9gals	18	30
Total Container Weight	170165.	160	280
	614390	614390	614390
COC#: Sample#- Fraction	092860	092860	092860
Accumulation	Start: 09/21/12	Start: 09/21/12	Start: 09/21/12
Date	Full: 09/21/12	Full: 09/21/12	Full: 09/21/12
Date Waste Moved to Accumulation Area	09/21/12	09/21/12	09/21/12
Accumulation Area Name	9925	9925	9925
Comments:			ę

Groundwater Monitoring Waste Generation Log

PLA 05-09, Revision 04 Page 23 of 27

TAILGATE SAI	FETY MEETING FORM
Dept: 4142 Well Location: CTF - MW -	<u>3</u> Date: 9/21/12 Time: 0830
Activities: Groundwater Monitoring (purging, samp (Anyone has the right to cease field activities for sa	bling, decon) fety concerns. The buddy system will be used when needed.)
Weather Conditions: Temp: 58.4°F Wind Speed: 0 MPH	Humidity: 30.7 % Wind Chill MA °F
Chemicals Used: <u>Acids in sample containers, stands</u> Other:	ard solutions, Hack ACCU-VAC ampules
Safety T	opics Presented
X Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	X 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
[∞] Use safe lifting practices. Wear leather gloves if necessary.	Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	X No eating or drinking at sampling counter.

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

Ai Robert Lynch Printed Name Milliam bibsun Printed Name Air Printed Name Printed Name	Signature Signature Milling Aillp Signature Alle Sutches Signature
Printed Name	Signature
	Signature ay not be the document currently in effect. The official version is Network (SRN), department home page

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab													_	Page	e_1_of_2
	Batch No. /	VA				SMO Use)					10		AR/COC	614	391
	Project Name	e:	SWMU 154 GWM	Date Samples	s Shipped:	9/22	5/12		SMO Au	uthorization	BN	4-12	~	Waste Characterization		X
	Project/Task	Manager:	Clinton Lum	Carrier/Waybi	ill No.	1	1.		SMO Co	ontact Phon	le:	9	NUD	RMMA		
	Project/Task	Number:	98026.01.15	Lab Contact:		Edie Kent/8	03-556-8	3171]	Lorraine I	Herrera/50	5-844-3199		Released by COC No.		
	Service Orde	r:	CF0251-13	Lab Destinatio	on:	GEL			Send Re	eport to SM	O:				1	4º Celsius
				Contract No.:		PO 691436]	Rita Kava	anaugh/50	5-284-2553		Bill to:Sandia National Laboratories	(Accounts	Payable),
	Tech Area:													P.O. Box 5800, MS-0154		
	Building:		Room:	Operationa	al Site:									Albuquerque, NM 87185-0154		
			e		Depth	Date/T	ïme	Sample	Co	ntainer	Preserv-	Collection	Sample	Parameter & Method	d	Lab
	Sample No.	Fraction	Sample Location D	Detail	(ft)	Collec	ted	Matrix	Туре	Volume	ative	Method	Туре	Requested		Sample ID
,	092862	-001	CTF-MW2		129	9/25/12	9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		
/	092862	-002	CTF-MW2		129	9/25/12	9:39	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-82700)	
,	092862	-009	CTF-MW2		129	9/25/12	9:40	GW	Р	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/602	.0/7470)	
	092862	-010	CTF-MW2		129	9/25/12	9:42	FGW	Р	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/602	20/7470)	
1	092862	-016	CTF-MW2		129	9/25/12	9:43	GW	Р	125 ml	4C	G	SA	Anions (SW846-9056)		
1	092862	-018	CTF-MW2		129	9/25/12	9:44	GW	Р	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		
•	092862	-020	CTF-MW2		129	9/25/12	9:45	GW	Р	250 ml	4C	G	SA	Perchlorate (314.0)		
•	092862	-022	CTF-MW2		129	9/25/12	9:46	GW	Р	500 ml	4C	G	SA	Alkalinity (SM2320B)		
•	092862	-024	CTF-MW2		129	9/25/12	9:48	GW	AG	4x1L	4C	G	. SA	High Explosives (SW846-8	321A Mo	od.)
•	092862	-033	CTF-MW2		129	9/25/12	9:49	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy(short li	/ /	1
	Last Chain		V Yes		Sample	Tracking		SMC) Use		structions	/QC Requi				tions on
	Validation	Req'd:	V Yes		Date En					EDD		🗹 Yes	period and a second	No	Rec	ceipt
	Backgroun	d:	Yes		Entered	by:				Turnarou	nd Time	<u>7 Da</u>	<u>y*</u>	<u>15 Day*</u>		
	Confirmato	ry:	L Yes		QC inits	:				Negotiate	d TAT					
	Sample	N	ame Signat	ure	Init.	Company	/Organiza	tion/Phon	e/Cell	Sample D	isposal	L Return	n to Client	Disposal by Lab		
	Team	Robert L	ynch Centym	the	R	SNL/4142/50	5-844-401	13/505-25	0-7090	Return Sa	mples By	:				
	Members	Alfred Sa	antillanes	Ella	dy	SNL/4142/50	5-844-513	30/505-22	8-0710	Comment	s:	Send report to	Tim Jacksor	n/4142/MS 0729/284-2547		
		William (Gibson Maler	SIL	asl	SNL/4142/50	5-284-330	07/505-23	9-7367					CO3). Anions (as		
				111	1						and the second se		cted, perf	orm verification analysis		
										using SW8	346-6850IM				Lab	Use
ľ	1.Relinguishe	d by A	Apl 3 gtille	Org. 414	2 Date	9/25/12	Time (024	3.Relind	uished by			Org.	Date	Time	0
ł	1. Received b		49. In guy						3. Rece				Org.	Date	Time	l.
t	2.Relinguishe		the four	Org.	Date		Time	· · · · ·	4.Relind	uished by			Org.	Date	Time	6
- F	2. Received b			Org.	Date		Time		4. Rece	ived by			Org.	Date	Time	l.
				-												

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

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

AR/COC 614391

		Project/Tas	Project/Task Manager: Clinton Lum					Project/Tas	sk No.:	980	026.01.15			
Tech Area:														
Building:		Room:												Lab use
				Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection	Sample		Lab
Sample No.	Fraction	Sample Location I	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
092862	-034	CTF-MW2		129	9/25/12	9:50	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
092862	-035	CTF-MW2		129	9/25/12	9:51	GW	Ρ	1 L	HNO3	G	SA	Isotopic Uranium(ASTM D3972-09M)	
092863	-001	CTF-TB2		NA	9/25/12	9:37	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
										ļ				
Recipient In														

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														_	Page	<u>1</u> of <u>1</u>
Batch No. N	1A				SMO Ușe	1					101	2	_	AR/COC	614	392
Project Name	- (-(SWMU 154 GWM	Date Samples	s Shipped	9/2:	FIZ			thorization		: 4 TA	2-		e Characterization		
		Clinton Lum	Carrier/Wayb	ill No.				SMO Co	ontact Phon			mo	RMM	A		
Project/Task	Number:	98026.01.15	Lab Contact:		Edie Kent/8	03-556-8	3171			and a second	5-844-3199		Relea	ased by COC No.		
Service Orde		CF0251-13	Lab Destination	on:	GEL			Send Re	eport to SM	0:					The second s	4º Celsius
			Contract No.:		PO 691436	·			Rita Kava	anaugh/50	5-284-2553		Bill to:Sandia	National Laboratorie	s (Accounts	Payable),
Tech Area:													P.O. Box 580	00, MS-0154		
Building:		Room:	Operationa	I Site:									Albuquerque	, NM 87185-0154		
g				Depth	Date/T	ïme	Sample	Co	ntainer	Preserv-	Collection	Sample	Pa	arameter & Metho	d	Lab
Sample No.	Fraction	Sample Location D	etail	(ft)	Collec	ted	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
092864	-011	CTF-MW2 PW		NA	9/25/12	9:30	FPW	Р	500 ml	HNO3	G	SA	Arsenic (S	SW846-6020)		
						All OA										
Last Chain	:	Ves		Sample	Tracking		SMC) Use	1.0.0	nstruction	s/QC Requ	irements				tions on
Validation	Req'd:	Yes		Date Er	itered:				EDD		Yes		No		Re	ceipt
Backgroun	d:	Yes		Entered	by:				Turnarou	nd Time	<u>7 Da</u>	<u>iy*</u>	<u>15 Day*</u>	✓ 30 Day		
Confirmato		Yes	1	QC inits					Negotiate	ed TAT						
Sample	1	lame Signat	ure	Init.	Company	/Organiza	tion/Phon	e/Cell	Sample D	Disposal	Retur	n to Client	t 🗹	Disposal by Lab		
Team	Robert L		ich	Re	SNL/4142/50)5-844-40 [°]	13/505-25	0-7090	Return Sa	amples By	:					
Members		antillanes Alle Sen	ula	COA	SNL/4142/50	05-844-513	30/505-22	8-0710	Commen	ts:	Send report to	o Tim Jackson	n/4142/MS 0729	0/284-2547		
Michibero	William		11.	2008	SNL/4142/50	05-284-330	07/505-23	9-7367	1							
		ALL AVERA	uap_	a gar					1							
		Helper Salt	alth		1	/			1						Lat	Use
1.Relinquishe	d by	Elly 9 1 an Cont		Z Date	9 25	ZTime	1028	3.Relind	quished by			Org		Date	Time)
1. Received I		4 4. The SMO		17 Date			1078	3. Rece				Org		Date	Time)
2.Relinquishe	and the second se	2 Te Conto	Org.	Date		Time			quished by			Org		Date	Time)
			Org.	Date		Time		4. Rece				Org	and the second se	Date	Time	9
2. Received b	Jy		org.	Date	,			1								

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

Groundwater Monitoring Well Sampling and Field Analytical Measurements January 2012

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154 GV	٧M	Project No.: 146422.10.11.01 / 9802	6.01.15	
Well I.D.: CTF-MW2		Date: 9/25/12		
Well Condition:		Weather Condition:		
Method: Portable pump	X	Dedicated pump	Pump depth:	128

Depth to	Time 24	Vol.	Temp	SC	ORP	pH	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	(µS/cm)	(mV)	pii	(NTU)	(%)	DOmy/L
(ft)									Umg/L
43.90	0758		51	ARt					
46.54	0815	5	17.33	3149	142.3	5.99	3.26	5.4	0.52
46.99	0826	10	17.36	3362	98.8	5.89	0.73	3.6	0.34
47.25	0837	15	17.67	3412	79.9	5.87	0.64		0.29
47.37	0849	20	17.97	3496	48.5	5.88	0.56	2.6	0.25
47.56	0900	25	18.18	3560	55.8	5.88	0.88	2.6	0.24
47.72	0911	30	18.28	3538	58.2	5.88	0.91		0.23
47.79	0917	33	18.36		58.3	5.89	0.78	2.4	0.22
47.82	0921	35	18.42	3548	58.5	5.89	0.68	2.3	0.22
47.54	0926	37	18.53	3544	58.4	5.90	0:70	2.2	0.20
47.32	0931	39	18.60	3550	58.2	5.90	0.73	2.1	0.20
47.20	0936	41	18.61		58.6	5.90	0.68	2.0	0-19
	0937		SA	mpli	na-				
				/	0				2 ×
	-								
			•16						Extra weight added
							-		Extra weight added to end of pump.
		and the later of the second							1
								-	From tubing 0804
									from tubing
									0804

PURGE MEASUREMENTS

Groundwater Monitoring Equipment Field Check For Water Quality Measurements January 2012

FOP 05-02, Revision 04 Page 21 of 22

SNL/NM Project Name: SWMU 154 GWM			SNL/NM Proje	ect No.: 146422	.10.11.01 / 98	3026.01.15	
Calibrations done by: Robert Lynch			Date: 9/25/12				
Make & Model: YSI 69	20 V2	ana ing ang ang ang ang ang ang ang ang ang a		ł	d a fandiselen van gesternen gebruik gebruik.		
YSI 6820 Sonde (S/N) with	DO, Ec, pH, ORP, and	l temperature prob	es: 08H1000	33			
YSI 650 MDS (S/N):							
		pH Ca	alibration		Mahimburan datamat yang		
pH Calibrated to (std): 7.(00		pH sloped to (s	std): 10.0			
Reference value:	4	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0630	4.02	21.1	7.00	21.1	10.00	21.1	
2. Time: 1052	4.01	20.8	7.01	20.9	10.01	20.9	
3. Time:							
4. Time:		l	040000		14//100	l	
Standard lot no.: 2AA670 Expiration date: Jan-14		2AB299 Feb-14		1AK189			
Expiration date:	Jall-14	SCC	libration		Nov-13		
D.G. 1/1. 127	78.115	50 0	1	2AD200			
Reference Value: 1278 uS Value Temp			Standard Lot No.: 2AB388 Expiration Date: Feb-13				
1. Time: 0630			Expiration Dat	FeD-13			
1. Time: 0637 2. Time: 1054	1280	21.1					
3. Time:	1200	20:0					
4. Time:							
		ORP C	Calibration				
Reference Value: 220 mV			Standard Lot No. 1AL131				
	Value	Temp	Expiration Dat	e: Sep-12			
1. Time: 063/	218.8	21.1					
2. Time: 1053		20.9					
3. Time:	÷4.						
4. Time:							
		DO C	alibration				
Calibration Value:	81% air satura	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0628	81.	81.4		1.36			
2. Time: 1051	81.0	81.6		1.40		4	
3. Time:							
4. Time:							

COLLECTION DIDLE DOUBLEDUE

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

SNL/NM Project Name: S	Project No.:	Project No.: 146422.10.11.01 / 98026.01.15						
Calibration done by: Rob	Date: 9/	Date: 9/25/12						
TURBIDIMETER								
Make & Model: HACH 2	Serial No. S	Serial No. S/N 10050C002897						
Reference Value	10	20	100	800				
Standard Lot No.	0161	0168	0162	0161				
1. Time 0500	9.94	19.8	101	796				
2. Time 0949	10.1	20.2	(06	799				
3. Time								
4. Time								
Comments:								

Groundwater Monitoring Equipment Decontamination January 2012

FOP 05-03, Revision 04 Page 19 of 19

Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 154 GWM	CTF-MN	N 2	Date: 9/25/12						
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03									
Pump and Tubing Bundle ID #: _GWM 1806-32		Water Level Indicator ID #:62088							
Personnel Performing Decontamination: Personnel Performing Decontamination: Robert Lynch RL Print Name: Initial: William Gibsen RJR Print Name: Initial: William Gibsen RJR Initial: Print Name:									
Condition of Equipment Pump:									
Pump: Tubi	ing Bundle:	000	Water Level Indicator:	good					
List of Decontamination Materials									
Distilled or Deonized (circle	HNO3								
Distinct of Debilized (circle	Grade:	Reagent							
Source: Culligan	UN #:	2031							
Lot Number: 091312	Manufacturer:	Fisher Scientific							
	Lot Number:	002735							

Groundwater Monitoring Waste Management January 2012

FOP 05-04, Revision 04 Page 29 of 29

	Groundwater Monitorii	ng Waste Generation Log	to the second
Waste Generator :	Bill Gibson Phone:	_239-7367 project le	eader: Clinton Lum
Project Name	SWMU 154 GWM	SWMU 154 GWM	SWMU 154 GWM
Container ID # (site-date-sequence)	CTF-MW2-092512-01	CTF-MW2-092512-02	CTF-092512
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purgewater	Purge Water	Decon Water
Container Type / Volume	55-gal CHPD	55-gal CHPD	55-gal CHPD
Volume of Waste	24gals.	24gals, 21	
Total Container Weight	220165.	190	980
COC#: Sample#- Fraction	614391 614392 092862 092864	614391 614392 092862 092864	614391 614392 092862 092864
Accumulation Date	Start:09/25/12 Full:09/25/12	Start: 09/25/12 Full: 09/25/12	Start: 09/25/17 Full: 09/25/17
Date Waste Moved to Accumulation Area	09/25/12	09/25/12	09/25/12
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

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Groundwater Monitoring Health and Safety Plan January 2012 PLA 05-09, Revision 04 Page 23 of 27

TAILGATE SAI	FETY MEETING FORM
Dept: 4142 Well Location: C.TF-MIN	2 Date: 9/25/12 Time: 0745
Activities: Groundwater Monitoring (purging, samp	
Weather Conditions: Temp: °F Wind Speed: MPH	Humidity:% Wind Chill°F
Chemicals Used: <u>Acids in sample containers, stand</u> Other:	ard solutions. Hach ACCU VAC ampules
Safety T	Sopics Presented
X Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	X 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
⊠ Use safe lifting practices. Wear leather gloves if necessary.	X Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	X No eating or drinking at sampling counter.
🛛 Be aware of chemical hazards.	Be aware of biohazards (snakes, spiders, etc.)
☑ Wear nitrile or latex gloves when sampling.	☑ Wear communication device (cell phone, EOC pager).
X Wear chemical safety goggles.	X Avoid spilling purge / decon water.

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

Attendees Signature Printed Signatu Printed Name Printed Name Signature Printed Name Signature Signature Printed Name

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

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



Memorandum

Date: November 6, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614390 SDG: 311781 Laboratory: GEL Project/Task: 98026.01.14 Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

Perchlorate:

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

<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.

Anions:

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.

Anions:

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 20X for chloride and sulfate.

<u>Nitrate/nitrite:</u> The sample was diluted 25X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica D ⁴	ymerski Lev	el I Date: 1	1/06/12



Memorandum

Date: November 6, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614390 SDG: 311781 and 311783 Laboratory: GEL Project/Task: 98026.01.14 Analysis: Metals

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

Summary

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

CVAA:

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

ICPMS:

- 1. Sb was detected in the MB at > the MDL but < the PQL. The associated result for sample 311783-001 was > MDL and < 5X the MB concentration and will be **qualified 0.0058U,B** at 5X the MB value.
- 2. The serial dilution %D for Na was > 10% and the parent sample result was > 50X the MDL. All associated sample results 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.

<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 and Cu were detected in the MB at > the MDL and < the PQL. All associated sample results that were ND or > 5X the MB concentration will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as follows.

ICP-MS:

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

CVAA and ICP-MS:

The MS analysis associated with sample 311783-001 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

ICP-AES:

The MS analysis associated with sample 311781-002 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicates met QC acceptance criteria.

CVAA and ICP-MS:

The replicate analysis associated with sample 311783-001 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

ICP-AES:

The replicate analysis associated with sample 311781-002 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted except as follows.

ICP-MS:

Both samples were diluted 10X for Ca and Na.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria.

ICP-MS:

The serial dilution analysis associated with sample 311783-001 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

ICP-AES:

The serial dilution analysis associated with sample 311781-002 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 11/06/12



Memorandum

Date:	November 6, 2012
То:	File
From:	Marcia Hilchey
Subject:	GC/MS Organic Data Review and Validation – SNI Site: SWMU 149 GWM AR/COC: 614390 SDG: 311781 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. Problems were identified with the data package that resulted in the qualification of data.

1. The RFs for vinyl acetate and 2-butanone were < 0.05 but > 0.01. All associated sample results were ND and will be **qualified UJ,I4**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The initial calibration RSD for bromoform was >15% but < 40% and no other calibration infractions occurred for this analyte. All associated sample results were ND and will not be qualified.

The ICV %D for vinyl acetate was > 20% with positive bias. The CCV %D for carbon disulfide was > 20% and < 40% with negative bias, with no other associated calibration infractions. All associated sample results were ND and will not be qualified.

<u>Blanks</u>

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

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 with the following exceptions. The MS and/or MSD %Rs for bromoform and dibromochloromethane were > the UAL. All associated sample results were ND and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 11/06/12



Memorandum

Date: November 8, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 Laboratory: GEL Project/Task: 98026.01.15 Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

Perchlorate:

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

<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.

<u>Anions and Perchlorate:</u> 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.

Anions 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> The sample was diluted 40X for chloride and sulfate.

<u>Nitrate/nitrite:</u> The sample was diluted 5X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica D	vmerski Level I	Date: 11/09/12



Memorandum

Date: November 7, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 Laboratory: GEL Project/Task: 98026.01.15 Analysis: High Explosives (HE) by LCMSMS

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

<u>Summary</u>

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

1) The MS/MSD RPD for tetryl was > UAL. The associated sample result was a ND and will be **qualified UJ,MS5**.

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

Holding Times

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level 1 Date: 11/09/1	Reviewed by: Monica Dymerski	Level I	Date: 11/09/12
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Memorandum

Date: November 8, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 and 311899 Laboratory: GEL Project/Task: 98026.01.15 Analysis: Metals

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

<u>Summary</u>

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

ICP-MS:

- 1. Cu was detected in the MB at > MDL and < PQL. The associated sample results were detects < 5X the MB concentration and will be **qualified 0.0019U,B** at 5X the MB value.
- 2. The MS %R for Zn was > UAL, and the parent sample result was > 4X the spike concentration. The associated sample results were detects and will be **qualified J,MS1**.
- 3. The SD %Ds for Cu, Mg, and Co were > 10% and the parent sample results were > 50X MDL. The associated sample results were detects and will be **qualified J,D1**.

CVAA:

1. Hg was reported in the ICB and CCBs at negative values, with absolute values > MDL. The associated sample results were ND 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

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 exception.

ICP-MS:

The CRI %R for Ba was > UAL. The associated sample results were detects > 5X PQL and 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:

Pb and U were detected in the MB at > MDL and < PQL. The associated sample results were ND or were > 5X the MB concentration and will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

ICP-MS:

The parent sample concentration for Mn was >4X the spike concentration, but the %R for this analyte met QC acceptance criteria. No sample data were qualified as a result.

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

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

ICP-AES:

The MS analysis for SDG 311894 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

CVAA:

The MS analysis for SDG 311899 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicates met QC acceptance criteria.

ICP-MS:

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

ICP-AES:

The MS analysis for SDG 311894 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

CVAA:

The MS analysis for SDG 311899 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:

Both samples were diluted 20X for Ca, Mg, and Na; and 5X for Mn. Sample 311894-003 was also diluted 5X for K.

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.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 11/09/12



Memorandum

Date: November 8, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 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>

One sample was 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.

Gamma Spec:

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. All sample results which were > but <3X the MDA will be **qualified J,FR7.**
- 2. The relative dilution factor between the 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. The associated sample results will be **qualified J,MS1** due to lack of matrix-specific accuracy data.

Gamma Spec:

1. The K-40 result 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 sample was 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.

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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 11/09/12



Memorandum

Date:	November 7, 2012
То:	File
From:	Marcia Hilchey
Subject:	GC/MS Organic Data Review and Validation – SNI Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 Laboratory: GEL Project/Task: 98026.01.15 Analysis: SVOCs

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

Summary

One sample was prepared and analyzed with accepted procedures using method EPA 8270C (SVOCs). All compounds were successfully analyzed. 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 sample was extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL y-intercept value for hexachlorocyclopentadiene was > the MDL but < 3X the MDL. The associated sample result was ND and will not be qualified.

The ICV and/or CCV %Ds for six target compounds were > 20% and < 40% with negative bias. All associated sample results were ND, with no other associated calibration infractions, and 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 11/09
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Memorandum

Date:	November 7, 2012
То:	File
From:	Marcia Hilchey
Subject:	GC/MS Organic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614391 SDG: 311894 Laboratory: GEL Project/Task: 98026.01.15 Analysis: VOCs

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

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. 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 CCV %D for carbon tetrachloride was > 20% with positive bias. All associated sample results were ND and 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 11/09/12

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SECTION IV SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, JULY – SEPTEMBER 2012

1.0 Introduction

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

The fourth of eight quarterly groundwater sampling events occurred in July 2012 for Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58, and monitoring wells at the Old Burn Site (OBS) OBS-MW1, OBS-MW2, and OBS-MW3, located within SWMU 68. Monitoring wells CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3 were installed in August 2011 (SNL/NM November 2011). Monitoring well CCBA-MW1 is located at the southwestern corner of SWMU 8, approximately 0.2 miles north of the ephemeral channel in Lurance Canyon and approximately 0.7 miles east of Coyote Springs (Figure IV-1). Monitoring well CCBA-MW2 is located near the center of SWMU 58, approximately 0.4 miles north of the ephemeral channel in Lurance Canyon and approximately 1 mile northeast of Coyote Springs (Figure IV-1). Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are located at SWMU 68 in the Coyote Test Field, approximately 0.6 miles southwest of the Starfire Optical Range (Figure IV-2).

The supplemental groundwater monitoring at the five newly installed 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 Third Quarter, Calendar Year (CY) 2012 reporting period (July through September 2012).

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

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on July 16 and July 12, 2012, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from July 17 to July 19, 2012, respectively. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in both the monitoring well CCBA-MW1 environmental sample and the duplicate environmental sample with concentrations of 5.03 mg/L and 5.00 mg/L, respectively. Fluoride in the monitoring well CCBA-MW2 environmental sample exceeds the method detection limit (MDL) at a concentration of 1.48 mg/L. 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 fourth of eight supplemental quarterly events for the five monitoring wells. The fifth of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (October through December 2012).

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 Second Quarter, CY 2012.

2.1 Equipment Decontamination

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

2.2 Well Evacuation

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

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

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

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

2.3 Groundwater Sample Collection

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

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

3.0 Analytical Results

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri, et al. 1998; DOE 1990). Table IV-4 lists the MDLs for VOCs and SVOCs analyzed and Table IV-5 lists the MDLs for HE compounds analyzed. Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results for samples collected from all five monitoring wells are shown in tabulated form in Tables IV-6 through IV-13. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Records Center.

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

3.1 Field Water Quality Measurements

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

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

3.2 Volatile Organic Compounds

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

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

3.3 Semivolatile Organic Compounds

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

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

3.4 High Explosive Compounds

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

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

3.5 Nitrate Plus Nitrite

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-6 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at a maximum concentration of 3.27 mg/L in the CCBA-MW2 environmental sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-6 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at a maximum concentration of 1.86 mg/L in the monitoring well OBS-MW1 duplicate environmental sample.

3.6 Anions and Alkalinity

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-7 summarizes alkalinity, major anion (as 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 from monitoring well CCBA-MW1 at concentrations of 5.03 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 1.48 mg/L, which is below the MCL. No other anions or total cyanide were detected above established MCLs. There are no established MCLs for bromide, chloride, sulfate, or alkalinity.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-7 summarizes alkalinity, major anion (as 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 micrograms per liter (μ g/L) (0.004 mg/L) in any groundwater sample from SWMUs 8/58. Table IV-8 presents perchlorate results.

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

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

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

3.8 Hexavalent Chromium

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

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

3.9 Metals

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. TAL metals plus uranium were analyzed in samples from both monitoring wells at SWMUs 8/58. Metal results for SWMUs 8/58 are summarized in Table IV-10. No metal parameters were detected above established MCLs in any groundwater sample.

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

3.10 Cations

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

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

3.11 Gamma Spectroscopy and Radioisotopic Analyses

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

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

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Gamma

spectroscopy activity results for short-list radionuclides are less than the associated MDAs for all groundwater samples. The result for potassium-40 activity was qualified as unusable during data validation in the CCBA-MW1 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 7.33 ± 0.996 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 0.169 ± 0.0741 pCi/L for uranium-235/236 to 21.7 ± 2.93 pCi/L for uranium-233/234. In this region, groundwater contacts bedrock, which contains material high in naturally occurring uranium.

3.12 Sample Results Exceeding Maximum Contaminant Levels

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

4.0 **Quality Control Samples**

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

4.1 Field Quality Control Samples

Field QC samples for this sampling event included duplicate environmental, EB, TB, and FB samples. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the Groundwater Characterization Work Plans for SWMUs 8/58 and 68 (SNL/NM September 2010).

4.1.1 **Duplicate Environmental Samples**

Duplicate environmental samples were collected from monitoring wells CCBA-MW1 and OBS-MW3 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate environmental samples were collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. Duplicate environmental samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW1 and OBS-MW3. RPD values were calculated only for detected parameters. The Work Plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate environmental sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all calculated parameters.

4.1.2 Equipment Blank Samples

A portable Bennett[™] groundwater sampling system was used to collect groundwater samples from all wells. The sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in SNL/NM FOP 05-03 "Groundwater Monitoring Equipment Decontamination" (SNL/NM January 2012a). In accordance with SNL/NM FOP 05-03, the following solutions were pumped through the sampling system: 5 gallons of deionized (DI) water mixed with 20 milliliters (mL) nonphosphate laboratory detergent, 5 gallons of DI water, 5 gallons of DI water mixed with 20 mL reagent-grade nitric acid, and 15 gallons of DI water. In addition, the

outside of the pump tubing was rinsed with DI water. EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW1 and were submitted for all analyses.

SWMUs 8/58, Monitoring Well CCBA-MW1. Bromodichloromethane, chloroform, chloride, chromium, fluoride, sulfate, and toluene were detected above the laboratory MDLs. Toluene in monitoring well CCBA-MW1 samples were detected at concentrations less than ten times the associated equipment blank result, and qualified as not detected during data validation. No corrective action was necessary for bromodichloromethane, chloroform, chloride, chromium, fluoride, or sulfate since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

SWMU 68, Monitoring Well OBS-MW3. Alkalinity, bromodichloromethane, chloroform, copper, dibromochloromethane, and toluene were detected above laboratory MDLs. No corrective action was necessary for alkalinity, bromodichloromethane, chloroform, or dibromochloromethane since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result. Copper and toluene in monitoring well OBS-MW3 environmental samples were detected at concentrations less than five times and ten times, respectively, the associated equipment blank result; therefore, qualified as not detected during data validation.

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

SWMU 68. A total of four TB samples were submitted with the samples collected during the July 2012 sampling event. 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-MW2 and OBS-MW3) to simulate the transfer of environmental samples from the sampling system to the sample container.

SWMUs 8/58, Monitoring Well CCBA-MW2. The VOC compounds

bromodichloromethane, carbon disulfide, chloroform, and dibromochloromethane were detected above associated laboratory MDLs. No corrective action was required as these compounds were not detected in the associated environmental sample.

SWMU 68, Monitoring Well OBS-MW2. The VOC compounds

bromodichloromethane, chloroform, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental samples.

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

No variances or nonconformances from requirements in the Groundwater Characterization Work Plans for SWMUs 8/58 and 68 (SNL/NM September 2010) occurred during the July 2012 sampling activities. Project specific issues during sampling activities are identified below. **SWMUs 8/58.** Toluene was detected at low level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new sample truck and equipment. Modifications to the water truck and equipment have been completed and additional decontaminations have been performed since this sampling event. The modifications include a more direct sampling output collection point, removal of the flow meter to the discharge line, changes to the decontamination process, and collection of more quality control samples. These modifications appear to be working as the trace toluene concentrations detected are decreasing over time.

SWMUs 68. Toluene was detected at low level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new sample truck and equipment. Modifications to the water truck and equipment have been completed and additional decontaminations have been performed since this sampling event.

The field team did not request analysis for bromide or fluoride due to oversight. The SNL/NM project leader was notified. No corrective action was performed since historical results are below established MCLs and these parameters are not constituents of concern.

5.0 Summary

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

Analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 environmental sample and environmental duplicate sample at concentrations of 5.03 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.

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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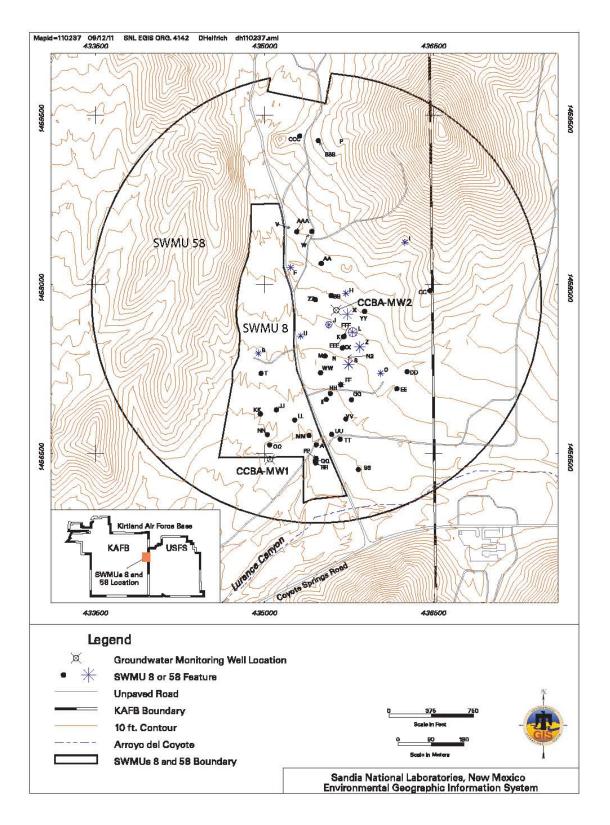
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Figures





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

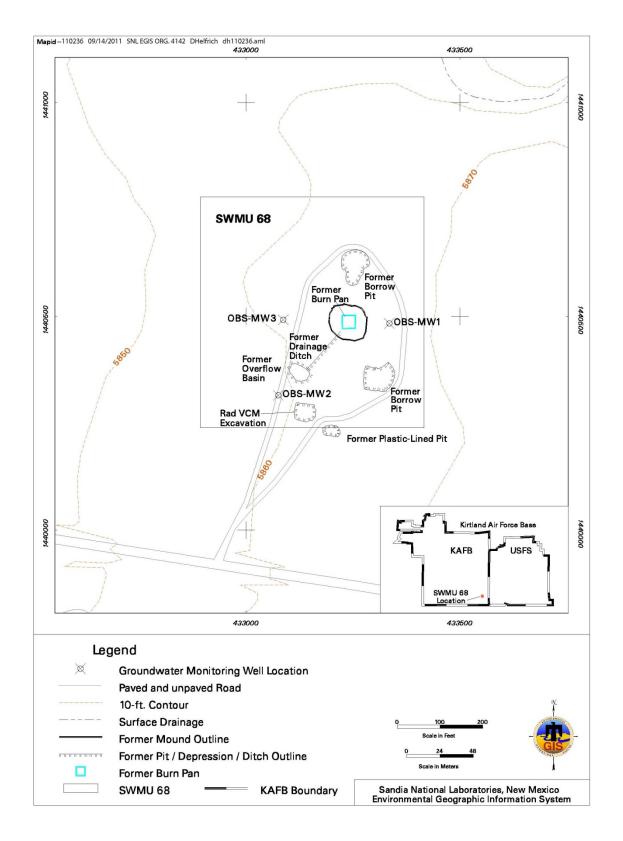


Figure IV-2

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 SW-846 9012	1 x 250-ML polyethylene, NaOH, 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	HASL-300	1 x 1-L polyethylene, HNO ₃ , 4°C

Notes

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

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

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

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

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

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

°C = Degrees Celsius.

- EPA = U.S. Environmental Protection Agency.
- 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 Third Quarter, CY 2012 Groundwater Sampling SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment July – September 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation		
CCBA-MW1	092615	614288			
CCBA-MW1 (duplicate)	092616	614287	SWMUs 8/58		
CCBA-MW2	092610	614286			
OBS-MW1	092618	614289			
OBS-MW2	092620	614290	SW/MLL 69		
OBS-MW3	092625	614292	SWMU 68		
OBS-MW3 (duplicate)	092626	614291			

Notes

AR/COC = Analysis Request/Chain of Custody. CCBA = Coyote Canyon Blast Area.

CY = Calendar Year.

MW = Monitoring well.

OBS

Old Burn Site.Solid Waste Management Unit. SWMU

Summary of Field Water Quality Measurements^a

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

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-Jul-12	18.81	482	173.9	6.46	0.33	31.6	2.92
CCBA-MW2	12-Jul-12	18.39	569	141.0	7.37	0.41	62.4	5.86
SWMU 68								
OBS-MW1	17-Jul-12	17.99	498	151.1	7.28	0.41	38.1	3.59
OBS-MW2	18-Jul-12	20.84	494	153.2	7.25	0.32	39.6	3.53
OBS-MW3	19-Jul-12	18.82	537	179.9	7.29	0.37	46.2	4.27

Notes

^aField measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

μmhos/cm = Micromhos per centimeter.

CCBA = Coyote Canyon Blast Area.

= Milligrams per liter. mg/L

mŽ = Millivolts.

= Monitoring well. MW

= Nephelometric turbidity units. NTU

OBS = Old Burn Site.

Potential of hydrogen (negative logarithm of the hydrogen ion concentration).Solid Waste Management Unit. pН

SWMU

Table IV-4Method Detection Limits for Volatile and Semivolatile Organic CompoundsSWMUs 8/58 and 68 Groundwater MonitoringQuarterly Assessment, July – September 2012

			SWM	J 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	1,2,4-Trichlorobenzene	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	1,2-Dichlorobenzene	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C
1,1,2-Trichloroethane	0.300	EPA 8260B	1,3-Dichlorobenzene	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C
1,1-Dichloroethane	0.300	EPA 8260B	1,4-Dichlorobenzene	3.00	EPA 8270C	Dibenzofuran	3.00	EPA 8270C
1,1-Dichloroethene	0.300	EPA 8260B	2,4,5-Trichlorophenol	3.00	EPA 8270C	Diethylphthalate	3.00	EPA 8270C
1,2-Dichloroethane	0.300	EPA 8260B	2,4,6-Trichlorophenol	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C
1,2-Dichloropropane	0.300	EPA 8260B	2,4-Dichlorophenol	3.00	EPA 8270C	Dinitro-o-cresol	3.00	EPA 8270C
2-Butanone	2.00	EPA 8260B	2,4-Dimethylphenol	3.00	EPA 8270C	Diphenyl amine	3.00	EPA 8270C
2-Hexanone	2.20	EPA 8260B	2,4-Dinitrophenol	5.00	EPA 8270C	Fluoranthene	0.300	EPA 8270C
4-methyl-, 2-Pentanone	1.50	EPA 8260B	2,4-Dinitrotoluene	3.00	EPA 8270C	Fluorene	0.300	EPA 8270C
Acetone	3.00	EPA 8260B	2,6-Dinitrotoluene	3.00	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
Benzene	0.300	EPA 8260B	2-Chloronaphthalene	0.300	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
Bromodichloromethane	0.300	EPA 8260B	2-Chlorophenol	3.00	EPA 8270C	Hexachlorocyclopentadiene	3.00	EPA 8270C
Bromoform	0.300	EPA 8260B	2-Methylnaphthalene	0.300	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
Bromomethane	0.300	EPA 8260B	2-Nitroaniline	3.00	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
Carbon disulfide	1.50	EPA 8260B	2-Nitrophenol	3.00	EPA 8270C	Isophorone	3.00	EPA 8270C
Carbon tetrachloride	0.300	EPA 8260B	3,3'-Dichlorobenzidine	3.00	EPA 8270C	Naphthalene	0.300	EPA 8270C
Chlorobenzene	0.300	EPA 8260B	3-Nitroaniline	3.00	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
Chloroethane	0.300	EPA 8260B	4-Bromophenyl phenyl ether	3.00	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
Chloroform	0.300	EPA 8260B	4-Chloro-3-methylphenol	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
Chloromethane	0.300	EPA 8260B	4-Chlorobenzenamine	3.30	EPA 8270C	Phenol	3.00	EPA 8270C
Dibromochloromethane	0.300	EPA 8260B	4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Pyrene	0.300	EPA 8270C
Ethyl benzene	0.300	EPA 8260B	4-Nitroaniline	3.00	EPA 8270C	bis(1-Chloroisopropyl)ether	3.00	EPA 8270C
Methylene chloride	3.00	EPA 8260B	4-Nitrophenol	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
Styrene	0.300	EPA 8260B	Acenaphthene	0.300	EPA 8270C	bis(2-Chloroethyl)ether	3.00	EPA 8270C
Tetrachloroethene	0.300	EPA 8260B	Acenaphthylene	0.300	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
Toluene	0.300	EPA 8260B	Anthracene	0.300	EPA 8270C	m,p-Cresol	3.00	EPA 8270C
Trichloroethene	0.300	EPA 8260B	Benzo(a)anthracene	0.300	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
Vinyl acetate	1.50	EPA 8260B	Benzo(a)pyrene	0.440	EPA 8270C	o-Cresol	3.00	EPA 8270C
Vinyl chloride	0.300	EPA 8260B	Benzo(b)fluoranthene	0.300	EPA 8270C			
Xylene	0.300	EPA 8260B	Benzo(ghi)perylene	0.300	EPA 8270C			
cis-1,2-Dichloroethene	0.300	EPA 8260B	Benzo(k)fluoranthene	0.300	EPA 8270C			
cis-1,3-Dichloropropene	0.300	EPA 8260B	Butylbenzyl phthalate	3.00	EPA 8270C			
trans-1,2-Dichloroethene	0.300	EPA 8260B	Carbazole	0.300	EPA 8270C			
trans-1,3-Dichloropropene	0.300	EPA 8260B	Chrysene	0.300	EPA 8270C			

Table IV-4 (Continued)Method Detection Limits for Volatile and Semivolatile Organic CompoundsSWMUs 8/58 and 68 Groundwater MonitoringQuarterly Assessment, July – September 2012

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

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

Notes

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

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

EPA = U.S. Environmental Protection Agency.

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.

SWMU = Solid Waste Management Unit.

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

	M	DL
Analyte	(μο	μ/L)
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0860 – 0.0879	0.0851 – 0.086
1,3-Dinitrobenzene	0.0860 - 0.0879	0.0851 – 0.086
2,4,6-Trinitrotoluene	0.0860 - 0.0879	0.0851 – 0.086
2,4-Dinitrotoluene	0.0860 - 0.0879	0.0851 – 0.086
2,6-Dinitrotoluene	0.0860 - 0.0879	0.0851 – 0.086
2-Amino-4,6-dinitrotoluene	0.0860 - 0.0879	0.0851 – 0.086
2-Nitrotoluene	0.0882 - 0.0901	0.0871 – 0.0882
3-Nitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
4-Amino-2,6-dinitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
4-Nitrotoluene	0.161 – 0.165	0.160 – 0.161
HMX	0.0860 – 0.0879	0.0851 – 0.086
Nitro-benzene	0.0860 – 0.0879	0.0851 – 0.086
Pentaerythritol tetranitrate	0.108 – 0.110	0.106 – 0.108
RDX	0.0860 – 0.0879	0.0851 – 0.086
Tetryl	0.0860 - 0.0879	0.0851 – 0.086

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-trinitro-triazine.
- SWMU = Solid Waste Management Unit.
- Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 16-Jul-12	Nitrate plus nitrite as N	1.41	0.085	0.250	10.0			092615-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jul-12	Nitrate plus nitrite as N	1.35	0.085	0.250	10.0			092616-018	EPA 353.2
CCBA-MW2 12-Jul-12	Nitrate plus nitrite as N	3.27	0.085	0.250	10.0			092610-018	EPA 353.2
SWMU 68			•						
OBS-MW1 17-Jul-12	Nitrate plus nitrite as N	1.86	0.085	0.250	10.0			092618-018	EPA 353.2
OBS-MW2 18-Jul-12	Nitrate plus nitrite as N	1.47	0.085	0.250	10.0			092620-018	EPA 353.2
OBS-MW3 19-Jul-12	Nitrate plus nitrite as N	1.56	0.085	0.250	10.0			092625-018	EPA 353.2
OBS-MW3 (Duplicate) 19-Jul-12	Nitrate plus nitrite as N	1.59	0.085	0.250	10.0			092626-018	EPA 353.2

Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

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.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

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

Notes (continued)

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Summary of Alkalinity, Anion, and Total Cyanide 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	I	(3/	((3)	(***3***/				
CCBA-MW1	Bicarbonate Alkalinity	192	0.725	1.00	NE			092615-022	SM2320B
16-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092615-022	SM2320B
	Bromide	0.344	0.067	0.200	NE			092615-016	EPA 9056
	Chloride	27.9	0.134	0.400	NE	В		092615-016	EPA 9056
	Fluoride	5.03	0.033	0.100	4.0			092615-016	EPA 9056
	Sulfate	53.8	0.266	0.800	NE			092615-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092615-027	EPA 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	188	0.725	1.00	NE			092616-022	SM2320B
16-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092616-022	SM2320B
	Bromide	0.310	0.067	0.200	NE			092616-016	EPA 9056
	Chloride	28.2	0.134	0.400	NE	В		092616-016	EPA 9056
	Fluoride	5.00	0.033	0.100	4.0			092616-016	EPA 9056
	Sulfate	54.2	0.266	0.800	NE			092616-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092616-027	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	182	0.725	1.00	NE			092610-022	SM2320B
12-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092610-022	SM2320B
	Bromide	0.539	0.067	0.200	NE			092610-016	EPA 9056
	Chloride	36.0	0.335	1.00	NE			092610-016	EPA 9056
	Fluoride	1.48	0.033	0.100	4.0			092610-016	EPA 9056
	Sulfate	92.0	0.665	2.00	NE			092610-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092610-027	EPA 9012

Table IV-7 (Continued)

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 68	1	,	,		/	•			
OBS-MW1	Bicarbonate Alkalinity	189	0.725	1.00	NE			092618-022	SM2320B
17-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092618-022	SM2320B
	Chloride	22.4	0.670	2.00	NE			092618-016	EPA 9056
	Sulfate	74.6	1.33	4.00	NE			092618-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092618-027	EPA 9012
OBS-MW2	Bicarbonate Alkalinity	183	0.725	1.00	NE			092620-022	SM2320B
18-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092620-022	SM2320B
	Chloride	20.9	0.335	1.00	NE	В		092620-016	EPA 9056
	Sulfate	81.8	0.665	2.00	NE			092620-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092620-027	EPA 9012
OBS-MW3	Bicarbonate Alkalinity	181	0.725	1.00	NE			092625-022	SM2320B
19-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092625-022	SM2320B
	Chloride	21.7	0.335	1.00	NE	В		092625-016	EPA 9056
	Sulfate	81.8	0.665	2.00	NE			092625-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092625-027	EPA 9012
OBS-MW3 (Duplicate)	Bicarbonate Alkalinity	181	0.725	1.00	NE			092626-022	SM2320B
19-Jul-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092626-022	SM2320B
	Chloride	21.7	0.335	1.00	NE	В		092626-016	EPA 9056
	Sulfate	81.8	0.665	2.00	NE			092626-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092626-027	EPA 9012

Table IV-7 (Concluded)

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes

- **Bold** = Indicates that a results exceeds the MCL.
- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- 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.
- OBS = Old Burn Site.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SM = Standard Method.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- 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.

Summary of Perchlorate Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c				
SWMUs 8/58												
CCBA-MW1 16-Jul-12	ND	0.004	0.012	NE	U		092615-020	EPA 314.0				
CCBA-MW1 (Duplicate) 16-Jul-12	ND	0.004	0.012	NE	U		092616-020	EPA 314.0				
CCBA-MW2 12-Jul-12	ND	0.004	0.012	NE	U		092610-020	EPA 314.0				
SWMU 68	1				L							
OBS-MW1 17-Jul-12	ND	0.004	0.012	NE	U		092618-020	EPA 314.0				
OBS-MW2 18-Jul-12	ND	0.004	0.012	NE	U		092620-020	EPA 314.0				
OBS-MW3 19-Jul-12	ND	0.004	0.012	NE	U		092625-020	EPA 314.0				
OBS-MW3 (Duplicate) 19-Jul-12	ND	0.004	0.012	NE	U		092626-020	EPA 314.0				

Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

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.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

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

Notes (continued)

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Summary of Hexavalent Chromium Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Hexavalent Chromium Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 17-Jul-12	ND	0.0033	0.010	NE	U		092618-014	EPA 7196A
OBS-MW2 18-Jul-12	ND	0.0033	0.010	NE	U		092620-014	EPA 7196A
OBS-MW3 19-Jul-12	ND	0.0033	0.010	NE	U		092625-014	EPA 7196A
OBS-MW3 (Duplicate) 19-Jul-12	ND	0.0033	0.010	NE	U		092626-014	EPA 7196A

Notes

- CFR = Code of Federal Regulations.
- 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.
- OBS = Old Burn Site.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

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-MW1	Aluminum	0.0314	0.015	0.050	NE	J	Quaimer	092615-009	EPA 6020
16-Jul-12	Antimony	ND	0.001	0.003	0.006	Ŭ		092615-009	EPA 6020
	Arsenic	0.0022	0.0017	0.005	0.010	J		092615-009	EPA 6020
	Barium	0.00335	0.0006	0.002	2.00			092615-009	EPA 6020
	Beryllium	0.000394	0.0002	0.0005	0.004	J		092615-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092615-009	EPA 6020
	Calcium	43.7	0.060	0.200	NE			092615-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092615-009	EPA 6020
	Cobalt	0.000101	0.0001	0.001	NE	J		092615-009	EPA 6020
	Copper	0.000437	0.00035	0.001	NE	J		092615-009	EPA 6020
	Iron	0.143	0.033	0.100	NE			092615-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092615-009	EPA 6020
	Magnesium	9.50	0.010	0.030	NE		J	092615-009	EPA 6020
	Manganese	0.00568	0.001	0.005	NE			092615-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092615-009	EPA 7470
	Nickel	0.000847	0.0005	0.002	NE	J		092615-009	EPA 6020
	Potassium	4.34	0.080	0.300	NE			092615-009	EPA 6020
	Selenium	0.00242	0.0015	0.005	0.050	J		092615-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092615-009	EPA 6020
	Sodium	69.9	0.400	1.25	NE			092615-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092615-009	EPA 6020
	Uranium	0.00181	0.000067	0.0002	0.03			092615-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092615-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092615-009	EPA 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

NA / - 11	Anglata	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	0.0305	0.015	0.050	NE	J		092616-009	EPA 6020
16-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092616-009	EPA 6020
	Arsenic	0.0027	0.0017	0.005	0.010	J		092616-009	EPA 6020
	Barium	0.0035	0.0006	0.002	2.00			092616-009	EPA 6020
	Beryllium	0.000443	0.0002	0.0005	0.004	J		092616-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092616-009	EPA 6020
	Calcium	44.2	0.060	0.200	NE			092616-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092616-009	EPA 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		092616-009	EPA 6020
	Copper	0.000486	0.00035	0.001	NE	J		092616-009	EPA 6020
	Iron	0.146	0.033	0.100	NE			092616-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092616-009	EPA 6020
	Magnesium	9.73	0.010	0.030	NE		J	092616-009	EPA 6020
	Manganese	0.00568	0.001	0.005	NE			092616-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092616-009	EPA 7470
	Nickel	0.00104	0.0005	0.002	NE	J		092616-009	EPA 6020
	Potassium	4.38	0.080	0.300	NE			092616-009	EPA 6020
	Selenium	0.00241	0.0015	0.005	0.050	J		092616-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092616-009	EPA 6020
	Sodium	63.8	0.400	1.25	NE			092616-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092616-009	EPA 6020
	Uranium	0.00182	0.000067	0.0002	0.03			092616-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092616-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092616-009	EPA 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Well	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		092610-009	EPA 6020
12-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092610-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092610-009	EPA 6020
	Barium	0.0472	0.0006	0.002	2.00			092610-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092610-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092610-009	EPA 6020
	Calcium	77.8	0.300	1.00	NE			092610-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092610-009	EPA 6020
	Cobalt	0.000139	0.0001	0.001	NE	J		092610-009	EPA 6020
	Copper	0.000808	0.00035	0.001	NE	B, J	0.00285U	092610-009	EPA 6020
	Iron	0.166	0.033	0.100	NE			092610-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092610-009	EPA 6020
	Magnesium	16.0	0.010	0.030	NE			092610-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092610-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092610-009	EPA 7470
	Nickel	0.00147	0.0005	0.002	NE	J		092610-009	EPA 6020
	Potassium	1.43	0.080	0.300	NE			092610-009	EPA 6020
	Selenium	0.00394	0.0015	0.005	0.050	J		092610-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092610-009	EPA 6020
	Sodium	49.3	0.400	1.25	NE			092610-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092610-009	EPA 6020
	Uranium	0.0054	0.000067	0.0002	0.03	-		092610-009	EPA 6020
	Vanadium	0.00953	0.001	0.005	NE			092610-009	EPA 6010
	Zinc	0.00535	0.0035	0.010	NE			092610-009	EPA 6020

Table IV-10 (Concluded)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- 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.

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

^cAnalytical Method

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

Table IV-11

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Well	Analyta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
wen	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
OBS-MW1	Aluminum	ND	0.015	0.050	NE	U		092618-009	EPA 6020
17-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092618-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092618-009	EPA 6020
	Barium	0.020	0.0006	0.002	2.00			092618-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092618-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092618-009	EPA 6020
	Calcium	75.3	0.300	1.00	NE			092618-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092618-009	EPA 6020
	Cobalt	0.00014	0.0001	0.001	NE	J		092618-009	EPA 6020
	Copper	0.000646	0.00035	0.001	NE	J	J+	092618-009	EPA 6020
	Iron	0.317	0.033	0.100	NE			092618-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092618-009	EPA 6020
	Magnesium	17.4	0.010	0.030	NE			092618-009	EPA 6020
	Manganese	0.00136	0.001	0.005	NE	J		092618-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092618-009	EPA 7470
	Nickel	0.00178	0.0005	0.002	NE	J		092618-009	EPA 6020
	Potassium	1.65	0.080	0.300	NE			092618-009	EPA 6020
	Selenium	0.00361	0.0015	0.005	0.050	J		092618-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092618-009	EPA 6020
	Sodium	20.3	0.400	1.25	NE			092618-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092618-009	EPA 6020
	Uranium	0.0107	0.000067	0.0002	0.03	В	J	092618-009	EPA 6020
	Vanadium	0.00111	0.001	0.005	NE	J		092618-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092618-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Well	Analyta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
wen	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier ^a	Qualifier ^b	Number	Method ^c
OBS-MW2	Aluminum	0.0323	0.015	0.050	NE	J		092620-009	EPA 6020
18-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092620-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092620-009	EPA 6020
	Barium	0.0227	0.0006	0.002	2.00			092620-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092620-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092620-009	EPA 6020
	Calcium	84.5	0.300	1.00	NE		J	092620-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092620-009	EPA 6020
	Cobalt	0.000185	0.0001	0.001	NE	J	0.0005U	092620-009	EPA 6020
	Copper	0.00102	0.00035	0.001	NE			092620-009	EPA 6020
	Iron	0.208	0.033	0.100	NE			092620-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092620-009	EPA 6020
	Magnesium	16.9	0.010	0.030	NE			092620-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092620-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092620-009	EPA 7470
	Nickel	0.00171	0.0005	0.002	NE	J		092620-009	EPA 6020
	Potassium	1.67	0.080	0.300	NE			092620-009	EPA 6020
	Selenium	0.00305	0.0015	0.005	0.050	J		092620-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092620-009	EPA 6020
	Sodium	23.2	0.080	0.250	NE			092620-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092620-009	EPA 6020
	Uranium	0.0136	0.000067	0.0002	0.03		J	092620-009	EPA 6020
	Vanadium	0.00124	0.001	0.005	NE	J		092620-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092620-009	EPA 6020

Table IV-11 (Continued)

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-MW3	Aluminum	ND	0.015	0.050	ŇĔ	U		092625-009	EPA 6020
19-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092625-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092625-009	EPA 6020
	Barium	0.0249	0.0006	0.002	2.00			092625-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092625-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092625-009	EPA 6020
	Calcium	77.4	0.300	1.00	NE			092625-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092625-009	EPA 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		092625-009	EPA 6020
	Copper	0.000749	0.00035	0.001	NE	J	0.0061UJ	092625-009	EPA 6020
	Iron	0.224	0.033	0.100	NE			092625-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092625-009	EPA 6020
	Magnesium	16.3	0.010	0.030	NE			092625-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092625-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092625-009	EPA 7470
	Nickel	0.00112	0.0005	0.002	NE	J		092625-009	EPA 6020
	Potassium	1.51	0.080	0.300	NE			092625-009	EPA 6020
	Selenium	0.0037	0.0015	0.005	0.050	J		092625-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092625-009	EPA 6020
	Sodium	22.4	0.400	1.25	NE			092625-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092625-009	EPA 6020
	Uranium	0.012	0.000067	0.0002	0.03			092625-009	EPA 6020
	Vanadium	0.00187	0.001	0.005	NE	B, J	0.0059U	092625-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092625-009	EPA 6020

Table IV-11 (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-MW3 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		092626-009	EPA 6020
19-Jul-12	Antimony	ND	0.001	0.003	0.006	U		092626-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092626-009	EPA 6020
	Barium	0.0282	0.0006	0.002	2.00			092626-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092626-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092626-009	EPA 6020
	Calcium	79.6	0.300	1.00	NE			092626-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092626-009	EPA 6020
	Cobalt	0.000105	0.0001	0.001	NE	J		092626-009	EPA 6020
	Copper	0.000844	0.00035	0.001	NE	J	0.0061UJ	092626-009	EPA 6020
	Iron	0.223	0.033	0.100	NE			092626-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092626-009	EPA 6020
	Magnesium	15.3	0.010	0.030	NE			092626-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092626-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092626-009	EPA 7470
	Nickel	0.00122	0.0005	0.002	NE	J		092626-009	EPA 6020
	Potassium	1.56	0.080	0.300	NE			092626-009	EPA 6020
	Selenium	0.00353	0.0015	0.005	0.050	J		092626-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092626-009	EPA 6020
	Sodium	21.3	0.400	1.25	NE			092626-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092626-009	EPA 6020
	Uranium	0.0124	0.000067	0.0002	0.03			092626-009	EPA 6020
	Vanadium	0.00156	0.001	0.005	NE	B, J	0.0059U	092626-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092626-009	EPA 6020

Table IV-11 (Concluded) Summary of Unfiltered Total Metal Results SWMU 68 Groundwater Monitoring Quarterly Assessment, July – September 2012

Notes

- CFR = Code of Federal Regulations.
- 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.
- OBS = Old Burn Site.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

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

^bValidation Qualifier

- If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
- J = The associated value is an estimated quantity.
- J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
- U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

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

Table IV-12

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	1			,			•	L	
CCBA-MW1	Calcium	40.7	0.060	0.200	NE			092615-017	EPA 6020
16-Jul-12	Magnesium	9.61	0.010	0.030	NE			092615-017	EPA 6020
	Potassium	4.12	0.080	0.300	NE			092615-017	EPA 6020
	Sodium	64.9	0.800	2.50	NE			092615-017	EPA 6020
CCBA-MW1 (Duplicate)	Calcium	41.5	0.060	0.200	NE			092616-017	EPA 6020
16-Jul-12	Magnesium	9.88	0.010	0.030	NE			092616-017	EPA 6020
	Potassium	4.27	0.080	0.300	NE			092616-017	EPA 6020
	Sodium	59.5	0.800	2.50	NE			092616-017	EPA 6020
CCBA-MW2	Calcium	72.8	0.300	1.00	NE			092610-017	EPA 6020
12-Jul-12	Magnesium	12.7	0.010	0.030	NE		J	092610-017	EPA 6020
	Potassium	1.28	0.080	0.300	NE			092610-017	EPA 6020
	Sodium	46.3	0.080	0.250	NE			092610-017	EPA 6020
SWMU 68				•		•	•		
OBS-MW1	Calcium	79.0	0.300	1.00	NE			092618-017	EPA 6020
17-Jul-12	Magnesium	17.1	0.010	0.030	NE			092618-017	EPA 6020
	Potassium	1.67	0.080	0.300	NE			092618-017	EPA 6020
	Sodium	26.3	0.080	0.250	NE			092618-017	EPA 6020
OBS-MW2	Calcium	67.5	0.600	2.00	NE			092620-017	EPA 6020
18-Jul-12	Magnesium	16.3	0.010	0.030	NE			092620-017	EPA 6020
	Potassium	1.67	0.080	0.300	NE			092620-017	EPA 6020
	Sodium	22.8	0.080	0.250	NE			092620-017	EPA 6020
OBS-MW3	Calcium	76.7	0.300	1.00	NE			092625-017	EPA 6020
19-Jul-12	Magnesium	16.2	0.010	0.030	NE			092625-017	EPA 6020
	Potassium	1.63	0.080	0.300	NE			092625-017	EPA 6020
	Sodium	21.8	0.400	1.25	NE	1		092625-017	EPA 6020
OBS-MW3 (Duplicate)	Calcium	81.7	0.300	1.00	NE			092626-017	EPA 6020
19-Jul-12	Magnesium	16.0	0.010	0.030	NE	1		092626-017	EPA 6020
	Potassium	1.62	0.080	0.300	NE	1		092626-017	EPA 6020
	Sodium	22.6	0.400	1.25	NE	1		092626-017	EPA 6020

Table IV-12 (Concluded)

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- 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.
- NE = Not established.
- OBS = Old Burn Site.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

Table IV-13

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 8/58		• •					•		
CCBA-MW1	Americium-241	-0.0219 ± 24.3	39.8	19.6	NE	U	BD	092615-033	EPA 901.1
16-Jul-12	Cesium-137	-0.296 ± 2.85	4.28	2.08	NE	U	BD	092615-033	EPA 901.1
	Cobalt-60	0.516 ± 2.60	4.60	2.20	NE	U	BD	092615-033	EPA 901.1
	Potassium-40	63.6 ± 33.2	45.2	21.6	NE	Х	R	092615-033	EPA 901.1
	Gross Alpha	6.08	NA	NA	15	NA	None	092615-034	EPA 900.0
	Gross Beta	5.70 ± 1.41	1.52	0.735	4mrem/yr			092615-034	EPA 900.0
	Uranium-233/234	2.00 ± 0.337	0.146	0.0657	NE			092615-035	HASL-300
	Uranium-235/236	0.0393 ± 0.0448	0.0524	0.0173	NE	U	BD	092615-035	HASL-300
	Uranium-238	0.657 ± 0.146	0.092	0.0388	NE			092615-035	HASL-300
CCBA-MW1 (Duplicate)	Americium-241	4.69 ± 17.1	29.1	14.3	NE	U	BD	092616-033	EPA 901.1
16-Jul-12	Cesium-137	1.67 ± 2.66	4.01	1.94	NE	U	BD	092616-033	EPA 901.1
	Cobalt-60	-1.16 ± 2.67	4.49	2.15	NE	U	BD	092616-033	EPA 901.1
	Potassium-40	16.8 ± 54.9	41.4	19.7	NE	U	BD	092616-033	EPA 901.1
	Gross Alpha	-0.49	NA	NA	15	NA	None	092616-034	EPA 900.0
	Gross Beta	5.01 ± 1.23	1.31	0.635	4mrem/yr			092616-034	EPA 900.0
	Uranium-233/234	1.75 ± 0.277	0.105	0.0473	NE			092616-035	HASL-300
	Uranium-235/236	0.00 ± 0.0185	0.0377	0.0125	NE	U	BD	092616-035	HASL-300
	Uranium-238	0.591 ± 0.120	0.0662	0.028	NE			092616-035	HASL-300
CCBA-MW2	Americium-241	7.99 ± 8.40	11.3	5.57	NE	U	BD	092610-033	EPA 901.1
12-Jul-12	Cesium-137	-0.29 ± 1.97	3.32	1.61	NE	U	BD	092610-033	EPA 901.1
	Cobalt-60	-1.4 ± 1.88	3.03	1.44	NE	U	BD	092610-033	EPA 901.1
	Potassium-40	2.98 ± 50.4	32.0	15.2	NE	U	BD	092610-033	EPA 901.1
	Gross Alpha	-6.55	NA	NA	15	NA	None	092610-034	EPA 900.0
	Gross Beta	3.86 ± 1.15	1.44	0.696	4mrem/yr		J	092610-034	EPA 900.0
	Uranium-233/234	7.33 ± 0.996	0.140	0.0633	NE			092610-035	HASL-300
	Uranium-235/236	0.107 ± 0.0556	0.0505	0.0167	NE		J	092610-035	HASL-300
	Uranium-238	1.60 ± 0.268	0.0886	0.0374	NE			092610-035	HASL-300

Table IV-13 (Continued)

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

SWMUs 8/58 and 68 Groundwater Monitoring

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	0.201 ± 9.97	15.3	7.51	NE	U	BD	092618-033	EPA 901.1
17-Jul-12	Cesium-137	-0.393 ± 1.77	2.96	1.43	NE	U	BD	092618-033	EPA 901.1
	Cobalt-60	0.931 ± 1.81	3.18	1.51	NE	U	BD	092618-033	EPA 901.1
	Potassium-40	8.23 ± 38.3	30.8	14.6	NE	U	BD	092618-033	EPA 901.1
	Gross Alpha	4.52	NA	NA	15 pCi/L	NA	None	092618-034	EPA 900.0
	Gross Beta	4.60 ± 1.15	1.19	0.577	4 mrem/yr			092618-034	EPA 900.0
	Uranium-233/234	16.5 ± 2.22	0.160	0.0717	NE			092618-035	HASL-300
	Uranium-235/236	0.169 ± 0.0741	0.0586	0.0189	NE		J	092618-035	HASL-300
	Uranium-238	3.11 ± 0.484	0.102	0.0423	NE			092618-035	HASL-300
OBS-MW2	Americium-241	6.20 ± 8.72	13.0	6.37	NE	U	BD	092620-033	EPA 901.1
18-Jul-12	Cesium-137	2.76 ± 2.19	3.05	1.47	NE	U	BD	092620-033	EPA 901.1
	Cobalt-60	0.676 ± 1.94	3.39	1.61	NE	U	BD	092620-033	EPA 901.1
	Potassium-40	22.9 ± 40.6	31.5	14.9	NE	U	BD	092620-033	EPA 901.1
	Gross Alpha	2.46	NA	NA	15 pCi/L	NA	None	092620-034	EPA 900.0
	Gross Beta	6.85 ± 1.50	1.18	0.568	4 mrem/yr			092620-034	EPA 900.0
	Uranium-233/234	21.7 ± 2.93	0.126	0.0562	NE			092620-035	HASL-300
	Uranium-235/236	0.267 ± 0.0872	0.046	0.0148	NE			092620-035	HASL-300
	Uranium-238	4.17 ± 0.616	0.0796	0.0332	NE			092620-035	HASL-300
OBS-MW3	Americium-241	-1.18 ± 10.3	18.2	8.89	NE	U	BD	092625-033	EPA 901.1
19-Jul-12	Cesium-137	1.83 ± 2.21	3.70	1.79	NE	U	BD	092625-033	EPA 901.1
	Cobalt-60	-0.0387 ± 2.15	3.76	1.78	NE	U	BD	092625-033	EPA 901.1
	Potassium-40	25.5 ± 61.8	33.9	15.9	NE	U	BD	092625-033	EPA 901.1
	Gross Alpha	-2.66	NA	NA	15 pCi/L	NA	None	092625-034	EPA 900.0
	Gross Beta	5.65 ± 1.39	1.47	0.712	4 mrem/yr		NJ+	092625-034	EPA 900.0
	Uranium-233/234	21.1 ± 3.05	0.180	0.0806	NE			092625-035	HASL-300
	Uranium-235/236	0.297 ± 0.109	0.0659	0.0212	NE			092625-035	HASL-300
	Uranium-238	3.66 ± 0.601	0.114	0.0476	NE			092625-035	HASL-300

Table IV-13 (Continued)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method [®]
SWMU 68									
OBS-MW3 (Duplicate)	Americium-241	13.8 ± 9.71	13.8	5.80	NE	U	BD	092626-033	EPA 901.1
19-Jul-12	Cesium-137	1.96 ± 2.03	3.28	1.58	NE	U	BD	092626-033	EPA 901.1
	Cobalt-60	2.35 ± 2.25	3.73	1.77	NE	U	BD	092626-033	EPA 901.1
	Potassium-40	-17.2 ± 32.4	38.8	18.5	NE	U	BD	092626-033	EPA 901.1
	Gross Alpha	2.49	NA	NA	15 pCi/L	NA	None	092626-034	EPA 900.0
	Gross Beta	4.94 ± 1.39	1.62	0.789	4 mrem/yr		NJ+	092626-034	EPA 900.0
	Uranium-233/234	19.8 ± 2.70	0.135	0.0604	NE			092626-035	HASL-300
	Uranium-235/236	0.272 ± 0.090	0.0494	0.0159	NE			092626-035	HASL-300
	Uranium-238	3.64 ± 0.555	0.0855	0.0357	NE			092626-035	HASL-300

Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- HASL = Health and Safety Laboratory.
- MCL = Maximum contaminant level. The following are the MCLs for gross alpha particles and beta particles in community water systems: 15 pCi/L = Gross alpha particle activity, excluding total uranium (40 CFR Parts 9, 141, and 142, Table I-4) 4 mrem/yr = any combination of beta and/or gamma emitting radionuclides (as dose rate).
- MDA = The minimal detectable activity or minimum measured activity in a sample required to ensure a 95% probability that the measured activity is accurately quantified above the critical level.
- mrem/yr = Millirem per year.
- MW = Monitoring well.
- NA = Not applicable for gross alpha activities. The MDA or critical level could not be calculated as the gross alpha activity was corrected by subtracting out the total uranium activity.
- NE = Not established.
- OBS = Old Burn Site.
- pCi/L = Picocuries per liter.
- SWMU = Solid Waste Management Unit.

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

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

Table IV-13 (Concluded)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Notes (continued)

^cLaboratory Qualifier

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

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

^dValidation Qualifier

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

- BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
- J = The associated value is an estimated quantity.
- NJ+ = Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.
- R = The data are unusable, and resampling or reanalysis are necessary for verification.
- None = No data validation for corrected gross alpha activity.

^eAnalytical Method

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

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

Table IV-14

Summary of Constituents Detected above Established MCLs

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through September 2012

Well	Date	Analyte	Result (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36	4.0			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94	4.0			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94	4.0			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	4.93	4.0			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	5.03	4.0			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	5.00	4.0			092616-016	EPA 9056

Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

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).

mg/L = Milligrams per liter.

MW = Monitoring well.

SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-15

Summary of Duplicate Samples

SWMUs 8/58 and 68 Groundwater Monitoring

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless othe	erwise noted	
CCBA-MW1		1	
Nitrate plus Nitrite	1.41	1.35	4
Bicarbonate Alkalinity	192	188	2
Bromide	0.344	0.310	10
Chloride	27.9	28.2	1
Fluoride	5.03	5.00	1
Sulfate	53.8	54.2	1
Aluminum	0.0314	0.0305	3
Arsenic	0.0022	0.0027	20
Barium	0.00335	0.0035	4
Beryllium	0.000394	0.000443	12
Calcium	43.7	44.2	1
Cobalt	0.000101	0.000104	3
Copper	0.000437	0.000486	11
Iron	0.143	0.146	2
Magnesium	9.50	9.73	2
Manganese	0.00568	0.00568	< 1
Nickel	0.000847	0.00104	20
Potassium	4.34	4.38	1
Selenium	0.00242	0.00241	< 1
Sodium	69.9	63.8	9
Uranium	0.00181	0.00182	1
Filtered Calcium	40.7	41.5	2
Filtered Magnesium	9.61	9.88	3
Filtered Potassium	4.12	4.27	4
Filtered Sodium	64.9	59.5	9
Gross Alpha (pCi/L)	6.08	-0.49	NC
Gross Beta (pCi/L)	5.70 ± 1.41	5.01 ± 1.23	NC
Uranium-233/234 (pCi/L)	2.00 ± 0.337	1.75 ± 0.277	NC
Uranium-238 (pCi/L)	0.657 ± 0.146	0.591 ± 0.120	NC
OBS-MW3			
Nitrate plus Nitrite	1.56	1.59	2
Bicarbonate Alkalinity	181	181	< 1
Chloride	21.7	21.7	<1
Sulfate	81.8	81.8	<1
Barium	0.0249	0.0282	12
Calcium	77.4	79.6	3
Cobalt	0.000111	0.000105	6
Iron	0.224	0.223	<1
Magnesium	16.3	15.3	6
Nickel	0.00112	0.00122	9
Potassium	1.51	1.56	3
Selenium	0.0037	0.00353	5
Sodium	22.4	21.3	5
Souraill	۲۲.4	21.J	5

Table IV-15 (Concluded)

Summary of Duplicate Samples

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a				
	mg/L unless othe	mg/L unless otherwise noted					
OBS-MW3							
Uranium	0.012	0.0124	3				
Filtered Calcium	76.7	81.7	6				
Filtered Magnesium	16.2	16.0	1				
Filtered Potassium	1.63	1.62	1				
Filtered Sodium	21.8	22.6	4				
Gross Alpha	-2.66 pCi/L	2.49 pCi/L	NC				
Gross Beta	5.65 ± 1.39 pCi/L	4.94 ± 1.39 pCi/L	NC				
Uranium-233/234	21.1 ± 3.05 pCi/L	19.8 ± 2.70 pCi/L	NC				
Uranium-235/236	0.297 ± 0.109 pCi/L	0.272 ± 0.090 pCi/L	NC				
Uranium-238	3.66 ± 0.601 pCi/L	3.64 ± 0.555 pCi/L	NC				
Nitrate plus Nitrite	1.56	1.59	2				
Bicarbonate Alkalinity	181	181	< 1				
Chloride	21.7	21.7	< 1				

Notes

= Coyote Canyon Blast Area. = Milligrams per liter. CCBA

mg/L

MW NC = Monitoring well. = Not calculated.

OBS = Old Burn Site.

= Picocuries per liter. pCi/L

^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: R_1

 R_2

= analysis result = duplicate analysis result This page intentionally left blank.

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

2

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8 and 58 GWM	Project No.: 146422.10.11.01 / 98026.01.12
Well I.D.: CCBA-MW1	Date: 07/16/12
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump Pump depth:

Depth to Water (ft)	Time 24 hr	Vol. (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Domy/L
and the second design of the s	0745	/	54	ART					
	0802	5	19.90	519	198.0	6.31	0.90	20.8	1.89
	0812	10	18.80		181.6	6.36		26.3	2.46
49.28	0823	15	18.43	482	177.5	6.40		30.1	2.82
49.31	0834	20	18.44	480	175.3	6.44	0.58	30.4	2.85
49.31	0841	23	18.50	482	174.5	6.45	0.59	31.0	2.90
49.29		25	18.65	479	174.1	6.46	0.39		2.96
49.29	0851	27	18.70	479	174.0	6.46	0,37	31.6	2.95
49.28	0856	29	18.76	482	174.0	6.46			2.88
49.27	0902	31	18.77	482	174.0	6.46	6.33	31.3	2.90
49.26	6907	33	18.81	482	173.9			31.6	2.92
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								-	~ 4.00 gals. purged
									from tubing
									0751 0

PURGE MEASUREMENTS

Project Name: SWMU 8 and 58 GWM	Project No.: 146422.10.11.01 / 98026.01.12
Well I.D .: CCBA-MW2	Date: 07/12/12
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump Pump depth: 117

Depth to Water (ft)	Time 24 hr	(Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments DOmg/L
and a second sec	0749	/	ST	ARt -			- 0- 		
	0807	5	19.33	564	139.4	7.29	5.18	45.6	4.19
72.01		10	18.16	5766	137.8	7.33	5.40		
	0827		17.90		138.2	7.34	1.77	54.3	5.18
72.02	0837	and a second	17.98	566	138.9	7.35	1.09	58.5	5.53
72.02	0847	25	18.07		139.4	7.36	0.67	60.7	
72.00		27	18.23		139.9	7.36	0.64	61.8	5.82
	0855	29	18.23		140.4	7.36	0.63	62.7	5.90
72.01		31	18.30		140.7		0.48	62.6	5.88
72.01	0904	33	18.34			7.37	0.41	62.4	5-86
	0905	/	5	AMP	ling			-	
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	-							1	-4.00 gals purged from tubing
									from tubing
									0757 0

PURGE MEASUREMENTS

L

SNL/NM Project Name: S	SWMU 8 and 58 G	WM	SNL/NM Project No.7 146422.10.11.01 / 98026.01.12				
Calibrations done by: Ro	bert Lynch		Date: 07/12/12				
Make & Model: YSI 69	920 V2						
YSI 6820 Sonde (S/N) wit	th DO, Ec, pH, ORP, and	l temperature prob	es: 08H1000)33		-	
YSI 650 MDS (S/N):	N/A					-	
		рН Са	libration			an un an a	
pH Calibrated to (std): 7.	.00		pH sloped to (s	td): 10.0			
Reference value:	4	.00	1 7	.00	1	0.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0630	4.02	20.3	7.00	20.3	10.00	20.3	
2. Time: 1048	4.01	20.5	7.01	20.5	9.98	20.5	
3. Time:		n	1				
4. Time: Standard lot no.:	044070		010000		4 4 17 4 00		
Standard lot no.: 2AA670 Expiration date: Jan-14		2AB299		1AK189			
		Feb-14 Nov-13					
		50 04	1	040000			
Reference Value: 1278	Value	Temp	Standard Lot N Expiration Dat				
1. Time: 063			Capitation Dat	Feb-13		No.	
2. Time: 1050	1276	20.3	- (1997) - (1997) - (1997)				
3. Time:		20.5					
4. Time:							
		ORP C	alibration			,	
Reference Value: 220 m	١V		Standard Lot N	o. 1AL131		tany and square	
	Value	Temp	Expiration Date	sep-12			
1. Time: 0631	219.6	20.3	1.			Summer and the second	
2. Time: 1049	220.7	20.5					
3. Time:	-		K. 4.				
4. Time:				CALL NO Y		11 - 1	
	ana ana ang ang ang ang ang ang ang ang	DO Ca	libration				
Calibration Value:	81% air satura	tion @ 5200 ft.	1	Atmospheric	Pressure in Hg		
1. Time: 0629	81.7		2	4.47			
2. Time: 10 47	\$1.6		2	4.50		~	
3. Time:			Industrial Alexan				
1 Time							

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

SNL/NM Project Name: SW	/MU 8 and 58 GWM	Project No.:	146422.10.11.01/9	8026.01.12
Calibration done by: Rober	l Lynch	Date: 07	112/12	
aaaan ahaa ahaan ahaan ahaan ahaan ahaa a		TURBIDIMETER	/	
Make & Model: HACH 246	00 2100Q	Serial No. S	/N 10050C002897	
Reference Value	×10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0744	10.1	20.4	101	298
2. Time 0916	9.95	20.2	102	795
3. Time				
4. Time				
				1
naar				

Page 1 of 2

SNL/NM Project Name: SWI	MU 8 and 58 G	WM	SNL/NM Project No.: 146422.10.11.01 / 98026.01.12				
Calibrations done by: Rober	t Lynch		Date: 07/16/12				
Make & Model: YSI 6920 YSI 6820 Sonde (S/N) with DO	D, Ec, pH, ORP, and	temperature probe	es: 08H1000	033			
YSI 650 MDS (S/N): <u>N/A</u>		-11 C	libration				
pH Calibrated to (std): 7.00		ph Ca					
	1		pH sloped to (std); 10.0				
Reference value:	4. Value	00 Temp	Value	7.00 Temp	Value	10.00 Tours	
1. Time: 0625	3.99	19.3	7.00	19.3	9.99	Temp	
2. Time: 1041	4.01	20.2	2.00	20.2	10.00	20.2	
3. 'Time:					10.00	00	
4. Time:				1	1		
Standard lot no.:	2AA670		2AB299 1AK189		9		
Expiration date:	Jan-14		Feb-14 Nov-13		3		
		SC Ca	libration				
Reference Value: 1278 uS			Standard Lot N	lo.: 2AB388			
	Value	Temp	Expiration Dat				
1. Time: 0627	1272	19.3	4	1000		10.00	
2. Time: 1043	1281	20.2	1			2	
3. Time:							
4. Time:		Andream					
		ORP C	alibration			•	
Reference Value: 220 mV			Standard Lot N	o. 1AL131			
	Value	Temp	Expiration Date	e: Sep-12			
1. Time: 0626	218.9	19.3				- 05	
2. Time: 1042	219.6	20:2					
3. Time:					6. 44		
4. Time:			-		12		
hannan (an th	L	DO Ca	libration		And the second second		
Calibration Value:	81% air saturat			Atmospheric l	Pressure in Hg	-	
1. Time: 0624	81.4	+	-	24.39		6 <u>1</u>	
2. Time: 1040	81.5		2	4.41		т.	
3. Time:	01.			<u>, , , , , , , , , , , , , , , , , , , </u>			
4. Time:		unneren er					

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

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

10^{-10} 20^{-100} 800^{-100} Standard Lot No. 0161 0168 0162 0161 1. Time 07444 9.944 20.7 1044 802 2. Time $09/7$ 9.894 20.1 103 805 3. Time		MU 8 and 58 GWM	Project No.:	146422.10.11.01 / 98	3026.01.12			
TURBIDIMETER TURBIDIMETER Make & Model: HACH 2100P 2100Q Serial No. S/N 10050C002897 Reference Value X 10 20 100 800 Standard Lot No. 0161 0168 0162 0161 1. Time 0744 9.944 20.7 104 802 2. Time 09/17 9.899 20.1 (03 805 3. Time Ime Ime Image: Mathematical column	Calibration done by: Robert	t Lynch	Date: 6	Date: 07/16/12				
Reference Value $\chi 10$ 20 100 800 Standard Lot No. 0161 0168 0162 0161 1. Time 07444 9.944 $20 \cdot 2$ 1044 802 2. Time $09/77$ 9.894 $20 \cdot 1$ 1033 8055 3. Time 4.		-	TURBIDIMETER	/ /				
X 10 20 100 800 Standard Lot No. 0161 0168 0162 0161 1. Time 07444 9.944 20.2 104 802 2. Time 0917 9.89 20.1 103 805 3. Time 4. Time <t< td=""><td>Make & Model: HACH 240</td><td>0P 2100Q</td><td>Serial No. S/</td><td>N 10050C002897</td><td></td></t<>	Make & Model: HACH 240	0P 2100Q	Serial No. S/	N 10050C002897				
1. Time 0744 9.94 20.7 104 802 2. Time 0917 9.89 20.1 103 805 3. Time 4. Time <td>Reference Value</td> <td>¥ 10</td> <td>20</td> <td>100</td> <td>800</td>	Reference Value	¥ 10	20	100	800			
2. Time 09/7 9.89 20.1 103 805 3. Time 4. Time	Standard Lot No.	0161	0168	0162	0161			
2. Time 09/7 9.89 20.1 103 805 3. Time 4. Time	1. Time 0744	9.94	20.7	104	802			
3. Time			20.1	103	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
	3. Time				1			
Comments:	4. Time							

Groundwater Monitoring Equipment Decontamination January 2012

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Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 8 and 58 GWM	Monitoring Well 1D # : CCBA-M	e Wi	Date: 07/12/12
The following equipmen	t was decontaminated at completion of sampling	ng activities in accordance v	vith FOP-05-03
Pump and Tubing Bundle ID #: <u>GWM 1806-</u>	32 Water Level I	ndicator ID #: 62088	
	tial: Rober Print Name: Print Name:	forming Decontamination	Initial:
Pump: good	Condition of Equipment		r: good
U	List of Decontamination Mater	als	U.
Distilled or Deonized (c	ircle one) Grad		IO ₃
Source: Culligan	UN	#:2031	
Lot Number: 070612	Manufacture	er: Fisher Scientific	
	Lot Numbe	er:002735	

Groundwater Monitoring Equipment Decontamination January 2012

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Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 8 and 58 GWM	Monitoring Well ID #: CCBR MY	N 1 Date: 07/16/12				
The following equipment w	vas decontaminated at completion of sampling act	tivities in accordance with FOP-05-03				
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	2 Water Level Indica	Water Level Indicator ID #: 62088				
Personnel Performing Decontamination: Robert Lynch Print Name: ALFRED SANTILLANCS MILINE Print Name: Pump: <u>2000</u> Tu	d: d: d: Print Name: Print Name: Print Name: Condition of Equipment	Water Level Indicator: <u>goso a</u>				
	List of Decontamination Materials					
Distilled or Deonized (circ	cle one) Grade: _	HNO ₃ Reagent				
Source: Culligan	UN #:	2031				
Lot Number: 07.0612	Manufacturer:	Fisher Scientific				
	Lot Number:	002735				

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Waste Generator	: Bill Gibson Phone:	: <u>239-7367</u> project le	eader: <u>Clinton Lum</u>
Project Name	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM
Container ID # (site-date-sequence)	CCBA-MW2-071212-01	CCBA-MW2-071212-02	CCBA-071212
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purgewater	Pivroje Water	Decon Water
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	19 gals	18	30
Total Container Weight	170165.	160	280
	614286	614286	614286
COC#: Sample#- Fraction	@92610	092610	592610
Accumulation Date	Start: 07/12/12 Full: 07/12/12	Start: 07/12/12 Full: 07/12/12	Start: 07/12/12
Date Waste Moved to Accumulation Area	07/12/12	07/10/12	07/12/12
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

		1	-
Project Name	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM
Container ID # (site-date-sequence)	CCBA-MW1-071612	CCBA-071612	
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	Decon water	
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	37gals	30	
Total Container Weight	350165	280	
	614288	614288	
COC#: Sample#- Fraction	092615	092615	
Accumulation	Start: 07/16/12 Full: 07/16/12	Start: 07/16/12 Full: 07/16/12	Start:
Date	Full: 07/16/12	Full: 07/16/12	Full:
Date Waste Moved to Accumulation Area	07/16/12	07/16/12	
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

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TAILGATE SA	FETY MEETING FORM
Dept: 4142 Well Location: CCBA-MW	Date: 07/12/12 Time: 0740
Activities: Groundwater Monitoring (purging, sam	oling, decon)
	fety concerns. The buddy system will be used when needed.)
Weather Conditions:	
Temp: °F Wind Speed: MPH	Humidity:% Wind Chill °F
Other:	Copics Presented
X Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	X Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
IX Wear safety boots.	🛛 Be aware of electrical hazards
☑ Use safe lifting practices. Wear leather gloves if necessary.	X Be aware of pressure hazards.
Re aware of pinch points on pump cable reel and hydraulic tailgate lift.	IX No eating or drinking at sampling counter.
🛿 Be aware of chemical hazards.	Be aware of biohazards (snakes, spiders, etc.)
Wear nitrile or latex gloves when	X Wear communication device (cell phone,
sampling.	EOC pager).

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

Attendees Signate Printed Name ANES Signe Printed Name Signature Print Name

Printed Name

Signature

Printed Name

Signature

Groundwater Monitoring Health and Safety Plan January 2012 PLA 05-09, Revision 04 Page 23 of 27

TAILGATE SA	FETY MEETING FORM			
Dept: 4142 Well Location: CCBA-MW	Date: 07/16/12 Time: 07.39			
Activities: Groundwater Monitoring (purging, sam				
	fety concerns. The buddy system will be used when neederl.)			
Weather Conditions: femp: °F Wind Speed: MPH	Humidity:% Wind Chill °F			
Themicals Used: <u>Acids in sample containers, stand</u> Other;	ard solutions. Hash ACCU VAC ampules			
	Topics Presented			
IX Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	IX Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.			
IX Wear safety boots.	🛛 Be aware of electrical hazards			
Use safe lifting practices. Wear leather gloves if necessary.	A Be aware of pressure hazards.			
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	IX No eating or drinking at sampling counter			
🕅 Be aware of chemical hazards.	Be aware of biohazards (snakes, spiders, etc.)			
Wear nitrile or latex gloves when	⊠ Wear communication device (cell phone,			
sampling.	EOC pager).			

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

Attendees Signalu Printed ANGS Signann Printed Name Signature Printed Name Signature Printed Name Signature Printed Name IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is

Project Name: SWMU 68 GWM	Project No.: 146422.10.1	1.01/98026.01.13
Well I.D.: OBS-MWI	Date: 07/17/12	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 154

Depth to Water (ft)	Time 24 hr	Vol. (Lga)	Temp (°C)	SC _ (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments DOrg/L
72.55	0812	/	ST	ART-					
72.59		5	18.98		162.3	7.22	1.86	38.2	3.54
	0840	10	18.07	496	157.0				3.53
72.60	0849	15	17.77	497	154.7			37.5	3.56
	0859		17.85	497			6.38		
	0906		17.89		1521		0.39		
72.60		25	17.95		151.3		0.43		
72.60		27	17.97		151.1	7.28			3.61
12.60		29	17.98	498	151.0	7.28			3.61
72.60		31	17.97		151.0	7.28		38.4	
	0926		1000	408	151.1	7.28	0.41	38.1	
	0927	/	SA	mplin	1a-			12-1	
1		Sec		1	0				
					1				
1					1-1-5			121	
					1				
	1				1				
				1					
								1	0821
								~	4.00 crals energed
									from Inbing
									0

PURGE MEASUREMENTS

Project Name: SWMU 68 GWM	Project No.: 146422.10.1	1.01/98026.01.13
Well I.D .: OBS-MW 2	Date: 07/18/12	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 253

Depth to Water (ft)	Time 24 hr	Vol. (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	Comments DOmg/L
174.04	0751	/	5	MART.					
174.90		5	2170	497	154.3	1.21	0.43	42.1	3.69
174.91		10	20.88	the second s	150.3	7.22		40.5	
174.89		15	20.78				0.33		
	0849		20.69	495	151.4		0.34		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0856		20.64	the second s	151.9	7.24	0.41		
174.98		25	20.77	496	152.0		0.42		
174.98		27	20.79	495	152.4	7.24	0.31	39.8	
175.01		29	20.77	497		7.24		39.8	3.56
175.02		31	20-82		152.8	7.25	0.29		3.57
175.04		33	20.84		153.2		0.32		3.53
	0919	/		mpli		-			
	- <u>-</u> - [pic	9				n an an 1977 and 1978
								_	
					1	1			
								-	
· · · · · · · · ·		-			10.00				
						1			
	1	-			1	1			
	1000							-	+4.00 gals, purged from tubing 0802
									from tubing
					1. S			-	0802 0

PURGE MEASUREMENTS

Project Name: SWMU 68 GWM	Project No.: 146422.10.1	1.01 / 98026.01.13
Well I.D.: 0135-MW3	Date: 67/19/12	•
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 209

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments DOmg/L
69.58	0800	/	5	MARJ			17 2.	1	
73.85		5	19.53	535	195.0	7.26	1.11	47.2	4.35
75.29		10	19.13	533	189.1	7.27	0.91	46.4	4.29
75.83	0837	15	18.88	532	186.0	7.27	0.85	46.0	4.27
76.05	0847	20	18.81	532	183.8	7.28	0.65	45.7	
76.10		23	18.83	the second se	182.7			45.6	
76.10		25	18.77		181.8	7.28	0.52	45.6	
	0903	27	18.77	537	181.2	7.28	0.42	45.5	
76.06	0907	29	18.77	536	180.5		0.37	45.5	4.23
	0913		18.79	537	180.0	7.29	0.35	45.9	4.24
74.19		33	1882	537	179.9		0.37	46.2	4.27
	0922		SA	mplin	19-				
				1	0				
			201	1	1221				
			5						
-	· · · · ·								
	1.								
					1				
		1 - 1							
						2		-	-4.00 gals purged
		1.00				£			from tubing. 0807
		1.20							0807

PURGE MEASUREMENTS

SNL/NM Project Name: SWN	1U 68 GWM		SNL/NM Pro	ject No.: 14642:	2.10.11.01/9	8026.01.13	
Calibrations done by: Robert	t Lynch		Date: 0	2/17/12			
Make & Model: YSI 6920 YSI 6829 Sonde (S/N) with DO YSI 650 MDS (S/N): <u>N/A</u>	, Ec, pH, ORP, and	l temperature prob	es: 08H100	033		_	
		pH C:	libration				
pH Calibrated to (std): 7.00			pH sloped to ((std): 10.0			
Reference value:	4	.00		7.00			
	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0626	4.01	20.6	7.03	20.6	10.00	20.6	
2. Time: 1044	3.99	20.9	2.01	20.9	10.01	20.9	
3. Time:			1				
4, Time:		J		1			
Standard lot no.:	2AA670		2AB299 1AK189				
Expiration date:	Jan-14	was bellete and a second state	Feb-14 Nov-13				
		SC Ca	libration				
Reference Value: 1278 uS			Standard Lot No.: 2AB388				
	Value	Temp	Expiration Date: Feb-13				
1. Time: 0628	1283	20.2	No.		The second		
2. Time: 1046	1284	20.9					
3. Time:							
4. Time:			15	and the second second			
		ORP C	alibration				
Reference Value: 220 mV			Standard Lot	No. 1AAL131			
	Value	Temp	Expiration Date: Sep-12				

and the second		
1. Time: 0627	218.7 20.	6 And
2. Time: 1045	219,2 20.	, 7
3. Time:	1.51	
4. Time:		
3		DO Calibration
Calibration Value:	81% air saturation @ 52	00 ft. Atmospheric Pressure in Hg
1. Time: 0625	81.4	24.38
2. Time: 1043	81.6	24.41
3. Time:		
4. Time:		

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

	/MU 68 GWM	Project No.	Project No.: 146422.10.11.01 / 98026.01.13				
Calibration done by: Rober	t Lynch	Date: 6	Date: 67/17/12				
		TURBIDIMETER					
Make & Model: HACH 216	0P 2100Q	Serial No. 1	S/N 10050C002897				
Reference Value	, 1 10	20	100	800			
Standard Lot No.	0161	0168	0162	0161			
1. Time 0815	9.83	19.1	101	802			
2. Time 0930	9.91	19-6	103	799			
3, Time			1				
4. Time							

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWN	1U 68 GWM		SNL/NM Project No.: 146422.10,11.01 / 98026.01.13				
Calibrations done by: Robert	t Lynch		Date: 07/18/12				
Make & Model: YSI 6920 YSI 6880 Sonde (S/N) with DO YSI 650 MDS (S/N):N/A		temperature prob	es: 08H1000	33	-		
6 (1994) e		pH C	alibration			and a standard bridge and place	
pH Calibrated to (std): 7.00			pH sloped to (s	td): 10.0			
Reference value:	1	7.00	10	0.00			
/	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0625	4.03	21.2	2.01	21.2	10.02	21.2	
2. Time: 1049	4.02	20.6	7.00	20.6	10.00	20.6	
3. Time:			1				
4, Time:							
Standard lot no.:	2AA670		2AB299		1AK189		
Expiration date:	Jan-14	anani Itanio' In Sama	Feb-14		Nov-13		
		SC C	alibration				
Reference Value: 1278 uS			Standard Lot N	lo.: 2AB388			
	Expiration Date: Feb-13						
1. Time: 0627	1284	21.2	1		1. 1. 1. 1. 1.		
2. Time: 1057	1282	20.6					
3. Time:				n an			
4. Time:		-	4				
		ORP C	Calibration	ar (1900 - M			
Reference Value: 220 mV		inoite at	Standard Lot N	lo. 1AAL131			
	Value	Temp	Expiration Date: Sep-12				
L Time: 0626	222.4	21.2					
2 Time: 1050	220.8	20.6					
3. Time:	1. S. C						
4. Time:			and a second second			23	
	in the second	DO C	alibration	N			
Calibration Value:	81% air saturat	ion @ 5200 ft.		Atmospheric	Pressure in Hg		
1. Time: 0624	81.5	š	2	4.39			
2. Time: 1048	81.6		2	4.40		-1	
3. Time:							
4. Time:	the second second	1					

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

SNL/NM Project Name: SWM	MU 68 GWM	Project No.:	Project No.: 146422,10.11.01 / 98026.01.13				
Calibration done by: Robert	Lynch	Date: 0	Date: 07/18/12				
	1	FURBIDIMETER					
Make & Model: HACH 2100	P 2100Q	Serial No. S	/N 10050C002897				
Reference Value	 10	20	100	800			
Standard Lot No.	0161	0168	0162	0161			
1. Time 0758	9.89	19.8	99.7	801			
2. Time 0933	9.96	19.6	99.8	803			
3, Time			1	1 · · · · · · · · · · · · · · · · · · ·			
4. Time							

SNL/NM Project Name: SWMU 68 GWM		SNL/NM Project No.: 146422.10.11.01 / 98026.01.13				
Calibrations done by: Robert Lynch		Date: 07	119/12			
Make & Model: YSI 692	0 V2		1	/		
YSI 6920 Sonde (S/N) with I	DO, Ec, pH, ORP, and	i temperature probe	s: 08H1000	33		-
YSI 650 MDS (S/N):	A					_
		pH Ca	libration			
pH Calibrated to (std): 7.00	0		pH sloped to (s	td): 10.0		
Reference value:	4	.00	7	.00	1	0.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0732		23.2	6.96	23.5	9.99	23.5
2. Time: 1051	4.00	22.7	6.99	22.7	10.01	22.7
3. Time:						
4. Time:		·	0.10000		141210	
Standard lot no.:	2AA670	1	2AB299 1AK189			
Expiration date:	Jan-14	00.0-	Feb-14		Nov-13	3
		SC Ca	libration			
Reference Value: 1278 us			Standard Lot N			
	Value	Temp	Expiration Data	Feb-13		
1. Time: 0737	1079	23.6			North Contraction	
2. Time: 1053	1281	22.7				
3 Time:	-				- Standard Barrier	THE T
4, Time:					New of the	-
		ORP C	libration	and a state of the second s		
Reference Value: 220 mV		1	Standard Lot No. 1AAL131			
	Value	Temp	Expiration Date	sep-12		
1. Time: 6737	220.5	23.2	the state			All a
2. Time: 1052	220.7	22.7	· - · 0.			
3. Time:	1.1					
4. Time:	An <u></u>	1				
S		DO Ca	libration	ANA	and the second se	
Calibration Value:	81% air saturation @ 5200 ft.			Atmospheric	Pressure in Hg	
1. Time: 0730	81.9	1	-	4.51		
2. Time: 1050	81.8	1		4.49		
3. Time:						
4. Time:						

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

GWM		/ 98026.01.13		
	Date: 07/19/12	Date: 07/19/12		
	TURBIDIMETER			
Q	1 2100P 2100Q Serial No. S/N 10050C0028	97		
 10	-+ 10 20 100	800		
0161	0161 0168 0162	0161		
.1	10.1 21.1 102	783		
.0	10.0 20.7 101	796		

Groundwater Monitoring Equipment Decontamination January 2012

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Portable Pump a	nd Tubing / Water Level Inc	dicator
	Decontamination Log Form	

Project Name: SWMU 68 GWM	Monitoring Well ID # : 085	- mw1	Date: 7-17-12
The following equipm	ent was decontaminated at completion of samp	ing activities in accordance	with FOP-05-03
Pump and Tubing Bundle ID #: <u>GWM 180</u>	6-32 Water Level	Indicator ID #: 62088	
Personnel Performing Decontamination: <u>William Gibsm</u> Print Name: Print Name: Pump: <u>Good</u>	UJA Initial: PL Initial: Condition of Equipmen Tubing Bundle:		Initial: PL Initial:
	List of Decontamination Mate	erials	
Distilled or Deonized		HM de: Reagent	NO3
Source: Culligan	U	N#: 2031	
Lot Number: 070612	Manufactu	rer: Fisher Scientific	2 C
	Lot Num	ber: 002735	

Groundwater Monitoring Equipment Decontamination January 2012

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Monitoring Well ID # :	5-mw2	Date: 7-18-2012
nt was decontaminated at completion of s	ampling activities in accordance	with FOP-05-03
-32 Water L	evel Indicator ID #: 62088	
itial: 21 nitial: Condition of Equip	Ilians 6:650 me: pefTLynch me:	Initial: RK Initial:
List of Decontamination	Materials	
	H Grade: Reagent	NO3
	UN #:2031	
Manuf	acturer: Fisher Scientific	s)
	nt was decontaminated at completion of s 5-32 Water L Personn UII Print Na Role Print Na Condition of Equip Tubing Bundle: Good List of Decontamination Circle one)	Personnel Performing Decontamination Millians Gibson Print Name: Robert Lynch Print Name: Print Name: Condition of Equipment Water Level Indicat Tubing Bundle: Good Water Level Indicat List of Decontamination Materials H Circle one) Grade: Reagent UN #: 2031

Groundwater Monitoring Equipment Decontamination January 2012

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Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 68 GWM	Monitoring Well 1D # : 035-mw	3 Date: 7/19/12
The following equipment	was decontaminated at completion of sampling ac	ctivities in accordance with FOP-05-03
Pump and Tubing Bundle ID #: <u>GWM 1806-3</u>	32 Water Level Indic	cator ID #:62088
Personnel Performing Decontamination: Robert Lynch Print Name: Print Name: Init	Robert Print Name:	ning Decontamination: Lynch <u>PL</u> Initial: Initial:
Pump: 9000 1	Condition of Equipment	Water Level Indicator:
0	List of Decontamination Materials	
Distilled or Deonized (ci	rcle one) Grade:	HNO ₃ Reagent
Source: Culligan	UN #:	2031
Lot Number: 070612	Manufacturer:	Fisher Scientific
	Lot Number:	002735

Waste Generator	: Bill Gibson Phor	ne: 239-7367 project	leader: Clinton Lum
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	0B5-MW1-071712	085-071712	
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	Decon water	
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	37 gals.	30	
Total Container Weight	350 lbs.	2 80	
namen and B	614289	614289	
COC#: Sample#- Fraction	092618	092618	
Accumulation Date	Start: 07/17/12 Full: 07/17/12	Start: 07/17/12 Full: 07/17/12	Start: Full:
Date Waste Moved to Accumulation Area	61/17/10	07/17/12	
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

Waste Generator	: Bill Gibson Phone	e: 239-7367 project	t leader: Clinton Lum
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OB5-MW2-071812	035-071812	
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	Decon Water	
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	37 gals.	35	
Total Container Weight	350 163.	330	
	614290	614290	
COC#: Sample#- Fraction	092620	092620	
Accumulation Date	Start: 07/18/12 Full: 07/18/12	Start: 07/18/12 Full: 07/18/12	Start: Full:
Date Waste Moved to Accumulation Area	07/18/12	07/18/12	
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

x

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	0BS-MW3-071912	035-071912	
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purgewater	Decon Water	
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	37gals	30	
Total Container Weight	35get 165	280	
	614292	614292	-
COC#: Sample#- Fraction	092625 092626	092625 092626	
Accumulation Date	Start: 07/19/12 Full: 07/19/12	Start: 07/19/12 Full: 07/19/12	Start: Full:
Date Waste Moved to Accumulation Area	07/19/12	61/19/12	
Accumulation Area Name	9925	9925	9925

Groundwater Monitoring Waste Generation Log

Groundwater Monitoring Health and Safety Plan January 2012 PLA 05-09, Revision 04 Page 23 of 27

TAILGATE SA	FETY MEETING FORM	
Dept: 4142 Well Location: OBS-MW1	Date: 07/17/12 Time: 0806	
Activities: Groundwater Monitoring (purging, sampl (Anyone has the right to cease field activities for sa	ling, decontamination) fety concerns. The buddy system will be used when needed.)	
Veather Conditions: Temp: 8 °F Wind Speed: MPH	Humidity: <u>45.6</u> % Wind Chill <u>69.8</u> °F	
Themicals Used: <u>Acids in sample containers, stand</u>		
Safety I	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	
Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.	
Be aware of pinch points on pump cable	⊠ No eating or drinking at sampling counter.	
reel and hydraulic tailgate lift.		

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

Attendees Signature Printed 6 U Printed Name Signature Printed Name Sign Printed Name Signature Printed Name Signature IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page

PLA 05-09, Revision 04 Page 23 of 27

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 2

Date: 07/18/12

Time: 0743

Activities: Groundwater Monitoring (purging, sampling, decontamination) (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions: Temp: 75.5 °F Wind Speed: 4.3 MPH

Wind Speed: 4.3 MPH Humidity: 40.4 % Wind Chill 73.1 °F

Chemicals Used: <u>Acids in sample containers, standard solutions, Hach ACCU-VAC ampules</u> Other:

Safety 1	opics 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
Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	≥ No eating or drinking at sampling counter.
Be aware of chemical hazards.	Be aware of biohazards (snakes, spiders, etc.)
Wear nitrile or latex gloves when sampling.	Wear communication device (cell phone, EOC pager).
X Wear chemical safety goggles.	X Avoid spilling purge / decon water.

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

Attendees Illiam Gibsin Signatu Printed W Printed Signatur Printed Name Printed Name Signature Printed Name Signature IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page

PLA 05-09, Revision 04 Page 23 of 27

TAILGATE SA	FETY MEETING FORM
Dept: 4142 Well Location: DBS-MW	<u>3</u> Date: 07/19//2 Time: 075/
Activities: Groundwater Monitoring (purging, sampl (Anyone has the right to cease field activities for sa	ing, decontamination) fety concerns. The buddy system will be used when needed.)
Veather Conditions: 'emp: <u>69.2</u> °F Wind Speed: <u>0</u> MPH Chemicals Used: <u>Acids in sample containers, stand</u> Other:	Humidity: 53.0 % Wind Chill 69.2 °F ard solutions, Hach ACCU-VAC ampules
	Sopics 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
Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	No eating or drinking at sampling counter.
⊠ Be aware of chemical hazards.	 Be aware of biohazards (snakes, spiders, etc.)
Wear nitrile or latex gloves when sampling.	X Wear communication device (cell phone, EOC pager).

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

X Wear chemical safety goggles.

Attendees Printed Name Signature l Signature Printed que Printed Name Signat Signatu Printed Name Printed Name Signature

X Avoid spilling purge / decon water.

Appendix B Analytical Laboratory Certificates of Analysis for SWMUs 8/58 and 68 Groundwater Monitoring Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Inte	rnal Lab														Page <u>1</u> of _	2
Bat	ch No.	ND				SMO Use						1 1		AR/COC	614288	•
Pro	ject Name	e:	SWMU 8/58 GWM	Date Samples Shipp	ed:					thorization:	Done	John	\sim	Waste Characterization		
Pro	ject/Task	Manager:	Clinton Lum	Carrier/Waybill No.					SMO Co	ntact Phone	: See	Bottle	one			
Pro	ject/Task	Number:	No. of the second se	Lab Contact:	Ē	Edie Kent/80	3.556.8	171				-844-3199		Released by COC No.	_	
Ser	vice Orde	r:	CF 262-12	Lab Destination:	2 S. 10 1422	GEL			Send Re	port to SMC):				√4º Celsi	us
				Contract No.:	F	PO 691436	1. 1.1	Same Ba		Rita Kava	naugh/505	.284.2553		Bill to: Sandia National Laboratories	(Accounts Payab	ole),
Tec	h Area:		-											P.O. Box 5800, MS-0154		
Bui	Iding:		Room:	Operational Site	:									Albuquerque, NM 87185-0154		
				Dep		Date/Ti		Sample		ntainer		Collection	•	Parameter & Method	Lab	
Sar	nple No.	Fraction	Sample Location D	etail (ft)		Collect	ed	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample	ID
10	92615	-001 ″	CCBA-MW1	79	4	7/16/12	9:08	GW	G	3x40ml	HCL	G	SA	TCL VOĆ (SW846-8260B)		
10	92615	-002	CCBA-MW1	79		7/16/12	9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
* 0	92615	-009	CCBA-MW1	79		7/16/12	9:12 🖊	GW	Р	500 ml <i>*</i>	HNO3	G	SA	TAL Metals + U (SW846-6020/	7470)	
40	92615	-016	CCBA-MW1	79		7/16/12	9:13	GW	P	125 ml	None	G	SA	Anions (SW846-9056)		
40	92615	-017	CCBA-MW1	79		7/16/12	9:15 🖊	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)		
10	92615	-018	CCBA-MW1	79)	7/16/12	9:16 -	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)		
40	92615	-020	CCBA-MW1	79)	7/16/12	9:17	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		
40	92615	-022	CCBA-MW1	79		7/16/12	9:18 -	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		
40	92615	-024	CCBA-MW1	79		7/16/12	9:20 🖌	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)		
40	92615	-027	CCBA-MW1	79		7/16/12	9:21	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-901	2)	
	st Chain		✓ Yes	Sam	ple 1	Fracking		SMC) Use	Special Ins	structions		rements:		Conditions on	1
Va	lidation	Req'd:	✓ Yes	Date	Ente	ered:	3 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		Selmer -	EDD		✓ Yes		No	Receipt	
Ba	ckgroun	d:	Yes	Enter	red b	oy:				Turnaroun	d Time	<u>7 Da</u>	<u>y*</u>	I5 Day*		
_	nfirmato	ory:		QC ir	nits.:					Negotiated	TAT					
S	ample	N	lame Signat			Company/	Organizat	tion/Phon	e/Cell	Sample Di	sposal	Retur	n to Client	✓)isposal by Lab		
	Team	Robert L	ynch Kallyno	n RI		SNL/4142/844				Return Sar	mples By:					
M	embers	Alfred Sa	antillanes	fle a		SNL/4142/844				Comments		Send report to	Tim Jackson	N/4142/MS 0729/284-2547		
		William .	J. Gibson	a tur	4	SNL/4142/844	4-4013/23	9-7367					1. Colorado	arbonate, carbonate)		
			<u>/``/</u>	.,					*********		te detecte	d,perform v	erification	analysis using SW846-		
		A	to a second			~ 1			1	6850M					Lab Use	
	elinquishe		at glille		ate	1/16/12	Time 🖌			uished by			Org.		Time	
	Received I		Watan		ate	7/16/12		024	3. Rece				Org.		Time	
	elinquishe				ate		Time			uished by			Org.		Time	
	Received I		with SMO required for 7 and		ate		Time		4. Rece	ived by	19 2 - 17 - 1		Org.	Date	Time	

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Recipient Initials

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614288 **Project Name: SWMU 8/58 GWM** Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.12 Tech Area: Room: **Building:** Lab use Depth Date/Time Sample Container Collection Sample Parameter & Method Lab Preserv-Sample No. Fraction Collected Matrix Volume ative Sample Location Detail (ft) Type Method Type Requested Sample ID CCBA-MW1 P 092615 -033 79 7/16/12 9:23 GW HNO3 G SA 1 L Gamma Spec (short list)(901.0) 092615 -034 CCBA-MW1 79 7/16/12 9:25 -GW P 1 L HNO3 G SA Gross Alpha/Beta (900.0) Ρ 092615 -035 CCBA-MW1 79 7/16/12 9:27 -GW 1 L HNO3 G SA Isotopic U (ASTM D3972-09M) 092616 -001 CCBA-MW1 79 7/16/12 9:08 GW G 3x40ml HCL G DU TCL VOC (SW846-8260B) -002 AG G 092616 CCBA-MW1 79 7/16/12 9:11-GW 4x1L None DU TCL SVOC (SW846-8270C) 092616 -009 CCBA-MW1 79 9:12 GW Ρ 500 ml HNO3 G DU 7/16/12 TAL Metals + U (SW846-6020/7470) 79 P G 092616 -016 7/16/12 9:13 GW 125 ml DU CCBA-MW1 None Anions (SW846-9056) Ρ 092616 -017 CCBA-MW1 79 7/16/12 9:15 -FGW 500 ml HNO3 G DU Cations (SW846-6020) P 092616 -018 CCBA-MW1 79 7/16/12 9:16 -GW 125 ml H2SO4 G DU NPN (353.2) 092616 -020 79 7/16/12 9:17 GW P 250 ml G CCBA-MW1 None DU Perchlorate (314.0) P 092616 -022 CCBA-MW1 79 7/16/12 9:18-GW 500 ml G None DU Alkalinity (SM2320B) 9:20 092616 -024 79 7/16/12 CCBA-MW1 GW AG 4x1L None G DU HE (SW846-8321A) P 092616 -027 CCBA-MW1 79 7/16/12 9:21 GW 250 ml NaOH G DU Total Cyanide (SW846-9012) Ρ 092616 -033 79 7/16/12 9:23-GW HNO3 G CCBA-MW1 1 L DU Gamma Spec (short list)(901.0) 092616 -034 79 Ρ G CCBA-MW1 7/16/12 9:25 . GW HNO3 DU 1 L Gross Alpha/Beta (900.0) P 092616 -035 HNO3 G CCBA-MW1 79 7/16/12 9:27 . GW 1 L DU Isotopic U (ASTM D3972-09M) 092617 -001 CCBA-TB3 N/A 7/16/12 9:08-DIW G 3x40ml HCL G TB TCL VOC (SW846-8260B)

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab																Page	_1_of_2_
Batch No.	NØ					SMO Use						A			AR/COC	614	4286 -
Project Name Project/Task I Project/Task I	Manager: Number:		ım .12	Date Samples Carrier/Wayb Lab Contact:	ill No.	7/(2/) /4/374 Edie Kent/8 GEL	46		SMO Co		lerrera/505	He ord 5-844-3199	~		te Characterization IA ased by COC No.		↓º Celsius
Service Order	r.	UF 202-12	2	Lab Destination	a series and the series of the	PO 691436	Copies a		Sena Re	eport to SMC Rita Kava): inaugh/505	.284.2553		Bill to: Sand	ia National Laboratorio		
Tech Area:		and a subject of the state of the				<u>- 1997 - 1997</u>	and the second		L					P.O. Box 58			into r ayabio),
Building:		Room:		Operationa	I Site:									Albuquerque	, NM 87185-0154		
Sample No.	Fraction	San	nple Location D	Detail	Depth (ft)	Date/T Collec		Sample Matrix	Сс Туре	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Pa	rameter & Method Requested		Lab Sample ID
092610	-001	CCBA-MV	V2		117	7/12/12	9:05	GW	G	3x40ml	HCL	G	SA	TCL VOC	(SW846-8260B)	1	
092610	-002	ССВА-МУ	V2		117	7/12/12	9:07 -	GW	AG	4x1L	None	G	SA	TCL SVO	C (SW846-8270	C)	
092610	-009 1	CCBA-MV	V2		117	7/12/12	9:08	GW	Р	500 ml	HNO3	G	SA	TAL Metals	s + U (SW846-6020)/7470)	
092610	-016	CCBA-MV	V2		117	7/12/12	9:09	GW	Р	125 ml	None	G	SA	Anions (S	SW846-9056)		
092610	-017	CCBA-MV	V2		117	7/12/12	9:11	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)		
092610	-018 -	CCBA-MV	V2		117	7/12/12	9:12 🖍	GW	Р	125 ml	H2SO4	G	SA	NPN (353	3.2)		
092610	-020 ″	CCBA-MV	V2		117	7/12/12	9:13 1	GW	P	250 ml	None	G	SA	Perchlora	ite (314.0)		144) 6
092610	-022	ССВА-МУ	V2		117	7/12/12	9:14	GW	P	500 ml	None	G	SA	Alkalinity	(SM2320B)		
092610	-024 ~	ССВА-МУ	V2		117	7/12/12	9:16 -	GW	AG	4x1L	None	G	SA	HE (SW8	46-8321A)		
092610	-027 🖍	ССВА-МУ	W2		117	7/12/12	9:17 🖉	GW	Р	250 ml	NaOH	G	SA	Total Cya	nide (SW846-90	12)	
Last Chain:		Yes				Tracking		SMC) Use		structions	/QC Requir	ements:				litions on
Validation I		✓ Yes	and a second		Date En		ر است. از سایر استان ا	and a start of the		EDD	1 7:000	✓ Yes		_No		R	eceipt
Backgroun Confirmato	and the second se	Yes Yes			Entered QC inits					Turnaroun Negotiated		<u>7 Da</u>		15 Day*	l√Day		
Sample	1	lame	Signat	ure	Init.		/Organizat	tion/Phon	e/Cell	Sample Di		Retur	to Client	t l	✓)isposal by Lab		
Team	Robert L		Coltin	dh	EL.	SNL/4142/84				Return Sa				State and an and a state of the			
101200100000	Alfred Sa	antillanes	Allas	telle	-de	SNL/4142/84	44-5130/22	8-0710		Comments		Send report to	Tim Jackson	n/4142/MS 0729	9/284-2547		
	William .	J. Gibson	Willer	Self.	WX	SNL/4142/84	14-4013/23	89-7367	A					Anions (Br,C arbonate,ca			
		10.000		/ /	1.1		and the second			If perchlora					sing SW846-	1. C.	6 I Inc.
1.Relinguishe	d by	Vac	100	Org. 4/14	1 a Data	7/ml.	1 Time	ACM	3 Poline	6850M) uished by			Org		Date	La Time	b Use
1. Received b		III	mill	Org. 4/19			Time /		3. Rece		· · · · · · · · · · · · · · · · · · ·		Org		Date	Time	
2.Relinguishe		- w G		Org.	Date		Time			uished by			Org		Date	Time	
2. Received b				Org.	Date		Time		4. Rece				Org		Date	Time	
*Drior confin	mation	ith SMO ro	quired for 7 and	15 day TAT	Ē												the second second second second

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614286 SWMU 8/58 GWM Project/Task No.: Project/Task Manager: **Clinton Lum** Project Name: 98026 01.12 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Collection Sample Parameter & Method Preserv-Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Requested Type Sample ID P Gamma Spec (short list)(901.0) 092610 -033" CCBA-MW2 117 7/12/12 9:18 GW 1L/ HNO3 G SA Ρ 1L < HNO3 Gross Alpha/Beta (900.0) -092610 -034 -CCBA-MW2 117 7/12/12 9:20 GW G SA Ρ Isotopic U (ASTM D3972-09M) 092610 -035 CCBA-MW2 117 9:22 GW 1 L HNO3 G SA 7/12/12 092611* -001 CCBA-TB1 * 117 7/12/12 9:05 DIW G 3x40ml HCL G TB VOC (SW846-8260B) 8:58 G 092612' -001 CCBA-FB1 " 117 DIW G 3x40ml HCL FB VOC (SW846-8260B) 7/12/12 **Recipient Initials**

AOP 95-

Page 2 of 2

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to aRA-MWI

Internal Lab Page 1 of 2 NA 614287 AR/COC Batch No SMO Use **SWMU 8/58 GWM** Date Samples Shipped: 7/12/12 SMO Authorization: Waste Characterization Project Name: 1)and Project/Task Manager: Cilnton Lum 1412-1416 SMO Contact Phone: See Bott le one П RMMA Carrier/Waybill No. Project/Task Number: 98026 01.12 Edie Kent/803.556.8171 Lorraine Herrera/505-844-3199 Released by COC No. Lab Contact: ☑ 4º Celsius Service Order: CF 262-12 GEL Send Report to SMO: Lab Destination: PO 691436 Rita Kavanaugh/505.284.2553 Contract No : Bill to: Sandia National Laboratories (Accounts Payable) P.O. Box 5800, MS-0154 Tech Area: Building: Room: **Operational Site:** Albuquerque, NM 87185-0154 Date/Time Container Preserv- Collection Sample Parameter & Method Lab Depth Sample Matrix Volume ative Method Requested Sample No. Fraction Sample Location Detail (ft) Collected Туре Type Sample ID G 092613 -001 7/12/12 10:15 -DIW G 3x40ml HCL TCL VOC (SW846-8260B) -CCBA-EB1 N/A EB AG G 092613 -002 CCBA-EB1 N/A 7/12/12 10:16 DIW 4x1L None EB TCL SVOC (SW846-8270C) Ρ DIW 500 ml HNO3 G 092613 -009 ~ CCBA-EB1 N/A 7/12/12 10:18 EB TAL Metals + U (SW846-6020/7470) Ρ G EB 092613 7/12/12 10:19 DIW 125 ml -016 CCBA-EB1 N/A None Anions (SW846-9056) 10:20 092613 -017 CCBA-EB1 N/A 7/12/12 FDIW Ρ 500 ml HNO3 G EB Cåtions (SW846-6020) NPN (353.2) 7/12/12 10:22 DIW Ρ 125 ml H2SO4 G EB 092613 CCBA-EB1 N/A -018 Ρ G 092613 -020 -CCBA-EB1 N/A 7/12/12 10:23 DIW 250 ml None FB Perchlorate (314.0) P G Alkalinity (SM2320B) 092613 -022 CCBA-EB1 N/A 7/12/12 10:24 DIW 500 ml None EB G 092613 -024 🕤 CCBA-EB1 N/A 7/12/12 10:25 DIW AG 4x1L None EB HE (SW846-8321A) Total Cyanide (SW846-9012) -027 " CCBA-EB1 10:27 DIW P 250 ml NaOH G EB 092613 N/A 7/12/12 Last Chain: T Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on V Yes Yes O No Validation Reg'd: Date Entered: EDD Receipt 15 Day* T Yes 2 7 Day* 2 30 Day Background: Entered by: **Turnaround Time** 1 Yes T Confirmatory: QC inits. Negotiated TAT Return to Client Disposal by Lab Sample Disposal Sample Name Init. Company/Organization/Phone/Cell Signature RL Robert Lynch SNL/4142/844-4013/250-7090 Return Samples By: Team Alfred Santillanes SNL/4142/844-5130/228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Members William J. Gibson 2019 SNL/4142/844-4013/239-7367 FDIW (Filtered in field w/40 micron filter), Anions (Br,CI,F,SO4), Cations (Ca,Mg,K,Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M) Lab Use Date 7 1.Relinguished by Org. 4142 12/12 Time 1001 3.Relinguished by Org. Date Time Time Received by Org.4142 Date 2/12 Time 1001 3. Received by Org. Date 2.Relinguished by Org. Date 4.Relinguished by Org. Date Time Time 4. Received by Time Ora. Date Time Org. Date 2. Received by

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

	Project Nam	e:	SWMU 8/58 GWM	Project/1	ask Manag	per:	Cilnton Lur	ກ	in	Project/Ta	sk No :	98026 01.1	12	AR/COC 61	ge <u>2</u> of <u>v2</u> 4287
-	Tech Area:			1		<u> </u>				1.10,000.14		00020 01.	12		
Ī	Building:		Room:												Lab use
	Sample No.	Fraction	Sample Locatior	Detail	Depth (ft)		/Time ected	Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Туре	Parameter & Method Requested	Lab Sample ID
	092613	-033 •	CCBA-EB1		N/A	7/12/12	10:28	DIW	Р	1 L	HNO3	G	EB	Gamma Spec (short list)(901.0)	
ł	092613	-034 -	CCBA-EB1		N/A	7/12/12	10:29 -	DIW	Р	1 L	НNОЗ	G	EB	Gross Alpha/Beta (900.0)	
ł	092613	-035 -	CCBA-EB1	1	N/A	7/12/12	10:30 =	DIW	Р	1 L	HNO3	G	EB	Isofopic U (ASTM D3972-09M)	
ł	092614-	-001	CCBA-TB2		N/A	7/12/12	10:15 🖌	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No.	NA		1		SMO Use								AR/COC 6'	14289
Project Name		SWMU 68 GWM	Date Samp	les Shipped:				SMO Au	thorization:	Down	alan	>	Waste Characterization	
		Clinton Lum	Carrier/Wa	ybill No.	galan an an			SMO Co	ontact Phone	See	B. HGa	en		
Project/Task I	Number:	98026 01.13	Lab Contac	t	Edie Kent/8	303.556.8	171		Lorraine H	lerrera/508	5-844-3199		Released by COC No.	
Service Order	r:	CF 263-12	Lab Destina		GEL	2000年7月2日		Send Re	eport to SMC					✓ Cels
			Contract No	o.:	PO 691436	5			Rita Kava	inaugh/505	5.284.2553		Bill to: Sandia National Laboratories (Acc	ounts Paya
Tech Area:		1		1.01/									P.O. Box 5800, MS-0154	
Building:		Room:	Operation		D. (1_			Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Loca	tion Detail	Depth (ft)	Date/1 Collec		Sample Matrix	Туре	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
092618	-001″	OBS-MW1	1	154	7/17/12	9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
092618·	-002 ″	OBS-MW1		154	7/17/12	9:29 <	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
092618	-009″	OBS-MW1		154	7/17/12	9:30 -	GW	Р	500 ml	HNO3	G	SA	TAL-Metals + U (SW846-6020/7470))
092618	-014	OBS-MW1		154	7/17/12	9:31 🗂	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-719	167
092618	-016	OBS-MW1		154	7/17/12	9:32	GW	Р	125 mੈl	None	G	SA	Anions (SW846-9056)	
092618	-017	OBS-MW1		154	7/17/12	9:34 -	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)	
092618	-018	OBS-MW1		154	7/17/12	9:35	GW	Р	125 ml	H2SO4	G	SA ·	NPN (353.2)	
092618	-020	OBS-MW1	, 	154	7/17/12	9:36	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
092618	-022 🛩	OBS-MW1	R Hunrid and an Statement of Statement	154	7/17/12	9:37	GW	Р	500 ml	None	G ·	SA	Alkalinity (SM2320B)	
092618	-024	OBS-MW1	19-32-52-54-19-1	154	7/17/12	9:39 -	GW	AG	4x1L -	None	G	SA	HE (SW846-8321A Mod)	
_ast Chain:		Yes		and the Cherry A	Tracking		SMC) Use	Special Ins	structions		rements:		nditions or
Validation I	the last of the la	✓ Yes	CONTRACTOR OF THE OWNER OWNER OF THE OWNER	Date En	1				EDD		√Yes	-		Receipt
Backgroun		Yes		Entered					Turnaroun		<u>7 Da</u>	<u>Y*</u>	<u>5 Day*</u> 3(√ay	
Confirmato	-		<u>.</u>	QC inits	phi mini in a share and			10 11	Negotiated			1 01		
Sample			Signature	Injt.		y/Organizat		e/Cell	Sample Di			n to Client	t sposal by Lab	
		J. Gibson	and the second	PL	SNL/4142/84 SNL/4142/84				Return Sau Comments			Ties laster		
Members	Robert L Alfred Sa	antillanes	atile_	ast	SNL/4142/84				FGVV (FIILE	erea in neid		on mer), /	n/4142/MS 0729/284-2547 Amions (U, 504), Cations .carbonate	
			6		7/17/	12			If perchlora 6850M	te detecte	d,perform v	erification	analysis using SW846-	Lab Use
I.Relinquishe	d by	Mal Satill	Org. 41	42 Date	tota	-Grime	0:10	3.Relinc	uished by			Org		AND STORAGE CONTRACT
1. Received b		hum		2 Date				3. Rece				Org		ne
2.Relinquishe	d by		Org.	Date		Time		4.Relinc	uished by			Org	. Date Tin	ne
2. Received b	v		Org.	Date		Time		4. Rece	ived by			Org	. Date Tin	ne

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Project Name	e:	SWMU 68 GWM	Project/Ta	sk Manao	aer:	Clinton Lum	ו		Project/Tas	sk No.:	98026 01.1	3		
Tech Area:					<u> </u>	an here it, and a constant						NUT ANALYSIS CONTRACTOR		
Building:		Room:										<u> </u>		Lab use
Sample No.	Fraction	Sample Location	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample I
092618	-027、	OBS-MW1		154	7/17/12	9:40 💊	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
092618	-033 ~	OBS-MW1		154	7/17/12	9:42	GW	Р	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
- 092618	-034	OBS-MW1		154	7/17/12	9:43	GW	Ρ	1 L	HNO3	G	SA -	Gross Alpha/Beta (900.0)	
092618	-035	OBS-MW1		154	7/17/12	9:45 🖌	- GW	Р	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	
092619	-001	OBS-TB1		NA	7/17/12	9:27	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	
			i											
			1											
			1											

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	nternal Lab	1														Page <u>1</u> of <u>2</u>
	Batch No.	A					SMO Upe	1					10	Λ	AR/COC	614290
Γ	Project Name		SWMU 68	3 GWM	Date Samples	Shipped:	2/18	112		SMO Au	thorization:	10/	491	2~	Waste Characterization	
	Project/Task I				Carrier/Waybi	ll No.	14	HOC	9	SMO Co	ontact Phone		t t ω	SMO		
1	Project/Task I		terrest in the second se	and a second	Lab Contact:		Edie Kent/8	303.556.8	8171		Lorraine H	lerrera/508	5-844-3199		Released by COC No.	
	Service Order	•	CF 263-12	2	Lab Destination	State of the second states	GEL			Send Re	eport to SMC					⁰ Celsiι
ļ					Contract No.:	나라 이 왕이라	PO 691436			1000-10	Rita Kava	naugh/505	5.284.2553		Bill to: Sandia National Laboratorie	es (Accounts Payable
- F	Tech Area:		_												P.O. Box 5800, MS-0154	
ŀ	Building:		Room:		Operationa		D 1	••••••••••••••••••••••••••••••••••••••		-		-			Albuquerque, NM 87185-0154	
	Sample No.	Fraction	San	nple Location D	Detail	Depth (ft)	Date/1 Collec	1 3 5 6 5 5 5	Sample Matrix	Сс Туре	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
/	092620	-001	OBS-MW2	2		253	7/18/12	9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
	092620	-002	OBS-MW2	2		253	7/18/12	9:21	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-82700	C)
1	092620	-009	OBS-MW2	2		253	7/18/12	9:22	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020)/7470)
ð	092620	-014	OBS-MW2	2		253	7/18/12	9:23	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW84	6-7196/
1	092620	-016	OBS-MW	2		253	7/18/12	9:24	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	
-	092620	-017	OBS-MW	2	2	253	7/18/12	9:26	FGW	Р	500 ml	HNO3	G	SA	Cations (SW846-6020)	$ \begin{array}{c} \mathbf{f}_{1} & \mathbf{f}_{2} \\ \mathbf{f}_{2} & \mathbf{f}_{3} \\ \mathbf{f}_{3} \\ \mathbf{f}_{3} & \mathbf{f}_{3} \\ f$
9	092620	-018	OBS-MW2	2		253	7/18/12	9:27	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)	
a	092620	-020	OBS-MW:	2		253	7/18/12	9:28	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	the first second
,	092620	-022	OBS-MW	2		253	7/18/12	9:29	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
	092620	-024	OBS-MW	2		253	7/18/12	9:32	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
	Last Chain:		Yes			Sample	Tracking	en e	SMC) Use	Special Ins	structions		rements:		Conditions on
- B	Validation I		✓ Yes			Date En	tered:				EDD		✓ Yes		lo	Receipt
	Backgroun		<u> </u>			Entered	by:				Turnaroun	d Time	7 Da	<u>v*</u>	<u>5 Day*</u> 3√Day	
	Confirmato	ry:	L Yes			QC inits.				i prosta	Negotiated	I TAT				
	Sample	N	ame	Signat	ure	Init.	Company	//Organiza	ation/Phon	e/Cell	Sample Di	sposal	Retur	n to Client	tisposal by Lab	
		Robert L		UN4n	ch	PL	SNL/4142/8	44-4013/2	50-7090		Return Sa	mples By:				
	Members	CALL ST. C. CALLAR		14.05-1	ille	at	SNL/4142/8				Comments	s: erea in neio	Send report to	Tim Jackson	n/4142/MS 0729/284-2547 Anions (UI,SU4), Cations	
		William .	I. Gibson	While the	la t	WTh	SNL/4142/8	44-4013/2	39-7367		The second second second second second				,carbonate)	
				'	/	/ .				۵. 		te detecte	d,perform v	erification	analysis using SW846-	
ŀ			1 11 23	- + AQ	- 10110						6850M					Lab Use
ŀ	1.Relinquishe		and the second	guere -	-Org. 919	0		the second se	1055		uished by			Org.		Time
ŀ	1. Received b	Y	14 9. 4	in Jul		2	7/18/12		1055	3. Rece				Org.		Time
H	2.Relinquishe		~		Org.	Date		Time			uished by			Org.		Time
L	2. Received b		HE OMO	quired for 7 and	Org.	Date		Time		4. Rece	ived by			Org.	. Date	Time

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

AR/COC 614290 Project Name: SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.13 Tech Area: Room: **Building:** Lab use Preserv- Collection Depth Date/Time Sample Container Sample Parameter & Method Lab Collected Matrix Volume Method Sample No. Fraction Sample Location Detail (ft) Type ative Type Requested Sample ID A GW Ρ 250 ml G Total Cyanide (SW846-9012) **OBS-MW2** 253 NaOH SA 092620 -027 7/18/12 9:33 Ŋ -033 OBS-MW2 253 GW P 1 L HNO3 G SA Gamma Spec (short list)(901.0) 092620 7/18/12 9:34 . Gross Alpha/Beta (900.0) P G 092620 -034 OBS-MW2 253 7/18/12 9:36 GW 1L HNO3 SA 253 GW P HNO3 G 1 L SA Isotopic Ur (ASTM D3972-09M) . 092620 -035 **OBS-MW2** 7/18/12 9:37 4 VOC (SW846-8260B) -001 N/A DIW G 3x40ml HCL G 092621 **OBS-TB2** 7/18/12 9:19 TB G G 1 **OBS-FB1** N/A DIW 3x40ml HCL FB VOC (SW846-8260B) 092622 -001 7/18/12 9:10 ; **Recipient Initials**

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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	614292
Project Name	:	SWMU 68 GWM	Date Samples S	Shipped:	7119/1	2		SMO Au	thorization:	Done	clum	t	Waste Characterization	
Project/Task I	Manager:	Clinton Lum	Carrier/Waybill	No.				SMO Co	ntact Phone	: Seel	softe or	ren		
Project/Task I	Number:	98026 01.13	Lab Contact:		Edie Kent/8	03.556.8	171				5-844-3199		Released by COC No.	
Service Order	:	CF 263-12	Lab Destination	:	GEL			Send Re	port to SMC):			1 -	✓ ^o Celsius
		a an ann a shara a sha	Contract No.:		PO 691436				Rita Kava	naugh/505	5.284.2553		Bill to: Sandia National Laborato	ories (Accounts Payable)
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operational	Site:									Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Location I		Depth (ft)	Date/T Collec		Sample Matrix	Сс Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Metho Requested	od Lab Sample II
092625	-001	OBS-MW3		209	7/19/12	9:22 🗸	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260	B)
092625	-002	OBS-MW3		209	7/19/12	9:25	GW	AG	4x1L •	None	G	SA	TCL SVOC (SW846-827	0C)
092625	-009	OBS-MW3		209	7/19/12	9:26 <	GW	Р	500 ml	HNO3	G	SA	TAL Metals + U (SW846-60	20/7470)
092625	-014	OBS-MW3		209	7/19/12	9:27 -	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW	846-7196A)
c 092625	-016	OBS-MW3		209	7/19/12	9:28-	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
092625	-017	OBS-MW3		209	7/19/12	9:30 •	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	
4 092625	-018	OBS-MW3		209	7/19/12	9:31 1	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
092625	-020	OBS-MW3		209	7/19/12	9:32 🐔	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)	
۲ 092625	-022	OBS-MW3		209	7/19/12	9:34 -	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
4 092625	-024	OBS-MW3		209	7/19/12	9:37 *	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
Last Chain:		√ Yes		Sample	Tracking		SMC) Use	Special Ins	structions		ements:		Conditions on
Validation I	Req'd:	✓ Yes	E	Date Ent	tered:				EDD		✓ Yes	L	lo	Receipt
Backgroun	d:	Yes	E	Entered	by:				Turnaroun	id Time	<u>7 Da</u>	<u>y*</u>	<mark>]5 Day*</mark> 3√⊅ay	
Confirmato	ry:	└ Yes		QC inits.	::::::::::::::::::::::::::::::::::::::			建国家	Negotiated	TAT				
Sample	N	lame Signa		Init,	Company	/Organiza	tion/Phon	e/Cell	Sample Di	sposal	Return	n to Client	tisposal by Lat)
Team	Robert L	ynch What	ch !	21	SNL/4142/84	4-4013/25	50-7090		Return Sa	mples By:				
Members	Alfred Sa	antillanes Helo 5-	till	at	SNL/4142/84	4-5130/22	28-0710		Comments				n/4142/MS 0729/284-2547	
	William .	J. Gibson	ild V	UNO.	SNL/4142/84	4-4013/23	39-7367						Anions (CI,SO4), Cations	
	Jessica	Salazar	Bern	ALS	SNL/4142/28	4-6517				the second of the second second second			analysis using SW846-	
		And	- ma	10-				11	6850M)		.,			Lab Use
1.Relinguishe	d by	Mul Settille	_Org. 4142	Date	7/19/12	? Time /	028	3.Relind	uished by			Org	. Date	Time
1. Received b		onWalant	Org. 4142			Time /		3. Rece	ived by		- M. (1997) - 1	Org	. Date	Time
2.Relinquishe			Org.	Date		Time		4.Relind	uished by	2		Org	. Date	Time
2. Received b	by .		Org.	Date		Time		4. Rece	ived by			Org	. Date	Time
*D.:		with SMO required for 7 an	d 15 day TAT					All and the second second						2

Droiget Nor		SWMU 68 GWM	Desiset/T			Olintan I.				1.11			AR/COC 6'	4292
Project Nam Tech Area:	e:	2001010 08 G 00101	Project/1	ask Manag	jer:	Clinton Lu	Im		Project/Tas	sk No.:	98026 01.1	13		
Building:	1	Room:												Lab use
Sample No.	Fraction	Sample Location	n Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
092625	-027	OBS-MW3		209	7/19/12	9:38 /	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
092625	-033	OBS-MW3		209	7/19/12	9:40	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	297 No.
092625	-034	OBS-MW3		209	7/19/12	9:41 /	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	122
092625	-035	OBS-MW3		209	7/19/12	9:43 -	GW	Р	1 L 🗸	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	and the second
092626	-001	OBS-MW3		209	7/19/12	9:22 🗸	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	4. ************************************
092626	-002 ~	OBS-MW3		209	7/19/12	`9:25 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	Sector of the
092626	-009	OBS-MW3	1	209	7/19/12	9:26 🖌	GW	Р	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470	
092626	-014	OBS-MW3		209	7/19/12	9:27	GW	Р	250 ml	None	G	DU	Hexavalent Chromium (SW846-719	6A)
092626	-016	OBS-MW3		209	7/19/12	9:28 1	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
092626	-017	OBS-MW3		209	7/19/12	9:30 %	FGW	P	500 ml	HNO3	G	DU	Cations (SW846-6020)	
- 092626	-018	OBS-MW3		209	7/19/12	9:31 🐔	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	12000
092626	-020	OBS-MW3		209	7/19/12	9:32	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	Sec. 1
092626	-022	OBS-MW3		209	7/19/12	9:34	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	
092626	-024	OBS-MW3		209	7/19/12	9:37	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	
092626	-027	OBS-MW3		209	7/19/12	9:38	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	-
092626	-033	OBS-MW3		209	7/19/12	9:40 -	GW	Р	1 L -	HNO3	G	DU	Gamma Spec (short list)(901.0)	
092626	-034	OBS-MW3		209	7/19/12	9:41 1	GW	Р	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	100
092626	-035	OBS-MW3		209	7/19/12	9:43 *	GW	Р	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	н.]
092627	-001	OBS-TB4		N/A	7/19/12	9:22 ′	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
					72	Automatica	1.1995 1.2750			a gi thene with	1	 	and the second se	
Recipient In	itials													

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

													1	Prior to eB	5 - Mu	-3.
Internal Lab															Pag	e <u>1</u> of <u>2</u>
Batch No. /	VIA					SMO Use	/					10	Λ	AR/CC	Part of the local division of the local divi	4291
Project Name		SWMU 68 GW	10.00 million (10.00	Date Samples		71	8/17		-	uthorization	and the second se	471	in	Waste Characteriza	ation	1
		Clinton Lum		Carrier/Waybil	Cherry and the start of the		the state of the second state of the second state of the second	Constructional and a second in some	SMO Co	ontact Phone		5	mo			
Project/Task		98026 01.13	12	Lab Contact:	그렇게 걸는 다음을 다 가지 않는	Edie Kent/8	03.556.8	,171				5-844-3199		Released by COC N		1.00.1.1
Service Order	r:	CF 263-12		Lab Destinatio	如何可能是一些可能有了。 1995年,1995年,1995年	GEL PO 691436			Send Ke	eport to SMC		E 204 2552		Dill tax. Candia National L		4º Celsius
Tech Area:				Contract No.:	Sector Sector	PU 091400			L	Kild Kava	anaugh/505).204.2000		Bill to: Sandia National La P.O. Box 5800, MS-0154	iboratories (Acco	unts Payable),
Building:		Room:		Operational	I Site									Albuquerque, NM 87185-01	151	
Bullung.	1				Depth	Date/T	lime	Sample	C(ontainer	Preserv-	Collection	Sample			Lab
Sample No.	Fraction	Sample I	Location Def	tail	(ft)	Collec		Matrix	Туре	Volume	ative	Method	Туре	Requeste		Sample ID
092623	-001	OBS-EB1			NA	7/18/12	10:23	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-82	260B)	
092623	-002	OBS-EB1			NA	7/18/12	10:25	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-	8270C)	
092623	-009	OBS-EB1			NA	7/18/12	10:26	DIW	Р	500 ml	HNO3	G	EB	TAL Metals + U (SW846	6-6020/7470)	
092623	-014	OBS-EB1			NA	7/18/12	10:27	DIW	Р	250 ml	None	G	EB	Hexavalent Chromium ((SW846-7196A	N.
092623	-016	OBS-EB1			NA	7/18/12	10:28	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056	δ)	
092623	-017	OBS-EB1			NA	7/18/12	10:29	FDIW	Р	500 ml	HNO3	G	EB	Cations (SW846-602	20)	
092623	-018	OBS-EB1			NA	7/18/12	10:30	DIW	Р	125 ml	H2SO4	G	EB	NPN (353.2)		
092623	-020	OBS-EB1			NA	7/18/12	10:31	DIW	Р	250 ml	None	G	EB	Perchlorate (314.0)		
092623	-022	OBS-EB1			NA	7/18/12	10:32	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B))	
092623	-024	OBS-EB1			NA	7/18/12	10:34	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)		
Last Chain		Yes			Sample	Tracking		SMC	O Use	Special Inf	structions	s/QC Requi	rements:		Conc	ditions on
Validation	Req'd:	✓ Yes			Date Ent	ered:				EDD		✓ Yes	l		the set of	Receipt
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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614291 SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 98026 01.13 Project Name: Tech Area: **Building:** Room: Lab use Collection Sample Parameter & Method Date/Time Sample Container Depth Lab Preserv-Matrix Method Sample Location Detail (ft) Collected Volume ative Type Requested Sample No. Fraction Type Sample ID OBS-EB1 7/18/12 DIW Ρ 250 ml NaOH G EB Total Cyanide (SW846-9012) 092623 -027 NA 10:35 Ρ G Gamma Spec (short list)(901.0) 092623 -033 OBS-EB1 NA DIW 1LHNO3 EB 7/18/12 10:36 092623 -034 OBS-EB1 NA 7/18/12 10:37 DIW Ρ 1 L HNO3 G EB Gross Alpha/Beta (900.0) OBS-EB1 DIW Ρ 1 L HNO3 G EB Isotopic U (ASTM D3972-09M) 092623 -035 NA 7/18/12 10:38 -001 DIW G 3x40ml HCL G VOC (SW846-8260B) 092624 OBS-TB3 NA 7/18/12 10:23 TB **Recipient Initials**

AOP 95-1

Page 2 of 2

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



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

Memorandum

Date: October 3, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 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>

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

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were ND and will be **qualified UJ, 15, B4**.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

<u>Perchlorate</u>: The CCV %R was >110%. However, the associated sample result was ND and, therefore, 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. Chloride was detected in the MB at < PQL. The associated sample results were > 5X the MB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

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

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

Both samples were diluted 5X for chloride, sulfate, and nitrate/nitrite. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

Other QC

Field duplicate pairs were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 10/16/



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

Memorandum

Date: October 2, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 Laboratory: GEL Project/Task: 98026.01.12 Analysis: High Explosives (HE) by LCMSMS

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

<u>Summary</u>

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

1) M-nitrotoluene, o-nitrotoluene, and p-nitrotoluene had initial calibration response factors of < 0.05 but > 0.01. All associated sample results were ND and will be **qualified UJ, I4**.

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

Holding Times

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

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

<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 QC acceptance criteria were met with the following exception. The MS and MSD %Rs for 1,3,5-trinitrobenzene were > UAL. All associated sample results were ND and will not be qualified.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

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

Other QC

A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 10/16/12



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Memorandum

Date: October 2, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 and 307969 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.

<u>Summary</u>

Two samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES), and EPA 7470A (CVAA mercury). Two additional 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.

ICP-MS:

SDG 307912

The SD %D for Mg was > 10% and the parent sample result was > 50X MDL. The associated sample results were detects and will be **qualified J,D1**.

CVAA:

Hg was reported in the ICB and CCBs at negative values, with absolute value > MDL. The associated sample results were ND 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

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.

<u>Blanks</u>

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

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:

Both SDGs:

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

SDG 307969:

The MS %R for K was > UAL. However, an MS analysis is not required for this analyte. Therefore, no sample data will be qualified.

CVAA:

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

Laboratory Replicate

All replicates met QC acceptance criteria.

CVAA:

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

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. Samples 307912-003 and -016 were diluted 5X for Na. Samples 307969-001 and -002 were diluted 10X 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.

Other QC

Field duplicate pairs were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 10/16/12



Memorandum

Date: October 3, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 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.

<u>Summary</u>

Two samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec), EPA 900.0 (gross alpha/beta), and HASL300 (Iso-U). Problems were identified with the data package that resulted in the qualification of data.

All analyses:

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

Gamma Spec:

- 1. The K-40 result for sample 307912-011 was "X" flagged by the laboratory due to peak not meeting identification criteria. This result will be **qualified R,Z2**.
- 2. The replicate RER for K-40 was > 1 and < 3. The associated result for the parent sample was rejected (see above). The K-40 result for sample -024 will be **qualified J,RP1** due to lack of applicable measure of precision.

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

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

All tracer recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Gross Alpha/Beta:

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

Laboratory Replicate

All replicate error ratios met QC acceptance criteria except as noted above in the Summary section and as follows.

Gamma Spec:

The duplicate RER for K-40 was > 1 and < 3. However, the parent sample (-011) result was rejected (see Summary section) and will not be further qualified due to the RER infraction.

Iso-U & Gross Alpha/Beta:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All required detection limits were met. The samples were not diluted.

Other QC

Field duplicate pairs were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

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

Reviewed by:Monica DymerskiLevel IDate: 10/16/12



Memorandum

Date: October 16, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 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

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

- 1) The ICAL %RSD for benzo(ghi)perylene was > 15% and < 40%, and the associated CCV was > 20% with negative bias. The associated sample results were ND and will be **qualified UJ,I3,C3**.
- 2) The CCV %D for 2,4-dinitrophenol was > 40% with negative bias. The associated sample results were ND and will be **qualified UJ,C3**.

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.

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

The ICV and/or CCV %Ds for 4-nitrophenol and hexachlorocyclopentadiene were > 20% and < 40% with negative bias. All associated sample results were ND, with no other associated calibration infractions, and 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exceptions. The LCS %Rs for 2,4-dinitrophenol, 4-nitrophenol, and hexachlorocyclopentadiene were < the LAL but $\geq 10\%$. However, this is within the allowable number of marginal LCS %R outliers for the number of reported analytes and, therefore, sample data 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

A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dyneiski Level I Date: 10/10/1.	Reviewed by: Monica Dymerski Level I Date: 10/16
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Memorandum

Date: October 2, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614288 SDG: 307912 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

Three 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.

CCV %Ds for vinyl acetate, acetone, 2-butanone, and 2-hexanone were > 20% with positive bias. A CCV %D for acetone was > 20% and < 40% with negative bias. All associated sample results were ND, with no other associated calibration infractions, and 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 10/16/12



Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 307986 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>

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

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, 15, B4**.

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

Holding Times and Preservation

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

Calibration

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

Anions:

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

<u>Perchlorate</u>: The CCV %R was >110%. However, the associated sample result was ND and, therefore, 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 recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

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

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

The sample was diluted 10X for chloride and sulfate and 5X for nitrate/nitrite as nitrogen due to overrange concentrations. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey



Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Organic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 307986 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.

<u>Summary</u>

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

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

<u>Blanks</u>

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria except for the following. The MS/MSD %Rs were > the laboratory QC acceptance limit for 1,3,5-trinitrobenzene. However, the associated sample result was an ND and, therefore, will not be qualified.

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

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey



Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 307986 & 307994 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.

<u>Summary</u>

One sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA6020 (ICP-MS), and EPA 7470A (CVAA mercury). Another fraction of the sample was prepared and analyzed with approved procedures using method EPA 6020A (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

CVAA:

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

ICP-MS SDG 307986:

- 1. The CRI %R for Cu was >130%. The associated sample result was a detect <5X the PQL and, therefore, will be **qualified J+, DL2.**
- 2. The serial dilution %D for U was >10%, and the parent sample result was >50X the MDL. The associated sample result was a detect and, therefore, will be **qualified J, D1**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The instrument tunes met all QC requirements.

Calibration

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

Reporting Limit Verification

The CRA/CRI recoveries met QC acceptance criteria except as noted above in the Summary section.

Blanks

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

ICP-MS SDG 307986:

In the CCB, the U was detected at a concentration > the PQL, and it was detected in the MB at > the MDL but < the PQL. In the CCB, Sb was also detected at > the MDL but < the PQL. However, the associated sample results were a detect >5X the blank concentration and ND, respectively, and, therefore, will not be qualified.

ICP-MS SDG 307994:

In the CCB, the Na concentration was negative with an absolute value > the MDL but < the PQL. However, the associated sample result was >5X the MDL and, therefore, will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS recoveries met QC acceptance criteria except for the following.

ICP-MS SDG 307986:

The MS %R for K was >125%. However, K is not a required MS analyte. Therefore, no sample data will be qualified.

CVAA:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

CVAA:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

ICP-MS SDG 307986:

The sample was diluted 5X for Ca and Na due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

ICP-MS SDG 307994:

The sample was diluted 5X for Ca due to an over-range concentration. All associated matrix QC samples were analyzed at relative dilution factors \leq 5X those of the samples.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilution %Ds met QC acceptance criteria except as noted above in the Summary section.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey



Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 3079865 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.

<u>Summary</u>

One sample was prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec), EPA 900.0 (gross alpha/beta), and HASL300 (Iso-U). Problems were identified with the data package that result in the qualification of data.

Gamma Spec:

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

Iso-U:

1. The U-235/236 sample result was > but <3X the MDA and, therefore, will be **qualified J, FR7.**

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

Holding Times and Preservation

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

Quantification

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

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

Blanks

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

Tracer/Carrier Recovery

All tracer recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Gross Alpha/Beta:

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

Laboratory Replicate

All replicate error ratios met QC acceptance criteria.

Gamma Spec & Gross Alpha/Beta:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

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

Reviewed by: Marcia Hilchey



Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 307986 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.

<u>Summary</u>

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

1. The ICV %D for 2,4-dinitrophenol was >20% but <40%, and the CCV %D was >40% but <60%, both with negative bias. The associated sample result was ND and, therefore, will be **qualified UJ**, **C3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

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

The CCV %Ds for hexachlorocyclopentadiene and 4-nitrophenol were >20% but <40% with negative bias. However, the associated sample results were NDs, and no other calibration infractions occurred for these analytes. Therefore, sample data 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

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS recoveries met QC acceptance criteria except for the following. The LCS %Rs for 2,4dinitrophenol, 4-nitrophenol, and hexachlorocyclopentadiene were < the laboratory acceptance limit but $\geq 10\%$. However, this is within the allowable number of marginal LCS %R outliers for the number of reported analytes and, therefore, sample data will not be qualified.

Detection Limits/Dilutions

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

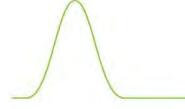
Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey





Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614289 SDG: 307986 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.

<u>Summary</u>

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 result in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration QC acceptance criteria were met with the following exceptions.

The initial calibration RSDs for bromodichloromethane and bromoform were >15% but <40%. Also, the CCV %D for 2-butanone was >20% but <40% with negative bias. However, the associated sample results were all NDs, and there were no other calibration outliers. Therefore, no sample results were qualified.

<u>Blanks</u>

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey Date: 09/10/12