

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



#### CERTIFIED MAIL-RETURN RECEIPT REQUESTED

OCT 26 2012

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, October 2012

Dear Mr. Kieling:

Enclosed is the *Environmental Restoration Operations Consolidated Quarterly Report, October* 2012 for the Department of Energy, National Nuclear Security Administration and Sandia Corporation that addresses all quarterly reporting (April through June 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 Pellegrinø

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-56, HQ/GTN Joanna Serra, NA-173, HQ/FORS Amy Blumberg, SNL/NM, MS-0141 Andrew Orrell, SNL/NM, MS-0711 David Miller, SNL/NM, MS-0718 John Cochran, SNL/NM, MS-0719 Sarah Summers, SNL/NM, MS-0727 Jeanette Norte, SSO/FP, MS-0184 Daniel Pellegrino, NNSA/SSO, MS-0184 Joe Estrada, SSO/FP, MS-0184 John Weckerle, SSO/FP, MS-0184 13-032-475447

## CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

#### Document title: Environmental Restoration Operations Consolidated Quarterly Report, October 2012

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.

10/22/2012

Date

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

and

Owner and Co-Operator

Signature:

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



Sandia National Laboratories, New Mexico

# **Environmental Restoration Operations**

A U.S. Department of Energy Environmental Cleanup Program

# **Consolidated Quarterly Report**

April – June 2012



October 2012



United States Department of Energy Sandia Site Office

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## **CONSOLIDATED QUARTERLY REPORT**

October 2012

#### 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**: April 2012 – June 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 Complete 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, April – June 2012
<u>SECTION II</u> :	Perchlorate Screening Quarterly Groundwater Monitoring Report, April – June 2012
SECTION III:	Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, April – June 2012
SECTION IV:	Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, April – June 2012

### ABBREVIATIONS AND ACRONYMS

~	
µg/L	microgram(s) per liter
AOC	Area of Concern
AOP	Administrative Operating Procedure
BSG	Burn Site Groundwater
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
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
ET Cover	evapotranspirative cover
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
HE	high explosive(s)
HQ	hazard quotient
LTMMP	Long-Term Monitoring and Maintenance Plan
LTS	Long-Term Stewardship
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
TB	trip blank
VOC	volatile organic compound

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## SECTION I ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, APRIL – JUNE 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 April, May, and June 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

A draft plan was completed in June 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 Cover) project. Once the plan is finalized, the stabilization work will be contracted and performed 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.



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

#### 2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities

Three 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 3-day period to stimulate a <sup>1</sup>/<sub>2</sub>-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 Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL/NM March 2012a).

#### 2.1.2 MWL Evapotranspirative Cover Maintenance Activities

Cover maintenance activities performed during this reporting period at the MWL included the application of pre-emergent and post-emergent herbicides on small (less than 200-square-foot) test plots at the south end of the ET Cover. The testing was informally approved by the New Mexico Environment Department (NMED) on March 29, 2012, to determine the effectiveness of common herbicides in controlling Russian thistle and other common invasive annual weed species. The pre-emergent and post-emergent herbicides were applied on April 13 and June 4, 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 regulatory closure activities 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 and I.2.2.2. In April 2010, the U.S. Department of Energy (DOE) and Sandia Corporation (Sandia), hereafter referred to as DOE/Sandia, received formal written communication from the NMED regarding its decisions on these sites (NMED April 2010). The decisions, presented in the NMED letter dated April 8, 2010, are summarized in Section I.2.2.3.

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

This report contains 36 potential release sites that require 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 the final determination of Corrective Action Complete (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 sites were submitted for the final regulatory 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," and (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 SWMU 68 (Old Burn Site), SWMU 149 (Building 9930 Septic System), SWMU 154 (Building 9960 Septic System and Seepage Pits), and SWMUs 8/58 (Open Dump [Coyote Canyon Blast Area]/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 SWMUs 49 and 116. 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 (Coyote Test Field [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)
- SWMU 52, The Liquid Waste Disposal System (LWDS), was addressed in the April 2010 NMED letter as a request for additional information to aid the NMED in determining the status of SWMU 52 (Brandwein December 2009a and 2009b). In December 2011, SNL/NM ER personnel provided the requested information to the NMED along with a proposal to address NMED concerns about the future use of this LWDS site (SNL/NM December 2011).

#### 2.3 Site-Wide Hydrogeologic Characterization

The following sections present site-wide hydrogeologic characterization 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.

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 BSG and 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 April 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 June 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 May and June 2012.

#### 2.3.2 Burn Site Groundwater

The groundwater monitoring well installation report for the BSG groundwater monitoring wells CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12 and collection of subsurface soil samples at Boreholes BSG-BH001 through BSG-BH010 (SNL/NM January 2012) was approved by the NMED in June 2012 (NMED June 2012).

The Monitoring Well Plug and Abandonment Plan and Well Construction Plan for the BSG groundwater monitoring wells 12AUP01, CYN-MW1D, CYN-MW2S, and CYN-MW13 (SNL/NM February 2012) was approved by the NMED in April 2012 (NMED April 2012a).

Groundwater sampling for the BSG investigation was conducted in April 2012.

#### 2.3.3 Tijeras Arroyo Groundwater

Groundwater sampling for the TAG investigation was conducted in June 2012.

#### 2.3.4 Mixed Waste Landfill Groundwater

No MWL groundwater monitoring activities were performed during this reporting period.

#### 2.3.5 Chemical Waste Landfill Groundwater

No CWL groundwater monitoring activities were performed during this reporting period.

#### 2.3.6 SWMUs 8/58 Groundwater

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

The groundwater monitoring well installation report for the SWMUs 8/58 groundwater monitoring wells CCBA-MW1 and CCBA-MW2 (SNL/NM November 2011) was approved by the NMED in April 2012 (NMED April 2012b).

#### 2.3.7 SWMU 68 Groundwater

Groundwater sampling for SWMU 68 was conducted in April 2012.

The groundwater monitoring well installation report for the SWMU 68 groundwater monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 (SNL/NM November 2011) was approved by the NMED in April 2012 (NMED April 2012b).

#### 2.3.8 SWMU 49 Groundwater

No SWMU 49 groundwater monitoring activities were performed during this reporting period.

#### 2.3.9 SWMU 116 Groundwater

No SWMU 116 groundwater monitoring activities were performed during this reporting period.

#### 2.3.10 SWMU 149 Groundwater

Groundwater sampling for SWMU 149 was conducted in June 2012.

#### 2.3.11 SWMU 154 Groundwater

Groundwater sampling for SWMU 154 was conducted in June 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).

• Quarterly inspection of the CWL ET Cover surface, storm-water diversion structures, and security fence was performed in June 2012. A request was submitted to SNL/NM Facilities to clear a storm water drainage channel of debris (primarily accumulated weeds) that was blocking greater than 1/3 of the drainage channel. This repair work will

be completed during the next reporting period. No other maintenance or repairs were required.

- A meeting was held at the NMED District 1 Office in Albuquerque on June 27, 2012, to discuss CWL Permit issues. Discussion topics included updating the NMED website version of the CWL Permit to reflect the February 2012 permit modification request approval (Kieling February 2012), correcting the February 2012 NMED approval replacement attachment, and addressing DOE/Sandia plans for another minor permit modification request to be submitted in 2012. Follow-up discussion of these topics is planned for the next reporting period.
- The final semiannual groundwater monitoring event will be performed in July 2012. All wells were inspected and no maintenance or repairs were required.
- No cover maintenance was performed on the CWL ET Cover during this reporting period.

#### 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 (April through June 2012) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in June 2012. The results will be presented in the 2012 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2012).
- Composite leachate sampling for waste characterization was conducted on May 22, 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 June 21 and June 28, 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:

• Six four-wing saltbush plants were identified growing on the containment cell vegetative cover. Because these plants can develop extensive root systems that could damage the high-density polyethylene fabric that is part of the cover system, they

were removed when they were identified. Figure I-2 presents a photograph of the native grasses and gravel mulch surface of the CAMU vegetative cover.

- Signs on the north and south gate were noted as fading and need to be replaced.
- A warning sign on the fence north of monitoring location CSS-1 needs to be repaired.



Figure I-2 Corrective Action Management Unit Vegetative Cover

- A bush at the westernmost benchmark needs to be trimmed so the benchmark is visible from the road.
- Windblown plywood debris inside the north gate needs to be removed.

#### 3.2.1 CAMU Waste Management Activities

Waste management data for the CAMU are reported in this section for the reporting period of April through June 2012. 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 April 1, 2012:
  - o 17 gallons
- Leachate waste generated on site during the reporting period:
  - o 96 gallons

- Leachate waste removed from the site by Hazardous Waste Handling Facility personnel on May 31, 2012:
  - o 76 gallons
- Leachate waste remaining on site at the end of this reporting period:
   37 gallons

#### 3.2.2 CAMU Regulatory Activities

No regulatory activities occurred during this quarter.

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

One LTS document that has been submitted to the NMED is, as of this reporting period, still pending review and approval. The "Chemical Waste Landfill Annual Post-Closure Care Report – Calendar Year 2011" was submitted to the NMED on March 26, 2012 (SNL/NM March 2012b).

#### 4.0 **References**

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

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

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

Kieling, J.E. (New Mexico Environment Department), February 2012. Letter to R. Sena (U.S. Department of Energy NNSA/Sandia Site Office) and M.W. Hazen (Sandia National Laboratories/New Mexico), "Approval, Class 1 Modification to Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories, November 2011, Sandia National Laboratories, EPA ID # NM5890110518 HWB-SNL-11-015," February 20, 2012.

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# Tables

#### Table I-1

## **Environmental Restoration Sites Subject to Corrective Action Complete Regulatory Process**

	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 (CT
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
<u> </u>	Building 9982 Drywell (Solar Tower Complex)
Total	9

LWDS

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

MWL

TA TAG

Technical Area.Tijeras Arroyo Groundwater.

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## **APPENDICES**

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

## SECTION II PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, APRIL – JUNE 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 Second Quarter of Calendar Year (CY) 2012 (April, May, and June) 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-sixth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the First Quarter of CY 2012 (SNL/NM February 2006, June 2006, September 2006, December 2006, March 2007, June 2007, September 2007, December 2007, March 2008, June 2008, September 2008, December 2008, June 2009, September 2009, December 2009, March 2010, June 2010a, September 2010a, December 2010, March 2011, June 2011, October 2011, January 2012a, April 2012, and July 2012).

Groundwater at BSG monitoring well CYN-MW6 has been sampled 19 times; Coyote Test Field (CTF) wells CTF-MW2 and CTF-MW3 have been sampled six times; Solid Waste Management Units (SWMUs) 8/58 wells CCBA-MW1 and CCBA-MW2 have been sampled three times; and SWMU 68 wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled three times. (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 Second Quarter of CY 2012 (April, May, and June) for the wells currently active in the perchlorate-screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ( $\mu$ 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 include the following: CYN-MW1D, CYN-MW5 (recently reinstated, discussed in Section II.3.0), 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, and TAV-MW14.

SNL/NM personnel performed groundwater sampling for perchlorate at eight wells on the dates listed in Table II-1. Several of the wells were installed after the Order was finalized 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 Third Quarter, Fiscal Year 2012" (SNL/NM March 2012a).
- "SWMU 68 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2012" (SNL/NM March 2012b).
- "Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2012" (SNL/NM March 2012c).
- "SWMU 149 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2012" (SNL/NM May 2012a).
- "SWMU 154 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2012" (SNL/NM May 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<sup>™</sup> 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 2012b). With the exception on CYN-MW6, each well was purged a minimum of one saturated screen volume before sampling in accordance with FOP 05-01, "Groundwater Monitoring Well Sampling and Field Analytical Measurements" (SNL/NM January 2012c). Well CYN-MW6 is a low-yield monitoring well and was purged dry and allowed to recover before sampling to ensure a representative groundwater sample.

Field water-quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the well prior to collecting groundwater samples. Groundwater temperature, SC, ORP, DO, and pH were measured with a  $YSI^{TM}$  Model 6920 water quality meter. Turbidity was measured with a HACH<sup>TM</sup> 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% for turbidity values greater than 5 NTU.
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5%.

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 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-2. 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  $4 \mu g/L$  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  $4 \mu g/L$  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  $4 \mu g/L$ , DOE/Sandia will evaluate the nature and extent of perchlorate contamination, based on a screening level/MDL of  $4 \mu g/L$ , 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 March 2007, DOE/Sandia received a letter of approval from the NMED, which stated the requirement that DOE/Sandia "determine the nature and extent of the contamination and complete a CME for the perchlorate-impacted groundwater in the vicinity of CYN-MW6" (NMED March 2007). As this was based solely on the four quarters of monitoring results, DOE/Sandia submitted a letter to the NMED in April 2007 (SNL/NM April 2007), which recommended further characterization through continued quarterly monitoring of CYN-MW6 for four additional quarters, ending in December 2007, to ensure appropriate characterization of this well. In January 2008, DOE/Sandia requested a meeting with the NMED to discuss the need for continued monitoring or additional characterization work and, potentially, a CME.

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

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

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

In April 2009, DOE/Sandia received a letter from the NMED requiring DOE/Sandia to characterize the nature and extent of the perchlorate contamination in soil and groundwater in the BSG study area (NMED April 2009). A characterization work plan was prepared and submitted to the NMED (SNL/NM November 2009), approved by the NMED (February 2010), and implemented in July 2010. 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/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 2010b) 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 2010b) that was subsequently approved (with modification) by the NMED (January 2011).

## 4.0 Monitoring Results

Table II-3 summarizes current and historical perchlorate results for wells currently in the perchlorate-screening monitoring network. The analytical laboratory COA for the Second 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. Also consistent with historical analytical results, perchlorate was detected above the screening level in the sample from CYN-MW6.

As shown in Table II-3, the April 2012 perchlorate concentrations reported for well CYN-MW6 environmental and duplicate environmental samples are 7.31 and 7.32  $\mu$ g/L, which are consistent with the average concentration detected since sampling began in March 2006 (Figure II-2). The hydrograph for well CYN-MW6 (Figure II-2) shows that the water table is rapidly declining.

Table II-4 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 March 2012a, March 2012b, March 2012c, May 2012a, and May 2012b) were identified during the Second Quarter of CY 2012 sampling activities.

### 5.0 Summary and Conclusions

Based on the analytical data presented in Table II-3 and in previous reports, the following statements can be made:

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 µg/L.
- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate-screening monitoring well network.
- The perchlorate concentrations for well CYN-MW6 for the Second Quarter of CY 2012 sampling event are 7.31 and 7.32  $\mu$ g/L (Table II-3), which are consistent with the average concentration reported since the inception of perchlorate sampling at well CYN-MW6 in March 2006 (Figure II-2).
- A human health risk assessment was performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in CYN-MW6 groundwater samples. The maximum concentration of perchlorate in CYN-MW6 samples to date (8.93 µg/L) was used in the assessment. The calculated HQ of 0.35 is less than the NMED target level of a hazard index (the sum of all HQs) of 1.0 (NMED June 2006 and SNL/NM March 2008).

DOE/Sandia will continue annual monitoring of perchlorate for 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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# Figures

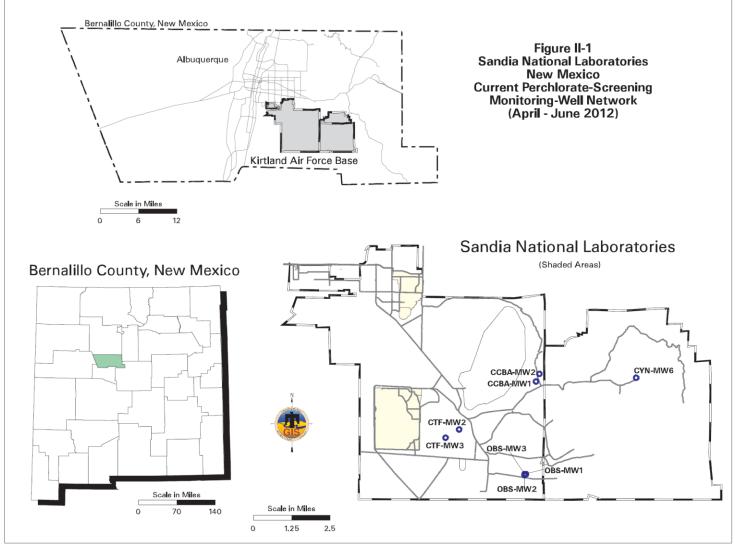


Figure II-1 Sandia National Laboratories, New Mexico Current Perchlorate-Screening Monitoring Well Network, April – June 2012

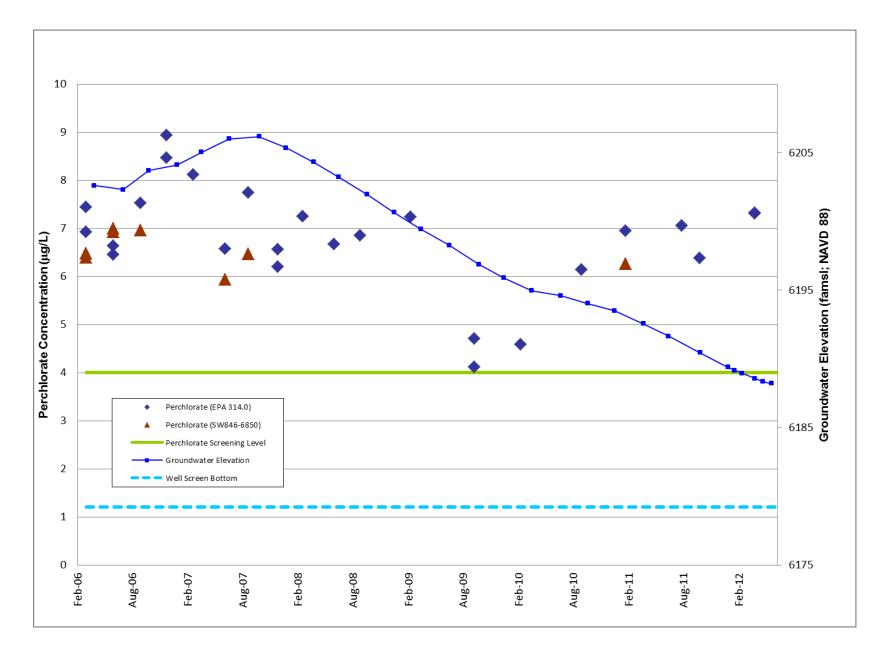


Figure II-2 Groundwater Elevations and Perchlorate Concentrations over Time in CYN-MW6

# Tables

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

### (April – June 2012)

Well	Date Sampled	Number of Consecutive Sampling Events <sup>a</sup>	Remaining Number of Sampling Events <sup>b</sup>	Sampling Equipment
CCBA-MW1	23-Apr-12	3	5	Bennett <sup>™</sup> Pump
CCBA-MW2	24-Apr-12	3	5	Bennett <sup>™</sup> Pump
CTF-MW2	19-Jun-12	6	2	Bennett <sup>™</sup> Pump
CTF-MW3	16-Jun-12	6	2	Bennett <sup>™</sup> Pump
CYN-MW6	16-Apr-12	19	TBD <sup>c</sup>	Bennett <sup>™</sup> Pump
OBS-MW1	18-Apr-12	3	5	Bennett <sup>™</sup> Pump
OBS-MW2	19-Apr-12	3	5	Bennett <sup>™</sup> Pump
OBS-MW3	17-Apr-12	3	5	Bennett™ Pump

#### Notes

<sup>a</sup>Includes this sampling event.

<sup>b</sup>Per 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 eight wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).

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

- $\mu$ g/L = Microgram(s) per liter.
- BSG = Burn Site Groundwater.
- CCBA = Coyote Canyon Blast Area.
- CTF = Coyote Test Field.
- CY = Calendar Year.
- CYN = Canyons (Burn Site).
- DOE = U.S. Department of Energy.
- MDL = Method detection limit.
- MW = Monitoring well.
- NMED = New Mexico Environment Department.
- OBS = Old Burn Site.
- Sandia = Sandia Corporation.

### Table II-2

## Sample Details for Second Quarter, CY 2012 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	092291-020	614155	
CCBA-MW2	092296-020 092297-020	614157	SWMUs 8/58
CTF-MW2	092538-020	614255	SWMU 154
CTF-MW3	092535-020	614254	SWMU 149
CYN-MW6	091990-020 091991-020	614071	BSG
OBS-MW1	092022-020 092023-020	614081	SWMU 68
OBS-MW2	092025-020	614082	3001010 08
OBS-MW3	092018-020	614079	

#### Notes

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

### Table II-3

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

Well ID	Sample Date	AR/COC Number	Sample Number	Perchlorate Result <sup>ª</sup> (μg/L)	MDL <sup>b</sup> (µg/L)	PQL <sup>c</sup> (µg/L)	MCL <sup>d</sup> (µg/L)	Laboratory Qualifier <sup>e</sup>	Validation Qualifier <sup>f</sup>	Analytical Method <sup>g</sup>	Comments
	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-MW1	16-Jan-12	613958	091615-020	ND	4.0	12	NE	U		EPA 314.0	
CCDA-IVIVVI	10-Jan-12	013930	091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	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	
	24-Apr-12	614157	092296-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Api-12	014157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
	00-1VIAI-11	013440	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	
CTF-MW2	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
	50-1viai-12	014055	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	
	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
	09-IVIAI-11	013450	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	
CTF-MW3	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091943-020	ND	4.0	12	NE	U		EPA 314.0	
	20-iviar-12	014053	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	

### Table II-3 (Continued)

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

Well ID	Sample Date	AR/COC Number	Sample Number	Perchlorate Result <sup>a</sup> (μg/L)	MDL <sup>b</sup> (µg/L)	PQL <sup>c</sup> (µg/L)	MCL <sup>d</sup> (µg/L)	Laboratory Qualifier <sup>e</sup>	Validation Qualifier <sup>f</sup>	Analytical Method <sup>9</sup>	Comments
			075985-020	6.92	4.0	12	NE	J		EPA 314.0	
	23-Mar-06	609578	075986-020	7.44	4.0	12	NE	J		EPA 314.0	Duplicate sample
	23-Iviai-00	009578	075985-R20	6.39	0.50	2.0	NE	Hh	HT, J	EPA 6850M	Verification/Reanalysis
			075986-R20	6.48	0.50	2.0	NE	Hh	HT, J	EPA 6850M	Verification/Reanalysis
			078687-020	6.63	4.0	12	NE	J		EPA 314.0	
			078688-020	6.45	4.0	12	NE	J		EPA 314.0	Duplicate sample
	22-Jun-06	609929	078687-021	6.99	1.0	4.0	NE			EPA 6850M	Verification
			078688-021	6.92	1.0	4.0	NE			EPA 6850M	Verification/Duplicate Sample
	00.0	040050	081626-020	7.52	4.0	12	NE	J		EPA 314.0	
	20-Sep-06	610652	081626-R20	6.96	1.0	4.0	NE		P2	EPA 6850M	Verification/Reanalysis
	45 0 00	044057	083858-020	8.46	4.0	12	NE	J		EPA 314.0	<b>2</b>
	15-Dec-06	611057	083859-020	8.93	4.0	12	NE	J		EPA 314.0	Duplicate sample
	14-Mar-07	611200	084237-020	8.12	4.0	12	NE	J		EPA 314.0	· · ·
	07 1 07	011000	084833-020	6.57	4.0	12	NE	J	J-, X1	EPA 314.0	
	27-Jun-07	611399	084833-R20	5.94	0.5	2.0	NE			EPA 6850M	Verification/Reanalysis
CYN-MW6	10 0 0 7	044504	085249-020	7.74	4.0	12	NE	J		EPA 314.0	
CTN-IVIVO	12-Sep-07	611581	085249-R20	6.46	0.5	2.0	NE	Hh	J	EPA 6850M	Verification/Reanalysis
	18-Dec-07	611668	085446-020	6.20	4.0	12	NE	J		EPA 314.0	
	18-Dec-07	011000	085447-020	6.56	4.0	12	NE	J		EPA 314.0	Duplicate sample
	10-Mar-08	611749	085661-020	7.25	4.0	12	NE	J		EPA 314.0	· · · ·
	23-Jun-08	611912	086280-020	6.67	4.0	12	NE	J		EPA 314.0	
	17-Sep-08	612004	086782-020	6.85	4.0	12	NE	J		EPA 314.0	
	02-Mar-09	612120	087047-020	7.24	4.0	12	NE	J		EPA 314.0	
	20 San 00	612392	087734-020	4.12	4.0	12	NE	J	J-	EPA 314.0	
	30-Sep-09	012392	087735-020	4.71	4.0	12	NE	J	J-	EPA 314.0	Duplicate sample
	03-Mar-10	612580	088180-020	4.59	4.0	12	NE	J		EPA 314.0	
	20-Sep-10	613279	089659-020	6.14	4.0	12	NE	J		EPA 314.0	
	14-Feb-11	612412	000000 000	6.95	4.0	12	NE	J	J-	EPA 314.0	
	14-Feb-11	613413	090000-020	6.26	0.5	2.0	NE	Hh		EPA 6850M	Verification/Reanalysis
	18-Aug-11	613723	091035-020	7.06	4.0	12	NE	J		EPA 314.0	
	17-Oct-11	613871	091320-020	6.38	4.0	12	NE	J		EPA 314.0	
	16-Apr-12	614071	091990-020	7.31	4.0	12	NE	J		EPA 314.0	
	10-Api-12	014071	091991-020	7.32	4.0	12	NE	J		EPA 314.0	Duplicate sample

### Table II-3 (Continued)

## Summary of Perchlorate Screening Analytical Results for the

### Current Monitoring-Well Network, as of Second Quarter, CY 2012

Well ID	Sample Date	AR/COC Number	Sample Number	Perchlorate Result <sup>a</sup> (μg/L)	MDL <sup>♭</sup> (µg/L)	PQL <sup>c</sup> (µg/L)	MCL <sup>d</sup> (µg/L)	Laboratory Qualifier <sup>e</sup>	Validation Qualifier <sup>f</sup>	Analytical Method <sup>9</sup>	Comments
	25-Oct-11	613879	091335-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW1	09-Jan-12	613952	091600-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-IVI VV I	10 Apr 10	614081	092022-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	014001	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW2	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
000-11112	10-Jan-12	613954	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	
	04.0+14	640000	091342-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW3	24-Oct-11	613882	091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
003-111113	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	

#### 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.
- CYN = Canyons (Burn Site).
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- MW = Monitoring well.
- OBS = Old Burn Site.

#### <sup>a</sup>Result

ND = Not detected (at MDL).

 $\mu$ g/L = Micrograms per liter.

#### <sup>▶</sup>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.

#### dMCL

Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11, Subpart B) and subsequent amendments or Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code, incorporating 40 CFR 141. NE = Not established.

### Table II-3 (Concluded)

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

#### Notes (continued)

#### <sup>e</sup>Laboratory Qualifier

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

#### <sup>f</sup>Validation Qualifier

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

- HT = The holding time was exceeded for the associated sample analysis.
- J = The associated value is an estimated quantity.
- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- P2 = Insufficient Quality control data to determine laboratory precision.
- X1 = General data quality is suspect.

#### <sup>9</sup>Analytical Method

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

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

### Table II-4

### Perchlorate Screening Groundwater Monitoring Field Water Quality Measurements<sup>a</sup>, Second Quarter, CY 2012

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation- Reduction Potential (mV)	рН	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	23-Apr-12	16.51	509	112.5	6.96	0.40	28.8	2.80
CCBA-MW2	24-Apr-12	18.90	610	102.0	7.87	0.48	63.5	5.86
CTF-MW2	19-Jun-12	19.58	3310	34.1	6.03	0.83	1.3	0.12
CTF-MW3	16-Jun-12	20.09	1530	178.7	6.89	0.19	87.4	7.84
CYN-MW6	16-Apr-12	15.79	977	132.3	7.42	6.17	30.3	3.04
OBS-MW1	18-Apr-12	17.70	531	99.5	7.75	0.47	39.0	3.71
OBS-MW2	19-Apr-12	17.54	531	100.7	7.73	0.46	39.2	3.74
OBS-MW3	17-Apr-12	16.39	531	30.6	7.74	0.52	43.4	4.24

#### Notes

<sup>a</sup>Field measurements obtained immediately before the groundwater sample was collected.

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

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Appendix A Analytical Laboratory Certificates of Analysis for the Perchlorate Data

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lah

Page 1 of 2 MA Batch No. AR/COC 614071 SMO Use Dept. No./Mail Stop: 4142/1126 Date Samples Shipped: 4/16/12 Project/Task No.146422.10.11.01 Waste Characterization cuo Project/Task Manager: Don Schofield Carrier/Waybill No. (39784 SMO Authorization: Dr. Luck -Send preliminary/copy report to: Edie Kent/803-556-8171 Burn Site GWM Contract #: PO 691436 Project Name: Lab Contact: ER/1333/DAT Record Center Code: Lab Destination: GEL Released by COC No.: See Rottle Orde ☑ Validation Required ER 058 Lorraine Herrera/505-844-3199 Logbook Ref. No .: SMO Contact/Phone: Service Order No. CF#058-12 Send Report to SMO: Lorraine Herrera/505-844-3199 Bill To:Sandia National Labs (Accounts Payable) Location Tech Area P.O. Box 5800 MS 0154 Reference LOV(available at SMO) 3027Room Buildina Albuquerque, NM 87185-0154 ER Sample ID or Pump **ER** Site Date/Time(hr) Sample Container Preserv-Collection Sample Parameter & Method Lab Sample Sample Location Detail Depth (ft) Collected Sample No.-Fraction No. Matrix Volume Method Type ative Type Requested ID 091990-001 CYN-MW6 164 NA 4-16-12 / 0930 GW G HCL G 3x40 ml SA TCL VOC ( (SW846-8260B) 091990-005 CYN-MW6 164 NA 4-16-12 / 0932 GW AG 4x1 L 4C G SA TPH DRO (SW846-8015A/B) SVOC 091990-006 164 NA 4-16-12 / 0935 GW AG 3x40 ml 4C G SA TPH GRO (SW846-8015A/B) VOC CYN-MW6 Ρ G 164 NA 4-16-12 / 0937 GW 500 ml HNO3 SA ✓ 091990-010 ≤ CYN-MW6 TAL Metals+U(SW846-6010/6020/7470) GW P 4C G SA 091990-0161 CYN-MW6 164 NA 4-16-12 / 0939 125 ml Anions SW846-9056) 091990-018 CYN-MW6 164 NA 4-16-12/0940 GW Ρ 125 ml H2SO4 G SA NPN (353.2) G GW P 250 ml 4C SA 091990-020 CYN-MW6 164 NA 4-16-12/0942 Perchlorate (314.0) P 164 NA 4-16-12 / 0944 GW 1 L HNO3 G SA Gamma Spec (short list) (901.0) 091990-033 CYN-MW6 GW Ρ 1 L HNO3 G SA Gross Alpha/Beta (900.0) 091990-034 / CYN-MW6 164 NA 4-16-12/0946 NA 4-16-12/0948 GW Ρ 1 L HNO3 G SA ISO Uranium (ASTM D3972-09M) 091990-035 1 CYN-MW6 164 VNo Ref. No. Sample Tracking Smo Use Special Instructions/QC Requirements Abnormal RMMA Yes 118/12 EDD Yes No Conditions on Return to Client J Disposal by lab Date Entered(mm/dd/yy) /04 Sample Disposal 10 11 V No Receipt **Turnaround Time** 7 Day 15 Day - 30 Day Entered by: Level D Package les \*Send report to: **Negotiated TAT** QC inits. **Return Samples By:** Company/Organization/Phone/Cellular Signature Init Tim Jackson/Org.4142/MS 0729/505-284-2547 Name Lab Use SNL/4143/850-8524 LAST SAMPLE FOR BURN SITE GWM Sample Gilbert Quintana Amite 1000 PAthnos P SNL/4142/844-4013/250-7090 Anions as Br.CI.F.SO4 Team Robert Lynch TAGIN-SNL/4142/284-2547 No perchlorate verification analysis required. 79 Members Tim Jackson VOC trip blank has headspace. \*Please list as separate report. Time Date 4-16-12 Time /045 4.Relinquished by Org. Date Org. 7142 1. Relinquished by TFL-MM Date Time Org. 4142 Date \$///6/12 Time 104 4. Received by Org. . Received by Date Time Org. 2.Relinguished by Org 4/4/ Date Malle Time 1200 5.Relinguished by Org. Date Time Date Time 5. Received by 2. Received by Org. Time 6.Relinguished by Org. Date Time Org. Date 3.Relinguished by Time 6. Received by Org. Date Time Received by Org. Date

### OFF-SITE LABORATORY Analysis Request And Chain Of Custody (Continuation)

Page 2 of 2

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oject Name:	Burn Site GWM	Project/Task N	Manger:	Don Schofield			Project/Task	No.:	146422.10.11.0	01		Bernnen anderen anderen
Location	Tech Area			<b>D</b> -6	~~						2012 1 - 27 14 - 20 14 - 20	
Building	Room	<u> </u>	T == 1	Reference l					10 11 11	1		Lab use
Sample No- Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Sito No	Date/Time (hr) Collected	Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sam ID
091990-036 /	CYN-MW6	164	NA	4-16-12 / 0950	GW	AG	250 ml	4C	G		Tritium (906.0)	
091991-001	CYN-MW6	164	NA	4-16-12 / 0930	GW	G	3x40 ml		G	DU	TCL VOC ( (SW846-8260B)	
/091991-005 /	CYN-MW6	164	NA	4-16-12 / 0932*	GW	AG	4x1 L	4C	G	DU	TPH DRO (SW846-8015A/B) SVOC	
091991-006	CYN-MW6	164	NA	4-16-12 / 0936	GW	AG	3x40 ml	4C	G	DU	TPH GRO (SW846-8015A/B) VOC	
091991-010/	CYN-MW6	164	NA	4-16-12 / 0938	GW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
091991-016	CYN-MW6	164	NA	4-16-12 / 0939	GW	Р	125 ml	4C	G	DU	Anions SW846-9056)	
/091991-018/	CYN-MW6	164	NA	4-16-12 / 0941	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
/091991-020 /	CYN-MW6	164	NA	4-16-12 / 0943	GW	Р	250 ml	4C	G	DU	Perchlorate (314.0)	
- 091991-033	CYN-MW6	164	NA	4-16-12 / 0945	GW	Р	1 L	HNO3	G	DU	Gamma Spec (short list) (901.0)	
091991-034	CYN-MW6	164	NA	4-16-12 / 0947	GW	Р	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	
091991-035	CYN-MW6	164	NA	4-16-12 / 0949	GW	Р	1L	HNO3	G	DU	ISO Uranium (ASTM D3972-09M)	
091991-036	CYN-MW6	164	NA	4-16-12 / 0951	GW	AG	250 ml	4C	G	DU	Tritium (906.0)	
<sup>/</sup> 091992-001 /	CYN-TB17	NA	NA	4-16-12/0915	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC ( (SW846-8260B)	
091992-006	CYN-TB18	NA	NA	4-16-12/0915	DIW	AG	3x40 ml	4C	G	ТВ	TPH GRO (SW846-8015A/B) VOC	
/091995-001/	CYN-FB3	NA	NA	4-16-12 / 0915	DIW	G	3x40 ml	HCL	G	FB	TCL VOC ( (SW846-8260B)	
v091995-006	CYN-FB4	NA	NA	4-16-12/0915	DIW	AG	3x40 ml	4C	G	FB	TPH GRO (SW846-8015A/B) VOC	
			<u> </u>		ļ	ļ			<u> </u>	<u> </u>		
			<u> </u>	<u> </u>	<u> </u>	<b> </b>	<u> </u>			<u> </u>		
					<u> </u>	<u> </u>	ļ	<u> </u>				
		<u> </u>		<u> </u>	Ļ	L	<u> </u>	L	<u> </u>	<u> </u>		<u> </u>
Abnormal Cond	itions on Receipt			LAB USE								

### **GEL LABORATORIES LLC**

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### **Certificate of Analysis**

			<u> </u>		JI Alla	<u>11 y 515</u>		D. (T		16.2	2012
								Report I	Date:	May 3	, 2012
	Company :	Sandia N	ational Laborate	ories							
	Address :	MS-0756	5, Org. 06765, B	ldg. 823/Rm. 427	6						
		1515 Eul	oank SE	-							
		Albuque	rque, New Mexi	co 87123							
	Contact:	Ms. Pam	ela M. Puissant								
	Project:	Level C,	Groundwater M	onitoring							
	Client Sample ID:	091990-0	)20			Project	:	SNLSGWate	er		
	Sample ID:	3027150	07			Client l	D:	SNLS003			
	Matrix:	AQUEO	US								
	Collect Date:	16-APR-	12 09:42								
	Receive Date:	17-APR-	12			Client I	Desc.:	CYN-MW6			
	Collector:	Client				Vol. Re	ecv.:				
Parameter	Quali	fier Re	sult	DL	RL	Units	DF	Analyst Date	e Tim	e Batch	Method
Ion Chrom	atogranhy							2			
	019		.d"								
Perchlorate	Perchlorate by IC "A		0731	0.004	0.012	m a/I	1	MAR1 04/27/12	0026	1205390	1
				0.004	0.012	mg/L	1	MAK1 04/2//12	0830	1205590	1
The follow	ving Analytical Meth	ods were p	performed:								
Method	Descri	ption				Anal	yst Co	omments			
		LABOR II									

Metho 1

EPA 314.0 DOE-AL

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### **Certificate of Analysis**

				Certificate o		<u>11 y 515</u>		Report Da	te:	May 3	, 2012
	Company :	Sand	lia National L	aboratories							
	Address :			765, Bldg. 823/Rm. 4276							
			5 Eubank SE								
				v Mexico 87123							
	Contact:		Pamela M. Pu								
	Project:	Leve	el C, Groundw	ater Monitoring							
	Client Sample ID:	0919	91-020			Project:		SNLSGWater			
	Sample ID:	3027	15018			Client II	D:	SNLS003			
	Matrix:	AQU	JEOUS								
	Collect Date:	16-A	PR-12 09:43								
	Receive Date:	17-A	PR-12			Client D	Desc.:	CYN-MW6			
	Collector:	Clie	nt			Vol. Re	cv.:				
Parameter	Quali	fier	Result	DL	RL	Units	DF	Analyst Date	Tim	e Batch	Method
Ion Chrom	atography										
	Perchlorate by IC "	As Red	ceived"								
Perchlorate	10101110111000091201	J	0.00732	0.004	0.012	mg/L	1	MAR1 04/27/12	0934	1205390	1
The follow	ving Analytical Meth	ods w	ere performed	1:							
Method	Descri	ption				Analy	st Co	mments			
1	EPA 31	4.0 DO	E-AL								

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

of 1107

NA Batch No. SMO Use AR/COC 614081 SWMU 68 GW Char Project Name: 4/18/12 Date Samples Shipped: SMO Authorization: Non when SMO Waste Characterization Project/Task Manager: Alicia Aragon Carrier/Waybill No. 140138 SMO Contact Phone: RMMA Project/Task Number: 98026/01.13 SCE Bottle order Lab Contact Edie Kent/803.556.8171 Released by COC No. CF 263-12 Service Order: Lab Destination: GEL Send Report to SMO: <sup>™</sup>Celsius PO 691436 Contract No .: Rita Kavanaugh/505.284.2553 Bill to: Sandia National Laboratories (Accounts Pavable) Tech Area: P.O. Box 5800, MS-0154 Building: Room: **Operational Site:** 202850 Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Sample Preserv-Collection Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 092022 -001 **OBS-MW1** 154 4/18/12 9:24 GW G 3x40ml HCL G 001 SA TCL VOC (SW846-8260B) 092022 -002 OBS-MW1 154 4/18/12 9:30 GW AG 4x1L None G SA TCL SVOC (SW846-8270C) 002 092022 -009 OBS-MW1 154 4/18/12 9:31 GW Ρ 500 mľ HNO3 G SA TAL Metals+U(SW846-6010/6020/7470) 003 092022 -014 OBS-MW1 154 4/18/12 9:33 GW Ρ G 250 ml None SA 004 Hexavalent Chromium (SW846-7196A) 092022 -016 OBS-MW1 154 4/18/12 9:34 GW Р G 125 ml None Anions (SW846-9056) SA 005 302861 092022 -017 OBS-MW1 154 4/18/12 Ρ 9:35 FGW 250 ml HNO3 G SA Cations (SW846-6020) 001 30285 092022 -018 OBS-MW1 154 4/18/12 9:36 Ρ GW 125 ml H2SO4 G SA NPN (353.2) 006 092022 -020 OBS-MW1 154 4/18/12 9:37 GW Ρ 250 ml G None SA Perchlorate (314.0) 007 092022 -022 OBS-MW1 154 4/18/12 Ρ 9:38 GW 500 mÌ None G SA Alkalinity (SM2320B) 008 OBS-MW1 HE (SW846-8321A) 092022 -024 154 4/18/12 9:40 GW AG 4x1L ` None<sup>1</sup> G SA 009 \_ast Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on Validation Reg'd:  $\checkmark$ Yes Date Entered: EDD V Yes No Receipt Yes Background: Entered by: Turnaround Time 7 Day\* 15 Day\* Day Confirmatory: Yes QC inits. Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client ✓ bisposal by Lab PL Team Robert Lynch SNL/4142/844-4013/250-7090 Return Samples By: LUNA Members Gilbert Quintana Hat Selmint. SNL/4142/844-5130/228-0710 Comments: inst Tim Jackson 1414-アウ SNL/4142/284-2547 If perchorate detected, then perform verification analysis using SW846-6850. Report anions (as Br, CI, F, SO4), cations (as Ca, Mg, K, Na), alkalinity (as bicarbonate and carbonate), and gamma spec (short list isotopes) Lab Use .Relinguished by T. Music-Date 4-18-12 Org. 4197 Time 1035 3.Relinguished by Org. Date Time . Received by Org.4/42 Date 4/18/12 Time 1035 Received by Org. Date Time Relinquished by / long Date 4/18/12 Org. 4/42 Time (200 4.Relinguished by Org. Date Time 2. Received by Org. Cel Date 4-16-12 Time 0725 Received by Org. Date Time

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

AOP 95-16

Page 1 of 2

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

												AR/COC	61	4081	
Project Nam	e:	SWMU 68 GW Char	Project/Tas	sk Manag	jer: A	licia Arago	on		Project/Tas	sk No.:	98	026/01.13			
Tech Area:															
Building:		Room:	L	<b>т</b>											Lab use
	-	Comula Location I	) et a il	Depth	Date/T Collec	-	Sample Matrix	Cor Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested		Lab Sample ID
Sample No.		Sample Location I	Jetan	(ft)	ġ	Seraalainines								10)	
092022		OBS-MW1		154	4/18/12	9:42 -	GW	P	250 ml <sup>-</sup>	NaOH	G	SA	Total Cyanide (SW846-90		016
092022	-033	OBS-MW1		154	4/18/12	9:43	GW	Р	1L -	HNO31	G	SA	Gamma Spec (short list)(9	01.0)	011
092022	-034	OBS-MW1		154	4/18/12	9:44	GW	Р	1L -	HNO3"	G	SA	Gross Alpha/Beta (900.0)	ndand with disc defined providence research	012
092022	-035	OBS-MW1		154	4/18/12	9:45 •	GW	Р	1 L-	HNO3-	G	SA	łsotopic U (ASTM D3972-0	9M)	013
092023	-001	OBS-MW1		154	4/18/12	9:24 <sup>-</sup>	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		014
092023	-002	OBS-MW1		154	4/18/12	9:30 -	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270	C)	015
092023	-009	OBS-MW1		154	4/18/12	9:31 ~	GW	Р	500 ml <sup>°</sup>	HNO3	G	DU	TAL Metals + U (SW846-6020	)/7470)	016
V 092023	-014	OBS-MW1	2	154	4/18/12	9:33 <sup>-</sup>	GW	Р	250 ml <sup>-</sup>	None	G	DU	Hexavalent Chromium (SW84	6-719)	017
· 092023	-016	OBS-MW1	1	154	4/18/12	9:34	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)		018
092023	-017	OBS-MW1		154	4/18/12	9:35×	FGW	Р	250 mł	HNO3	G	DU	Cations (SW846-6020)	ange kan der die gescheid stehen	302561
v 092023	-018	OBS-MW1		154	4/18/12	9:36 -	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)		302859
v 092023	-020	OBS-MW1		154	4/18/12	9:37 ·	GW	Р	250 ml <sup>-</sup>	None	G	DU	Perchlorate (314.0)		020
092023	-022	OBS-MW1		154	4/18/12	9:38	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)		021
092023	-024	OBS-MW1		154	4/18/12	9:40	GW	AG	4x1L `	None	G	DU	HE (SW846-8321A)	ana kanana marana mara	022
092023	-027	OBS-MW1		154	4/18/12	9:42	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-90	12)	023
4 092023	-033	OBS-MW1		154	4/18/12	9:43 -	GW	Р	1L -	HNO3 <sup>-</sup>	G	DU	Gamma Spec (short list)(9	01.0)	024
v 092023	-034	OBS-MW1		154	4/18/12	9:44 ~	GW	Р	1 L `	HNO3	G	<sup>"</sup> UD	Gròss Alpha/Beta (900.0)		025
V 092023	-035	OBS-MW1		154	4/18/12	9:45 ·	GW	Р	1L,	нлоз	G	DU	Isotopic U (ASTM D3972-0	)9M)	026
092024	-001	OBS-TB3		N/A	4/18/12	9:24 、	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	)	027
		n menengan penerikan kenangkan penerikan penerikan kenangkan penerikan penerikan penerikan penerikan penerikan			and a state of the part of the		T								
Recipient In	itials	, 14													

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

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### **Certificate of Analysis**

			Certificate		<u>1 y 313</u>		Report D	ate:	May 17	, 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. 427 Iexico 87123 ant	6			-		-	
	Client Sample ID:	092022-020			Project:		SNLSGWate	r		
	Sample ID:	302859007			Client II	D:	SNLS003			
	Matrix:	AQUEOUS								
	Collect Date:	18-APR-12 09:37								
	Receive Date:	19-APR-12			Client D	esc.:	OBS-MW1			
	Collector:	Client			Vol. Rec	ev.:				
Parameter	Quali	fier Result	DL	RL	Units	DF	Analyst Date	Tim	e 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 04/27/12	1110	1205390	1
The follow	ving Analytical Meth	ods were performed:								
Method 1	Descri EPA 31	ption 4.0 DOE-AL			Analy	st Co	omments			· · ·

### **GEL LABORATORIES LLC**

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### **Certificate of Analysis**

			Certificate	UI AIIa	1 <u>y 515</u>		Report Da	te:	May 17	7, 2012
	Company : Address : Contact: Project:	1515 Eubank SI Albuquerque, N Ms. Pamela M.	06765, Bldg. 823/Rm. 42 3 ew Mexico 87123	276						
	Client Sample ID:	092023-020			Project	:	SNLSGWater			
	Sample ID:	302859020			Client I	D:	SNLS003			
	Matrix:	AQUEOUS								
	Collect Date:	18-APR-12 09:3	7							
	Receive Date:	19-APR-12			Client l	Desc.:	OBS-MW1			
	Collector:	Client			Vol. Re	ecv.:				
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 04/27/12	1129	1205390	1
The follow	ving Analytical Meth	ods were perform	ed:							
Method	Descri	ption			Analy	yst Co	omments			
1	EPA 31	4.0 DOE-AL								

EPA 314.0 DOE-AL

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	$\bigcirc$															Pag	e <u>1</u> of <u>2</u>
Batch No.	MA					SMO Use									AR/CO	DC 61	4082
Project Name	2	SWMU 68	GW Char	Date Sample	s Shipped:	4/19/	12	28-54-63	SMO Au	thorization:	am	stigen	rsno		Vaste Characteriza	ition	
Project/Task		and the second	Const. Physical Structures and the State State States.	Carrier/Wayb			9 869	7	SMO Co	ntact Phone	9:	1		1 🗌 F	RMMA		
Project/Task				Lab Contact:		Edie Kent/	803.556.8	171		Seels	Lette O	den			Released by COC I	io.	
Service Orde		CF 0263-		Lab Destinati	on:	GEL			Send Re	port to SMC	D:			1		-	<sup>¶</sup> ⁰ Celsius
				Contract No .:		PO 691430	S			Rita Kava	naugh/50	.284.2553		Bill to: S	andia National Lab	oratories (Acco	ounts Payable),
ech Area:			· · · · · · · · · · · · · · · · · · ·											P.O. Bo	k 5800, MS-0154		
Building:		Room:		Operationa	al Site:									Albuque	rque, NM 87185-0*	154	302948
			annan an a		Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection	Sample		Parameter & M	ethod	Lab
Sample No.	Fraction	San	nple Location D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре		Requested	1	Sample ID
092025	-001	OBS-MW	2		253	4/19/12	9:34 /	GW	G	3x40ml	HCL	G	SA	TCL V	OC (SW846-8	260B)	001
092025	-002	OBS-MW	2		253	4/19/12	9:37 <	GW	AG	4x1L	None	G	SA	TCL S	VOC (SW846-	8270C)	002
092025	-009	OBS-MW	2		253	4/19/12	9:38	GW	<b>Р</b> .	500 ml	HNO3	G	SA	TAL Me	tals+U(SW846-601	0/6020/7470)	003
092025	-014	OBS-MW	2		253	4/19/12	9:39 <sup>7</sup>	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-71964		846-7196A)	004
092025	-016	OBS-MW	2		253	4/19/12	9:40 /	GW	Р	125 ml	None	G	SA	Anion	s (SW846-9056	3)	005
092025	-017	OBS-MW	2		253	4/19/12	9:41 /	FGW	Р	250 ml	HNO3	G	SA	Catior	Cations (SW846-6020)		302,449 001 302948
092025	-018	OBS-MW	2		253	4/19/12	9:427	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)			006
092025	-020	OBS-MW	2		253	4/19/12	9:43 `	GW	Р	250 ml	None	G	SA	Perch	lorate (314.0)	212.8.4.05.00 (P.70)	007
092025	-022	OBS-MW	2		253	4/19/12	9:44 -	GW	Р	500 ml-	None	G	SA	Alkalir	nity (SM2320B)		008
092025	-024	OBS-MW	2		253	4/19/12	9:47	GW	AG	4x1L	None	G	SA	HE (S	W846-8321A)		009
Last Chain	•	Yes			Careford and	Tracking		SMO	Use	Special In	structions		rements:	٦			ditions on Receipt
Validation	Req'd:	Yes	an ang an a the Alasta Charlotter and a second statement of the		Date En					EDD		V Yes		_No 15 Day	* 30 1		(eceipi
Backgroun		Yes	Real Data Reconstruction and the second s	a sea an agus gay an baran an an an an an an	Entered					Turnaroun		<u>7 Da</u>	<u>Y (</u>	15 Day			
Confirmato	ory:	Yes			QC inits.					Negotiated					✓ Disposal by		
Sample	N	ame	Signat	Second and the second	Init.		y/Organizat		e/Cell	Sample Di			n to Clien	[		Lap	
Team	Robert L	ynch	1/ -/ // 0.	<u>n</u>	El.	SNL/4142/8			500 E.o. c.	Return Sa							
Members	Gilbert C	uintana		Tul. a	10-26	SNL/4143/8		0-8524		Comments	5: 115 82	Send report to	Tim Jackson	V4142/MS cci≤p===	0729/284-2547 ( /		
	Tim Jack	son	Tim fielly	,	TA	SNL/4142/2	84-2547	a dia mangana ana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisia		If perchlorate	detected, th	ien perform v	erification a	inalysis u	sing SW846-6850.		
							Report anions (as Br, Cl, F, SO4), cations (as Ca bicarbonate and carbonate), and gamma spectro					a, Mg, K, Na), alkalinity (as		L	ab Use		
.Relinguish	I	T=1-11	L	Org. 7142	Date	4-19-12	Time / d	20	3.Relina	uished by			Org		Date	Tim	9
1. Received				Org. 4/4 2		4/14/12		The second se	3. Recei				Org		Date	Tim	e
1. Received by A D too Crompact 013:1772 === 11/17								Tim	9								
2. Received		h. F	1.	Org. Cel		4-20-10		Contraction of the second s	4. Recei				Org		Date	Tim	9
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\*Prior confirmation with SMO required for 7 and 15 day TAT

Page 55MO 2012-ARCOC (4-2012) 6 of 965

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

														e_2_of_2 4082
Project Nam	e:	SWMU 68 GW Char	Project/Ta	sk Mana	ger:	Alicia Arag	on		Project/Tas	sk No.:	98	026/01.13		
Tech Area:								ann an the second se	L					
Building: Room:									Lab use					
Sample No.	Fraction	Sample Location I	Detail	Depth (ft)	Depth Date/Time Sar (ft) Collected Ma			Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092025	-027	OBS-MW2		253	4/19/12	9:48	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	016 .
092025	-033	OBS-MW2		253	4/19/12	9:49	GW	Р	1L -	HNO3	G	SA	Gamma Spec (short list)(901.0)	011
092025	-034	OBS-MW2		253	4/19/12	9:50 🗸	GW	Ρ.	11	HNO3.	G	SA	Gross Alpha/Beta (900.0)	612 .
r 092025	-035	OBS-MW2		253	4/19/12	9:51 /	GW	P -	1 L/	HNO'3	G	SA	Isotopic Ur (ASTM D3972-09M)	013
092026	-001	OBS-TB4		N/A	4/19/12	9:25 -	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	014 .
092027	-001	OBS-FB1		N/A	4/19/12	9:25 ´	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	015 .
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			WEAK-LOUIS CONTRACTOR			an a	ļ			<u> </u>			n en annañ eta Dagon antenn e ar estar Vezal hande anten e en anten anten anten de se anten anten anten a	
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	l				1	and the second secon		Section 2 Contraction			and the second	the second states and the second	and a state of the state of t	
Recipient In	itials_//	1 <u>K</u>												

AOP 95-16

### **GEL LABORATORIES LLC**

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

### **Certificate of Analysis**

			Certificate of	n Alla	<u>19818</u>	Report Date: May 17, 2012
	Company : Address : Contact: Project:	Sandia National Labo MS-0756, Org. 06763 1515 Eubank SE Albuquerque, New M Ms. Pamela M. Puiss Level C, Groundwate	5, Bldg. 823/Rm. 427 Iexico 87123 ant	6		
	Client Sample ID:	092025-020			Project:	SNLSGWater
	Sample ID:	302948007			Client ID	: SNLS003
	Matrix:	AQUEOUS				
	Collect Date:	19-APR-12 09:43				
	Receive Date:	20-APR-12			Client De	esc.: OBS-MW2
	Collector:	Client			Vol. Recy	<i>v</i> .:
Parameter	Quali	ifier Result	DL	RL	Units	DF Analyst Date Time Batch Method
Ion Chrom	atography					
EPA 314.0	Perchlorate by IC "	As Received"				
Perchlorate		U ND	0.004	0.012	mg/L	1 MAR1 04/27/12 1148 1205390 1
The follow	ving Analytical Meth	nods were performed:				
Method	Descr	iption			Analys	t Comments
1	EPA 31	4.0 DOE-AL				

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

	Batch No.	NA				SMO Use							AR/CC	C 61	4079
I	Project Name	:	SWMU 68 GW Char	Date Samples	Shipped:	4/17/12	an a	SMO Au	thorization:	Jouve	tegun	1500	Waste Characteriza	tion	a man kanananan kanan kananan kanan kanan
	Project/Task I	Manager:	Alicia Aragon	Carrier/Wayb	ili No.	1399	61	SMO Co	ntact Phone	-	and a second				
	Project/Task I		98026/01.13	Lab Contact:		Edie Kent/803.556.8	171						Released by COC N		
	Service Order		CF 263-12	Lab Destination	on:	GEL		Send Re	eport to SMC						4º Celsius
			and and an an an an and an	Contract No .:		PO 691436			Rita Kava	naugh/505	.284.2553		Bill to: Sandia National Labo	oratories (Acco	ounts Payable),
	Tech Area:												P.O. Box 5800, MS-0154		
	Building:		Room:	Operationa	I Site:								Albuquerque, NM 87185-01	54	302788
	Sample No.	Fraction	Sample Location I	Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Co Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Me Requested		Lab Sample ID
V	092018	-001	OBS-MW3		209	4/17/12 9:10 *	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-82	60B)	801
V	092018	-002	OBS-MW3		209	4/17/12 9:12 -	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8	3270C)	002
V	092018	-009	OBS-MW3		209	4/17/12 9:13 <sup></sup>	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010	/6020/7470)	003
V	092018	-014	OBS-MW3	a ya ya ya sa a sa a sa a sa a sa a sa	209	4/17/12 9:14 <	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW8	346-7196A)	004
v	092018	-016	OBS-MW3		209	4/17/12 9:15	GW	Р	125 ml	4C	G	SA	Anions (SW846-9056	)	302797
r	092018	-017	OBS-MW3		209	4/17/12 9:16	FGW	Р	250 ml	HNO3	G	SA	Cations (SW846-602	)(	302788
V	092018	-018	OBS-MW3		209	4/17/12 9:17*	GW	P.	125 ml <sup>-</sup>	H2SO4	G	SA	NPN (353.2)		006
V	092018	-020	OBS-MW3	a an gran ann an tar an tar a stà Allanda	209	4/17/12 9:18 <sup>2</sup>	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)		007
V	092018	-022	OBS-MW3		209	4/17/12 9:19 *	GW	Р	500 ml	4C	G	SA	Alkalinity (SM2320B)		008
V	092018	-024	OBS-MW3	A THE REAL PROPERTY OF A THE REAL PROPERTY OF	209	4/17/12 9:21	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)		009
	Last Chain:		Yes	a second and a second secon		Tracking	SMC	) Use	Special Ins	structions	•	rements:			iditions on
	Validation	Req'd:	✓ Yes		Date En				EDD		✓ Yes	<u> </u>	No		Receipt
	Backgroun	d:	Yes	and the second secon	Entered				Turnaroun		<u>7 Da</u>		15 Day*	ay	
	Confirmato	ry:	Yes		QC inits.	and the second			Negotiated				[/http://www.ithu		
	Sample	N	lame Signa		Init.	Company/Organiza		ie/Cell	Sample Di			n to Client	t sposal by	Lao	
	Team	Robert L	ynch Kally	nch	RL	SNL/4142/844-4013/2			Return Sar						
	Members	Gilbert C	and the second	niluno	Asy	SNL/4143/844-2507/8	50-8524		Comments		Send report to	o Tim Jackson	n/4142/MS 0729/284-2547 Br, CI, F, SOY) End 4/15	12	
		Tim Jack	kson TEA-MI	4-	71	SNL/4142/284-2547			FGW (Filtere	ed in field w/	40 micron filt	er), Anions	(GI,SO4), Cations (Ca,Mg,K,	Na	
				ADMINISTRATING AND ADDRESS OF ADDRESS OF ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRES	· · · · ·				). If perchlora	ate detected	, then perforr	n verificatio			ab Üse
		L		A	L	L (7	10//	2 Police	Alkalinity (tota	ai, dicardona	te,carbonate	Org	Date	 Tim	
	1.Relinquishe		Construction of the second	Org. 7172 Org. 4141		4-17-12 Time / 4/17/12 Time /		3. Rece		//-/		Org		Tim	
		- Care		Org. 414	and the second se	and the second			uished by		ala an	Org	and "	Tim	a na ana ana ana ana ana ana ana ana an
	2.Relinquishe	and the second s	Why the and			4-18-12 Time		4. Rece				Org		Tim	
	2. Received b	, <u>y &lt; </u> ∦	nhe milin	Uld Contract	- Date	F-10-10 Inne (	12	1				3		annan an tao ann an 1990 an 1991 an 1990 an 1991 an 19	

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

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

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Project Name	e:	SWMU 68 GW Char Project	t/Task Manag	er: Alicia Arag	on		Project/Tas	sk No.:	980	026/01.13		
fech Area:												
Building:		Room:				0		Υ	Collection	Sampla	Parameter & Method	Lab u
Sample No.	Croation	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Со Туре	ntainer Volume	Preserv-	Method	Туре	Requested	Sample
092018	-027	OBS-MW3	209	4/17/12 9:22 -	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010
092018	-027	OBS-MW3	209	4/17/12 9:23	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	01
		OBS-MW3	209	4/17/12 9:24	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	01.
092018	-034	OBS-MW3	209	4/17/12 9:25	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	01
092018		OBS-MVV3	200 N/A	4/17/12 9:10	DIW	G	3x40ml	HCL	G	ТВ	VOC (SW846-8260B)	01
092019	-001	UBS-IDI		4/1/12 3.10		<u> </u>						
-94.000						<u> </u>						
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Page 2 of 2 . . . . . .

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

# **Certificate of Analysis**

			Certificate		<u>1 y 515</u>		Rep	ort Da	te:	May 16	, 2012
	Company : Address : Contact:	1515 Eubank SE Albuquerque, New I Ms. Pamela M. Puis	55, Bldg. 823/Rm. 427 Mexico 87123 sant	76							
	Project:	Level C, Groundwat	ter Monitoring								
	Client Sample ID:	092018-020			Projec	t:	SNLSG	Water			
	Sample ID:	302788007			Client	ID:	SNLS00	13			
	Matrix:	AQUEOUS	- 2								
	Collect Date:	17-APR-12 09:18									
	Receive Date:	18-APR-12			Client	Desc.:	OBS-M	W3			
	Collector:	Client			Vol. F	lecv.:					
Parameter	Quali	ifier Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chroma	atography										
	Perchlorate by IC "	As Received"									
Perchlorate	2	U ND	0.004	0.012	mg/L	1	MAR1 04	/27/12	1031	1205390	1
The follow	ving Analytical Meth	ods were performed:									
Method	Descr	iption			Ana	lyst Co	mments				
1	EPA 31	4.0 DOE-AL									

SMO 2012-ARCOC (4-2012)

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internation         MA         SMO Use         ARCOC         614155           Project Train Number         State No.         Topestreame is blacked with the second of the second o			ANAL	YSIS	REQUEST	AND	CHA	IN OF	CUSTO	DDY		Page	1 of AZ	2
Bath No:         Sint/Lie	Internal Lab:	14											Contraction of the second s	-
Product and Managor         Cardinations of the serve of the se	Batch No.:	//1							A	-	<u></u>			
Project/Task Number         geoge 01.12         Conditionat         Longine Momenta/Sec. 43.139         Project/Task Number	Project Name:	SWMU 8/58 GWM		· ····································	and the second s									
Project Bis Name:         Sample         CF28:12         Case Depresence         CP2:01         Sample Number         File Area         Convertex Notice         Sample Number         File Area         Convertex Notice         Sample Number         Presence Color         Convertex Notice         Sample Number         Presence Color         Color State State         Sample Number         Presence Color	Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	138	471		SMO C							
Bernier Order         CF282-12         Lie Dependence         Mail         Dependence         Mail         Dependence         Dependence <td>Project/Task Number:</td> <td>98026.01.12</td> <td>Lab Contact:</td> <td>Edle Ker</td> <td><b>it</b></td> <td></td> <td></td> <td>L</td> <td>orraine Her</td> <td>erra/508-</td> <td>844-3199</td> <td>Released by COC No.</td> <td></td> <td></td>	Project/Task Number:	98026.01.12	Lab Contact:	Edle Ker	<b>it</b>			L	orraine Her	erra/508-	844-3199	Released by COC No.		
Tech Area:         Operational Site:         P.O. Box S800, MS-M154, Abuquerque, F.M. 87185-014           Sample Number         Fraction         Sample Location Detail         DatofTime(hr)         Sample Context         Preserv         Collect Sample         Parameter & Method         Lab.           092291         001         CCBA-MW1         79         4/23/12 0919'         GW         G         3x40 ml         HCL G         SA         TCL VOC (SVM846-8200C)         2 & 32         2 & 32           092291         002         CCBA-MW1         79         4/23/12 0919'         GW         G         3x40 ml         HCL G         SA         TCL VOC (SVM846-8200C)         2 & 32         2 & 32           092291         009         CCBA-MW1         79         4/23/12 0923'         GW         P         500 ml         HN03 G         SA         TAL Mealsh-U(SW846-60100:6207/470)         2 & 32           092291         016         CCBA-MW1         79         4/23/12 0924'         FGW         P         250 ml         HN03 G         SA         Cations (SW846-6020)         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27         3 & 32/27	Service Order:	CF262-12	Lab Destination	GEL			Send F							
Iech Area:         Operational Site:         33337           Building:         Room:         Operational Site:         0 pertuined Stample Location Detail         Operational Site:         Sample Aumber         Sample Aumber Aumber Aumber Aumber Aumber Aumber         Sample Aumber         Sampl			Contract No.	691436					Rita Kavana	augh/505	.284.2553	Bill to: Sandia National Laboratories	(Accounts Paya	able);
Building :         Rom:         Uppertunding intermetting         Deptine the sample intermetting         Sample intermetting         Contrainer         Preservative         Content of the sample intermetting	Tech Area:											P.O. Box 5800, MS-0154; Albuquero	ue, NIVI 67165-	303091
Sample Number         Fraction         Sample Location Detail         Open         Description         Sample Number         Type         Network         <	Building :	Room:	Operational Site:	T	D. C. T					0	Gamela	Darameter & Me		
Sample Number         Plaubin         Database         Dig         4/23/12 0919'         GW         G         3x40 ml         HCL         G         SA         TCL VOC (SW846-8260B)         ØC         ////////////////////////////////////		Exection	Sample Location Detail											
092291         001         CCBA.MW1         /9         4/23/12 0912         GW         G         0A4 min         FCL         GO         FCL	Sample Number	Fraction	Sample Location Detail											A. 1
092291         002         CCBA-MW1         /9         4/23/12 0921         GW         AG         ART         Note         G         GA         Note Sector         Colored Control Generation           092291         009         CCBA-MW1         79         4/23/12 0922         GW         P         500 ml         HN03         G         SA         Anions (SW846-80106020/7470)         C.Ø.3           092291         016         CCBA-MW1         79         4/23/12 0923         GW         P         125 ml         None         G         SA         Anions (SW846-80106020/7470)         C.Ø.3           092291         017         CCBA-MW1         79         4/23/12 0925         GW         P         250 ml         HN03         G         SA         Cations (SW846-6020)         26.6         26.7           092291         018         CCBA-MW1         79         4/23/12 0927         GW         P         250 ml         None         G         SA         Alkalinity (SM2320B)         26.6         26.7           092291         020         CCBA-MW1         79         4/23/12 0927         GW         P         500 ml         None         G         SA         Alkalinity (SM2320B)         26.6         7	092291	001	CCBA-MW1	79	4/23/12 0919'	GW	G	3x40 ml	HCL	G	ISA	ICL VOC (SW846-8260B)		001
0         009         CCBA-MW1         79         4/23/12 0922         GW         P         500 ml         HNO3         G         SA         TAL Metals+U(SW846-6010/60207/470)         GZ 3           0         092291         016         CCBA-MW1         79         4/23/12 0923         GW         P         125 ml         None         G         SA         Anions (SW846-6020)         20.0 4/           092291         017         CCBA-MW1         79         4/23/12 0925         GW         P         250 ml         HNO3         G         SA         Cations (SW846-6020)         20.0 4/           092291         018         CCBA-MW1         79         4/23/12 0926         GW         P         125 ml         H2SO4         G         SA         NPN (353.2)         20.0 4/           092291         020         CCBA-MW1         79         4/23/12 0927         GW         P         500 ml         None         G         SA         Alkalinity (SM2320B)         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/         0.0 5/ </td <td>092291</td> <td>002</td> <td>CCBA-MW1</td> <td>79</td> <td>4/23/12 0921</td> <td>GW</td> <td>AG</td> <td>4x1L</td> <td>None</td> <td>G</td> <td>SA</td> <td>TCL SVOC (SW846-8270C)</td> <td></td> <td>002</td>	092291	002	CCBA-MW1	79	4/23/12 0921	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)		002
092291       016       CCBA-MW1       79       4/23/12 0923       GW       P       125 ml       None       G       SA       Anions (SW846-9056)       26.97         092291       017       CCBA-MW1       79       4/23/12 0924       FGW       P       250 ml       HN03       G       SA       Cations (SW846-9020)       26.97         092291       018       CCBA-MW1       79       4/23/12 0925       GW       P       125 ml       H2SO4       G       SA       NPN (353.2)       26.93         092291       020       CCBA-MW1       79       4/23/12 0925       GW       P       250 ml       None       G       SA       Perchlorate (314.0)       0052         092291       022       CCBA-MW1       79       4/23/12 0927       GW       P       500 ml       None       G       SA       Alkalinity (SM2320B)       62.97         092291       022       CCBA-MW1       79       4/23/12 0926       GW       A for all cyanide (SW846-8012)       60.97         092291       024       CCBA-MW1       79       4/23/12 0926       GW       A for all cyanide (SW846-8012)       60.97         1ast Chain:       Yes       Dize       Dize       Dize		009	CCBA-MW1	79	4/23/12 0922	GW	Ρ	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/60	20/7470)	003
010         010         010         010         0221         010         0221         010         0221         010         0221         010         0221         010         0221         010         0221         010         0221         010         0221         010         0221         010         0221         018         0261         1				79	4/23/12 0923	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)		
092291       017       0CBAHWI       10       Instructions       32 93% / 32 93%	1				4/23/12 0924	FGW	Р	250 ml	ниоз	G	SA	- Cations (SW846-6020)		001
092291         018         CCBA-MW1         79         4/23/12 0925         GW         P         120 mil	092291	017	CCBA-INIVI									·		303091
092291       020       CCBA-MW1       79       4/23/12 0928       GW       P       200 mil       None       G       SA       Alkalinity (SM2320B)       020         092291       022       CCBA-MW1       79       4/23/12 0927       GW       P       500 mil       None       G       SA       Alkalinity (SM2320B)       020       020         092291       024       CCBA-MW1       79       4/23/12 0929       GW       AG       4x1L       None       G       SA       High Explosives (SW846-8321A) Mod.       020 %         092291       027       CCBA-MW1       79       4/23/12 0930       GW       P       250 mil       NaOH       G       SA       Total Cyanide (SW846-9012)       000 %         092291       027       CCBA-MW1       79       4/23/12 0930       GW       P       250 mil       NaOH       G       SA       Total Cyanide (SW846-9012)       000 %       000 %         Uaidation Req'd:       Yes       Sample Tracking       SM0 Use       Special Instructions/QC Requirements: EDD:       Yes       None       Receipt	092291	018	CCBA-MW1	79	4/23/12 0925	GW	<u>Р</u>	125 ml	H2SO4	G	SA	•		
0.92291       022       CCBA-MW1       79       4/23/12 0927       GW       P       000 min       None       G       SA       High Explosives (SW846-8321A) Mod.       023         0.92291       024       CCBA-MW1       79       4/23/12 0929       GW       AG       4x1L       None       G       SA       High Explosives (SW846-8321A) Mod.       023         0.92291       027       CCBA-MW1       79       4/23/12 0930       GW       P       250 ml       NaOH       G       SA       Total Cyanide (SW846-8012)       023       029         Last Chain:       Yes       Sample Tracking       SM0 Use       Special Instructions/QC Requirements:       EDD:       Yes       No       Receipt         Background:       Yes       Oci inits:       Name       Signature       Init       Company/Org/Phone/Cell       Sample Disposal:       Return to Client       Disposal by Lab       Receipt         Sample       William Gibson       Multi	V 092291	020	CCBA-MW1	79	4/23/12 0926	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		
092291       024       CCBA-MW1       /9       4/23/12 0920       GW       AG       4X1L       Nole       O       Ingrespective (concentration of the concentration of the concentratin of the concentratin of the concentratin	V 092291	022	CCBA-MW1	79	4/23/12 0927	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		
092291       027       CCBA-MW1       /9       /4/2.5/12 0330       GW       P       200 min       Match 10       Cequirements:       Abnormal Conditions or         Last Chain:       Yes       Sample Tracking       SM0 Use       Special Instructions/QC Requirements:       No       Receipt       Receipt <t< td=""><td>092291</td><td>024</td><td>CCBA-MW1</td><td>79</td><td>4/23/12 0929</td><td>GW</td><td>AG</td><td>4x1L</td><td>None</td><td>G</td><td>SA</td><td>High Explosives (SW846-8</td><td>321A) Mod.</td><td></td></t<>	092291	024	CCBA-MW1	79	4/23/12 0929	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8	321A) Mod.	
Last Chain:       Yes       Sample Tracking       SMO Use       Special Instructions/QC Requirements:       Abnormal Conditions or         Validation Req'd:       Yes       Date Entered       EDD:       Yes       No       Receipt       Receipt         Background:       Yes       Entered by:       Turnaround Time:       7 Day*       15 Day *       30 Day       Receipt         Background:       Yes       QC inits:       Negotiated TAT:	V 092291	027	CCBA-MW1	79	4/23/12 0930	GW	Р							
Validation Req'd:       Yes       Yes       No       Interest by:       Turnaround Time:       7 Day*       15 Day *       30 Day         Background:       Yes       Yes       QC inits:       Negotiated TAT:       Image: Confirmatory:       Yes       Image: Confirmatory:       Yes				Sampl	e Tracking	SMO U	SE		nstruction	ns/QC F	Requiren	nents:		
Background:       Yes       Entered by:       Turnaround Time:       7 Day*       15 Day       0 30 Day         Confirmatory:       Yes       QC inits:       Negotiated TAT:		: 🗸 Yes		Date E	ntered						Contraction of the local division of the loc		1100	Jeipe
Continuatory:       Ites       Signature       Init.       Company/Org/Phone/Cell       Sample Disposal:       Return to Client       Disposal by Lab         Name       Signature       Init.       Company/Org/Phone/Cell       Sample Disposal:       Return to Client       Disposal by Lab         Sample       William Gibson       William Gibson       William Gibson       William Gibson       SNL/4142/844-4013/239-7367       Return Samples By:         Team       Robert Lynch       William Gibson       William Gibson       William Gibson       SNL/4142/844-4013/250-7090       Comments:         Members       Alfred Santillanes       Alfred Santillanes       Mathematication       Mathematication       SNL/4142/844-5130/228-0710       If perchlorate detected, then perform verification analysis using SW846-6850.       Report anions (as Br,Cl,F,SO4), cations (as Ca,Mg,K,Na), alkalinity (as bicarbonate), and gamma spec (short list).       Lab Use         1       Pelinguished by       Org.       Org.       Org.       Time	Background:	Yes		Entere	d by:			+1			7 Day*	<u>15 Day</u> <u>30 Day</u>		
Name       Signature       Init.       Company/Org/Hole/ceit       Stample Dispession       Init.       Init.       Stample Dispession       Init.       Init.       Init.       Init.       Init.       Init.       Init.       Init.       Init.	Confirmatory:	Yes		QC Init	and the standard sector in the standard sector is a standard sector in the standard sector is a standard sector in the standard sector is a standard se							Disposal by Lab		
Sample       William Closen       William Close		Name	Signature	Init.	2	Contraction of the local division of the loc				Survey 1	eturn to C	Client Disposar by Lab		
Induction analysis       Construction	Sample	William Gibson	Willing Aitop	Jug						sy:				
Members       Alfred Santillanes       # Junt Med. T	Team	Robert Lynch						If perchlora	te detected	l, then pe	rform verif	ication analysis using SW846-6850.		
*Please list as separate report.     Labitse       1 Polinguished by     Org. 4/42     Date 4/23/12 Time/8     3. Relinquished by     Org. Date     Time	Members	Alfred Santillanes	Helper Fint The	_ A	SNL/4142/844	5130/2	28-071	Report ani	ons (as Br,C	CI, F, SO4)	, cations (	as Ca,Mg,K,Na), alkalinity (as		
1 Polinguished by Alla Salle Org. 4/42 Date 4/23/12 Time/8 3. Relinquished by Org. Date Time								bicarbonat					Lat	o Use
1 Palinguished by Alas Sciller Org. 4/72 Date //3//2 Hild O D. Reinguished by		11.	na linto		All rate Timell	D	2 P	elinquished		. 1131 43	Joparat		Tim	ie
		y ft god Sale		Date	1/25/12 1111R/	0	_					Org. Date	Tim	ie
1. Received by a grand org. The ball of the transformer of the ball of the bal	-A	1gandy	Urg. 4/4 2	Date	1/12/12 Time	200					C. CONTROLLED CONTROL OF		Tim	ie
2. Received by Why John Org. Cen Date 4.24 Time 0.740 4. Received by Org. Date Time		y contract										Org. Date	Tim	ie

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

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AOP 95-16

Recipient Initials\_\_\_\_\_

Page 2 of 2

# CONTRACT LABORATORY Analysis Request And Chain Of Custody (Continuation)

ARCOC-614155 Project Name: SWMU 8/58 GWM Project/Task Manager: Alicia Aragon Project/Task No.: 98026.01.12 Tech Area: Room: Building: Lab use Date/Time(hr) Sample Container Collect Sample Parameter & Method Lab Preser-Sample Number Fraction Sample Location Detail Depth (ft) Collected Matrix Vol vative Method Туре Requested Sample Id Type **Н**NO3 010 092291 033 CCBA-MW1 79 4/23/12 0932 GW Ρ 1L \* G SA Gamma Spec (short list)(901.0) 092291 79 4/23/12 0933 GW Ρ 1L-HNO3 G SA Gross Alpha/Beta (900.0) 011 034 CCBA-MW1 012 Ρ 092291 035 CCBA-MW1 79 4/23/12 0934 GW 1L HNO3 G SA Isotopic U (ASTM D3972-09M) <u>c 13</u> 092292 CCBA-TB1 4/23/12 0919 G 3x40 ml HCL G TCL VOC (SW846-8260B) 001 DIW TΒ na 014 G 4/23/12 0909 G 3x40 ml HCL FB TCL VOC (SW846-8260B) 092293 001 CCBA-FB1 DIW na

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## **GEL LABORATORIES LLC**

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# **Certificate of Analysis**

Report Date: May 23, 2012 Sandia National Laboratories Company : MS-0756, Org. 06765, Bldg. 823/Rm. 4276 Address : 1515 Eubank SE Albuquerque, New Mexico 87123 Ms. Pamela M. Puissant Contact: Project: Level C, Groundwater Monitoring Client Sample ID: 092291-020 Project: **SNLSGWater** Client ID: SNLS003 Sample ID: 303091006 AQUEOUS Matrix: 23-APR-12 09:26 Collect Date: Client Desc.: CCBA-MW1 Receive Date: 24-APR-12 Vol. Recv.: Collector: Client Qualifier Result RL Units DF Analyst Date Time Batch Method DL Parameter Ion Chromatography EPA 314.0 Perchlorate by IC "As Received" 0.012 1 MAR1 04/27/12 1324 1207232 1 mg/L 0.004 ND Perchlorate U The following Analytical Methods were performed: Description Analyst Comments Method EPA 314.0 DOE-AL

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1

SMO 2012-ARCOC (4-2012)

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab:												Pa	<u>ge 1 of 1</u>	
Batch No.: NA	5				SMO Use					2		ARCOC	614157	
Project Name:	SWMU 8/58 GWM		Date Samples Shipped:	In the local division of the local divisiono	27112			Authorization.				Waste Characterization	nakal kawana na gawa ka Shakin Gulara Mila Ar	
Project/Task Manager:	Alicia Aragon		Carrier/Waybill No.	140	209		SMO (	Contact Phon	e: see Bo	stle 0	June -			
Project/Task Number:	98026.01.12		Lab Contact:	Edie Ker	nt				Lorraine He			Released by COC No.		
Service Order:	CF262-12		Lab Destination:	GEL			Send I	Report to SM	0:					4° Celsius
			Contract No .:	691436			]		Rita Kavan	augh/505	.284.2553	Bill to: Sandia National Laboratorie	and provide a state of the stat	
Tech Area:	Deam		On a retire net Cite.									P.O. Box 5800, MS-0154; Albuque	rque, NM 87185	5-0154
Building :	Room:		Operational Site:		Date/Time(hr)	1			T					303091
Sample Number	Fraction	Samp	le Location Detail	Depth (ft)	Collected	Sample Matrix	Sector sector	ontainer Vol	Preser- vative	Collect Method		Parameter & N Requeste		Lab Sample Id
			and a second an			ł	1	1				ricqueste		1
092296	001	CCBA-MV	V2	117	4-24-12/0938	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	den management of the state of the	028
V 092296	002	ССВА-МИ	12	117	4-24-12/0940	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-82700	~	029
					;					<u> </u>	<u> </u>	102 0100 (011040-02700	<i>/</i> /	1000/
092296	009	CCBA-MV	V2	117	4-24-12/0944	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6	020/7470)	030
092296	016	ССВА-МИ	12	117	4-24-12/0946	GW	P	125 ml	None	G	SA	Anions (SW846-9056)		031
7				1			<u>.</u>					///////////////////////////////////////	**************************************	303092
092296	017	CCBA-MV	V2	117	4-24-12/0947	FGW	Р	250 ml	HNO3	G	SA	Cations (SW846-6020)		003
092296	018	ССВА-МИ	10	117	4-24-12/0949	GW	P	125 ml	H2SO4	G	SA	NDN (252.2)		303091
1032230			۶ <u>۲</u>			1	<u> </u>	123 111	112004	<u> </u>	04	NPN (353.2)	19 Marco da esta program anter micros	032
092296	020	CCBA-MV	V2	117	4-24-12/0950	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		033
092296	022	ССВА-МИ	V2	117	4-24-12/0951.	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		034
V 092296	024	ССВА-МУ	V2	117	4-24-12/0952	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8	321A) Mod.	035
092296	027	ССВА-МУ	V2	117	4-24-12/0956	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-901	12)	036
Last Chain:	Yes		na na mangana mangana mangana ng kanang na	Sample	Tracking	SMO Us	se	Special In	struction				Abnormal Co	
Validation Req'd:	🗸 Yes			Date En	tered:			EDD:		Yes	✓ No		Rec	
Background:	Yes		an a start with the start of the	Entered	by:			Turnarou	nd Time:		<u>'Day*</u>	<b>15 Day</b> *   ✓ 30 Day		
Confirmatory:	Yes			QC inits	:			Negotiate	d TAT:					
	Name	0.117	Signature	Init.	Company/Org			Sample D		- trestout	urn to Cl	ient 🗹 Disposal by Lab		
Sample	William Gibson	(Millin)	Lell.	WIX 1722	SNL/4142/844-4			+	the second se	/:		ana an		
Team	Robert Lynch	Vite	Mich	9/	SNL/4142/844-4					then perfe	orm verific	ation analysis using SW846-6850.		
Members	Alfred Santillanes	1			SNL/4142/844-	3130/220	5-0710	Report anior	ns (as Br,Cl	,F,SO4), (	cations (as	s Ca,Mg,K,Na), alkalinity (as		
7		_		+				bicarbonate				bec (short list).	Lab	
1. Relinguished by	Thisting.	<u>\$</u>	Org. 4/47	Date	//21/12 Time / 0	045	3 Ro	I linguished I	*Please	iist as s	eparate	Org. Date	Lab Time	
1. Received by	my man pr	SA -	Org. 4147	A TAXABLE IN CONTRACTOR OF TAXABLE	12/12 Time / 2	And in case of the local division in the loc		ceived by	<i></i>			Org. Date	Time	
2. Relinquished by	Donplater	ant	Org.4142		4/24/12 Time /		+	linguished t	зу	*******		Org. Date	Time	
2. Received by					1-25-12 Time C	730	4. Re	ceived by		• - uri un ante di esta gante a.		Org. Date	Time	

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

# CONTRACT LABORATORY Analysis Request And Chain Of Custody (Continuation)

ARCOC- 614157

<u> </u>	T						1				ARCOC- 614	<u>4157</u>
Project Name:	SWMU 8/58 GWM	Project/Ta	sk Manager:	Alicia Aragon	1, (an are and a second		Project/Ta	ask No.:	98026.01	.12		
Tech Area:												
Building:	Room:		1	Date/Time(hr)	Sample		ntainer	Г	Collect	<u>la</u> .		Lab use
Sample Number	Fraction	Sample Location Detail	Depth (ft)	Collected	Matrix	Туре	Vol	Preser- vative	Method	Sample Type	Parameter & Method Requested	Lab Sample Id
092296	033	CCBA-MW2	117	4-24-12/0957	GW	Р	1L	HNO3	G	SA	Gamma Spec (short list)(901.0)	037
092296	034	CCBA-MW2	117	4-24-12 /0959.	GW	Р	1L	HNO3	G	SA	Gross Alpha/Beta (900.0)	033
092296	035	CCBA-MW2	117	4-24-12/1000.	GW	Р	1L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	037
092297	001	CCBA-MW2	117	4-24-12/0938-	GW	G	3x40 mi	. HCL	G	DU	· TCL VOC (SW846-8260B)	040
092297	002	CCBA-MW2	117	4-24-12/0940	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	041
092297	009	CCBA-MW2	117	4-24-12/0944.	GW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	042
092297	016	CCBA-MW2	117	4-24-12/0946	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	043
<u>لا 092297</u>	017	CCBA-MW2	117	4-24-12/0947	FGW	Р	250 ml	HNO3	G	DU	Cations (SW846-6020)	303092
092297	018	CCBA-MW2	117 -	4-24-12/0949	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	303091
092297	020	CCBA-MW2	117	4-24-12/0950.	GW	Р	250 ml	None	G	DU	Perchlorate (314.0)	045
092297	022	CCBA-MW2	117	4-24-12/095/·	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	046
ú 092297	024	CCBA-MW2	117	4-24-12/0952	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A) Mod.	047
092297	027	CCBA-MW2	117	4-24-12/0956	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	048
092297	033	CCBA-MW2	117	4-24-12/0957	GW	Р	1L	HNO3	G	DU	Gamma Spec (short list)(901.0)	049
092297	034	CCBA-MW2	117	4-24-12/0959	GW	Р	1L	HNO3	G	DU	Gross Alpha/Beta (900.0)	050
092297	035	CCBA-MW2	117	4-24-12/1000	GW	Р	11L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	031
092298	001	CCBA-TB3	na	4-24-12/0938-	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	052
Recipient li	ANC											
recipienti	muaio 11											

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# **Certificate of Analysis**

			Certificate	01 Alla	<u>1y 515</u>		Report Da	te: May 23	3, 2012
	Company : Address :	1515 Eubank SE	)6765, Bldg. 823/Rm. 42	76			۴		
	Contact:	Ms. Pamela M. I							
	Project:		water Monitoring		Project:	<b>C1</b>	NLSGWater		
	Client Sample ID: Sample ID:	092296-020 303091033			Client II		NLS003		
	Matrix: Collect Date:	AQUEOUS 24-APR-12 09:5	0						
	Receive Date:	25-APR-12					CBA-MW2		
	Collector:	Client			Vol. Red	ev.:			
				, Wa					
Parameter	Quali	ifier Result	DL	RL	Units	DF Ar	alyst Date	Time Batch	Method
Ion Chroma	atography								
	Perchlorate by IC "				-				
Perchlorate		U ND	0.004	0.012	mg/L	1 M.	AR1 04/27/12	1440 1207232	1
The follow	ving Analytical Meth	nods were perform	ed:		-				
Method	Descr	iption			Analy	st Comn	nents		
1	EPA 31	4.0 DOE-AL							

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# **Certificate of Analysis**

				uncate	UI AIIA	1 9 515		Report Da	ate: May	y 23, 20	012
	Company : Address : Contact:	MS-0756, O 1515 Eubanl	, New Mexico 8	823/Rm. 42′	76						
	Project:	Level C, Gro	undwater Monit	oring							
	Client Sample ID:	092297-020				Projec	t:	SNLSGWater			
	Sample ID:	303091045				Client	ID:	SNLS003			1
	Matrix:	AQUEOUS									
	Collect Date:	24-APR-12 (	9:50								
	Receive Date:	25-APR-12				Client	Desc.:	CCBA-MW2			
	Collector:	Client				Vol. R	ecv.:				
Parameter	Quali	fier Result		DL	RL	Units	DF	Analyst Date	Time Ba	itch M	ethod
Ion Chroma	atography										
	Perchlorate by IC "A	As Received"									
Perchlorate		U NI	i i i i i i i i i i i i i i i i i i i	0.004	0.012	mg/L	1	MAR1 04/27/12	1459 1207	232	1
The follow	ving Analytical Meth	ods were perf	ormed:								
Method 1	Descri EPA 31	ption 4.0 DOE-AL				Ana	lyst Cc	omments			

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab NA Page 1 of 1 Batch No. SMO Use 614254 AR/COC Project Name: SWMU 149 GWM 6/18/12 Date Samples Shipped: SMO Authorization: Waste Characterization Project/Task Manager: Clinton Lum 142743 Carrier/Waybill No. SMO Contact Phone: Sec Bille 0-RMMA Project/Task Number: 98026.01.14 Edie Kent/803-556-8171 Lab Contact: Lorraine Herrera/505-844-3199 Г Released by COC No. Service Order: CF250-12 GEL Lab Destination: Send Report to SMO: ✓ 4° Celsius PO 691436 Contract No.: Rita Kavanaugh/505-284-2553 Bill to:Sandia National Laboratories (Accounts Payable), Tech Area: P.O. Box 5800, MS-0154 Building: Room: Operational Site: 30631 Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Collection Preserv Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Туре Requested Sample ID 092535 -0011 CTF-MW3 359 6/16/12 9:32 G 3x40 mL GW HCL G SA TCL VOC (SW846-8260B) 001 092535 -009 CTF-MW3 359 6/16/12 9:33 GW Р 500 mL HNO3 G SA TAL Metals (SW846-6010/6020/7470 002 306315 092535 -010 -CTF-MW3 359 6/16/12 9:34 FGW Ρ 500 mL G HNO3 SA TAL Metals (SW846-6010/6020/7470 001 306314 092535 -016 < CTF-MW3 359 6/16/12 9:35 GW Ρ 125 mL 4C G SA Anions (SW846-9056) 003 092535 -018~ CTF-MW3 359 6/16/12 9:36 GW Ρ 125 mL H2SO4 G NPN (EPA 353.2) SA 004 092535 -020 / CTF-MW3 359 6/16/12 9:37~ Р G Perchlorate (EPA 314.0) GW 250 mL 4C SA 005 092535 -022 / CTF-MW3 359 6/16/12 9:38 GW Ρ 500 mL 4C G SA Alkalinity (SM2320B) 006 092536 -001 / łSWMU 149-TB1 6/16/12 9:32 DIW G 3x40 mL HCL G 007 na TB TCL VOC (SW846-8260B) Last Chain: V Yes Sample Tracking Special Instructions/QC Requirements: SMO Use Conditions on Validation Reg'd: ✓ Yes Date Entered: FDD V Yes No Receipt Background: Yes Entered by: Turnaround Time 7 Day\* 15 Day\* Dav Confirmatory: Yes QC inits. Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Visposal by Lab LINCh AL Robert Lynch Team SNL/4142/505-844-4013/505-250-7090 Return Samples By: Hul // SNL/4142/505-844-5130/505-228-0710 Alfred Santillanes Members Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Bill Gibson Vil SNL/4142/505-284-3307/505-239-7367 If perchlorate detected, then perform verification analysis using method SW846-6850M. Report anions (as Br.CI,F.SO4) and alkalinity (as total as CACO3, HCO3, and CO3) Lab Use Org. 4/42 Date 6 17 Time 0920 3. Relinquished by .Relinguished by Soult Org. Date Time . Received by 1 an Org. 4/42 Date Time 0920 3. Received by Org. Date Time Relinguished by Org.24142 Date 6/18/12 12 Time 1100 4.Relinguished by Org Date Time . Received by -Org. 1sel Date 6-19-12 Time 0800 4. Received by Org. Date Time

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

of 783

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

# **Certificate of Analysis**

				meate	UI AIIa	1 9 515		Report Da	ate: July l	3, 2012
	Company : Address :	MS-0756, Or 1515 Eubank Albuquerque	New Mexico 871		76					
	Contact: Project:	Ms. Pamela M	4. Puissant undwater Monitori	ing						
	Client Sample ID:	092535-020				Projec	:t:	SNLSGWater		
	Sample ID:	306314005				Client		SNLS003		
	Matrix:	AQUEOUS								
	Collect Date:	16-JUN-12 0	9:37							
	Receive Date:	19-JUN-12				Client	Desc.:	CTF-MW3		
	Collector:	Client				Vol. R	lecv.:			
Parameter	Quali	fier Result		DL	RL	Units	DF	Analyst Date	Time Bate	h Method
Ion Chrom	atography				112		~ .	Thay of Date	Third Build	in method
	Perchlorate by IC "A	As Received"								
Perchlorate		U ND	0	0.004	0.012	mg/L	1	MAR1 06/22/12	1610 1223673	3 1
The follow	ving Analytical Meth	ods were perfo	rmed:							
Method 1	Descri EPA 31	ption 4.0 DOE-AL				Ana	lyst Co	mments		

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

6	Internal Lab	NA															Page	∋_1_of_2_
	Batch No.	295					SMO Use									AR/COC	61	4255
	Project Name	:	SWMU 154	4 GWM	Date Sample	s Shipped:	6/19/	12		SMO AL	thorization:	Done	tere	ant		aste Characterization		
	Project/Task I	Manager:	Clinton Lu	ım	Carrier/Wayb	ill No.	1403		The second s		ontact Phone			en		MMA		
	Project/Task I	Number:	98026.01.	.15	Lab Contact:		Edie Kent/	803-556-8					-844-3199			eleased by COC No.		
	Service Order	:	CF251-12	2	Lab Destinati	on:	GEL			Send Re	eport to SMC	):		940 W. H. BAN, G. H. Y. H. H. Y.			[-	Celsius
					Contract No .:		PO 69143	6	in de la compañía de Compañía de la compañía		Rita Kava	naugh/505	-284-2553		Bill to:Sar	ndia National Laboratorie	s (Accou	nts Payable),
	Tech Area:														P.O. Box	5800, MS-0154		
	Building:		Room:		Operationa	al Site:									Albuquer	que, NM 87185-0154		
						Depth	Date/	Time	Sample	Co	ontainer	Preserv-	Collection	Sample		Parameter & Method	i	Lab
	Sample No.	Fraction	San	nple Location D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
-	09253B	-001	CTF-MW2	2		129	6/19/12	9:28 -	GW	G	3x40 mL	HCL	G	SA	TCL V	DC (SW846-8260B	)	306356
¥	09253 <b>B</b>	-002 `	CTF-MW2	2		129	6/19/12	9:30	GW	AG	4x1 L	4C	G	SA	TCL SV	/OC (SW846-8270	C)	306356
~	09253B	-009	CTF-MW2	2		129	6/19/12	9:31 -	GW	Ρ	500 mL	HNO3	G	SA	TAL Meta	ils+U(SW846-6010/6020	)/7470)	306356
<b>9</b> ~	09253B	-010*	CTF-MW2	2		129	6/19/12	9:32	FGW	Р	500 mL	HNO3	G	SA	TAL Meta	als+U(SW846-6010/6020	)/7470)	306364
K	09253B	-016	CTF-MW2	2		129	6/19/12	9:33	GW	Р	125 mL	4C	G	SA	1	(SW846-9056)		306356
r	09253B	-018 -	CTF-MW2	2		129	6/19/12	9:34*	GW	Р	125 mL	H2SO4	G	SA	1	EPA 353.2)	nanana menanahir 1995 da	306356
-	09253Đ	-020	CTF-MW2	2		129	6/19/12	9:35*	GW	Р	250 mL	4C	G	SA	•	orate (EPA 314.0)		306356
r	09253 <b>7</b> 8	-022 °	CTF-MW2	2		129	6/19/12	9:36	GW	Р	500 mL	4C	G	SA	1	ty (SM2320B)		306356
r	09253B	-024 1	CTF-MW2			129	6/19/12	9:38~	GW	AG	4x1 L	4C	G	SA	1.	xplosives (SW846-	 8321A)	306356
V	09253B	-033	CTF-MW2		n an an the state and a state of the	129	6/19/12	9:39	GW	P	1 L	HNO3	G	SA		Spectroscopy (EPA		306356
	Last Chain:		V Yes			Sample	Tracking	. Autor Bel	1	Use	Special Ins	<u>د</u>	QC Requi		1			ditions on
	Validation I		✓ Yes	<b>₩₩₽₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩</b>		Date En	생활 수 있는 것이 집에 없다.				EDD		✓ Yes	٦	lo			eceipt
	Backgroun		Yes		antara constructivadore de constructivado en e construit de	Entered	by:				Turnaroun	d Time	7 Da	y*	5 Day*	3√⊅ay		
	Confirmato		Yes			QC inits.	Seconda				Negotiated	TAT						
	Sample	N	ame	Signatu	ure,	Init.	Compan	y/Organizat	ion/Phone	e/Cell	Sample Dis	sposal	Retur	n to Client		✓isposal by Lab		
	•	William (	Gibson /	111les 21	lA '	UNK	SNL/4142/5	05-284-330	7/505-23	9-7367	Return Sar	nples By:	******	fleit das i mondationes and pilot				
	Members	Alfred Sa	Intillanes	Allaber	De-	at	SNL/4142/5	05-844-513	0/505-22	8-0710	Comments	:	Send report to	Tim Jacksor	v/4142/MS 0	729/284-2547		
		Robert L	ynch	Eathing	h	RL	SNL/4142/5	05-844-401	3/505-25	0-7090	1							
																ng method SW846- as CACO3, HCO3, and		
		Δ							M		CO3), and ga					13 CACCO, 11000, and	La	ab Use
	1.Relinquishe	d by /-/4	Agel S.	alill	-Org. 4/4	ノ Date	6/19/1	Z Time /	007	3.Relind	uished by			Org.		Date	Time	,
	1. Received b	y KG	nille	my	Org. 4/4	2 Date	6/19/10	2 Time /	:007	3. Rece	ived by			Org.		Date	Time	)
	2.Relinquishe	d by De	narch	infligh	Org.4/4	2 Date	6/17/12	Time 🖊	130	4.Relind	uished by			Org.		Date	Time	;
	2. Received b	y Z	plant.	nlen	Org. Gel	<ul> <li>Date</li> </ul>	6-20-12	Time c	740	4. Rece	ived by	, ,		Org.		Date	Time	;
	*Prior confin	nation w	ith SMO re	quired for 7 and	15 day TAT				1									And a second sec

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

Page800 2012-ARCOC (4-2012) 6 of 11176

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

	j.	26.01.15	980	k No.:	Project/Tas		<u>n</u>	Clinton Lur	ger:	ask Mana	Project/Ta	SWMU 154 GWM	e:	Project Nam Tech Area:
												Room:		Building:
Lab use			·			-			Dete	Danth		Room:		building:
Lab Sample I	Parameter & Method Requested	Sample Type	Collection Method	Preserv- ative	ntainer Volume	Со Туре	Sample Matrix	Time ected		Depth (ft)	1 Detail	n Sample Location	Fraction	Sample No.
306350	Gross Alpha/Beta (EPA 900.0)	SA	G	HNO3	1 L	Р	GW	9:41	6/19/12	129		CTF-MW2	-034 *	09253중
30635	Isotopic Uranium(ASTM D3972-09M)		G	HNO3	1 L	Р	GW	9:42	6/19/12	129		CTF-MW2	-035 *	09253 වි
) 30635 011 306351 012	TCL VOC (SW846-8260B)		G	HCL	3x40 mĹ	G	DIW	9:28 *	6/19/12	na		SWMU 154-TB1 -	-001	092538- 092539
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# **GEL LABORATORIES LLC**

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# **Certificate of Analysis**

	Company : Address : Contact: Project:	1515 Eubank S Albuquerque, I Ms. Pamela M	06765, Bldg. 823/Rm. E New Mexico 87123	4276			Rej	port Da	ite:	July 13	, 2012
	Client Sample ID:	092538-020			Projec	et:	SNLSG	Water			
	Sample ID:	306356006			Client	ID:	SNLS0	03			
	Matrix:	AQUEOUS									
	Collect Date:	19-JUN-12 09:	35								
	Receive Date:	20-JUN-12			Client	Desc.	CTF-M	W2			
	Collector:	Client			Vol. F	lecv.:					
Parameter	Quali	fier Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chrom	atography										
EPA 314.0	Perchlorate by IC "A	As Received"									
Perchlorate		U ND	0.004	0.012	mg/L	1	MAR1 0	5/22/12	1708	1223673	1
The follow	ving Analytical Meth	ods were perform	med:								
Method 1	Descri EPA 31	ption 4.0 DOE-AL			Ana	lyst Co	omments				

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



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

Memorandum

Date: May 31, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: Burn Site GWM AR/COC: 614071 SDG: 302715 Laboratory: GEL Project/Task: 146422.10.11.01 Analysis: General Chemistry

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

#### Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA314.0 (Perchlorate), EPA9056 (Anions), and EPA353.2 (nitrate/nitrite as nitrogen). Data were reported for all required analytes. No problems were identified with the data package that result in the qualification of data.

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

#### **Holding Times and Preservation**

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

#### **Calibration**

The initial and continuing calibrations met all QC acceptance criteria.

#### **Blanks**

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

#### Anions:

Chloride was detected in EB sample 302619-001 from COC 614070 associated with the samples in this SDG . All associated sample results were >5X the blank concentration and, therefore, 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.

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

#### Anions:

The samples were diluted 10X for chloride & sulfate and 50X for nitrate/nitrite due to high concentrations. 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 this COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by**: Marcia Hilchey

Date: 06/01/12





## AR/COC: 614071

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RO	2		
	091990-035/CYN-MW6	Uranium-235/236 (13982-70-2)	J, FR7
	091991-035/CYN-MW6	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	091990-034/CYN-MW6	ALPHA (12587-46-1)	J, FR7
	091990-034/CYN-MW6	BETA (12587-47-2)	NJ+, FR7, B2
	091991-034/CYN-MW6	ALPHA (12587-46-1)	J, FR7
	091991-034/CYN-MW6	BETA (12587-47-2)	BD, FR7
EPA 901.1			
	091990-033/CYN-MW6	Americium-241 (14596-10-2)	BD, FR3
	091990-033/CYN-MW6	Cesium-137 (10045-97-3)	BD, FR3
	091990-033/CYN-MW6	Cobalt-60 (10198-40-0)	BD, FR3
	091990-033/CYN-MW6	Potassium-40 (13966-00-2)	BD, FR3
	091991-033/CYN-MW6	Americium-241 (14596-10-2)	BD, FR3
	091991-033/CYN-MW6	Cesium-137 (10045-97-3)	BD, FR3
	091991-033/CYN-MW6	Cobalt-60 (10198-40-0)	BD, FR3
	091991-033/CYN-MW6	Potassium-40 (13966-00-2)	R, Z2
EPA 906.0 Modified			
	091990-036/CYN-MW6	Tritium (10028-17-8)	BD, FR3
	091991-036/CYN-MW6	Tritium (10028-17-8)	BD, BR3
SW846 7470A			
	091990-010/CYN-MW6	Mercury (7439-97-6)	UJ, B4
	091991-010/CYN-MW6	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	091995-001/CYN-FB3	Bromodichloromethane (75-27-4)	1.0U, B2
	091995-001/CYN-FB3	Chloroform (67-66-3)	6.4U, B2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091995-001/CYN-FB3	Dibromochloromethane (124-48-1)	1.0U, B2

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



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

Memorandum

Date: June 17, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614079, 614080 SDG: 302948 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), EPA314.0 (Perchlorate), EPA9056 (Anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA7196A (Cr+6), 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 > but < 3X the MDL. Also, Total CN was detected in the ICB and CCB at negative concentrations with absolute values > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, I5, B4**.

#### Anions:

1. The ICAL intercept for chloride was > the MDL. The associated result of sample 302788-019 was a detect <3X the intercept and, therefore, will be **qualified J+, I5** 

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

#### **Holding Times and Preservation**

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

#### **Calibration**

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 not qualified above in the Summary section were all either ND or >3X the intercept and, therefore, will not be qualified.

#### **Blanks**

No target analytes were detected in any of the blanks except as noted above in the Summary section and the following. In the EB, chloride was detected. However, this EB is associated with samples in another data package (COC 614081) and should not be applied to samples in this SDG.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

#### Anions, Perchlorate:

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, Perchlorate:

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. No samples were diluted with the following exceptions.

#### Anions & Nitrate/Nitrite as Nitrogen:

Sample 302788-005 was diluted 5X for chloride & sulfate, and sample -006 was diluted 10X for nitrate/nitrite as nitrogen due to high concentrations or matrix interference. All associated matrix QC samples were analyzed at relative dilution factors  $\leq$ 5X those of the samples.

#### Other QC

One EB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.





## AR/COC: 614079, 614080

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	092020-035/OBS-EB1	Uranium-233/234 (N/A)	BD, FR3
	092020-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092020-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	092018-034/OBS-MW3	BETA (12587-47-2)	J, FR7
	092020-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	092020-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	092018-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	092018-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	092018-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	092018-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	092020-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	092020-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092020-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092020-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092018-009/OBS-MW3	Chromium (7440-47-3)	0.0109U, B
	092018-009/OBS-MW3	Magnesium (7439-95-4)	J, D1
	092018-017/OBS-MW3	Magnesium (7439-95-4)	J, D1
	092020-009/OBS-EB1	Calcium (7440-70-2)	0.3025U, B
	092020-009/OBS-EB1	Chromium (7440-47-3)	0.0109U, B
	092020-017/OBS-EB1	Calcium (7440-70-2)	0.3025U, B
SW846 3535/8321A Modifie	d		
	092018-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14

### AR/COC: 614079, 614080

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092018-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	092018-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
	092020-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	092020-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	092020-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092018-009/OBS-MW3	Mercury (7439-97-6)	UJ, I5, B4
	092020-009/OBS-EB1	Mercury (7439-97-6)	UJ, I5, B4
SW846 9012B			
	092018-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5, B4
	092020-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5, B4
SW846 9056			
	092020-016/OBS-EB1	Chloride (16887-00-6)	J+, 15

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



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Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859 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), EPA314.0 (Perchlorate), EPA9056 (Anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA7196A (Cr+6), 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 ICB and CCB at negative concentrations with absolute values > 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 fluoride, 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 any of the blanks except for the following.

#### Anions:

In EB sample 302788-019 from COC 614080, chloride was detected. However, this sample result was qualified U due to blank contamination and, therefore, will not be applied to sample results.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total cyanide, Anions, Perchlorate, & Nitrate/Nitrite as Nitrogen:

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.

<u>Total cyanide, Anions, Perchlorate, Total CN, & Nitrate/Nitrite as Nitrogen:</u> It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

#### **Detection Limits/Dilutions**

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

#### Anions & Nitrate/Nitrite as Nitrogen:

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

#### **Other QC**

A field duplicate pair was submitted on the COC. 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: Marcia Hilchey

Date: 6/25/12





## AR/COC: 614081

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	с		
	092022-035/OBS-MW1	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	092022-034/OBS-MW1	BETA (12587-47-2)	J, FR7
	092023-034/OBS-MW1	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092022-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	092022-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092022-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092022-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, Z2
	092023-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	092023-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092023-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092023-033/OBS-MW1	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	092022-009/OBS-MW1	Copper (7440-50-8)	0.0065U, B2
	092023-009/OBS-MW1	Antimony (7440-36-0)	0.0064U, B2
	092023-009/OBS-MW1	Copper (7440-50-8)	0.0065U, B2
SW846 3535/8321A Modifie	ed		
	092022-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	092022-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092022-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	092023-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	092023-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092023-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092022-009/OBS-MW1	Mercury (7439-97-6)	UJ, I5, B4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092023-009/OBS-MW1	Mercury (7439-97-6)	UJ, I5, B4
SW846 9012B			
	092022-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15, B4
	092023-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15, B4

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



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Memorandum

Date: June 14, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614082 SDG: 302948 Laboratory: GEL Project/Task: 98026.01.13 Analysis: General Chemistry

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

#### **Summary**

One sample was prepared and analyzed with accepted procedures using methods EPA9012A (Total CN), EPA314.0 (Perchlorate), EPA9056 (Anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA7196A (Cr+6), 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 ICB and CCB at negative concentrations with absolute values > the MDL but < the PQL. The associated sample result was ND 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 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 fluoride, 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 any of the blanks.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

#### Anions, Perchlorate, & Nitrate/Nitrite as Nitrogen:

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, Perchlorate, & Nitrate/Nitrite as Nitrogen:

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. No samples were diluted with the following exceptions.

#### Anions & Nitrate/Nitrite as Nitrogen:

The samples were diluted 5X for chloride, sulfate, and nitrate/nitrite as nitrogen due to high 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:** 6/15/12





#### AR/COC: 614082

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	092025-034/OBS-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092025-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	092025-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092025-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092025-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, Z2
SW846 3005/6020 DOE-AL			
	092025-009/OBS-MW2	Cadmium (7440-43-9)	U, B, B3
SW846 3535/8321A Modifie	ed		
	092025-024/OBS-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092025-024/OBS-MW2	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092025-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	092025-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	092025-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092025-009/OBS-MW2	Mercury (7439-97-6)	UJ, I5, B4
SW846 9012B			
	092025-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5, B4

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



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Memorandum

Date: June 23, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 Laboratory: GEL Project/Task: 98026.01.12 Analysis: General Chemistry

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

#### <u>Summary</u>

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography); EPA 9012A (total cyanide); EPA 314.0 (perchlorate by IC); SM 2320B (alkalinity); and EPA 353.2 (nitrate/nitrite by Cd reduction). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

#### Anions:

The ICAL intercept for chloride was positive and > the MDL. The associated result for sample 303091-018 was a detect < 3X the intercept value and will be **qualified J+, I5**.

#### Total cyanide:

The ICAL intercept for total cyanide was negative, with an absolute value > MDL but  $\leq 2X$  the PQL. Also, total cyanide was detected in ICB and CCB at a negative value with absolute value > MDL. The total cyanide result for sample -048 was a detect < 5X the MDL and < 3X the absolute value of the intercept and will be **qualified NJ-, I5, B4**. The total cyanide results for samples -009, -023, and -036 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**

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

Anions:

The ICAL intercepts for fluoride and chloride were positive and > the MDL. Associated sample results that are ND or > 3X the intercept value will not be qualified.

### <u>Blanks</u>

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

Anions:

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

### Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

All LCS/LCSD acceptance criteria were met.

### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

Nitrate/Nitrite:

Samples -005, -032, and -044 were diluted 10X, and sample -019 was diluted 5X.

Anions:

Sample -004 was diluted 5X for chloride and sulfate; samples -031 and -043 were diluted 10X for chloride and sulfate.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

### **Other QC**

EBs and field duplicates were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 06/26/12





# AR/COC: 614155, 614156, 614157

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		Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC	2		
	092291-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	092294-035/CCBA-EB1	Uranium-233/234 (N/A)	BD, FR3
	092294-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092294-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	092296-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	092297-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	092291-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7
	092294-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3
	092294-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3
	092296-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
	092297-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092291-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	092291-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092291-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092291-033/CCBA-MW1	Potassium-40 (13966-00-2)	R, Z2
	092294-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	092294-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092294-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092294-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	092296-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	092296-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092296-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092296-033/CCBA-MW2	Potassium-40 (13966-00-2)	R, Z2

### AR/COC: 614155, 614156, 614157

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092297-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, Z2
	092297-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092297-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092297-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092291-009/CCBA-MW1	Calcium (7440-70-2)	J, D1
	092291-009/CCBA-MW1	Chromium (7440-47-3)	0.01885U, B
	092291-009/CCBA-MW1	Thallium (7440-28-0)	0.0038U, B3
	092291-017/CCBA-MW1	Calcium (7440-70-2)	J, D1
	092294-009/CCBA-EB1	Calcium (7440-70-2)	0.03695UJ, B,D1
	092294-009/CCBA-EB1	Chromium (7440-47-3)	0.01885U, B
	092294-017/CCBA-EB1	Calcium (7440-70-2)	0.398UJ, B,D1
	092296-009/CCBA-MW2	Calcium (7440-70-2)	J, D1
	092296-009/CCBA-MW2	Chromium (7440-47-3)	0.01885U, B
	092296-009/CCBA-MW2	Copper (7440-50-8)	0.00555U, B2
	092296-017/CCBA-MW2	Calcium (7440-70-2)	J, D1
	092297-009/CCBA-MW2	Calcium (7440-70-2)	J, D1
	092297-009/CCBA-MW2	Chromium (7440-47-3)	0.01885U, B
	092297-009/CCBA-MW2	Copper (7440-50-8)	0.00555U, B2
	092297-017/CCBA-MW2	Calcium (7440-70-2)	J, D1
SW846 3535/8321A Modifie	ed		
	092291-024/CCBA-MW1	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092291-024/CCBA-MW1	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092291-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	092291-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092291-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	092294-024/CCBA-EB1	2,6-Dinitrotoluene (606-20-2)	UJ, L3

### AR/COC: 614155, 614156, 614157

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092294-024/CCBA-EB1	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092294-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	092294-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	092294-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	092296-024/CCBA-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092296-024/CCBA-MW2	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092296-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	092296-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	092296-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	092297-024/CCBA-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092297-024/CCBA-MW2	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092297-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	092297-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	092297-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092291-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	092294-009/CCBA-EB1	Mercury (7439-97-6)	UJ, B4
	092296-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
	092297-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	092291-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4
	092294-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4
	092296-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4
	092297-027/CCBA-MW2	Cyanide, Total (57-12-5)	NJ-, 15,B4
SW846 9056			
	092294-016/CCBA-EB1	Chloride (16887-00-6)	J+, I5

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



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Memorandum

Date: July 27, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614254 SDG: 306314 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 EPA9056 (Anions), EPA353.2 (Nitrate/Nitrite), SM2320B (Alkalinity), and EPA314.0 (perchlorate). Data were reported for all required analytes. A problem was 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**

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

Anions:

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

### **Blanks**

No target analytes were detected in the blanks.

### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

### Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

<u>Anions and Nitrate/Nitrite</u>: Samples were diluted.

### **Other QC**

No other specific issues that affect data quality were identified.



Sample Findings Summary



AR/COC: 614254			Page 1 of 1
Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL			
	092535-001/CTF-MW3	Dibromochloromethane (124-48-1)	J+, I5

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



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Memorandum

Date: July 30, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614255 SDG: 306356 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 EPA9056 (Anions), EPA353.2 (Nitrate/Nitrite), SM2320B (Alkalinity), and EPA314.0 (perchlorate). Data were reported for all required analytes. A problem was 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**

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

#### Anions:

The ICAL intercept for sulfate was > the MDL. The associated sample result was >3X the intercept value and will not be qualified.

### **Blanks**

No target analytes were detected in the blanks.

### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

### Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

<u>Anions and Nitrate/Nitrite:</u> Samples were diluted.

### **Other QC**

No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

**Date:** 07/31/12





### AR/COC: 614255

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC	
DOE EML HASL-300, U-02-RC				
	092538-035/CTF-MW2	Uranium-235/236 (13982-70-2)	J, FR7	
EPA 901.1				
	092538-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3	
	092538-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3	
	092538-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3	
	092538-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2	
SW846 3005/6020 DOE-AL				
	092538-009/CTF-MW2	Nickel (7440-02-0)	J-, MS3	
	092538-010/CTF-MW2	Nickel (7440-02-0)	J-, MS3	
SW846 8270C				
	092538-002/CTF-MW2	3,3'-Dichlorobenzidine (91-94-1)	R, MS3	
	092538-002/CTF-MW2	4-Chloroaniline (106-47-8)	UJ, MS3, MS5	
	092538-002/CTF-MW2	Diethylphthalate (84-66-2)	UJ, MS3	
	092538-002/CTF-MW2	Di-n-butylphthalate (84-74-2)	UJ, MS3	
	092538-002/CTF-MW2	Hexachlorocyclopentadiene (77-47- 4)	R, MS3	

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, APRIL – JUNE 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 June 2012 sampling event, CTF-MW2 and CTF-MW3 had been sampled 16 and 17 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 sixth 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 analytical results discussed in this section correspond to the reporting period of April through June 2012. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on June 16 and June 19, 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 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 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 June 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 CTF-MW3 groundwater samples exceed the corresponding MCLs. Except for arsenic, none of the analytical results for the CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in CTF-MW2 groundwater samples at concentrations of 0.0433 mg/L in the unfiltered sample and 0.0276 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 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.

This groundwater sampling event represents the sixth of eight supplemental quarterly events for monitoring wells CTF-MW3 and CTF-MW2. The seventh of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (July – September 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 June 2010). Groundwater monitoring at 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 CTF-MW3 and CTF-MW2 during the Second Quarter of Calendar Year (CY) 2012.

# 2.1 Equipment Decontamination

A portable Bennett<sup>™</sup> groundwater sampling system was used to collect the groundwater samples from both wells. The Bennett<sup>™</sup> 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<sup>™</sup> Model 6920 water quality meter. Turbidity was measured with a HACH<sup>™</sup> 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%, or less than 5 nephelometric turbidity units
- pH is within 0.1 units

- Temperature is within 1.0 degree Celsius
- SC is within 5% 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 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 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, CTF-MW3.** Table III-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to sampling well CTF-MW3.

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

# 3.2 Volatile Organic Compounds

**SWMU 149, CTF-MW3.** No VOCs were detected at concentrations above established MCLs. The compounds bromodichloromethane, chloroform, dibromochloromethane, and toluene were detected above laboratory MDLs. The VOC dibromochloromethane was qualified as an estimated value during data validation because the initial calibration intercept was below the MDL. Table III-4 summarizes detected VOCs in environmental groundwater samples, and Table III-5 lists the VOC MDLs.

**SWMU 154, CTF-MW2.** No VOCs were detected at concentrations above established MCLs in the CTF-MW2 environmental sample. The VOC toluene was detected at a concentration of 0.580 micrograms per liter ( $\mu$ g/L). Table III-4 summarizes VOCs detected in the environmental sample and Table III-6 lists the VOC MDLs.

# 3.3 Semivolatile Organic Compounds

SWMU 149, CTF-MW3. Analysis of SVOCs is not required for CTF-MW3.

**SWMU 154, CTF-MW2.** No SVOCs were detected at concentrations above established MCLs in the CTF-MW2 environmental sample. No SVOCs were reported above laboratory MDLs. The SVOC results for 3,3-dichlorobenzidine and

hexachlorocyclopentadiene were qualified as unusable because associated matrix spike and matrix spike duplicate samples were recovered outside acceptance criteria. Table III-6 lists the SVOC MDLs.

# 3.4 High Explosive Compounds

SWMU 149, CTF-MW3. Analysis of HE compounds is not required for CTF-MW3.

**SWMU 154, CTF-MW2.** No HE compounds were detected in the 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 CTF-MW2 at a concentration of 0.199  $\mu$ 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, 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 5.39 mg/L in the CTF-MW3 environmental sample.

**SWMU 154, CTF-MW2.** Table III-8 summarizes NPN results for CTF-MW2. NPN values were compared with the nitrate MCL of 10 mg/L. No NPN was detected above the nitrate MCL. NPN was reported at a concentration of 0.278 mg/L in the CTF-MW2 environmental sample.

# 3.6 Anions and Alkalinity

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

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

# 3.7 Perchlorate

**SWMU 149, CTF-MW3.** Perchlorate was not detected above the NMED-specified screening level/MDL of 4  $\mu$ g/L (0.004 mg/L) in the sample from CTF-MW3. Table III-10 presents the perchlorate results.

**SWMU 154, CTF-MW2.** Perchlorate was not detected above the NMED-specified screening level/MDL of 4  $\mu$ g/L (0.004 mg/L) in the sample from 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 CTF-MW2 also included analysis of uranium in both the unfiltered and filtered fractions.

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

**SWMU 154, CTF-MW2.** No metals were detected above established MCLs in the 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 0.0433 mg/L, and dissolved arsenic at 0.0276 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. Unfiltered and filtered metal results for CTF-MW2 are summarized in Tables III-13 and III-14, respectively. In addition, arsenic concentrations since March 2002 are plotted on Figure III-3.

### 3.9 Gamma Spectroscopy and Radioisotopic Analyses

SWMU 149, CTF-MW3. Gamma spectroscopy analysis is not required for CTF-MW3.

**SWMU 154, CTF-MW2.** The 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 result for potassium-40 activity was qualified as unusable during data validation because the peak could not be identified.

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  $56.9 \pm 7.48$  pCi/L, uranium-235/236 at  $1.02 \pm 0.376$  pCi/L, and uranium-238 at  $8.96 \pm 1.47$  pCi/L. In this region, naturally occurring uranium in groundwater is elevated due to contact with bedrock, which contains minerals high in uranium.

# 3.10 Sample Results Exceeding Maximum Contaminant Levels

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. The only constituent exceeding MCLs in samples collected during this quarter consists of arsenic, which was detected in the CTF-MW2 samples. Figure III-3 shows the concentrations of arsenic and groundwater elevations over time for 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 June 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) or project-specific issues were identified during the June 2012 sampling activities at CTF-MW3 and CTF-MW2.

# 5.0 Summary

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

Analytical parameters for 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 CTF-MW3 are comparable to previous results.

Analytical parameters for 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 CTF-MW2 groundwater sample at concentrations of 0.0433 mg/L in the unfiltered sample and 0.0276 mg/L in the filtered samples. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. These values are comparable to previous results.

# 6.0 **References**

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# Figures

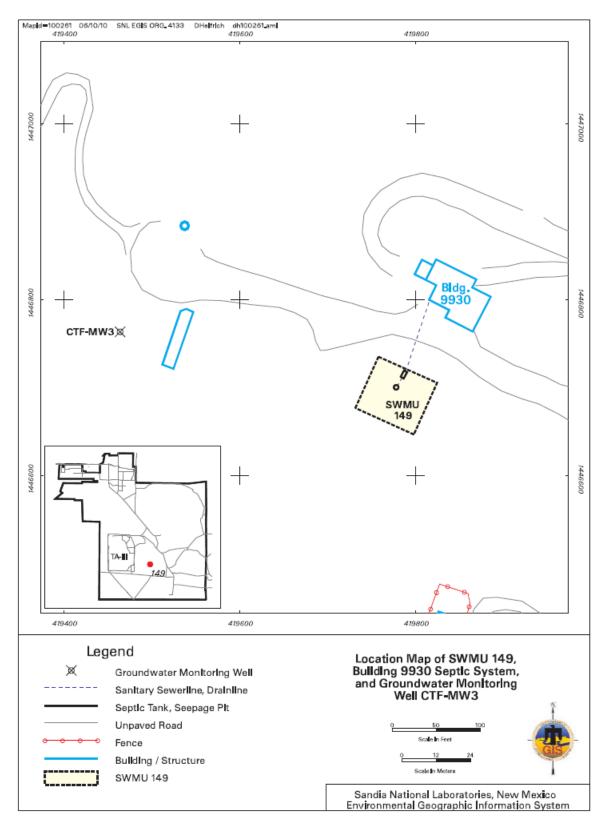


Figure III-1 Location of Monitoring Well CTF-MW3 near SWMU 149

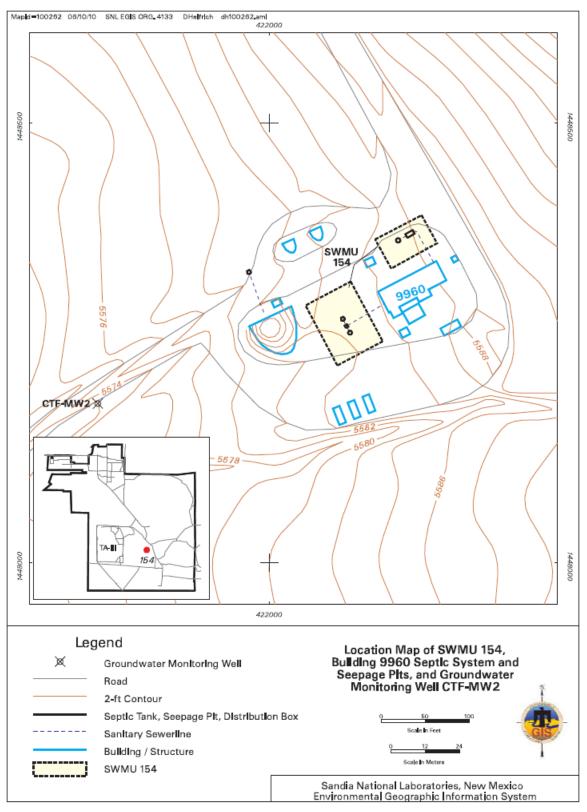


Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

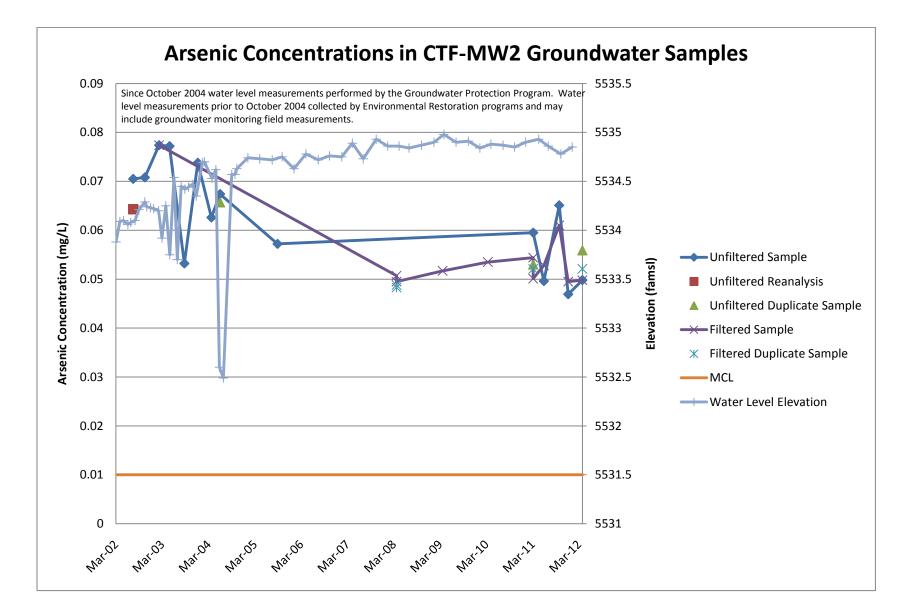


Figure III-3

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

# Tables

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

Analysis	Analytical Method <sup>a</sup>	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 <sup>b</sup>	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO <sub>3</sub> , 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations <sup>c</sup>	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 <sub>2</sub> SO <sub>4</sub> , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Gamma Spectroscopy <sup>d</sup>	EPA 901.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Isotopic Uranium	ASTM D3972-09	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

#### Notes

<sup>a</sup>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, 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,* 20<sup>th</sup> 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, 2009. "Standard Test Method for Isotopic Uranium in Water by Radiochemistry," ASTM D3972-09, ASTM International, West Conshohocken, Pennsylvania. <sup>b</sup>Metals = filtered and unfiltered samples, TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

<sup>c</sup>Major anions include bromide, chloride, fluoride, and sulfate.

<sup>d</sup>Gamma 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<sub>3</sub> = Nitric acid.
- L = Liter
- mL = Milliliter(s).
- SM = Standard Method.
- SWMU = Solid Waste Management Unit.
- TAL = Target Analyte List.

# Sample Details for Second Quarter, CY 2012 Groundwater Sampling Solid Waste Management Units 149 and 154 Groundwater Monitoring Quarterly Assessment April – June 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	092535	614254	SWMU 149
CTF-MW2	092538	614255	SWMU 154

Notes

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

CY

MW

= Monitoring well. = Solid Waste Management Unit. SWMU

# Summary of Field Water Quality Measurements<sup>a</sup>

# Solid Waste Management Units 149 and 154 Groundwater Monitoring

## **Quarterly Assessment, April – June 2012**

Well ID	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	16-Jun-12	20.09	1530	178.7	6.89	0.19	87.4	7.84
SWMU 154								
CTF-MW2	19-Jun-12	19.58	3310	34.1	6.03	0.83	1.3	0.12

#### Notes

<sup>a</sup>Field measurements collected prior to sampling.

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

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

# Solid Waste Management Units 149 and 154 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (μg/L)	MDL (µg/L)	PQL (μg/L)	MCL (µg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMU 149									
CTF-MW3	Bromodichloromethane	0.500	0.300	1.00	NE	J		092535-001	SW846-8260B
16-Jun-12	Chloroform	0.710	0.300	1.00	NE	J		092535-001	SW846-8260B
	Dibromochloromethane	1.12	0.300	1.00	NE		+ل	092535-001	SW846-8260B
	Toluene	0.510	0.300	1.00	1000	J		092535-001	SW846-8260B
SWMU 154									
CTF-MW2	Toluene	0.580	0.300	1.00	1000	J		092538-001	SW846-8260B
19-Jun-12	RDX	0.199	0.821	0.256	NE	J		092538-024	SW846-8321A

#### Notes

- μg/L = Micrograms per liter.
- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

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

#### <sup>c</sup>Analytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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) Solid Waste Management Unit 149 Groundwater Monitoring Quarterly Assessment, April – June 2012

Analyte	MDL
-	(µg/L)
1,1,1-Trichloroethane	0.300
1,1,2,2-Tetrachloroethane	0.300
1,1,2-Trichloroethane	0.300
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-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

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

# Table III-6Method Detection Limits for Volatile and Semivolatile Organic CompoundsSolid Waste Management Unit 154 Groundwater MonitoringQuarterly Assessment, April – June 2012

Analyte	MDL⁵ (µg/L)	Analytical Method <sup>9</sup>	Analyte	MDL <sup>ь</sup> (µg/L)	Analytical Method <sup>9</sup>	Analyte	MDL <sup>ь</sup> (µg/L)	Analytical Method <sup>9</sup>
1,1,1-Trichloroethane	0.300	8260B	1,2,4-Trichlorobenzene	2.94	8270C	Di-n-butyl phthalate	2.94	8270C
1,1,2,2-Tetrachloroethane	0.300	8260B	1,2-Dichlorobenzene	2.94	8270C	Di-n-octyl phthalate	2.94	8270C
1,1,2-Trichloroethane	0.300	8260B	1,3-Dichlorobenzene	2.94	8270C	Dibenz[a,h]anthracene	0.294	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	2.94	8270C	Dibenzofuran	2.94	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	2.94	8270C	Diethylphthalate	2.94	8270C
1,2-Dichloroethane	0.300	8260B	2,4,6-Trichlorophenol	2.94	8270C	Dimethylphthalate	2.94	8270C
1,2-Dichloropropane	0.300	8260B	2,4-Dichlorophenol	2.94	8270C	4,6-Dinitro-o-cresol	2.94	8270C
2-Butanone	2.00	8260B	2,4-Dimethylphenol	2.94	8270C	Diphenyl amine	2.94	8270C
2-Hexanone	2.20	8260B	2,4-Dinitrophenol	4.90	8270C	Fluoranthene	0.294	8270C
4-methyl-, 2-Pentanone	1.50	8260B	2,4-Dinitrotoluene	2.94	8270C	Fluorene	0.294	8270C
Acetone	3.00	8260B	2,6-Dinitrotoluene	2.94	8270C	Hexachlorobenzene	2.94	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.294	8270C	Hexachlorobutadiene	2.94	8270C
Bromodichloromethane	0.300	8260B	2-Chlorophenol	2.94	8270C	Hexachlorocyclopentadiene	2.94	8270C
Bromoform	0.300	8260B	2-Methylnaphthalene	0.294	8270C	Hexachloroethane	2.94	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	2.94	8270C	Indeno(1,2,3-c,d)pyrene	0.294	8270C
Carbon disulfide	1.50	8260B	2-Nitrophenol	2.94	8270C	Isophorone	2.94	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	2.94	8270C	Naphthalene	0.294	8270C
Chlorobenzene	0.300	8260B	3-Nitroaniline	2.94	8270C	Nitro-benzene	2.94	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	2.94	8270C	Pentachlorophenol	2.94	8270C
Chloroform	0.300	8260B	4-Chloro-3-methylphenol	2.94	8270C	Phenanthrene	0.294	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	3.24	8270C	Phenol	2.94	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	2.94	8270C	Pyrene	0.294	8270C
Ethyl benzene	0.300	8260B	4-Nitroaniline	2.94	8270C	bis(2-Chloroethoxy)methane	2.94	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	2.94	8270C	bis(2-Chloroethyl)ether	2.94	8270C
Styrene	0.300	8260B	Acenaphthene	0.294	8270C	bis(2-Chloroisopropyl)ether	2.94	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.294	8270C	bis(2-Ethylhexyl)phthalate	2.94	8270C
Toluene	0.300	8260B	Anthracene	0.294	8270C	m,p-Cresol	2.94	8270C
Trichloroethene	0.300	8260B	Benzo(a)anthracene	0.294	8270C	n-Nitrosodipropylamine	2.94	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.431	8270C	o-Cresol	2.94	8270C
Vinyl chloride	0.300	8260B	Benzo(b)fluoranthene	0.294	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.294	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.294	8270C			
cis-1,3-Dichloropropene	0.300	8260B	Butylbenzyl phthalate	2.94	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.294	8270C			
trans-1,3-Dichloropropene	0.300	8260B	Chrysene	0.294	8270C			

# Table III-6 (Concluded) Method Detection Limits for Volatile and Semivolatile Organic Compounds Solid Waste Management Unit 154 Groundwater Monitoring Quarterly Assessment, April – June 2012

#### Notes

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

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

µg/L = Micrograms per liter.

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.

# Method Detection Limits for High Explosive Compounds (EPA Method 8321A) Solid Waste Management Unit 154 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Analyte	MDL (μg/L)
1,3,5-Trinitrobenzene	0.0821
1,3-Dinitrobenzene	0.0821
2,4,6-Trinitrotoluene	0.0821
2,4-Dinitrotoluene	0.0821
2,6-Dinitrotoluene	0.0821
2-Amino-4,6-dinitrotoluene	0.0821
2-Nitrotoluene	0.0841
3-Nitrotoluene	0.0821
4-Amino-2,6-dinitrotoluene	0.0821
4-Nitrotoluene	0.154
HMX	0.0821
Nitro-benzene	0.0821
Pentaerythritol tetranitrate	0.103
RDX	0.0821
Tetryl	0.0821

#### Notes

- $\mu$ g/L = Micrograms per liter.
- EPA = U.S. Environmental Protection Agency.
- HMX = Tetrahexamine tetranitramine.

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

- RDX = Hexahydro-trinitro-triazine.
- Tetryl = 2,4,6-trinitrophenylmethylnitramine.

# **Summary of Nitrate Plus Nitrite Results**

# Solid Waste Management Units 149 and 154 Groundwater Monitoring

## Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMU 149									
CTF-MW3	Nitrate plus nitrite as N	5.39	0.170	0.500	10.0			092535-018	EPA 353.2
16-Jun-12 SWMU 154									
CTF-MW2									
19-Jun-12	Nitrate plus nitrite as N	0.278	0.085	0.250	10.0			092538-018	EPA 353.2

#### Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.
- 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.

#### <sup>a</sup>Laboratory Qualifier

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

## Solid Waste Management Units 149 and 154 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMU 149									
CTF-MW3	Bicarbonate Alkalinity	329	0.725	1.00	NE			092535-022	SM2320B
16-Jun-12	Carbonate Alkalinity	ND	0.725	1.00	NE		U	092535-022	SM2320B
	Bromide	1.16	0.067	0.200	NE			092535-016	SW846 9056
	Chloride	115	1.34	4.00	NE			092535-016	SW846 9056
	Fluoride	2.28	0.033	0.100	4.0			092535-016	SW846 9056
	Sulfate	486	2.66	8.00	NE			092535-016	SW846 9056
SWMU 154					•			· · ·	
CTF-MW2	Total Alkalinity	1600	0.725	1.00	NE			092538-022	SM2320B
19-Jun-12	Bromide	ND	0.067	0.200	NE	U		092538-016	SW846 9056
	Chloride	432	3.35	10.0	NE			092538-016	SW846 9056
	Fluoride	2.23	0.033	0.100	4.0			092538-016	SW846 9056
	Sulfate	148	6.65	20.0	NE			092538-016	SW846 9056

#### Notes

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

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

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

#### Notes (continued)

#### <sup>c</sup>Analytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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*, 20<sup>th</sup> ed., Method 2320B.

# **Summary of Perchlorate Results**

# Solid Waste Management Units 149 and 154 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMU 149								
CTF-MW3	ND	0.004	0.012	NE	11		092535-020	EPA 314.0
16-Jun-12	ND	0.004	0.012		0		092555-020	EPA 314.0
SWMU 154								
CTF-MW2	ND	0.004	0.012	NE			092538-020	EPA 314.0
19-Jun-12	ND	0.004	0.012		U		092556-020	EFA 314.0

#### Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical 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

# Solid Waste Management Unit 149 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		092535-009	SW846 6020
16-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092535-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092535-009	SW846 6020
	Barium	0.029	0.0006	0.002	2.00			092535-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092535-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092535-009	SW846 6020
	Calcium	184	0.600	2.00	NE			092535-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092535-009	SW846 6020
	Cobalt	0.000346	0.0001	0.001	NE	J		092535-009	SW846 6020
	Copper	0.00186	0.00035	0.001	NE			092535-009	SW846 6020
	Iron	0.392	0.033	0.100	NE			092535-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092535-009	SW846 6020
	Magnesium	45.0	0.010	0.030	NE			092535-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092535-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092535-009	SW846 7470
	Nickel	0.00391	0.0005	0.002	NE			092535-009	SW846 6020
	Potassium	11.3	0.080	0.300	NE			092535-009	SW846 6020
	Selenium	0.0243	0.0015	0.005	0.050			092535-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092535-009	SW846 6020
	Sodium	161	0.800	2.50	NE			092535-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092535-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092535-009	SW846 6010
	Zinc	0.00525	0.0035	0.010	NE	J		092535-009	SW846 6020

# Table III-11 (Concluded)

# **Summary of Unfiltered Total Metal Results**

## Solid Waste Management Unit 149 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

#### Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

# Summary of Filtered Total Metal Results

# Solid Waste Management Unit 149 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		092535-010	SW846 6020
16-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092535-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092535-010	SW846 6020
	Barium	0.0294	0.0006	0.002	2.00			092535-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092535-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092535-010	SW846 6020
	Calcium	193	0.600	2.00	NE			092535-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092535-010	SW846 6020
	Cobalt	0.000404	0.0001	0.001	NE	J		092535-010	SW846 6020
	Copper	0.00203	0.00035	0.001	NE			092535-010	SW846 6020
	Iron	0.396	0.033	0.100	NE			092535-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092535-010	SW846 6020
	Magnesium	47.1	0.010	0.030	NE			092535-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092535-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092535-010	SW846 7470
	Nickel	0.00377	0.0005	0.002	NE			092535-010	SW846 6020
	Potassium	11.2	0.080	0.300	NE			092535-010	SW846 6020
	Selenium	0.0245	0.0015	0.005	0.050			092535-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092535-010	SW846 6020
	Sodium	172	0.800	2.50	NE			092535-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092535-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092535-010	SW846 6010
	Zinc	0.00522	0.0035	0.010	NE	J		092535-010	SW846 6020

# Table III-12 (Concluded)

# Summary of Filtered Total Metal Results

# Solid Waste Management Unit 149 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

#### Notes

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

# Summary of Unfiltered Total Metal Results

# Solid Waste Management Unit 154 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW2	Aluminum	0.122	0.015	0.050	NE			092538-009	SW846 6020
19-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092538-009	SW846 6020
	Arsenic	0.0433	0.0017	0.005	0.010			092538-009	SW846 6020
	Barium	0.0756	0.0006	0.002	2.00			092538-009	SW846 6020
	Beryllium	0.00266	0.0002	0.0005	0.004			092538-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092538-009	SW846 6020
	Calcium	383	1.20	4.00	NE			092538-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092538-009	SW846 6020
	Cobalt	0.00883	0.0001	0.001	NE			092538-009	SW846 6020
	Copper	0.00156	0.00035	0.001	NE			092538-009	SW846 6020
	Iron	2.17	0.033	0.100	NE			092538-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092538-009	SW846 6020
	Magnesium	83.6	0.200	0.600	NE			092538-009	SW846 6020
	Manganese	2.93	0.020	0.100	NE			092538-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092538-009	SW846 7470
	Nickel	0.0162	0.0005	0.002	NE		J-	092538-009	SW846 6020
	Potassium	40.2	0.080	0.300	NE			092538-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092538-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092538-009	SW846 6020
	Sodium	492	1.60	5.00	NE			092538-009	SW846 6020
	Thallium	0.00126	0.00045	0.002	0.002	J		092538-009	SW846 6020
	Uranium	0.0278	0.000067	0.0002	0.03			092538-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092538-009	SW846 6010
	Zinc	0.208	0.0035	0.010	NE			092538-009	SW846 6020

# Table III-13 (Concluded)

# **Summary of Unfiltered Total Metal Results**

## Solid Waste Management Unit 154 Groundwater Monitoring

# Quarterly Assessment, April – June 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.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

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

#### <sup>c</sup>Analytical Method

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

# Summary of Filtered Total Metal Results

# Solid Waste Management Unit 154 Groundwater Monitoring

# Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW2	Aluminum	0.0663	0.015	0.050	NE			092538-010	SW846 6020
19-Jun-12	Antimony	ND	0.001	0.003	0.006	U		092538-010	SW846 6020
	Arsenic	0.0276	0.0017	0.005	0.010			092538-010	SW846 6020
	Barium	0.0769	0.0006	0.002	2.00			092538-010	SW846 6020
	Beryllium	0.00147	0.0002	0.0005	0.004			092538-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092538-010	SW846 6020
	Calcium	389	1.20	4.00	NE			092538-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092538-010	SW846 6020
	Cobalt	0.00791	0.0001	0.001	NE			092538-010	SW846 6020
	Copper	0.0794	0.00035	0.001	NE			092538-010	SW846 6020
	Iron	1.84	0.033	0.100	NE			092538-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092538-010	SW846 6020
	Magnesium	84.7	0.200	0.600	NE			092538-010	SW846 6020
	Manganese	2.85	0.020	0.100	NE			092538-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092538-010	SW846 7470
	Nickel	0.0166	0.0005	0.002	NE		J-	092538-010	SW846 6020
	Potassium	39.9	0.080	0.300	NE			092538-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092538-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092538-010	SW846 6020
	Sodium	500	1.60	5.00	NE			092538-010	SW846 6020
	Thallium	0.00123	0.00045	0.002	0.002	J		092538-010	SW846 6020
	Uranium	0.00692	0.000067	0.0002	0.03			092538-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092538-010	SW846 6010
	Zinc	1.71	0.0035	0.010	NE			092538-010	SW846 6020

# Table III-14 (Concluded)

# Summary of Filtered Total Metal Results

# Solid Waste Management Unit 154 Groundwater Monitoring

# Quarterly Assessment, April – June 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.
- ID = Identification.
- 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).
- 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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

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

# Solid Waste Management Unit 154 Groundwater Monitoring

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL (pCi/L)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>®</sup>
CTF-MW2	Americium-241	$-39.2 \pm 21.8$	19.1	9.30	NE	U	BD	092538-033	EPA 901.1
19-Jun-12	Cesium-137	-0.819 ± 1.94	3.31	1.58	NE	U	BD	092538-033	EPA 901.1
	Cobalt-60	$-1.07 \pm 2.08$	3.51	1.64	NE	U	BD	092538-033	EPA 901.1
	Potassium-40	$36.7\pm56.5$	33.1	15.3	NE	Х	R	092538-033	EPA 901.1
	Gross Alpha	12.72	NA	NA	15	NA	None	092538-034	EPA 900.0
	Gross Beta	$74.0\pm15.7$	13.0	6.30	4mrem/yr			092538-034	EPA 900.0
	Uranium-233/234	$56.9\pm7.48$	0.710	0.320	NE			092538-035	HASL-300
	Uranium-235/236	$1.02 \pm 0.376$	0.396	0.155	NE		J	092538-035	HASL-300
	Uranium-238	$8.96 \pm 1.47$	0.368	0.149	NE			092538-035	HASL-300

# Quarterly Assessment, April – June 2012

#### Notes

CFR = Code of Federal Regulations

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

HASL = Health and Safety Laboratory.

ID = Identification.

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.

<sup>a</sup>Activities 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).

<sup>b</sup>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. 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

# Solid Waste Management Unit 154 Groundwater Monitoring

# **Quarterly Assessment, April – June 2012**

#### Notes (continued)

#### <sup>c</sup>Laboratory Qualifier

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

#### <sup>d</sup>Validation Qualifier

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

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

#### <sup>e</sup>Analytical Method

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

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

# Summary of Constituents Detected above Established MCLs

# Solid Waste Management Units 149 and 154 Groundwater Monitoring

# **Quarterly Assessments through June 2012**

Well ID	Date	Analyte	Result	MCL	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
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	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	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.Ś. Environmental Protection Agency.
- ID = Identification.
- 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.

# <sup>a</sup>Laboratory Qualifier

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

# Table III-16 (Concluded)

# Summary of Constituents Detected above Established MCLs

# Solid Waste Management Units 149 and 154 Groundwater Monitoring

## **Quarterly Assessments through June 2012**

#### Notes (continued)

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

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

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

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

# FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 149 GW	Project No.: 146422.10.11.01 / 98026.01.14		
Well I.D.: CTF-MW3		Date: 6/16/12	
Well Condition:		Weather Condition:	
Method: Portable pump	X	Dedicated pumpPump depth: 359	

[		Vol.	Temp	SC	ORP	I	Turbidity	DO	Comments
Depth to	Time 24			1		pН		1	Comments
Water	hr	(L/gal)	(°C)	(µS/cm)	(mV)		(NTU)	(%)	$D_{n}$
(ft)									Long
307.33	NENL		STK	ret					
1	1		I						
314.26		5	20.43		1994.7	6.88	0.34	90.7	8.13
317.82	0832	10	20.00		183.9		0.29	89.5	8.13
320.69	0843	10 15	19.61	1515	182.8		0.32	89.5	8.16
322.93	0853	20	19.65		181.6		0.31	88.5	8.05
324.31	0900	_	19.63		181.2		0.26	98.1	8.02
325.09	0904	25	19.68		181.1	6.89	0.30	\$7.6	1.98
325.66		27	19.79		180.4	6.89	0.23	87.8	7.99
326.17		29	19.90		180.0		0.25	87.6	
326.60		31	20.03		179.3		0.20	88.5	
327.03		33	20.07	1530	179.2	6.89	0.20	87.6	
327.36		35	20.09		178.7	6.89		\$7.4	7.84
	0932		S	Amplin	202-				
				/	0				
								2	4.00 gals purged
									from tubing
									0813

# PURGE MEASUREMENTS

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# FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154 GWM	Project No.: 146422.10.11.01 / 98026.01.15
Well I.D.: CTF-MW2	Date: 06/19/12
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump Pump depth:

Depth to	Time 24	Vol.	Temp	SC	ORP	pH	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	(µS/cm)	(mV)	P**	(NTU)	(%)	Dong/L
(ft)									10.19/2
43.78	0747	$\checkmark$	51	ART_					
	0802	5	19.55	2904	141.8	5.99	1.46	4.6	0.41
47.35	0812	10	19.03	3085	101.5	5.95	0.50	3.0	0.27
47.48	0822	15	18.85	3177	73.6	5.94	0.51	2.1	0.20
47.54	0833	20	18.81	3232	39.3	5.96	0.41	1.7	0.16
47,46		25	18.84	3279	40.3	5.99	0.59	1.5	0.14
47.32		30	19.07	3300	39.0	6.00	0.88	1.4	0.13
47.25	0905	33	19.28	3318	37.1	6.03	0.87	1.4	0.13
47.23	0910	35	19.33	3310	38.3	6.03	0.85	1.4	0.13
47.18		37	19.42	3317	37.8	6.03	0.83	1.4	0.12
47.08	0921	39	19.51	3303	37.6	6.03	0.67	1.3	0.12
47.00	0927	41	19.58	3310	34.1	6.03	0.83	1.3	0.12
	0928		SA	nplin	g				
				/	0				
	-10								
			Suc						
								-	-4-00 gals purged
									from tubing
			· ·						0754

# PURGE MEASUREMENTS

IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page Appendix B Analytical Laboratory Certificates of Analysis for Monitoring Wells CTF-MW3 and CTF-MW2 Groundwater Data

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab	NA															Page	1_of_1_
Batch No.	N		1			SMO Use					^	1 /			AR/COC	614	254 -
Project Name	e:	SWMU 14	9 GWM	Date Sample	s Shipped:	6/18/1	2		SMO Au	thorization:	Dank	Laper	10	Waste	Characterization		
Project/Task				Carrier/Wayb	oill No.	142743				ntact Phone	Constanting of the second s		al				
Project/Task	Number:			Lab Contact:		Edie Kent/8	303-556-8	171		Lorraine H	lerrera/505	5-844-3199		Relea	sed by COC No.		
Service Orde	r:	CF250-12	2	Lab Destinati	Sector Revealer	GEL			Send Re	eport to SMC	):					<b>√</b> 4'	° Celsius
				Contract No.:	:	PO 691436	5			Rita Kava	naugh/505	-284-2553		Bill to:Sandia	National Laboratories	s (Account	s Payable),
Tech Area: Building:		Room:		Operationa	al Site:						30	6314	·f	P.O. Box 580 Albuquerque.	0, MS-0154 NM 87185-0154		
Sample No.	Fraction	saı	mple Location D	Detail	Depth (ft)	Date/		Sample Matrix	Co Type	ntainer Volume	2	Collection Method	Sample Type		ameter & Method Requested	10	Lab Sample ID
092535	-001	CTF-MW	3		359	6/16/12	9:32	GW	G	3x40 mL	HCL	G	SA	TCL VOC	(SW846-8260B)		
092535 √	-009 -	CTF-MW	3		359	6/16/12	9:33	GW	Р	500 mL	HNO3	G	SA		(SW846-6010/602	4	
092535 1	-010#	CTF-MW	3		359	6/16/12	9:34	FGW	Р	500 mL	HNO3	G	SA		(SW846-6010/602		
092535	-016 -	CTF-MW	3		359	6/16/12	9:35	GW	Р	125 mL	4C	G	SA	Anions (S)	W846-9056)		
092535	-018	CTF-MW	3		359	6/16/12	9:36 -	GW	Р	125 mL	H2SO4	G	SA	NPN (EPA	NPN (EPA 353.2)		
092535	-020 /	CTF-MW	3		359	6/16/12	9:37~	GW	Р	250 mL	4C	G	SA	Perchlorat	Perchlorate (EPA 314.0)		As a start
092535	-022 /	CTF-MW	3		359	6/16/12	9:38	GW	P	500 mL	4C	G	SA	Alkalinity (	SM2320B)		
092536	-001 🌽	SWMU 1	49-TB1		na	6/16/12	9:32	DIW	G	3x40 mL-	HCL	G	ТВ	TCL VOC	(SW846-8260B)	)	
						n and a star of an all the following startion		Nontreast Calence	Sector Construction								
Last Chain Validation		✓ Yes ✓ Yes			Sample Date En	Tracking	26/19	SMC	) Use	Special Ins	structions	/QC Requin	rements:	No			tions on ceipt
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Confirmato		Yes			QC inits		110	anna a' Linia, ann		Negotiated				<u></u>			
Sample	1	lame	, Signat	ture	Init.		/Organiza	tion/Phon	e/Cell	Sample Di		Retur	n to Client		bisposal by Lab		
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members	Bill Gibs		MAIN VG.	lare	ANA	SNL/4142/5		and the state of the local division of the									
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		111								as CACO3						Lat	o Use
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2. Received			. /	Org.	Date		Time		4. Rece	ived by			Org		Date	Time	
*Prior confir	rmation w	vith SMO re	equired for 7 and	d 15 day TA	Т												

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No.       SMO Use       AR/C         Project Name:       SWMU 154 GWM       Date Samples Shipped:       6/19/12       SMO Authorization:       10 to transport       Waste Character         Project/Task Manager:       Clinton Lum       Carrier/Waybill No.       140 36 4       SMO Contact Phone:       Set Bod & Orthone:       RMMA         Project/Task Number:       98026.01.15       Lab Contact:       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by CO         Service Order:       CF251-12       Lab Destination:       GEL       Send Report to SMO:       Released by CO	aboratories (Acc 4 5-0154	Image: 14255 →         Image
Project Name:       SWMU 154 GWM       Date Samples Shipped:       6/19/12       SMO Authorization:       Downstream       Waste Character         Project/Task Manager:       Clinton Lum       Carrier/Waybill No.       140364       SMO Contact Phone:       See Both & Orhowith       RMMA         Project/Task Number:       98026.01.15       Lab Contact:       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by CO         Service Order:       CF251-12       Lab Destination:       GEL       Send Report to SMO:       Released by CO	aboratories (Acc 4 5-0154	<b>⊡</b> º Celsius
Project/Task Manager: Clinton Lum       Carrier/Waybill No.       140364       SMO Contact Phone:       Set Set & Origination:       RMMA         Project/Task Number:       98026.01.15       Lab Contact:       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by CO         Service Order:       CF251-12       Lab Destination:       GEL       Send Report to SMO:       Released by CO	DC No. aboratories (Acc 4 5-0154	
Service Order: CF251-12 Lab Destination: GEL Send Report to SMO:	aboratories (Acc 4 5-0154	
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Contract No.: PO.691436 Rita Kavanaugh/505-284-2553 Bill to:Sandia National La	4 5-0154	
Tech Area: P.O. Box 5800, MS-0154	and the second second second	
Building: Room: Operational Site: 366.356 Albuquerque, NM 87185	Method	
Depth Date/Time Sample Container Preserv- Collection Sample Parameter &	mounda	Lab
Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Request	sted	Sample ID
- 09253 -001 CTF-MW2 129 6/19/12 9:28 - GW G 3x40 mL HCL G SA TCL VOC (SW846-	6-8260B)	
▲ 092537 -002 CTF-MW2 129 6/19/12 9:30 GW AG 4x1 L 4C G SA TCL SVOC (SW84	46-8270C)	
- 092537 -009 / CTF-MW2 129 6/19/12 9:31 - GW P 500 mL HNO3 G SA TAL Metals+U(SW846-6	6010/6020/7470)	
▶ 09253 -010 CTF-MW2 129 6/19/12 9:32 FGW P 500 mL HNO3 G SA TAL Metals+U(SW846-6	6010/6020/7470)	
# 09253 € -016 / CTF-MW2     129 6/19/12 9:33 GW P 125 mL 4C G SA Anions (SW846-90)	056)	$\begin{array}{c} 4 M_{1}^{2} m_{1}^{2} m_{2}^{2} m_{1}^{2} m_{1}^{$
Monometric March 2018. CTF-MW2     129 6/19/12 9:34* GW P 125 mL H2SO4 G SA NPN (EPA 353.2)		
- 09253 € -020 / CTF-MW2 129 6/19/12 9:35° GW P 250 mL 4C G SA Perchlorate (EPA 3	314.0)	
✓ 09253 3 -022 ✓ CTF-MW2 129 6/19/12 9:36 GW P 500 mL 4C G SA Alkalinity (SM2320)	DB)	
✓ 09253 0-024 - CTF-MW2       129     6/19/12     9:38 -     GW     AG     4x1 L     4C     G     SA     High Explosives (S	SW846-8321	A)
V 09253 -033 CTF-MW2 129 6/19/12 9:39 GW P 1 L HNO3 G SA Gamma Spectroscop	py (EPA 901.0	
Last Chain: Ves Sample Tracking ,SMO Use Special Instructions/QC Requirements:	Co	onditions on
Validation Reg'd: Ves Date Entered: 06/19/17 EDD Ves Io		Receipt
Background: Yes Entered by: RL Turnaround Time 7 Day* 5 Day* 3	Day	
Confirmatory: Yes QC inits.: ALS Negotiated TAT		
Sample Name Signature Init Company/Organization/Phone/Cell Sample Disposal Return to Client isposal	l by Lab	
Team William Gibson W	· 22.2047	
Members Alfred Santillanes Musicilianes Musi		
Robert Lynch Relffmal RL SNL/4142/505-844-4013/505-250-7090		
If perchlorate detected, then perform verification analysis using method SW 6850M. Report anions (as Br,CI,F,SO4), alkalinity (as total as CACO3, HC		
CO3), and gamma spectroscopy (short list isotopes).		Lab Use
1.Relinquished by //// Schill Org. 4/42 Date 6/19/12 Time 1007 3.Relinquished by Org. Date	Tir	me
1. Received by Abundly Org. 4/42 Date 6/14/12 Time 1007 3. Received by Org. Date	Tir	me
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2. Received by Org. Date Time 4. Received by Org. Date	Tir	me

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

Project Nam	e:	SWMU 154 GWM	Project/T	ask Manag	jer:	Clinton Lun	n		Project/Ta	sk No.:	980	26.01.15		and the second
ech Area:			-											
Building:		Room:				-								Lab use
Sample No.	Fraction	Fraction Sample Location		Depth (ft)	Date/ Colle		Sample Matrix	Co Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample I
092538	-034 *	CTF-MW2		129	6/19/12	9:41	GW	Р	1 L	НNО3	G	SA	Ġross Alpha/Beta (EPA 900.0)	
092537	-035*	CTF-MW2		129	6/19/12	9:42 *	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium(ASTM D3972-09M)	
-092538-	-001 -	SWMU 154-TB1 *		na	6/19/12	9:28 *	DIW	G	3x40 mĹ	HCL	G		TCL VOC (SW846-8260B)	
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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

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Internal Lab	/v ·													Page <u>1</u> of <u>1</u>
Batch No.					SMO Use						1 4		AR/COC	614256
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		Clinton Lum	Carrier/Waybill	No.	1403	64			ontact Phon			her		
Project/Task	Number:	98026.01.15	Lab Contact:		Edie Kent/8	03-556-8	8171		Lorraine I	Herrera/50	5-844-3199		Released by COC No.	
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Building:		Room:	Operational	Site:		•							Albuquerque, NM 87185-0154	
				Depth	Date/T	ime	Sample	C	ontainer	Preserv	Collection	Sample		Lab
Sample No.	Fraction	Sample Locatio	the second se	(ft)	Collec		Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample I
092539-	-009=/	CTF-MW2		na	6/19/12	9:13 -	WGW	Р	500 mL	HNO3	G	WC	Arsenic (SW846-6020)	744 (Jack)
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\*Prior confirmation with SMO required for 7 and 15 day TAT

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

Sample Findings Summary



		Page 1 of 1
Sample ID	Analyte Name (CAS#)	Qualifier, RC
092535-001/CTF-MW3	Dibromochloromethane (124-48-1)	J+, I5
	Sample ID 092535-001/CTF-MW3	

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



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#### Memorandum

Date: July 27, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614254 SDG: 306314 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 EPA9056 (Anions), EPA353.2 (Nitrate/Nitrite), SM2320B (Alkalinity), and EPA314.0 (perchlorate). Data were reported for all required analytes. A problem was 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

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

#### Anions:

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

#### **Blanks**

No target analytes were detected in the blanks.

### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

### Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

## **Detection Limits/Dilutions**

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

.

<u>Anions and Nitrate/Nitrite</u>: Samples were diluted.

## Other QC

No other specific issues that affect data quality were identified.



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mm.aquine.

### Memorandum

Date: July 27, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614254 SDG: 306414 and 306415 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 metals), EPA 6010B (ICP metals), and EPA 7470A (CVAA mercury). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

#### **Holding Times and Preservation**

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

#### **ICP-MS Instrument Tune**

All instrument tune requirements were met.

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

### **Reporting Limit Verification**

All CRA/CRI recoveries met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

### **ICP - MS Internal Standards**

All internal standards met QC acceptance criteria.

### Matrix Spike (MS)

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

### ICP; CVAA:

The MS analysis associated with sample 306414-002 was performed on a sample of similar matrix from another SNL SDG. No sample data were qualified as a result.

### ICP-MS; CVAA:

The MS analysis associated with sample 306415-001 was performed on a sample of similar matrix from another SNL SDG. No sample data were qualified as a result.

### Laboratory Replicate

All replicates met QC acceptance criteria.

#### ICP; CVAA:

The MS analysis associated with sample 306414-002 was performed on a sample of similar matrix from another SNL SDG. No sample data were qualified as a result.

#### ICP-MS; CVAA:

The MS analysis associated with sample 306415-001 was performed on a sample of similar matrix from another SNL SDG. No sample data were qualified as a result.

#### Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

#### **Detection Limits/Dilutions**

All detection limits were properly reported. The samples were diluted 10X for Na and Ca.

#### ICP Interference Check Sample (ICS A and AB)

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

## **ICP Serial Dilution**

The serial dilution analyses met all QC acceptance criteria.

## Other QC

No other specific issues that affect data quality were identified.



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### Memorandum

Date: July 27, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 149 GWM AR/COC: 614254 SDG: 306314 Laboratory: GEL Project/Task: 98026.01.14 Analysis: VOCs

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

#### Summary

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

1) The initial calibration intercept for dibromochloromethane was > MDL but < 3X MDL. Associated detected sample results that were < 3X the value of the intercept will be **qualified J+**, **I5**.

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

#### **Holding Times**

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 intercept for dibromochloromethane was > MDL but < 3X MDL. Associated ND sample results will not be qualified.

The initial calibration RSD for bromoform was > 15% but < 40%. All associated sample results were ND, and there were no other associated calibration infractions. No sample results were qualified.

The ICV and/or CCV %Ds for vinyl acetate, bromoform, acetone, and 2-hexanone were >20% but <40% 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

A TB was submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.

# Sample Findings Summary



## AR/COC: 614255

## Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EMIL HASL-300, U-02-R	C al anti anti anti anti anti anti anti anti		
	092538-035/CTF-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 901.1			
	092538-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	092 <b>538-03</b> 3/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092 <b>538-033/C</b> TF <b>-</b> MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092538-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	092 <b>538-009/</b> CTF <b>-</b> MW2	Nickel (7440-02-0)	J-, MS3
	092 <b>538-010/</b> CTF-MW2	Nickel (7440-02-0)	J-, MS3
SW846 8270C			
	092 <b>538-002/</b> CTF-MW2	3,3'-Dichlorobenzidine (91-94-1)	R, MS3
	092 <b>538-002/</b> CTF-MW2	4-Chloroaniline (106-47-8)	UJ, MS3, MS5
	092 <b>538-002/</b> CTF-MW2	Diethylphthalate (84-66-2)	UJ, MS3
	09 <b>2538-00</b> 2/CTF-MW2	Di-n-butylphthalate (84-74-2)	UJ, MS3
	092 <b>538-002/</b> CTF-MW2	Hexachlorocyclopentadiene (77-47- 4)	R, MS3

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



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Memorandum

Date: July 30, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614255 SDG: 306356 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 EPA9056 (Anions), EPA353.2 (Nitrate/Nitrite), SM2320B (Alkalinity), and EPA314.0 (perchlorate). Data were reported for all required analytes. A problem was 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**

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

#### Anions:

The ICAL intercept for sulfate was > the MDL. The associated sample result was >3X the intercept value and will not be qualified.

#### <u>Blanks</u>

No target analytes were detected in the blanks.

## Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

## Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

## Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

## **Detection Limits/Dilutions**

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

Anions and Nitrate/Nitrite: Samples were diluted.

### Other QC

No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

**Date:** 07/31/12



616 Maxine NE Albuquerque, NM 87123 505-299-5201

www.againc.net

### Memorandum

Date: July 30, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614255 SDG: 306356 Laboratory: GEL Project/Task: 98026.01.15 Analysis: High Explosives (HE) by LCMSMS

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

#### Summary

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

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

## **Calibration**

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

## Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

## **Blanks**

No target analytes were detected in the blanks with the following exception. HMX was detected in the MB at > PQL. The associated sample result was ND and will not be qualified.

## **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## Internal Standards

All internal standards met QC acceptance criteria.

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met QC acceptance criteria.

## 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: Ken Salaz

Date: 07/31/12



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Memorandum

Date: July 30, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614255 SDG: 306356 and 306364 Laboratory: GEL Project/Task: 98026.01.15 Analysis: Metals

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

## Summary

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

## ICPMS:

The MS %R for Ni was < the LAL. The associated sample results were detects and will be qualified J-, MS3.

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

## Holding Times and Preservation

The 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.

### ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

### Matrix Spike (MS)

All MS analyses met QC acceptance criteria except as noted above in the Summary section and as follows. The parent sample concentrations for Ca, K, Mg, and Na were >4X the spike. However, an MS analysis is not required for these analytes. Therefore, no sample data will be qualified.

### ICPMS; ICP; CVAA:

The MS analysis associated with sample 306356-003 was performed on a sample of similar matrix from another SNL SDG. No sample data were qualified as a result.

### Laboratory Replicate

All replicates met QC acceptance criteria.

#### ICPMS; ICP; CVAA:

The MS analysis associated with sample 306356-003 was performed on a sample of similar matrix from another SNL SDG. No sample data were qualified as a result.

## Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

#### Detection Limits/Dilutions

All detection limits were properly reported. The samples were diluted 20X for Na, K, Mg, and Ca.

## ICP Interference Check Sample (ICS A and AB)

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

## ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria.

## Other QC

No other specific issues that affect data quality were identified. Reviewed By: Ken Salaz

Date: 07/31/12



PO Box 2198 Albuquerque, NM 8715 1-888-678-544

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Memorandum

Date: July 30, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614255 SDG: 306356 Laboratory: GEL Project/Task: 98026.01.15 Analysis: RAD

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

#### **Summary**

One sample was prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

#### Gamma Spec, Iso-U; Gross Alpha/Beta:

- 1) All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be qualified BD, FR3.
- The U-235/236 sample result was > MDA but <3X the associated MDA and will be qualified J, FR7.

#### Gamma Spec:

1) The K-40 result for sample 306356-009 was X-flagged by the laboratory due to the peak not meeting identification criteria and will be qualified **R**, **Z2**.

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

#### Holding Times and Preservation

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

## Quantification

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

## **Calibration**

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

## **Blanks**

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

## Tracer/Carrier Recovery

All tracer/carrier recoveries met QC acceptance criteria.

## Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

## Laboratory Replicate

All replicate error ratio acceptance criteria were met.

## Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

## **Detection** Limits/Dilutions

All required detection limits were met. No dilutions were required.

## Other QC

No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 07/31/12



616 Maxine NE Albuquerque, NM 87123 505-299-5201

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### Memorandum

Date:July 30, 2012To:FileFrom:Marcia HilcheySubject:GC/MS Organic Data Review and Validation – SNL<br/>Site: SWMU 154 GWM<br/>AR/COC: 614255<br/>SDG: 306356<br/>Laboratory: GEL<br/>Project/Task: 98026.01.15<br/>Analysis: SVOCs

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

#### Summary

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

- The MS and/or MSD recoveries for di-n-butylphthalate; diethylphthalate; and 4chloroaniline were < the LAL but > 10%. All associated sample results were ND and will be qualified UJ, MS3.
- 2) The MS/MSD RPD for 4-chloroaniline was > the UAL. The associated sample result was ND and will be qualified UJ, MS5.
- 3) The MS and MSD recoveries for 3,3'-dichlorobenzidine and hexachlorocyclopentadiene were < 10%. The associated sample results were ND and will be qualified R, MS3.

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

#### Holding Times

The sample was prepared 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 intercepts for 2,4-dinitrophenol; pentachlorophenol; and 2-methyl-4,6-dinitrophenol were > the MDL. The associated sample results were all NDs and will not be qualified.

The CCV %Ds for seven target compounds were >20% but <40% with negative bias. The associated sample results were ND, with no other calibration infractions, and will not be qualified.

### Blanks

No target analytes were detected in the blank.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### Internal Standards

All internal standards met QC acceptance criteria.

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

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

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exceptions. The LCS %Rs for 2nitrophenol and hexachlorocyclopentadiene were < the LAL. These infractions are within the allowable marginal exceedances. No sample results will 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

An EB was submitted on the AR/COC(s). No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 07/31/12



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Memorandum

Date: July 30, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 614255 SDG: 306356 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 initial calibration intercept for dibromochloromethane was > MDL but < 3X MDL. All associated sample results were ND and will not be qualified.

The initial calibration RSD for bromoform was > 15% but < 40%. All associated sample results were ND, and there were no other associated calibration infractions. No sample results were qualified.

The ICV and/or CCV %Ds for vinyl acetate and bromoform were >20% but < 40% with positive bias. All associated sample results were ND and will not be qualified.

## Blanks

No target analytes were detected in the blanks.

## **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## Internal Standards

All internal stand: rds 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

A TB was submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 07/31/12

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- Appendix A. Field Measurement Logs for SWMUs 8/58 and 68 Groundwater Monitoring Data
- Appendix B. Analytical Laboratory Certificates of Analysis for SWMUs 8/58 and 68 Groundwater Monitoring Data
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# SECTION IV SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, APRIL – JUNE 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 third of eight quarterly groundwater sampling events occurred in April 2012 for Coyote Canyon Blast Area (CCBA) 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 (Old Burn Site). Monitoring wells CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3 were installed in August 2011 (SNL/NM November 2011). 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). 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). 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 Second Quarter, Calendar Year (CY) 2012 reporting period (April – June 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 April 23 and April 24, 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 April 17 to April 19, 2012. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in the CCBA-MW1 environmental sample at a concentration of 4.93 mg/L. Fluoride in both the CCBA-MW2 environmental sample and the duplicate environmental sample exceed the method detection limit (MDL) at a concentration of 1.54 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 third of eight supplemental quarterly events for the five monitoring wells. The fourth of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (July to September 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<sup>™</sup> groundwater sampling system was used to collect the groundwater samples from both wells. The Bennett<sup>™</sup> 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<sup>™</sup> Model 6920 water quality meter. Turbidity was measured with a HACH<sup>™</sup> 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%, or less than 5 nephelometric turbidity units
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5% 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, 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, 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, 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, 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, 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, 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, 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, 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, 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 3.72 mg/L in the CCBA-MW2 environmental sample.

**SWMU 68, 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 1.85 mg/L in the OBS-MW1 duplicate environmental sample.

# 3.6 Anions and Alkalinity

**SWMUs 8/58, 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 sample from CCBA-MW1 at a concentration of 4.93 mg/L. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities. Fluoride was reported in both the

CCBA-MW2 environmental and duplicate environmental samples at a concentration of 1.54 mg/L, which is below the MCL. No other anions or total cyanide were detected above established MCLs. Total cyanide was reported below the MCL of 0.200 mg/L in the CCBA-MW2 duplicate environmental sample. This value was qualified as an estimated value during data validation due to negative values associated with laboratory calibration blank samples. Total cyanide was not detected above the laboratory MDL in the CCBA-MW1 or CCBA-MW2 environmental samples. There are no established MCLs for bromide, chloride, sulfate, or alkalinity.

**SWMU 68, 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, CCBA-MW1 and CCBA-MW2.** Perchlorate was not detected above the NMED-specified screening level/MDL of 4 micrograms per liter ( $\mu$ g/L) (0.004 mg/L) in any groundwater sample from SWMUs 8/58. Table IV-8 presents perchlorate results.

**SWMU 68, OBS-MW1, OBS-MW2, and OBS-MW3.** Perchlorate was not detected above the NMED-specified screening level/MDL of 4  $\mu$ 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, CCBA-MW1 and CCBA-MW2.** Analysis of hexavalent chromium is not required for SWMUs 8/58.

**SWMU 68, 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, 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, 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, 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, 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, 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 and CCBA-MW2 environmental samples because the laboratory was unable to meet peak identification criteria.

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 range from  $0.0382 \pm 0.0358$  pCi/L for uranium-235/236 to  $7.15 \pm 0.906$  pCi/L for uranium-233/234.

**SWMU 68, OBS-MW1, OBS-MW2, and OBS-MW3.** Gamma spectroscopy activity results for short-list radionuclides are less than the associated MDAs, except for potassium-40. The results for potassium-40 activity in the OBS-MW1 duplicate environmental sample and the OBS-MW2 environmental sample were qualified as unusable during data validation as the laboratory could not meet identification criteria.

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  $0.197 \pm 0.0604$  pCi/L for uranium-235/236 to  $20.6 \pm 2.66$  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 the CCBA-MW1 environmental sample from SWMUs 8/58. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities.

# 4.0 **Quality Control Samples**

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

### 4.1 Field Quality Control Samples

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

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

# 4.1.1 **Duplicate Environmental Samples**

Duplicate environmental samples were collected from CCBA-MW2 and OBS-MW1 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate environmental samples were collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. Duplicate environmental samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for CCBA-MW2 and OBS-MW1. 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<sup>™</sup> 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, CCBA-MW2.** Bicarbonate alkalinity, bromodichloromethane, chloroform, chloride, copper, dibromochloromethane, and sodium were detected above the laboratory MDLs. Copper was detected in the CCBA-MW2 samples at concentrations less than five times the associated EB result, and the results was qualified as not detected during data validation. No corrective action was necessary for bicarbonate alkalinity, bromodichloromethane, chloroform, chloride, dibromochloromethane, or sodium as these

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

**SWMU 68, OBS-MW1.** Antimony, bromodichloromethane, chloroform, copper, dibromochloromethane, and chloride were detected above laboratory MDLs. No corrective action was necessary for bromodichloromethane, chloroform, dibromochloromethane, or chloride as these analytes were either not detected in environmental samples or detected at concentrations greater than five times the blank result. Antimony in the OBS-MW1 duplicate environmental sample and copper in both OBS-MW1 environmental samples were detected at concentrations less than five times the associated EB result, and the results were 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 April 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 April 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 (CCBA-MW2 and OBS-MW3) to simulate the transfer of environmental samples from the sampling system to the sample container.

**SWMUs 8/58, CCBA-MW1.** The VOC compounds bromodichloromethane, 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, 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 and the results for potassium-40 activity in the CCBA-MW1 and CCBA-MW2 environmental samples, the OBS-MW1 duplicate environmental sample, and the OBS-MW2 environmental sample were qualified as unusable. No other 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 April 2012 sampling activities.

# 5.0 Summary

During the Second Quarter of CY 2012, samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58; and 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 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 CCBA-MW1 environmental sample at a concentration of 4.93 mg/L. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities.

Analytical parameters for 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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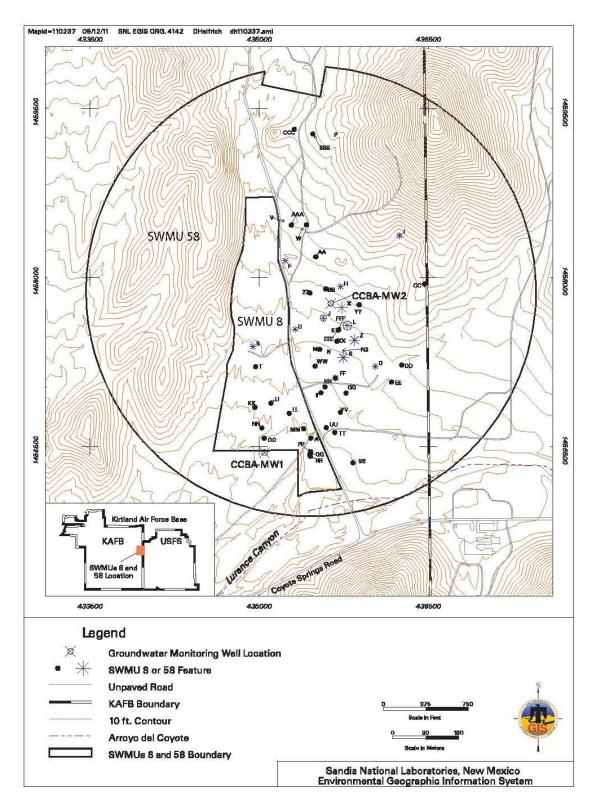
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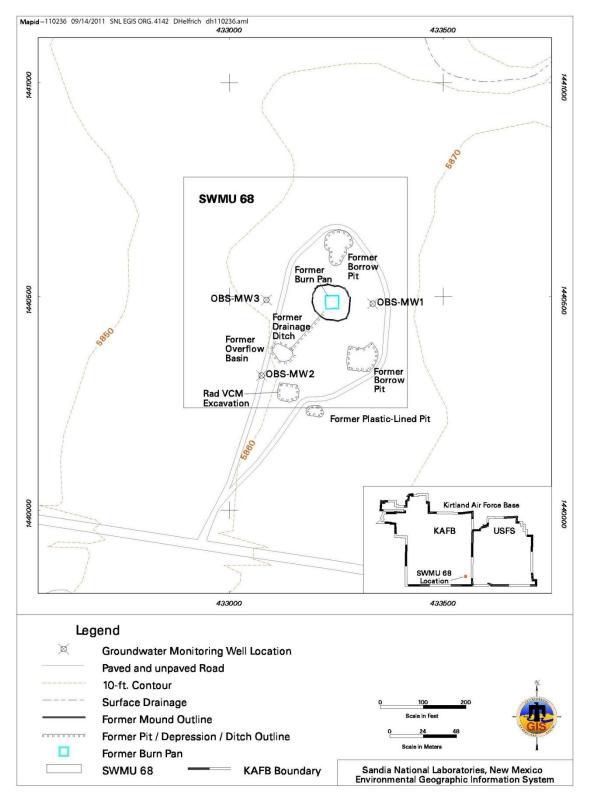
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# Figures





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





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 <sup>a</sup>	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 <sup>b</sup>	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO <sub>3</sub> , 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 <sup>c</sup>	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 <sub>2</sub> SO <sub>4</sub> , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Gamma Spectroscopy <sup>d</sup>	EPA 901.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

#### Notes

<sup>a</sup>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, Washington, D.C.

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<sup>b</sup>Metals = TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

<sup>c</sup>Major anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.

<sup>d</sup>Gamma 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.
- $HNO_3$  = 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 Second Quarter, CY 2012 Groundwater Sampling Solid Waste Management Units 8/58 and 68 Groundwater Monitoring Quarterly Assessment April – June 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation		
CCBA-MW1	092291	614155			
CCBA-MW2	092296	614157	SWMUs 8/58		
CCBA-MW2 (dup)	092297	014157			
OBS-MW1	092022	614081			
OBS-MW1 (dup)	092023	014081	SWMU 68		
OBS-MW2	092025	614082	3001010 68		
OBS-MW3	092018	614079			

#### Notes

AR/COC	= Analysis Request/Chain of Custody.
CCBA	= Coyote Canyon Blast Area.
CY	= Calendar Year.
dun	= Dunlicate environmental sample

Duplicate environmental sample.Monitoring well. dup MW

OBS = Old Burn Site.

SWMU = Solid Waste Management Unit.

### Summary of Field Water Quality Measurements<sup>a</sup>

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

Well ID	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	23-Apr-12	16.51	509	112.5	6.96	0.40	28.8	2.80
CCBA-MW2	24-Apr-12	18.90	610	102.0	7.87	0.48	63.5	5.86
SWMU 68		•				•		
OBS-MW1	18-Apr-12	17.70	531	99.5	7.75	0.47	39.0	3.71
OBS-MW2	19-Apr-12	17.54	531	100.7	7.73	0.46	39.2	3.74
OBS-MW3	17-Apr-12	16.39	531	30.6	7.74	0.52	43.4	4.24

#### Notes

<sup>a</sup>Field measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

 $\mu$ mhos/cm = Micromhos per centimeter.

- CCBA = Coyote Canyon Blast Area.
- = Identification. ID

Milligrams per liter.Millivolts. mg/L

- mV
- MW
- Monitoring well.Nephelometric turbidity units. NTU
- OBS = Old Burn Site.
- = Potential of hydrogen (negative logarithm of the hydrogen ion concentration). pН
- SWMU = Solid Waste Management Unit.

# Method Detection Limits for Volatile and Semivolatile Organic Compounds Solid Waste Management Units 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2012

Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (μg/L)	Analytica Method <sup>a</sup>
1,1,1-Trichloroethane	0.300	8260B	1,2,4-Trichlorobenzene	3.00 - 3.16	8270C	Di-n-butyl phthalate	3.00 - 3.16	8270C
1,1,2,2-Tetrachloroethane	0.300	8260B	1,2-Dichlorobenzene	3.00 - 3.16	8270C	Di-n-octyl phthalate	3.00 - 3.16	8270C
1,1,2-Trichloroethane	0.300	8260B	1,3-Dichlorobenzene	3.00 - 3.16	8270C	Dibenz[a,h]anthracene	0.300 - 0.316	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	3.00 - 3.16	8270C	Dibenzofuran	3.00 - 3.16	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	3.00 - 3.16	8270C	Diethylphthalate	3.00 - 3.16	8270C
1,2-Dichloroethane	0.300	8260B	2,4,6-Trichlorophenol	3.00 - 3.16	8270C	Dimethylphthalate	3.00 - 3.16	8270C
1,2-Dichloropropane	0.300	8260B	2,4-Dichlorophenol	3.00 - 3.16	8270C	Dinitro-o-cresol	3.00 - 3.16	8270C
2-Butanone	2.00	8260B	2,4-Dimethylphenol	3.00 - 3.16	8270C	Diphenyl amine	3.00 - 3.16	8270C
2-Hexanone	2.20	8260B	2,4-Dinitrophenol	5.00 - 5.26	8270C	Fluoranthene	0.300 - 0.316	8270C
4-methyl-, 2-Pentanone	1.50	8260B	2,4-Dinitrotoluene	3.00 - 3.16	8270C	Fluorene	0.300 - 0.316	8270C
Acetone	3.00	8260B	2,6-Dinitrotoluene	3.00 - 3.16	8270C	Hexachlorobenzene	3.00 - 3.16	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.300 - 0.316	8270C	Hexachlorobutadiene	3.00 - 3.16	8270C
Bromodichloromethane	0.300	8260B	2-Chlorophenol	3.00 - 3.16	8270C	Hexachlorocyclopentadiene	3.00 - 3.16	8270C
Bromoform	0.300	8260B	2-Methylnaphthalene	0.003 - 0.316	8270C	Hexachloroethane	3.00 - 3.16	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	3.00 - 3.16	8270C	Indeno(1,2,3-c,d)pyrene	0.300 - 0.316	8270C
Carbon disulfide	1.50	8260B	2-Nitrophenol	3.00 - 3.16	8270C	Isophorone	3.00 - 3.16	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	3.00 - 3.16	8270C	Naphthalene	0.300 - 0.316	8270C
Chlorobenzene	0.300	8260B	3-Nitroaniline	3.00 - 3.16	8270C	Nitro-benzene	3.00 - 3.16	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	3.00 - 3.16	8270C	Pentachlorophenol	3.00 - 3.16	8270C
Chloroform	0.300	8260B	4-Chloro-3-methylphenol	3.00 - 3.16	8270C	Phenanthrene	0.300 - 0.316	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	3.00 - 3.16	8270C	Phenol	3.00 - 3.16	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	3.00 - 3.16	8270C	Pyrene	0.300 - 0.316	8270C
Ethyl benzene	0.300	8260B	4-Nitroaniline	3.00 - 3.16	8270C	bis(2-Chloroethoxy)methane	3.00 - 3.16	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	3.00 - 3.16	8270C	bis(2-Chloroethyl)ether	3.00 - 3.16	8270C
Styrene	0.300	8260B	Acenaphthene	0.300 - 0.316	8270C	bis(2-Ethylhexyl)phthalate	3.00 - 3.16	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.300 - 0.316	8270C	bis-Chloroisopropyl ether	3.00 - 3.16	8270C
Toluene	0.300	8260B	Anthracene	0.300 - 0.316	8270C	m,p-Cresol	3.00 - 3.16	8270C
Trichloroethene	0.300	8260B	Benzo(a)anthracene	0.300 - 0.316	8270C	n-Nitrosodipropylamine	3.00 - 3.16	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.300 - 0.316	8270C	o-Cresol	3.00 - 3.16	8270C
Vinyl chloride	0.300	8260B	Benzo(b)fluoranthene	0.300 - 0.316	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.300 - 0.316	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.300 - 0.316	8270C			
cis-1,3-Dichloropropene	0.300	8260B	Butylbenzyl phthalate	3.00 - 3.16	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.300 - 0.316	8270C			
trans-1,3-Dichloropropene	0.300	8260B	Chrysene	0.300 - 0.316	8270C			

# Table IV-4 (Continued)Method Detection Limits for Volatile and Semivolatile Organic CompoundsSolid Waste Management Units 8/58 and 68 Groundwater MonitoringQuarterly Assessment, April – June 2012

			SWI	AU 68				
Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>
1,1,1-Trichloroethane	0.300	8260B	1,2,4-Trichlorobenzene	2.83 - 3.00	8270C	Di-n-butyl phthalate	2.83 - 3.00	8270C
1,1,2,2-Tetrachloroethane	0.300	8260B	1,2-Dichlorobenzene	2.83 - 3.00	8270C	Di-n-octyl phthalate	2.83 - 3.00	8270C
1,1,2-Trichloroethane	0.300	8260B	1,3-Dichlorobenzene	2.83 - 3.00	8270C	Dibenz[a,h]anthracene	0.283 - 0.300	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	2.83 - 3.00	8270C	Dibenzofuran	2.83 - 3.00	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	2.83 - 3.00	8270C	Diethylphthalate	2.83 - 3.00	8270C
1,2-Dichloroethane	0.300	8260B	2,4,6-Trichlorophenol	2.83 - 3.00	8270C	Dimethylphthalate	2.83 - 3.00	8270C
1,2-Dichloropropane	0.300	8260B	2,4-Dichlorophenol	2.83 - 3.00	8270C	Dinitro-o-cresol	2.83 - 3.00	8270C
2-Butanone	2.00	8260B	2,4-Dimethylphenol	2.83 - 3.00	8270C	Diphenyl amine	2.83 - 3.00	8270C
2-Hexanone	2.22	8260B	2,4-Dinitrophenol	4.72 - 5.00	8270C	Fluoranthene	0.283 - 0.300	8270C
4-methyl-, 2-Pentanone	1.50	8260B	2,4-Dinitrotoluene	2.83 - 3.00	8270C	Fluorene	0.283 - 0.300	8270C
Acetone	3.00	8260B	2,6-Dinitrotoluene	2.83 - 3.00	8270C	Hexachlorobenzene	2.83 - 3.00	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.283 - 0.300	8270C	Hexachlorobutadiene	2.83 - 3.00	8270C
Bromodichloromethane	0.300	8260B	2-Chlorophenol	2.83 - 3.00	8270C	Hexachlorocyclopentadiene	2.83 - 3.00	8270C
Bromoform	0.300	8260B	2-Methylnaphthalene	0.283 - 0.300	8270C	Hexachloroethane	2.83 - 3.00	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	2.83 - 3.00	8270C	Indeno(1,2,3-c,d)pyrene	0.283 - 0.300	8270C
Carbon disulfide	1.50	8260B	2-Nitrophenol	2.83 - 3.00	8270C	Isophorone	2.83 - 3.00	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	2.83 - 3.00	8270C	Naphthalene	0.283 - 0.300	8270C
Chlorobenzene	0.300	8260B	3-Nitroaniline	2.83 - 3.00	8270C	Nitro-benzene	2.83 - 3.00	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	2.83 - 3.00	8270C	Pentachlorophenol	2.83 - 3.00	8270C
Chloroform	0.300	8260B	4-Chloro-3-methylphenol	2.83 - 3.00	8270C	Phenanthrene	0.283 - 0.300	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	2.83 - 3.00	8270C	Phenol	2.83 - 3.00	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	2.83 - 3.00	8270C	Pyrene	0.283 - 0.300	8270C
Ethyl benzene	0.300	8260B	4-Nitroaniline	2.83 - 3.00	8270C	bis(1-Chloroisopropyl)ether	2.83 - 3.00	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	2.83 - 3.00	8270C	bis(2-Chloroethoxy)methane	2.83 - 3.00	8270C
Styrene	0.300	8260B	Acenaphthene	0.283 - 0.300	8270C	bis(2-Chloroethyl)ether	2.83 - 3.00	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.283 - 0.300	8270C	bis(2-Ethylhexyl)phthalate	2.83 - 3.00	8270C
Toluene	0.300	8260B	Anthracene	0.283 - 0.300	8270C	m,p-Cresol	2.83 - 3.00	8270C
Trichloroethene	0.300	8260B	Benzo(a)anthracene	0.283 - 0.300	8270C	n-Nitrosodipropylamine	2.83 - 3.00	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.283 - 0.300	8270C	o-Cresol	2.83 - 3.00	8270C
Vinyl chloride	0.300	8260B	Benzo(b)fluoranthene	0.283 - 0.300	8270C		·	
Xylene	0.300	8260B	Benzo(ghi)perylene	0.283 - 0.300	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.283 - 0.300	8270C			
cis-1,3-Dichloropropene	0.300	8260B	Butylbenzyl phthalate	2.83 - 3.00	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.283 - 0.300	8270C			
trans-1,3-Dichloropropene	0.300	8260B	Chrysene	0.283 - 0.300	8270C			

# Table IV-4 (Concluded)Method Detection Limits for Volatile and Semivolatile Organic CompoundsSolid Waste Management Units 8/58 and 68 Groundwater MonitoringQuarterly Assessment, April – June 2012

#### Notes

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

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

μg/L = Micrograms per liter.

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) Solid Waste Management Units 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2012

	М	DL
Analyte	(μο	g/L)
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0833 – 0.0899	0.0833 - 0.0894
1,3-Dinitrobenzene	0.0833 - 0.0899	0.0833 - 0.0894
2,4,6-Trinitrotoluene	0.0833 - 0.0899	0.0833 - 0.0894
2,4-Dinitrotoluene	0.0833 - 0.0899	0.0833 - 0.0894
2,6-Dinitrotoluene	0.0833 - 0.0899	0.0833 - 0.0894
2-Amino-4,6-dinitrotoluene	0.0833 - 0.0899	0.0833 - 0.0894
2-Nitrotoluene	0.0854 – 0.0921	0.0854 - 0.0916
3-Nitrotoluene	0.0833 - 0.0899	0.0833 - 0.0894
4-Amino-2,6-dinitrotoluene	0.0833 - 0.0899	0.0833 - 0.0894
4-Nitrotoluene	0.156 – 0.169	0.1560 – 0.1680
HMX	0.0833 – 0.0899	0.0833 - 0.0894
Nitrobenzene	0.0833 – 0.0899	0.0833 - 0.0894
PETN	0.104 – 0.112	0.1040 – 0.1120
RDX	0.0833 – 0.0899	0.0833 - 0.0894
Tetryl	0.0833 – 0.0899	0.0833 - 0.0894

#### 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.
PETN	= Pentaerythritol tetranitrate.
RDX	= Hexahydro-trinitro-triazine.
SWMU	= Solid Waste Management Unit.

Tetryl = 2,4,6-trinitrophenylmethylnitramine.

#### **Summary of Nitrate Plus Nitrite Results**

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### Quarterly Assessment, April – June 2012

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMUs 8/58							•		
CCBA-MW1 23-Apr-12	Nitrate plus nitrite as N	2.17	0.170	0.500	10.0			092291-018	EPA 353.2
CCBA-MW2 24-Apr-12	Nitrate plus nitrite as N	3.72	0.170	0.500	10.0			092296-018	EPA 353.2
CCBA-MW2 (Duplicate) 24-Apr-12	Nitrate plus nitrite as N	3.14	0.170	0.500	10.0			092297-018	EPA 353.2
SWMU 68						-			
<b>OBS-MW1</b> 18-Apr-12	Nitrate plus nitrite as N	1.80	0.170	0.500	10.0			092022-018	EPA 353.2
OBS-MW1 (Duplicate) 18-Apr-12	Nitrate plus nitrite as N	1.85	0.170	0.500	10.0			092023-018	EPA 353.2
<b>OBS-MW2</b> 19-Apr-12	Nitrate plus nitrite as N	1.43	0.085	0.250	10.0			092025-018	EPA 353.2
OBS-MW3 17-Apr-12	Nitrate plus nitrite as N	1.61	0.170	0.500	10.0			092018-018	EPA 353.2

#### Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

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 Solid Waste Management Units 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2012

Notes (continued)

<sup>a</sup>Laboratory Qualifier

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMUs 8/58									
CCBA-MW1	Bicarbonate Alkalinity	185	0.725	1.00	NE			092291-022	SM2320B
23-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092291-022	SM2320B
-	Bromide	0.312	0.067	0.200	NE			092291-016	SW846 9056
	Chloride	24.4	0.335	1.00	NE			092291-016	SW846 9056
	Fluoride	4.93	0.033	0.100	4.0			092291-016	SW846 9056
	Sulfate	49.3	0.665	2.00	NE			092291-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092291-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	180	0.725	1.00	NE			092296-022	SM2320B
24-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092296-022	SM2320B
	Bromide	0.545	0.067	0.200	NE			092296-016	SW846 9056
	Chloride	32.7	0.670	2.00	NE			092296-016	SW846 9056
	Fluoride	1.54	0.033	0.100	4.0			092296-016	SW846 9056
	Sulfate	86.6	1.33	4.00	NE			092296-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092296-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	183	0.725	1.00	NE			092297-022	SM2320B
(Duplicate)	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092297-022	SM2320B
24-Apr-12	Bromide	0.566	0.067	0.200	NE			092297-016	SW846 9056
	Chloride	34.2	0.670	2.00	NE			092297-016	SW846 9056
	Fluoride	1.54	0.033	0.100	4.0			092297-016	SW846 9056
	Sulfate	90.2	1.33	4.00	NE			092297-016	SW846 9056
	Total Cyanide	0.00441	0.00167	0.005	0.200	J	NJ-	092297-027	SW846 9012

# Table IV-7 (Continued)

#### Summary of Alkalinity, Anion, and Total Cyanide Results

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMU 68		(ing/L)	(iiig/L)	(iiig/L)	(ilig/L)	Quanner	Quanner	Number	Method
OBS-MW1	Bicarbonate Alkalinity	188	0.725	1.00	NE			092022-022	SM2320B
18-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092022-022	SM2320B
•	Bromide	0.360	0.067	0.200	NE			092022-016	SW846 9056
	Chloride	21.8	0.335	1.00	NE			092022-016	SW846 9056
	Fluoride	1.99	0.033	0.100	4.0			092022-016	SW846 9056
	Sulfate	74.6	0.665	2.00	NE			092022-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092022-027	SW846 9012
OBS-MW1	Bicarbonate Alkalinity	188	0.725	1.00	NE			092023-022	SM2320B
(Duplicate)	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092023-022	SM2320B
18-Apr-12	Bromide	0.336	0.067	0.200	NE			092023-016	SW846 9056
	Chloride	21.7	0.335	1.00	NE			092023-016	SW846 9056
	Fluoride	2.01	0.033	0.100	4.0			092023-016	SW846 9056
	Sulfate	74.7	0.665	2.00	NE			092023-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092023-027	SW846 9012
OBS-MW2	Bicarbonate Alkalinity	178	0.725	1.00	NE			092025-022	SM2320B
19-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092025-022	SM2320B
	Bromide	0.335	0.067	0.200	NE			092025-016	SW846 9056
	Chloride	21.1	0.335	1.00	NE			092025-016	SW846 9056
	Fluoride	2.06	0.033	0.100	4.0			092025-016	SW846 9056
	Sulfate	83.6	0.665	2.00	NE			092025-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092025-027	SW846 9012
OBS-MW3	Bicarbonate Alkalinity	178	0.725	1.00	NE			092018-022	SM2320B
17-Apr-12	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092018-022	SM2320B
	Bromide	0.335	0.067	0.200	NE			092018-016	SW846 9056
	Chloride	21.9	0.335	1.00	NE			092018-016	SW846 9056
	Fluoride	2.10	0.033	0.100	4.0			092018-016	SW846 9056
	Sulfate	83.4	0.665	2.00	NE			092018-016	SW846 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092018-027	SW846 9012

#### Table IV-7 (Concluded)

#### Summary of Alkalinity, Anion, and Total Cyanide Results

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

#### Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.
- SW = Solid Waste.
- SWMU = Solid Waste Management Unit.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

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

#### <sup>c</sup>Analytical Method

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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*, 20<sup>th</sup> ed., Method 2320B.

#### Summary of Perchlorate Results

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### Quarterly Assessment, April – June 2012

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMUs 8/58					•			
<b>CCBA-MW1</b> 23-Apr-12	ND	0.004	0.012	NE	U		092291-020	EPA 314.0
CCBA-MW2 24-Apr-12	ND	0.004	0.012	NE	U		092296-020	EPA 314.0
CCBA-MW2 (Duplicate) 24-Apr-12	ND	0.004	0.012	NE	U		092297-020	EPA 314.0
SWMU 68	1			L	ł	L		
<b>OBS-MW1</b> 18-Apr-12	ND	0.004	0.012	NE	U		092022-020	EPA 314.0
OBS-MW1 (Duplicate) 18-Apr-12	ND	0.004	0.012	NE	U		092023-020	EPA 314.0
<b>OBS-MW2</b> 19-Apr-12	ND	0.004	0.012	NE	U		092025-020	EPA 314.0
<b>OBS-MW3</b> 17-Apr-12	ND	0.004	0.012	NE	U		092018-020	EPA 314.0

#### Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

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**

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

#### Notes (continued)

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical 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**

#### Solid Waste Management Unit 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

Well ID	Hexavalent Chromium Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>OBS-MW1</b> 18-Apr-12	ND	0.0033	0.010	NE	U		092022-014	SW846 7196A
<b>OBS-MW1</b> (Duplicate) 18-Apr-12	ND	0.0033	0.010	NE	U		092023-014	SW846 7196A
<b>OBS-MW2</b> 19-Apr-12	ND	0.0033	0.010	NE	U		092025-014	SW846 7196A
<b>OBS-MW3</b> 17-Apr-12	ND	0.0033	0.010	NE	U		092018-014	SW846 7196A

#### Notes

- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.

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.

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical 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

#### Solid Waste Management Units 8/58 Groundwater Monitoring

Well ID	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
CCBA-MW1	Aluminum	0.0307	0.015	0.050	NE	J		092291-009	SW846 6020
23-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092291-009	SW846 6020
	Arsenic	0.00186	0.0017	0.005	0.010	J		092291-009	SW846 6020
	Barium	0.00425	0.0006	0.002	2.00			092291-009	SW846 6020
	Beryllium	0.00049	0.0002	0.0005	0.004	J		092291-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092291-009	SW846 6020
	Calcium	41.8	0.060	0.200	NE	В	J	092291-009	SW846 6020
	Chromium	0.00369	0.002	0.010	0.100	B, J	0.01885U	092291-009	SW846 6020
	Cobalt	0.000149	0.0001	0.001	NE	J		092291-009	SW846 6020
	Copper	0.000704	0.00035	0.001	NE	J		092291-009	SW846 6020
	Iron	0.163	0.033	0.100	NE			092291-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092291-009	SW846 6020
	Magnesium	9.64	0.010	0.030	NE			092291-009	SW846 6020
	Manganese	0.00714	0.001	0.005	NE			092291-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092291-009	SW846 7470
	Nickel	0.00117	0.0005	0.002	NE	J		092291-009	SW846 6020
	Potassium	4.22	0.080	0.300	NE			092291-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		092291-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092291-009	SW846 6020
	Sodium	67.0	0.400	1.25	NE			092291-009	SW846 6020
	Thallium	0.000674	0.00045	0.002	0.002	J	0.0038U	092291-009	SW846 6020
	Uranium	0.002	0.000067	0.0002	0.03			092291-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092291-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092291-009	SW846 6020

#### Table IV-10 (Continued)

#### Summary of Unfiltered Total Metal Results

#### Solid Waste Management Units 8/58 Groundwater Monitoring

Well ID	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		092296-009	SW846 6020
24-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092296-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092296-009	SW846 6020
	Barium	0.0452	0.0006	0.002	2.00			092296-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092296-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092296-009	SW846 6020
	Calcium	73.4	0.300	1.00	NE	В	J	092296-009	SW846 6020
	Chromium	0.00355	0.002	0.010	0.100	B, J	0.01885U	092296-009	SW846 6020
	Cobalt	0.000131	0.0001	0.001	NE	J		092296-009	SW846 6020
	Copper	0.00118	0.00035	0.001	NE		0.00555U	092296-009	SW846 6020
	Iron	0.286	0.033	0.100	NE			092296-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092296-009	SW846 6020
	Magnesium	14.8	0.010	0.030	NE			092296-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092296-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092296-009	SW846 7470
	Nickel	0.00134	0.0005	0.002	NE	J		092296-009	SW846 6020
	Potassium	1.37	0.080	0.300	NE			092296-009	SW846 6020
	Selenium	0.00269	0.0015	0.005	0.050	J		092296-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092296-009	SW846 6020
	Sodium	42.9	0.080	0.250	NE			092296-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092296-009	SW846 6020
	Uranium	0.00565	0.000067	0.0002	0.03			092296-009	SW846 6020
	Vanadium	0.00939	0.001	0.005	NE			092296-009	SW846 6010
	Zinc	0.00714	0.0035	0.010	NE	J		092296-009	SW846 6020

#### Table IV-10 (Continued)

#### Summary of Unfiltered Total Metal Results

#### Solid Waste Management Units 8/58 Groundwater Monitoring

Well ID	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		092297-009	SW846 6020
(Duplicate)	Antimony	0.0011	0.001	0.003	0.006	J		092297-009	SW846 6020
24-Apr-12	Arsenic	ND	0.0017	0.005	0.010	U		092297-009	SW846 6020
	Barium	0.0461	0.0006	0.002	2.00			092297-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092297-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092297-009	SW846 6020
	Calcium	71.8	0.300	1.00	NE	В	J	092297-009	SW846 6020
	Chromium	0.00415	0.002	0.010	0.100	B, J	0.01885U	092297-009	SW846 6020
	Cobalt	0.000139	0.0001	0.001	NE	J		092297-009	SW846 6020
	Copper	0.00122	0.00035	0.001	NE		0.00555U	092297-009	SW846 6020
	Iron	0.294	0.033	0.100	NE			092297-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092297-009	SW846 6020
	Magnesium	14.6	0.010	0.030	NE			092297-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092297-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092297-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	J		092297-009	SW846 6020
	Potassium	1.49	0.080	0.300	NE			092297-009	SW846 6020
	Selenium	0.00245	0.0015	0.005	0.050	J		092297-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092297-009	SW846 6020
	Sodium	43.4	0.080	0.250	NE			092297-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092297-009	SW846 6020
	Uranium	0.00579	0.000067	0.0002	0.03			092297-009	SW846 6020
	Vanadium	0.00955	0.001	0.005	NE			092297-009	SW846 6010
	Zinc	0.00647	0.0035	0.010	NE	J		092297-009	SW846 6020

#### Table IV-10 (Concluded)

#### Summary of Unfiltered Total Metal Results

#### Solid Waste Management Units 8/58 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

#### Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory 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.

#### <sup>b</sup>Validation 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.

#### <sup>c</sup>Analytical 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

### Solid Waste Management Unit 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW1	Aluminum	0.028	0.015	0.050	NE	J		092022-009	SW846 6020
18-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092022-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092022-009	SW846 6020
	Barium	0.0202	0.0006	0.002	2.00			092022-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092022-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092022-009	SW846 6020
	Calcium	77.5	0.300	1.00	NE			092022-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092022-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092022-009	SW846 6020
	Copper	0.000517	0.00035	0.001	NE	J	0.0065U	092022-009	SW846 6020
	Iron	0.120	0.033	0.100	NE			092022-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092022-009	SW846 6020
	Magnesium	16.1	0.010	0.030	NE			092022-009	SW846 6020
	Manganese	0.00114	0.001	0.005	NE	J		092022-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092022-009	SW846 7470
	Nickel	0.000961	0.0005	0.002	NE	J		092022-009	SW846 6020
	Potassium	1.71	0.080	0.300	NE			092022-009	SW846 6020
	Selenium	0.00272	0.0015	0.005	0.050	J		092022-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092022-009	SW846 6020
	Sodium	22.9	0.080	0.250	NE			092022-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092022-009	SW846 6020
	Uranium	0.0104	0.000067	0.0002	0.03			092022-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092022-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092022-009	SW846 6020

## Table IV-11 (Continued)

### Summary of Unfiltered Total Metal Results

### Solid Waste Management Unit 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW1	Aluminum	ND	0.015	0.050	NE	U		092023-009	SW846 6020
(Duplicate)	Antimony	0.0013	0.001	0.003	0.006	J	0.0064U	092023-009	SW846 6020
18-Apr-12	Arsenic	ND	0.0017	0.005	0.010	U		092023-009	SW846 6020
-	Barium	0.0193	0.0006	0.002	2.00			092023-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092023-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092023-009	SW846 6020
	Calcium	78.7	0.300	1.00	NE			092023-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092023-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092023-009	SW846 6020
	Copper	0.000514	0.00035	0.001	NE	J	0.0065U	092023-009	SW846 6020
	Iron	0.132	0.033	0.100	NE			092023-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092023-009	SW846 6020
	Magnesium	16.6	0.010	0.030	NE			092023-009	SW846 6020
	Manganese	0.00111	0.001	0.005	NE	J		092023-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092023-009	SW846 7470
	Nickel	0.000945	0.0005	0.002	NE	J		092023-009	SW846 6020
	Potassium	1.85	0.080	0.300	NE			092023-009	SW846 6020
	Selenium	0.00278	0.0015	0.005	0.050	J		092023-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092023-009	SW846 6020
	Sodium	23.3	0.080	0.250	NE			092023-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092023-009	SW846 6020
	Uranium	0.0106	0.000067	0.0002	0.03			092023-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		092023-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092023-009	SW846 6020

## Table IV-11 (Continued)

### Summary of Unfiltered Total Metal Results

### Solid Waste Management Unit 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		092025-009	SW846 6020
19-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092025-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092025-009	SW846 6020
	Barium	0.0222	0.0006	0.002	2.00			092025-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092025-009	SW846 6020
	Cadmium	0.000133	0.00011	0.001	0.005	B, J	U	092025-009	SW846 6020
	Calcium	81.5	0.600	2.00	NE			092025-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		092025-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		092025-009	SW846 6020
	Copper	0.000369	0.00035	0.001	NE	J		092025-009	SW846 6020
	Iron	0.138	0.033	0.100	NE			092025-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092025-009	SW846 6020
	Magnesium	20.0	0.100	0.300	NE			092025-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092025-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092025-009	SW846 7470
	Nickel	0.000929	0.0005	0.002	NE	J		092025-009	SW846 6020
	Potassium	1.78	0.080	0.300	NE			092025-009	SW846 6020
	Selenium	0.00324	0.0015	0.005	0.050	J		092025-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092025-009	SW846 6020
	Sodium	29.0	0.800	2.50	NE			092025-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092025-009	SW846 6020
	Uranium	0.0141	0.000067	0.0002	0.03			092025-009	SW846 6020
	Vanadium	0.00126	0.001	0.005	NE	J		092025-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092025-009	SW846 6020

## Table IV-11 (Continued)

### Summary of Unfiltered Total Metal Results

### Solid Waste Management Unit 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		092018-009	SW846 6020
17-Apr-12	Antimony	ND	0.001	0.003	0.006	U		092018-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092018-009	SW846 6020
	Barium	0.0259	0.0006	0.002	2.00			092018-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092018-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092018-009	SW846 6020
	Calcium	78.7	0.300	1.00	NE	В		092018-009	SW846 6020
	Chromium	0.00219	0.002	0.010	0.100	B, J	0.0109U	092018-009	SW846 6020
	Cobalt	0.000154	0.0001	0.001	NE	J		092018-009	SW846 6020
	Copper	0.00101	0.00035	0.001	NE			092018-009	SW846 6020
	Iron	0.258	0.033	0.100	NE			092018-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		092018-009	SW846 6020
	Magnesium	16.2	0.010	0.030	NE		J	092018-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		092018-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092018-009	SW846 7470
	Nickel	0.00143	0.0005	0.002	NE	J		092018-009	SW846 6020
	Potassium	1.69	0.080	0.300	NE			092018-009	SW846 6020
	Selenium	0.00286	0.0015	0.005	0.050	J		092018-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		092018-009	SW846 6020
	Sodium	22.4	0.080	0.250	NE			092018-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		092018-009	SW846 6020
	Uranium	0.0116	0.000067	0.0002	0.03			092018-009	SW846 6020
	Vanadium	0.00128	0.001	0.005	NE	J		092018-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		092018-009	SW846 6020

#### Table IV-11 (Concluded)

#### **Summary of Unfiltered Total Metal Results**

#### Solid Waste Management Unit 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

#### Notes

- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

#### <sup>a</sup>Laboratory 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.

#### <sup>b</sup>Validation 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.

#### <sup>c</sup>Analytical 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

# Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMUs 8/58	L					4	L		
CCBA-MW1	Calcium	40.9	0.060	0.200	NE	В	J	092291-017	SW846 6020
23-Apr-12	Magnesium	8.61	0.010	0.030	NE			092291-017	SW846 6020
	Potassium	4.19	0.080	0.300	NE			092291-017	SW846 6020
	Sodium	61.3	0.400	1.25	NE			092291-017	SW846 6020
CCBA-MW2	Calcium	76.0	0.300	1.00	NE	В	J	092296-017	SW846 6020
24-Apr-12	Magnesium	13.2	0.010	0.030	NE			092296-017	SW846 6020
	Potassium	1.30	0.080	0.300	NE			092296-017	SW846 6020
	Sodium	44.5	0.080	0.250	NE			092296-017	SW846 6020
CCBA-MW2	Calcium	74.1	0.300	1.00	NE	В	J	092297-017	SW846 6020
(Duplicate)	Magnesium	13.4	0.010	0.030	NE			092297-017	SW846 6020
24-Apr-12	Potassium	1.41	0.080	0.300	NE			092297-017	SW846 6020
•	Sodium	47.6	0.080	0.250	NE			092297-017	SW846 6020
SWMU 68				•					
OBS-MW1	Calcium	83.8	0.300	1.00	NE			092022-017	SW846 6020
18-Apr-12	Magnesium	17.1	0.010	0.030	NE			092022-017	SW846 6020
•	Potassium	1.88	0.080	0.300	NE			092022-017	SW846 6020
	Sodium	24.4	0.080	0.250	NE			092022-017	SW846 6020
OBS-MW1	Calcium	80.0	0.300	1.00	NE			092023-017	SW846 6020
(Duplicate)	Magnesium	16.7	0.010	0.030	NE			092023-017	SW846 6020
18-Apr-12	Potassium	1.75	0.080	0.300	NE			092023-017	SW846 6020
•	Sodium	22.5	0.080	0.250	NE			092023-017	SW846 6020
OBS-MW2	Calcium	90.2	0.600	2.00	NE			092025-017	SW846 6020
19-Apr-12	Magnesium	20.6	0.100	0.300	NE			092025-017	SW846 6020
•	Potassium	1.73	0.080	0.300	NE			092025-017	SW846 6020
	Sodium	28.4	0.800	2.50	NE			092025-017	SW846 6020
OBS-MW3	Calcium	79.5	0.300	1.00	NE	В		092018-017	SW846 6020
17-Apr-12	Magnesium	17.2	0.010	0.030	NE	1	J	092018-017	SW846 6020
	Potassium	1.69	0.080	0.300	NE	ľ		092018-017	SW846 6020
	Sodium	23.0	0.080	0.250	NE	1		092018-017	SW846 6020

#### Table IV-12 (Concluded)

#### **Summary of Filtered Cation Results**

### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

#### Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.
- SW = Solid Waste.
- SWMU = Solid Waste Management Unit.

#### <sup>a</sup>Laboratory Qualifier

B = The analyte was detected in the blank above the effective MDL.

#### <sup>b</sup>Validation 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.

#### <sup>c</sup>Analytical Method

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

#### Table IV-13

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

### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
SWMUs 8/58									
CCBA-MW1	Americium-241	-3.18 ± 16.1	23.6	11.6	NE	U	BD	092291-033	EPA 901.1
23-Apr-12	Cesium-137	-0.851 ± 3.13	4.48	2.18	NE	U	BD	092291-033	EPA 901.1
	Cobalt-60	$0.875\pm2.54$	4.54	2.18	NE	U	BD	092291-033	EPA 901.1
	Potassium-40	97.0 ± 41.1	40.9	19.5	NE	Х	R	092291-033	EPA 901.1
	Gross Alpha	-0.42	NA	NA	15 pCi/L	NA	None	092291-034	EPA 900.0
	Gross Beta	$4.93 \pm 1.11$	0.942	0.449	4mrem/yr			092291-034	EPA 900.0
	Uranium-233/234	1.74 ± 0.280	0.0805	0.0343	NE			092291-035	HASL-300
	Uranium-235/236	$0.0382 \pm 0.0358$	0.0571	0.0211	NE	U	BD	092291-035	HASL-300
	Uranium-238	$0.561 \pm 0.123$	0.0402	0.0141	NE			092291-035	HASL-300
CCBA-MW2	Americium-241	$0.557 \pm 6.16$	10.6	5.20	NE	U	BD	092296-033	EPA 901.1
24-Apr-12	Cesium-137	$2.51 \pm 2.35$	3.37	1.63	NE	U	BD	092296-033	EPA 901.1
	Cobalt-60	-2.58 ± 3.17	3.62	1.73	NE	U	BD	092296-033	EPA 901.1
	Potassium-40	$33.4 \pm 45.4$	28.7	13.5	NE	Х	R	092296-033	EPA 901.1
	Gross Alpha	5.18	NA	NA	15 pCi/L	NA	None	092296-034	EPA 900.0
	Gross Beta	2.17 ± 1.25	1.94	0.946	4mrem/yr		J	092296-034	EPA 900.0
	Uranium-233/234	$7.15 \pm 0.906$	0.045	0.0192	NE			092296-035	HASL-300
	Uranium-235/236	$0.0764 \pm 0.0325$	0.0319	0.0118	NE		J	092296-035	HASL-300
	Uranium-238	$1.69 \pm 0.241$	0.0225	0.00789	NE			092296-035	HASL-300
CCBA-MW2 (Duplicate)	Americium-241	$7.53 \pm 5.44$	7.54	3.35	NE	U	BD	092297-033	EPA 901.1
24-Apr-12	Cesium-137	$-1.72 \pm 6.12$	6.27	3.07	NE	U	BD	092297-033	EPA 901.1
	Cobalt-60	$2.93 \pm 2.88$	4.73	2.26	NE	U	BD	092297-033	EPA 901.1
	Potassium-40	$-6.38 \pm 43.4$	51.7	24.8	NE	U	BD	092297-033	EPA 901.1
	Gross Alpha	2.13	NA	NA	15 pCi/L	NA	None	092297-034	EPA 900.0
	Gross Beta	1.94 ± 0.739	0.982	0.468	4mrem/yr		J	092297-034	EPA 900.0
	Uranium-233/234	$6.87\pm0.923$	0.0659	0.028	NE			092297-035	HASL-300
	Uranium-235/236	$0.0894 \pm 0.0426$	0.0467	0.0173	NE		J	092297-035	HASL-300
	Uranium-238	1.71 ± 0.266	0.0329	0.0115	NE			092297-035	HASL-300

#### Table IV-13 (Continued)

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

### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
SWMU 68									
OBS-MW1	Americium-241	$3.89 \pm 14.8$	21.8	10.7	NE	U	BD	092022-033	EPA 901.1
18-Apr-12	Cesium-137	1.73 ± 3.01	4.39	2.13	NE	U	BD	092022-033	EPA 901.1
	Cobalt-60	-1.1 ± 2.38	4.06	1.94	NE	U	BD	092022-033	EPA 901.1
	Potassium-40	59.5 ± 37.3	59.5	24.0	NE	U	BD	092022-033	EPA 901.1
	Gross Alpha	1.78	NA	NA	15 pCi/L	NA	None	092022-034	EPA 900.0
	Gross Beta	$3.12\pm1.15$	1.49	0.713	4mrem/yr		J	092022-034	EPA 900.0
	Uranium-233/234	17.9 ± 2.37	0.139	0.0618	NE			092022-035	HASL-300
	Uranium-235/236	$0.226 \pm 0.0879$	0.0803	0.0306	NE		J	092022-035	HASL-300
	Uranium-238	$3.29 \pm 0.499$	0.0893	0.0369	NE			092022-035	HASL-300
OBS-MW1 (Duplicate)	Americium-241	8.25 ± 9.66	14.1	6.93	NE	U	BD	092023-033	EPA 901.1
18-Apr-12	Cesium-137	1.17 ± 2.00	3.34	1.62	NE	U	BD	092023-033	EPA 901.1
	Cobalt-60	$2.52 \pm 2.34$	3.77	1.80	NE	U	BD	092023-033	EPA 901.1
	Potassium-40	41.6 ± 42.3	32.0	15.1	NE	Х	R	092023-033	EPA 901.1
	Gross Alpha	1.07	NA	NA	15 pCi/L	NA	None	092023-034	EPA 900.0
	Gross Beta	3.53 ± 1.32	1.75	0.844	4mrem/yr		J	092023-034	EPA 900.0
	Uranium-233/234	16.6 ± 2.12	0.0792	0.0352	NE			092023-035	HASL-300
	Uranium-235/236	0.197 ± 0.0604	0.0457	0.0174	NE			092023-035	HASL-300
	Uranium-238	$3.13 \pm 0.438$	0.0509	0.021	NE			092023-035	HASL-300
OBS-MW2	Americium-241	-1.31 ± 28.3	41.0	20.2	NE	U	BD	092025-033	EPA 901.1
19-Apr-12	Cesium-137	2.54 ± 3.20	4.68	2.28	NE	U	BD	092025-033	EPA 901.1
-	Cobalt-60	$-2.36 \pm 3.21$	5.09	2.45	NE	U	BD	092025-033	EPA 901.1
	Potassium-40	$92.2\pm49.6$	50.4	24.2	NE	Х	BD	092025-033	EPA 901.1
	Gross Alpha	-0.95	NA	NA	15 pCi/L	NA	None	092025-034	EPA 900.0
	Gross Beta	3.97 ± 1.57	2.16	1.05	4mrem/yr		J	092025-034	EPA 900.0
	Uranium-233/234	20.1 ± 2.58	0.0825	0.0366	NE			092025-035	HASL-300
	Uranium-235/236	$0.272 \pm 0.0745$	0.0476	0.0181	NE			092025-035	HASL-300
	Uranium-238	$3.88 \pm 0.536$	0.053	0.0219	NE			092025-035	HASL-300

### Table IV-13 (Continued)

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

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
SWMU 68									
OBS-MW3	Americium-241	4.72 ± 11.0	17.9	8.84	NE	U	BD	092018-033	EPA 901.1
17-Apr-12	Cesium-137	$0.685 \pm 2.56$	3.87	1.87	NE	U	BD	092018-033	EPA 901.1
	Cobalt-60	$1.12 \pm 2.45$	4.32	2.06	NE	U	BD	092018-033	EPA 901.1
	Potassium-40	-27.2 ± 43.1	50.8	24.4	NE	U	BD	092018-033	EPA 901.1
	Gross Alpha	8.08	NA	NA	15 pCi/L	NA	None	092018-034	EPA 900.0
	Gross Beta	$3.48 \pm 1.15$	1.34	0.639	4mrem/yr		J	092018-034	EPA 900.0
	Uranium-233/234	$20.6\pm2.66$	0.0908	0.0403	NE			092018-035	HASL-300
	Uranium-235/236	$0.240 \pm 0.073$	0.0524	0.020	NE			092018-035	HASL-300
	Uranium-238	$3.88\pm0.545$	0.0584	0.0241	NE			092018-035	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.

<sup>a</sup>Activities 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).

<sup>b</sup>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. 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

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

#### Notes (continued)

#### <sup>c</sup>Laboratory Qualifier

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

#### <sup>d</sup>Validation Qualifier

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

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

#### <sup>e</sup>Analytical Method

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

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

#### Table IV-14

#### Summary of Constituents Detected above Established MCLs

#### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessments through June 2012**

Well ID	Date	Analyte	Result	MCL	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36 mg/L	4.0 mg/L			091345-016	SW846 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091615-016	SW846 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091616-016	SW846 9056
CCBA-MW1	23-Apr-12	Fluoride	4.93 mg/L	4.0 mg/L			092291-016	SW846 9056

#### Notes

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.

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.

#### <sup>a</sup>Laboratory Qualifier

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

### Table IV-15

## Summary of Duplicate Samples

## Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup>
	mg/L unless othe	erwise noted	
CCBA-MW2	0.70		47
Nitrate plus Nitrite	3.72	3.14	17
Bicarbonate Alkalinity	180	183	2
Bromide	0.545	0.566	4
Chloride	32.7	34.2	4
Fluoride	1.54	1.54	< 1
Sulfate	86.6	90.2	4
Total Cyanide	ND	0.00441	NC
Antimony	ND	0.0011	NC
Barium	0.0452	0.0461	2
Calcium	73.4	71.8	2
Cobalt	0.000131	0.000139	6
Iron	0.286	0.294	3
Magnesium	14.8	14.6	1
Nickel	0.00134	0.0013	3
Potassium	1.37	1.49	8
Selenium	0.00269	0.00245	9
Sodium	42.9	43.4	1
Uranium	0.00565	0.00579	2
Vanadium	0.00939	0.00955	2
Zinc	0.00714	0.00647	10
Filtered Calcium	76.0	74.1	3
Filtered Magnesium	13.2	13.4	2
Filtered Potassium	1.30	1.41	8
Filtered Sodium	44.5	47.6	7
Gross Alpha (pCi/L)	5.18	2.13	NC
Gross Beta (pCi/L)	2.17 ± 1.25	$1.94 \pm 0.739$	NC
Uranium-233/234 (pCi/L)	7.15 ± 0.906	6.87 ± 0.923	NC
Uranium-235/236 (pCi/L)	0.0764 ± 0.0325	0.0894 ± 0.0426	NC
Uranium-238 (pCi/L)	1.69 ± 0.241	1.71 ± 0.266	NC
OBS-MW1	1.05 ± 0.241	1.71±0.200	NC
Nitrate plus Nitrite	1.80	1.85	3
Bicarbonate Alkalinity	188	188	< 1
Bromide	0.360	0.336	7
Chloride	21.8	21.7	< 1
Fluoride	1.99	2.01	1
Sulfate	74.6	74.7	<1
Aluminum	0.028	ND	NC
Barium	0.0202	0.0193	5
Calcium	77.5	78.7	2
Iron	0.120	0.132	10
Magnesium	16.1	16.6	3
Magnese	0.00114	0.00111	3
Nickel	0.000961	0.000945	2
Potassium	1.71	1.85	8
Selenium	0.00272	0.00278	2
	22.9	23.3	2
Sodium	22.9	23.3	۷

## Table IV-15 (Concluded)

#### **Summary of Duplicate Samples**

### Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2012**

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup>
	mg/L unless othe	erwise noted	
OBS-MW1			
Nitrate plus Nitrite	1.80	1.85	3
Bicarbonate Alkalinity	188	188	< 1
Bromide	0.360	0.336	7
Chloride	21.8	21.7	< 1
Fluoride	1.99	2.01	1
Sulfate	74.6	74.7	< 1
Aluminum	0.028	ND	NC
Barium	0.0202	0.0193	5
Calcium	77.5	78.7	2
Iron	0.120	0.132	10
Magnesium	16.1	16.6	3
Manganese	0.00114	0.00111	3
Nickel	0.000961	0.000945	2
Potassium	1.71	1.85	8
Selenium	0.00272	0.00278	2
Sodium	22.9	23.3	2
Uranium	0.0104	0.0106	2
Filtered Calcium	83.8	80.0	5
Filtered Magnesium	17.1	16.7	2
Filtered Potassium	1.88	1.75	7
Filtered Sodium	24.4	22.5	8
Gross Alpha	1.78	1.07	NC
Gross Beta	$3.12 \pm 1.15$	$3.53 \pm 1.32$	NC
Uranium-233/234	17.9 ± 2.37	16.6 ± 2.12	NC
Uranium-235/236	$0.226 \pm 0.0879$	$0.197 \pm 0.0604$	NC
Uranium-238	$3.29\pm0.499$	$3.13\pm0.438$	NC

#### Notes

CCBA = Coyote Canyon Blast Area.

= Identification. ID

- mg/L = Milligrams per liter.
- МŴ = Monitoring well.
- NC = Not calculated.
- OBS = Old Burn Site.
- pCi/L = Picocuries per liter.

<sup>a</sup>RPD

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<sub>1</sub>  $R_2$ 

= analysis result = duplicate analysis result

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

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#### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8 and 58 GWM	Project No.; 14642,2.10.11.01 / 98026.01.12
Well I.D.: CCBA-MW]	Date: 4/23/12
Well Condition:	Weather Condition:
Method: Portable pumpX	Dedicated pump Pump depth: 79

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments DO mg/L
48.01	0805		5	TARY					>
49.14	0820	5	16.38	5.44	130.1	6,77	0.79	21.5	0.10
49.34	0828	10	16.68	530	124.6	6.32	0.73	22.6	2.24
49,24	0839	15	16.64	513	119.6	6.91	0.63	28.4	2.80
219.25	0850	20	16.12	511	116.9	6.94	0.46	29.5	2.90
49.25	0358	23	16,18	509	115.2	6.95	0.37	29.6	2.91
	0902	25	16.25	510	114.6	6.95	0.40	29.6	2.90
49.25	0906	27	16.31	509	114.1	6.96	0.34	30.1	2.95
	0910	29	16.43	510	113.5	6.96	0,44	29,9	2.90
49.25	0914	31	16.49	51)	11311	6.95	0.37	29.9	2.91
49.24	C918	33		509	112.5	6.96	0.40	28.8	2.80
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									-4.00 gals. purged From tubing
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## PURGE MEASUREMENTS

#### 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-MW2	Date: $4/24/12$
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump Pump depth: 117

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pН	Turbidity (NTU)	DO (%)	Comments $D \sigma m_g/L$
	0810		<+	101-			<u>ي</u>		
71,48		$\leq$	2/3	TRI		7 90	202		
72.01	0827	5	17.40	607	1:26.1	7,82	2.92	41.4	3.96
72.02	0835	10	17.61	607	114.0	7.84	1.14	43,2	4.12
72.02	0844	15	17.75	606	109,8	7.26	1.07	55,7	5.29
71.91	0853		18.01	606	106.8	7.86	0.55	59.3	5.61
71.86	0902	23	18.21	606	105.3	7.86	0.53	61.3	5.77
71.81	0907	25	18.90	608	1637	7,86	0.46	61.4	5.75
71.79	0915	27	18.65	609	102.2	7.87	0.47	62,5	5.84
71.78	0922	29	18:91	610	10212	7.87	0.50	63,4	5.88
71.86	0929	31	18.88	610	101.7	7.86	0.54	63,7	5.90
71.85	0937		18,90	610	162.0	7.87	0,48	63.5	5.86
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## PURGE MEASUREMENTS

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#### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68 GWM	Project No.: 146422.10.11.01/	98026.01.13
Well I.D.: OBS-MW1	Date: 4//8//2	
Well Condition:	Weather'Cohdition:	
Method: Portable pump X	Dedicated pump	Pump depth: 154

Depth to	Time 24	Vol.	Temp	SC	ORP	pH	Turbidity	DO	Comments
Water	hr	(L/gal)	(°C)	(µS/cm)	(mV)	1	(NTU)	(%)	Doma/L
(ft)		<u> </u>	-				5		PUNAL
72,32	0753		57	ART-					>
72.36	0811	5	15.49	529	128.2	7.75	1.27	38.4	3,82
72.36		10	16.53	531	119.6	7.75	0.88	381)	3.71
72.36	0834	15	16.98	531	113.9	7.75	0.57	38.5	3.72
72.35	0847	20	17.16	536	108.4	7.75	0.54	38.7	3,72
72.35	0854	23	17.32	531	105.7	7,75	0,49	38.7	3.71
72.35	0900	25	17.39	531	104.1	7.75	0,41	38.9	3.73
72.35	0906	27	17.49	531	102.9	7.75	0.56	38.9	3.72
72.35	0911	29	17.57	530	101.8	7.75	0.60	38.9	3.71
72.35	0917	31	17.66	531	100.7	7.75	0.45	39.0	3:71
72.35	0923	33	17.70	531	99.5	7.75	0.47	39.0	3,71
	0924		SH	mplin	íı				$\longrightarrow$
		-			0				***************************************
					9 				
	с.				ž -		R		***************************************
					487 1				99999999999999999999999999999999999999
					-			in,	-4.00 gals purched
									from tubing 0301
			×.						0301

## PURGE MEASUREMENTS

1

#### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68 GWM	Project No.: 146422,10.11.01 / 98026.01.13	
Well I.D.: OBS-MW2	Date: $4/19/12$	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump Pump depth: 253	, "

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(L(gal)	(°C)	(µS/cm)	(mV)		(NTU)	(%)	DO ma/L
(ft)							- 5		7
174.44	0745		ST	4Kt-					
175.37	0804	5	17:36	530	125.8	7.71	0.58	42.7	4.09
175.12	0817	10	17.42	530	121.1	7.72	0.46	41.9	4.01
175,10	0131	15	17.40	530	114.5	7.72	0.45	40.8	3.90
175.05	0845	20	17.40	529	109.9	7.72	0.57	40.3	3.85
175.00	0855	23	17.43	529	107.3	7.72	0.56	39.8	3.81
174.95	0901	25	17.40	530	105.9	7.72	0.69	40.2	3,84
174.95	0909	27	17.54	530	104.3	7.72	0.45	40.2	3.84
174.92	0918	29	17,58	531	102.3	7.73	0.56	40.3	3.84
174.91	0925	31	17.53	530	101.9	7.73	0.43	40.2	3.84
174.87	0933	33	17.54	531	1 7	7.73	0.46	39.2	3.74
	0934		SA	mplin	(a				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
				ŀ	0				
			•2,						
			c						
								2	- 4100 gals purged
									from tubing
									0755

### PURGE MEASUREMENTS

•

#### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68 GWM	Project No.: 146422.10.11.01 / 98026.01.13
Well I.D.: OBS-MW3	Date: 4/17/12
Well Condition: getd	Weather Condition:
Method: Portable pumpX	Dedicated pump Pump depth: 309

Depth to Water	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments
(ft)				M /					DOmal
69.43	0742			STAR-					>
73.52	0 804	5	16.59	528	99.1	7.69	1.50	46.2	4.50
74.51	0815	10	16.31	529	61.4	7.71	1.03	44.7	4.38
75.01	0827	15	16.31	529	48.9	7.73	0.79	44.2	4.33
75.41	0838	20	16.35	529	42.1	7.73	0.66	44.0	4.30
75.55	0845	23	16.34	529	37.2	7.73	0.58	43.7	4.28
75.61	0850	25	16.33		34.8	7.74	0.63	43.7	4.27
75.66	0954	27	16.33	531	32.7	7.74	0.51	43.7	4.28
75.91	0859	29	16.34	531	31.3	7.74	0.56	43.6	4.26
75.73	0964	31	16.37	531	29.7	7.74	0.51	43.5	4.26
75,71	0909	33	16.39	531	30.6	7,74	0.50	43.4	4.24
	0910		5,	9m pli	ng-				>
				/	0				
		_						8	
			×						
			-		18°.				
								~	-4.00 gals purged from Lubing 0753
									from Lubing
									0753

## PURGE MEASUREMENTS

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

SMO 2012-ARCOC (4-2012)

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab:	N Å		ANAL	1313	REQUEST	AND	Сп		CUST	ODY			Page 1	of 12	
Batch No.:	IA			:	SMO Use							ARCOC	and the second se	4155	
Project Name:	SWMU 8/58 GWM		Date Samples Shipped:	4/23	112		SMO A	Authorization.	: Ano	John	- 500	Waste Characteriza	and the second		
Project/Task Manager:	Alicia Aragon		Carrier/Waybill No.	138	471			Contact Phon							
Project/Task Number:	98026.01.12		Lab Contact:	Edie Ker			Lorraine Hererra/508-844-3199						No.		
Service Order:	CF262-12		Lab Destination:	GEL			Send Report to SMO:					,,,		4º Celsiu	
			Contract No.:	691436						augh/505	284 2553	Bill to: Sandia National	Laboratorias (App	and the second s	us
Tech Area:	and the second						1					P.O. Box 5800, MS-0154			
Building :	Room:	-	Operational Site:					3030921							
Sample Number	Fraction	Samp	le Location Detail	Depth (ft)	Date/Time(hr) Collected	Sample Matrix	С Туре	ontainer Vol	Preser- vative	Collect Method	Sample Type	Para	ameter & Method Requested	Lab Sample Id	
092291 🕅	001 /	CCBA-MV	/1	79	4/23/12 0919 <sup>4</sup>	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846	-8260B)		
092291 ×	002 -	CCBA-MW	/1	79	4/23/12 0921	GW	AG	4x1L	None	G	SA	TCL SVOC (SW84	46-8270C)		
092291 🕅	009 -	CCBA-MW	/1	79	4/23/12 0922	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW84	46-6010/6020/74	470)	
092291 X	016 -	CCBA-MW	/1	79	4/23/12 0923	GW	Р	125 ml	None	G	SA	Anions (SW846-90	056)		
092291	017 /	CCBA-MW	/1	79	4/23/12 0924	FGW	Р	250 ml	HNO3	G	SA	Cations (SW846-6	6020)		
092291 🗡	018 -	CCBA-MW	/1	79	4/23/12 0925	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)			
092291	020 -	CCBA-MW	/1	79	4/23/12 0926	GW	Р	250 ml	None	G	SA	Perchlorate (314.0	))		
092291	022 /	CCBA-MV	/1	79	4/23/12 0927	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320	)B)		
092291	024 /	CCBA-MV	/1	79	4/23/12 0929	GW	AG	4x1L	None	G	SA	High Explosives (S	SW846-8321A	<u>،) Mod.</u>	
092291 X	027 Yes	CCBA-MV	/1		4/23/12 0930 Tracking	GW smo us	Р	250 ml Special In		G	SA	Total Cyanide (SV	100000		
Validation Req'd:	✓ Yes			Date En		4/12		EDD:	ourdouon		No		ADD	iormal Conditions o Receipt	Οſ
Background:	Yes			Entered	·····	//~		Turnarou	nd Time:		7 Day*		30 Day		
Confirmatory:	Yes				WP			Negotiate							
	Name	T	Signature	Init.	Company/Org	p/Phone/(	Cell	Sample D		Re	turn to C	lient 🗸 Dispos	al by Lab		
Sample	William Gibson	Milling	Gild .	PUAS	SNL/4142/844-4	and the second se				/:					
Team	Robert Lynch	alt	hel	The	SNL/4142/844-	4013/25	0-7090	Comment	s:		100				
Members	Alfred Santillanes	Alfa	Sedific	A.K-	SNL/4142/844-	5130/22	8-0710	Thepoil anio	and carbon	nate), and	gamma s	ation analysis using SW8 s Ca,Mg,K,Na), alkalinity pec (short list).	346-6850. (as		
1. Relinquished by	Alestant	0	Org. 4142	Data	4/23/12 Time 1	Q	3 Do	linquished	*Please	list as s	separate	and a second	ate	Lab Use	
1. Received by	Hymalle		Org. 4142		1/25/12 Time /			ceived by	by				ate	Time	_
2. Relinguished by	Omertens	me	Org. 4/92		//23//2 Time /			linguished	by				ate	Time	
2. Received by			Org.	Date	Time			ceived by			6		ate	Time	

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

Page 2 of 2

# CONTRACT LABORATORY Analysis Request And Chain Of Custody (Continuation)

	1										ARCOC- 61	4155
	SWMU 8/58 GWM	Project/Tas	k Manager:	Alicia Aragon			Project/Ta	ask No.:	98026.01	.12		C. Statist
Tech Area:												and and a second se
Building:	Room:											Lab use
Sample Number	Fraction	Sample Location Detail	Depth (ft)	Date/Time(hr) Collected	Sample Matrix	100 C C C C C C C C C C C C C C C C C C	ntainer Vol	Preser- vative	Collect Method	Sample Type	Parameter & Method Requested	Lab Sample Id
092291	033 -	CCBA-MW1	79	4/23/12 0932	GW	P	1L `	Н́NO3	G	SA	Gamma Spec (short list)(901.0)	Sample lu
092291 🗡	034 -	CCBA-MW1	79	4/23/12 0933	GW	Р	1L"	HNO3	G	SA	Gross Alpha/Beta (900.0)	
092291 🗡	035 -	CCBA-MW1	79	4/23/12 0934	GW	Р	1L	HNO3	G	SA	* Isotopic U (ASTM D3972-09M)	
092292 ×	001 -	CCBA-TB1	na	4/23/12 0919	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
092293 ×	001 /	CCBA-FB1	na	4/23/12 0909	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
/							-					
										-		
Recipient Ir	aitials											
incorpient in	ntiono											

SMO 2012-ARCOC (4-2012)

Internal Lab:

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab:	٨											Pa	ge 1 of 2	
Batch No.:	4				SMO Use				Λ	10	~	ARCOC	614156	
Project Name:	SWMU 8/58 GWM		Date Samples Shipped:	4/	23/12		SMO	Authorization.	Ron	John	-0-	Waste Characterization		
Project/Task Manager:	Alicia Aragon		Carrier/Waybill No.	/3	8411		SMO	Contact Phon	e: See	30#6	anes	RMMA		
Project/Task Number:	98026.01.12		Lab Contact:	Edie Kei	nt			l	_orraine He	ererra/508	844-3199	Released by COC No.		
Service Order:	CF262-12		Lab Destination.	GEL			Send	Report to SM	0:					4° Celsius
			Contract No.:	691436					Rita Kavan	augh/505	284.2553	Bill to: Sandia National Laboratorie	s (Accounts Pay	able);
Tech Area:	10											P.O. Box 5800, MS-0154; Albuque	rque, NM 87185	5-0154
Building :	Room:	1	Operational Site:											Francisco
Sample Number	Fraction	Samp	le Location Detail	Depth (ft)	Date/Time(hr) Collected	Sample Matrix		ontainer Vol	Preser- vative	Collect Method	Sample Type	Parameter & M Requeste		Lab Sample Id
092294 ×	001 /	CCBA-EB	1	na	4/23/12 1039 -	DIW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)		
092294 🗡	002 -	CCBA-EB	1	na	4/23/12 1040	DIW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C	;)	
092294 🗡	009 -	CCBA-EB	1	na	4/23/12 1042	DIW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6	020/7470)	
092294 ×	016 -	CCBA-EB	1	na	4/23/12 1043	DIW	Р	125 ml	None	G	SA	Anions (SW846-9056)		
092294 ×	017 1	CCBA-EB	1	na	4/23/12 1044	FDIW	P.	250 ml	HNO3	G	SA	Cations (SW846-6020)		
092294 ×	018 /	CCBA-EB	1	na	4/23/12 1045	DIW	Р	125 ml	H2SO4	G	SA	NPN (353.2)		
092294	020 /	CCBA-EB	1	na	4/23/12 1046	DIW	Р	250 ml	None	G	SA	Perchlorate (314.0)		
092294 🗡	022 /	CCBA-EB	1	na	4/23/12 1047	DIW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		
092294 🗙	024 /	CCBA-EB	1	na	4/23/12 1048	DIW	AG	4x1L	None	G	SA	High Explosives (SW846-8	321A) Mod.	
092294	027	CCBA-EB	1	na	4/23/12 1050	DIW	Р	250 ml	NaOH	G	SA ·	Total Cyanide (SW846-901	12)	
Last Chain:	Yes			Sample	Tracking	SMO Us	e	Special In	struction				Abnormal Co	onditions on
Validation Req'd:	✓ Yes			Date En		24/12	2	EDD:		Yes	✓ No		Rece	eipt
Background:	Yes			Entered		- (		Turnarou	nd Time:		Day*	<u>15 Day</u> * ✓ 30 Day		
Confirmatory:	Yes			QC inits	WP			Negotiate	d TAT:					
	Name	1	Signature	Init.	Company/Org	g/Phone/C	Cell	Sample D	isposal:	Ret	urn to Cl	ient 🗹 Disposal by Lab		
Sample	William Gibson	Mipy	thurs	WAS	SNL/4142/844-4	4013/23	9-7367	Return Sa	mples B	y:				
Team	Robert Lynch	Figura	inch	RC	SNL/4142/844-4	4013/25	0-7090							
Members	Alfred Santillanes	HUSA	wille .	tot	SNL/4142/844-	5130/22	8-0710	Report anio	ns (as Br,C	I,F,SO4),	cations (as	ation analysis using SW846-6850. s Ca,Mg,K,Na), alkalinity (as pec (short list).		
	A. A.				1.						eparate		Lab I	Use
1. Relinquished by	1. Relinquished by Allal Sattle Org.4/42				Al BlizTime	3. Relinguished by					Org. Date	Time	and a second and a second a second a second	
1. Received by Jourdangs Sm Org. 4/4 2			100100								Org. Date	Time	9	
2. Relinquished by				Date 4/23//2 ime 1310				<ul> <li>4. Relinquished by</li> </ul>				Org. Date	Time	)
2. Received by			Org.	Date	Time		4. Re	eceived by				Org. Date	Time	9

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

AOP 95-16

# CONTRACT LABORATORY Analysis Request And Chain Of Custody (Continuation)

Page 2 of 2 ARCOC- 614156

											ARCOC- 61	4156
Project Name:	SWMU 8/58 GWM	Project/Tas	k Manager:	Alicia Aragon			Project/Ta	ask No.:	98026.01	.12		
Tech Area:												
Building:	Room:									Lab use		
Sample Numb		Sample Location Detail	Depth (ft)	Date/Time(hr) Collected	Sample Matrix		ntainer Vol	Preser- vative	Collect Method	Sample Type	Parameter & Method Requested	Lab Sample Id
092294	× 033 ′	CCBA-EB1	na	4/23/12 1051	DIW	Р	1L -	HNO3	G	SA	▪ Gamma Spec (short list)(901.0)	
092294	034 /	CCBA-EB1	na	4/23/12 1052 -	DIW	Р	1L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
092294	× 035 /	CCBA-EB1	na	4/23/12 1053 *	DIW	P	1L	HNO3	G	SA	* Isotopic U (ASTM D3972-09M)	
092295	✓ 001 ∕	CCBA-TB2	na	4/23/12 1039	DIW	G	3x40 ml	HCL	G	ТВ	<ul> <li>TCL VOC (SW846-8260B)</li> </ul>	
					-							
												-
												_
												_
												_
												_
												_
								-				_
Recipier	t Initials											
					• .*							<u></u>

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Project/Task Number: Service Order:	SWMU 8/58 GWM Alicia Aragon 98026.01.12 CF262-12 Room:		Date Samples Shipped: Carrier/Waybill No. Lab Contact:	410	SMO Use RM 12 14020		ISMO	Authorization.	· Ama.	3.0.		ARCOC	614157	
Project/Task Manager: Project/Task Number: Service Order:	Alicia Aragon 98026.01.12 CF262-12		Carrier/Waybill No. Lab Contact:		64		SMO	Authorization	· Desa,	1.0.				
Project/Task Number: Service Order:	98026.01.12 CF262-12		Lab Contact:		14070			Autionzation.	· OF Ville	Call Carton		Waste Characterization		
Service Order:	CF262-12				17020	9	SMO (	Contact Phon	e: 500.Bc	stole 0	ala -	RMMA		
				Edie Ker	nt				Lorraine He			Released by COC No.		
Tech Area	Room:		Lab Destination:	GEL			Send	Report to SM	0:					4° Celsius
Tool Anon	Room:		Contract No.:	691436					Rita Kavan	augh/505	284.2553	Bill to: Sandia National Laboratorio	and a second sec	
Tech Area:	uilding : Room:											P.O. Box 5800, MS-0154; Albuque		
Building :			Operational Site:	1		-								
Sample Number	Fraction	Samp	le Location Detail	Depth (ft)	Date/Time(hr) Collected	Sample Matrix		ontainer Vol	Preser- vative	Collect Method	Sample Type	Parameter & I Request		Lab Sample Id
092296 ×	001 /	CCBA-MW	/2	117	4-24-12/0938	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	)	
092296 7	002 /	ССВА-МИ	/2	117	4-24-12/0940	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270	C)	
092296 **	009 /	CCBA-MW	/2	117	4-24-12/0944	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6	6020/7470)	
092296	016 -	ССВА-МИ	/2	117	4-24-12/0946	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)		
092296	017 1	CCBA-MW	/2	117	4-24-12/0947	FGW	Р	250 ml	HNO3	G	SA	Cations (SW846-6020)		
092296	018 /	ССВА-ММ	V2	117	4-24-12/0949	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)		
092296 ×	020 /	ССВА-ММ	V2	117	4-24-12/0950	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		
092296 🗡	022 ^	CCBA-MV	V2	117	4-24-12/0951-	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		
092296 🗡	024 /	ССВА-МИ	V2	117	4-24-12/0952	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8	8321A) Mod.	
092296 ×	027	CCBA-MV	V2	117	4-24-12/0956	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-90	12)	
Last Chain:	Yes			Sample	Tracking /	SMO,U	se	Special In	struction				Abnormal Co	onditions on
Validation Req'd:	✓ Yes			Date En	0110	5/10	2	EDD:		Yes	✓ No		Rec	eipt
Background:	Yes			Entered		-		Turnarou			Day*	<u>15 Day</u> * 30 Day		
Confirmatory:	Yes			QC inits	1			Negotiate						
	Name	1.111	Signature	Init.	Company/Org			Sample D		-towned	urn to Cl	ient 🔄 Disposal by Lab		
Sample	William Gibson	10 miles	help.	MAX	SNL/4142/844-4				and the second second	/:				
Team	Robert Lynch	KITY	Nell	\$26	SNL/4142/844-4	Martin Contraction				then perfe	orm verific	ation analysis using SW846-6850.		
Members wf A	Alfred Santillanes				SNL/4142/844-	5130/22	8-0710	Report anio	ns (as Br,Cl	I,F,SO4),	cations (as	s Ca,Mg,K,Na), alkalinity (as		
7								bicarbonate				bec (short list).	1	
1. Relinguished by	Ant: N.A.	b.A	Org. 4/47	Date	1/2.4/12 Time 10	340	3 Re	l elinguished l		nst as s	eparate	Org. Date	Lab Time	- And the second se
1. Received by	y may the	Sh	Org. 4147	Date	11110	1100		eceived by	<i></i>			Org. Date	Time	
2. Relinquished by	Im Walent	and	Org. 4142	Date	u la	130		elinguished l	ov			Org. Date	Time	
2. Received by	U como or of	/	Org.	Date	Time	····		eceived by	-	5		Org. Date	Time	

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

AOP 95-16

# CONTRACT LABORATORY Analysis Request And Chain Of Custody (Continuation)

ARCOC- 614157

			Ballaharan and an									ARCOC- 612	415/
P	roject Name:	SWMU 8/58 GWM	Project/Tas	k Manager:	Alicia Aragon			Project/Ta	ask No.:	98026.01	.12		
Т	ech Area:												
В	uilding:	Room:											Lab use
					Date/Time(hr)	Sample		ntainer	Preser-		Sample	Parameter & Method	Lab
-	Sample Number	Fraction	Sample Location Detail	Depth (ft)	Collected	Matrix	Туре	Vol	vative	Method	Туре	Requested	Sample Id
4	092296	033 -	CCBA-MW2	117	4-24-12/0957	GW	Р	1L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
4	092296 🗡	034 -	CCBA-MW2	117	4-24-12 /0959.	GW	Р	1L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
4	092296 🗸	035 /	CCBA-MW2	117	4-24-12/1000.	GW	Р	1L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	
4ª	092297 🗡	001 -	CCBA-MW2	117	4-24-12/0938	GW	G	3x40 ml	. HCL	G	DU	· TCL VOC (SW846-8260B)	
4	092297 乄	002 -	CCBA-MW2	117	4-24-12/0940	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
2-	092297 🗴	009 -	CCBA-MW2	117	4-24-12/0944.	GW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
r	092297 🗡	016 /	CCBA-MW2	117	4-24-12/0946	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
r	092297 ×	017 -	CCBA-MW2	117	4-24-12/0947	FGW	Р	250 ml	HNO3	G	DU	Cations (SW846-6020)	
2	092297 🗡	018	CCBA-MW2	117 *	4-24-12/0949	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
4	092297 🗡	020 /	CCBA-MW2	117	4-24-12/0950.	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	
20	092297 🌶	022 /	CCBA-MW2	117	4-24-12/095/	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	
ir	092297 🗡	024 /	CCBA-MW2	117	4-24-12/0952	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A) Mod.	
X	092297 ×	027 -	CCBA-MW2	117	4-24-12/0956	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
4	092297 🗡	033 -	CCBA-MW2	117	4-24-12/0957	GW	P	1L	HNO3	G	DU	Gamma Spec (short list)(901.0)	
2	092297 🗡	034 ~	CCBA-MW2	117	4-24-12/0959.	GW	Р	1L	HNO3	G	DU	Gross Alpha/Beta (900.0)	
~	092297 >	035 /	CCBA-MW2	117	4-24-12/1000	GW	Р	1 <sup>L</sup>	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	
2	092298 🗡	001 ′	CCBA-TB3	na	4-24-12/0938-	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
-													
Γ	-												
	Recipient I	itials											

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page	1	of	2
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Internal Lab															Page <u>1</u> o
Batch No.	NA					SMO Use	j se				200			AR/COC	61408
Project Name:	э:	SWMU 68	8 GW Char	Date Samples	es Shipped <sup>.</sup>	: 4/18/	12		SMO A	uthorization:	Donwi	tenne	Smo	Waste Characterization	Distance of the second s
Project/Task N	Manager	: Alicia Ara	gon	Carrier/Waybi	The state of the same of the	14013				ontact Phone	e:	/			
Project/Task N				Lab Contact:	Contraction of the Contract Office of the Contract		/803.556.8		44	sce!	Bottle	orden	Released by COC No.		
Service Order		CF 263-12		Lab Destinatio	and the second second second	GEL			Send R	Report to SMC					4º Cel
		2.2.10.10.10.10.10.10.10.10.10.10.10.10.10.	And Marcall Transmission	Contract No.:									Bill to: Sandia National Laboratori		
Tech Area:	<u></u>		and the second sec	Souther to serve an and									P.O. Box 5800, MS-0154		
Building:	· · · · · · · · · · · · · · · · · · ·	Room:		Operationa	al Site:	÷		281						Albuquerque, NM 87185-0154	
	<b></b>	1		1	Depth	Date	/Time	Sample	C C	ontainer	Preserv-	- Collection	Sample		od La
Sample No.	Fraction	1 San	mple Location D	Detail	(ft)		ected	Matrix		Volume	ative	Method	Туре	Requested	Samp
092022	-001	OBS-MW1	1		154	4/18/12	9:24 -	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B	3)
	-002	OBS-MW1	1	′	154	4/18/12	9:30	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270	JC)
092022	-009	OBS-MW1	1	'	154	4/18/12	9:31 ·	GW	Р	500 mľ	HNO3	G	SA	TAL Metals+U(SW846-6010/6020	<u>J/7470)</u>
	-014	OBS-MW1	1	!	154	4/18/12	9:33	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-7	196A)
	-016	OBS-MW1		!	154	4/18/12	9:34	GW	Р	125 ml	None	G	1	Anions (SW846-9056)	
	-017	OBS-MW1		!	154	4/18/12	9:35 •	FGW		250 ml	HNO3		SA ·	· Cations (SW846-6020)	
		OBS-MW1		/	154	4/18/12	9:36 *	GW	Р	125 ml `	H2SO4			NPN (353.2)	
092022	-020	OBS-MW1		!	154	4/18/12	9:37 .	GW	Р	250 ml	None	G		Perchlorate (314.0)	
	-022	OBS-MW1		!	154	4/18/12	9:38	GW	Р	500 mÌ	None	G		Alkalinity (SM2320B)	
	-024	OBS-MW1	1	′	154	4/18/12	9:40 -	GW	AG	4x1L*	Nonet			HE (SW846-8321A)	
Last Chain:		Yes			a grant and and a string of the string of the	Tracking		SMC	O Use	22	structions/	s/QC Requir			Conditions of
Validation F		✓ Yes			Date Ent					EDD		V Yes		No	Receipt
Background		Yes		and the second	Entered I	to be the second particular				Turnaround	d Time	7 Day	<u>.v*</u>	<u>I5 Day*</u>	ſ
Confirmator	ry:	Ves			QC inits.	the grant to grant and the				Negotiated				· · · · · · · · · · · · · · · · · · ·	
Sample	N	Name	Signatu	(ure ,	Init.	Compar	ny/Organizat	tion/Phor	ie/Cell	Sample Dis	sposal	Retur	rn to Client	nt 🗹 isposal by Lab	
Team	Robert Ly	ynch	Kottin	ch	PL	SNL/4142/8	844-4013/25	50-7090		Return San	mples By:			3	
Members	Gilbert Q	Juintana	Aller Ston	inti na	west	SNL/4142/8	844-5130/22	28-0710		Comments	5:		*	8	( State of the sta
	Tim Jack	kson	7-1-114		1 1	SNL/4142/2	284-2547		1					analysis using SW846-6850.	
·					<u> </u>	t		······································	<u></u>	Report anions (as Br, Cl, F, SO4),cations (as Ca, Mg, K, Na), alkalinity (as bicarbonate and carbonate), and gamma spec (short list isotopes).					
1.Relinquished	ed by T	In115-		Org:4192	Date	Date 4-18-12 Time 1035				quished by			Org.	de persona e construcción e construcción de la defensión de la defensión de la defensión de la defensión de la	Time
1. Received by		nat	myngh	Org.4/42						eived by			Org.	g. Date	Time
2.Relinquished				Org.	Date	and the second s	Time		4.Relinquished by Org.						Time
2. Received by	Jy			Org.	Date								Org.	j. Date	Time
Category and the second data and the second da			And a second					And the second second		And the second second second					

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

_				1										AR/COC 61	4081
	Project Name	e:	SWMU 68 GW Char	Project/Ta	sk Manag	ger:	Alicia Arag	on		Project/Tas	sk No.:	98	026/01.13		
H	Fech Area:		r	-											
4	Building:		Room:								·				Lab use
	Sample No.	Fraction	Sample Location I	Detail	Depth (ft)		/Time ected	Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
ł	092022	-027 ~	OBS-MW1		154	4/18/12	9:42 /	GW	P	250 ml <sup>-</sup>	NaOH <sup>+-</sup>	s G	SA	Total Cyanide (SW846-9012)	
Ł	092022	-033	OBS-MW1		154	4/18/12	9:43 -	GW	Р	1 L -	HNO3 <sup>-</sup>	G	SA	Gamma Spec (short list)(901.0)	
¥	092022	-034	OBS-MW1		154	4/18/12	9:44	GW	Р	1L ·	HNO3	G	SA	Gřoss Alpha/Beta (900.0)	
Ł	092022	-035	OBS-MW1	i.	154	4/18/12	9:45 ,	GW	Р	1 L ′	HNO3-	G	SA	Isotopic U (ASTM D3972-09M)	
ł	092023	-001	OBS-MW1		154	4/18/12	9:24 -	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
Ý	092023	-002	OBS-MW1	1	154	4/18/12	9:30 -	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
ł	092023	-009	OBS-MW1		154	4/18/12	9:31 `	GW	Р	500 ml `	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	
Y	092023	-014	OBS-MW1		154	4/18/12	9:33 -	GW	Р	250 ml <sup>~</sup>	None	G	DU	Hexavalent Chromium (SW846-719)	
ł	092023	-016	OBS-MW1		154	4/18/12	9:34 -	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
X	092023	-017	OBS-MW1		154	4/18/12	9:35	FGW	Р	250 mŀ	HNO3	G	DU	Cations (SW846-6020)	
¥	092023	-018	OBS-MW1		154	4/18/12	9:36 -	GW	Р	125 ml	H2SO4	G	DU	NPN (353.2)	
Y	092023	-020	OBS-MW1		154	4/18/12	9:37	GW	Р	250 ml *	None	G	DU	Perchlorate (314.0)	
ł	092023	-022 <sup>-</sup>	OBS-MW1	-	154	4/18/12	9:38	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	
ł	092023	-024	OBS-MW1		154	4/18/12	9:40 *	GW	AG	4x1L `	None	G	DU	HE' (SW846-8321A)	
ł	092023	-027	OBS-MW1		154	4/18/12	9:42	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
4	092023	-033	OBS-MW1		154	4/18/12	9:43 -	GW	Р	1L-	HNO3 <sup>-</sup>	G	DU	Gamma Spec (short list)(901.0)	
ł	092023	-034	OBS-MW1		154	4/18/12	9:44 ~	GW	Р	1L`	HNO3	G	DU	Gròss Alpha/Beta (900.0)	
4	092023	-035	OBS-MW1		154	4/18/12	9:45	GW	Р	1L.	НИОЗ	G	DU	Isotopic U (ASTM D3972-09M)	
1	092024	-001	OBS-TB3		N/A	4/18/12	9:24 、	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
				1414 - 1749 - 1769 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 - 1760 -	All Charles and the second	CTCADLAR. P. (2014) Inc. Inc.			AND MALE POLICE	10-10-00 April ( 04-10-00-00-00-00-00-00-00-00-00-00-00-00-					
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Recipient Ini	itials								1					

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Page 2 of 2

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page _1_ of _2_	
Batch No.	NA					SMO Use	A							AR/COC	614082	
Project Name	e:	SWMU 68	8 GW Char	Date Samples	es Shipped:				SMO A	uthorization:	Done	Telegren	1800	Waste Characterization	and the set of the set	
Project/Task				Carrier/Waybi	sill No.					ontact Phone	e:	1	P			
Project/Task				Lab Contact:	and a start the second	Carl A LAND ALL AND DURING AND ADDRESS AND ADDRESS AND	/803.556.8	J171	1	Seels	bette O	John		Released by COC No.	and the second	
Service Orde	ır:	CF 0263-1	12	Lab Destination	Church Contract Contract	GEL			Send Re	eport to SMO	): :				✓ <b>4º Celsius</b>	
			′	Contract No .:		PO 691436	6.	的分析的	1	Rita Kava	naugh/505	5.284.2553		Bill to: Sandia National Laboratories (Accounts Payable),		
Tech Area:		Τ		-									P.O. Box 5800, MS-0154	P.O. Box 5800, MS-0154		
Building:	'	Room:	′	Operationa	TT			12 14	T		T	1	<u> </u>	Albuquerque, NM 87185-0154	ARTICLE CONTRACTOR OF THE OWNER OWNER OF THE OWNER O	
Sample No	Eraction	Sar	mple Location De	) Datail	Depth (ft)		/Time	Sample		ontainer	-				· · · · · · · · · · · · · · · · · · ·	
Zana and and and a start of the	0	的管理的副的影响。		etan	(ft)		ected	Matrix		Volume	ative	Method	Туре	Requested	Sample ID	
092025	-001	OBS-MW2	An and a set of the control of the set of the differ		253	4/19/12	9:34 -	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		
и 092025	-002	OBS-MW2	2		253	4/19/12	9:37 (	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C	;)	
4 092025	-009 ·	OBS-MW2	2	/	253	4/19/12	9:38 `	GW	P۰	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7	7470)	
092025	-014	OBS-MW2	2		253	4/19/12	9:39 /	GW	Р	250 ml <sup>.</sup>	None	G	SA	Hexavalent Chromium (SW846-719	96A)	
V 092025	-016	OBS-MW2	2		253	4/19/12	9:40 /	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)		
v 092025	-017	OBS-MW2	2		253	4/19/12	9:41 /	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)		
092025	-018	OBS-MW2	2	/	253	4/19/12	9:42 /	GW	Р	125 ml	H2SO4	G	SA	NPN (353.2)		
v 092025	-020	OBS-MW2	2		253	4/19/12	9:43`	GW	Р	250 ml	None	G	SA	Perchlorate (314.0)		
092025	-022	OBS-MW2	2		253	4/19/12	9:44 -	GW	Р	500 ml -	None	G	SA	Alkalinity (SM2320B)		
092025	-024	OBS-MW2	2		253	4/19/12	9:47	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)		
Last Chain:	<i>c</i> :	Yes		,	Sample	Tracking		SMC	O Use	Special Ins	structions	s/QC Requir	rements:		Conditions on	
Validation I	Req'd:	🗹 Yes			Date Ente	tered:		建制和的	an balanta	EDD		✓ Yes		No	Receipt	
Backgroun	ıd:	Yes			Entered b	by:			States of	Turnaround	d Time	7 Dav	<u>ıy*</u>	<u>I5 Day*</u> √Day		
Confirmato	ory:	L Yes			QC inits.:				Service Service	Negotiated	TAT					
Sample	N	Name	Signatu		Init.		ny/Organizat		e/Cell	Sample Dis	sposal	Retur	rn to Client	ntisposal by Lab		
Team	Robert Ly	ynch	17 11 1100	ch	1		844-4013/25			Return San						
Members	Gilbert Q	Juintana		truly a			844-2507/85	0-8524	/	Comments	5: 1 CP	Send report to	Tim Jackson	on/4142/MS 0729/284-2547		
	Tim Jack	kson	Tinfully	2-	TA	SNL/4142/2	284-2547		′					analysis using SW846-6850.		
			· · · · · · · · · · · · · · · · · · ·	,	<u> </u>				/	Report anions	ns (as Br, Cl, I	, F, SO4), catio	tions (as Ca,	a, Mg, K, Na), alkalinity (as		
			L			<u> </u>			·'		ind carbonat	te), and gamr		oscopy (short list isotopes)	Lab Use	
1.Relinquishe	11	T=1-114	a l	Org. 4142		1112				quished by			Org.		Time	
	1. Received by Vonweltinger Org. 4/									eived by			Org.		Time	
2.Relinquishe				Org.	Date						Org.	and the second	Time			
2. Received b			quired for 7 and	Org.	Date Time 4. Received by Org.							I. Date	Time			

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614082 SWMU 68 GW Char Project Name: Project/Task Manager: Alicia Aragon Project/Task No.: 98026/01.13 Tech Area: Room: **Building:** Lab use Depth Date/Time Sample Container Collection Sample Parameter & Method Lab Preserv Sample No. Fraction Collected Matrix Type Volume ative Method Sample Location Detail (ft) Туре Requested Sample ID Ρ NaOH G 092025 -027 **OBS-MW2** 253 9:48 GW 250 ml SA Total Cyanide (SW846-9012) 4/19/12 092025 -033 Ρ HNO3 G Gamma Spec (short list)(901.0) **OBS-MW2** 253 4/19/12 9:49 GW 1 L SA 092025 -034 **OBS-MW2** 253 GW Ρ 1 L' HNO3. G SA Gross Alpha/Beta (900.0) 4/19/12 9:50 1 L/ HNO3 Isotopic Ur (ASTM D3972-09M) 092025 -035 **OBS-MW2** 253 4/19/12 GW P -G SA 9:51 G VOC (SW846-8260B) 092026 G 3x40ml HCL -001 **OBS-TB4** N/A 4/19/12 9:25 DIW TB 092027 -001 OBS-FB1 N/A DIW G 3x40ml HCL G FB VOC (SW846-8260B) 4/19/12 9:25 **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	614079	
Project Name: Project/Task N Project/Task N Service Order	Manager: Number:	Alicia Arag	gon .13	Date Samples Carrier/Waybi Lab Contact: Lab Destinatio Contract No.:	bill No.	Edie Kent/8 GEL PO 691436	803.556.8	.171	SMO Co	uthorization: ontact Phone eport to SMC Bita Kava	e: D:	5 284 2553	1540	Waste Characterization RMMA Released by COC No. Bill to: Sandia National Laboratories (	✓ 4º Celsius	
Tech Area:				Contract Ne.	D: PO 691436 Rita Kavanaugh/505.284.2553								Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154			
Building: Room: Operation					al Site:									Albuquerque, NM 87185-0154		
Sample No.	Fraction	Sar	mple Location D	etail	Depth (ft)	Date/1 Collec	o no rom	Sample Matrix	e Co Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
092018	-001	OBS-MW	3		209	4/17/12	9:10	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		
092018	-002	OBS-MW3	3		209	4/17/12	9:12 -	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)		
092018	-009	OBS-MW3	3		209	4/17/12	9:13	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/74	70)	
092018	-014	OBS-MW3	3		209	4/17/12	9:14 -	GW	Р	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196/	A)	
092018	-016	OBS-MW:	3		209	4/17/12	9:15/	GW	Р	125 ml	4C	G	SA	Anions (SW846-9056)		
092018	-017	OBS-MW3	3		209	4/17/12	9:16	FGW	Р	250 ml	HNO3	G	SA	Cations (SW846-6020)		
092018	-018	OBS-MW3	3		209	4/17/12	9:17*	GW	Ρ.	125 ml <sup>.</sup>	H2SO4	G	SA	NPN (353.2)		
092018	-020	OBS-MW	3		209	4/17/12	9:18 <sup>,</sup>	GW	Р	250 ml	4C	G	SA	Perchlorate (314.0)		
092018	-022	OBS-MW	3		209	4/17/12	9:19 -	GW	Р	500 ml	4C +	G	SA	Alkalinity (SM2320B)		
092018		OBS-MW	3		209	4/17/12	9:21 -	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)		
Last Chain:		Yes			State State	Tracking		SMC	O Use	20 A	structions	s/QC Requir			Conditions on	
Validation F	and the second second	✓ Yes		/	Date Ent					EDD	1	✓ Yes			Receipt	
Background	and the second se	Yes Yes		/	Entered QC inits.					Turnaroun Negotiated		<u>7 Da</u>		<u>I5 Day*</u> [√]Day		
Sample			Signatu		Init.	and the second s	y/Organizat	tion/Phon		Sample Dis			n to Client	t isposal by Lab		
· · ·	Robert Ly		Rottin		V/	SNL/4142/84			3/001	Return San	and the second se					
1	Gilbert Q		Mar + Ala	- ling	diry.	SNL/4143/84				Comments			Tim Jackson	n/4142/MS 0729/284-2547		
	Tim Jack		T=1-114	-	74	SNL/4142/284-2547 SNL/4142/284-2547 FGW (Filtered in field w/40 micron filter), Ania ). If perchlorate detected, then perform verific Alkalinity (total, bicarbonate, carbonate)							m verification	s ( Cl,SO4), Cations (Ca,Mg,K,Na		
1.Relinquished	d by T	-1 A15-	ł.	Org. 7142	1/42 Date 4-17-12 Time 1055 3				3.Relinquished by Org					Date	Time	
1. Received b	Received by Jon W clangery & SMO Org. 41.								3. Received by Org.				Date	Time		
2.Relinquished	Relinquished by Org.						Time		4.Relinc	quished by		- Company	Org.	Date	Time	
2. Received by			quired for 7 and	Org.								Org.	Date	Time		

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

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614079 Project Name: SWMU 68 GW Char Project/Task Manager: Alicia Aragon Project/Task No.: 98026/01.13 Tech Area: **Building:** Room: Lab use Depth Date/Time Sample Container Collection Sample Parameter & Method Preserv Lab Sample No. Fraction Collected Sample Location Detail (ft) Matrix Type Volume ative Method Type Requested Sample ID 092018 -027 **OBS-MW3** 209 Ρ Total Cyanide (SW846-9012) 4/17/12 9:22 / GW 250 ml NaOH G SA 092018 -033 **OBS-MW3** Ρ HNO3 G Gamma Spec (short list)(901.0) 209 4/17/12 9:23 GW 1 L SA 092018 -034 **OBS-MW3** 209 4/17/12 9:24 GW Ρ 1 L HNO3 G SA Gross Alpha/Beta (900.0) 092018 -035 Ρ G **OBS-MW3** GW HNO3 Isotopic Ur (ASTM D3972-09M) 209 4/17/12 9:25 1 L SA 092019 -001 G 3x40ml G OBS-TB1 N/A 4/17/12 DIW HCL TB VOC (SW846-8260B) 9:10 **Recipient Initials** 

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Pridr +00BS-MW)

Internal Lab														17,0170002	Page 1 of 12
Batch No.	NA					SMO Use								AR/COC	614080
Project Name	:	SWMU 68	GW Char	Date Samples	Shipped:	4/17/1	2		SMO Au	thorization:	In wat	Trading	Sun	Waste Characterization	
Project/Task		Contraction and the second	The state of the s	Carrier/Wayb	BUR SHOW THE STORE					ntact Phone		yary			
Project/Task				Lab Contact:		Edie Kent/	803.556.8	171						Released by COC No.	
Service Order		CF 0263-		Lab Destinati	on:	GEL			Send Re	port to SMC	):				✓4º Celsius
				Contract No.:		PO 69143	6	調整観念		Rita Kava	naugh/505	5.284.2553		Bill to: Sandia National Laboratories (	Accounts Payable),
Tech Area:														P.O. Box 5800, MS-0154	
Building:		Room:		Operationa	I Site:									Albuquerque, NM 87185-0154	
					Depth		Time	Sample		ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	San	nple Location D	etail	(ft)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
v 092020	-001	OBS-EB1			N/A	4/17/12	10:20 /	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
092020	-002	OBS-EB1	an waa waan		N/A	4/17/12	10:24	DIW	AG	4x1L	NONE	G	EB	TCL SVOC (SW846-8270C)	
r 092020	-009	OBS-EB1			N/A	4/17/12	10:25×	DIW	Р	500 ml <sup>.</sup>	HNO3	G	EB	TAE Metals+U(SW846-6010/6020/747	70)
092020	-014	OBS-EB1			N/A	4/17/12	10:26	DIW	Р	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A	
V 092020	-016 <sup>r</sup>	OBS-EB1			N/A	4/17/12	10:27	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)	
092020	-017 <sup>·</sup>	OBS-EB1			N/A	4/17/12	10:28	FDIW	Р	250 ml ′	HNO3	G	EB	Cations (SW846-6020)	
092020	-018 <sup>.</sup>	OBS-EB1			N/A	4/17/12	10:29	DIW	Р	125 ml	H2SO4	G	EB	NPN (353.2)	
092020	-020 <sup>-</sup>	OBS-EB1	and the second second		N/A	4/17/12	10:30/	DIW	Р	250 ml -	None-	G	EB	Perchlorate (314.0)	
092020	-022,	OBS-EB1			N/A	4/17/12	10:31 1	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)	To share a financial and a second sec
092020	-024.	OBS-EB1			N/A	4/17/12	10:35	DIW	AG	4x1L -	None	G	EB	HE (SW846-8321A)	
Last Chain		Yes	an anna an tarth an tarth			Tracking		SMC	Use	Special Ins	tructions				Conditions on
Validation		✓ Yes	and the second		Date En	- Constant + // at Constant a share		用效相应的		EDD		✓ Yes			Receipt
Backgroun		Yes			Entered	AND A CANADA AND A PARAMETER AND A CANADA				Turnaroun		<u>7 Da</u>	<u>v*</u>	<u>]5 Day*</u> ⊡Day	
Confirmato	-	L Yes		dana tantana	QC inits.	CONTRACTOR CONTRACTOR TORONT				Negotiated					
Sample		ame	Signati	ure /	Init.		y/Organizat		e/Cell	Sample Dis			n to Client	isposal by Lab	
Team	Robert L		Fortyno	n	RL		44-4013/25			Return Sar					
Members	Gilbert Q		mattala	aline.	Mikle		44-2507/85	0-8524		Comments		Send report to	Tim Jackson	141421MS 07291284-2547 headl5pace,	
	Tim Jack	son	1=1-114		T1	SNL/4142/2	284-2547								
									an tangan	If perchlora Alkalinity (to				analysis using SW846-6850	Lab Use
1.Relinquishe	1.Relinquished by 1-1-415 - Org. 4172			- Date	4-17-12	Time /	100	3.Relinq	And the second sec			Org.	Date	Time	
1. Received t		Water.		Org. 4/4 2	Date	4.17.12	Time A	00	3. Recei	ved by			Org.	Date	Time
2.Relinquishe			e	Org.	Date		Time		4.Relinq	uished by		- 0.54	Org.	Date	Time
2. Received b	2. Received by Org.				Date		Time	4. Received by Org					Org.	Date	Time

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 3

AR/COC	614080

Project Name: SWMU 68 GW Char Project/Task Manager: Alicia Aragon Project/Task No.: 98026/01							026/01.13						
Tech Area:													
Building:		Room:							10.000				Lab use
		1			e/Time			ntainer	Preserv-	Collection		Parameter & Method	Lab
Sample No.	1		(ft)	Coll	ected	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
092020	-027	OBS-EB1	N/A	4/17/12	10:36 1	DIW	Р	250 ml	NaOH	G	EB	Total Çyanide (SW846-9012)	
092020	-033	OBS-EB1	N/A	4/17/12	10:37 /	DIW	Р	1 L	HNO3	G	EB	Gamma Spec (short list)(901.0)	
092020	-034	OBS-EB1	N/A	4/17/12	10:38	DIW	Р	1 L	HNO3	G	EB	Gross Alpha/Beta (900.0)	
092020	-035	OBS-EB1	N/A	4/17/12	10:39 /	DIW	Р	1 L	HNO3	G	EB	Isotopic Ur (ASTM D3972-09M)	
092021	-001	OBS-TB2	N/A	4/17/12	10:20 -	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	
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Appendix C Data Validation Sample Findings Summary Sheets for SWMUs 8/58 and 68 Groundwater Monitoring Data



# AR/COC: 614155, 614156, 614157

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RO	C		
	092291-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	092294-035/CCBA-EB1	Uranium-233/234 (N/A)	BD, FR3
	092294-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092294-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	092296-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	092297-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	092291-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7
	092294-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3
	092294-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3
	092296-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
	092297-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092291-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	092291-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092291-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092291-033/CCBA-MW1	Potassium-40 (13966-00-2)	R, Z2
	092294-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	092294-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092294-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092294-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	092296-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	092296-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092296-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092296-033/CCBA-MW2	Potassium-40 (13966-00-2)	R, Z2

# AR/COC: 614155, 614156, 614157

# Page 2 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
nn fra den dela della statistica per presidente en socializzation data de subserva presidente.	092297-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, Z2
	092297-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092297-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092297-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092291-009/CCBA-MW1	Calcium (7440-70-2)	J, D1
	092291-009/CCBA-MW1	Chromium (7440-47-3)	0.01885U, B
	092291-009/CCBA-MW1	Thallium (7440-28-0)	0.0038U, B3
	092291-017/CCBA-MW1	Calcium (7440-70-2)	J, D1
	092294-009/CCBA-EB1	Calcium (7440-70-2)	0.03695UJ, B,D1
	092294-009/CCBA-EB1	Chromium (7440-47-3)	0.01885U, B
	092294-017/CCBA-EB1	Calcium (7440-70-2)	0.398UJ, B,D1
	092296-009/CCBA-MW2	Calcium (7440-70-2)	J, D1
	092296-009/CCBA-MW2	Chromium (7440-47-3)	0.01885U, B
	092296-009/CCBA-MW2	Copper (7440-50-8)	0.00555U, B2
	092296-017/CCBA-MW2	Calcium (7440-70-2)	J, D1
	092297-009/CCBA-MW2	Calcium (7440-70-2)	J, D1
	092297-009/CCBA-MW2	Chromium (7440-47-3)	0.01885U, B
	092297-009/CCBA-MW2	Copper (7440-50-8)	0.00555U, B2
	092297-017/CCBA-MW2	Calcium (7440-70-2)	J, D1
SW846 3535/8321A Modifie	d		
	092291-024/CCBA-MW1	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092291-024/CCBA-MW1	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092291-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	092291-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092291-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	092294-024/CCBA-EB1	2,6-Dinitrotoluene (606-20-2)	UJ, L3

# AR/COC: 614155, 614156, 614157

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092294-024/CCBA-EB1	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092294-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	092294-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	092294-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	092296-024/CCBA-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092296-024/CCBA-MW2	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092296-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	092296-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	092296-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	092297-024/CCBA-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, L3
	092297-024/CCBA-MW2	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, L3
	092297-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	092297-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	092297-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092291-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	092294-009/CCBA-EB1	Mercury (7439-97-6)	UJ, B4
	092296-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
	092297-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
SW846 9012B	이 것은 소장 중 중 관람을	같이 한다는 것이 있는 것이 있다. 이 가지 않는 것이 같이 있는 것이 같이 있는 것이 같이 있는 것이 같이 있는 것이 있는 것이 있는 것이 없는 것이 없는 것이 없는 것이 없는 것이 같이 있는 것이 같이 있는 것이 있는 것이 있는 것이 없는 것이 않는 것이 없는 것이 없	
	092291-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4
	092294-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4
	092296-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4
	092297-027/CCBA-MW2	Cyanide, Total (57-12-5)	NJ-, 15,84
SW846 9056	092294-016/CCBA-EB1	Chloride (16887-00-6)	J+, I5
		n	2

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



PO Box 2198 Albuquerque, NM 8715 1-888-678-544 www.againc.ne

Memorandum

Date: June 23, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 Laboratory: GEL Project/Task: 98026.01.12 Analysis: General Chemistry

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

# Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography); EPA 9012A (total cyanide); EPA 314.0 (perchlorate by IC); SM 2320B (alkalinity); and EPA 353.2 (nitrate/nitrite by Cd reduction). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

# Anions:

The ICAL intercept for chloride was positive and > the MDL. The associated result for sample 303091-018 was a detect < 3X the intercept value and will be **qualified J+, I5**.

# Total cyanide:

The ICAL intercept for total cyanide was negative, with an absolute value > MDL but  $\leq 2X$  the PQL. Also, total cyanide was detected in ICB and CCB at a negative value with absolute value > MDL. The total cyanide result for sample -048 was a detect < 5X the MDL and < 3X the absolute value of the intercept and will be **qualified NJ-, I5**, **B4**. The total cyanide results for samples -009, -023, and -036 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**

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

Anions:

The ICAL intercepts for fluoride and chloride were positive and > the MDL. Associated sample results that are ND or > 3X the intercept value will not be qualified.

## <u>Blanks</u>

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

#### Anions:

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

## Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

All LCS/LCSD acceptance criteria were met.

## Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

## Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

# Nitrate/Nitrite:

Samples -005, -032, and -044 were diluted 10X, and sample -019 was diluted 5X.

Anions:

Sample -004 was diluted 5X for chloride and sulfate; samples -031 and -043 were diluted 10X for chloride and sulfate.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

#### Other QC

EBs and field duplicates were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 06/26/12



616 Maxine NE Albuquerque, NM 87123 505-299-5201

www.aqainc.net

#### Memorandum

Date: June 22, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 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.

#### **Summary**

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

- 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 should be qualified UJ, I4.
- 2) LCS recoveries for 4-amino-2,6-dinitrotoluene and 2,6-dinitrotoluene were < the LAL but >10%. All associated sample results were ND and should be **qualified UJ, L3**.

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

#### **Holding Times**

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

# **Calibration**

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

# **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

# <u>Blanks</u>

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## **Internal Standards**

All internal standards met QC acceptance criteria.

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met QC acceptance criteria.

It should be noted that MS/MSD analyses were performed on an SNL sample from another SDG. No sample data will be qualified as a result.

## Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met except as noted above in the Summary section.

# **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

An EB and a field duplicate were submitted with the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 06/26/12



PO Box 2198 Albuquerque, NM 8715 1-888-678-544 www.againc.ne

Memorandum

Date: June 22, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 and 303092 Laboratory: GEL Project/Task: 98026.01.13 Analysis: Metals

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

# Summary

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

# ICP-MS SDG 303091:

- 1) Tl was detected in the CCBs at < PQL. The associated result for sample 303091 -003 was a detect < 5X the CCB value and will be **qualified "0.0038U, B3"** at 5X the CCB value.
- 2) Ca and Cr were detected in the MB at < PQL. The Ca result for sample -017 was > MDL and < 5X the MB concentration and will be qualified "0.03695U, B" at 5X the MB value. The Cr results for samples -003, 017, -030, and -042 were > MDL and < 5X the MB concentration and will be qualified "0.01885U, B" at 5X the MB value.</p>
- 3) Cu was detected in the EB associated with samples -030 and -042. Associated sample results were > MDL and < 5X the EB concentration and will be **qualified "0.00555U, B2"** at 5X the EB value.
- 4) The serial dilution %D was > 10% for Ca. The associated results for samples -003, -030, and -042 were detects and will be qualified "J, D1". The associated result for sample -017 was a qualified ND (see item 1 above) and will be qualified "0.03695UJ, B, D1".

# ICP-MS SDG 303092:

1) Ca was detected in the MB at < PQL. The serial dilution %D was > 10% for Ca. The associated result for sample 303092-002 was a detect < 5X the MB concentration and will be **qualified 0.398UJ, B, D1**". The

associated results for samples -001, -003, and -004 were detects > 5X the MB concentration and will be **qualified "J, D1"**.

CVAA:

1) Hg was detected in CCBs associated with all samples at negative concentrations > MDL and < PQL. 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 and as follows.

#### ICP-MS:

U and Tl were detected in associated CCBs at <PQL. Ca was detected in the MBs at < PQL. All associated sample results that were ND or > 5X the associated blank concentration will not be qualified.

Ca, Cr, Cu, and Na were detected in one or both EBs associated with field samples in this data package. All associated sample results that were ND or > 5X the associated EB concentration will not be qualified. It should be noted that several results in the EB samples (303091-017 and 303092-002) were qualified U due to MB and CCB contamination and, therefore, will not be applied to associated sample results (see Summary section above).

# **ICP -MS Internal Standards**

All internal standards met QC acceptance criteria.

# Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

# Laboratory Replicate

All replicates met QC acceptance criteria.

# Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

#### **Detection Limits/Dilutions**

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

<u>ICP-MS:</u> Samples 303291-003, -030, and -042 and 303092-001, -003, and -004 were diluted 5X for Na.

## ICP Interference Check Sample (ICS A and AB)

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

## **ICP Serial Dilution**

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

# Other QC

EBs and field duplicates were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 06/26/12



PO Box 2198 Albuquerque, NM 8715 1-888-678-544 www.againc.ne

Memorandum

Date: June 23, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 Laboratory: GEL Project/Task: 98026.01.12 Analysis: RAD

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

#### **Summary**

Four samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

#### Gamma Spec, Iso-U; Gross Alpha/Beta:

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

# Gamma Spec:

- 1) The K-40 results for samples 303091-010 and -037 were X-flagged by the laboratory due to the peak not meeting identification criteria and will be **qualified "R, Z2."**
- According to the case narrative, no peaks were identified for Am-241 in sample -049. The associated sample result is considered a ND at the calculated MDA and will be qualified "BD, Z2."

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

#### **Holding Times and Preservation**

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

# **Quantification**

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

# **Calibration**

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

# <u>Blanks</u>

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

# **Tracer/Carrier Recovery**

All tracer/carrier recoveries met QC acceptance criteria.

# Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

# Laboratory Replicate

All replicate error ratio acceptance criteria were met except as follows.

<u>Gamma Spec:</u> The RER for K-40 was > 1 and < 3. The parent sample result was X-qualified by the laboratory, therefore the associated RER was not applied to sample results.

# Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

# **Detection Limits/Dilutions**

All required detection limits were met. No dilutions were required.

# Other QC

EBs and field duplicates were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz

Date: 06/26/12



616 Maxine NE Albuquerque, NM 87123 505-299-5201

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#### Memorandum

Date: June 22, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 Laboratory: GEL Project/Task: 98026.01.12 Analysis: SVOCs

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

#### **Summary**

Four samples were prepared and analyzed with accepted procedures using method EPA 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 samples were prepared 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 intercepts for 2,4-dinitrophenol; p-nitroaniline; and 2-methyl-4,6-dinitrophenol were > the MDL. However, the associated sample results were all NDs and, therefore, will not be qualified.

The CCV %D for bis(2-chloroisopropyl) ether was >20% but <40% with negative bias. The associated sample results were ND, with no other calibration infractions, and should not be qualified.

## **Blanks**

No target analytes were detected in the blanks.

## **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## **Internal Standards**

All internal standards met QC acceptance criteria.

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

## Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exception. The LCS %R for pyrene was > the UAL. All associated sample results were ND and should 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

An EB was submitted on the AR/COC(s). No other specific issues that affect data quality were identified.

#### Reviewed By: Ken Salaz

Date: 06/26/12



PO Box 2198 Albuquerque, NM 8715, 1-888-678-544 www.aqainc.ne

Memorandum

Date: June 22, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614155, -156, -157 SDG: 303091 Laboratory: GEL Project/Task: 98026.01.12 Analysis: VOCs

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

#### **Summary**

Eight samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. 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 initial calibration RSD for bromoform was > 15% and < 40%. There were no other associated calibration infractions. Associated ND sample results will not be qualified.

The ICV %Ds for chloromethane and bromomethane were > 20% but < 40% with negative bias. The CCV %Ds for carbon disulfide, vinyl acetate, 2-butanone, and 2-hexanone were > 20% but < 40% with positive 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 except as follows.

Bromodichloromethane, chloroform, and dichloromethane were detected in the FB and EB associated with some samples in this SDG. The associated sample results were ND and should not be qualified.

# **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## **Internal Standards**

All internal standards met QC acceptance criteria.

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

It should be noted that MS/MSD analyses were 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 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**

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

No other specific issues that affect data quality were identified.

Reviewed By: Ken Salaz Date: 06/26/12

# Sample Findings Summary



# AR/COC: 614081

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RO			
	092022-035/OBS-MW1	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	092022-034/OBS-MW1	BETA (12587-47-2)	J, FR7
	092023-034/OBS-MW1	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092022-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	092022-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092022-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092022-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, Z2
	092023-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	092023-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092023-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092023-033/OBS-MW1	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	092022-009/OBS-MW1	Copper (7440-50-8)	0.0065U, B2
	092023-009/OBS-MW1	Antimony (7440-36-0)	0.0064U, B2
	092023-009/OBS-MW1	Copper (7440-50-8)	0.0065U, B2
SW846 3535/8321A Modifie	d		
	092022-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
· .	092022-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092022-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	092023-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	092023-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	092023-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 7470A			
	092022-009/OBS-MW1	Mercury (7439-97-6)	UJ, 15, B4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092023-009/OBS-MW1	Mercury (7439-97-6)	UJ, I5, B4
SW846 9012B			
	092022-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15, B4
	092023-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15, B4

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



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Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859 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), EPA314.0 (Perchlorate), EPA9056 (Anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA7196A (Cr+6), 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 ICB and CCB at negative concentrations with absolute values > 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 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 fluoride, chloride, and sulfate were > the MDL. However, the associated sample results were all >3X the intercept and, therefore, will not be qualified.

# **Blanks**

No target analytes were detected in any of the blanks except for the following.

Anions:

In EB sample 302788-019 from COC 614080, chloride was detected. However, this sample result was qualified U due to blank contamination and, therefore, will not be applied to sample results.

## Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

## Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total cyanide, Anions, Perchlorate, & Nitrate/Nitrite as Nitrogen:

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.

<u>Total cyanide, Anions, Perchlorate, Total CN, & Nitrate/Nitrite as Nitrogen:</u> It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

#### **Detection Limits/Dilutions**

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

#### Anions & Nitrate/Nitrite as Nitrogen:

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

#### Other QC

A field duplicate pair was submitted on the COC. 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: Marcia Hilchey

Date: 6/25/12



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Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: Organic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859 Laboratory: GEL Project/Task: 98026.01.13 Analysis: High Explosives (HE)

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

#### Summary

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

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

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

# **Calibration**

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

# **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

# <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. It should be noted that the MS/MSD analyses were performed on an SNL sample of similar matrix from another SDG.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

#### **Other QC**

One EB, sample 302788-024, was submitted on COC 614080. A field duplicate pair was submitted on the COC. 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: Marcia Hilchey

Date: 6/25/12



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Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859, 302861 Laboratory: GEL Project/Task: 98026.01.13 Analysis: Metals

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

#### Summary

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

# CVAA:

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

#### **ICP-MS:**

In EB sample 302788-017 from COC 614080, Cu and Sb were detected. All Cu sample results and the Sb result of sample 302859-16 were detects <5X the blank concentration and, therefore, will be qualified 0.0065U, B2 and 0.0064U, B2, respectively.</li>

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

#### **Holding Times and Preservation**

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

# **ICP-MS Instrument Tune**

The instrument tunes met all QC requirements.

## **Calibration**

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

## **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 the following.

#### **ICP-MS**:

In EB sample 302788-017 from COC 614080, Cr and Ca were detected. However, these sample results were qualified U due to blank contamination and, therefore, will not be applied to sample results.

## **ICP -MS Internal Standards**

All internal standards met QC acceptance criteria.

# Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

#### ICP-MS:

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

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

#### **ICP-MS**:

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

# ICP Interference Check Sample (ICS A and AB)

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

# **ICP Serial Dilution**

All serial dilution %Ds met QC acceptance criteria.

# Other QC

A field duplicate pair was submitted on the COC. 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: Marcia Hilchey

Date: 6/25/12



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#### Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859 Laboratory: GEL Project/Task: 98026.01.13 Analysis: RAD

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

#### Summary

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

#### Gamma Spec:

- 1. No peaks were detected for K-40 in sample 302859-024 and, therefore, it will be **qualified BD**, **Z2**.
- 2. The K-40 result of sample -011 did not meet peak identification criteria and, therefore, will be **qualified R, Z2**.
- **3.** All other gamma spec sample results were either < the associated 2-sigma TPU or < the associated MDA and, therefore, will be **qualified BD, FR3.**

# Gross Alpha/Beta & Iso-U:

1. The U-235/236 result of sample 302859-013 and all gross beta sample results were > 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 samples were analyzed within the prescribed holding times and properly preserved.

# **Quantification**

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

# **Calibration**

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

## **Blanks**

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

## **Tracer/Carrier Recovery**

All tracer/carrier 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 analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

#### Laboratory Replicate

All replicate error ratios met QC acceptance criteria.

#### 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

One EB, samples 302788-025 to -027, was submitted on COC 614080. A field duplicate pair was submitted on the COC. 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.

<b>Reviewed by:</b>	Marcia Hilchey	Date: 6/25/12



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Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859 Laboratory: GEL Project/Task: 98026.01.13 Analysis: SVOCs

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

#### Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8270B (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that result in the qualification of data.

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

# **Calibration**

All initial and continuing calibration QC acceptance criteria were met except for the following.

The ICV %Ds for pentachlorophenol and 2,4-dinitrophenol were >20% but <40% with negative bias, and the ICV %D for isophorone was >20% but <40% with positive 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 except for the following. The 2-fluorophenol surrogate %R for the MS sample was < the QC acceptance limit. Since this is a QC sample, no sample data will be qualified.

# **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. It should be noted that the MS/MSD analyses were performed on an SNL sample of similar matrix from another SDG.

## 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 EB, sample 302788-016, was submitted on COC 614080. A field duplicate pair was submitted on the COC. 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: Marcia Hilchey

Date: 6/25/12



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# Memorandum

Date: June 19, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 68 GWM (ER) AR/COC: 614081 SDG: 302859 Laboratory: GEL Project/Task: 98026.01.13 Analysis: VOCs

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

#### Summary

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 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 %RSD for bromoform was >15% but <40%, the ICV %Ds for chloromethane and bromomethane were >20% but <40% with negative bias, and the CCV %Ds for carbon disulfide, vinyl acetate, 2-butanone, and 2-hexanone were >20% with positive bias. However, the associated sample results were non-detects, and no other calibration infractions occurred for these analytes. Therefore, sample data will not be qualified.

# **Blanks**

No target analytes were detected in the blanks, except for the following. Bromodichloromethane, chloroform, and dibromochloromethane were detected in the EB. However, the associated sample results were all NDs and, therefore, will not be qualified.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## **Internal Standards**

The internal standards met all QC acceptance criteria.

## Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

## 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 EB, sample 302788-015, was submitted on COC 614080. A field duplicate pair was submitted on the COC. 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: Marcia Hilchey

**Date:** 6/25/12