



#### Department of Energy National Nuclear Security Administration Sandia Field Office

P. O. Box 5400 Albuquerque, NM 87185



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

NOV - 4 2014

NMED Hazardous Waste Bureau

Subject: Department of Energy/National Nuclear Security Administration Sandia National Laboratories Environmental Restoration Operations Consolidated Quarterly Report, October 2014.

Dear Mr. Kieling:

Enclosed is the Environmental Restoration Operations Consolidated Quarterly Report, October 2014 for the Department of Energy, National Nuclear Security Administration, Sandia National Laboratories that addresses all quarterly reporting (April through June 2014) 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 Post-Closure Care Permit for Sandia National Laboratories/New Mexico, Environmental Protection Agency identification number NM5890110518.

If you have questions, please contact me at (505) 284-6668 or John Weckerle of my staff at (505) 845-6026.

Sincerely,

James W. Todd

Assistant Manager for Engineering

Enclosure

cc: See Page 2

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### **CERTIFICATION STATEMENT FOR APPROVAL AND** FINAL RELEASE OF DOCUMENTS

Document title:

**Environmental Restoration Operations Consolidated Quarterly** 

Report, October 2014

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.

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and

Signature:

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U.S. Department of Energy

National Nuclear Security Administration

Sandia Site Office

Owner and Co-Operator

29 oct 2014



### Sandia National Laboratories, New Mexico

### **Environmental Restoration Operations**

A U.S. Department of Energy Environmental Cleanup Program

## **Consolidated Quarterly Report**

April – June 2014



October 2014



United States Department of Energy Sandia Field Office

#### CONSOLIDATED QUARTERLY REPORT

#### October 2014

#### SANDIA NATIONAL LABORATORIES, NEW MEXICO

#### ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY:

CONTRACTOR:

SANDIA FIELD OFFICE

SANDIA CORPORATION

PROJECT MANAGER:

John Cochran

#### NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 33

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

**REPORTING PERIOD**: April – June 2014

#### **OVERVIEW**

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) fulfills all quarterly reporting requirements set forth in the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, the Consent Order, and the Chemical Waste Landfill Post-Closure Care Permit. The 33 sites in the Corrective Action regulatory process are listed in Table I-1. The 33 sites consist of 25 Solid Waste Management Units and 8 Areas of Concern (AOCs). 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 and are included within this Consolidated Quarterly Report for completeness. This ER Quarterly Report presents activities and data in sections as follows:

<u>SECTION I</u>: Environmental Restoration Operations Consolidated Quarterly Report,

April – June 2014

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report,

April – June 2014

SECTION III: Solid Waste Management Units 149 and 154 Quarterly Groundwater

Monitoring Report, April – June 2014

SECTION IV: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater

Monitoring Report, April – June 2014

#### **ABBREVIATIONS AND ACRONYMS**

°C degrees Celsius

 $\mu g/L$  microgram(s) per liter

μmhos/cm micromhos per centimeter

% Sat percent saturation

AGMR Annual Groundwater Monitoring Report

ALTMM Annual Long-Term Monitoring and Maintenance

AOC Area of Concern

AOP Administrative Operating Procedure

AR Analysis Request
bgs below ground surface
BSG Burn Site Groundwater

BW background well

CAC Corrective Action Complete

CAMU Corrective Action Management Unit

CCBA Coyote Canyon Blast Area
CFR Code of Federal Regulations
CME Corrective Measures Evaluation

COA certificates of analyses
COC Chain-of-Custody
CTF Coyote Test Field

CWL Chemical Waste Landfill

CY Calendar Year

CYN Canyons (Burn Site)

DI deionized

DO dissolved oxygen

DOE U.S. Department of Energy

EB equipment blank

EPA U.S. Environmental Protection Agency
ER Environmental Restoration Operations

ER Quarterly Report Environmental Restoration Operations (ER) Consolidated Quarterly Report

ET Cover evapotranspirative cover

FB field blank

FOP Field Operating Procedure
GEL GEL Laboratories LLC

H<sub>2</sub>SO<sub>4</sub> sulfuric acid

HASL Health and Safety Laboratory

HCI hydrochloric acid

HE high explosive(s)

HMX tetrahexamine tetranitramine

HNO<sub>3</sub> nitric acid HQ hazard quotient

HSWA Hazardous and Solid Waste Amendments

L liter

LCRS leachate collection and removal system

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)

mrem/yr millirem per year
MRN Magazine Road North

mV millivolt

MW monitoring well

MWL Mixed Waste Landfill
NaOH sodium hydroxide
NA not applicable
ND nondetect
NE not established

NMED New Mexico Environment Department NNSA National Nuclear Security Administration

NPN nitrate plus nitrite

NTU nephelometric turbidity unit NWTA Northwest Technical Area

OBS Old Burn Site

ORP oxidation-reduction potential PCCP Post-Closure Care Permit

pCi/L picocuries per liter
pH potential of hydrogen
PQL practical quantitation limit

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 SM standard method

SNL/NM Sandia National Laboratories, New Mexico

SVOC semivolatile organic compound
SWMU Solid Waste Management Unit
SWTA Southwest Technical Area

TA Technical Area

TA-VG Technical Area V Groundwater
TAG Tijeras Arroyo Groundwater

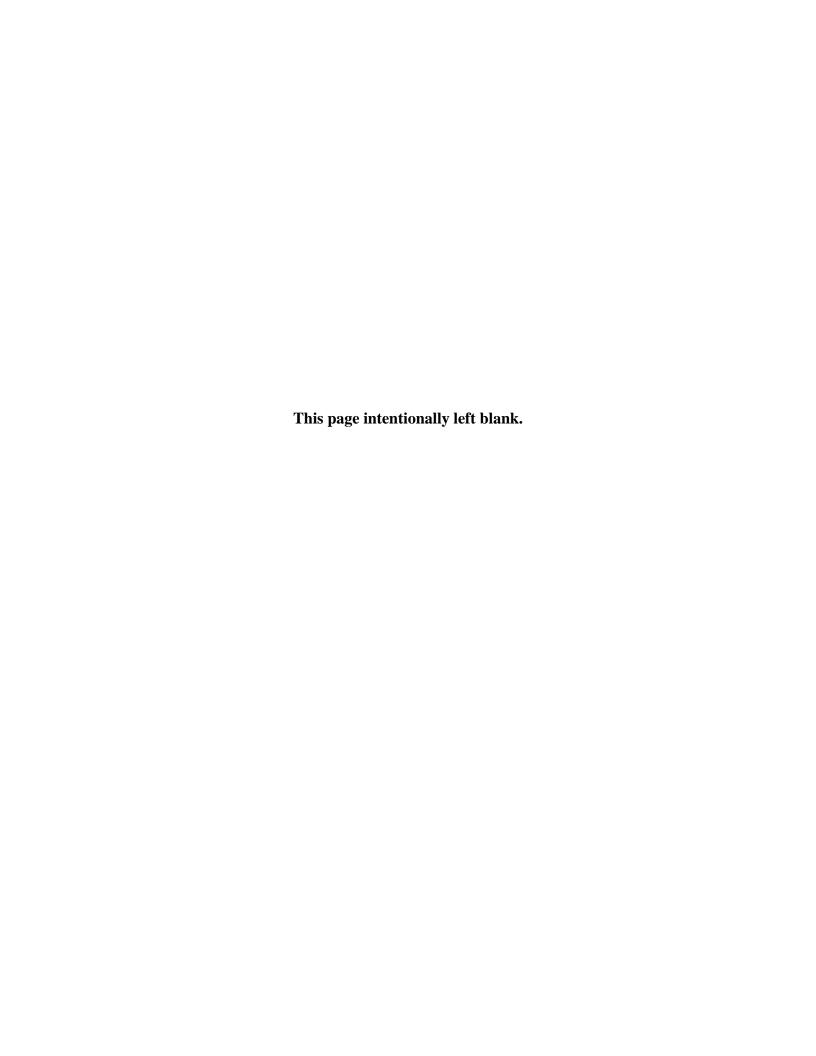
TAL Target Analyte List

TB trip blank

Tetryl 2,4,6-trinitrophenylmethylnitramine
The Consent Order the Compliance Order on Consent

TO Technical Order

VOC volatile organic compound



## SECTION I TABLE OF CONTENTS

ENV	IRONM	IENTAL 1	RESTORATION OPERATIONS CONSOLIDATED QUARTERLY		
	REPO	ORT, Apri	il – June 2014	I-1	
1.0	Intro	duction		I-1	
2.0	Environmental Restoration Operations Work Completed			I-1	
	2.1				
	2.2	Project Management and Site Closure			
		2.2.1	Permit Modification Request Submitted in March 2006		
		2.2.2	Permit Modification Request Submitted in January 2008		
		2.2.3	Status of Permit Modification Requests Submitted in March 2006 a		
			January 2008	I-4	
	2.3	Hydrog	geologic Characterization	I-7	
		2.3.1	Technical Area V Groundwater	I-7	
		2.3.2	Burn Site Groundwater	I-7	
		2.3.3	Tijeras Arroyo Groundwater	I-8	
		2.3.4	Mixed Waste Landfill Groundwater	I-8	
		2.3.5	Chemical Waste Landfill Groundwater	I-8	
		2.3.6	SWMUs 8/58 Groundwater	I-8	
		2.3.7	SWMU 49 Groundwater	I-8	
		2.3.8	SWMU 68 Groundwater	I-8	
		2.3.9	SWMU 116 Groundwater	I-8	
		2.3.10	SWMU 149 Groundwater	I-9	
		2.3.11	SWMU 154 Groundwater	I-9	
	2.4	Environmental Restoration Operations Documents Submitted to the NME			
		Pending	g Regulatory Review and Approval	I-9	
3.0	Long	Long-Term Stewardship Work Completed			
	3.1	Mixed Waste Landfill			
	3.2	Chemical Waste Landfill			
	3.3	3.3 Corrective Action Management Unit		I-12	
		3.3.1	CAMU Waste Management Activities	I-13	
		3.3.2	CAMU Regulatory Activities	I-13	
	3.4	.4 Long-Term Stewardship Documents Submitted to the NMED Pendin			
		Regulat	tory Review and Approval	I-13	
4.0	Refer	rences		I_1/	

### **LIST OF TABLES**

Table	Title
I-1	Environmental Restoration Sites Subject to Corrective Action Regulatory Process
I-2	Hydrogeologic Characterization

### SECTION I ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, April – June 2014

#### 1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective actions and related Long-Term Stewardship (LTS) activities being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the April, May, and June 2014 quarterly reporting period. Section 2.0 provides the status of ER Operations activities including closure activities for the Mixed Waste Landfill (MWL), project management and site closure, and hydrogeologic characterizations. Section 3.0 provides the status of LTS activities that relate to the Chemical Waste Landfill (CWL) and the associated Corrective Action Management Unit (CAMU). Section 4.0 provides the references noted in Section I of this report.

#### 2.0 Environmental Restoration Operations Work Completed

#### 2.1 Mixed Waste Landfill

The Long-Term Monitoring and Maintenance Plan (LTMMP) was submitted to the New Mexico Environment Department (NMED) in March 2012 (SNL/NM March 2012). NMED approved the LTMMP on January 8, 2014 (Blaine January 2014). Monitoring, inspections, maintenance/repair, and reporting activities required by the LTMMP are now presented in Section I.3.1, including MWL Evapotranspirative Cover (ET Cover) supplemental watering and maintenance (LTS Activities). Remaining ER Operations activities at the MWL are presented below.

The work plan for installation of the three multi-port, soil-vapor monitoring wells (SNL/NM January 2014) specified in the MWL LTMMP was approved by the NMED on February 14, 2014 (Blaine February 2014). Contracting and planning for the drilling field effort were completed during this reporting period, and drilling field work began on May 23, 2014. The following drilling scope was completed by the end of the reporting period.

• The first attempt at the MWL-SV03 location failed due to the loss of the drilling bit down the borehole. This occurred as modifications were being made to the drilling approach to address difficulties associated with swelling clays encountered from approximately 180 to 250 feet below ground surface (bgs) at this location.

- NMED staff visited the MWL site on June 4, 2014 to observe drilling activities. After
  discussion, agreement was reached to decommission the MWL-SV03 borehole (renamed
  MWL-BH16 to avoid confusion), re-drill MWL-SV03 20 feet directly south of the
  original location, and document the activities as variances in the Installation Report.
- MWL-SV03 was subsequently drilled at the new location and the installation of the FLUTe<sup>TM</sup> soil-vapor monitoring well was completed on June 27, 2014.
- MWL-SV04 was drilled and installed from June 3 through June 12, 2014.
- The MWL-SV05 borehole was drilled in one day to the total depth of 410 feet bgs on June 30, 2014.

Completion of all drilling and soil-vapor monitoring well installation activities is anticipated during the next reporting period. Remaining activities include completion of MWL-SV05, flow testing of all sampling ports to verify they are functioning properly for sampling, and demobilization of all drilling equipment. Preparation of the FLUTe<sup>TM</sup> Installation Report began during this reporting period and the report will be submitted to NMED during the next reporting period. The first semiannual soil-vapor sampling event under the LTMMP will be scheduled approximately 2 months after completion of drilling and installation activities to allow for vadose zone equilibration as specified in the Installation Plan (SNL/NM January 2014).

A groundwater monitoring report focusing on filtered and unfiltered metals in groundwater from monitoring well MWL-MW4 from the annual sampling event conducted in January and February 2013 was prepared and submitted to NMED on May 20, 2014 (SNL/NM May 2014). This report was provided in advance of the SNL/NM Calendar Year (CY) 2013 Annual Groundwater Monitoring Report as requested by NMED, and addressed results from analysis of groundwater for unfiltered metals (chromium, cobalt, copper, iron, and nickel) that showed an increase in the 2013 samples. Filtered metals results did not show the same increase, except for nickel results. The report provides a detailed evaluation of the recent and historic metals results from MWL-MW4 groundwater samples and concludes that the probable source is corrosion of the dedicated stainless steel sampling pump (MWL-MW4 is the only MWL monitoring well with dedicated sampling equipment because of the 6 degree from vertical angle and the packer that is required to isolate the lower screen interval from the upper screen interval). The MWL-MW4 unfiltered metals results are consistent with unfiltered metals results from previous MWL monitoring wells that had documented corrosion issues with stainless steel well screens (i.e., MWL-BW1, MWL-MW1 through MWL-MW3). Additional activities will be determined and prioritized after receiving input from NMED on the May 2014 MWL-MW4 Groundwater Report.

#### 2.2 **Project Management and Site Closure**

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

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

This Quarterly Report addresses 33 sites undergoing corrective action under the Permit and the Compliance Order on Consent (the Consent Order) (Table I-1); of these 33 sites, 26 sites were the subject of a request submitted to the NMED in March 2006 (Wagner March 2006) for final determination of CAC. The sites include 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, and 196
- AOCs 1090, 1094, 1095, 1114, 1116, and 1117

#### 2.2.2 Permit Modification Request Submitted in January 2008

Five additional sites were submitted for the NMED determination of CAC in a permit modification request submitted in January 2008 (Wagner January 2008). The four SWMUs and one AOC included in the January 2008 permit modification request are:

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

This permit modification included all remaining SNL/NM ER sites with the exception of three active mission sites (SWMUs 83, 84, and 240), the MWL (SWMU 76), and three groundwater AOCs (Technical Area [TA]-V, Burn Site Groundwater [BSG], and Tijeras Arroyo Groundwater [TAG]).

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

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

This letter included four main sections:

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

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

- The section titled, "SWMUs Requiring Additional Corrective Action," specifies additional groundwater characterization requirements for:
  - 1. SWMUs 8/58 Open Dump/Coyote Canyon Blast Area
  - 2. SWMU 68 Old Burn Site
  - 3. SWMU 149 Building 9930 Septic System (Coyote Test Field [CTF])
  - 4. SWMU 154 Building 9960 Septic System and Seepage Pits

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

- The section titled, "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls," specifies that annual groundwater monitoring is to be conducted at:
  - 1. SWMU 49 Building 9820 Drains (Lurance Canyon)
  - 2. SWMU 116 Building 9990 Septic Systems (CTF)

Groundwater monitoring results are summarized in Sections I.2.3.7 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:
  - SWMU 4 Liquid Waste Disposal System (LWDS) Surface Impoundments (TA-V)
  - 2. SWMU 46 Old Acid Waste Line Outfall
  - 3. SWMU 91 Lead Firing Site (Thunder Range)
  - 4. SWMU 196 Building 6597 Cistern (TA-V)
  - 5. SWMU 234 Storm Drain System Outfall
  - 6. AOC 1090 Building 6721 Septic System (TA-III)
- The section titled, "SWMUs/AOCs that do not Require Corrective Action," includes the following 25 SWMUs/AOCs:
  - 1. SWMU 4 LWDS Surface Impoundments (TA-V)
  - 2. SWMU 5 LWDS Drainfield
  - 3. SWMU 28-2 Mine Shafts
  - 4. SWMU 46 Old Acid Waste Line Outfall
  - 5. SWMU 49 Building 9820 Drains (Lurance Canyon)
  - 6. SWMU 91 Lead Firing Site (Thunder Range)
  - 7. SWMU 101 Building 9926/9926A Septic System and Seepage Pit (CTF)
  - 8. SWMU 105 Mercury Spill Building 6536
  - 9. SWMU 116 Building 9990 Septic System (CTF)
  - 10. SWMU 138 Building 6630 Septic Systems (TA-III)
  - 11. SWMU 140 Building 9965 Septic System (Thunder Range)
  - 12. SWMU 147 Building 9925 Septic Systems (CTF)
  - 13. SWMU 150 Buildings 9939/9939A Septic System and Drainfield (CTF)
  - 14. SWMU 161 Building 6636 Septic System (TA-III)
  - 15. SWMU 196 Building 6597 Cistern (TA-V)
  - 16. SWMU 233 Storm Drain System Outfall
  - 17. SWMU 234 Storm Drain System Outfall
  - 18. AOC 1090 Building 6721 Septic System (TA-III)
  - 19. AOC 1094 Live Fire Range East Septic System (Lurance Canyon)
  - 20. AOC 1095 Building 9938 Seepage Pit (CTF)
  - 21. AOC 1101 Building 885 Septic System (TA-I)
  - 22. AOC 1114 Building 9978 Drywell (CTF)
  - 23. AOC 1115 Former Offices Septic System (Solar Tower Complex)
  - 24. AOC 1116 Building 9981A Seepage Pit (Solar Tower Complex)
  - 25. AOC 1117 Building 9982 Drywell (Solar Tower Complex)

The SWMU 52 - LWDS Holding Tank was addressed separately in the April 2010 NMED letter. The NMED requested additional information to aid their determination of site status (Brandwein December 2009a and 2009b). In December 2011, SNL/NM ER personnel provided requested information to the NMED, along with a proposal to address NMED concerns about the future use of this LWDS site (SNL/NM December 2011).

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

- SWMUs 233 and 234
- AOC 1115

Via Public Notice and letter (both dated September 17, 2012), the NMED solicited public comments and initiated the public comment period on 24 SWMUs/AOCs that the NMED intends, pending public input, to approve as CAC (NMED September 2012). The 24 SWMUs/AOCs included SWMU 52. Twenty-three of these 24 SWMUs/AOCs were from the March 2006 and January 2008 requests.

In response to the NMED's September 17, 2012 Public Notice and Interested Person Letter, Fact Sheet/Statement of Basis for the Corrective Action Complete Proposal, and the Administrative Record Index, submitted written public comments included requests for a public hearing on the granting of corrective action complete status to the 24 SWMUs/AOCs. The NMED held the Public Hearing on the "Renewal of Hazardous Waste Permit EPA ID Number NM890110518 and Granting of Corrective Action Complete Status For Certain Solid Waste Management Units and Areas Of Concern at Sandia National Laboratories" from May 5 through 8, 2014, at the Hotel Cascada in Albuquerque, New Mexico. Sandia provided testimony at the Hearing in support of granting corrective action complete status to the 24 SWMUs/AOCs.

In summary, of the original 31 SWMUs/AOCs submitted for CAC status (26 in 2006 and 5 in 2008), 5 are undergoing additional groundwater investigations (summarized in Section I.2.3), 3 were granted CAC status, and the Public Hearing was held for the granting of corrective action complete status to the remaining 23 sites (one site, under the responsibility of SNL LTS Program rather than ER, brings the number addressed in the Public Hearing to 24 sites).

#### 2.3 **Hydrogeologic Characterization**

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

Analytical results for groundwater monitoring at TA-VG; BSG; TAG; the MWL; the CWL; and SWMUs 68, 149, 154, 8/58, 49, and 116 will be presented in the SNL/NM CY 2014 Annual Groundwater Monitoring Report, which is an anticipated submittal to the NMED in summer 2015. Also, analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2014.

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

Analytical results for the June 2014 groundwater sampling of monitoring wells at SWMU 149 (CTF-MW3) and SWMU 154 (CTF-MW2) are presented in Section III of this ER Quarterly Report.

Analytical results for the April 2014 groundwater sampling of monitoring wells at SWMUs 8/58 (CCBA-MW-1 and CCBA-MW-2) and SWMU 68 (OBS-MW1, OBS-MW2, and OBS-MW3) are presented in Section IV of this ER Quarterly Report.

#### 2.3.1 Technical Area V Groundwater

Groundwater sampling at TA-VG was conducted in May 2014.

#### 2.3.2 **Burn Site Groundwater**

Groundwater sampling at the BSG AOC was conducted in June 2014. The NMED approved the Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013b) in June 2014 (NMED June 2014a). This will allow SNL/NM to install groundwater monitoring wells CYN-MW14 and CYN-MW15. The NMED also approved an extension request for the submittal of the Burn Site Corrective Measures Evaluation Report (NMED June 2014b).

#### 2.3.3 Tijeras Arroyo Groundwater

Groundwater sampling at TAG was conducted in May and June 2014. The NMED approved the Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013b) in June (NMED June 2014a). This will allow SNL/NM personnel to install groundwater monitoring well TA2-W-28 and decommission TA2-SW1-320.

#### 2.3.4 Mixed Waste Landfill Groundwater

The first semiannual groundwater monitoring event under the MWL LTMMP was conducted in April 2014 at compliance monitoring wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9. Monitoring well MWL-MW8 was resampled in June 2014 for volatile organic compounds (VOCs) only. Groundwater monitoring results will be presented in the MWL Long-Term Monitoring and Maintenance Report for the reporting period April 1, 2014 to March 31, 2015, which will be submitted to NMED in June 2015.

#### 2.3.5 Chemical Waste Landfill Groundwater

No CWL groundwater monitoring activities were performed during this reporting period. The next semiannual groundwater monitoring event will be performed in July 2014.

#### 2.3.6 **SWMUs 8/58 Groundwater**

SWMUs 8/58 groundwater sampling was conducted in April 2014.

#### 2.3.7 **SWMU 49 Groundwater**

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

#### 2.3.8 SWMU 68 Groundwater

SWMU 68 groundwater sampling was conducted in April 2014.

#### 2.3.9 SWMU 116 Groundwater

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

#### 2.3.10 SWMU 149 Groundwater

SWMU 149 groundwater sampling was conducted in June 2014.

#### 2.3.11 SWMU 154 Groundwater

SWMU 154 groundwater sampling was conducted in June 2014.

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

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

- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 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);
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011); and
- Mixed Waste Landfill Groundwater Monitoring Report, Monitoring Well MWL-MW4 Metals Data, Calendar Year 2013.

#### 3.0 Long-Term Stewardship Work Completed

#### 3.1 Mixed Waste Landfill

The MWL LTMMP was approved by the NMED on January 8, 2014 (Blaine January 2014). Monitoring, inspections, maintenance/repair, and reporting activities required by the LTMMP represent LTS Program activities and are presented in this section. Implementation of all LTMMP inspection and monitoring activities were initiated upon LTMMP approval. The reporting year for the MWL under the LTMMP is April 1 through March 31of the next year, with Annual Reports due to the NMED by June 30 of each year.

- As required by the LTMMP, all reference documents cited in the LTMMP Sampling and Analysis Plans were submitted to the NMED on March 6, 2014 within 60 days of LTMMP approval (Todd March 2014). This occurred during the previous reporting period, but was inadvertently omitted from the January – March ER Consolidated Quarterly Report (SNL/NM July 2014).
- Quarterly radon air monitoring was initiated on January 14, 2014. The detectors for the
  first quarterly event (January through March) were collected on April 2, 2014 and sent to
  the analytical laboratory for analysis. New detectors were placed at the 17 monitoring
  locations and will be collected in early July 2014.
- Tumbleweed accumulations along the perimeter fence noted during the February 18, 2014 ET Cover System Inspection were removed from March 31 through April 4, 2014.
   Dead and dry vegetation was also removed from the ET Cover, native grasses, and the area surrounding the perimeter fence. Two, 30-cubic yard roll-offs of compressed weeds were removed from the site.
- Semiannual groundwater monitoring was conducted at wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9 in April 2014. Well MWL-MW8 was resampled for VOCs only on June 30, 2014. No results exceeded LTMMP trigger levels.
- The ET Cover Biology Inspection was performed on May 15, 2014. The vegetation is dominated by native perennial grass species with even coverage across the ET Cover. The ET Cover meets successful revegetation criteria as stipulated in the MWL LTMMP (SNL/NM March 2012), but quarterly inspections will continue until the August inspection is completed during the 2014 growing season. From January to June 2014 there has been 0.87 inches of precipitation as measured at the nearby SNL/NM meteorological station A36 in Technical Area (TA)-III.

- The ET Cover System Inspection was performed on May 21, 2014. Tumbleweed
  accumulations along the perimeter fence were noted and were removed on June 3 and 4,
  2014. During this time, tumbleweeds and other non-native grass plants were removed
  by hand from the ET Cover and perimeter area. One, 30-cubic yard roll-off of
  compressed weeds was removed from the site.
- The MWL supplemental watering system was reactivated in May due to very low precipitation totals in early CY 2014. Three events were performed during the period of April 1 through June 30, 2014, with each event applying the equivalent of a 0.5-inch rainfall on the ET Cover surface (total of 1.5 inches). Watering was performed on May 21 and 22, May 29, and June 5, 2014. Additional supplemental watering will be evaluated during the next reporting period after the start of the monsoon season in July.
- The first MWL Annual Long-Term Monitoring and Maintenance Report for the initial implementation reporting period of January 8 through March 31, 2014 was submitted to NMED on June 18, 2014 (SNL/NM June 2014).
- Drilling and installation of the three FLUTe<sup>TM</sup> multi-port soil-vapor monitoring wells, required by the MWL LTMMP, continued throughout the reporting period. Completion of all drilling and soil-vapor monitoring well installation activities is anticipated during the next reporting period, including submittal of the Installation Report to NMED. See section 2.1 for more details.

#### 3.2 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 CY 2014 CWL Annual Post-Closure Care Report (due to the NMED in March 2015). Activities for this reporting period include the following:

• Tumbleweed accumulations that were noted adjacent to the two culverts along the southern boundary swale and along the perimeter fence during the March 3, 2014 ET Cover System Inspection were removed as part of the ET Cover maintenance work conducted from April 7 through 11, 2014. Dead and dry weeds were removed from the cover surface, perimeter fence, storm water diversion features, and the perimeter area just outside the fence line. Two, 30-cubic yard roll-offs of compressed weeds were removed from the site.

- ET Cover maintenance work was conducted from May 28 through 30, 2014. Dead and dry weeds were removed from the cover surface, perimeter fence, storm water diversion features, and the perimeter area just outside the fence line. One, 30-cubic yard roll-off of compressed weeds was removed from the site.
- The quarterly ET Cover System Inspection (surface, storm water diversion structures, security fence, and survey monuments) was performed on June 17, 2014. The westernmost survey benchmark was covered with dirt; the benchmark was cleared during the inspection. No other issues were identified.
- Two supplemental watering events were performed during the reporting period using the large sprinkler that is operated at six stations to ensure equal distribution of applied water across the ET Cover. Events were conducted on May 27 and 28 and June 3, 2014, with each event applying the equivalent of a 0.5-inch rainfall on the ET Cover surface (total of 1.0 inches). Additional supplemental watering will be evaluated during the next reporting period, after the start of the monsoon season in July.

#### 3.3 Corrective Action Management Unit

The 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, May, and June 2014) include the following:

- The September 2013 quarterly inspection identified the need to remove sediment accumulation and make minor repairs to the perimeter drainage at the toe of the containment cell. Consequently, after evaluating various options and alternatives for performing the work, the decision was made to have it performed internally through the Environmental Resources Field Office. Work will commence pending the approval of a work plan that has been submitted for review.
- Tumbleweeds identified for removal during the March 2014 quarterly inspection were removed in April 2014. Additional fence clearing and weed removal from the ET Cover vegetation was performed in late May and early June.
- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in May 2014. The results will be presented in the CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2014).

- Weekly pumping of leachate from the leachate collection and removal system (LCRS) was performed. Waste management associated with the LCRS during this reporting period is presented in Section I.3.3.1.
- Composite leachate sampling for waste characterization was conducted on April 22, 2014.
- Weekly inspections of the RCRA less than 90-day accumulation area were performed.
- Quarterly inspection of the site was performed on June 10 and June 25, 2014, which
  included the containment cell cover, stormwater diversion structures, security fences,
  gates, signs, and benchmarks. There were no findings other than the aforementioned
  follow up work to the September 2013 quarterly inspection.

#### 3.3.1 CAMU Waste Management Activities

CAMU waste management data for the reporting period are documented in this section. Solid waste (i.e., personal protective equipment, paper wipes, and plastic drum pump) generated during this reporting period did not exceed 10 pounds. All waste is removed from the site by Hazardous Waste Handling Facility personnel.

- Leachate and rinsate waste stored on site as of March 31, 2014 equaled 47 and 0 gallons, respectively.
- Leachate and rinsate waste generated on site during the reporting period equaled 77 and 2 gallons, respectively. Leachate and rinsate waste were removed from the site on May 5, 2014 equaled 71 and 2 gallons, respectively.
- Leachate and rinsate waste remaining on site at the end of this reporting period equaled 53 and 0 gallons, respectively.

#### 3.3.2 **CAMU Regulatory Activities**

No regulatory activities occurred during this quarter.

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

Not included in the previous quarterly report was mention of the request sent to the NMED on October 25, 2013 (Beausoleil October 2013) for modification to the hazardous waste

permit for the CAMU. The modification would allow the use of alternative analytical methods for soil-gas samples, including but not limited to, Environmental Protection Agency Method Technical Order (TO)-15. The request was made because numerous analytical laboratories, including the laboratories under contract to Sandia, are phasing out the TO-14 analytical method and switching to the more rigorous TO-15 method.

The CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for 2013 (reporting period July 2012 through June 2013) was submitted to the NMED on September 27, 2013 (SNL/NM September 2013c).

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## **Tables**

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

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

#### Notes

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

TA TAG = Tijeras Arroyo Groundwater.

## Table I-2 Hydrogeologic Characterization

Investigation Site	Sampling Frequency in CY 2014 <sup>a</sup>	Quarter of Sampling in CY 2014	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TA-VG	Quarterly	1,2,3,4	AGMR	NA	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG	Semiannually	2,4	AGMR	NA	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13
TAG	Quarterly	1,2,3,4	AGMR	NA	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-SW1-320, TA2-W-01, TA2-W-19, TA2-W-26, TA2-W-27, TJA-2, TJA-3, TJA-4, TJA-6, TJA-7, WYO-3, WYO-4
MWL Groundwater	Semiannually	2,4	AGMR, Section 4 of MWL ALTMM Report	NA	MWL-BW2, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR, Section 4 CWL PCCP Report	NA	CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW11
SWMUs 8/58 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	CCBA-MW1, CCBA-MW2
SWMU 68 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	OBS-MW1, OBS-MW2, OBS-MW3
SWMU 49 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CTF-MW1
SWMU 149 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	CTF-MW3
SWMU 154 Groundwater	Quarterly	1,2,3,4	AGMR, Section III of ER Quarterly	Section II of ER Quarterly	CTF-MW2

#### **Notes**

<sup>a</sup>Not all wells in a particular investigation are sampled at the same frequency; this represents the maximum frequency of sampling at a site.

AGMR = Annual Groundwater Monitoring Report.

ALTMM = Annual Long-Term Monitoring and Maintenance.

BSG = Burn Site Groundwater.
BW = Background well.
CWL = Chemical Waste Landfill.
CY = Calendar Year.

ER = Environmental Restoration Operations.

MWL = Mixed Waste Landfill.

NA = Not applicable. No wells in the site network are currently being sampled and analyzed for perchlorate.

PCCP = Post-Closure Care Permit.
SWMU = Solid Waste Management Unit.
TAG = Tijeras Arroyo Groundwater.
TA-VG = Technical Area V Groundwater.

## SECTION II TABLE OF CONTENTS

PERC	HLORATE SCREENING QUARTERLY GROUNDWATER MONITORING			
	REPORT, April – June 2014			
1.0	Introduction			
2.0	Scope of Activities			
3.0	Regulatory Criteria			
	3.1 Burn Site Groundwater	II-4		
	3.2 Tijeras Arroyo and Technical Area V Groundwater	II-6		
	3.3 March 2006 and January 2008 Permit Modification Requests	II-6		
4.0	Monitoring Results	II-7		
5.0	Summary and ConclusionsII			
6.0	ReferencesII			
LIST OF FIGURES  Figure Title				
II-1	Sandia National Laboratories, New Mexico, Current Perchlorate Screening Monitoring Well Network, April – June 2014			
	LIST OF TABLES			
Table	Title			
II-1	Current Perchlorate Screening Monitoring Well Network, Second Quarter, CY 2014			
II-2	Wells Discussed in Previous Perchlorate Screening Reports			
II-3	Sample Details for Second Quarter, CY 2014 Perchlorate Sampling			

## LIST OF TABLES (Concluded)

Table	Title
II-4	Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Second Quarter, CY 2014
II-5	Perchlorate Screening Groundwater Monitoring Field Water Quality Measurements, Second Quarter, CY 2014

#### **APPENDICES**

Appendix A	Analytical Laboratory Certificates of Analysis for the Perchlorate Data
Appendix B	Data Validation Sample Findings Summary Sheets for the Perchlorate Data

# SECTION II PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, April – June 2014

#### 1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Consent Order), between the New Mexico Environment Department (NMED), the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), jointly referred to as DOE/Sandia, for Sandia National Laboratories, New Mexico (SNL/NM), effective on April 29, 2004, stipulates that a select group of groundwater monitoring wells at SNL/NM be sampled for perchlorate (NMED April 2004). This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) summarizes the perchlorate screening groundwater monitoring completed during the Second Quarter of Calendar Year (CY) 2014 (April, May, and June) in response to the requirements of the Consent Order. The outline of this report is based on the required elements of a "Periodic Monitoring Report" described in Section X.D. of the Consent 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) Area of Concern (AOC) monitoring well that has been under the sampling and reporting requirements of the Consent 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 thirty-fourth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Fourth Quarter of CY 2013 (SNL/NM February 2006 and July 2014).

Groundwater at Coyote Test Field (CTF) monitoring well CTF-MW2 has been sampled 14 times; monitoring well CTF-MW3 has been sampled 13 times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled 11 times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled 11 times (Table II-1). The Consent 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 2014 (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 Consent 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 Consent Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate screening reports are included in Table II-2.

SNL/NM personnel performed groundwater sampling for perchlorate at seven wells on the dates listed in Table II-1. Several of the wells were installed after the Consent Order was finalized (NMED April 2004) and were therefore required to be sampled for perchlorate as "new" wells; the other wells were sampled to meet other regulatory requirements (discussed in Section II.3.0).

Groundwater sampling activities were conducted in accordance with procedures outlined in the following investigation-specific sampling and analysis plans (SAPs) entitled:

- "SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2014" (SNL/NM March 2014a)
- "SWMU 68 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2014" (SNL/NM March 2014b)
- "SWMU 149 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2014" (SNL/NM June 2014)
- "SWMU 154 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2013" (SNL/NM May 2014)

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 2012a). Each well was purged a minimum of one saturated screen volume before sampling in accordance with FOP 05-01, "Groundwater Monitoring Well Sampling and Field Analytical Measurements" (SNL/NM January 2012b).

Field water quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the well prior to collecting groundwater samples. Groundwater temperature, SC, ORP, DO, and pH were measured with an YSI<sup>™</sup> Model EXO1 water quality meter. Turbidity was measured with a HACH<sup>™</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 percent for turbidity values greater than 5 NTU.
- pH is within 0.1 units.

- Temperature is within 1.0 degree Celsius.
- SC is within 5 percent.

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

The groundwater samples were submitted to GEL Laboratories LLC (GEL) for chemical analysis of perchlorate using U.S. Environmental Protection Agency (EPA) Method 314.0 (EPA November 1999). The sample identification, Analysis Request/Chain-of-Custody form number, and the associated groundwater investigation, are provided in Table II-3. The analytical report from GEL, including certificates of analyses (COA) (Appendix A), analytical methods, MDLs, practical quantitation limits, dates of analyses, and results of quality control (QC) analyses and 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 Consent 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 Consent Order clarifies that the CME process will be initiated where there is a documented release to the environment, and where corrective measures are necessary to protect human health and the environment.

#### 3.1 Burn Site Groundwater

In March 2007, DOE/Sandia received a letter of approval from the NMED, which stated the requirement that DOE/Sandia "determine the nature and extent of the contamination and complete a CME for the perchlorate-impacted groundwater in the vicinity of CYN-MW6" (NMED March 2007). As this was based solely on four quarters of monitoring results, DOE/Sandia submitted a letter to the NMED in April 2007 (SNL/NM April 2007) recommending further characterization through continued quarterly monitoring of monitoring well CYN-MW6 for four additional quarters, ending in December 2007, to

ensure appropriate characterization of this well. In January 2008, DOE/Sandia requested a meeting with the NMED to discuss the need for continued monitoring or additional characterization work and, potentially, a CME.

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

In accordance with the requirements of Section VI.K.1.b of the Consent Order (NMED April 2004), a human health risk assessment has been performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in monitoring well CYN-MW6 groundwater samples. The maximum perchlorate concentration to date of 8.93  $\mu$ 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–Appendix E).

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

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

#### 3.2 Tijeras Arroyo and Technical Area V Groundwater

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

#### 3.3 March 2006 and January 2008 Permit Modification Requests

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

- SWMU 8/58—Installation of at least two groundwater monitoring wells west of and near Features YY and OO, submittal and approval of a work plan.
- SWMU 49—Annual sampling of existing monitoring well CYN-MW5.
- SWMU 68—Installation of monitoring wells near the burn pan and associated ditch/surface impoundments, submittal and approval of a work plan.
- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.
- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.
- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

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

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

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

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

#### 4.0 Monitoring Results

Table II-3 summarizes the details of samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3 in the Second Quarter of CY 2014. Table II-4 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 2014 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3.

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

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

No variances or nonconformances in perchlorate sampling field activities, or field conditions from requirements in the groundwater monitoring Mini-SAPs (SNL/NM March 2014a,

March 2014b, May 2014, and June 2014), were identified during the Second Quarter of CY 2014 sampling activities.

#### 5.0 **Summary and Conclusions**

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

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 μg/L.
- Since June 2004 (the start of sampling as required by the Consent 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. Due to a deficiency of water in CYN-MW6, perchlorate samples have not been collected since October 2012.

DOE/Sandia will continue annual monitoring of perchlorate for monitoring wells CTF-MW1 and CYN-MW5, and quarterly monitoring for monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3. The semiannual monitoring for the well that will replace monitoring well CYN-MW6 (CYN-MW15) will begin after the well is installed (anticipated in fourth quarter of CY 2014).

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### Figures

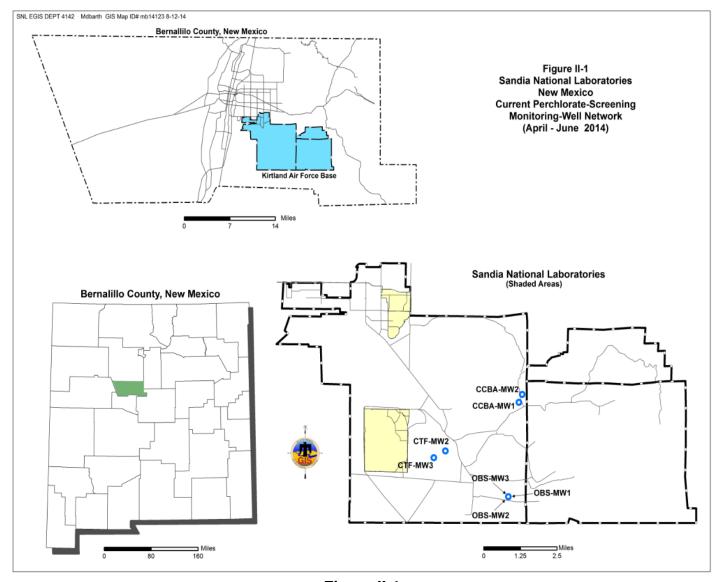


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, April – June 2014

### **Tables**

#### Table II-1 **Current Perchlorate Screening Monitoring Well Network** Second Quarter, CY 2014

Well	Date Sampled	Number of Consecutive Sampling Events <sup>a</sup>	Remaining Number of Sampling Events <sup>b</sup>	Sampling Equipment
CCBA-MW1	07-Apr-14	11	TBD <sup>c</sup>	Bennett™ Pump
CCBA-MW2	08-Apr-14	11	TBD <sup>c</sup>	Bennett™ Pump
CTF-MW2	06-Jun-14	14	TBD <sup>c</sup>	Bennett™ Pump
CTF-MW3	27-Jun-14	13 <sup>d</sup>	TBD <sup>c</sup>	Bennett™ Pump
OBS-MW1	14-Apr-14	11	TBD <sup>c</sup>	Bennett™ Pump
OBS-MW2	15-Apr-14	11	TBD <sup>c</sup>	Bennett™ Pump
OBS-MW3	16-Apr-14	11	TBD <sup>c</sup>	Bennett™ Pump

#### Notes

μg/L = Microgram(s) per liter. CCBA = Coyote Canyon Blast Area. CTF = Coyote Test Field.

CY = Calendar Year.

DOE/Sandia = U.S. Department of Energy/Sandia Corporation.

MDL = Method Detection Limit. MW = Monitoring Well.

**NMED** = New Mexico Environment Department.

= Old Burn Site.

The Consent Order = The Compliance Order on Consent. = Solid Waste Management Unit. SWMU

<sup>&</sup>lt;sup>a</sup> Includes this sampling event.

b Per the requirements of Table XI-1 of the Consent 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, seven of the nine wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).

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

d Due to road access issues, this well was not sampled in September 2013.

Table II-2
Wells Discussed in Previous Perchlorate Screening Reports

Well
CTF-MW1
CTF-MW3
CYN-MW1D
CYN-MW5
CYN-MW6
CYN-MW7
CYN-MW8
CYN-MW9
CYN-MW10
CYN-MW11
CYN-MW12
LWDS-MW1
MRN-2
MRN-3D
MWL-BW1
MWL-BW2
MWL-MW1
MWL-MW7
MWL-MW8
MWL-MW9
NWTA3-MW2
SWTA3-MW4
TA1-W-03
TA1-W-06
TA1-W-08
TA2-W-01
TA2-W-27
TAV-MW11
TAV-MW12
TAV-MW13
TAV-MW14

#### Notes

BW = Background Well.
CTF = Coyote Test Field.
CYN = Canyons (Burn Site).

LWDS = Liquid Waste Disposal System.

MRN = Magazine Road North.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.

NWTA = Northwest Technical Area (III).
SWTA = Southwest Technical Area (III).

TA = Technical Area.

 $\mathsf{W} \qquad = \mathsf{WeII}.$ 

Table II-3 Sample Details for Second Quarter, CY 2014 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	095725-020	615424	SWMUs 8/58
CCBA-MW2	095730-020	615426	SWMUs 8/58
CCBA-MW2 (Duplicate)	095731-020	013420	30010105 6/36
CTF-MW2	096045-020	615528	SWMU 154
CTF-MW3	096142-020	615590	SWMU 149
OBS-MW1	095733-020	615427	SWMU 68
OBS-MW2	095736-020	615428	SWMU 68
OBS-MW3	095741-020	615430	SWMU 68
OBS-MW3 (Duplicate)	095742-020	013430	3441410 66

#### Notes

AR/COC

CCBA

= Analysis Request/Chain-of-Custody.
= Coyote Canyon Blast Area.
= Coyote Test Field.
= Calendar Year.
= Monitoring Well.
= Old Burn Site. CTF CY MW OBS

SWMU = Solid Waste Management Unit.

Table II-4
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Second Quarter, CY 2014

Well	Sample	AR/COC	Sample	Result	MDL	PQL	MCL	Laboratory	Validation	Analytical Method <sup>c</sup>	Comments
	Date	Number	Number	(μg/L)	(μg/L)	(μ <b>g/L</b> )	(μ <b>g/L</b> )	Qualifiera	Qualifier <sup>b</sup>		
	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-12	613958	091615-020	ND	4.0	12	NE	U		EPA 314.0	
			091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
			092616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	22-Oct-12	614466	093013-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-MW1	16-Jan-13	614567	093341-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-WW	10-3411-13	014307	093342-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	24-Apr-13	614745	093873-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-13	614939	094376-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-13	614939	094377-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	10-Oct-13	615095	094779-020	ND	4.0	12	NE	U		EPA 314.0	·
	07 1 44	045044	095213-020	ND	4.0	12	NE	U		EPA 314.0	
	27-Jan-14	615211	095214-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	07-Apr-14	615424	095725-020	ND	4.0	12	NE	U		EPA 314.0	·
			091349-020	ND	4.0	12	NE	U		EPA 314.0	
	01-Nov-11	613885	091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
	24.4.42		092296-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jul-12	614286	092610-020	ND	4.0	12	NE	Ü		EPA 314.0	.,
			093018-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Oct-12	614468	093019-020	ND	4.0	12	NE	Ü		EPA 314.0	Duplicate sample
CCBA-MW2	15-Jan-13	614565	093336-020	ND	4.0	12	NE	Ü		EPA 314.0	
			093878-020	ND	4.0	12	NE	Ü		EPA 314.0	
	25-Apr-13	614747	093879-020	ND	4.0	12	NE	Ü		EPA 314.0	Duplicate sample
	15-Jul-13	614937	094371-020	ND	4.0	12	NE	Ü		EPA 314.0	
			094779-020	ND	4.0	12	NE	Ü		EPA 314.0	
	14-Oct-13	615095	094780-020	ND	4.0	12	NE	Ü		EPA 314.0	Duplicate sample
	23-Jan-14	615209	095208-020	ND	4.0	12	NE	Ü		EPA 314.0	
			095730-020	ND	4.0	12	NE	Ü		EPA 314.0	
	08-Apr-14	615426	095731-020	ND ND	4.0	12	NE	Ü		EPA 314.0	Duplicate sample

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Second Quarter, CY 2014

Well	Sample	AR/COC	Sample	Result	MDL	PQL	MCL	Laboratory	Validation	Analytical	Comments
wen	Date	Number	Number	(μg/L)	(μg/L)	(μg/L)	(μg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Method <sup>c</sup>	Comments
	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	J		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
	30-IVIAI-12	014033	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	
CTF-MW2	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
CIF-WWZ	18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-13	614663	093723-020	ND	4.0	12	NE	U		EPA 314.0	
	20-Mai-13	014003	093724-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	25-Jun-13	614827	094042-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Sep-13	615029	094646-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Dec-13	615180	095086-020	ND	4.0	12	NE	U		EPA 314.0	
		045447	095579-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Mar-14	615417	095580-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	06-Jun-14	615528	096045-020	ND	4.0	12	NE	U		EPA 314.0	
	00 Mar 44	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Mar-11	613450	090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
	00 Mar 40	C4 4050	091943-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Jun-12	614254	092536-020	ND	4.0	12	NE	U		EPA 314.0	
CTF-MW3	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	00 M 40		093717-020	ND	4.0	12	NE	Ü		EPA 314.0	
	22-Mar-13	614661	093718-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	28-Jun-13	614829	094044-020	ND	4.0	12	NE	U		EPA 314.0	
	13-Dec-13	615179	095085-020	ND	4.0	12	NE	U		EPA 314.0	
		045445	095572-020	ND	4.0	12	NE	Ū		EPA 314.0	
	14-Mar-14	615415	095573-020	ND	4.0	12	NE	Ū		EPA 314.0	Duplicate sample
	27-Jun-14	615590	096142-020	ND	4.0	12	NE	Ü		EPA 314.0	

# Table II-4 (Continued) Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Second Quarter, CY 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (μg/L)	MDL (μg/L)	PQL (μg/L)	MCL (μg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>	Comments
	25-Oct-11	613879	091335-020	ND ND	4.0	12	NE NE	U		EPA 314.0	
	09-Jan-12	613952	091600-020	ND	4.0	12	NE	U		EPA 314.0	
	40 4== 40	C4 4004	092022-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	614081	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Oct-12	614462	093003-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW1	22-Jan-13	614570	093349-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-IVIVV I	22-Jan-13	614570	093350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Apr-13	614741	093863-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Jul-13	614933	094361-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Oct-13	615091	094767-020	ND	4.0	12	NE	U		EPA 314.0	
	06-001-13	013091	094768-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	20-Jan-14	615205	095196-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Apr-14	615427	095733-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	013934	091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093007-020	ND	4.0	12	NE	U		EPA 314.0	
	17-001-12	014404	093008-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
OBS-MW2	21-Jan-12	614568	093344-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Apr-13	614742	093866-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jul-13	614935	094365-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jul-13	614935	094366-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	07-Oct-13	615089	094762-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-14	615207	095201-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-14	015207	095202-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Apr-14	615428	095736-020	ND	4.0	12	NE	U		EPA 314.0	

#### **Table II-4 (Continued)**

#### Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network as of Second Quarter, CY 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (μg/L)	MDL (μg/L)	PQL (μg/L)	MCL (μg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>	Comments
	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
	24-06-11	013002	091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
	19-341-12	014292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW3	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093870-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	014744	093871-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jul-13	614936	094368-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Oct-13	615092	094771-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Jan-14	615208	095205-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Apr-14	615430	095741-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Αρι-14	015450	095742-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

#### Notes

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

H = Analytical holding time was exceeded.

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

#### <sup>b</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.

H1 = The holding time criteria was exceeded by >1x, but <2x.

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

#### <sup>c</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: EPA, 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).

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

AR/COC = Analysis Request/Chain-of-Custody.

**Bold** = Result exceeds the 4  $\mu$ g/L screening level for perchlorate.

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

CTF = Coyote Test Field. CY = Calendar Year.

EPA = U.S. Environmental Protection Agency.

#### Table II-4 (Concluded)

#### Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network as of Second Quarter, CY 2014

#### Notes (continued)

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

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.

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 the indicated method under routine laboratory operating conditions.

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements<sup>a</sup>, Second Quarter, CY 2014

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation- Reduction Potential (mV)	рН	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	07-Apr-14	15.63	452.5	194.3	6.70	1.19	32.4	3.21
CCBA-MW2	08-Apr-14	16.18	531.1	184.3	7.63	0.23	64.9	6.37
CTF-MW2	06-Jun-14	19.17	3195.0	35.2	5.86	0.86	0.9	0.09
CTF-MW3	27-Jun-14	22.11	1651.1	296.9	6.96	0.51	79.6	6.92
OBS-MW1	14-Apr-14	14.56	462.2	-199.9	7.54	0.31	36.4	3.71
OBS-MW2	15-Apr-14	16.14	464.0	189.7	7.52	0.19	36.2	3.55
OBS-MW3	16-Apr-14	16.70	471.0	197.7	7.56	0.24	46.6	4.52

#### 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.

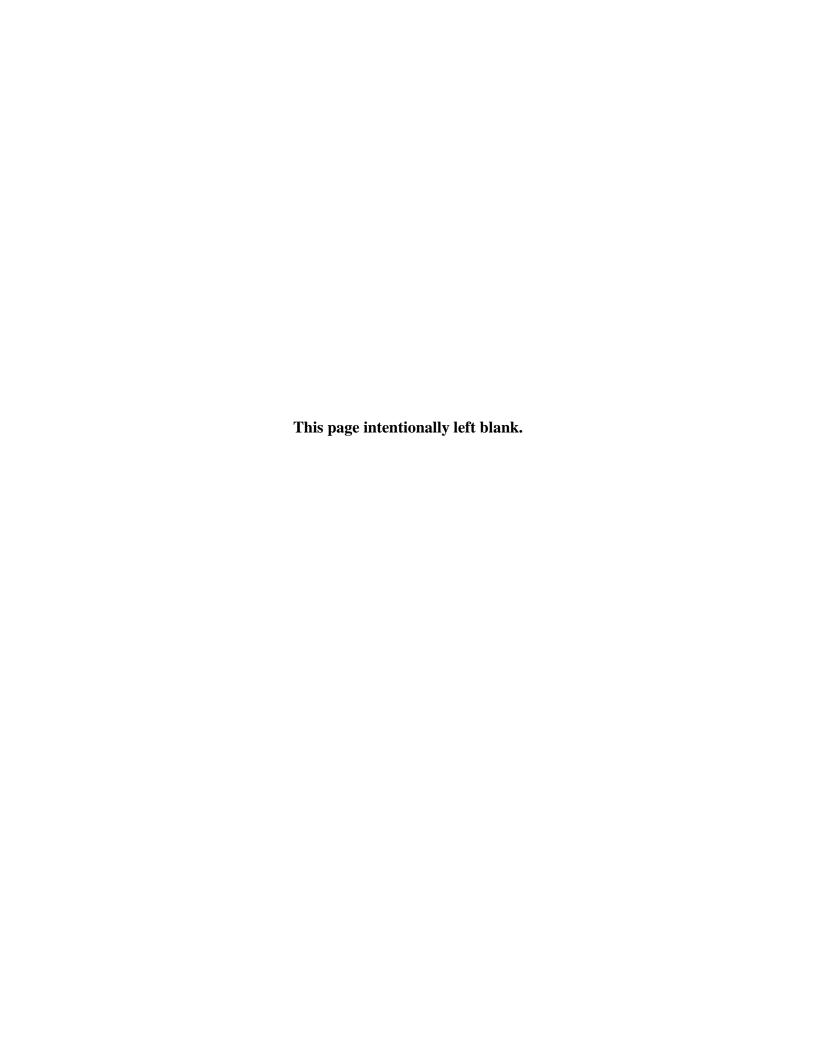
CTF = Coyote Test Field.
CY = Calendar Year.
mg/L = Milligrams per liter.
mV = Millivolt(s).

MW = Monitoring Well.

NTU = Nephelometric Turbidity Unit.

OBS = Old Burn Site.

pH = Potential of Hydrogen (negative logarithm of the hydrogen ion concentration).



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

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Done 4 of 0
Batch No.						SMO Use								47/222	Page <u>1</u> of <u>2</u>
Project Nam			8/58 GWM	Date Sample	es Shipped	4/7/14			ISMO A	uthorization:	12	16		AR/COC	615424
Project/Task				Carrier/Way		217	062			ontact Phon		1000		Waste Characterization	
Project/Task	Numbe	r: 146422.1	10.11.01	Lab Contact		Edie Kent/		3171	10000					RMMA	
Service Orde	er:	CF262-1	4	Lab Destina		GEL	000-000-0	7171	Sond D	teport to SM		5-844-3199		Released by COC No.	
				Contract No		PO 130387	73		- Selid K						
Tech Area:						1 0 100001				Rita Kava	anaugh/50	5-284-2553		Bill to:Sandia National Laboratorie	es (Accounts Payable),
Building:		Room:		Operation	al Site									P.O. Box 5800, MS-0154	
				Topolation	Depth	Date/	Time	lo	T -					Albuquerque, NM 87185-0154	
Sample No.	Fractio	on Sa	ample Location D	etail	(ft)	Colle		Sample		ontainer	Preserv-	Collection	Sample	Parameter & Method	d Lab
095724	004		200			Cone		Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
095725	-001	CCBA-FE			NA .	4/7/14	9:35 ′	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346180
/	-001	CCBA-M			79	4/7/14	9:35	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346180
095725	-002	CCBA-M	W1		79	4/7/14	9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346180
095725	-009 /	CCBA-M	W1		79	4/7/14	9:37 /	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020	134/2/20
095725	-016 /	CCBA-M	W1		79	4/7/14	9:40	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	346180
095725	-017	CCBA-MW1			79	4/7/14	9:39	FGW	Р	500 ml	HNO3	G	SA	Metals Ča,Mg,K,Na(SW846-6	346183
095725	-018	CCBA-M	W1		79	4/7/14	9:41 ′	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180
095725	-020	ССВА-М	W1		79	4/7/14	9:42	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346180
095725	-022	CCBA-M\	W1		79	4/7/14	9:43	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	346180
095725	-024	ССВА-М	W1		79	4/7/14	9:44	GW	AG	4x1 L	None	G	SA	/	246180
Last Chain:		Yes			Sample	Tracking		SMC	Use	Special Ins				High Explosives (SW846-8321A m	
Validation I		✓ Yes			Date Ent	ered:				EDD	on detions/	✓ Yes			Conditions on
Backgroun		Yes			Entered I	oy:				Turnaroun	d Time		Common Co	No Do	Receipt
Confirmato	ry:	Yes			QC inits.					Negotiated		7 Day	<u> </u>	15 Day* ✓ 30 Day	
Sample	1	Name	Signatu	ire ,	Init.	Company	/Organizati	ion/Phon	a/Call	Sample Dis		115.			
Team	Robert I	Lynch	WIGN		ZL	SNL/4142/50						☐ Return	to Client	Disposal by Lab	
Members	Alfred S	antillanes	Allack 5 m	tille		SNL/4142/50				Return San					
	William		Millian	2.11		SNL/4142/50				Comments		Send report to	Tim Jackson	/4142/MS 0729/284-2547	
			minute of the	100	arya,	31VL/4 142/30	5-284-330	7/505-23	9-7367	filtered in field	detected,pe l using a 0.4	fform verifica 5 micron in-lii	tion analysi	s using SW846-6850M. FGW, port Anions (as Br,CI,F,SO4),	
1					-					Alkalinity (as t	total CaCO3	HCO3,CO3)	, and Gamn	na Spectroscopy (as short list	
1.Relinquishe	d by	11AC	tell_	Org.4/4	D-1-	11/2/11	/ ` `			isotopes).				a openiosopy (as short list	Lab Use
1. Received b	/V	on w	7			4/7/14	Time /	-		uished by			Org.	Date	Time
2.Relinquishe	1//	200	, , , , , , , , , , , , , , , , , , , ,	Org. 4/42		4/7/14		15	<ol><li>Recei</li></ol>				Org.	Date	Time
2. Received b		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					100		uished by			Org.	Date	Time	
		with SMO -	quired for 7	Date	4-8-14	Time O	725	<ol><li>Recei</li></ol>	ved by			Org.	Date	Time	
		n with SMO required for 7 and 15 day TAT													

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

Page 2 of 2

roject Nam	e:	SWMU 8/58 GWM	Project/	ask Manag	ger:	Clinton Lur	n		Project/Ta	ok No.	44040	10.44.5		5424
ech Area:						Omnton Eur			Projecula	SK NO.:	146422	2.10.11.01		
uilding:		Room:												l
Sample No.	Fraction	n Sample Locatio	n Detail	Depth (ft)	Date/ Colle		Sample Matrix	Co Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method	Lab us
095725	-029 ′	CCBA-MW1		79	4/7/14	9:46	GW	Р	250 ml	NaOH	G	SA	Requested	346/8
095725	-033	CCBA-MW1		79	4/7/14	9:47 /	GW	Р	1 L	HNO3	G	SA	Total Cyanide (SW846-9012)	3461
095725	-034	CCBA-MW1		79	4/7/14	9:48	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	3461 3461 012
095726	-001	CCBA-TB1		NA	4/7/14	9:35 /	DIW	G	3x40ml	HCL	G	TB	Gross Alpha and Beta (EPA 900.0)	3461
									- CA TOTAL	HOL	- 0	10	TCL VOC (SW846-8260B)	013
														-
			Super to the vigo o											
														<u> </u>
· · · · · · · · · · · · · · · · · · ·														
						Was Indiana								
cipient Ini	80	W.		95.00					L					

#### **GEL LABORATORIES LLC**

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

#### **Certificate of Analysis**

Report Date:

May 5, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Sample ID:

Client Sample ID: 095725-020 346180007

Matrix:

**AQUEOUS** 

Collect Date:

07-APR-14 09:42

Receive Date: Collector:

08-APR-14 Client

Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: CCBA-MW1

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF .	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy									
EPA 314.0 Perch	lorate by IC "As Re	eceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 04	1/15/14	0613 1378827	1
The following A	nalytical Methods v	vere performed:								
Method	Description				Ana	alyst Cor	nments			
1	EPA 314.0 DC	E-AL				•				

Notes:

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

internal Lab															Page	_1_of_2
Batch No.		- A				SMO Use								AR/COC	-	5426
Project Nam Project/Task Project/Task Service Orde	Manager Number:	Clinton L 146422.	10.11.01	Date Sample Carrier/Way Lab Contact	bill No.	2170 Edie Kent	98	3171		uthorization: ontact Phone Lorraine I		5-844-3199	my/L	Waste Characterization RMMA Released by COC No.	010	7420
	er.	CF262-1	4	Lab Destinat Contract No.		GEL PO 13038	73		Send R	eport to SMC	D:	5-284-2553			<b>4</b>	lº Celsius
Tech Area:										Tata Nave	maugii/500	J-204-2555		Bill to:Sandia National Laboratorio	es (Account	ts Payable),
Building:		Room:		Operation	al Site:									P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154		
Sample No.	Fraction		mala I assticus D		Depth		Time	Sample	С	ontainer	Preserv-	Collection	Sample		4	Lab
			mple Location D	etaii	(ft)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре	Requested		Sample ID
095730	-001	CCBA-M			117	4/8/14	9:27 *	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		346180
095730	-002	CCBA-M	W2		117	4/8/14	9:28	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	7	346180
095730	-009	CCBA-M			117	4/8/14	9:32	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020		346180
095730	-016	ССВА-М			117	4/8/14	9:35 <	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)		346180
095730	-017	ССВА-М			117	4/8/14	9:34 /	FGW	Р	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6	5020)	346183
095730	-018	CCBA-MW2 1				4/8/14	9:36	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)		346180
095730	-020 -	CCBA-M		954	117	4/8/14	9:37~	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	- 1	386180
095730	-022	CCBA-M		-	117	4/8/14	9:38	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		346180
095730 095730		CCBA-M			117	4/8/14	9:39	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A n	nod.)	24 <u>6</u> 180
Last Chain	-029	CCBA-MV	W2		117	4/8/14	9:43	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		346180
Validation		✓ Yes				Tracking		SMO	Use	Special Ins	tructions/	QC Requir	ements:	J		tions on
Backgroun		Yes			Date Ent					EDD		✓ Yes		No		ceipt
Confirmato		Yes			Entered   QC inits.					Turnaround		7 Day	<u> </u>	15 Day* ☑ 30 Day		
Sample		ame	Signatu	re	Init.		//Organizati	(D)	10.11	Negotiated		Ц				
Team	Robert Ly	nch	Utten	1	- 4	SNL/4142/50				Sample Dis		☐ Return	to Client	Disposal by Lab		
Members	NU4142						05-844-5130	1/505-230	0-7090	Return San						
	William Gibson William Sill SNL/4142/505-284-3307									Comments:		Send report to	Tim Jackson	/4142/MS 0729/284-2547 is using SW846-		
					The second		20 1 0001	7000 200	7-1301	6850M.FGW,f	iltered in fiel	d using a 0.4	5 micron in	-line filter Report Anions (as		
	1					,				DI, CI, F, 504).	Alkalinity (as	s total CaCO	3,HCO3,CC	D3). Gamma Spectroscopy (as		3.7
1.Relinquishe	E: 20 12	bel 5g	illo (	Org.4/4.	2 Date	4/8/14	/ Time /	0:16 :	3.Relina	short list isotor uished by	pes).		0		Lab	Use
1. Received b	- 520	mla	. , , , , , , , , , , , , , , , , , , ,	Org.4142	Date	14/8/14	Time /0		3. Recei				Org.	Date	Time	
2.Relinquishe		musi		Org.4142	Date	4/8/14	Time //			uished by			Org.	Date	Time	
2. Received b		h_b	tow (	Org. Ce1	<ul><li>Date</li></ul>	4-9-14	Time O		4. Recei				Org.	Date	Time	
Prior confirmation with SMO required for 7 and 15 day TAT												Oig.	Date	Time		

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

Page 2 of 2

Project N Tech Area		SWMU 8/58 GWM	Project/Ta	Project/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01										15426
Building:		Room:												
Sample N	o. Fracti	on Sample Locatio	n Detail	Depth (ft)	Date/		Sample Matrix	Co	ntainer Volume	Preserv-	Collection	1	Parameter & Method	Lab use
095730	-033	CCBA-MW2		117	4/8/14	9:44 V	GW	Р		ative	Method	Туре	Requested	Sample I
095730	-034	CCBA-MW2		117	4/8/14	9:46	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	34618
095731	-001	CCBA-MW2		117	4/8/14	9:27 🗸	GW	G	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	34618
095731	-002	CCBA-MW2		117	4/8/14	9:28	GW	AG	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	042
095731	-009	CCBA-MW2		117	4/8/14	9:32	GW	P	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	34618
095731	-016	CCBA-MW2		117	4/8/14	9:35 /	GW	Р Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	34618
095731	-017	CCBA-MW2	***	117	4/8/14	9:34	FGW	Р	125 ml	None	G		Anions (SW846-9056)	34618
095731	-018	CCBA-MW2		117	4/8/14	9:36-	GW	P	500 ml	HNO3	G		Metals Ca,Mg,K,Na(SW846-6020)	004
095731	-020	CCBA-MW2		117	4/8/14	9:37	GW	P	125 ml	H2SO4	G		Nitrate+Nitrite (EPA 353.2)	34618
095731	-022	CCBA-MW2		117	4/8/14	9:38 V	GW	Р	250 ml	None	G		Perchlorate (EPA 314.0)	34618
095731	-024	CCBA-MW2		117	4/8/14	9:39 🗡	GW		500 ml	None	G		Alkalinity (SM2320B)	34618
095731	-029	CCBA-MW2	·	117	4/8/14	9:43	GW	AG P	4x1 L	None	G		High Explosives (SW846-8321A mod.)	346180
095731	-033	CCBA-MW2		117	4/8/14	9:44 /	GW	P	250 ml	NaOH	G		Total Cyanide (SW846-9012)	34618
095731	-034	CCBA-MW2		117	4/8/14	9:46 1	GW	P	1 L	HNO3	G		Gamma Spectroscopy (EPA 901.0)	346180
095732	-001	CCBA-TB3		NA	4/8/14	9:27		-	1 L	HNO3	G		Gross Alpha and Beta (EPA 900.0)	346180
					4/0/14	9.27	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	346/86
				_			-+							
				-+			-+	-+						
		n 1/												
Recipient I	nitials_/	7/4												

#### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date:

May 5, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Sample ID:

Client Sample ID: 095730-020 346180036

Matrix:

**AQUEOUS** 

Collect Date:

08-APR-14 09:37

Receive Date:

Collector:

09-APR-14

Client

Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: CCBA-MW2

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy									
EPA 314.0 Perch	lorate by IC "As Re	eceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 04	4/15/14	0730 1378827	1
The following A	nalytical Methods v	vere performed:								
Method	Description				Ana	lyst Co	mments			
1	EPA 314.0 DC	DE-AL								

Notes:

#### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date:

May 5, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Client Sample ID: 095731-020 Sample ID:

346180047

Matrix:

**AQUEOUS** 

Collect Date:

08-APR-14 09:37

Receive Date:

Collector:

09-APR-14

Client

Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: CCBA-MW2

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy									
EPA 314.0 Perch	lorate by IC "As Re	ceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 0	4/15/14	0749 1378827	1
The following A	nalytical Methods v	vere performed:								
Method	Description		350 - 3105 - 4105		Ana	lyst Co	mments			
1	EPA 314.0 DC	E-AL				•				

Notes:

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Р	age 1 of 2
Batch No.	NIA					SMO Use	,				2	, , ,		AR/C		615528
Project Nam		SWMU 15		Date Sample	s Shipped	610	14		SMO A	uthorization	nh.	lecto		Waste Characterization		310020
Project/Task	Manager	: Clinton Lu	ım	Carrier/Wayt	oill No.	2	194			ontact Phone	44	7000		RMMA	n	
Project/Task	Number:	146422.10	0.11.01	Lab Contact:		Edie Kent/						Su		Released by COC No.		
Service Orde	er:	CF353-14		Lab Destinat	ion:	GEL			Send R	eport to SMC	).		-	Released by COC No.		[/] 40 Catains
				Contract No.	:	PO 13038	73			5-2		5.284.2553		Dill to: Condin Maties at Late		✓ 4º Celsius
Tech Area:			-						L	Trica Trava	maugn/500	7.204.2333		Bill to: Sandia National Lab	oratories (A	Accounts Payable),
Building:	1	Room:		Operation	al Site:									P.O. Box 5800, MS-0154		
				1-1	Depth	Date/	Time	Sample	C.	ontainer	ln.	0 . 11 . 11		Albuquerque, NM 87185-01		
Sample No.	Fraction	San	nple Location D	etail	(ft)	Colle		Matrix	Type	Volume	Preserv- ative	Collection	Sample			Lab
000045	204								Турс	Volume	auve	Method	Type	Requested	1	Sample ID
096045	-001	CTF-MW2			128	<u> </u>	9:03 -	GW	G	3 x 40 mL	HCL	G	SA	TCL VOCs (SW846-826	(80)	350254
096045	-002	CTF-MW2	2		128	6/6/14	9:05	GW	AG	4 x 1 L	None	G	SA	TCL SVOCs (SW846-82	270C)	350254
096045	-024	CTF-MW2	2		128	*6/6/14	9:07 -	GW	AG	4 x 1 L	None	G	SA	High Explosives (SW84		350259
096045	-009	CTF-MW2	2		128	· 6/6/14	9:08 -	GW	Р	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/60	)20/7470)	350254
096045	-010	CTF-MW2	2		128	6/6/14	9:09	FGW	Р	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/60		350 255 00 1
096045	-016	CTF-MW2	2		128	- 6/6/14	9:10	GW	Р	125 mL	None	G	SA	Anions (SW846-9056)		350254
096045	-018	CTF-MW2	2		128	' 6/6/14	9:11 /	GW	Р	125 mL	H2SO4	G	SA	Nitrate plus Nitrite (EPA	353.2)	350254
096045	-022	CTF-MW2	2		128	6/6/14	9:12	GW	Р	500 mL	None	G	SA	Alkalinity as CaCO3, HCO3, CC	)3 (SM2320E	
096045	-020	CTF-MW2			128	· 6/6/14	9:13	GW	Р	250 mL	None	G	SA	Perchlorate (EPA 314.0	)	350259
096045	-033	CTF-MW2			128	6/6/14	9:14	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (	FPA 901	.0) 350254
Last Chair		✓ Yes	*		Sample	Tracking		SMC	Use	Special Ins	structions	/QC Requir		ј		Conditions on
Validation		✓ Yes			Date En	tered:				EDD		✓ Yes		No		Receipt
Backgrour	nd:	Yes			Entered	by:				Turnaroun	d Time	7 Da	v*	15 Day* 30 E	) 21/	receipt
Confirmate	ory:	Yes			QC inits	.:				Negotiated		H	<u></u>	1000	ray	
Sample	N	lame	Signati	ure ,	Init.	Compan	y/Organiza	tion/Phon	e/Cell	Sample Dis		Retur	n to Client	Disposal by	100	
Team	Robert L	ynch	Lottan	ch	2	SNL/4142/5				Return Sar		Trotui	1 to Olicin	Disposal by	Lab	
Members	Tim Jacl	kson	Tillate	5-	71	SNL/4142/5				Comments					$\dashv$	
					1					1					1	
										Water has high	buffering cap	acity, please cl	neck pH upor	receipt and add preservation as	á .	
														ysis. VOCs have headspace.		
1.Relinquish	ed by 7	SA-115	_	Org. 4/4	2 Date	6/6/14	Time (	2940	3 Relino	juished by	etected, then	perform verifica		using method SW846-6850.		Lab Use
1. Received		191	gny	Org. 4/4		14/1	Time (		3. Rece				Org.			Гime
2.Relinquish	ed by	1912		Org.4/4	7 Date					juished by			Org.	Date		Time
2. Received		MEG	And	Org. Gol	Date	2/0//			4. Rece				Org.			Гime
		vith SMO red	quired for 7 and	15 day TA	T	0-114	THIE C	1025	+. Rece	ived by			Org.	Date	T	Time

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

AR/COC 615528 Project Name: SWMU 154 GWM Project/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01 Tech Area: **Building:** Room: Lab use Depth Date/Time Sample Container Collection Sample Preserv Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 096045 -034 CTF-MW2 128 6/6/14 9:15 P 350254 GW 1 L HNO3 G SA Gross Alpha/Beta (EPA 900.0) 010 096045 -035 CTF-MW2 350254 128 6/6/14 9:16 GW P 1 L HNO3 G SA Isotopic Uranium (HASL 300) 096046 -001 SWMU154 - TB1 NA 350254 6/6/14 DIW 9:03 G 3 x 40 mL HCL G TB TCL VOCs (SW846-8260B) Recipient Initials

#### **GEL LABORATORIES LLC**

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

#### **Certificate of Analysis**

Report Date:

July 3, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Chefit Samp

Client Sample ID: 096045-020

Sample ID:

350254008

Matrix:

Collector:

AQUEOUS

Collect Date:

06-JUN-14 09:13

Receive Date:

07-JUN-14 Client Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: CTF-MW2

/ 1 D

Vol. Recv.:

Parameter	Qualifier Res	ult	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy									
EPA 314.0 Perch	lorate by IC "As Received	d"								
Perchlorate	15	ND	0.004	0.012	mg/L	1	MAR1 06	5/19/14	1915 1395606	1
The following A	nalytical Methods were pe	erformed:								
Method	Description				Ana	lyst Co	mments			
1	EPA 314.0 DOE-AL									

Notes:

### CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.						SMO Use										Page 1 o	f _2
Project Nam		SWMU 1	149 GWM	Date Sample	es Shinned		27114		Tours 4		1	1			AR/COC	615590	0-
Project/Tasi Project/Tasi Service Ord	Number:	Clinton L 146422. CF352-1	.um 10.11.01	Carrier/Way Lab Contact Lab Destinat	bill No. : tion:	2 (99 Edie Kent/ GEL	10 803-556-8	3171	ѕмо с	authorization: contact Phone Lorraine I deport to SMC	e: Herrera/50:	5-844-3199	RI	ste Characterization IMA leased by COC No.	☑ 4° Cel	eine	
Tech Area:				Contract No.	<u>:</u>	PO 13038	73			Rita Kava	anaugh/50	5-284-2553	Bill to:San	es (Accounts Paya	sius		
Building:		Room:		Operation	al Sito:									P.O. Box 5	800, MS-0154	o ( locounts i aya	Die),
Sample No.			mple Location D		Depth (ft)	Date/		Sample Matrix	C	ontainer Volume	Preserv-	Collection Method			ue, NM 87185-0154 arameter & Method		
096141	-001	CTF-FB2	2		NA	6/27/14	9:37						Туре	-	Requested	Samp 35/5	
096142	-001 ′	CTF-MW	/3		359	6/27/14	9:37	GW	G	3x40ml	HCL	G	FB	TCL VO	(SW846-8260B)	00	11
096142	-009 /	CTF-MW	3		359	6/27/14	9:39 /	GW	P	3x40ml	HCL	G	SA		(SW846-8260B)	3579 3579	
096142	-010°	CTF-MW	3		359	6/27/14	9:401	FGW~	P	500 ml	HNO3	G	SA		als(SW846-6010/602	20/7470)	13
096142	-016 /	CTF-MW	3		359	6/27/14	9:42			500 ml	HNO3	G	SA	TAL Meta	als(SW846-6010/602	20/7470)	01
096142/	-018′	CTF-MW	3		359	6/27/14	9:43	GW	P	125 ml	None	G	SA	Anions (S	SW846-9056)	35/3 02 35/3	26
096142	-020-✓	CTF-MW	3		359	6/27/14	9:44	GW	P	125 ml	H2SO4	G	SA	NPN (EP	A 353.2)	00	5
096142	-022	CTF-MW	3		359	6/27/14	9:45			250 ml	None	G	SA	Perchlora	te (EPA 314.0)	35/5	69
096143	-001	CTF-MW:	3		359	6/27/14	9:37	GW	Р	500 ml	None	G	SA	Alkalinity	(SM2320B)	35/5	7
096143		CTF-MW:			359	6/27/14	9:39	GW	G	3x40ml	HCL	G	DU	TCL VOC	(SW846-8260B)	35/9	8
Last Chain		✓ Yes				Tracking	9.39		P	500 ml	HNO3	G	DU	TAL Meta	ls(SW846-6010/602	0/7470) 35/5	193
Validation		✓ Yes			Date Ent			SMO	Use	Special Ins	tructions/		ements:			Conditions of	
Backgroun		Yes			Entered I					EDD		✓ Yes		No		Receipt	
Confirmato	ry:	Yes			QC inits.:					Turnaround Negotiated		7 Day	*	15 Day*	✓ 30 Day		
Sample		me	// Signatur	re ,	Init.	Company	/Organizati	ion/Phone	/Cell	Sample Dis			1 0"				
	Robert Lyi		MIN	1	pl	SNL/4142/50				Return Sam		- Return	to Client		Disposal by Lab		
Members			Hyd Spe	180_	as	SNL/4142/50	5-844-5130	0/505-228	3-0710	Comments:		C1					
	William Gi	bson	Welley &	elf!	WAX	SNL/4142/50	5-284-3307	7/505-239	9-7367	If perchlorate	e detected	Send report to , perform ve	erification	analysis ı	eing SMIRAE		
	4				-					6850M. Rep CaCO3,HC0	ort anions	as Br,Cl,F,	SO4. Rep	ort alkalini	ty as total		
.Relinquishe	d by	125	tillo .	Org. 414	O Date	6/27/14	Time 14	112	0.0. "		-,					Lab Use	
. Received b	y Sou			Org. 414		6/12/14	Time/O			uished by			Org.		Date	Time	$\dashv$
.Relinquishe		rufal		Org. 4/4		1/27/14		7	3. Recei				Org.		Date	Time	$\dashv$
. Received b		We.	1	ora los	Date	(or) 8 W				uished by			Org.		Date Time		$\neg$
Prior confirm	nation wit	h SMO rec	quired for 7 and 1	5 day TAT		0 17	· mile	910	4. Recei	vea by			Org.		Date	Time	
																	$\overline{}$

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

Page 2 of 2

Project Nam	e:	SWMU 149 GWM	Project/Ta	ek Man-		0"			Г					AR/COC	61	5590
Tech Area:			rojecura	sk wana	ger:	Clinton Lur	n		Project/Ta	sk No.:	146422	2.10.11.01				
Building:		Room:											1			
Sample No.	Fraction	S		Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection	Comple				Lab use
			Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Pa	rameter & Method		Lab
096143		CTF-MW3		359	6/27/14	9:40 /	FGW	Р	500 ml	HNO3	G	DU	TAL	Requested		Sample ID
096144	-001	CTF-TB2		NA	6/27/14	9:37	DIW	G	3x40ml					s(SW846-6010/6020	)/7470)	002
								<u> </u>	3,40111	HCL	G	TB	TCL VOC	(SW846-8260B)		Sample ID 35/599 002 35/593
															$\dashv$	
															$\dashv$	
														-		
								-								
							-			+						
								$\dashv$								
				$\dashv$			-+								$\Box$	
		>													$\neg$	
ecipient Initi	als_I												-	T T		
	MIC															

### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date:

July 24, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Sample ID:

Client Sample ID: 096142-020 351543006

Matrix:

**AQUEOUS** 

Collect Date:

27-JUN-14 09:44

Receive Date:

Collector:

28-JUN-14

Client

Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: CTF-MW3

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy									
EPA 314.0 Perch	lorate by IC "As Re	ceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 0	7/02/14	1729 1399523	1
The following A	nalytical Methods v	vere performed:								
Method	Description				Ana	alyst Co	mments	146		
1	EPA 314.0 DC	E-AL								

Notes:

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														Page 1 of 2
Batch No.					SMO Use						,		AR/COC	615427~
Project Name Project/Task Project/Task	Manager:	SWMU 68 GWM Clinton Lum 146422.10.11.01	Date Samples Carrier/Waybi Lab Contact:	The state of the same of the same of	4/14/14 2/734 Edie Kent/8	17	R171		uthorization: ontact Phone	:	S-844-3199	my	Waste Characterization RMMA	010427
Service Orde		CF263-14	Lab Destination	on:	GEL	,000 000 0		Send R	eport to SMC		5-844-3199		Released by COC No.	✓ 4º Celsius
			Contract No.:		PO 130387	3			3		-284-2553		Bill to:Sandia National Laboratories	
Tech Area:			_										P.O. Box 5800, MS-0154	(ricodulis rayable),
Building:		Room:	Operationa				,						Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Location	n Detail	Depth (ft)	Date/I		Sample Matrix	Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095733	-001 /	OBS-MW1		153	4/14/14	9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673
095733	-002 ′	OBS-MW1		153	4/14/14	9:45	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673
095733	-009 ′	OBS-MW1		153	4/14/14	9:47 /	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020	346673 7470) 003
095733	-014 ′	OBS-MW1		153	4/14/14	9:50 /	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-719	24/2/27
095733	-016	OBS-MW1		153	4/14/14	9:51	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	346673
095733	-017/	OBS-MW1		153	4/14/14	9:49	FGW	Р	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6	901-1-70
095733	-018 /	OBS-MW1		153	4/14/14	9:52 /	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673
095733	-020	OBS-MW1		153	4/14/14	9:53	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	39667
095733	-022	OBS-MW1		153	4/14/14	9:54 ′	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	346673
095733	-024	OBS-MW1		153	4/14/14	9:55	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-832	346673
Last Chain Validation		☐ Yes ☑ Yes			Tracking		SMC	) Use	Special Ins	structions				Conditions on
Backgroun		☐ Yes		Date Ent				4.6	EDD		☑ Yes		No	Receipt
Confirmato		☐ Yes		Entered		1116-66			Turnaroun		7 Da	<u>v*</u>	<u>15 Day*</u>	
Sample		103	nature	QC inits.		/Oi	· /DI	(O II	Negotiated		<u> </u>			
	Robert L		incl	Ele	SNL/4142/50	Organiza			Sample Dis	·	□ Return	to Client	☐ Disposal by Lab	
Members		antillanes Alled	till -	104	SNL/4142/50				Return Sar		Cond asset to	T:- 11		
monibolo	William (	Gibson Wille Va	11/1		SNL/4142/50						Sena report to erform verifica	tion analys	n/4142/MS 0729/284-2547 sis using SW846-6850M. FGW,	
		1000000		47		20100	J11000 E0	0 1001	filtered in field	dusing a 0.4	5 micron in-li	ne filter. Re	eport Anions (as Br CLF SO4)	
		1100							isotopes).	total CaCOs	s,HCO3,CO3)	. Gamma S	Spectroscopy (as short list	Lab Use
1.Relinquishe	- 197	In Satille	- Org. 4/4.			¥ Time /⟨		3.Relino	uished by			Org.	Date	Time
Received b     Relinquisher	1	relega	Org. 414					3. Rece				Org.		Time
<ol> <li>Relinquished</li> <li>Received to</li> </ol>		maklane	Org. 4/47		4/14/1			4.Relino	quished by			Org.	Date	Time
		ith SMO required for 7 a	Org. Cel	_ Date	4-15-14	Time 6	7745	4. Rece	ived by			Org.	Date	Time

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

Page \_2\_ of \_2\_

Project Name	e:	SWMU 68 GWM	Project/	Task Mana	ger:	Clinton Lun	n		Project/Tas	sk No ·	146422	.10.11.01		N = 2151 - 23
ech Area:									i rojeco ra.	3K 140	140422	.10.11.01		
Building:		Room:											×	Lab use
Sample No.	Eraction	Sample Locati	D.4!!	Depth	Date/		Sample		ntainer		Collection	Sample	Parameter & Method	Lab
		· · · · · · · · · · · · · · · · · · ·	ion Detail	(ft)	Colle		Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample II
095733		OBS-MW1		153	4/14/14	9:57	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	346673 34667
095733		OBS-MW1		153	4/14/14	9:58 <	GW	Р	1 L/	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	34667
095733	-034 ^	OBS-MW1		153	4/14/14	9:59 ′	GW	Р	1 L	ниоз	G	SA	Gross Alpha and Beta (EPA 900.0)	134661
095733	-035	OBS-MW1		153	4/14/14	10:00 ′	GW	Р	1 L ~	HNO3	G	SA	Isotopic Uranium (HASL 300)	3466
095734	-001	OBS-TB1 /		NA	4/14/14	9:44	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	39667
														5
														DE THE
														Eget I.
														2-36
														Pro-state and
														S NET S NET S
						- 1000								10 At 10
50														F-010-1
														8/11/5-07
														ACCESS OF THE
		./	EMPL ME	SPURE AREA	Management of	(STRONE)					L			

### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date:

May 14, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Sample ID:

Client Sample ID: 095733-020 346673007

Matrix:

**AQUEOUS** 

Collect Date:

14-APR-14 09:53

Receive Date: Collector:

15-APR-14

Client

Client ID:

Project:

**SNLSGWater** 

SNLS004

Client Desc.: OBS-MW1

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy					****				
EPA 314.0 Perch	lorate by IC "As Rece	ived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 05	5/06/14	1707 1380834	1
The following A	nalytical Methods wer	e performed:								
Method	Description				Ana	lyst Co	mments			
1	EPA 314.0 DOE-	AL				•				

Notes:

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Dage	a 1 of 2
Batch No.	VA					SMO Use	,					, ,		AR/COC		5428
Project Name		SWMU 6		Date Samples	Shipped:		1,4		SMO A	uthorization:	01	60	-		01	3426
Project/Task	Manager:	Clinton Lu	ım	Carrier/Waybil	II No.		403			ontact Phone		ilip	Smy			
Project/Task	Number:	146422.1	0.11.01	Lab Contact:		Edie Kent/		2171	JSWICC					RMMA		
Service Orde	r:	CF263-14	1	Lab Destination	m.	GEL	000-000-0	7171	Cand D			5-844-3199		Released by COC No.		
		1		Contract No.:		PO 130387	72		Sena K	eport to SMC						4º Celsius
Tech Area:				Contract No.,		10 13030	3		L	Rita Kava	naugh/505	5-284-2553		Bill to:Sandia National Laboratorie	s (Accou	nts Payable),
Building:		Room:			. 0.4									P.O. Box 5800, MS-0154		
Dunuing.		ROOM.		Operational										Albuquerque, NM 87185-0154		
Cample No	F				Depth	Date/		Sample	C	ontainer	Preserv-	Collection	Sample	Parameter & Method		Lab
Sample No.	Fraction	Sar	nple Location D	etail	(ft)	Colle	cted	Matrix	Type	Volume	ative	Method	Туре	Requested	·	Sample ID
095735	-001	OBS-FB1			NA	4/15/14	9:13 <	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)		346673
095736	-001	OBS-MW	2		252	4/15/14	9:13 -	GW	G	240	1101					346673
005700	200		_			1710/14	0.10	GVV	6	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		016
095736	-002	OBS-MW	2		252	14/15/14	9:14	f gw	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)		346673
095736	-009	OBS-MW	2		252	*4/15/14	9:16	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020	7.470	346673
095736	-014	OBS-MW	2		252	4/15/14	9:19 ~	GW	Р	250 ml	None	G	SA			346673
095736	-016	OBS-MW	2		252	• 4/15/14	9:20 /	GW	Р	125 ml	None	G		Hexavalent Chromium (SW846-71	96A)	346673
095736	-017	OBS-MW	2		252	*4/15/14	9:18	FGW	P	500 ml	HNO3		SA	Anions (SW846-9056)		346674
005726	040	000 104	•					1000		300 1111	HIVO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6	020)	002
095736		OBS-MW			252	*4/15/14	9:21	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)		346673
095736		OBS-MW	2		252	4/15/14	9:22 /	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)		346673
095736	-022	OBS-MW:	2		252	4/15/14	9:23	gw	Р	500 ml	None	G	CA	Aller Entre (Ottoppen)		346673
Last Chain	The second secon	Yes			Sample	Tracking		SMO		Special Ins			SA	Alkalinity (SM2320B)		023
Validation I	Req'd:	✓ Yes			Date Ent			00	036	EDD	ucuons.		ements:			ditions on
Backgroun		Yes			Entered									No	Re	eceipt
Confirmato		Yes			QC inits.					Turnaroun		7 Day	<u> </u>	<u>15 Day*</u>		
Sample		ame	Signatu				10			Negotiated		Ц				
•	Robert Ly		Langue		Init.		/Organizat			Sample Dis	sposal	☐ Return	to Client	☐ Disposal by Lab		
1			The state of the			SNL/4142/50				Return San	nples By:					
Members	Alfred Sa		17 4900	refer		SNL/4142/50				Comments	:	Send report to	Tim Jackson	/4142/MS 0729/284-2547		
	William G	ibson ·	Weller D.	Wh V	WAX	SNL/4142/50	5-284-330	7/505-239	9-7367	If Perchlorate	detected,pe	rform verifica	tion analys	S USING SW846-6850M ECW		
			<i>[ ] ]</i>	/	1					filtered in field	using a 0.4	5 micron in-li	ne filter. Re	port Anions ( as Br CLE SO4)		
	1	0								Alkalinity (as i	total CaCO3	(HCO3,CO3,	Gamma S	pectroscopy (as short list		
1.Relinquishe	d by	19als	getille	Org. 4/47	Date	4/15/14	Time (	950	2 Deline	isotopes).					La	b Use
1. Received b	y	1. 5. 0		Org. 4142		4/15/14	Time 6			uished by			Org.	Date	Time	
2.Relinquishe	d by	my J		Org. 4/4)					3. Rece	,			Org.	Date	Time	1
2. Received b	- //	Me I				4-16-14			The same of the sa	uished by			Org.	Date	Time	
	rior confirmation with SMO required for 7 and 15 day TAT						Time O	725	4. Rece	ved by			Org.	Date	Time	

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

Page 2 of 2 AR/COC 615428 Project Name: SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Preserv- Collection Sample Sample No. Fraction Parameter & Method Sample Location Detail Lab (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 095736 -024 OBS-MW2 252 9:24 346673 GW AG 4x1 L None G SA High Explosives (SW846-8321A mod.) 095736 -029 OBS-MW2 252 4/14/15 \$ 9:26 GW P 250 ml NaOH G SA Total Cyanide (SW846-9012) 095736 -033 OBS-MW2 252 4/14/15 9:27 GW Р 1 L HNO3 G SA Gamma Spectroscopy (EPA 901.0) 095736 -034 026 OBS-MW2 252 4/14/15 3 9:28 GW 346673 1 L HNO3 G Gross Alpha and Beta (EPA 900.0) SA 095736 -035 OBS-MW2 252 4/14/15 9:29 GW 346673 1 L HNO3 G SA Isotopic Uranium (HASL 300) 095737 -001 OBS-TB2 NA 4/14/15 9:13 DIW G 3x40 ml HCL G TB TCL VOC (SW846-8260B) Recipient Initials

### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date:

May 14, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Client Sample ID: Sample ID:

095736-020 346673022

Matrix:

AQUEOUS

Collect Date: Receive Date: 15-APR-14 09:22 16-APR-14

Collector:

Client

Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: OBS-MW2

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatograp	phy									
EPA 314.0 Perch	lorate by IC "As Re	ceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MARI 0	5/06/14	1804 1380834	1
The following A	nalytical Methods v	vere performed:								
Method	Description				Ana	alvst Co	mments			
1	EPA 314.0 DC	E-AL						AMPRICA N	1000	

Notes:

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

		0.000.00		
Paα	•	4	-5	
ray	•		10	-

Batch No.						SMO Use										i age	<u> </u>
Project Nam		SWMU 6		Date Samples Ship		4/16	114		Temo		1	10/		/-	AR/COC	61	5430
Project/Task				Carrier/Waybill No.	-	2170				authorization: Contact Phone		day		Waste Cha	racterization		
Project/Task	Number:	146422.	10.11.01	Lab Contact:	-	die Kent	803-556-8	2171	Jamoc					RMMA			
Service Orde	er:	CF263-1	4	Lab Destination:		EL	000-000-0	7171	Cond	Lorraine I	Herrera/50	5-844-3199		Released	by COC No.		
				Contract No.:		O 13038	73		Joena P	Report to SMC							4° Celsiu
Tech Area:						0 .0000	-			Rita Kava	inaugh/50	5-284-2553		Bill to:Sandia Natio	onal Laboratorie	es (Accour	nts Payable
Building:		Room:		Operational Site	e:									P.O. Box 5800, MS	3-0154		T-0.000
C!- N-	_			De		Date/	Time	Sample	C	ontainer	Preserv-	Collection	C	Albuquerque, NM			Υ
		Sa	mple Location D	Detail (f	t)	Colle	cted	Matrix	Туре	Volume	ative	Method	Sample Type	1	ter & Method quested	d	Lab
095741	-001	OBS-MV	/3	20	08 4	4/16/14	9:04	GW	G	3x40ml	HCL	G	SA				Sample I
095741	-002	OBS-MV	/3	20	08	4/16/14	9:05	GW	AG	4x1 L′	None	G		TCL VOC (SW8			34667
095741	-009 🖊	OBS-MV	/3	20	08	4/16/14	9:08	GW	Р	500 ml			SA	TCL SVOC (SW			048
095741	-014	OBS-MV	/3	20	08	4/16/14	9:11	GW			HNO3	G	SA	TAL Metals+U (SV	/846-6010/602	0/7470)	34667
095741	-016	OBS-MV	/3	20			,		Р	250 ml	None	G	SA	Hexavalent Chrom	um (SW846-7	196A)	34667.
095741		OBS-MV				4/16/14	9:12	GW	Р	125 ml	None	G	SA	Anions (SW846-	9056)		34667
095741		OBS-MW		20		4/16/14	9:10	FGW 1	Р	500 ml	HNO3	G	SA	SA Metals-Ca,Mg,K,Na(SW846			346679
095741	~ ~			20	8 2	1/16/14	9:13	GW	Р	125 ml	H2SO4	G	SA Nitrate+Nitrite (EPA 353.2)				34667
	-	OBS-MW		20	8 4	1/16/14	9:14	GW	Р	250 ml	None	G	SA	Perchlorate (EP	A 314.0)		346673
095741		OBS-MW		20	8 4	1/16/14	9:15	GW	Р	500 ml	None	G	SA	Alkalinity (SM23			34667
095741 Last Chain:		OBS-MW	3	20		1/16/14	9:16 🗸	GW	AG	4x1 L	None	G	SA	High Explosives			34667
Validation I		✓ Yes				acking		SMO	Use	Special Ins	tructions/	QC Requir		- iigii Explosives	(377040-032		
Backgroun					Entere					EDD		☑ Yes		No			itions on
-		Yes			red by:					Turnaround	Time	7 Day	· ·		7000	Re	eceipt
Confirmato Sample		☐ Yes me		QC ir						Negotiated	TAT			13 Day	✓ 30 Day		
	Robert Lyi	10.00	Signatu			Company	/Organizati	on/Phone	e/Cell	Sample Dis	posal	Return	to Client	V Dien	osal by Lab		
			14019100	I The	101	NL/4142/50	5-844-4013	3/505-250	0-7090	Return Sam	ples By:				JSAI DY LAD		
	Alfred Sar		Hapel Seel	all Cl	SI	IL/4142/50	5-844-5130	0/505-228	3-0710	Comments		Send report to	Tim tackson	/4142/MS 0729/284-25			
- 1	William Gi	bson	Wellen 13	West 30/8	X SN	IL/4142/50	5-284-3307	7/505-239		If Perchlorate	detected.pe	rform verificat	tion analysis	Susing SIMBAR COE	DA FOLK		
			//	1 0	1					Imrered in held	using a 0.4	6 micron in-lin	e filter Re	nort Anione / as D.	15000		
	1	4								Alkalinity (as to isotopes).	otal CaCO3	,HCO3,CO3).	Gamma S	pectroscopy (as sho	rt list		
.Relinquished		3-d5-	etilo.	Org.4142 Da	ate 4	116/14	Time o	257	3 Pelina	uished by						Lab	Use
. Received by	y 1500	Wale	- //				Time 04						Org.	Date		Time	
.Relinquished		wel				110/	Time /		3. Recei				Org.	Date		Time	
. Received by		Talat	Neu Man	Ora De		111711	Time ()	Oly. Date			Time						
Prior confirm								0 735 4. Received by Org. Date									

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

Page 2 of 2

roject Nan ech Area:	16.	SWMU 68 GWM	Project/	Task Mana	ger:	Clinton Lur	n		Project/Ta	sk No ·	146422	2.10.11.01	AR/COC	615430
uilding:		Room:								ok No.	140422	2.10.11.01		
				Depth	Date/	Time	Sample	Co	ntainer	1_	lo a u a a u	· -		Lab u
Sample No.	Fraction	Sample Locat	ion Detail	(ft)	Colle	cted	Matrix	Туре	Volume	Preserv- ative	Collection Method	Sample	l mounda	Lab
095741	-029 /	OBS-MW3		208	4/16/14	9:19 /	GW	P	250 ml			Туре	Requested	3466
095741	-033 ′	OBS-MW3		208	4/16/14	9:20 /	GW	P		NaOH	G	SA	Total Cyanide (SW846-9012)	09
095741	-034 ′	OBS-MW3		208	4/16/14	9:22			1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901	
095741	-035 -	OBS-MW3		208			GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900	
095742	-001	OBS-MW3			4/16/14	9:24	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	3466
095742	-002	OBS-MW3		208	4/16/14	9:04	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	3466
095742 V	-009	1.1		208	4/16/14	9:05 /	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	3466
095742		OBS-MW3		208	4/16/14	9:08 /	GW	Р	500 ml	НИОЗ	G	DU	TAL Metals+U (SW846-6010/6020/74	140/1/
	-014	OBS-MW3		208	4/16/14	9:11 🖍	GW	Р	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A	3466
095742	-016 /	OBS-MW3		208	4/16/14	9:12	GW	Р	125 mi	None	G		Anions (SW846-9056)	3466
095742√	-017 ′	OBS-MW3		208	4/16/14	9:10	FGW	Р	500 ml	HNO3	G			1011111
095742	-018 🗸	OBS-MW3		208	4/16/14	9:13/	GW	Р	125 ml	H2SO4	G		Metals-Ca,Mg,K,Na(SW846-602	3466
095742	-020 ✓	OBS-MW3		208	4/16/14	9:14°	GW	P	250 ml				Nitrate+Nitrite (EPA 353.2)	3466
095742	-022	OBS-MW3		208	4/16/14	9:15	GW	P		None	G		Perchlorate (EPA 314.0)	106
095742	-024	OBS-MW3		208	4/16/14	9:16			500 ml	None	G	DU	Alkalinity (SM2320B)	3466
095742	-029 '	OBS-MW3		208	4/16/14		GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A	
095742	-033 -	OBS-MW3		1		9:19	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	3466
095742	-034	OBS-MW3		208	4/16/14	9:20 /	GW	Р	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901	0) 3466
095742		OBS-MW3		208	4/16/14	9:22	GW	Р	1 L	HNO3	G	- 1	Gross Alpha and Beta (EPA 900.	12////
		f 1		208	4/16/14	9:24	GW	Р	1 L	HNO3	G	V1000000000	Isotopic Uranium (HASL 300)	3466
093743	-001	OBS-TB4 ⊬		NA	4/16/14	9:04 🗸	DIW	G	3x40 ml	HCL	G		TCL VOC (SW846-8260B)	3466
		AY											1 0 (011010-02000)	01

### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date: May 14, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Sample ID:

Client Sample ID: 095741-020 346673052

Matrix:

**AQUEOUS** 

Collect Date:

16-APR-14 09:14

Receive Date: Collector:

17-APR-14 Client

Project:

**SNLSGWater** 

Client ID:

SNLS004

Client Desc.: OBS-MW3

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatogra	phy									
EPA 314.0 Perch	lorate by IC "As Re	ceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 0	5/06/14	1843 1380834	1
The following A	nalytical Methods w	ere performed:								
Method	Description	42-20			Ana	lyst Co	mments			
1	EPA 314.0 DO	E-AL				7.00				1000

Notes:

### **GEL LABORATORIES LLC**

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

**Certificate of Analysis** 

Report Date:

May 14, 2014

Company:

Sandia National Laboratories

Address:

MS-0756, Org. 06765, Bldg. 823/Rm. 4276

1515 Eubank SE

Albuquerque, New Mexico 87123

Contact:

Ms. Pamela M. Puissant

Project:

Groundwater, Level C Package

Client Sample ID: Sample ID:

095742-020

Matrix:

346673064 **AQUEOUS** 

Collect Date:

Collector:

16-APR-14 09:14

Receive Date:

17-APR-14

Client

Client ID:

Project:

**SNLSGWater** 

SNLS004

Client Desc.: OBS-MW3

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatogra	phy									
EPA 314.0 Perch	lorate by IC "As Re	ceived"								
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1 0	5/06/14	1902 1380834	1
The following A	nalytical Methods v	vere performed:								
Method	Description			0.50	Ana	alyst Co	mments			
1	EPA 314.0 DC	E-AL				•				

Notes:

# 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: July 29, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 149 GWM

AR/COC: 615589 and 615590

SDG: 351543 Laboratory: GEL

Project/Task: 146422.10.11.01 Analysis: General Chemistry

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

### **Summary**

One sample was prepared and analyzed with accepted procedures using methods EPA 314.0 (Perchlorate by Ion Chromatography); EPA 9056 (anions by IC); EPA 353.2 (nitrate/nitrite); and SM 2320B (Total Alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

### **Holding Times and Preservation**

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

### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

Alkalinity MB results were reported, but were not assessed for data validation.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

### Nitrate/nitrite-N

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

### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

### Nitrate/nitrite-N

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

### **Detection Limits/Dilutions**

All detection limits were properly reported.

### Nitrate/nitrite:

The sample was diluted 10X.

### Anions:

The sample was diluted 50X for chloride and sulfate.

### Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 08/18/14



### Sample Findings Summary



AR/COC: 615424, 615425, 615426

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	095725-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	095725-034/CCBA-MW1	BETA (12587-47-2)	J, MS1
	095728-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	095728-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	095730-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	095731-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	095731-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	095725-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	095725-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	095725-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	095725-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	095728-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	095728-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095728-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095728-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095730-033/CCBA-MW2	Americium-241 (14596-10-2)	R, FR4
	095730-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095730-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095730-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	095731-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	095731-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095731-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095731-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095725-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	095725-009/CCBA-MW1	Potassium (7440-09-7)	J, D1
	095727-009/CCBA-FB2	Magnesium (7439-95-4)	UJ, D1
	095727-009/CCBA-FB2	Potassium (7440-09-7)	UJ, D1
	095728-009/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
	095728-009/CCBA-EB1	Potassium (7440-09-7)	UJ, D1
	095730-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095730-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095730-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
	095731-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095731-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095731-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	095725-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095725-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095728-002/CCBA-EB1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095728-002/CCBA-EB1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095730-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095730-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095731-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095731-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
SW846 3535/8321A Modifie		AW	
	095725-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	095725-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	095728-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	095728-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	095730-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	095730-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	095731-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095731-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8260B DOE-AL			
	095727-001/CCBA-FB2	Dibromochloromethane (124-48-1)	J+, I3,C2
SW846 9012B			
	095725-029/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	095728-029/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4
	095730-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4
	095731-029/CCBA-MW2	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 5, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 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**

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

### Total cyanide:

- 1. The intercept for total cyanide was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were NDs and will be **qualified UJ,15**.
- 2. Total cyanide was detected in the ICB and CCB at negative values with absolute values ≤ the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

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

### **Holding Times and Preservation**

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

### **Calibration**

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

### **Blanks**

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Chloride and nitrate/nitrite were detected at < the PQL in the EB, samples 346180022 and -023. The associated sample results were detects >5X the EB values and will not be qualified.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

### Nitrate/Nitrite:

Sample -006 was diluted 5X and samples -035 and -046 were diluted 10X.

#### Anions:

Sample -005 was diluted 5X for chloride, sulfate and fluoride and samples -034 and -045 were diluted 10X for chloride and sulfate.

### Other QC

An FB was submitted with AR/COC 615425 but was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. 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: Mary Donivan Level: I Date: 06/09/14



### Sample Findings Summary



AR/COC: 615427, 615428, 615429, 615430

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	RC		
	095739-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	095739-035/OBS-EB1	Uranium-235/236 (15117-96- 1/13982-70-)	BD, FR3
	095739-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	095733-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	095733-034/OBS-MW1	BETA (12587-47-2)	J, FR7,MS1
	095736-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	095736-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	095739-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	095739-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	095741-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	095741-034/OBS-MW3	BETA (12587-47-2)	J, MS1
	095742-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	095742-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	095733-033/OBS-MW1	Americium-241 (14596-10-2)	BD, Z2
	095733-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	095733-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	095733-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	095736-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	095736-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095736-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095736-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	095739-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095739-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095739-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095739-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095741-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095741-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095741-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095741-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	095742-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095742-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095742-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095742-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095741-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
	095742-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
SW846 3510C/8270D	005733 003/ODC MANA	Carlanala (OC 74 0)	111 12 62
	095733-002/OBS-MW1	Carbazole (86-74-8)	UJ, 13,C3
	095736-002/OBS-MW2	Carbazole (86-74-8)	UJ, 13,C3
	095739-002/OBS-EB1	Carbazole (86-74-8)	UJ, 13,C3
	095741-002/OBS-MW3	Carbazole (86-74-8)	UJ, 13,C3
	095742-002/OBS-MW3	Carbazole (86-74-8)	UJ, 13,C3
SW846 3535/8321A Modific	ed 095733-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	095733-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	095736-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095736-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095739-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095739-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095741-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	095741-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
		p 130 000 000 (33 33 0)	33,

<b>Analytical Method</b>	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095742-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	095742-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8260B DOE-AL			
	095735-001/OBS-FB1	Dibromochloromethane (124-48-1)	J+, I3,C2
	095739-001/OBS-EB1	2-Butanone (78-93-3)	UJ, 14
	095739-001/OBS-EB1	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095739-001/OBS-EB1	Methyl acetate (79-20-9)	UJ, 14
	095740-001/OBS-TB3	2-Butanone (78-93-3)	UJ, 14
	095740-001/OBS-TB3	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095740-001/OBS-TB3	Methyl acetate (79-20-9)	UJ, 14
	095741-001/OBS-MW3	2-Butanone (78-93-3)	UJ, 14
	095741-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095741-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, 14
	095742-001/OBS-MW3	2-Butanone (78-93-3)	UJ, 14
	095742-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095742-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, 14
	095743-001/OBS-TB4	2-Butanone (78-93-3)	UJ, 14
	095743-001/OBS-TB4	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095743-001/OBS-TB4	Methyl acetate (79-20-9)	UJ, 14

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





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#### Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 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**

Five samples were prepared and analyzed with accepted procedures using methods EPA 314.0 (perchlorate), EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide) and SM 2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

### **Holding Times and Preservation**

The samples were prepared and analyzed within the prescribed holding times and properly preserved except as follows. Samples 346673004, -019, -045 and -046 were prepared and analyzed very slightly beyond the 24 hour method-specified holding time for hexavalent chromium. Based on professional judgment, no data were qualified.

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

No target analytes were detected in the blanks except as follows. Chloride was detected at < the PQL in the EB, sample -035. The associated sample results were detects >5X the EB values and will not be qualified.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

### Nitrate/Nitrite:

Samples -006 and -021 were diluted 5X and samples -051 and -063 were diluted 10X.

### Anions:

All samples except the EB were diluted 10X for chloride and sulfate.

### Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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**: Mary Donivan Level: I Date: 06/10/14





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#### Memorandum

Date: July 29, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 154 GWM AR/COC: 615528 SDG: 350254 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 4.

### **Summary**

One sample was prepared and analyzed with accepted procedures using methods EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

### **Holding Times and Preservation**

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

No target analytes were detected in the blanks.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria except as follows. The PS %R was >125% for bromide. The associated sample result was an ND and will not be qualified. It should be noted that the PS was reanalyzed to verify recovery.

The parent sample concentration for alkalinity was >4X the spike. However, the MS %R met acceptance criteria. Therefore, no sample data will be qualified.

It should be noted that the PS for nitrate/nitrite was performed on an SNL sample of similar matrix from another SDG.

### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

It should be noted that the replicate analysis for nitrate/nitrite was performed on an SNL sample of similar matrix from another SDG.

### **Detection Limits/Dilutions**

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

### Nitrate/Nitrite:

Sample -006 was diluted 5X.

#### Anions

Sample -005 was diluted 100X for chloride and sulfate.

### Other QC

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I Date:** 07/30/14



### Sample Findings Summary



**AR/COC:** 615528 Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096045-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	096045-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	096045-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096045-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096045-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	096045-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-009/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	096045-009/CTF-MW2	Thallium (7440-28-0)	2.5U, B3
	096045-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-010/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-010/CTF-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	096045-002/CTF-MW2	Phenol (108-95-2)	UJ, RP2
SW846 3535/8321A Modifie			
	096045-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	096045-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	096045-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	096045-024/CTF-MW2	Tetryl (479-45-8)	UJ, L3,MS3
SW846 8260B DOE-AL			
	096045-001/CTF-MW2	Bromomethane (74-83-9)	UJ, 13,C3
	096046-001/SWMU154-TB1	Bromomethane (74-83-9)	UJ, I3,C3

**AR/COC:** 615528 Page 2 of 2

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

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



### Sample Findings Summary



**AR/COC: 615589, 615590** Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	096139-009/CTF-EB1	Arsenic (7440-38-2)	R, X1
	096139-009/CTF-EB1	Calcium (7440-70-2)	0.99U, B
	096139-010/CTF-EB1	Arsenic (7440-38-2)	R, X1
	096139-010/CTF-EB1	Calcium (7440-70-2)	0.99U, B
	096142-009/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096142-009/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096142-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096142-009/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	096142-009/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	096142-010/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096142-010/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096142-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096142-010/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	096143-009/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096143-009/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096143-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096143-009/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	096143-009/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	096143-010/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096143-010/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096143-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096143-010/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	096143-010/CTF-MW3	Nickel (7440-02-0)	J-, CK3
SW846 8260B DOE-AL			

**AR/COC: 615589, 615590** Page 2 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096138-001/CTF-FB1	Methylene chloride (75-09-2)	UJ, 13,C3
	096139-001/CTF-EB1	Methylene chloride (75-09-2)	UJ, 13,C3
	096140-001/CTF-TB1	Methylene chloride (75-09-2)	UJ, 13,C3
	096141-001/CTF-FB2	Methylene chloride (75-09-2)	UJ, 13,C3
	096142-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, 13,C3
	096143-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, 13,C3
	096144-001/CTF-TB2	Methylene chloride (75-09-2)	UJ, 13,C3

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

## SECTION III TABLE OF CONTENTS

SOLI	D WAS	STE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROU	UNDWATER	
	MON	ITORING REPORT, April – June 2014	III-1	
1.0	Introd	luction	III-1	
2.0	Field	Methods and Measurements	III-3	
	2.1	Equipment Decontamination	III-3	
	2.2	Well Evacuation	III-3	
	2.3	Groundwater Sample Collection	III-4	
3.0	Analy	ytical Results	III-4	
	3.1	Field Water Quality Measurements	III-5	
	3.2	Volatile Organic Compounds		
	3.3	Semivolatile Organic Compounds		
	3.4	High Explosive Compounds	III-6	
	3.5	Nitrate Plus Nitrite	III-6	
	3.6	Anions and Alkalinity	III-6	
	3.7	Perchlorate	III-7	
	3.8	Metals	III-7	
	3.9	Gamma Spectroscopy and Radioisotopic Analyses	III-8	
	3.10	Sample Results Exceeding Maximum Contaminant Levels	III-8	
4.0	Quali	ty Control Samples	III-9	
	4.1	Field Quality Control Samples	III-9	
		4.1.1 Duplicate Groundwater Samples		
		4.1.2 Equipment Blank Samples		
		4.1.3 Trip Blank Samples	III-10	
		4.1.4 Field Blank Samples	III-10	
	4.2	Laboratory Quality Control Samples	III-10	
	4.3	Variances and Nonconformances	III-11	
	4.4	Project Field Notes and Comments	III-11	
5.0	Sumn	Summary III-		
6.0	Refer	ences	III-12	

### **LIST OF FIGURES**

Figure	Title
III-1	Location of Monitoring Well CTF-MW3 near SWMU 149
III-2	Location of Monitoring Well CTF-MW2 near SWMU 154
III-3	Concentrations of RDX over Time in Monitoring Well CTF-MW2 near SWMU 154
III-4	Concentrations of Arsenic and Groundwater Elevations over Time in Monitoring Well CTF-MW2 near SWMU 154

### **LIST OF TABLES**

Table	Title
III-1	Laboratory Analytical Methods, Container Types, and Preservation Requirements for SWMUs 149 and 154 Groundwater Samples
III-2	Sample Details for Second Quarter, CY 2014 Groundwater Sampling, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-3	Summary of Field Water Quality Measurements, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-4	Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-5	Method Detection Limits for Volatile Organic Compounds, SWMU 149 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-6	Method Detection Limits for Volatile and Semivolatile Organic Compounds, SWMU 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-7	Method Detection Limits for High Explosive Compounds (EPA Method 8321A), SWMU 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-8	Summary of Nitrate Plus Nitrite Results, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014

### LIST OF TABLES (Concluded)

Table	Title
III-9	Summary of Anion and Alkalinity Results, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-10	Summary of Perchlorate Results, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-11	Summary of Unfiltered Total Metal Results, SWMU 149 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-12	Summary of Filtered Total Metal Results, SWMU 149 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-13	Summary of Unfiltered Total Metal Results, SWMU 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-14	Summary of Filtered Total Metal Results, SWMU 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-15	Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, SWMU 154 Groundwater Monitoring Quarterly Assessment, April – June 2014
III-16	Summary of Constituents Detected above Established MCLs, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessments through June 2014
III-17	Summary of Duplicate Samples, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessments, April – June 2014
	APPENDICES
Appendix A	Field Measurement Logs for Monitoring Well CTF-MW2 and Monitoring Well CTF-MW3
Appendix B	Analytical Laboratory Certificates of Analysis for Monitoring Well CTF-MW2 and Monitoring Well CTF-MW3 Groundwater Data
Appendix C	Data Validation Sample Findings Summary Sheets for Monitoring Well CTF-MW2 and Monitoring Well CTF-MW3 Groundwater Data

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# SECTION III SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, April – June 2014

### 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 (NMED April 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 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. Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the June 2014 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 24 times for a variety of constituents.

This report summarizes the fourteenth and thirteenth quarterly groundwater sampling events for CTF-MW2 and CTF-MW3, respectively, following the April 8, 2010 letter by NMED requiring eight quarters of additional groundwater monitoring (NMED April 2010). CTF-MW3 is located near SWMU 149 (Building 9930 Septic System) and monitoring well CTF-MW2 is located near SWMU 154 (Building 9960 Septic System and Seepage Pits). This groundwater characterization at the two SWMUs is designed to meet the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) (NMED April 2004).

Monitoring wells CTF-MW3 and CTF-MW2 were sampled on June 27 and, June 06, 2014, respectively.

Groundwater sampling was conducted in conformance with the procedure "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 with modifications by NMED in December 2010 (NMED December 2010).

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

Analytical results for the June 2014 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for arsenic, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples in both unfiltered and filtered samples. Arsenic was reported at a concentration of 0.0341 mg/L in the unfiltered sample and at a concentration of 0.0261 mg/L in the filtered sample. The reported values for arsenic are comparable to historical values.

The elevated concentrations of arsenic in monitoring well CTF-MW2 groundwater samples are most likely from a naturally occurring source and not associated with SNL/NM testing activities. Analysis of trace gases and helium isotope data from CTF-MW2 groundwater show that it is a mixture of shallow and upwelling endogenic (deeply derived) fluids (Williams, et al., August 2013).

The quality control (QC) samples for CTF-MW3 and CTF-MW2 consisted of one groundwater duplicate sample, one equipment blank (EB) sample, three trip blank (TB) samples, and one field blank (FB) sample. These QC samples were submitted for analysis during this quarterly sampling event. The following sections provide descriptions of the field methods used and discussions of the analytical and QC sampling results.

#### 2.0 Field Methods and Measurements

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM June 2010). Groundwater monitoring at monitoring well CTF-MW2 was performed according to the SAPs submitted as Attachment 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 the groundwater sample collected from monitoring wells CTF-MW3 and CTF-MW2 during the Second Quarter of CY 2014.

#### 2.1 **Equipment Decontamination**

A portable Bennett<sup>™</sup> groundwater sampling system was used to collect 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 an YSI<sup>™</sup> Model EXO1 water quality meter. Turbidity was measured with a HACH<sup>™</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 within 10 percent, or less than 5 nephelometric turbidity units.
- pH is within 0.1 units.
- Temperature is within 1.0 degree Celsius.
- SC is within 5 percent as micromhos per centimeter.

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

#### 2.3 Groundwater Sample Collection

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

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

#### 3.0 Analytical Results

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

monitoring wells CTF-MW3 and CTF-MW2 are shown in tabulated form in Tables III-4 through III-15. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center. The analytical reports are provided in Appendix B.

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

#### 3.1 Field Water Quality Measurements

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

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

#### 3.2 Volatile Organic Compounds

SWMU 149, Monitoring Well CTF-MW3. No VOCs were detected at concentrations above established MCLs. The compounds bromodichloromethane and chloroform were detected above laboratory MDLs at concentrations comparable to historical values. Bromodichloromethane was detected at 0.450 micrograms per liter ( $\mu$ g/L) in the groundwater sample and 0.440  $\mu$ g/L in the groundwater duplicate sample. Chloroform was detected at 0.720  $\mu$ g/L in both the groundwater sample and groundwater duplicate sample. Table III-4 summarizes detected VOCs in groundwater samples and Table III-5 lists the VOC MDLs.

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

#### 3.3 Semivolatile Organic Compounds

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

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

#### 3.4 High Explosive Compounds

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

**SWMU 154, Monitoring Well CTF-MW2.** No HE compounds were detected in the monitoring well CTF-MW2 groundwater sample at concentrations above laboratory MDLs, except hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). RDX was detected in the groundwater sample collected from monitoring well CTF-MW2 at a concentration of 0.208  $\mu$ g/L in the groundwater sample. RDX concentrations since March 2002 are plotted on Figure III-3. The EPA does not have an MCL for RDX. NMED does have a tap water screening level for RDX of 6.11  $\mu$ g/L (NMED February 2012), which is approximately 29 times greater than CTF-MW2 analytical concentration. Table III-4 summarizes the HE compounds detected in the groundwater sample and Table III-7 lists the HE compound MDLs.

#### 3.5 **Nitrate Plus Nitrite**

**SWMU 149, Monitoring Well CTF-MW3.** Table III-8 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. No NPN was detected above the nitrate MCL. The NPN was reported at a concentration of 5.97 mg/L in the groundwater sample. A duplicate sample was not collected for NPN.

**SWMU 154, Monitoring Well CTF-MW2.** Table III-8 summarizes NPN results for monitoring well CTF-MW2. NPN was not detected above the MCL of 10 mg/L or above the MDL.

#### 3.6 Anions and Alkalinity

**SWMU 149, Monitoring Well CTF-MW3.** Table III-9 summarizes alkalinity and major anion (i.e., bromide, chloride, fluoride, and sulfate) results for monitoring well

CTF-MW3 samples. No parameters were detected above established MCLs. A duplicate sample was not collected for anions and alkalinity.

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

#### 3.7 **Perchlorate**

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

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

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

#### 3.8 Metals

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

**SWMU 149, Monitoring Well CTF-MW3.** No metals were detected above established MCLs in any groundwater sample. Metal results for both unfiltered and filtered samples from monitoring well CTF-MW3 are summarized in Tables III-11 and III-12, respectively. Arsenic reanalysis was requested because of the variability of results between the groundwater sample and groundwater duplicate sample. The external laboratory indicated that there may have been a small amount of arsenic carryover in equipment on the day of the original analysis. Arsenic was not detected in the reanalysis, and the original results were qualified as unusable during data validation.

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic in the unfiltered sample was detected above the MCL of 0.010 mg/L with a concentration of 0.0341 mg/L in the groundwater sample. Arsenic was detected in the filtered sample with a concentration of 0.0261 mg/L. The elevated concentrations of arsenic in the groundwater sample are most likely attributable to deeply-derived upwelling waters. Arsenic concentrations since March 2002 are plotted on Figure III-4. Unfiltered and filtered metal results for monitoring well CTF-MW2 are summarized in Tables III-13 and III-14, respectively.

#### 3.9 Gamma Spectroscopy and Radioisotopic Analyses

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

swmu 154, Monitoring Well CTF-MW2. The monitoring well CTF-MW2 groundwater sample was screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. The CTF-MW2 potassium-40 was qualified as unusable during data validation. Details are provided in Section 4.2. All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table III-15.

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

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

#### 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. Arsenic was the only constituent exceeding MCLs detected in the June 2014 CTF-MW2 monitoring well samples. Figure III-4 shows the arsenic concentration over time for monitoring well CTF-MW2. The elevated concentrations of arsenic in the groundwater samples are most

likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite that is sourced by a mixture of shallow and deeply-derived upwelling waters.

#### 4.0 Quality Control Samples

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

#### 4.1 Field Quality Control Samples

Based on the approved SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2) groundwater duplicate, FB, and EB groundwater samples were collected during this sampling event. The TB samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the SAPs.

#### 4.1.1 **Duplicate Groundwater Samples**

Duplicate groundwater samples were collected from CTF-MW3 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate samples were collected immediately after the original groundwater samples in order to reduce variability caused by timing and/or sampling mechanics. The duplicate sample was analyzed for VOCs and metals only.

Table III-17 summarizes results of duplicate sample analyses and calculated relative percent difference (RPD) values. RPD values are only calculated for chemical parameters when detected above the MDL in both samples.

**SWMU 149, Monitoring Well CTF-MW3**. The duplicate sample results show good agreement (RPD values < 20 percent for organic compounds and < 35 for inorganic analyses) for all calculated parameters.

#### 4.1.2 **Equipment Blank Samples**

EB samples were collected prior to sampling monitoring wells CTF-MW3 and CTF-MW2 and were submitted for all analyses. EB samples were collected according to

procedures described in SNL/NM FOP 05-03 "Groundwater Monitoring Equipment Decontamination" (SNL/NM January 2012a).

**SWMU 149, Monitoring Well CTF-MW3**. Magnesium was detected above the laboratory MDL. No corrective action was necessary since the environmental and environmental duplicate samples report magnesium at concentrations greater than five times the EB result.

#### 4.1.3 Trip Blank Samples

A TB sample is submitted whenever a groundwater or duplicate groundwater sample is collected for VOC analyses to assess whether contamination of the sample has occurred during shipment and storage. The TB samples were brought to the field and accompanied each sample shipment.

**SWMU 149, Monitoring Well CTF-MW3.** Two TBs were submitted with the June 2014 samples. No VOCs were detected above associated laboratory MDLs in any of the TB samples.

**SWMU 154, Monitoring Well CTF-MW2.** One TB was submitted with the June 2014 samples. No VOCs were detected above associated laboratory MDLs in the TB sample.

#### 4.1.4 Field Blank Samples

A FB sample was collected for VOCs to assess whether contamination of the samples had resulted from ambient field conditions.

**SWMU 149, Monitoring Well CTF-MW3.** No VOCs were detected above associated laboratory MDLs in the FB sample.

#### 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, except for the original CTF-MW3 arsenic and CTF-MW2 potassium-40 results. The original

arsenic results did not compare to historical values or associated duplicate samples. Since original results were not verified by reanalysis, they were qualified as unusable during data validation. The CTF-MW2 potassium-40 was qualified as unusable during data validation, since the result was rejected by GEL due to the peak not meeting identification criteria. 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 SAP for SWMUs 149 and 154 (SNL/NM June 2010, Attachment 1 and 2) were identified during the June 2014 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

#### **4.4** Project Field Notes and Comments

Field observations, activities, and project matters noted during sampling activities are summarized below:

- SWMU 149, Monitoring Well CTF-MW3. A new deionized (DI) water source for equipment decontamination and QC samples was used, due to continuous detections of trihalomethanes at low level concentrations in blank samples during previous sampling events. As a replacement to Culligan DI water, DI water was obtained from the SNL/NM Building 858 DI water system. As a result, no trihalomethanes or other VOCs were reported above MDLs in any EB or FB samples.
- **SWMU 154, Monitoring Well CTF-MW3.** Water from CTF-MW2 has a high buffering capacity. SNL/NM personnel instructed GEL to check pH upon receipt of samples and add preservative as needed.
- **SWMU 154, Monitoring Well CTF-MW3.** The nitrogen air pressure was increased to the sampling system since the sample pump ceased working at low pressures, and resulted in a higher flow rate during purging and sampling.

#### 5.0 **Summary**

During CY 2014 Second Quarter, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154. The April 8, 2010 letter from NMED required eight quarters of groundwater

sampling and analysis. The CY 2014 Second Quarter sampling event represents the thirteenth and fourteenth quarterly groundwater sampling event for monitoring wells CTF-MW3 and CTF-MW2, respectively. Sampling will continue at both wells until further guidance is provided by NMED. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

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

Analytical parameters for monitoring well CTF-MW2 include VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

No parameters were detected above established MCLs, except for arsenic in monitoring well CTF-MW2. Arsenic was detected above the MCL of 0.010 mg/L at concentrations of 0.0341 mg/L and 0.0261 mg/L in the unfiltered and filtered groundwater samples, respectively. These values are comparable to previous results. 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 that is sourced by a mixture of shallow and upwelling endogenic (deeply derived) waters. RDX was detected at a concentration of 0.208  $\mu$ g/L in the CTF-MW2 groundwater sample. These concentrations are significantly below the NMED tap water screening level for RDX of 6.03  $\mu$ g/L.

#### 6.0 **References**

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

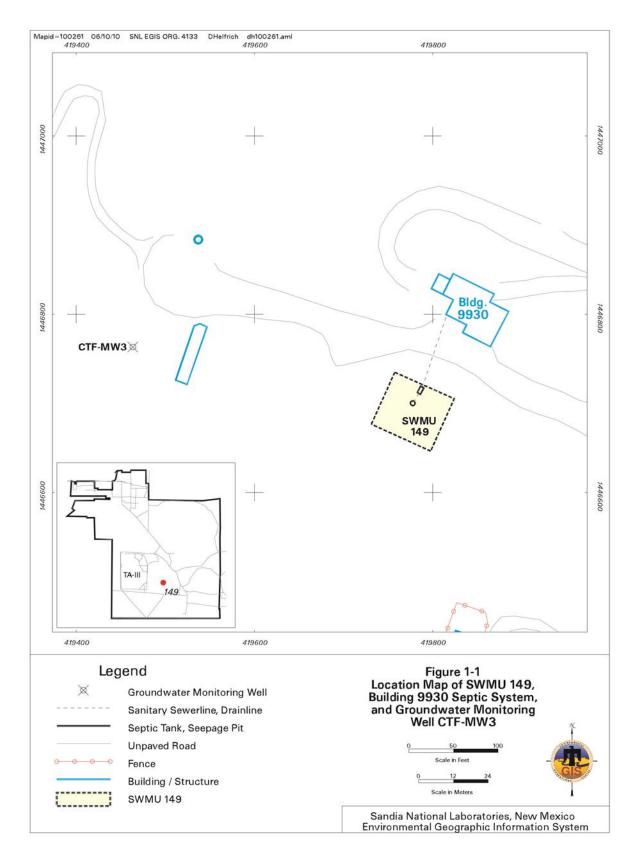


Figure III-1
Location of Monitoring Well CTF-MW3 near SWMU 149

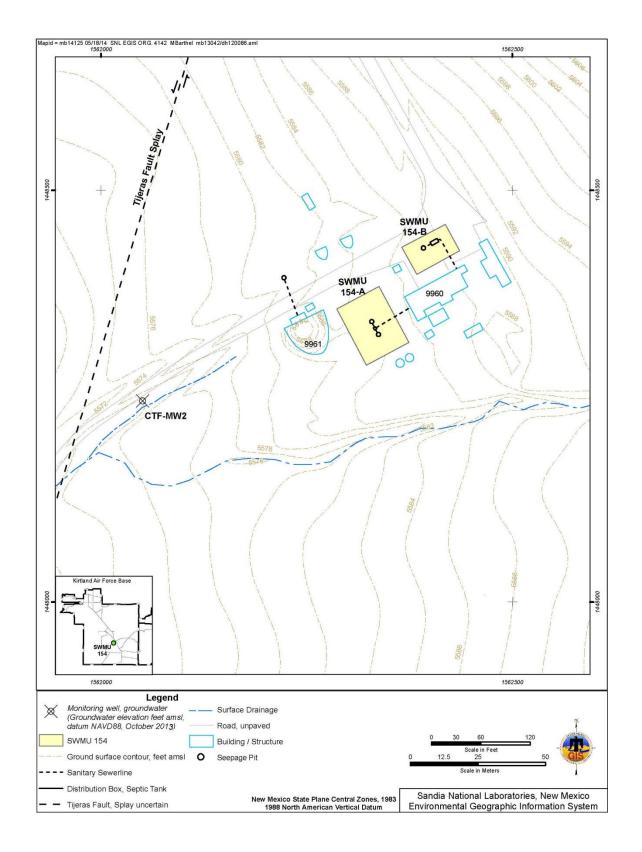


Figure III-2
Location of Monitoring Well CTF-MW2 near SWMU 154

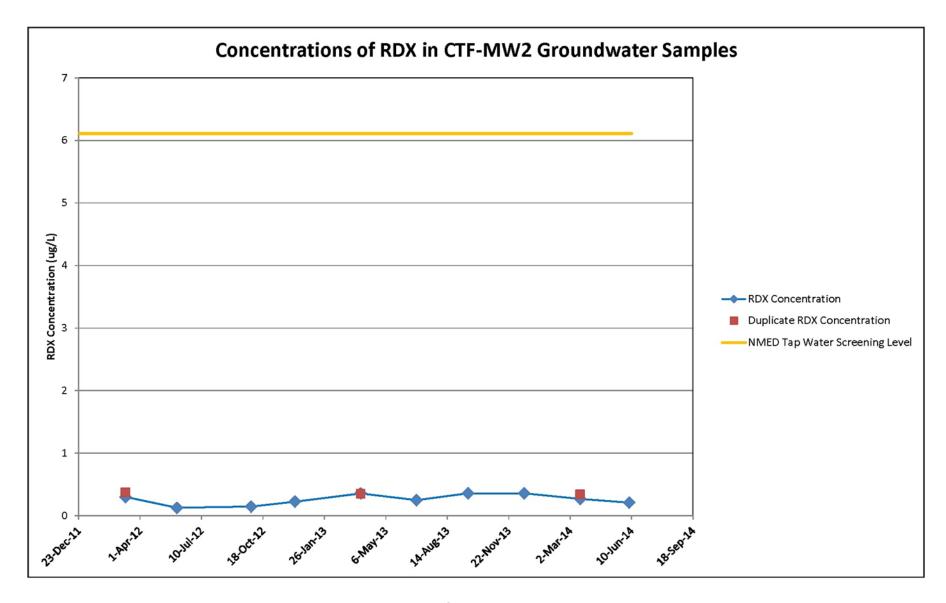


Figure III-3

Concentrations of RDX over Time in Monitoring Well CTF-MW2 near SWMU 154

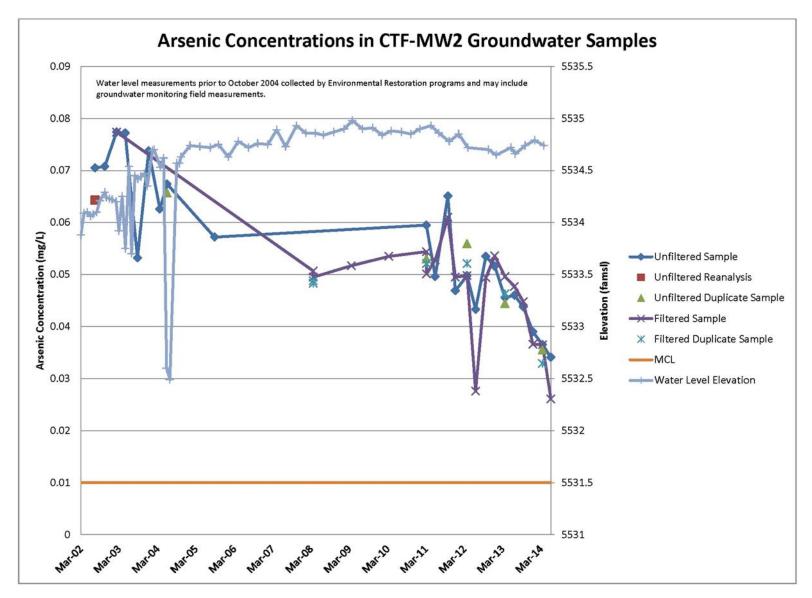


Figure III-4

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

### **Tables**

Table III-1

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

Analysis	Analytical Method <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	HASL-300	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

#### Notes

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

 $H_2SO_4$  = Sulfuric Acid.

HASL = Health and Safety Laboratory.

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.

<sup>&</sup>lt;sup>a</sup> 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.

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.

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

<sup>&</sup>lt;sup>b</sup>Metals = filtered and unfiltered samples, TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

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

<sup>&</sup>lt;sup>d</sup>Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

#### Table III-2 Sample Details for Second Quarter, CY 2014 Groundwater Sampling SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April - June 2014

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation	
CTF-MW3	27-Jun-14	096142	615590	SWMU 149	
CTF-MW3 (Duplicate) a	27-Juli-14	096143	613390	3001010 149	
CTF-MW2	06-Jun-14	096045	615528	SWMU 154	

#### Notes

= Analysis Request/Chain-of-Custody.= Coyote Test Field. AR/COC

CTF CY = Calendar Year. = Monitoring Well.= Solid Waste Management Unit. MW

SWMU

<sup>&</sup>lt;sup>a</sup> The collected duplicate sample was submitted for analysis of Volatile Organic Compounds and metals. No other analyses were performed on the duplicate sample.

#### Table III-3 Summary of Field Water Quality Measurements<sup>a</sup> **SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014**

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	рН	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 149								
CTF-MW3	27-Jun-14	22.11	1651.1	296.9	6.96	0.51	79.6	6.92
SWMU 154								
CTF-MW2	06-Jun-14	19.17	3195.0	35.2	5.86	0.86	0.9	0.09

#### 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. = Milligrams per Liter. mg/L

mV Millivolts. = Monitoring Well.= Nephelometric Turbidity Units. MW

NTU

pН = Potential of Hydrogen (negative logarithm of the hydrogen ion concentration).

= Solid Waste Management Unit. . SWMU

#### Table III-4

## Summary of Detected Volatile Organic, Semivolatile Organic and High Explosive Compounds SWMUs 149 and 154 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2014**

Well	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	0.450	0.300	1.00	NE	J		096142-001	EPA 8260B		
27-Jun-14	Chloroform	0.720	0.300	1.00	NE	J		096142-001	EPA 8260B		
CTF-MW3 (Duplicate)	Bromodichloromethane	0.440	0.300	1.00	NE	J		096143-001	EPA-8260B		
27-Jun-14	Chloroform	0.720	0.300	1.00	NE	J		096143-001	EPA-8260B		
SWMU 154											
CTF-MW2	RDX	0.208	0.0865	0.270	NE	1		096045-024	EPA 8321A		
06-Jun-14	NDA	0.206	0.0000	0.270	INE	J		090043-024	EFA 0321A		

#### Notes

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

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

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

#### <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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

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

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

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

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-1,3,5-trinitro-1,3,5-triazine.

#### Table III-5

## Method Detection Limits for Volatile Organic Compounds SWMU 149 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2014**

Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>
1,1,1-Trichloroethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.500	EPA 8260B	Ethyl benzene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Methylcyclohexane	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Toluene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Trichloroethene	0.300	EPA 8260B
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
Acetone	2.50	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
Benzene	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
Bromochloromethane	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
Bromodichloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
Bromoform	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
Bromomethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
Carbon disulfide	1.50	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
Carbon tetrachloride	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B

#### Notes

#### <sup>a</sup>Analytical Method

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

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

 $\mu$ 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-6

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, April – June 2014

Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>
1,1,1-Trichloroethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.500	EPA 8260B	Ethyl benzene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Methylcyclohexane	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Toluene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Trichloroethene	0.300	EPA 8260B
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
Acetone	2.50	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
Benzene	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
Bromochloromethane	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
Bromodichloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
Bromoform	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
Bromomethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
Carbon disulfide	1.50	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
Carbon tetrachloride	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B

#### Table III-6 (Concluded)

#### Method Detection Limits for Volatile and Semivolatile Organic Compounds

#### **SWMU 154 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

Analyte	MDL	Analytical	Analyte	MDL	Analytical	Analyte	MDL	Analytical
,	(μg/L)	Method <sup>a</sup>	•	(μg/L)	Method <sup>a</sup>	•	(μg/L)	Method <sup>a</sup>
1'-Biphenyl 1	3.00	EPA 8270C	Acenaphthene	0.300	EPA 8270C	Fluoranthene	0.300	EPA 8270C
1,2,4-Trichlorobenzene	3.00	EPA 8270C	Acenaphthylene	0.300	EPA 8270C	Fluorene	0.300	EPA 8270C
1,4-Dioxane	3.00	EPA 8270C	Acetophenone	3.00	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
2,4,5-Trichlorophenol	3.00	EPA 8270C	Anthracene	0.300	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
2,4,6-Trichlorophenol	3.00	EPA 8270C	Atrazine 3.00 EPA 8270C Hexachlorocyclopentadiene		3.00	EPA 8270C		
2,4-Dichlorophenol	3.00	EPA 8270C	Benzaldehyde	3.00	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
2,4-Dimethylphenol	3.00	EPA 8270C	Benzo(a)anthracene	0.300	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
2,4-Dinitrophenol	5.00	EPA 8270C	Benzo(a)pyrene	0.300	EPA 8270C	Isophorone	3.50	EPA 8270C
2,4-Dinitrotoluene	3.00	EPA 8270C	Benzo(b)fluoranthene	0.300	EPA 8270C	Naphthalene	0.300	EPA 8270C
2,6-Dinitrotoluene	3.00	EPA 8270C	Benzo(ghi)perylene	0.300	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
2-Chloronaphthalene	0.410	EPA 8270C	Benzo(k)fluoranthene	0.300	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
2-Chlorophenol	3.00	EPA 8270C	Butylbenzyl phthalate	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
2-Methylnaphthalene	0.300	EPA 8270C	Caprolactam	3.00	EPA 8270C	Phenol	3.00	EPA 8270C
2-Nitroaniline	3.00	EPA 8270C	Carbazole	0.300	EPA 8270C	Pyrene	0.300	EPA 8270C
2-Nitrophenol	3.00	EPA 8270C	Chrysene	0.300	EPA 8270C	bis(1-Chloroethyl)ether	3.00	EPA 8270C
3,3'-Dichlorobenzidine	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
3-Nitroaniline	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00	EPA 8270C
4-Bromophenyl phenyl ether	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
4-Chloro-3-methylphenol	3.00	EPA 8270C	Dibenzofuran	3.00	EPA 8270C	m,p-Cresol	3.70	EPA 8270C
4-Chlorobenzenamine	3.30	EPA 8270C	Diethylphthalate	3.00	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C	o-Cresol	3.00	EPA 8270C
4-Nitroaniline	3.00	EPA 8270C	Dinitro-o-cresol	3.00	EPA 8270C			
4-Nitrophenol	3.00	EPA 8270C	Diphenyl amine	3.00	EPA 8270C			

#### Notes

#### <sup>a</sup>Analytical Method

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

= Micrograms per Liter.

μg/L 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-7 Method Detection Limits for High Explosive Compounds (EPA Method 8321A) SWMU 154 Groundwater Monitoring

#### Quarterly Assessment, April - June 2014

Analyte	MDL
Allalyte	(μg/L)
1,3,5-Trinitrobenzene	0.0865
1,3-Dinitrobenzene	0.0865
2,4,6-Trinitrotoluene	0.0865
2,4-Dinitrotoluene	0.0865
2,6-Dinitrotoluene	0.0865
2-Amino-4,6-dinitrotoluene	0.0865
2-Nitrotoluene	0.0886
3-Nitrotoluene	0.0865
4-Amino-2,6-dinitrotoluene	0.0865
4-Nitrotoluene	0.162
HMX	0.0865
Nitro-benzene	0.0865
Pentaerythritol tetranitrate	0.108
RDX	0.0865
Tetryl	0.0865

#### 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-1,3,5-trinitro-1,3,5-triazine. SWMU = Solid Waste Management Unit. Tetryl = 2,4,6-trinitrophenylmethylnitramine.

#### Table III-8

#### Summary of Nitrate Plus Nitrite Results

#### SWMUs 149 and 154 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2014**

Well	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											
<b>CTF-MW3</b> 27-Jun-14	Nitrate plus nitrite	5.97	0.170	0.500	10.0			096142-018	EPA 353.2		
SWMU 154	·										
<b>CTF-MW2</b> 06-Jun-14	Nitrate plus nitrite	ND	0.085	0.250	10.0	U		096045-018	EPA 353.2		

#### Notes

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

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

= 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, 1984, "Methods for Chemical Analysis of Water and Wastes." EPA 600-4-79-020.

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

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

ND = Not Detected (at MDL).

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.

# Table III-9 Summary of Anion and Alkalinity Results SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, April – June 2014

Well	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	328	0.725	1.00	NE			096142-022	SM2320B
27-Jun-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096142-022	SM2320B
	Bromide	1.17	0.067	0.200	NE			096142-016	EPA 9056
	Chloride	123	3.35	10.0	NE			096142-016	EPA 9056
	Fluoride	2.54	0.033	0.100	4.0			096142-016	EPA 9056
	Sulfate	507	6.65	20.0	NE			096142-016	EPA 9056
SWMU 154									
CTF-MW2	Bicarbonate Alkalinity	1530	0.725	1.00	NE			096045-022	SM2320B
06-Jun-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096045-022	SM2320B
	Bromide	ND	0.067	0.200	NE	N, U		096045-016	EPA 9056
	Chloride	460	6.70	20.0	NE			096045-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.0			096045-016	EPA 9056
	Sulfate	158	13.3	40.0	NE			096045-016	EPA 9056

#### Notes

EPA

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

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

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

N = Results associated with a spike analysis that was outside control limits.

#### <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

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

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

CTF = Coyote Test Field.

= U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

#### Table III-9 (Concluded)

#### **Summary of Anion and Alkalinity Results**

#### **SWMUs 149 and 154 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

#### Notes (continued)

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.

#### Table III-10

#### **Summary of Perchlorate Results**

#### SWMUs 149 and 154 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2014**

Well	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		096142-020	EPA 314.0
27 Jun-14	ND	0.004	0.012	INC	U		090142-020	EFA 314.0
SWMU 154								
CTF-MW2	ND	0.004	0.012	NE	11		096045-020	EPA 314.0
06-Jun-14	ND	0.004	0.012	INE	U		090045-020	EFA 314.0

#### Notes

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

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

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

#### <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.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

ND = Not Detected (at MDL).

NE = Not Established.

PQL = Practical Quantitation Limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated

method under routine laboratory operating conditions.

Table III-11
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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	0.0226	0.015	0.050	NE	J		096142-009	EPA 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096142-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U	R	096142-009	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096142-R09	EPA 6020
	Barium	0.0319	0.0006	0.002	2.00			096142-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096142-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096142-009	EPA 6020
	Calcium	197	3.00	10.0	NE	В		096142-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096142-009	EPA 6020
	Cobalt	0.000396	0.0001	0.001	NE	J		096142-009	EPA 6020
	Copper	0.00243	0.00035	0.001	NE		J-	096142-009	EPA 6020
	Iron	0.322	0.033	0.100	NE			096142-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096142-009	EPA 6020
	Magnesium	45.1	0.010	0.030	NE			096142-009	EPA 6020
	Manganese	0.00172	0.001	0.005	NE	J	J+	096142-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096142-009	EPA 7470
	Nickel	0.00338	0.0005	0.002	NE		J-	096142-009	EPA 6020
	Potassium	11.5	0.400	1.50	NE			096142-009	EPA 6020
	Selenium	0.0286	0.0015	0.005	0.050			096142-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096142-009	EPA 6020
	Sodium	163	4.00	12.5	NE			096142-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096142-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096142-009	EPA 6010
	Zinc	0.00497	0.0035	0.010	NE	J		096142-009	EPA 6020

#### Table III-11 (Continued)

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

#### **SWMU 149 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

Well	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 (Duplicate)	Aluminum	0.018	0.015	0.050	NE	J		096143-009	EPA 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096143-009	EPA 6020
	Arsenic	0.00292	0.0017	0.005	0.010	J	R	096143-009	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096143-R09	EPA 6020
	Barium	0.0317	0.0006	0.002	2.00			096143-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096143-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096143-009	EPA 6020
	Calcium	194	3.00	10.0	NE	В		096143-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096143-009	EPA 6020
	Cobalt	0.000404	0.0001	0.001	NE	J		096143-009	EPA 6020
	Copper	0.00257	0.00035	0.001	NE		J-	096143-009	EPA 6020
	Iron	0.319	0.033	0.100	NE			096143-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096143-009	EPA 6020
	Magnesium	43.9	0.010	0.030	NE			096143-009	EPA 6020
	Manganese	0.00168	0.001	0.005	NE	J	J+	096143-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096143-009	EPA 7470
	Nickel	0.00352	0.0005	0.002	NE		J-	096143-009	EPA 6020
	Potassium	11.3	0.400	1.50	NE			096143-009	EPA 6020
	Selenium	0.0272	0.0015	0.005	0.050			096143-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096143-009	EPA 6020
	Sodium	158	4.00	12.5	NE			096143-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096143-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096143-009	EPA 6010
	Zinc	0.00458	0.0035	0.010	NE	J		096143-009	EPA 6020

#### Table III-11 (Concluded)

#### Summary of Unfiltered Total Metal Results

#### **SWMU 149 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

#### Notes

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

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

= The analyte was found in the blank above the effective 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.

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

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

R = The data are unusable (compound may or may not be present). Resampling or reanalysis are necessary for verification.

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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

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

CTF = Coyote Test Field.

**EPA** = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter. ΜŴ = 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.

Table III-12
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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		096142-010	EPA 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096142-010	EPA 6020
	Arsenic	0.00235	0.0017	0.005	0.010	J	R	096142-010	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096142-R10	EPA 6020
	Barium	0.031	0.0006	0.002	2.00			096142-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096142-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096142-010	EPA 6020
	Calcium	197	3.00	10.0	NE	В		096142-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096142-010	EPA 6020
	Cobalt	0.000378	0.0001	0.001	NE	J		096142-010	EPA 6020
	Copper	0.00233	0.00035	0.001	NE		J-	096142-010	EPA 6020
	Iron	0.293	0.033	0.100	NE			096142-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096142-010	EPA 6020
	Magnesium	44.8	0.010	0.030	NE			096142-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096142-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096142-010	EPA 7470
	Nickel	0.00347	0.0005	0.002	NE		J-	096142-010	EPA 6020
	Potassium	11.4	0.400	1.50	NE			096142-010	EPA 6020
	Selenium	0.0272	0.0015	0.005	0.050			096142-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096142-010	EPA 6020
	Sodium	159	4.00	12.5	NE			096142-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096142-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096142-010	EPA 6010
	Zinc	0.00455	0.0035	0.010	NE	J	_	096142-010	EPA 6020

#### Table III-12 (Continued)

#### **Summary of Filtered Total Metal Results**

#### **SWMU 149 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

Well	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 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		096143-010	EPA 6020
27-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096143-010	EPA 6020
	Arsenic	0.00363	0.0017	0.005	0.010	J	R	096143-010	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096143-R10	EPA 6020
	Barium	0.0324	0.0006	0.002	2.00			096143-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096143-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096143-010	EPA 6020
	Calcium	218	3.00	10.0	NE	В		096143-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096143-010	EPA 6020
	Cobalt	0.000431	0.0001	0.001	NE	J		096143-010	EPA 6020
	Copper	0.00274	0.00035	0.001	NE		J-	096143-010	EPA 6020
	Iron	0.325	0.033	0.100	NE			096143-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096143-010	EPA 6020
	Magnesium	44.6	0.010	0.030	NE			096143-010	EPA 6020
	Manganese	0.00103	0.001	0.005	NE	J	J+	096143-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096143-010	EPA 7470
	Nickel	0.00355	0.0005	0.002	NE		J-	096143-010	EPA 6020
	Potassium	11.7	0.400	1.50	NE			096143-010	EPA 6020
	Selenium	0.0277	0.0015	0.005	0.050			096143-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096143-010	EPA 6020
	Sodium	177	4.00	12.5	NE			096143-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096143-010	EPA 6020
	Vanadium	0.00107	0.001	0.005	NE	J		096143-010	EPA 6010
	Zinc	0.00482	0.0035	0.010	NE	J		096143-010	EPA 6020

#### Table III-12 (Concluded)

#### **Summary of Filtered Total Metal Results**

#### **SWMU 149 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

#### Notes

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

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

B = The analyte was found in the blank above the effective 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 numerical value is an estimated quantity with a suspected negative bias.

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

R = The data are unusable (compound may or may not be present). Resampling or reanalysis are necessary for verification.

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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

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

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

ND = Not Detected (at MDL).

NE = Not Established.

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

Table III-13
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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	0.116	0.015	0.050	NE			096045-009	EPA 6020
06-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096045-009	EPA 6020
	Arsenic	0.0341	0.0017	0.005	0.010			096045-009	EPA 6020
	Barium	0.0797	0.0006	0.002	2.00			096045-009	EPA 6020
	Beryllium	0.00274	0.0002	0.0005	0.004			096045-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096045-009	EPA 6020
	Calcium	347	6.00	20.0	NE			096045-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096045-009	EPA 6020
	Cobalt	0.0091	0.0001	0.001	NE			096045-009	EPA 6020
	Copper	0.000987	0.00035	0.001	NE	J	J-	096045-009	EPA 6020
	Iron	2.14	0.033	0.100	NE			096045-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096045-009	EPA 6020
	Magnesium	73.7	1.00	3.00	NE			096045-009	EPA 6020
	Manganese	2.84	0.100	0.500	NE		J	096045-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096045-009	EPA 7470
	Nickel	0.0157	0.0005	0.002	NE		J-	096045-009	EPA 6020
	Potassium	47.9	0.080	0.300	NE		J	096045-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		096045-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096045-009	EPA 6020
	Sodium	444	8.00	25.0	NE			096045-009	EPA 6020
	Thallium	0.0013	0.00045	0.002	0.002	J	2.5U	096045-009	EPA 6020
	Uranium	0.0258	0.000067	0.0002	0.03			096045-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096045-009	EPA 6010B
	Zinc	0.104	0.0035	0.010	NE			096045-009	EPA 6020

#### Table III-13 (Concluded)

### Summary of Unfiltered Total Metal Results SWMU 154 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2014**

#### Notes

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

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

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

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.

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

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

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

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

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

**Bold** = Indicates that a result exceeds the MCL.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

ND = Not Detected (at MDL).

NE = Not Established.

PQL = Practical Quantitation Limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated

method under routine laboratory operating conditions.

SWMU = Solid Waste Management Unit.

Table III-14
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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	0.100	0.015	0.050	NE			096045-010	EPA 6020
06-Jun-14	Antimony	ND	0.001	0.003	0.006	U		096045-010	EPA 6020
	Arsenic	0.0261	0.0017	0.005	0.010			096045-010	EPA 6020
	Barium	0.0782	0.0006	0.002	2.00			096045-010	EPA 6020
	Beryllium	0.00246	0.0002	0.0005	0.004			096045-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096045-010	EPA 6020
	Calcium	343	6.00	20.0	NE			096045-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096045-010	EPA 6020
	Cobalt	0.00867	0.0001	0.001	NE			096045-010	EPA 6020
	Copper	0.0551	0.00035	0.001	NE		J-	096045-010	EPA 6020
	Iron	1.97	0.033	0.100	NE			096045-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096045-010	EPA 6020
	Magnesium	72.8	1.00	3.00	NE			096045-010	EPA 6020
	Manganese	2.71	0.100	0.500	NE		J	096045-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096045-010	EPA 7470
	Nickel	0.017	0.0005	0.002	NE		J-	096045-010	EPA 6020
	Potassium	49.6	0.080	0.300	NE		J	096045-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		096045-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096045-010	EPA 6020
	Sodium	433	8.00	25.0	NE			096045-010	EPA 6020
	Thallium	0.00131	0.00045	0.002	0.002	J		096045-010	EPA 6020
	Uranium	0.0123	0.000067	0.0002	0.03			096045-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096045-010	EPA 6010B
	Zinc	0.832	0.0035	0.010	NE			096045-010	EPA 6020

#### Table III-14 (Concluded)

#### **Summary of Filtered Total Metal Results**

#### **SWMU 154 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

#### Notes

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

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

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

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.

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

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

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

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

**Bold** = Indicates that a result exceeds the MCL.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

ND = Not Detected (at MDL).

NE = Not Established.

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

SWMU = Solid Waste Management Unit.

#### Table III-15

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

#### SWMU 154 Groundwater Monitoring

#### Quarterly Assessment, April - June 2014

Well	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>e</sup>
CTF-MW2	Americium-241	-0.726 ± 11.8	20.5	10.0	NE	U	BD	096045-033	EPA 901.1
06-Jun-14	Cesium-137	-0.0079 ± 1.77	3.19	1.52	NE	U	BD	096045-033	EPA 901.1
	Cobalt-60	-1.16 ± 3.22	3.55	1.66	NE	U	BD	096045-033	EPA 901.1
	Potassium-40	32.1 ± 44.4	32.0	14.8	NE	X	R	096045-033	EPA 901.1
	Gross Alpha	-6.64	NA	NA	15 pCi/L	NA	None	096045-034	EPA 900.0
	Gross Beta	$56.6 \pm 24.5$	31.3	14.2	4mrem/yr		J	096045-034	EPA 900.0
	Uranium-233/234	$56.9 \pm 7.24$	0.132	0.0589	NE			096045-035	HASL-300
	Uranium-235/236	$0.566 \pm 0.138$	0.110	0.0466	NE			096045-035	HASL-300
	Uranium-238	8.77 ± 1.18	0.0739	0.030	NE			096045-035	HASL-300

#### Notes

J

<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 Code of Federal Regulations 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.

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

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

NA = Not applicable.

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

X = Data rejected due to peak not meeting identification criteria.

#### <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.

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

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.

#### Table III-15 (Concluded)

## Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results SWMU 154 Groundwater Monitoring

#### **Quarterly Assessment, April – June 2014**

#### Notes (continued)

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

HASL = Health and Safety Laboratory.

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

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

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

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

critical level.

mrem/yr = Millirem per year. MW = Monitoring Well.

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

NE = Not Established. pCi/L = Picocuries per Liter.

SWMU = Solid Waste Management Unit.

# Table III-16 Summary of Constituents Detected above Established MCLs SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessments through June 2014

Well	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	<b>0.0544</b> mg/L	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	<b>0.0521</b> mg/L	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	<b>0.0528</b> mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	<b>0.0610</b> mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	<b>0.0495</b> mg/L	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Filtered	<b>0.0498</b> mg/L	0.010 mg/L			091949-010	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Filtered	<b>0.0521</b> mg/L	0.010 mg/L			091950-010	EPA 6020
CTF-MW2	19-Jun-12	Arsenic—Filtered	<b>0.0276</b> mg/L	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sep-12	Arsenic—Filtered	<b>0.0494</b> mg/L	0.010 mg/L			092862-010	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Filtered	<b>0.0536</b> mg/L	0.010 mg/L		J-	093251-010	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Filtered	<b>0.0496</b> mg/L	0.010 mg/L			093723-010	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Filtered	<b>0.0463</b> mg/L	0.010 mg/L			093724-010	EPA 6020
CTF-MW2	25-Jun-13	Arsenic – Filtered	<b>0.0477</b> mg/L	0.010 mg/L			094042-010	EPA 6020
CTF-MW2	17-Sept-13	Arsenic – Filtered	<b>0.0488</b> mg/L	0.010 mg/L			094646-010	EPA 6020
CTF-MW2	17-Dec-13	Arsenic – Filtered	<b>0.0366</b> mg/L	0.010 mg/L			095086-010	EPA 6020
CTF-MW2	18-Mar-14	Arsenic – Filtered	<b>0.0365</b> mg/L	0.010 mg/L			095579-010	EPA 6020
CTF-MW2 (Duplicate)	18-Mar-14	Arsenic – Filtered	<b>0.0329</b> mg/L	0.010 mg/L			095580-010	EPA 6020
CTF-MW2	06-Jun-14	Arsenic – Filtered	<b>0.0261</b> mg/L	0.010 mg/L			096045-010	EPA 6020
CTF-MW2	08-Mar-11	Arsenic—Unfiltered	<b>0.0595</b> mg/L	0.010 mg/L			090237-009	EPA 6020
CTF-MW2	31-May-11	Arsenic—Unfiltered	<b>0.0496</b> mg/L	0.010 mg/L			090670-009	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Unfiltered	<b>0.0651</b> mg/L	0.010 mg/L			091259-009	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Unfiltered	<b>0.0469</b> mg/L	0.010 mg/L			091525-009	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Unfiltered	<b>0.0498</b> mg/L	0.010 mg/L			091949-009	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Unfiltered	<b>0.0559</b> mg/L	0.010 mg/L			091950-009	EPA 6020
CTF-MW2	19-Jun-12	Arsenic—Unfiltered	0.0433 mg/L	0.010 mg/L			092538-009	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Unfiltered	<b>0.0535</b> mg/L	0.010 mg/L			092862-009	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Unfiltered	<b>0.0516</b> mg/L	0.010 mg/L		J-	093251-009	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Unfiltered	<b>0.0456</b> mg/L	0.010 mg/L			093723-009	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Unfiltered	<b>0.0444</b> mg/L	0.010 mg/L			093724-009	EPA 6020
CTF-MW2	25-Jun-13	Arsenic—Unfiltered	<b>0.046</b> mg/L	0.010 mg/L			094042-009	EPA 6020
CTF-MW2	17-Sep-13	Arsenic—Unfiltered	0.0438 mg/L	0.010 mg/L			094646-009	EPA 6020
CTF-MW2	17-Dec-13	Arsenic—Unfiltered	<b>0.039</b> mg/L	0.010 mg/L			095086-009	EPA 6020

#### Table III-16 (Concluded)

#### **Summary of Constituents Detected above Established MCLs**

#### SWMUs 149 and 154 Groundwater Monitoring

#### **Quarterly Assessments through June 2014**

Well	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	18-Mar-14	Arsenic—Unfiltered	<b>0.0365</b> mg/L	0.010 mg/L			095579-009	EPA 6020
CTF-MW2 (Duplicate)	18-Mar-14	Arsenic—Unfiltered	<b>0.0355</b> mg/L	0.010 mg/L			095580-009	EPA 6020
CTF-MW2	06-Jun-14	Arsenic —Unfiltered	<b>0.0341</b> mg/L	0.010 mg/L			096045-009	
CTF-MW2	31-May-11	Gross Alpha	23.38 pCi/L	15 pCi/L			090670-010	EPA 900.0
CTF-MW2	17-Sep-13	Gross Alpha	23.54 pCi/L	15 pCi/L	NA	None	094646-034	EPA 900.0
CTF-MW2 (Reanalysis)	17-Sep-13	Gross Alpha	26.94 pCi/L	15 pCi/L	NA	None	094646-R34	EPA 900.0
CTF-MW2	17-Dec-13	Gross Alpha	21.25 pCi/L	15 pCi/L	NA	None	095086-034	EPA 900.0
CTF-MW2	08-Mar-11	Thallium—Unfiltered	0.00249 mg/L	0.002 mg/L	J		090237-009	EPA 6020

#### Notes

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

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

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

NA = Not applicable.

#### <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.

None = No data validation for corrected gross alpha activity.

#### <sup>c</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. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

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

**Bold** = Indicates that a result exceeds the MCL.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

Standards (EPA 2009).

mg/L = Milligrams per liter.

MW = Monitoring Well.

pCi/L = Picocuries per liter.

SWMU = Solid Waste Management Unit.

Table III-17
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, April – June 2014

Well/Parameter	Groundwater Sample (R1)	Duplicate Sample (R2)	RPD <sup>i</sup>			
	mg/L unless ot	mg/L unless otherwise noted				
CTF-MW3						
Bromodichloromethane	0.450	0.440	2			
Chloroform	0.720	0.720	< 1			
Aluminum	0.0226	0.018	23			
Barium	0.0319	0.0317	1			
Calcium	197	194	2			
Cobalt	0.000396	0.000404	2			
Copper	0.00243	0.00257	6			
Iron	0.322	0.319	1			
Magnesium	45.1	43.9	3			
Manganese	0.00172	0.00168	2			
Nickel	0.00338	0.00352	4			
Potassium	11.5	11.3	2			
Selenium	0.0286	0.0272	5			
Sodium	163	158	3			
Zinc	0.00497	0.00458	8			
Filtered Barium	0.031	0.0324	4			
Filtered Calcium	197	218	10			
Filtered Cobalt	0.000378	0.000431	13			
Filtered Copper	0.00233	0.00274	16			
Filtered Iron	0.293	0.325	10			
Filtered Magnesium	44.8	44.6	< 1			
Filtered Nickel	0.00347	0.00355	2			
Filtered Potassium	11.4	11.7	3			
Filtered Selenium	0.0272	0.0277	2			
Filtered Sodium	159	177	11			
Filtered Zinc	0.00455	0.00482	6			

#### Table III-17 (Concluded)

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

#### **SWMUs 149 and 154 Groundwater Monitoring**

#### Quarterly Assessments, April - June 2014

#### **Notes**

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

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

where:  $R_1$  = analysis result.

R<sub>2</sub> = duplicate analysis result.

μg/L = Micrograms per liter.
CTF = Coyote Test Field.
mg/L = Milligrams per liter.
MW = Monitoring Well.

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

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

#### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 149	Project No.: 146422.10.11.01		
Well I.D.: CTF-MW 3	Date: 06/27/14		
Well Condition: Good	Weather Condition: See Tailaste Form		
Method: Portable pump X	Dedicated pump	Pump depth: 359'	

#### **PURGE MEASUREMENTS**

		X7.1	I m	0.0	ODD		(D. 1 : 11	DO		^	
Depth to Water	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	DO/L	Comments	
(ft)											
308.18	1749		517	nrt.							~>
315.06	0813	5		1606.7	320.1	6.92	1.13	79.0	6.97		
317.93	0823	10	20.80	1586.9	317.5	6.92	0.86	71.5	6.38		, , , , , , , , , , , , , , , , , , , ,
320.65	0834	15	20.71	1587.4	314.5	6.94	0.65		6.93		
322.61		20	21.44	1640.8	312.5	6.95	0.63		100		
325,17	0912	30		1651.8	309.2						
325,49		32	22.45	1652.8	306.0	6.96					
325.84		34	22.25	1651.8	304.4	6.96	0.65	80.5			
326.11	0930	36		1651.5	301.7	6.96	0.57	80.2			
326.34	0936	38	11.66	1651.1		6.96		79.6	6.92		
	0937	/	SA	mplin	6						7
					0						
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4. Time:

#### GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2 SNL/NM Project No.: 146422.10.11.01 SWMU 149 Calibrations done by: R Lynch Date: Make & Model: YSI EXO1 YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167 YSI 650 MDS (S/N): NA pH Calibration pH Calibrated to (std): 7.00 pH sloped to (std): 10.00 7.00 10.00 Reference value: 4.00 Value Value Temp Value Temp Temp 1. Time: 4,00 200 0,00 2. Time 10.00 2000 7.00 20.0 20.0 3. Time: 4. Time: Standard lot no.: 3AE725 3AD782 3AD357 Expiration date: 4/15 5/15 4/15 SC Calibration Reference Value: 1225 uS Standard Lot No.: 3AE221 Value Temp **Expiration Date** 5/15 1. Time 2. Time: 20. 3. Time: 4. Time **ORP** Calibration 220 mV Standard Lot No. 4AA010 Reference Value: Value Temp Expiration Date: 7/14 1. Time 220.1 2. Time: 220.2 3. Time: 4. Time DO Calibration 81% air saturation @ 5200 ft. Atmospheric Pressure in Hg Calibration Value: 1. Time: 2. Time: 3. Time:

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

SNL/NM Project Name:	5 SWM4 149	Project No.:	Project No.: 146422.10.11.01  Date: 6/27/14				
Calibration done by: R Lync		Date: 6/2					
	TUI	RBIDIMETER					
Make & Model: HACH 21	00P HACH 2100Q	Serial No. S	S/N 10060C003010				
Reference Value	2-10	20	100	800			
Standard Lot No.	0161	0167	0168	0161			
1. Time 0745	9.96	19.9	103	796			
2. Time 0945	10.0	19.7	101	794			
3. Time				ψ.			
4. Time							
Comments:		7	()				
			a				
		*:					
4/							

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

Project Name: SWMU-149 GWM Monitoring Well ID # :	CTF-MW3	Date: 06-27-14			
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03					
Pump and Tubing Bundle ID #: 1806-586	Water Level Indicator ID #: 210269				
Personnel Performing Decontamination:  Robert Lynch Print Name:  Alfred Santillanes Print Name:  Initial:	Personnel Performing Decorporation  Robert Lynch Print Name:  Alfred Santillanes Print Name:	Initial:			
Condition	of Equipment				
Pump: Good Tubing Bundle: Good	Water Level Indicator: Good				
List of Decont	amination Materials				
Distilled or Deonized (circle one)		HNO <sub>3</sub>			
	Grade: Reagent				
Source: Gulligan SNL/NM Building 850  Lot Number: Pick-up on 6/25/14	UN#: 2031				
Lot Number: Pick-up on 6/25/14	Manufacturer: AROC	AROC			
	Lot Number: A031686	3			

**Groundwater Monitoring Waste Generation Log** 

Waste Generator	: William Gibson Phone	239-7367 project	leader: Clinton Lum
Project Name	SWMU-149	SWMU-149	SWMU-149
Container ID # (site-date-sequence)	SWMU-CTF-MW3-062714-01	SWMU-CTF-MW3-062714-02	SWMU-062714
Initial Label Type (Hazardous or Non-Regulated)	Non-Regulated	Non-Regulated	Non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD / 55gal.	CHPD / 55gal.	CHPD / 55gal.
Volume of Waste	~ 24 gal.	~ 18 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 140 lbs.	~ 240 lbs.
141	CoC # 615590	CoC # 615590	CoC # 615590
COC#: Sample#- Fraction	Sample # 096142, 096143	Sample # 096142, 096143	Sample # 096142, 096143
Accumulation Date	Start: 06/27/14  Full: 06/27/14	Start: 06/27/14  Full: 06/27/14	Start: 06/27/14  Full: 06/27/14
Date Waste Moved to Accumulation Area	06/27/14	06 / 27 / 14	. 06 / 27 / 14
Accumulation Area Name	9925	9925	9925
Comments:	-		

#### TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-Mw	3 Date: 6/27/14 Time: 0740		
Activities: Groundwater Monitoring and Sampling	fety concerns. The buddy system will be used when needed.)		
Weather Conditions: Temp: 81.3 °F Wind Speed: ~5 MPH	Humidity: 24.5 % Wind Chill NA F		
Chemicals Used: Acids in sample containers, standa Other:	ard solutions, Hach ACCU-VAC ampules		
Safety To	opics Presented		
Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<ul> <li>☑ Be aware of environmental conditions (heat / cold stress). Dress accordingly.</li> <li>Wear sunscreen if necessary. Stay hydrated.</li> </ul>		
☑ Wear safety boots.	☐ Be aware of electrical hazards		
☑ Use safe lifting practices. Wear leather gloves if necessary.	☑ Be aware of pressure hazards.		
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	☑ No eating or drinking at sampling counter.		
🛭 Be aware of chemical hazards.	☐ Be aware of biohazards (snakes, spiders, etc.)		
☑ Wear nitrile or latex gloves when sampling.	Wear communication device (cell phone, EOC pager).		
⊠ Wear chemical safety goggles.	☑ Avoid spilling purge / decon water.		
Hospital/Clinic: Sandia Medical Clinic Phone:  Robert Lynch Printed Name  ALFRED SANTILLANES Printed Name  Ulliam Gibson Printed Name	Attendees Signature Signature Signature Signature Signature		
Printed Name	Signature		
Printed Name	Signature		

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#### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10.11.01
Well I.D.: CTF-MW 2	Date: 06/06/14
Well Condition: 600d	Weather Condition: see This yet Form
Method: Portable pump X	Dedicated pump Pump depth: 128'

#### PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol (L(gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	DO Comments
	0759		57	ART-					7
46.95	0813	5	20.48	3238,6	80.1	5.85	0.83	2.0	0.18
47.03	0820	10	19.60	3229.5	64.1	5.84	0.47	1.5	0.19
48.02	0825	15	19.30	3194.4	25.1	5.84	0.43	1.3	0.12
48.34	0832	20	19.10	3193.3	32.7	5.85	0.30	1.2	0.11
48.60	0838	25	19.12	3190.4	34.6	5.84	0.31	1.1	0.10
48.93	0843	30	19.14	3193.1	34.2	5.85	0.56	1.1	0.10
48.98	0848	34	19.10	3194.0	35.4	5,84	0.79	1.0	6.09
49.05	0851	36	19.11	3191.5	35.8	5.84	0.88	1.0	0.09
49.10	0853	38	19.12	3194.0	36.0	5.85	0.86	1.0	0.09
49.10	0854	40	19.13	3192.6	36.1	5.85	0.76	1.0	6.09
49.12	0859	42	19.14	3194.1	35.6	5.86	0.88	1.0	0.09
49.12	0902	44	19.17			5.86	0.86	0.9	0.09
	0903		SA	mplin	19-				<del></del>
				-	0				
						97			
								7	-4.00 gals purged
									from tubing
					7				0806

GROUNDWATER S	AMPLE COL	LECTION FI	IELD EQUIPMENT CHECK LOG Page 1 of 2								
SNL/NM Project Name: SWMU	J 154		SNL/NM Proje	ect No.: 146422.1	10.11.01						
Calibrations done by: R Lynch			Date: 06/06/14								
Make & Model: YSI EXO1											
YSI 6820 Sonde (S/N) with DO,	Ec, pH, ORP, and	temperature prob	es: 13C101167			-					
YSI 650 MDS (S/N); NA						_					
		рН Са	alibration								
pH Calibrated to (std): 7.00			pH sloped to (	std): 10.00							
Reference value:	4.	00		7.00	10	0.00					
	Value	Temp	Value	Temp	Value	Temp					
1. Time: 0633	3.99	18.9	7.00	18.9	9.99	18.9					
2. Time 1224	41.01	19.6	7.00	19.6	10.01	19.6					
3. Time											
4. Time											
Standard lot no.:	3AD782		3AE725		3AD357						
Expiration date:	4/15		5/15		4/15						
		SC Ca	libration								
Reference Value: 1225 uS			Standard Lot N	No.: 3AE221							
	Value	Temp	Expiration Date: 5/15								
1. Time: 0631	1222	18.8	TO SEE ST. S			AND STATE					
2. Time: 1223	1225	19.6									
3. Time:	1	( )									
4. Time:											
		ORP C	alibration	aud timore social female amona pip							
Reference Value	220 mV		Standard Lot N	No. 4AA101							
	Value	Temp	Expiration Dat	te:	7/14						
1. Time: 0634	220.1	20,0									
2. Time: 1225	220.4	19.6									
3. Time.											
4. Time:											
		DO Ca	alibration								
Calibration Value:	81% air satura	tion @ 5200 ft.		Atmospheri	c Pressure in Hg						
1. Time: 0636	81.	4	-	24-64							
2. Time: 1222	81.	5		24.66							
3. Time:											
774F774840033 5773											

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

Calibration done by: R Lynch		Date: 06/06/14	ı						
	Т	TURBIDIMETER							
Make & Model: HACH 21	00P HACH 2100Q	Serial No. S	Serial No. S/N 10060C003010						
Reference Value	PL+10	20	100	800					
Standard Lot No.	0161	0167	0168	0161					
. Time 0753	10.2	19.9	103	801					
. Time 0916	10.3	19.7	104	799					
. Time									
. Time									

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

Project Name: SWMU 154 GWM	Monitoring Well ID # :	CTF-MW2		Date: 6-6-14	
The following equipment was	s decontaminated at comple	etion of sampling a	activities in accordance with	FOP-05-03	
Pump and Tubing Bundle ID #: 1806-586	_	Water Level Indi	cator ID #: 210269		
Personnel Performing Decontamination:  Robert Lynch Print Name:  Tim Jackson Print Name:  Initial:		Personnel Performance Robert Lynch Print Name: Tim Jackson Print Name:	ming Decontamination:	Initial: Initial:	
	Condition of	of Equipment			
Pump: Good Tubi	ng Bundle: Good		Water Level Indicator:	Good	
	List of Decontar	mination Materials			
Distilled or Deonized (circle	one)		HNO <sub>3</sub>		
Distinct of Deonized (Circle	, one)	Grade:	Reagent	8	
Source: Culligan		UN #:	2031		
Lot Number: 051814		Manufacturer:	AROC		
		Lot Number:	A0316863		

**Groundwater Monitoring Waste Generation Log** 

Waste Generator	Robert Lynch Phone:	250-7090 project	leader: Clinton Lum
Project Name	SWMU154 GWM	SWMU154 GWM	SWMU154 GWM
Container ID # (site-date-sequence)	CTF-MW2-060614-01	CTF-MW2-060614-02	SWMU154-060614
Type (Hazardous or Non- Regulated)	NON REG	NON REG	NON REG
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	PURGE WATER	PURGE WATER	DECON WATER
Container Type / Volume	CHPD/55 GALLONS	CHPD/55 GALLONS	CHPD/55 GALLONS
Volume of Waste	24 GALLONS	24 GALLONS	30 GALLONS
Total Container Weight	192 lbs	192 lbs	240 lbs
	615528 615529	615528 615529	615528 615529
COC#: Sample#- Fraction	096045 096047	096045 096047	096045 096047
Accumulation Date	Start: 6-6-14 Full: 6-6-14	Start: 6-6-14 Full: 6-6-14	Start: 6-6-14 Full: 6-6-14
Date Waste Moved to Accumulation Area	6-6-14	6-6-14	6-6-14
Accumulation Area Name	9925	9925	9925
Comments:			

#### TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF - MW	2 Date: 6/6/14 Time: 0749
Activities: Groundwater Monitoring and Sampling (Anyone has the right to cease field activities for some	afety concerns. The buddy system will be used when needed.)
Weather Conditions: Temp: <b>70.3</b> °F Wind Speed: <b>~10</b> MPH	Humidity: 21.8 % Wind Chill NA°F
Chemicals Used: Acids in sample containers, stand Other:	dard solutions, Hach ACCU-VAC ampules
Safety 1	Topics Presented
Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<ul> <li>☑ Be aware of environmental conditions (heat / cold stress). Dress accordingly.</li> <li>Wear sunscreen if necessary. Stay hydrated.</li> </ul>
Wear safety boots.       ■ Wear safety boots.	☑ Be aware of electrical hazards
☑ Use safe lifting practices. Wear leather gloves if necessary.	☑ Be aware of pressure hazards.
☐ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	☑ No eating or drinking at sampling counter.
⊠ Be aware of chemical hazards.	☑ Be aware of biohazards (snakes, spiders, etc.)
	Wear communication device (cell phone, EOC pager).
Wear chemical safety goggles.	☒ Avoid spilling purge / decon water.
Hospital/Clinic: Sandia Medical Clinic Phone  Robert Lynch  Printed Name  Tran Tackgan  Printed Name	Attendees Signature Tilalig Signature
Printed Name	Signature
Printed Name	Signature
Printed Name	Signature

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page _1_ of _2
Batch No.						SMO Use					1	1 .		AR/COC	615590-
Project Name:		SWMU 14	9 GWM	Date Samples	Shipped:				SMO Au	thorization:	Vonc	the	26	Waste Characterization	
Project/Task N	lanager:	Clinton Lu	m	Carrier/Waybil	l No.				SMO Co	ntact Phone	):			RMMA	
Project/Task N	lumber:	146422.10	0.11.01	Lab Contact:		Edie Kent/	803-556-8	171		Lorraine F	Herrera/50	5-844-3199	Released by COC No.	200	
Service Order:		CF352-14		Lab Destinatio	n:	GEL			Send Report to SMO:					1	✓ 4º Celsius
				Contract No.:		PO 130387	73		Rita Kavanaugh/505-284-2553					Bill to:Sandia National Laboratories	(Accounts Payable)
Tech Area:														P.O. Box 5800, MS-0154	
Building:		Room:		Operational	Site:									Albuquerque, NM 87185-0154	
	Fraction	San	nple Location D	etail	Depth (ft)	Date/	37777	Sample Matrix	Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample II
	-001 /	CTF-FB2			NA	6/27/14	9:37	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096142	-001 /	CTF-MW3	3		359	6/27/14	9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096142	-009 /	CTF-MW3	3		359	6/27/14	9:39	GW	Р	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/602	0/7470)
096142	-010*	CTF-MW3	3		359	6/27/14	9:401	FGW~	Р	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/602	0/7470)
096142	-016 🖍	CTF-MW3	3		359	6/27/14	9:42	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	
096142/	-018′	CTF-MW3	3	359	6/27/14	9:43	GW	Р	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		
096142	-020-/	CTF-MW3			359	6/27/14	9:44	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096142	-022	CTF-MW	3		359	6/27/14	9:45	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
096143	-001 /	CTF-MW	3		359	6/27/14	9:37	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
	-009 /	CTF-MW	3		359	6/27/14	9:39	GW	Р	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/602	0/7470)
Last Chain:		✓ Yes			Sample	Tracking	7 7 8	SMC	O Use	A CONTRACTOR OF THE CONTRACTOR	structions	/QC Requi	rements:		Conditions on
Validation R		✓ Yes			Date En					EDD		✓ Yes		No	Receipt
Background		Yes			Entered					Turnarour	No. of Contract of	7 Da	ay*	15 Day*	
Confirmator	ry:	☐ Yes			QC inits					Negotiate	d TAT				
Sample		lame	Signal		Init.	Compar	ny/Organiza	tion/Phor	ne/Cell	Sample D	isposal	Retur	n to Clien	t Disposal by Lab	
The second of	Robert L		10 4 7 N	N. Contraction of the Contractio	pl	SNL/4142/5	505-844-40	13/505-25	50-7090	Return Sa	mples By				
Members	Alfred S	antillanes	Heras	file_	as	SNL/4142/5	505-844-51	30/505-22	28-0710	Comment		Carried and a selection of the second		n/4142/MS 0729/284-2547	
	William	Gibson d	Willed	Rell!	WIX	SNL/4142/5	505-284-33	07/505-23	39-7367					n analysis using SW846-	
			0	1	1								-,SO4. Re	eport alkalinity as total	
										CaCO3,H0	JUS, and (	.03.			Lab Use
1.Relinquishe	d by	4-05.	ville-	Org. 414	2 Date	6/27/1	4 Time	0:13	3.Reline	quished by			Org	J. Date	Time
1. Received b	y Sho	wal	en			6/27/1		013	3. Rece	eived by			Org	ı. Date	Time
2.Relinquishe	_			Org.	Date	1	Time		4.Relin	quished by			Org		Time
2. Received b	у			Org.	Date		Time		4. Rece	eived by			Org	J. Date	Time
*Prior confirm	nation v	vith SMO re	quired for 7 an	d 15 day TAT	Г										

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

Page 2 of 2

AR/COC 615590

			and the second										A10000 01	0000
Project Name	e:	SWMU 149 GWM	Project/Ta	sk Manag	ger: (	Clinton Lum	1		Project/Tas	sk No.:	146422	.10.11.01		
Tech Area:														
Building:		Room:											() Se	Lab use
Sample No.	Fraction	Sample Location	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Cor Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096143	-010	CTF-MW3		359	6/27/14	9:40 /	FGW	Р	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	
096144	-001	CTF-TB2		NA	6/27/14	9:37~	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
	-			-						ļ				
	-			-						+	-			
	-									-				
	-			-	-					-	-			-
							<b>-</b>							
Recipient In	nitials_[	~						. 17						

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab														_	Page _1_ of _1_	
Batch No.						SMO Use					^			AR/COC	615589 -	
Project Name	:	SWMU 149	GWM	Date Samples	Shipped:	E eti.			SMO Au	thorization:	Genen	Jole	2	Waste Characterization		
Project/Task I	Manager:	Clinton Lui	m	Carrier/Waybil		3 July 1871				ntact Phone			0	RMMA		
Project/Task I		146422.10		Lab Contact:		Edie Kent/8	303-556-8	171				5-844-3199		Released by COC No.	10.00	
Service Order		CF352-14		Lab Destination	on:	GEL			Send Re	eport to SMC	TO A SOUTH OF THE PARTY.			1 -	✓ 4º Celsius	
				Contract No.:		PO 130387	'3					5-284-2553		Bill to:Sandia National Laboratories (Accounts Payable),		
Tech Area:			-1								3			P.O. Box 5800, MS-0154		
Building:		Room:		Operationa	I Site:									Albuquerque, NM 87185-0154		
Dulluling.		ixooiii.		Орегацина	Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample		Lab	
Sample No.	Fraction	Sam	ple Location i	Detail	(ft)	, Colle		Matrix	Туре	Volume	ative	Method	Type	Requested	Sample ID	
096138	-001 -	CTF-FB1			NA	6/26/14	13:20	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)		
096139	-001	CTF-EB1			NA	6/26/14	13:20	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)		
096139	-009	CTF-EB1			NA	6/26/14	13:21	DIW	Р	500 ml	HNO3	G	EB	TAL Metals (SW846-6010/60	20/7470	
096139	-010	CTF-EB1			NA	6/26/14	13:23	FDIW	Р	500 ml	HNO3	G	EB	TAL Metals (SW846-6010/60		
	-001	CTF-TB1				6/26/14	13:20					G			20/14/0	
096140	-001 /	CIF-IBI			NA	0/20/14	13.20	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)		
						-		+	-		<del> </del>	-				
								-	-		-					
		-				-		-	-	-	-	-				
		-				-		-	-	1	-	-		-		
Last Chain	<u> </u>	Yes			Sample	Tracking		SM	O Use	Special In	etructions	s/QC Requi	rements:		Conditions on	
Validation		✓ Yes			Date Er	Committee of the second				EDD		✓ Yes		] No	Receipt	
Backgroun		Yes			Entered					Turnarou	nd Time	7 Da	N*	15 Day* 30 Day	rtooolpt	
Confirmato		Yes			QC inits					Negotiate	STORY OF THE STORY	-	<u> </u>	10 Bay 00 Bay		
-			0:		-		(0	Ain - /Dha	/Call			Petus	n to Clien	nt Disposal by Lab		
Sample	_	Name	Signa	ature	Init.		y/Organiza			Sample D			n to Clien	It Lisposal by Lab		
Team	Robert		Kolfyn	200		SNL/4142/5				Return Sa						
Members		Santillanes	Alfa Ses	///	99	SNL/4142/5				Comment	ts:	Send report to	o Tim Jackso	on/4142/MS 0729/284-2547		
	William	Gibson '	Willen	(Alla)	WX	SNL/4142/5	05-284-33	07/505-2	39-7367	-						
	_ 1			11/	01					1						
	1	1							_						Lab Use	
1.Relinquish	ed by	4.150	tille	-Org. 4/4	2 Date	6/26/1		420	3.Relin	quished by			Org	g. Date	Time	
1. Received		Local	und	Org.414 2	Date	6/26/19	Time	1420	3. Reco	eived by			Org	g. Date	Time	
2.Relinquish	ed by			Org.	Date	9	Time		4.Relin	quished by			Org	g. Date	Time	
2. Received	by			Org.	Date	е	Time 4. Received by O					Org	g. Date	Time		

<sup>\*</sup>Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page _1_ of _2_
Batch No. /	VIA					SMO Ușe	1				,	111		AR/COC	615528
Project Name		SWMU 15	4 GWM	Date Sample	s Shipped:	610	414		SMO Au	thorization	01	Gela	_	Waste Characterization	
Project/Task				Carrier/Wayt	oill No.	- ( 6	7.,		SMO Co	ntact Phone	9:			RMMA	
Project/Task	Number:	146422.10	.11.01	Lab Contact:		Edie Kent/	803-556-8	3171						Released by COC No.	
Service Orde	r.	CF353-14		Lab Destinat	ion:	GEL			Send Report to SMO:						✓ 4º Celsius
				Contract No.		PO 13038	73		Rita Kavanaugh/505.284.2553					Bill to: Sandia National Laboratorie	es (Accounts Payable),
Tech Area:														P.O. Box 5800, MS-0154	
Building:		Room:		Operation	al Site:				,					Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sam	ple Location D	etail	Depth (ft)	Date/ Colle		Sample Matrix	Type	volume Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096045	-001	CTF-MW2			128	* 6/6/14	9:03 -	GW	G	3 x 40 mL	HCL	G	SA	TCL VOCs (SW846-8260B)	
096045	-002	CTF-MW2			128	6/6/14	9:05	GW	AG	4 x 1 L	None	G	SA	TCL SVOCs (SW846-8270C)	
096045	-024	CTF-MW2			128	* 6/6/14	9:07 -	GW	AG	4 x 1 L	None	G	SA	High Explosives (SW846-832	1A)
096045	-009	CTF-MW2			128	6/6/14	9:08 -	GW	Р	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470	0)
096045	-010	CTF-MW2			128	6/6/14	9:09	FGW	Р	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470	0)
096045	-016	CTF-MW2			128	* 6/6/14	9:10	GW	Р	125 mL	None	G	SA	Anions (SW846-9056)	
096045	-018	CTF-MW2			128	* 6/6/14	9:11 /	GW	Р	125 mL	H2SO4	G	SA	Nitrate plus Nitrite (EPA 353.2	2)
096045	-022	CTF-MW2			128	6/6/14	9:12	GW	Р	500′mL	None	G	SA	Alkalinity as CaCO3, HCO3, CO3 (SM2	320B)
096045	-020	CTF-MW2			128	- 6/6/14	9:13	GW	Р	250 mL	None	G	SA	Perchlorate (EPA 314.0)	
096045	-033	CTF-MW2	!		128	¢ 6/6/14	9:14	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 9	901.0)
Last Chain		✓ Yes			Sample	Tracking		SMC	) Use	Special In:	structions		rements:		Conditions on
Validation		✓ Yes			Date En	tered:				EDD		✓ Yes		No	Receipt
Backgroun		Yes			Entered					Turnaroun	nd Time	7 Da	<u>y*</u>	15 Day*	
Confirmato	ory:	☐ Yes			QC inits					Negotiated					
Sample	_	lame	Signat		Init.	Compan	y/Organiza	tion/Phon	ne/Cell	Sample Di	sposal	Retur	n to Clien	t	
Team	Robert L	ynch	10/4	ech	2c	SNL/4142/5	05-844-40	13/505-25	50-7090	Return Sa	mples By:				
Members	Tim Jac	kson	1 - Aluch	4-	71	SNL/4142/5	05-284-254	47/505-26	3-6639	Comment	s:				
	-				-									n receipt and add preservation as ysis. VOCs have headspace.	
										1				s using method SW846-6850.	Lab Use
1.Relinquish	ed by 7	= A Mis	_	Org. 4/9	2 Date	6/6/14	/ Time	0940	3.Relino	quished by		r	Org		Time
1. Received		191	- Gray	Org. 4/4				0940	3. Rece				Org		Time
2.Relinquish		11.6		Org.	Date	-/-//	Time			quished by			Org		Time
2. Received	by			Org.	Date	6	Time		4. Rece	ived by			Org		Time

<sup>\*</sup>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 Na	me:	SWMU 154 GWM	Project/T	ask Manag	ger:	Clinton Lu	m		Project/Tas	sk No.:	146422	2.10.11.01		
Tech Area:														
Building:	_	Room:		1	n Date/Time Sa									Lab use
Sample No	o. Fraction	Sample Location	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
096045	-034	CTF-MW2		128	€ 6/6/14	9:15	GW	Р	1 L	HNO3	G	SA	Gross Alpha/Beta (EPA 900.0)	
096045	-035	CTF-MW2		128	• 6/6/14	9:16	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096046	-001	SWMU154 - TB1		NA	* 6/6/14	9:03	DIW	G	3 x 40 mL	HCL	G	ТВ	TCL VOCs (SW846-8260B)	

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Project Name: SWMU 154 GWM Date Samples Shipped: SMO Authorization: SMO Contact Phone: SWMU 154 GWM Date Samples Shipped: SMO Contact Phone: SMO C	Internal Lab																Page _1_ of _1_
Project/Task Manager: Clinton Lum:   Camer/Weylal No.   Carbot.	Batch No. /	/A					SMO Uşe	,					100			AR/COC	615529
Project/Task Number	Project Name	1:(	SWMU 1	54 GWM	Date Samples	Shipped:	66	114		SMO Au	thorization:	21	il Pm		√ Waste C	haracterization	
Project Task Number   148422.710.11.01   Lab Contact Service Order   CF353-14   Lab Destination:   CF353-14   Lab Contact Number	Project/Task	Manager:	Clinton L	.um	Carrier/Wayb	II No.		[ ' '		SMO Co	ntact Phone	e:	ci	NO	RMMA		
Contract No:	Project/Task	Number:	146422.	10.11.01	Lab Contact:		Edie Kent/	803-556-	8171				70	v	Release	d by COC No.	_
Room:   Operational Sites	Service Orde	r:	CF353-1	4	Lab Destination	on:	GEL			Send Re	eport to SMO	O:					
Building: Room: Operational Site:  Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume attve Method Type Requested Sample IC Container Matrix Type Volume attve Method Type Requested Sample IC Container Albertage Attainer Sample IC Container Method Type Requested Sample IC Container Albertage Attainer Sample Int. Company/Organization/Phone/Cell Sample Int. Container Albertage Attainer Sample Int. Container Sample Int. Conta					Contract No.:		PO 13038	73			Rita Kava	anaugh/50	5.284.2553		Bill to: Sandia	a National Laboratorie	s (Accounts Payable),
Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume attive Method Type Requested Sample IC Requested Sample IC Requested Sample IC Sample No. Fraction  128 6/6/14 8:56 FGW P 500 mL HNO3 G SA Arsenic (SW846-6020)  Last Chain:    Ves   Sample Tracking   SMO Use   Special Instructions/QC Requirements:   Conditions on Receipt	Tech Area:														P.O. Box 580	0, MS-0154	
Sample No.   Fraction   Sample Location Detail   (ft)   Collected   Matrix   Type   Volume   ative   Method   Type   Requested   Sample ID	Building:		Room:		Operationa	I Site:									Albuquerque,	NM 87185-0154	
Last Chain:	Sample No.	Fraction	Sa	imple Location E	)etail		200000000000000000000000000000000000000		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			-		A PROPERTY OF A COLO	Par		Lab Sample ID
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# Appendix C Data Validation Sample Findings Summary Sheets for Monitoring Well CTF-MW2 and Monitoring Well CTF-MW3 Groundwater Data



### Sample Findings Summary



**AR/COC: 615589, 615590** Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	096139-009/CTF-EB1	Arsenic (7440-38-2)	R, X1
	096139-009/CTF-EB1	Calcium (7440-70-2)	0.99U, B
	096139-010/CTF-EB1	Arsenic (7440-38-2)	R, X1
	096139-010/CTF-EB1	Calcium (7440-70-2)	0.99U, B
	096142-009/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096142-009/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096142-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096142-009/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	096142-009/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	096142-010/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096142-010/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096142-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096142-010/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	096143-009/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096143-009/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096143-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096143-009/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	096143-009/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	096143-010/CTF-MW3	Arsenic (7440-38-2)	R, X1
	096143-010/CTF-MW3	Chromium (7440-47-3)	UJ, CK3
	096143-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	096143-010/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	096143-010/CTF-MW3	Nickel (7440-02-0)	J-, CK3
SW846 8260B DOE-AL			

**AR/COC: 615589, 615590** Page 2 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096138-001/CTF-FB1	Methylene chloride (75-09-2)	UJ, 13,C3
	096139-001/CTF-EB1	Methylene chloride (75-09-2)	UJ, 13,C3
	096140-001/CTF-TB1	Methylene chloride (75-09-2)	UJ, 13,C3
	096141-001/CTF-FB2	Methylene chloride (75-09-2)	UJ, 13,C3
	096142-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, 13,C3
	096143-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, 13,C3
	096144-001/CTF-TB2	Methylene chloride (75-09-2)	UJ, 13,C3

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





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#### Memorandum

Date: July 29, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 149 GWM

AR/COC: 615589 and 615590

SDG: 351543 Laboratory: GEL

Project/Task: 146422.10.11.01 Analysis: General Chemistry

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

#### **Summary**

One sample was prepared and analyzed with accepted procedures using methods EPA 314.0 (Perchlorate by Ion Chromatography); EPA 9056 (anions by IC); EPA 353.2 (nitrate/nitrite); and SM 2320B (Total Alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

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

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

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

Alkalinity MB results were reported, but were not assessed for data validation.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

#### Nitrate/nitrite-N

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

#### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

#### Nitrate/nitrite-N

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

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

All detection limits were properly reported.

#### Nitrate/nitrite:

The sample was diluted 10X.

#### Anions:

The sample was diluted 50X for chloride and sulfate.

#### Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 08/18/14





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#### Memorandum

Date: July 29, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 149 GWM

AR/COC: 615589 and 615590

SDG: 351543, 351544, 353817, and 353818

Laboratory: GEL

Project/Task: 146422.10.11.01

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 4.

#### Summary

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

#### ICP-MS:

- 1. The original results for As for all samples did not agree with historical data. The samples were relogged and reanalyzed as 353817001 through -003 and 353818001 through -003 Since the original sample results were not verified, they will be **qualified R,X1** per client request.
- 2. Ca was detected in the MB at a concentration < the PQL. The associated results for EB samples 351543013 and 351544003 were detects ≤5X the MB concentration and will be qualified **0.99U.B.**
- 3. The Ca concentrations for samples 351543003 and -009, and 351544001 and -002 were comparable to or above the ICS levels for the ICP-MS analysis. The ICS A results for Cr, Cu and Ni were negative with absolute values > the MDL but ≤2X the MDL. The associated sample results for Cu and Ni were detects at ≤50X the absolute values of the associated ICS A results and will be **qualified J-,CK3**. The associated Cr sample results were non-detects and will be **qualified UJ,CK3**.
- 4. The Ca concentrations for samples 351543003 and -009, and 351544001 and -002 were comparable to or above the ICS levels for the ICP-MS analysis. The ICS A result for Mn was positive and > the MDL. The associated results for samples 351543003 and -009, and 351544002 were detects at ≤50X the absolute values of the associated ICS A result and will be **qualified J+,CK2**.

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 were properly preserved.

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

The ICP-MS tunes met QC acceptance criteria.

## Calibration

All initial and continuing calibrations met QC acceptance criteria.

# **Reporting Limit Verification**

All CRA/CRI recoveries met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

## **Blanks**

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

Ca was detected in the MB at a concentration < the PQL. The associated results for samples 351543003 and -009, and 351544001 and -002 were detects >5X the MB concentration and will not be qualified.

Tl was detected at < the PQL in a CCB associated with sample 351544001 only. The associated sample result was a non-detect and will not be qualified.

Mg was detected in EB sample 351543013 at < the PQL. The associated sample results were detects >5X the EB concentration and will not be qualified.

Ca was detected in EB samples 351543013 and 351544003 at > the PQL. The Ca results for both EBs were qualified U due to MB contamination; therefore the EB sample results will not be used to evaluate field sample results.

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

The ICP-MS internal standards met QC acceptance criteria.

#### Matrix Spike (MS)

The MS met all QC acceptance criteria except as follows.

#### <u>ICP-MS:</u>

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

#### **Laboratory Replicate**

The replicates met all QC acceptance criteria.

# **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

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

All detection limits were properly reported. Samples 351543003 and -009, and 351544001 and -003 were diluted 5X for K, and 50X for Ca and Na.

# ICP Interference Check Sample (ICS A and AB)

The results met QC acceptance criteria except as noted above in the Summary section and as follows.

#### **ICP-MS**

Results of the ICS A and AB analyses were evaluated because the concentrations of Ca in the undiluted analyses of samples 351543003 and -009, and 351544001 and -002 were > those in the ICS solutions.

The ICS A result for Mn was positive and > the MDL. The associated result for sample 351544001 was a non-detect and will not be qualified.

#### **ICP-AES**

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

# **ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

# Other QC

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donivan Level: I Date: 08/18/14





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#### Memorandum

Date: July 29, 2014

To: File

From: Monica Dymerski

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 149 GWM

AR/COC: 615589 and 615590

SDG: 351543 Laboratory: GEL

Project/Task: 146422.10.11.01

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 4.

# **Summary**

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

1. The ICAL %RSD was >40% but ≤60%, and the CCV %D was >20% but ≤40% with negative bias for methylene chloride. The associated sample results were non-detects and will be **qualified UJ,I3,C3.** 

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

#### **Holding Times**

The samples were analyzed within the prescribed holding times and were 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 CCV %D for 1,2,3-trichlorobenzene was >20% with positive bias. The associated results for all samples were non-detects and will not be qualified.

The CCV %D was >20% but ≤40% with negative bias for acetone, methyl acetate, 2-butanone, and 2-hexanone. The associated sample results were NDs and since no other calibration infractions occurred for those analytes, will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

## **Surrogates**

All surrogate recoveries met QC acceptance criteria.

## **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met with the following exceptions. The MS and MSD %Rs were > the upper acceptance criteria for 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene. The associated sample results were non-detects and will not be qualified.

## **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met with the following exception. The LCS %R was > the upper acceptance limit for 1,2,3-trichlorobenzene. Up to three LCS recovery infractions are allowed since 52 LCS analytes were reported, and associated sample results were non-detect. Therefore, the associated sample results will not be qualified.

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

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

# **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

# Other QC

Two TBs were submitted, on for each ARCOC. One EB was submitted with ARCOC 615589 and was applied to samples from ARCOC 615590. One FB was submitted with ARCOC 615590 and was applied to samples from 615590. An FB was submitted with 615589 with results not to be applied to sample results.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donivan Level: I Date: 08/18/14

# **Data Validation Summary Worksheet**

AR/COC #: 615589 and 615590 Site/Project: SWMU 149 GWM Validation Date: 07/29/14

SDG #: 351543 and 351544 Laboratories LLC Validator: Monica Dymerski

Matrix: Aqueous # of Samples: 17 CVR present yes Analysis Type: X Organic X Metals

AR/COC(s) present: yes Sample Container Integrity: intact Rad X Gen Chem

Requested Analyses Not Reported												
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments						
None												

Hold Time/Preservation Outliers													
Sample Number	2X HT												
None													

Comments: Sampled 06/26/14 and 06/27/14 Revised 7/2007

Validated By: Manuca Dymush

# **Organic Worksheet (GC/MS)**

AR/COC #: 615589 and 615590 SDG #:351543 Matrix: Aqueous

Laboratory Sample IDs: 351143001, -002, -008, -010, -011, -012, -014

Method/Batch #s: 1401816 Tuning (pass/fail): pass TICs Required? (yes/no) no

	Analyte			Calib	ration			5X				MS/		ED		
Ana (outl	•		Int.	RF	RSD/ R <sup>2</sup>	CCV (ICV) %D	Method Blank	(10X) Blank	LCS %R	MS %R	MSD %R	MSD RPD	EB -012	FBs -001 and -011	TBs -010 and -014	
1,2,3-trichlorobenzene			NA	✓	✓	25.7	✓	NA	138	143	147	✓	✓	✓	✓	
1,2,4-trichlorobenzene			NA	✓	✓	✓	✓	NA	✓	130	129	✓	✓	✓	✓	
methylene chloride			NA	✓	41.9	-28.2	✓	NA	✓	✓	✓	✓	✓	✓	✓	
acetone			NA	✓	✓	-26.6	✓	NA	✓	✓	✓	✓	✓	✓	✓	
methyl acetate			NA	✓	✓	-33.0	✓	NA	✓	✓	✓	✓	✓	✓	✓	
2-butanone			NA	✓	✓	-28.3	✓	NA	✓	✓	✓	✓	✓	✓	✓	
2-hexanone			NA	✓ 	✓ 	-22.4	✓ 	NA	✓ ————————————————————————————————————	✓ 	✓ 	✓ ————————————————————————————————————	✓ 	✓ 	<b>√</b>	
					S	urrogate	Recovery	Outliers								1
Sample ID  None																
						I	S Outliers									
Sample ID	Area	RT	Are	ea	RT	Are	a F	RT	Area	RT		Area	RT	Ar	rea	RT
None																

Comments: HTs OK. I-cal VOA6, 6/17/14. Samples analyzed on 07/09/14. MS/MSD performed on sample -002.

# **Inorganic Metals Worksheet**

AR/COC #: 615589 and 615590

SDG #:351543, 351544, 353817, and 353818

Matrix: Aqueous

Laboratory Sample IDs: 351543003, -009, and -013 (UF) 351544001, -002, and -003 (F) 353817001 through -003 (As reanalysis of UF) 353818001 through -003 (As

reanalysis of F)

Method/Batch #s: 3005A/6010B (ICP-AES): 1399466(prep)/1399467 3005A/6020 (ICP-MS): 1399468(prep)/1399469 As Reanalysis: 1408279(prep)/1408280 7470A (Hg):

1401645(prep)/1401647

ICPMS Mass Cal (pass/fail) pass

ICPMS Resolution (pass/fail) pass

Analyte				Metho d	5X Blank or	LCS %R	MS %R	Lab Rep. RP	Serial Dil.	ICS	ICS A±	CRA/ CRI	EB UF	5X EB	EB F	5X			
(outliers)	Int.	$\mathbb{R}^2$	ICV	CCV	ICB	ССВ	Blank	(5X MDL)	70 <b>K</b>	70K	D	%D	AB %R	MDL µg/L	%R	-013		-003	EB
Ca	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	0.198J	0.99	✓	400*	✓	<b>✓</b>	<b>✓</b>	<b>✓</b>	✓	0.244	1.22	0.256	1.28
Mg	✓	✓	✓	✓	✓	✓	✓	NA	✓	180*	✓	✓	✓	✓	✓	0.0136J	0.068	✓	NA
K	✓	✓	✓	✓	✓	✓	✓	NA	✓	130*	✓	✓	✓	✓	✓	✓	NA	✓	NA
Na	✓	✓	✓	✓	✓	✓	✓	NA	✓	400*	✓	✓	✓	✓	✓	✓	NA	✓	NA
As***	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	0.00197J	0.00985	✓	NA
Cr	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-2.19	✓	✓	NA	✓	NA
Cu	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-0.56	✓	✓	NA	✓	NA
Mn	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	1.56	✓	✓	NA	✓	NA
Ni	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-0.83	✓	✓	NA	✓	NA
Tl	<b>√</b>	✓	✓	✓	✓	0.551**	✓	2.755	<b>√</b>	✓	<b>√</b>	✓	✓	<b>√</b>	✓	<b>√</b>	NA	✓	NA

	IS Out	liers			IS Out	liers	
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
None				None			

**Comments:** HTs OK. 6010, 6020, and 7470A matrix QC were all performed on 351544001. As reanalysis batch QC performed on 353818002. \*Ca, Mg, K, and Na parent sample concentrations were all >4X spike concentrations, but are not required MS analytes. \*\*Associated with sample 351544001 only. \*\*\*As EB results are associated with batch 1399469, the original results. Dilutions: Samples 351543003 and -009, and 351544001 and -002 were diluted 5X for K and 50X for Ca and Na.

# **General Chemistry Worksheet**

AR/COC #: 615589 and 615590 SDG #: 351543 Matrix: Aqueous

Laboratory Sample IDs: 351543- See below

Method/Batch #s: EPA 314.0 (Perchlorate): Batch 1399523 Sample -006

Method/Batch #s: EPA 9056 (anions): Batch 1399521 Sample -004

Method/Batch #s: EPA 353.2 (NO<sub>3</sub>/NO<sub>2</sub> – N): Batch 1399488 Sample -005

Method/Batch #s: SM2320B (Alkalinity): Batch 1402064 Sample -007

	Calibration				5X				MS/	Lab					
Analyte (outliers)	Int.	$\mathbb{R}^2$	ICV	ccv	ICB	ССВ	Method Blank	Blank or 5X MDL	LCS %R	MS %R	MSD %R	MSD RPD	Rep. RPD		
None															

Comments: HTs OK. **Matrix QC: 314.0:** Performed on sample -006. **9056**: performed on sample -004; **353.2**: performed on SNL sample from another SDG; **SM2320B**: performed on sample -007 – parent sample concentration >4X the spike concentration. MS%R within limits.

diluted 50X for Cl and SO4. diluted 10X for  $NO_3/NO_2 - N$ .

All MS/PS recoveries met QC acceptance criteria except as follows. The PS %R was >125% for bromide. The associated sample result was an ND and will not be qualified. It should be noted that the PS was reanalyzed to verify recovery.

The parent sample concentration for alkalinity was >4X the spike. However, the MS %R met acceptance criteria. Therefore, no sample data will be qualified.

It should be noted that the PS for nitrate/nitrite was performed on an SNL sample of similar matrix from another SDG.

#### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

It should be noted that the replicate analysis for nitrate/nitrite was performed on an SNL sample of similar matrix from another SDG.

## **Detection Limits/Dilutions**

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

#### Nitrate/Nitrite:

Sample -006 was diluted 5X.

#### Anions

Sample -005 was diluted 100X for chloride and sulfate.

# Other QC

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I Date:** 07/30/14





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## Memorandum

Date: July 29, 2014

To: File

From: Mary Donivan

Subject: LC/MS/MS Organic Data Review and Validation – SNL

Site: SWMU 154 GWM

AR/COC: 615528 SDG: 350254 Laboratory: GEL

Project/Task: 146422.10.11.01 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 4.

#### Summary

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

- 1. The ICAL RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥0.01. All associated sample results were NDs and will be **qualified UJ,I4.**
- 2. The LCS %R was < the lower acceptance limit but ≥10% for tetryl. The associated sample result was an ND and will be **qualified UJ,L3.**
- 3. The MS %R was < the lower acceptance limit but  $\ge 10\%$  for tetryl. The associated sample result was an ND and will be **qualified UJ,MS3.**

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

#### **Holding Times**

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

#### **Instrument Tune**

The instrument tune was not reported or evaluated.

# **Calibration**

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

## **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

# **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met all QC acceptance criteria except as noted above in the Summary section.

# **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria 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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 07/30/14





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#### Memorandum

Date: July 29, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 154 GWM AR/COC: 615528

SDG: 350254 and 350255

Laboratory: GEL

Project/Task: 146422.10.11.01

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 4.

#### Summary

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

#### ICP-MS:

- 1. Tl was detected at < the PQL in the CCB analyzed prior to sample 350254004. The associated sample result was a detect <5X the CCB value and will be **qualified 2.5U,B3** at 5X the CCB value.
- 2. The parent sample concentration for Mn was >4X the spike, and the MS %R was outside acceptance criteria. Therefore, the MS %R was not used to evaluate field sample data. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix-specific accuracy data.
- 3. The Ca concentrations for both samples were comparable to or above the ICS levels for the ICP-MS analysis. The ICS A result for Cu and Ni were negative with absolute values >2X the MDL. The associated sample results were detects at <50X the absolute values of the associated ICS A results and will be **qualified J-,CK3** due to a negative ICS A results.
- 4. The original K result for the serial dilution parent sample were >50X the MDL and the serial dilution %D was >10%. All associated sample results were detects and will be **qualified J,D1**.

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

# **Holding Times and Preservation**

The samples were prepared and analyzed within the prescribed holding times and properly preserved. The samples listed on AR/COC 615528 were received at the laboratory at pH 7 and were acidified by the laboratory.

# **ICP-MS Instrument Tune**

The ICP-MS tunes met QC acceptance criteria.

#### Calibration

All initial and continuing calibration met QC acceptance criteria.

# **Reporting Limit Verification**

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

#### **Blanks**

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. In the CCB analyzed after the samples, Ca was detected at a negative concentration with an absolute value < the PQL. The associated sample results were detects >5X the MDL and will not be qualified.

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

The ICP-MS internal standards met QC acceptance criteria.

# Matrix Spike (MS)

The MS met all QC acceptance criteria except as noted above in the Summary section.

#### ICP-MS:

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

#### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

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

All detection limits were properly reported. Both samples were diluted 100X for Ca, Mg, Mn and Na.

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

Results of the ICS A and AB analyses were not evaluated for ICP-AES because the sample concentrations of Ca, Mg, Fe and Al were < those in the ICS solution.

Results of the ICS A and AB analyses for ICP-MS met acceptance criteria except as noted above in the Summary section.

# **ICP Serial Dilution**

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

# Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 07/30/14





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#### Memorandum

Date: July 30, 2014

To: File

From: Mary Donivan

Subject: Radiochemical Data Review and Validation – SNL

Site: SWMU 154 GWM

AR/COC: 615528 SDG: 350254 Laboratory: GEL

Project/Task: 146422.10.11.01

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 4.

#### Summary

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

#### Gross Alpha/Beta:

1. The sample result for gross beta was > the MDA but  $\le 3X$  the MDA will be **qualified J,FR7.** 

#### Gammaspec:

- 1. The K-40 result for sample 350254009 was rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.
- 2. All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3.**

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

The samples were prepared and analyzed within the prescribed holding times. The samples listed on AR/COC 615528 were received at the laboratory at pH 7 and were acidified by the laboratory.

## 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**

The sample tracer recoveries met QC acceptance criteria.

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

The MS/MSD met all 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**

The samples were not diluted. All required detection limits were met except as follows.

#### Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 07/30/14



# Sample Findings Summary



**AR/COC:** 615528 Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096045-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	096045-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	096045-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096045-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096045-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	096045-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-009/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	096045-009/CTF-MW2	Thallium (7440-28-0)	2.5U, B3
	096045-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-010/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-010/CTF-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	096045-002/CTF-MW2	Phenol (108-95-2)	UJ, RP2
SW846 3535/8321A Modifie			
	096045-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	096045-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	096045-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	096045-024/CTF-MW2	Tetryl (479-45-8)	UJ, L3,MS3
SW846 8260B DOE-AL			
	096045-001/CTF-MW2	Bromomethane (74-83-9)	UJ, 13,C3
	096046-001/SWMU154-TB1	Bromomethane (74-83-9)	UJ, I3,C3

**AR/COC:** 615528 Page 2 of 2

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

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





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#### Memorandum

Date: July 29, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 154 GWM AR/COC: 615528 SDG: 350254 Laboratory: GEL

Project/Task: 146422.10.11.01

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 4.

### **Summary**

One sample was prepared and analyzed with accepted procedures using methods EPA 3510C/8270D (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD RPD did not meet acceptance criteria for phenol. The associated sample result was an ND and will be **qualified UJ,RP2.** 

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 analyzed within the prescribed holding times and properly preserved.

# **Instrument Tune**

All instrument tune requirements were met.

#### **Calibration**

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The ICAL %RSD was >15% but ≤40% for p-nitroaniline. The associated sample result was an ND and since no other calibration infraction occurred, will not be qualified.

The ICV %Ds were >20% but ≤40% with negative bias for hexachlorocyclopentadiene and 2,4-dinitrophenol. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

# **Surrogates**

All surrogate recoveries met QC acceptance criteria.

# **Internal Standards**

All internal standards met QC acceptance criteria.

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

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

# **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

## **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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski Level I Date: 07/30/14





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#### Memorandum

Date: July 29, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 154 GWM AR/COC: 615528 SDG: 350254 Laboratory: GEL

Project/Task: 146422.10.11.01

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 4.

# **Summary**

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

1. The ICAL %RSD was >15% but ≤40% and ICV %D was >20% but ≤40% with negative bias for bromomethane. The associated sample results were non-detects and will be **qualified UJ,I3,C3.** 

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

#### **Holding Times**

The samples were analyzed within the prescribed holding time 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 ICAL %RSD was >15% but  $\le40\%$  for dibromochloromethane. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

The ICAL %RSDs for bromoform and 1,2-dibromo-3-chloropropane were >15% but ≤40% and the ICV and/or CCV %Ds were >20% with positive bias. Since the associated sample results were NDs, the positive ICV/CCV %Ds are not considered infractions. Associated sample results will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

# **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

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

## **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met except as follows. The %R was < the lower acceptance limit for trichlorotrifluoroethane. Up to three outliers per LCS are allowed since 52 analytes were reported. Therefore, the associated sample results will not be qualified.

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

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

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

#### Other QC

One TB was submitted with the AR/COC.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I Date:** 07/30/14

# **Data Validation Summary Worksheet**

AR/COC #: 615528	Site/Project: SWMU 154 GWM Validation Date: <u>07/29/2</u>													
SDG #: 350254 and 350255		Labo	ratory: GEL	Laboratori	es LLC		Validator:	Mary Donivar	<u>a</u>					
Matrix: Aqueous	# of Samples: 13	CVR	present:	Yes	<del></del>	A	nalysis Type:	X Organic X M	etals					
AR/COC(s) present: Yes	Samı	ple Contair	ner Integrity:		OK			X Rad X Ge	n Chem					
		Requ	ested Anal	yses Not I	Reported									
Sample Number	Laboratory ID	organic	genchem	metals	rad		Com	ments						
None														
					<b>'</b>									
		Hold	Time/Pres	servation	Outliers									
Sample Number	Laboratory ID	A moleco	ia D	res.	Coll. Date	Prep. Date	Anal. Date	Anal. within	Anal. beyond					
Sample Number	Laboratory ID	Analys	is r	res.	Con. Date	Frep. Date	Aliai. Date	2X HT	2X HT					
None														
Comments: Samples collected 06/06/20 Samples 350254004, -009, -010, -011 ar		nH 7 per in	etructions on (	COC camples	were acidified	to nH 🗸 unon rece	aint							
Samples 330234004, -009, -010, -011 an	ild 330233001 were received at p	pri 7, per m	structions on C	coc samples	were actumed	to pri <2 upon reco	zipt							
									Revised 7/2007					
					Validated	l By:	Cary A. D.	onivan_						

# **Organic Worksheet (GC/MS)**

AR/COC #: 615528 SDG #:350254 Matrix: Aqueous

Laboratory Sample IDs: 350254001 and -012

Method/Batch #s: 8260B 1397331 Tuning (pass/fail): pass TICs Required? (yes/no) no

				Calib	ration			5X				MS/			
	alyte		Int.	RF	RSD/ R <sup>2</sup>	CCV (ICV) %D	Method Blank	(10X Blan	$\frac{\text{LCS}}{\text{%R}}$	MS %R	MSD %R	MSD RPD	TB -012		
bromomethane			NA	✓	23.5	(-24.0)	✓	NA	. ✓	✓	✓	✓	✓		
dibromochloromethan	e		NA	✓	20.4	✓	✓	NA	. ✓	✓	✓	✓	✓		
bromoform			NA	✓	30.5	(22.4) 29.6	✓	NA	. ✓	✓	✓	✓	✓		
1,2-dibromo-3-chlorop	propane		NA	✓	29.8	30.8	✓	NA	. ✓	✓	✓	✓	✓		
trichlorotrifluoroethan			NA	✓	<b>√</b>	✓	✓	NA	72.5	<b>√</b>	✓	✓	✓		
					S	urrogate	Recovery	Outlie	rs						
Sample ID															
None															
						т	S Outliers	,							
	1					1				1				1 .	
Sample ID	Area	RT	Area	ı	RT	Area	a l	RT	Area	RT		Area	RT	Area	RT
None															

Comments: HTs OK, ICAL VOAA.I 06/09/14

MS/MSD performed on SNL sample of similar matrix from another SDG

# **Organic Worksheet (GC/MS)**

AR/COC #: 615528 SDG #:350254 Matrix: Aqueous

Laboratory Sample IDs: 350254002

Method/Batch #s: 3510C/8270D 1394325/1394333 Tuning (pass/fail): pass TICs Required? (yes/no) no

		Calib	ration			5X				MS/			
Analyte (outliers)	Int.	RF	RSD/ R <sup>2</sup>	CCV (ICV) %D	Method Blank	(10X) Blank	LCS %R	MS %R	MSD %R	MSD RPD			
p-nitroaniline	NA	✓	15.9	✓	✓	NA	✓	✓	✓	✓			
hexachlorocyclopentadiene	NA	✓	✓	(-28.8)	✓	NA	✓	✓	✓	✓			
2,4-dinitrophenol	NA	✓	✓	(-26.5)	✓	NA	✓	✓	✓	✓			
phenol	NA	✓	✓	<b>√</b>	✓	NA	<b>√</b>	✓	✓	38.3			
			S	urrogate	e Recovery	Outliers							
Sample ID				dirogan	Recovery	Outhers							
None													
				]	S Outliers								
Sample ID Area RT	Ar	rea	RT	Are	a I	RT	Area	RT		Area	RT	Area	RT
None													

Comments: HT OK, ICAL MSD4.I 06/02/14

MS/MSD -002

# **High Explosives Worksheet (LC/MS/MS)**

AR/COC #: 615528 SDG #: 350254 Matrix: Aqueous																	
Laboratory Sample IDs350																	
Method/Batch #s: <u>8535/8</u>	321A	1395268	<u>8/1395269</u>														
	Initi	al Calib	oration	Cor	ntinuing	Calibra	tion	Method	5X	LCS	MS	MSD	MS/				
Analyte (Outliers)	Int.	RF	COD RSD/R <sup>2</sup>	ICV	CCV	ICB	ССВ	Blank	(10X) Blank	%R	%R	%R	MSD RPD	CRI			
m-nitrotoluene	<b>✓</b>	0.022	✓	<b>√</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	<b>√</b>			
o-nitrotoluene	✓	0.029	✓	✓	✓	✓	✓	<b>√</b>	✓	✓	✓	✓	<b>✓</b>	<b>√</b>			
p-nitrotoluene	✓	0.014	✓	✓	✓	✓	✓	<b>√</b>	✓	✓	✓	✓	✓	<b>√</b>			
tetryl	✓	<b>√</b>	✓	✓	✓	✓	✓	✓	✓	39.8	43.4	✓	✓	<b>√</b>			
						Surro	gate Re	covery O	ıtliers					1			
Sample ID																	
None																	
						Ŧ.,	1.04	1 10	41*								
				1			rnal Sta	ndard Ou						T .			
Sample ID	Are	a	RT		Samp	le ID		Area	RT		Sa	mple ID		Area	1	R	T
None																	

Comments: HTs OK; MS/MSD -003; all sample and QC extracts diluted 1:1 with LC reagent grade water

ICAL LCMSMS3 7/9/2014

# **Inorganic Metals Worksheet**

AR/COC #:615528	SDG #: <u>350254 and 352</u>	2525	Matrix:	<u>Aqueous</u>
Laboratory Sample IDs: <u>350254004 (UF) 350255001 (F)</u>				
Method/Batch #s: <b>3005/6010B:</b> 1394927/1394928 <b>3005/6020:</b> 1394898/13	94899 <b>7470A</b> 1396350/	1396363		
ICPMS Mass Cal (nass/fail) Pass ICPMS Resolu	ution (pass/fail)	Pass		

Analyte			Cal	libratio	n		Method Blank	5X Blank or	LCS	MS	Lab Rep.	Serial Dil.		ICS A±	CRI		
(outliers)	Int.	$\mathbb{R}^2$	ICV	CCV	ICB μg/L	CCB µg/L	mg/kg (μg/L)	mg/kg (5X	%R	SR %R	RPD	%D	ICS AB	MDL	%R		
Mn*							$\sqrt{}$	$\sqrt{}$		128*	$\sqrt{}$			$\sqrt{}$	V		
K							$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	12.8	$\sqrt{}$	NA			
Ca						-76.0	$\sqrt{}$	(300)	$\sqrt{}$		$\sqrt{}$		$\sqrt{}$	NA			
T1						0.495	$\sqrt{}$	2.5	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$			
Cu	√		<b>V</b>	V	V	√	√	<b>√</b>	√	√	√	√	√	-1.0	√		
Ni	√	$\sqrt{}$	$\sqrt{}$	√	√	1	V	V	√	1	√	V	√	-1.27	√		
																_	
																+	
																+	
																_	

	IS Outliers	60-125%		IS Outliers 80-120%						
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery			
None				None						

Comments: HTs OK; Matrix QC -004 (ICPMS), -001 (ICP-AES and CVAA); Ca, Mg, Mn\*, K and Na >4X spike amount; both samples diluted 100X for Ca, Mg, Mn and Na

# **General Chemistry Worksheet**

AR/COC #: 615528 SDG #: 350254 Matrix: Aqueous

Laboratory Sample IDs: 350254 – see below

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1395606, -008 Method/Batch #s: SW846 9056 (anions): Batch 1395539, -005

Method/Batch #s: EPA 353.2 (NO<sub>3</sub>/NO<sub>2</sub> – N): Batch 1394301, -006 Method/Batch #s: SM 2320B(total alkalinity): Batch 1396657, -007

			Calibr	ation				5X		MS/	Lab			
Analyte (outliers)	Int.	R <sup>2</sup>	ICV	ccv	ICB mg/L	CCB mg/L	Method Blank	Blank or 5X MDL	LCS %R	PS %R	Rep. RPD			
bromide	✓	✓	✓	✓	✓	✓	✓	NA	✓	429	✓			

 $Comments: HTs \ OK, \ Matrix \ QC \ from \ this \ SDG \ except \ for \ NO_3/NO_2-N; \ alkalinity > 4X \ spike \ amount$ 

Sample -005 diluted 50X for Cl and SO4; sample -006 was diluted 5X for  $NO_3/NO_2 - N$ 

# Radiochemistry Worksheet

AR/COC #: <u>615528</u>					S	SDG #: <u>3</u>	50254			Ma	trix: <u>Aqueou</u>	<u>s</u>		
Laboratory Sample IDs:35														
Method/Batch#s:DOE EMI	L HASL-300 (	Alphaspec	U) <b>1394438</b>	350254011	_									
Method/Batch#s:EPA 901.	1 (Gammaspe	c) <b>1394543</b>	35025400	9										
Method/Batch#s:EPA 900.	0 (Gross alpha	/beta) 139	<b>5961</b> 350254	<u> 4010</u>										
Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	N	MS/ MSD RER	Lab Rep. RER				
None														
	1					ecovery Ou						1		1
Sample ID	Tracer/Ca	rrier %	R	Sample ID	•	Tracer/	Carrier	%R		Sample	ID	Trac	er/Carrier	%R
None			_											
Comments: HTs OK; Matrix			-		-	beta (-010)								
Data rejected by the lab due to	_	-												
Sample -009 was recounted for		_		=	orted.									
Gross alpha/beta parent and d	up = 20  ml, M	IS/MSD=10	) ml – no qu	al										

\_Revised 7/2007

# SECTION IV TABLE OF CONTENTS

SOL	ID WAS	TE MAI	NAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUN	DWATER						
	MON	ITORIN	G REPORT, April – June 2014	IV-1						
1.0	Introd	luction		IV-1						
2.0	Field Methods and Measurements									
	2.1	Equipn	IV-3							
	2.2		vacuation							
	2.3	Ground	dwater Sample Collection	IV-4						
3.0	Analy	IV-4								
	3.1	IV-5								
	3.2	Volatil	e Organic Compounds	IV-5						
	3.3	Semivo	IV-5							
	3.4	High E	IV-6							
	3.5	Nitrate	IV-6							
	3.6	Anions	IV-6							
	3.7	Perchlo	IV-7							
	3.8	Hexava	IV-7							
	3.9	Metals	IV-7							
	3.10	Cation	IV-8							
	3.11	Gamm	IV-8							
	3.12	Sample	e Results Exceeding Maximum Contaminant Levels	IV-9						
4.0	Quality Control Samples									
	4.1	Field Q	Quality Control Samples	IV-9						
		4.1.1	Duplicate Groundwater Samples	IV-9						
		4.1.2	Equipment Blank Samples	IV-10						
		4.1.3	Trip Blank Samples	IV-10						
		4.1.4	Field Blank Samples	IV-11						
	4.2	Labora	IV-11							
	4.3	Varian	ces and Nonconformances	IV-11						
5.0	Sumn	Summary								
6.0	Refer	ences		IV-12						

#### **LIST OF FIGURES**

	LIST OF FIGURES
Figure	Title
IV-1	Location of Monitoring Wells CCBA-MW1 and CCBA-MW2 within SWMUs 8/58
IV-2	Location of Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 within SWMU 68
	LIST OF TABLES
Table	Title
IV-1	Laboratory Analytical Methods, Container Types, and Preservation Requirements for SWMUs 8/58 and 68 Groundwater Samples
IV-2	Sample Details for Second Quarter, CY 2014 Groundwater Sampling, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014

Monitoring Quarterly Assessment, April – June 2014

Monitoring Quarterly Assessment, April – June 2014

Quarterly Assessment, April – June 2014

Quarterly Assessment, April – June 2014

IV-3

IV-4

IV-5

IV-6

IV-7

IV-8

IV-9

2014

2014

Summary of Field Water Quality Measurements, SWMUs 8/58 and 68 Groundwater

SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June

Method Detection Limits for High Explosive Compounds (EPA Method 8321A), SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June

Summary of Nitrate Plus Nitrite Results, SWMUs 8/58 and 68 Groundwater

Groundwater Monitoring Quarterly Assessment, April – June 2014

Summary of Alkalinity, Anion, and Total Cyanide Results, SWMUs 8/58 and 68

Summary of Perchlorate Results, SWMUs 8/58 and 68 Groundwater Monitoring

Summary of Hexavalent Chromium Results, SWMU 68 Groundwater Monitoring

Method Detection Limits for Volatile and Semivolatile Organic Compounds,

# LIST OF TABLES (Concluded)

Table	Title
IV-10	Summary of Unfiltered Total Metal Results, SWMUs 8/58 Groundwater Monitoring Quarterly Assessment, April – June 2014
IV-11	Summary of Unfiltered Total Metal Results, SWMU 68 Groundwater Monitoring Quarterly Assessment, April – June 2014
IV-12	Summary of Filtered Cation Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014
IV-13	Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014
IV-14	Summary of Constituents Detected above Established MCLs, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessments through June 2014
IV-15	Summary of Duplicate Samples, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014

# **APPENDICES**

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
Appendix C	Data Validation Sample Findings Summary Sheets 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 2014

#### 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.

This is the eleventh quarterly groundwater sampling event following the April 8, 2010 letter by NMED requiring eight quarters of groundwater monitoring. The Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2 are located within SWMUs 8/58, and Old Burn Site (OBS) monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are located within SWMU 68. These five monitoring wells were installed in August 2011 (SNL/NM November 2011). The location of CCBA monitoring wells are shown in Figure IV-1 and OBS monitoring wells in Figure IV-2.

The supplemental groundwater monitoring at these monitoring wells is designed to meet the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent 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) 2014 reporting period (April – June 2014).

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 with modification by NMED in January 2011 (NMED January 2011).

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on April 7 and April 8, 2014, 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 (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, and gross alpha/beta activity.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from April 14 to April 16, 2014. The samples were analyzed for the required constituents, consisting 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.

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 groundwater sample at a concentration of 4.97 mg/L. Fluoride in the CCBA-MW2 groundwater sample and groundwater duplicate sample was above the method detection limit (MDL) with values of 1.59 mg/L and 1.63 mg/L, respectively.

Quality control (QC) samples consisting of duplicate groundwater, 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.

# 2.0 Field Methods and Measurements

Groundwater monitoring at SWMUs 8/58 and 68 was performed according to 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 the Second Quarter, CY 2014.

# 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.

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 an YSI<sup>™</sup> Model EXO1 water quality meter. Turbidity was measured with a HACH<sup>™</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 within 10 percent, or less than 5 nephelometric turbidity units.
- pH is within 0.1 units.
- Temperature is within 1.0 degree Celsius.
- SC is within 5 percent as micromhos per centimeter.

Table IV-3 summarizes the temperature, pH, SC, and turbidity measurements, which are discussed in Section IV.3.1. Field Measurement Logs documenting details of well purging, and water quality measurements are included in Appendix A and 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 and Test America Laboratories 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 and Table IV-5 lists the MDLs for HE compounds. 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). The data are acceptable, and reported QC measures are adequate. The data validation summary sheets are provided in Appendix C.

#### 3.1 Field Water Quality Measurements

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

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

#### 3.2 Volatile Organic Compounds

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

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

#### 3.3 Semivolatile Organic Compounds

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

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

#### 3.4 **High Explosive Compounds**

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

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

#### 3.5 **Nitrate Plus Nitrite**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-6 summarizes NPN results. NPN was not detected above the MCL of 10 mg/L in any groundwater sample. NPN was reported at a maximum concentration of 3.89 mg/L in the CCBA-MW2 groundwater duplicate sample.

**SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3.** Table IV-6 summarizes NPN results. NPN was not detected above the MCL of 10 mg/L in any groundwater sample. NPN was reported at a maximum concentration of 1.92 mg/L in the OBS-MW3 groundwater sample.

#### 3.6 Anions and Alkalinity

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-7 summarizes alkalinity, major anion (i.e., bromide, chloride, fluoride, and sulfate), and total cyanide results. Fluoride was detected above the established MCL of 4.0 mg/L in the CCBA-MW1 groundwater sample with concentrations of 4.97 mg/L. The detection is most likely attributable to the presence of fluorite mineralization in the unconsolidated alluvium and possible weathered quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities. Review of nearby ore deposits demonstrates that there are large, but uneconomic deposits of fluorite-bearing minerals in the Precambrian and Paleozoic rocks in the eastern portion of Kirtland Air Force Base (Skelly August 2013). Fluoride in the CCBA-MW2 groundwater was reported at a concentration of 1.59 mg/L and 1.63 mg/L for the groundwater sample and duplicate

groundwater sample, respectively. No other anions or total cyanide were detected above established MCLs. There are no established MCLs for bromide, chloride, sulfate, or alkalinity.

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

#### 3.7 **Perchlorate**

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

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

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

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

#### 3.9 Metals

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

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

#### 3.10 Cations

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

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

#### 3.11 Gamma Spectroscopy and Radioisotopic Analyses

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

**SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2.** All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The corrected gross alpha activity was below the MCL of 15 picocuries per liter (pCi/L) in all groundwater samples. Gross beta activity results do not exceed established MCLs.

**SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3.** All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The corrected gross alpha activity was below the MCL of 15 pCi/L in all groundwater samples. Gross beta activity results do not exceed established MCLs.

#### 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 that is exceeding the MCLs in samples collected during this quarter is fluoride, detected in the CCBA-MW1 groundwater sample. Fluoride detected in the CCBA-MW1 sample is most likely from the mineralized fluorite-bearing unconsolidated alluvium and possible quartzite 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 groundwater, 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 Groundwater Samples**

Duplicate groundwater samples were collected from monitoring wells CCBA-MW2 and OBS-MW3 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate groundwater samples were collected immediately after the original groundwater sample to reduce variability caused by time and/or sampling mechanics. Duplicate groundwater samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW1 and OBS-MW2. RPD values were calculated only for detected chemical parameters. The work plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate groundwater sample data; however, duplicate sample results show good correlation (RPD values of less than 35 for inorganic analytes) for all calculated parameters.

#### 4.1.2 **Equipment Blank Samples**

EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW3 and were submitted for all analyses. EB samples were collected according to procedures described in SNL/NM FOP 05-03 "Groundwater Monitoring Equipment Decontamination" (SNL/NM January 2012a).

**SWMUs 8/58, Monitoring Well CCBA-MW2.** Bromodichloromethane, chloroform, chloride, copper, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary, since these analytes were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CCBA-MW2 groundwater and duplicate groundwater samples during data validation, since copper was reported in the EB sample at a concentration greater than the associated groundwater sample.

**SWMU 68, Monitoring Well OBS-MW3.** Alkalinity, bromodichloromethane, chloroform, chloride, copper, magnesium, and sodium were detected above laboratory MDLs. With the exception of copper, no corrective action was necessary since these compounds were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the OBS-MW3 groundwater and duplicate groundwater samples during data validation, since copper was reported in the EB sample at concentrations greater than the associated groundwater sample.

#### 4.1.3 Trip Blank Samples

TB samples are submitted whenever groundwater samples are collected for VOC analyses to assess whether contamination of the samples occurred during shipment and storage. TBs were brought to the field and accompanied each sample shipment.

**SWMUs 8/58.** A total of three trip blanks were submitted with the April 2014 samples. No VOCs were detected above associated laboratory MDLs.

**SWMU 68.** A total of four trip blanks were submitted with the April 2014 samples. No VOCs were detected above associated laboratory MDLs, except for toluene. Toluene was detected above the MDL in the TB sample. No corrective action was required, because this compound was not detected in the groundwater sample.

#### 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.

**SWMUs 8/58, Monitoring Well CCBA-MW2.** The VOCs bromodichloromethane and chloroform were detected above laboratory MDLs. Bromodichloromethane and chloroform are common byproducts of the water deionization process. No corrective action was required, since these compounds were not detected in the associated groundwater sample.

**SWMU 68, Monitoring Well OBS-MW3.** The VOCs bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs and are common by products of the water deionization process. No corrective action was required, since this compound was not detected in the associated groundwater 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).

All data are determined to be acceptable and reported QC measures are adequate, except for the americium-241 activity in the CCBA-MW2 groundwater sample. Americium-241 was qualified as unusable during data validation since the reported value was a negative with an absolute value greater than two times the associated MDA. Americium-241 was reported below the detection limit in the associated duplicate sample. 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 Plan for SWMU 8/58 (SNL/NM September 2010) occurred during the April 2014 sampling activities.

No variances or nonconformances from requirements in the Groundwater Characterization Work Plan for SWMU 68 (SNL/NM September 2010) occurred during the April 2014 sampling activities.

#### 5.0 **Summary**

During the Second Quarter of CY 2014, samples were collected from SWMUs 8/58 monitoring wells CCBA-MW1 and CCBA-MW2, and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride in CCBA-MW1. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 groundwater sample at a concentration of 4.97 mg/L. This detection is similar to historical concentrations and is most likely attributable to the fluorite-bearing minerals in the unconsolidated alluvium and possible quartzite bedrock in which the well is completed (Skelly August 2013). Fluoride is not a site contaminant of concern and is not associated with SNL/NM testing activities.

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

#### 6.0 **References**

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## Figures

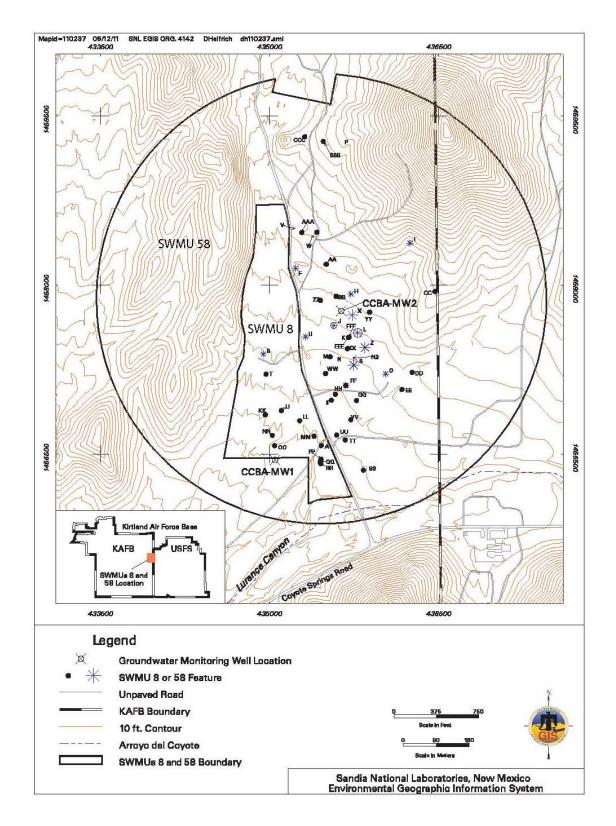


Figure IV-1
Location of Monitoring Wells CCBA-MW1 and CCBA-MW2 within SWMUs 8/58

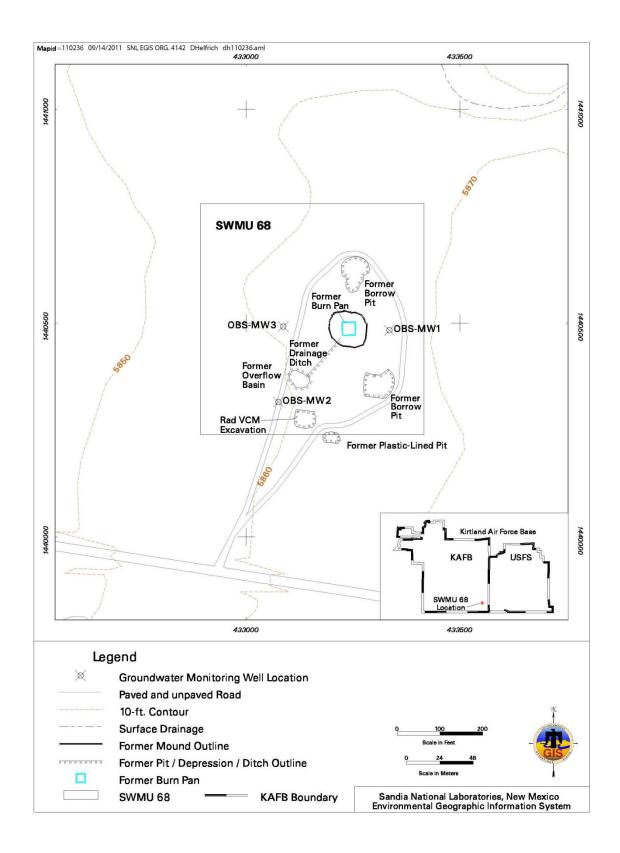


Figure IV-2
Location of Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 within SWMU 68

## Tables

Table IV-1

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

Analysis	Analytical Method <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 9012	1 x 250-mL polyethylene, NaOH, 4°C
Nitrate plus Nitrite as Nitrogen	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 901.1	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

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

 $H_2SO_4$  = Sulfuric acid.

HASL = Health and Safety Laboratory.

HCl = Hydrochloric acid. HNO<sub>3</sub> = Nitric acid.

L = Liter.
mL = Milliliter(s).
NaOH = Sodium Hydroxide.
SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

<sup>&</sup>lt;sup>a</sup> 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.

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

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

<sup>&</sup>lt;sup>d</sup>Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

Table IV-2 Sample Details for Second Quarter, CY 2014 Groundwater Sampling **SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment** April - June 2014

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation		
CCBA-MW1	095725	615424			
CCBA-MW2	095730	615426	SWMUs 8/58		
CCBA-MW2 (duplicate)	095731	615426			
OBS-MW1	095733	615427			
OBS-MW2	095736	615428	SWMU 68		
OBS-MW3	095741	615120	3001010 66		
OBS-MW3 (duplicate)	095742	615430			

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

CY = Calendar Year. MW = Monitoring Well. OBS = Old Burn Site.

SWMU = Solid Waste Management Unit.

Table IV-3 Summary of Field Water Quality Measurements<sup>a</sup> SWMUs 8/58 and 68 Groundwater Monitoring **Quarterly Assessment, April – June 2014** 

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	рН	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMUs 8/58								
CCBA-MW1	07-Apr-14	15.68	452.5	194.3	6.70	1.19	32.4	3.21
CCBA-MW2	08-Apr-14	16.18	531.1	184.3	7.63	0.23	64.9	6.37
SWMU 68								
OBS-MW1	14-Apr-14	14.56	462.2	-199.9	7.54	0.31	36.4	3.71
OBS-MW2	15-Apr-14	16.14	464.0	189.7	7.52	0.19	36.2	3.55
OBS-MW3	16-Apr-14	16.7	471.0	197.7	7.56	0.24	46.6	4.52

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

= Degrees Celsius. °C % Sat = Percent saturation. μmhos/cm = Micromhos per centimeter. = Coyote Canyon Blast Area. CCBA

= Milligrams per liter. mg/L

= Millivolts. mΫ MW

Monitoring Well.Nephelometric turbidity units. NTU

OBS = Old Burn Site.

pН = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

= Solid Waste Management Unit. SWMU

Table IV-4

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 2014

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

## **Table IV-4 (Continued)**

## Method Detection Limits for Volatile and Semivolatile Organic Compounds SWMUs 8/58 and 68 Groundwater Monitoring

## **Quarterly Assessment, April – June 2014**

		SV	VMU 8/58			
Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (μg/L)	Analytical Method <sup>a</sup>	
1'-Biphenyl 1	3.00 – 3.16	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.16	EPA 8270C	
1,2,4-Trichlorobenzene	3.00 – 3.16	EPA 8270C	Caprolactam	3.00 – 3.16	EPA 8270C	
1,4-Dioxane	3.00 – 3.16	EPA 8270C	Carbazole	0.300 - 0.316	EPA 8270C	
2,4,5-Trichlorophenol	3.00 – 3.16	EPA 8270C	Chrysene	0.300 - 0.316	EPA 8270C	
2,4,6-Trichlorophenol	3.00 – 3.16	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.16	EPA 8270C	
2,4-Dichlorophenol	3.00 – 3.16	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.16	EPA 8270C	
2,4-Dimethylphenol	3.00 – 3.16	EPA 8270C	Dibenz[a,h]anthracene	0.300 - 0.316	EPA 8270C	
2,4-Dinitrophenol	5.00 - 5.26	EPA 8270C	Dibenzofuran	3.00 – 3.16	EPA 8270C	
2,4-Dinitrotoluene	3.00 – 3.16	EPA 8270C	Diethylphthalate	3.00 – 3.16	EPA 8270C	
2,6-Dinitrotoluene	3.00 – 3.16	EPA 8270C	Dimethylphthalate	3.00 – 3.16	EPA 8270C	
2-Chloronaphthalene	0.410 - 0.432	EPA 8270C	Dinitro-o-cresol	3.00 – 3.16	EPA 8270C	
2-Chlorophenol	3.00 – 3.16	EPA 8270C	Diphenyl amine	3.00 – 3.16	EPA 8270C	
2-Methylnaphthalene	0.300 - 0.316	EPA 8270C	Fluoranthene	0.300 - 0.316	EPA 8270C	
2-Nitroaniline	3.00 – 3.16	EPA 8270C	Fluorene	0.300 - 0.316	EPA 8270C	
2-Nitrophenol	3.00 – 3.16	EPA 8270C	Hexachlorobenzene	3.00 – 3.16	EPA 8270C	
3,3'-Dichlorobenzidine	3.00 – 3.16	EPA 8270C	Hexachlorobutadiene	3.00 – 3.16	EPA 8270C	
3-Nitroaniline	3.00 – 3.16	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.16	EPA 8270C	
4-Bromophenyl phenyl ether	3.00 – 3.16	EPA 8270C	Hexachloroethane	3.00 – 3.16	EPA 8270C	
4-Chloro-3-methylphenol	3.00 – 3.16	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 - 0.316	EPA 8270C	
4-Chlorobenzenamine	3.30 - 3.47	EPA 8270C	Isophorone	3.50 - 3.68	EPA 8270C	
4-Chlorophenyl phenyl ether	3.00 – 3.16	EPA 8270C	Naphthalene	0.300 - 0.316	EPA 8270C	
4-Nitroaniline	3.00 – 3.16	EPA 8270C	Nitrobenzene	3.00 – 3.16	EPA 8270C	
4-Nitrophenol	3.00 – 3.16	EPA 8270C	Pentachlorophenol	3.00 – 3.16	EPA 8270C	
Acenaphthene	0.300 - 0.316	EPA 8270C	Phenanthrene	0.300 - 0.316	EPA 8270C	
Acenaphthylene	0.300 - 0.316	EPA 8270C	Phenol	3.00 – 3.16	EPA 8270C	
Acetophenone	3.00 – 3.16	EPA 8270C	Pyrene	0.300 - 0.316	EPA 8270C	
Anthracene	0.300 - 0.316	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.16	EPA 8270C	
Atrazine	3.00 – 3.16	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.16	EPA 8270C	
Benzaldehyde	3.00 – 3.16	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.16	EPA 8270C	
Benzo(a)anthracene	0.300 - 0.316	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.16	EPA 8270C	
Benzo(a)pyrene	0.300 - 0.316	EPA 8270C	m,p-Cresol	3.70 – 3.89	EPA 8270C	
Benzo(b)fluoranthene	0.300 - 0.316	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.16	EPA 8270C	
Benzo(ghi)perylene	0.300 - 0.316	EPA 8270C	o-Cresol	3.00 – 3.16	EPA 8270C	
Benzo(k)fluoranthene	0.300 - 0.316	EPA 8270C				

## **Table IV-4 (Continued)**

# Method Detection Limits for Volatile and Semivolatile Organic Compounds SWMUs 8/58 and 68 Groundwater Monitoring

## **Quarterly Assessment, April – June 2014**

SWMU 68										
Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>					
1,1,1-Trichloroethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B					
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B					
1,1,2-Trichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B					
1,1-Dichloroethane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B					
1,1-Dichloroethene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B					
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B					
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B					
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Ethyl benzene	0.300	EPA 8260B					
1,2-Dibromoethane	0.300	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B					
1,2-Dichlorobenzene	0.300	EPA 8260B	Methyl acetate	1.50	EPA 8260B					
1,2-Dichloroethane	0.300	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B					
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B					
1,3-Dichlorobenzene	0.300	EPA 8260B	Styrene	0.300	EPA 8260B					
1,4-Dichlorobenzene	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B					
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B					
2-Butanone	2.00	EPA 8260B	Toluene	0.300	EPA 8260B					
2-Hexanone	2.20	EPA 8260B	Trichloroethene	0.300	EPA 8260B					
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B					
Acetone	3.00	EPA 8260B	Vinyl chloride	0.300	EPA 8260B					
Benzene	0.300	EPA 8260B	Xylene	0.300	EPA 8260B					
Bromochloromethane	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B					
Bromodichloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B					
Bromoform	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B					
Bromomethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B					
Carbon disulfide	1.50	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B					
Carbon tetrachloride	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B					

## Table IV-4 (Continued)

# Method Detection Limits for Volatile and Semivolatile Organic Compounds SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014

		SI	WMU 68		
Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>
1'-Biphenyl 1	3.00 - 3.03	EPA 8270C	Butylbenzyl phthalate	3.00 - 3.03	EPA 8270C
1,2,4-Trichlorobenzene	3.00 - 3.03	EPA 8270C	Caprolactam	3.00 - 3.03	EPA 8270C
2,4,5-Trichlorophenol	3.00 - 3.03	EPA 8270C	Carbazole	0.300 - 0.303	EPA 8270C
1,4-Dioxane	3.00 - 3.03	EPA 8270C	Chrysene	0.300 - 0.303	EPA 8270C
2,4,6-Trichlorophenol	3.00 - 3.03	EPA 8270C	Di-n-butyl phthalate	3.00 - 3.03	EPA 8270C
2,4-Dichlorophenol	3.00 - 3.03	EPA 8270C	Di-n-octyl phthalate	3.00 - 3.03	EPA 8270C
2,4-Dimethylphenol	3.00 - 3.03	EPA 8270C	Dibenz[a,h]anthracene	0.300 - 0.303	EPA 8270C
2,4-Dinitrophenol	5.00 - 5.05	EPA 8270C	Dibenzofuran	3.00 - 3.03	EPA 8270C
2,4-Dinitrotoluene	3.00 - 3.03	EPA 8270C	Diethylphthalate	3.00 - 3.03	EPA 8270C
2,6-Dinitrotoluene	3.00 - 3.03	EPA 8270C	Dimethylphthalate	3.00 - 3.03	EPA 8270C
2-Chloronaphthalene	0.410 - 0.414	EPA 8270C	Dinitro-o-cresol	3.00 - 3.03	EPA 8270C
2-Chlorophenol	3.00 - 3.03	EPA 8270C	Diphenyl amine	3.00 - 3.03	EPA 8270C
2-Methylnaphthalene	0.300 - 0.303	EPA 8270C	Fluoranthene	0.300 - 0.303	EPA 8270C
2-Nitroaniline	3.00 - 3.03	EPA 8270C	Fluorene	0.300 - 0.303	EPA 8270C
2-Nitrophenol	3.00 - 3.03	EPA 8270C	Hexachlorobenzene	3.00 - 3.03	EPA 8270C
3,3'-Dichlorobenzidine	3.00 - 3.03	EPA 8270C	Hexachlorobutadiene	3.00 - 3.03	EPA 8270C
3-Nitroaniline	3.00 - 3.03	EPA 8270C	Hexachlorocyclopentadiene	3.00 - 3.03	EPA 8270C
4-Bromophenyl phenyl ether	3.00 - 3.03	EPA 8270C	Hexachloroethane	3.00 - 3.03	EPA 8270C
4-Chloro-3-methylphenol	3.00 - 3.03	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 - 0.303	EPA 8270C
4-Chlorobenzenamine	3.30 - 3.33	EPA 8270C	Isophorone	3.50 - 3.54	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 - 3.03	EPA 8270C	Naphthalene	0.300 - 0.303	EPA 8270C
4-Nitroaniline	3.00 - 3.03	EPA 8270C	Nitro-benzene	3.00 - 3.03	EPA 8270C
4-Nitrophenol	3.00 - 3.03	EPA 8270C	Pentachlorophenol	3.00 - 3.03	EPA 8270C
Acenaphthene	0.300 - 0.303	EPA 8270C	Phenanthrene	0.300 - 0.303	EPA 8270C
Acenaphthylene	0.300 - 0.303	EPA 8270C	Phenol	3.00 - 3.03	EPA 8270C
Acetophenone	3.00 - 3.03	EPA 8270C	Pyrene	0.300 - 0.303	EPA 8270C
Anthracene	0.300 - 0.303	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 - 3.03	EPA 8270C
Atrazine	3.00 - 3.03	EPA 8270C	bis(2-Chloroethyl)ether	3.00 - 3.03	EPA 8270C
Benzaldehyde	3.00 - 3.03	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 - 3.03	EPA 8270C
Benzo(a)anthracene	0.300 - 0.303	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 - 3.03	EPA 8270C
Benzo(a)pyrene	0.300 - 0.303	EPA 8270C	m,p-Cresol	3.70 - 3.74	EPA 8270C
Benzo(b)fluoranthene	0.300 - 0.303	EPA 8270C	n-Nitrosodipropylamine	3.00 - 3.03	EPA 8270C
Benzo(ghi)perylene	0.300 - 0.303	EPA 8270C	o-Cresol	3.00 - 3.03	EPA 8270C
Benzo(k)fluoranthene	0.300 - 0.303	EPA 8270C			

#### Table IV-4 (Concluded)

## Method Detection Limits for Volatile and Semivolatile Organic Compounds SWMUs 8/58 and 68 Groundwater Monitoring **Quarterly Assessment, April – June 2014**

#### Notes

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

μg/L EPA = Micrograms per liter.

= U.S. Environmental Protection Agency.

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

SWMU = Solid Waste Management Unit.

## Table IV-5 Method Detection Limits for High Explosive Compounds (EPA Method 8321A) SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April - June 2014

Analyte	MI (μg	- <del>-</del>
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0851 - 0.0870	0.0833 - 0.0860
1,3-Dinitrobenzene	0.0851 - 0.0870	0.0833 - 0.0860
2,4,6-Trinitrotoluene	0.0851 - 0.0870	0.0833 - 0.0860
2,4-Dinitrotoluene	0.0851 - 0.0870	0.0833 - 0.0860
2,6-Dinitrotoluene	0.0851 - 0.0870	0.0833 - 0.0860
2-Amino-4,6-dinitrotoluene	0.0851 - 0.0870	0.0833 - 0.0860
2-Nitrotoluene	0.0872 - 0.0891	0.0854 - 0.0882
3-Nitrotoluene	0.0851 - 0.0870	0.0833 - 0.0860
4-Amino-2,6-dinitrotoluene	0.0851 - 0.0870	0.0833 - 0.0860
4-Nitrotoluene	0.160 - 0.163	0.156 - 0.161
HMX	0.0851 - 0.0870	0.0833 - 0.0860
Nitrobenzene	0.0851 - 0.0870	0.0833 - 0.0860
Pentaerythritol tetranitrate	0.106 - 0.109	0.104 - 0.108
RDX	0.0851 - 0.0870	0.0833 - 0.0860
Tetryl	0.0851 - 0.0870	0.0833 - 0.0860

#### **Notes**

μg/L EPA = Micrograms per liter.= U.S. Environmental Protection Agency.

HMX = Tetrahexamine tetranitramine.

= Method detection limit. The minimum concentration that can be measured and reported with 99% MDL

confidence that the analyte is greater than zero; analyte is matrix-specific.

= Hexahydro-1,3,5-trinitro-1,3,5-triazine. SWMU = Solid Waste Management Unit. Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Table IV-6 **Summary of Nitrate Plus Nitrite Results SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014** 

Well	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	Nitrata plua pitrita	1.80	0.085	0.250	10.0			095725-018	EPA 353.2
07-Apr-14	Nitrate plus nitrite	1.60	0.065	0.250	10.0			095725-018	EPA 353.2
CCBA-MW2	Nitrate plus nitrite	3.62	0.170	0.500	10.0			095730-018	EPA 353.2
08-Apr-14	Mitrate plus filtrite	3.02	0.170	0.500	10.0			095730-016	EPA 333.2
CCBA-MW2 (Duplicate)	Nitrate plus nitrite	3.89	0.170	0.500	10.0			095731-018	EPA 353.2
08-Apr-14	Mitrate plus filtrite	3.09	0.170	0.500	10.0			093731-016	EPA 333.2
SWMU 68									
OBS-MW1	Nitrate plus nitrite	1.91	0.085	0.250	10.0			095733-018	EPA 353.2
14-Apr-14	Miliale plus fillifle	1.91	0.065	0.250	10.0			093733-016	EFA 333.2
OBS-MW2	Nitrate plus nitrite	1.68	0.085	0.250	10.0			095736-018	EPA 353.2
15-Apr-14	Miliale plus fillifle	1.00	0.065	0.230	10.0			093730-018	EFA 333.2
OBS-MW3	Nitrate plus nitrite	1.92	0.170	0.500	10.0			095741-018	EPA 353.2
16-Apr-14	Miliale plus fillifle	1.92	0.170	0.500	10.0			093741-016	EFA 333.2
OBS-MW3 (Duplicate) 16-Apr-14	Nitrate plus nitrite	1.89	0.170	0.500	10.0			095742-018	EPA 353.2

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

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

#### <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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
  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-6 (Concluded)

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

#### **SWMUs 8/58 and 68 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

#### Notes (continued)

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2000)

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.

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-7
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

M/all	Amalasta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier	Qualifier <sup>b</sup>	Number .	Method <sup>c</sup>
SWMUs 8/58			, <u> </u>						
CCBA-MW1	Bicarbonate Alkalinity	181	0.725	1.00	NE			095725-022	SM 2320B
07-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095725-022	SM 2320B
	Bromide	0.334	0.067	0.200	NE			095725-016	EPA 9056
	Chloride	29.2	0.335	1.00	NE			095725-016	EPA 9056
	Fluoride	4.97	0.165	0.500	4.0			095725-016	EPA 9056
	Sulfate	58.0	0.665	2.00	NE			095725-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095725-029	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	178	0.725	1.00	NE			095730-022	SM 2320B
08-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095730-022	SM 2320B
	Bromide	0.554	0.067	0.200	NE			095730-016	EPA 9056
	Chloride	38.6	0.670	2.00	NE			095730-016	EPA 9056
	Fluoride	1.59	0.033	0.100	4.0			095730-016	EPA 9056
	Sulfate	97.7	1.33	4.00	NE			095730-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095730-029	EPA 9012
CCBA-MW2 (Duplicate)	Bicarbonate Alkalinity	178	0.725	1.00	NE			095731-022	SM 2320B
08-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095731-022	SM 2320B
	Bromide	0.569	0.067	0.200	NE			095731-016	EPA 9056
	Chloride	37.8	0.670	2.00	NE			095731-016	EPA 9056
	Fluoride	1.63	0.033	0.100	4.0			095731-016	EPA 9056
	Sulfate	95.8	1.33	4.00	NE			095731-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095731-029	EPA 9012

## Table IV-7 (Continued)

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

## SWMUs 8/58 and 68 Groundwater Monitoring

## **Quarterly Assessment, April – June 2014**

Well	Analyte	Result	MDL	PQL	MCL	Laboratory		Sample	Analytical
	7	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier	Qualifier	Number	Method <sup>c</sup>
SWMU 68									
OBS-MW1	Bicarbonate Alkalinity	183	0.725	1.00	NE			095733-022	SM 2320B
14-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095733-022	SM 2320B
	Bromide	0.383	0.067	0.200	NE			095733-016	EPA 9056
	Chloride	24.3	0.670	2.00	NE			095733-016	EPA 9056
	Fluoride	2.24	0.033	0.100	4.00			095733-016	EPA 9056
	Sulfate	83.0	1.33	4.00	NE			095733-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095733-029	EPA 9012
OBS-MW2	Bicarbonate Alkalinity	179	0.725	1.00	NE			095736-022	SM 2320B
15-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095736-022	SM 2320B
	Bromide	0.347	0.067	0.200	NE			095736-016	EPA 9056
	Chloride	23.0	0.670	2.00	NE			095736-016	EPA 9056
	Fluoride	2.36	0.033	0.100	4.00			095736-016	EPA 9056
	Sulfate	85.9	1.33	4.00	NE			095736-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095736-029	EPA 9056
OBS-MW3	Bicarbonate Alkalinity	181	0.725	1.00	NE			095741-022	SM 2320B
16-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095741-022	SM 2320B
	Bromide	0.370	0.067	0.200	NE			095741-016	EPA 9056
	Chloride	23.6	0.670	2.00	NE			095741-016	EPA 9056
	Fluoride	2.39	0.033	0.100	4.00			095741-016	EPA 9056
	Sulfate	86.1	1.33	4.00	NE			095741-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095741-029	EPA 9012
OBS-MW3 (Duplicate)	Bicarbonate Alkalinity	182	0.725	1.00	NE			095742-022	SM 2320B
16-Apr-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095742-022	SM 2320B
	Bromide	0.344	0.067	0.200	NE			095742-016	EPA 9056
	Chloride	23.9	0.670	2.00	NE			095742-016	EPA 9056
	Fluoride	2.39	0.033	0.100	4.00			095742-016	EPA 9056
	Sulfate	86.9	1.33	4.00	NE			095742-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095742-029	EPA 9012

#### **Table IV-7 (Concluded)**

# Summary of Alkalinity, Anion, and Total Cyanide Results SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, April – June 2014

#### Notes

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

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

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

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

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

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

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

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

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

**Bold** = Indicates that a result exceeds the MCL.

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter.

MW = Monitoring Well.

ND = Not detected (at MDL).

NE = Not established.
OBS = Old Burn Site.

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

SM = Standard Method.

SWMU = Solid Waste Management Unit.

Table IV-8
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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> 07-Apr-14	ND	0.004	0.012	NE	U		095725-020	EPA 314.0
<b>CCBA-MW2</b> 08-Apr-14	ND	0.004	0.012	NE	U		095730-020	EPA 314.0
CCBA-MW2 (Duplicate) 08-Apr-14	ND	0.004	0.012	NE	U		095731-020	EPA 314.0
SWMU 68	1	•	•		1			
<b>OBS-MW1</b> 14-Apr-14	ND	0.004	0.012	NE	U		095733-020	EPA 314.0
<b>OBS-MW2</b> 15-Apr-14	ND	0.004	0.012	NE	U		095736-020	EPA 314.0
<b>OBS-MW3</b> 16-Apr-14	ND	0.004	0.012	NE	U		095741-020	EPA 314.0
OBS-MW3 (Duplicate) 16-Apr-14	ND	0.004	0.012	NE	U		095742-020	EPA 314.0

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

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

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

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

#### Table IV-8 (Concluded)

#### **Summary of Perchlorate Results**

#### **SWMUs 8/58 and 68 Groundwater Monitoring**

#### Quarterly Assessment, April – June 2014

#### Notes (continued)

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

Standards (EPA, 2009).

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

mg/L = Milligrams per liter.

MW = Monitoring Well.

ND = Not detected (at MDL).

NE = Not established.
OBS = Old Burn Site.

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

method under routine laboratory operating conditions.

SWMU = Solid Waste Management Unit.

#### Table IV-9

### **Summary of Hexavalent Chromium Results**

#### **SWMU 68 Groundwater Monitoring**

#### **Quarterly Assessment, April – June 2014**

Well	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> 14-Apr-14	ND	0.003	0.010	NE	U		095733-014	EPA 7196A
<b>OBS-MW2</b> 15-Apr-14	ND	0.003	0.010	NE	U		095736-014	EPA 7196A
<b>OBS-MW3</b> 16-Apr-14	ND	0.003	0.010	NE	U		095741-014	EPA 7196A
OBS-MW3 (Duplicate) 16-Apr-14	ND	0.003	0.010	NE	U		095742-014	EPA 7196A

#### Notes

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

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

= 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, 3<sup>rd</sup> ed.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter. MW = Monitoring Well. ND = Not detected (at MDL). NE = Not established.

OBS

= Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-10
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, April – June 2014

\A/all	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
CCBA-MW1	Aluminum	0.0733	0.015	0.050	NE			095725-009	EPA 6020
07-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095725-009	EPA 6020
-	Arsenic	0.00179	0.0017	0.005	0.010	J		095725-009	EPA 6020
	Barium	0.00242	0.0006	0.002	2.00			095725-009	EPA 6020
	Beryllium	0.000414	0.0002	0.0005	0.004	J		095725-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095725-009	EPA 6020
	Calcium	48.5	0.060	0.200	NE			095725-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095725-009	EPA 6020
	Cobalt	0.000158	0.0001	0.001	NE	J		095725-009	EPA 6020
	Copper	0.000442	0.00035	0.001	NE	J		095725-009	EPA 6020
	Iron	0.147	0.033	0.100	NE			095725-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095725-009	EPA 6020
	Magnesium	9.57	0.010	0.030	NE		J	095725-009	EPA 6020
	Manganese	0.0044	0.001	0.005	NE	J		095725-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095725-009	EPA 7470
	Nickel	0.00165	0.0005	0.002	NE	J		095725-009	EPA 6020
	Potassium	4.35	0.080	0.300	NE		J	095725-009	EPA 6020
	Selenium	0.00227	0.0015	0.005	0.050	J		095725-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095725-009	EPA 6020
	Sodium	65.4	0.400	1.25	NE			095725-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095725-009	EPA 6020
	Uranium	0.00236	0.000067	0.0002	0.03			095725-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095725-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095725-009	EPA 6020

## Table IV-10 (Continued)

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

## **SWMUs 8/58 Groundwater Monitoring**

## Quarterly Assessment, April – June 2014

Well	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well		(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		095730-009	EPA 6020
08-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095730-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095730-009	EPA 6020
	Barium	0.0429	0.0006	0.002	2.00			095730-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095730-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095730-009	EPA 6020
	Calcium	80.1	0.300	1.00	NE			095730-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095730-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095730-009	EPA 6020
	Copper	0.000586	0.00035	0.001	NE	J	0.0038U	095730-009	EPA 6020
	Iron	0.132	0.033	0.100	NE			095730-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095730-009	EPA 6020
	Magnesium	14.1	0.010	0.030	NE		J	095730-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095730-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095730-009	EPA 7470
	Nickel	0.00156	0.0005	0.002	NE	J		095730-009	EPA 6020
	Potassium	1.19	0.080	0.300	NE		J	095730-009	EPA 6020
	Selenium	0.00409	0.0015	0.005	0.050	J		095730-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095730-009	EPA 6020
	Sodium	46.1	0.080	0.250	NE			095730-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095730-009	EPA 6020
	Uranium	0.00534	0.000067	0.0002	0.03			095730-009	EPA 6020
	Vanadium	0.00997	0.001	0.005	NE			095730-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095730-009	EPA 6020

## Table IV-10 (Continued)

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

## **SWMUs 8/58 Groundwater Monitoring**

## **Quarterly Assessment, April – June 2014**

Well	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		095731-009	EPA 6020
(Duplicate)	Antimony	ND	0.001	0.003	0.006	U		095731-009	EPA 6020
08-Apr-14	Arsenic	ND	0.0017	0.005	0.010	U		095731-009	EPA 6020
	Barium	0.0435	0.0006	0.002	2.00			095731-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095731-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095731-009	EPA 6020
	Calcium	75.5	0.300	1.00	NE			095731-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095731-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095731-009	EPA 6020
	Copper	0.000483	0.00035	0.001	NE	J	0.0038U	095731-009	EPA 6020
	Iron	0.130	0.033	0.100	NE			095731-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095731-009	EPA 6020
	Magnesium	14.7	0.010	0.030	NE		J	095731-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095731-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095731-009	EPA 7470
	Nickel	0.00169	0.0005	0.002	NE	J		095731-009	EPA 6020
	Potassium	1.22	0.080	0.300	NE		J	095731-009	EPA 6020
	Selenium	0.00414	0.0015	0.005	0.050	J		095731-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095731-009	EPA 6020
	Sodium	43.1	0.080	0.250	NE			095731-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095731-009	EPA 6020
	Uranium	0.00535	0.000067	0.0002	0.03			095731-009	EPA 6020
	Vanadium	0.00977	0.001	0.005	NE			095731-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U	-	095731-009	EPA 6020

#### **Table IV-10 (Concluded)**

## Summary of Unfiltered Total Metal Results SWMUs 8/58 Groundwater Monitoring Quarterly Assessment, April – June 2014

#### Notes

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

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

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

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.

#### <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.

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

Standards (EPA, 2009).

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

mg/L = Milligrams per liter.

MW = Monitoring Well.

ND = Not detected (at MDL).

NE = Not established.

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

SWMU = Solid Waste Management Unit.

Table IV-11
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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	Quantito	095733-009	EPA 6020
14-Apr-14	Antimony	ND	0.001	0.003	0.006	Ü		095733-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	Ü		095733-009	EPA 6020
	Barium	0.0178	0.0006	0.002	2.00			095733-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095733-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095733-009	EPA 6020
	Calcium	83.4	0.300	1.00	NE			095733-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095733-009	EPA 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		095733-009	EPA 6020
	Copper	0.000853	0.00035	0.001	NE	J		095733-009	EPA 6020
	Iron	0.170	0.033	0.100	NE			095733-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095733-009	EPA 6020
	Magnesium	17.0	0.010	0.030	NE			095733-009	EPA 6020
	Manganese	0.00101	0.001	0.005	NE	J		095733-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095733-009	EPA 7470
	Nickel	0.00178	0.0005	0.002	NE	J		095733-009	EPA 6020
	Potassium	1.71	0.080	0.300	NE			095733-009	EPA 6020
	Selenium	0.00315	0.0015	0.005	0.050	J		095733-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095733-009	EPA 6020
	Sodium	21.6	0.080	0.250	NE			095733-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095733-009	EPA 6020
	Uranium	0.0107	0.000067	0.0002	0.03			095733-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095733-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095733-009	EPA 6020

# Table IV-11 (Continued)

# **Summary of Unfiltered Total Metal Results**

# **SWMU 68 Groundwater Monitoring**

Well	Analyte	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
	7	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		095736-009	EPA 6020
15-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095736-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095736-009	EPA 6020
	Barium	0.0191	0.0006	0.002	2.00			095736-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095736-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095736-009	EPA 6020
	Calcium	78.2	0.300	1.00	NE			095736-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095736-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095736-009	EPA 6020
	Copper	0.000351	0.00035	0.001	NE	J		095736-009	EPA 6020
	Iron	0.161	0.033	0.100	NE			095736-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095736-009	EPA 6020
	Magnesium	16.4	0.010	0.030	NE			095736-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095736-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095736-009	EPA 7470
	Nickel	0.00162	0.0005	0.002	NE	J		095736-009	EPA 6020
	Potassium	1.65	0.080	0.300	NE			095736-009	EPA 6020
	Selenium	0.0031	0.0015	0.005	0.050	J		095736-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095736-009	EPA 6020
	Sodium	22.2	0.080	0.250	NE			095736-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095736-009	EPA 6020
	Uranium	0.0141	0.000067	0.0002	0.03			095736-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095736-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095736-009	EPA 6020

# Table IV-11 (Continued)

# **Summary of Unfiltered Total Metal Results**

# **SWMU 68 Groundwater Monitoring**

Well	Analyte	Result	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	A luna ia una	(mg/L) ND	(mg/L)	(mg/L)	(mg/L) NE		Qualifier		EPA 6020
	Aluminum	*	0.015	0.050		U		095741-009	
16-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095741-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095741-009	EPA 6020
	Barium	0.0265	0.0006	0.002	2.00			095741-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095741-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095741-009	EPA 6020
	Calcium	76.9	0.300	1.00	NE			095741-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095741-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095741-009	EPA 6020
	Copper	0.000375	0.00035	0.001	NE	J	0.0029U	095741-009	EPA 6020
	Iron	0.156	0.033	0.100	NE			095741-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095741-009	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			095741-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095741-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095741-009	EPA 7470
	Nickel	0.00164	0.0005	0.002	NE	J		095741-009	EPA 6020
	Potassium	1.71	0.080	0.300	NE			095741-009	EPA 6020
	Selenium	0.00316	0.0015	0.005	0.050	J		095741-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095741-009	EPA 6020
	Sodium	21.5	0.080	0.250	NE			095741-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095741-009	EPA 6020
	Uranium	0.0129	0.000067	0.0002	0.03			095741-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095741-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095741-009	EPA 6020

# Table IV-11 (Continued)

# **Summary of Unfiltered Total Metal Results**

# **SWMU 68 Groundwater Monitoring**

M/all	Amalasta	Result	MDL	PQL	MCL	Laboratory	Validation	Sample	Analytical
Well	Analyte	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Qualifier <sup>a</sup>	Qualifier <sup>b</sup>	Number	Method <sup>c</sup>
OBS-MW3 (Duplicate)	Aluminum	ND	0.015	0.050	NE	U		095742-009	EPA 6020
16-Apr-14	Antimony	ND	0.001	0.003	0.006	U		095742-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095742-009	EPA 6020
	Barium	0.0264	0.0006	0.002	2.00			095742-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095742-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095742-009	EPA 6020
	Calcium	75.2	0.300	1.00	NE			095742-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095742-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095742-009	EPA 6020
	Copper	0.000384	0.00035	0.001	NE	J	0.0029U	095742-009	EPA 6020
	Iron	0.157	0.033	0.100	NE			095742-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095742-009	EPA 6020
	Magnesium	16.8	0.010	0.030	NE			095742-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095742-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095742-009	EPA 7470
	Nickel	0.00157	0.0005	0.002	NE	J		095742-009	EPA 6020
	Potassium	1.67	0.080	0.300	NE			095742-009	EPA 6020
	Selenium	0.00334	0.0015	0.005	0.050	J		095742-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095742-009	EPA 6020
	Sodium	22.3	0.080	0.250	NE			095742-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095742-009	EPA 6020
	Uranium	0.0129	0.000067	0.0002	0.03			095742-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095742-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095742-009	EPA 6020

## **Table IV-11 (Concluded)**

# Summary of Unfiltered Total Metal Results SWMU 68 Groundwater Monitoring

# **Quarterly Assessment, April – June 2014**

#### Notes

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

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

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

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.

#### <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.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter. MW = Monitoring Well.

ND = Not detected (at MDL).

NE = Not established.

OBS = Old Burn Site.

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

method under routine laboratory operating conditions.

SWMU = Solid Waste Management Unit.

Table IV-12
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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	Calcium	48.2	0.060	0.200	NE			095725-017	EPA 6020
07-Apr-14	Magnesium	10.5	0.050	0.150	NE			095725-017	EPA 6020
	Potassium	4.34	0.080	0.300	NE	N		095725-017	EPA 6020
	Sodium	61.1	0.400	1.25	NE			095725-017	EPA 6020
CCBA-MW2	Calcium	75.5	0.300	1.00	NE			095730-017	EPA 6020
08-Apr-14	Magnesium	15.5	0.050	0.150	NE			095730-017	EPA 6020
	Potassium	1.22	0.080	0.300	NE	N		095730-017	EPA 6020
	Sodium	48.2	0.080	0.250	NE			095730-017	EPA 6020
CCBA-MW2 (Duplicate)	Calcium	78.4	0.300	1.00	NE			095731-017	EPA 6020
08-Apr-14	Magnesium	16.5	0.050	0.150	NE			095731-017	EPA 6020
	Potassium	1.29	0.080	0.300	NE	N		095731-017	EPA 6020
I	Sodium	49.2	0.080	0.250	NE			095731-017	EPA 6020
SWMU 68									
OBS-MW1	Calcium	78.2	0.300	1.00	NE			095733-017	EPA 6020
14-Apr-14	Magnesium	16.3	0.010	0.030	NE			095733-017	EPA 6020
	Potassium	1.89	0.080	0.300	NE			095733-017	EPA 6020
	Sodium	21.5	0.080	0.250	NE			095733-017	EPA 6020
OBS-MW2	Calcium	77.5	0.300	1.00	NE			095736-017	EPA 6020
15-Apr-14	Magnesium	15.0	0.010	0.030	NE			095736-017	EPA 6020
-	Potassium	1.82	0.080	0.300	NE			095736-017	EPA 6020
	Sodium	21.5	0.080	0.250	NE			095736-017	EPA 6020
OBS-MW3	Calcium	76.9	0.300	1.00	NE			095741-017	EPA 6020
16-Apr-14	Magnesium	16.2	0.010	0.030	NE			095741-017	EPA 6020
	Potassium	1.82	0.080	0.300	NE			095741-017	EPA 6020
	Sodium	21.3	0.080	0.250	NE			095741-017	EPA 6020
OBS-MW3 (Duplicate)	Calcium	80.7	0.300	1.00	NE			095742-017	EPA 6020
16-Apr-14	Magnesium	16.1	0.010	0.030	NE			095742-017	EPA 6020
•	Potassium	1.91	0.080	0.300	NE			095742-017	EPA 6020
1	Sodium	22.6	0.080	0.250	NE			095742-017	EPA 6020

#### Table IV-12 (Concluded)

# **Summary of Filtered Cation Results**

# SWMUs 8/58 and 68 Groundwater Monitoring

# Quarterly Assessment, April – June 2014

#### Notes

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

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

N = Results associated with a spike analysis that was outside control limits.

#### <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.

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

Drinking Water Standards (EPA, 2009).

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

mg/L = Milligrams per liter.

MW = Monitoring Well.

NE = Not established.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-13
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	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	7.72 ± 15.7	24.5	12.0	NE	U	BD	095725-033	EPA 901.1
07-Apr-14	Cesium-137	2.57 ± 2.51	3.52	1.70	NE	U	BD	095725-033	EPA 901.1
	Cobalt-60	-1.22 ± 2.11	3.54	1.68	NE	U	BD	095725-033	EPA 901.1
	Potassium-40	-6.16 ± 36.7	51.3	24.7	NE	U	BD	095725-033	EPA 901.1
	Gross Alpha	3.48	NA	NA	15 pCi/L	NA	None	095725-034	EPA 900.0
	Gross Beta	5.06 ± 1.12	1.01	0.488	4mrem/yr		J	095725-034	EPA 900.0
CCBA-MW2	Americium-241	-57.8 ± 27.4	8.01	3.95	NE	U	R	095730-033	EPA 901.1
08-Apr-14	Cesium-137	-2.73 ± 3.65	4.80	2.32	NE	U	BD	095730-033	EPA 901.1
	Cobalt-60	$0.494 \pm 2.99$	5.25	2.50	NE	U	BD	095730-033	EPA 901.1
	Potassium-40	-18.5 ± 52.6	59.1	28.3	NE	U	BD	095730-033	EPA 901.1
	Gross Alpha	4.55	NA	NA	15 pCi/L	NA	None	095730-034	EPA 900.0
	Gross Beta	$3.17 \pm 0.927$	0.992	0.468	4mrem/yr			095730-034	EPA 900.0
CCBA-MW2 (Duplicate)	Americium-241	0.491 ± 18.4	29.4	14.4	NE	U	BD	095731-033	EPA 901.1
08-Apr-14	Cesium-137	-0.13 ± 2.43	3.69	1.77	NE	U	BD	095731-033	EPA 901.1
	Cobalt-60	0.956 ± 2.48	4.40	2.08	NE	U	BD	095731-033	EPA 901.1
	Potassium-40	-37.7 ± 46.9	49.5	23.5	NE	U	BD	095731-033	EPA 901.1
	Gross Alpha	8.82	NA	NA	15 pCi/L	NA	None	095731-034	EPA 900.0
	Gross Beta	$2.60 \pm 0.882$	0.993	0.464	4mrem/yr		J	095731-034	EPA 900.0

# **Table IV-13 (Continued)**

# Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results SWMUs 8/58 and 68 Groundwater Monitoring

Well	Analyte	Activity <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	14.7 ± 11.2	14.8	4.77	NE	U	BD	095733-033	EPA 901.1
14-Apr-14	Cesium-137	-2.74 ± 4.03	5.38	2.61	NE	U	BD	095733-033	EPA 901.1
	Cobalt-60	0.336 ± 3.31	5.78	2.76	NE	U	BD	095733-033	EPA 901.1
	Potassium-40	23.8 ± 60.1	71.8	34.6	NE	U	BD	095733-033	EPA 901.1
	Gross Alpha	-2.77	NA	NA	15 pCi/L	NA	None	095733-034	EPA 900.0
	Gross Beta	1.52 ± 0.931	0.954	0.453	4 mrem/yr		J	095733-034	EPA 900.0
	Uranium-233/234	16.9 ± 2.19	0.0959	0.0415	NE			095733-035	HASL-300
	Uranium-235/236	0.366 ± 0.105	0.0686	0.0263	NE			095733-035	HASL-300
	Uranium-238	3.50 ± 0.507	0.0796	0.0333	NE			095733-035	HASL-300
OBS-MW2	Americium-241	1.54 ± 12.9	22.2	10.9	NE	U	BD	095736-033	EPA 901.1
15-Apr-14	Cesium-137	$0.653 \pm 3.89$	5.93	2.86	NE	U	BD	095736-033	EPA 901.1
	Cobalt-60	-0.197 ± 4.24	6.39	3.02	NE	U	BD	095736-033	EPA 901.1
	Potassium-40	-42.4 ± 55.5	72.8	34.6	NE	U	BD	095736-033	EPA 901.1
	Gross Alpha	13.74	NA	NA	15 pCi/L	NA	None	095736-034	EPA 900.0
	Gross Beta	6.05 ± 1.41	1.14	0.546	4 mrem/yr		7	095736-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.63	0.0487	0.0211	NE			095736-035	HASL-300
	Uranium-235/236	0.381 ± 0.0813	0.0349	0.0134	NE			095736-035	HASL-300
	Uranium-238	4.28 ± 0.558	0.0404	0.0169	NE			095736-035	HASL-300
OBS-MW3	Americium-241	-1.77 ± 19.5	29.2	14.3	NE	U	BD	095741-033	EPA 901.1
16-Apr-14	Cesium-137	1.22 ± 2.91	4.35	2.10	NE	U	BD	095741-033	EPA 901.1
	Cobalt-60	0.0547 ± 2.69	4.68	2.23	NE	U	BD	095741-033	EPA 901.1
	Potassium-40	13.2 ± 46.5	59.1	28.4	NE	U	BD	095741-033	EPA 901.1
	Gross Alpha	10.16	NA	NA	15 pCi/L	NA	None	095741-034	EPA 900.0
	Gross Beta	4.07 ± 1.33	0.986	0.469	4 mrem/yr		J	095741-034	EPA 900.0
	Uranium-233/234	20.5 ± 2.56	0.0549	0.0237	NE			095741-035	HASL-300
	Uranium-235/236	0.371 ± 0.0841	0.0393	0.0151	NE			095741-035	HASL-300
	Uranium-238	4.07 ± 0.541	0.0455	0.0191	NE			095741-035	HASL-300

# **Table IV-13 (Continued)**

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

# SWMUs 8/58 and 68 Groundwater Monitoring

# Quarterly Assessment, April - June 2014

Well	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 (Duplicate)	Americium-241	6.06 ± 15.1	24.2	11.9	NE	U	BD	095742-033	EPA 901.1
16-Apr-14	Cesium-137	-0.369 ± 2.37	3.45	1.66	NE	U	BD	095742-033	EPA 901.1
	Cobalt-60	-0.252 ± 2.62	4.01	1.91	NE	U	BD	095742-033	EPA 901.1
	Potassium-40	-40 ± 39.4	45.4	21.7	NE	U	BD	095742-033	EPA 901.1
	Gross Alpha	7.03	NA	NA	15 pCi/L	NA	None	095742-034	EPA 900.0
	Gross Beta	5.16 ± 1.29	1.32	0.639	4 mrem/yr		J	095742-034	EPA 900.0
	Uranium-233/234	$20.7 \pm 2.62$	0.0607	0.0263	NE			095742-035	HASL-300
	Uranium-235/236	$0.355 \pm 0.0858$	0.0434	0.0167	NE			095742-035	HASL-300
	Uranium-238	4.02 ± 0.545	0.0504	0.0211	NE			095742-035	HASL-300

#### Notes

<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 Code of Federal Regulations 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.

NA = Not applicable.

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

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

NA = Not applicable.

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

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

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.

# Table IV-13 (Concluded)

# Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results SWMUs 8/58 and 68 Groundwater Monitoring

# Quarterly Assessment, April - June 2014

#### Notes (continued)

CCBA = Coyote Canyon Blast Area.

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 Code of Federal Regulations Parts 9, 141, and 142, Table I-4)

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

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

critical level.

mrem/yr = Millirem per year. MW = Monitoring Well.

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

NE = Not established.
OBS = Old Burn Site.
pCi/L = Picocuries per liter.

SWMU = Solid Waste Management Unit.

Table IV-14 **Summary of Constituents Detected above Established MCLs SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessments through June 2014** 

Well	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	<b>5.36</b> mg/L	4.0 mg/L			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	<b>4.94</b> mg/L	4.0 mg/L			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	<b>4.94</b> mg/L	4.0 mg/L			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	<b>4.93</b> mg/L	4.0 mg/L			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	<b>5.03</b> mg/L	4.0 mg/L			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	<b>5.00</b> mg/L	4.0 mg/L			092616-016	EPA 9056
CCBA-MW1	22-Oct-12	Fluoride	<b>5.32</b> mg/L	4.0 mg/L			093013-016	EPA 9056
CCBA-MW2	15-Jan-13	Benzo(a)pyrene	<b>0.640</b> μg/L	0.440 µg/L	J		093336-002	EPA 8270C
CCBA-MW1	16-Jan-13	Fluoride	<b>4.97</b> mg/L	4.0 mg/L			093341-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-13	Fluoride	<b>5.00</b> mg/L	4.0 mg/L			093342-016	EPA 9056
CCBA-MW1	24-Apr-13	Fluoride	<b>4.57</b> mg/L	4.0 mg/L			093863-016	EPA 9056
CCBA-MW1	16-Jul-13	Fluoride	<b>4.78</b> mg/L	4.0 mg/L			094376-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-13	Fluoride	<b>4.82</b> mg/L	4.0 mg/L			094377-016	EPA 9056
CCBA-MW1	10-Oct-13	Fluoride	<b>4.93</b> mg/L	4.0 mg/L			094774-016	EPA 9056
CCBA-MW1	27-Jan-14	Fluoride	<b>4.68</b> mg/L	4.0 mg/L			095213-016	EPA 9056
CCBA-MW1 (Duplicate)	27-Jan-14	Fluoride	<b>4.74</b> mg/L	4.0 mg/L			095214-016	EPA 9056
CCBA-MW1	07-Apr-14	Fluoride	<b>4.97</b> mg/L	4.0 mg/L			095725-016	EPA 9056

#### Notes

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

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

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

#### <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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

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-14 (Concluded)**

# Summary of Constituents Detected above Established MCLs SWMUs 8/58 and 68 Groundwater Monitoring

# **Quarterly Assessments through June 2014**

#### Notes (continued)

**Bold** = Indicates that a result exceeds the MCL.

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

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

Standards (EPA, 2009).

mg/L = Milligrams per liter. MW = Monitoring Well.

SWMU = Solid Waste Management Unit.

Table IV-15
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	$RPD^a$
	mg/L unless other	erwise noted	
CCBA-MW1			
Nitrate plus Nitrite	3.62	3.89	7
Bicarbonate Alkalinity	178	178	< 1
Bromide	0.554	0.569	3
Chloride	38.6	37.8	2
Fluoride	1.59	1.63	2
Sulfate	97.7	95.8	2
Barium	0.0429	0.0435	1
Calcium	80.1	75.5	6
Iron	0.132	0.130	2
Magnesium	14.1	14.7	4
Nickel	0.00156	0.00169	8
Potassium	1.19	1.22	2
Selenium	0.00409	0.00414	1
Sodium	46.1	43.1	7
Uranium	0.00534	0.00535	< 1
Vanadium	0.00997	0.00977	2
Filtered Calcium	75.5	78.4	4
Filtered Magnesium	15.5	16.5	6
Filtered Potassium	1.22	1.29	6
Filtered Sodium	48.2	49.2	2
OBS-MW1			
Nitrate plus Nitrite	1.92	1.89	2
Bicarbonate Alkalinity	181	182	1
Bromide	0.370	0.344	7
Chloride	23.6	23.9	1
Fluoride	2.39	2.39	< 1
Sulfate	86.1	86.9	1
Barium	0.0265	0.0264	< 1
Calcium	76.9	75.2	2
Iron	0.156	0.157	1
Magnesium	15.5	16.8	8
Nickel	0.00164	0.00157	4
Potassium	1.71	1.67	2
Selenium	0.00316	0.00334	6

# Table IV-15 (Concluded)

# **Summary of Duplicate Samples**

# SWMUs 8/58 and 68 Groundwater Monitoring

# Quarterly Assessment, April - June 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup>
	mg/L unless other	rwise noted	
OBS-MW1	-		
Sodium	21.5	22.3	4
Uranium	0.0129	0.0129	< 1
Filtered Calcium	76.9	80.7	5
Filtered Magnesium	16.2	16.1	1
Filtered Potassium	1.82	1.91	5
Filtered Sodium	21.3	22.6	6

#### **Notes**

#### <sup>a</sup>RPD

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

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

where:  $R_1$  = analysis result.

R<sub>2</sub> = duplicate analysis result.

CCBA = Coyote Canyon Blast Area.

mg/L = Milligrams per liter.

MW = Monitoring Well.

OBS = Old Burn Site.

SWMU = Solid Waste Management Unit.

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

Project Name: SWMU 8/58	Project No.: 146422.10	.11.01
Well I.D.: CCBA-MW 1	Date: 04/07/14	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 79'

Depth to	Time 24	Vol.	Temp	SC	ORP	рН	Turbidity	DO	Comments
Water	hr	(L/gal)	(°C)	(μS/cm)	(mV)		(NTU)	(%)	m. I
(ft)	0 -			-1 0 i					My/L
48.08			57	ART					
49.23		5	14.83	499.9	227.1	6.46	2.60	17.4	1.76
49.39	0844	10	15.18	476.8	1.816	6.55	7,63	27.6	2.15
49.49	0853	15	15.33	455.8	229.4	6.64	4.03	30.1	3.01
49.52	0902	20	15.39	453.7	220.8	6.67	2.26	31.8	3.17
49.54	09/2	25	15.55	451.0	200.3	6.70	1164	32.6	3.25
49.55	0918	28	15.54	450.9	196.6	6.70	1-33	32.6	3.26
49.56	0922	30	15.62	450.3	195.0	6.71	1.55	33.3	3.31
49.56	0926	32	15.60	452.5	195.3	6.70	1.53	33.2	3.29
49.55	0930	34	15.63	450.4	195.4	6.70	1.33	32.5	3.22
49.55		36	15.68	452.5	194.3	6.70	1-19	32.4	3.21
	0935	/	SAN	pline	L -				
				1					
						91			
								-	- 4.00 gals DI water
									purged from tubing 0825

Project Name: SWMU 8/58	Project No.: 146422.10	.11.01
Well I.D.: CCBA-MW 2	Date: 04/08/14	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 117'

Depth to	Time 24	Vol.	Temp	SC	ORP	рН	Turbidity	DO	Comments
Water	hr	(L(gal)	(°C)	(μS/cm)	(mV)		(NTU)	(%)	DOmg/2
(ft)	40.00			201					DOM9/7
71.82		_	571	7R+ -					
72.29		5	16.11	525.3	228.3	7.62	0.37	59.1	5.82
72.30	0836	10		527.8	203.9	7-67	0.38	59.3	5.81
72.30	0846	15	16.46	531.0	193.6	7.64	0.32	62.7	6.11
72.30		20		533.3	184.0	7.63	0.25	64.2	6.25
72.31	0905	25	16.46	533,2	184.1	7.63	0.24	64.6	6.30
72.31	0911	28	16.36	532.4	181.4	7.63	0.18	64.6	6.32
72.31	0915	30	14.26	531.6	184.4	7.63	0.21	64.9	6.35
72.32	0919	32	16.23	531.3	184.4	7.63	0.25	64.9	6.36
72.32	0922	34	14.19	530.9	184.0	7.63	0.33	64.8	6.37
72.32	0926	36		53111	184.3	7.63	0.23	64.9	6.37
	6927	/	SH	mpli	·na-				
				7-1-	0				
									*
								~	4.00 gals DI water
									14.00 gals DI water purged from tubing 0817
									0817

GROUNDWATER	SAMPLE COL	LECTION F	IELD EQUIP	MENT CHEC	K LOG I	Page 1 of 2
SNL/NM Project Name: SWM	U 8/58		SNL/NM Project No. 146422.10.11.01			
Calibrations done by: R Lynch	1		Date 4/7/14			
Make & Model: YSI EXO1			7	7		
YS1 6820 Sonde (S/N) with DO	O, Ec, pH, ORP, and	temperature prob	bes: 13C101167			_
YSI 650 MDS (S/N): NA						_
		рН С	alibration			
pH Calibrated to (std): 7,00			pH sloped to (	std): 10.00		
Reference value:	4.	00		7.00		0.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0701	4.01	16.0	7.00	16.0	10.00	16.1
2. Time: //07	41.02	16.7	7.00	16.7	10.01	16.7
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15 4/15			
		SC C	alibration			
Reference Value: 1225 uS			Standard Lot	No. 3AE221		
	Value	Temp	Expiration Da	te:	5/15	
1. Time: 0703	1225	16.5				
2. Time: 1109	1224	16.7				
3. Time:						
4. Time:						
		ORP (	Calibration			
Reference Value:	220 mV		Standard Lot No. 4AA010			
	Value	Temp	Expiration Da	te	7/14	
1. Time: 0702	2200	16.1				
2. Time: 1168	200.1	16.4				
3. Time:						
4. Time:						
		DO C	Calibration			
Calibration Value:	81% air satura	tion @ 5200 ft.	Atmospheric Pressure in Hg			
1. Time: 0658	81.6	,	20	1.37		
2. Time // 0 C	81.5	7		139		
3. Time:						
4 Time						

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

SNL/NM Project Name: SWI	MU 8/58	Project No.:	Project No.: 146422.10.11.01			
Calibration done by: R Lynvh		Date: 4/-	Date: 4/7/14			
	T	URBIDIMETER	BIDIMETER			
Make & Model: HACH 210	0()P HACH 2100Q	Serial No. S.	N 10060C003010			
Reference Value	2410	20	100	800		
Standard Lot No.	0161	0167	0168	0161		
1. Time 08/2	10.3	19.8	102	794		
2. Time 0950	10.1	19.6	104	797		
3. Time						
4. Time						
Comments:						
7						

4. Time:

#### GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2 SNL/NM Project No. 146422.10.11.01 SNL/NM Project Name: SWMU 8/58 Calibrations done by: R Lynch Date Make & Model: YSI EXO1 YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167 YSI 650 MDS (S/N): NA pH Calibration pH sloped to (std): 10.00 pH Calibrated to (std): 7.00 7.00 10.00 Reference value: 4.00 Value Temp Value Temp Value Temp 0.00 7.00 17.8 7.8 1. Time .01 2. Time 4.03 7,00 18,1 18.1 3. Time 4. Time: Standard lot no. 3AE725 3AD357 3AD782 5/15 4/15 Expiration date 4/15 SC Calibration Reference Value: 1225 uS 3AE221 Standard Lot No. Value Temp Expiration Date: 5/15 17.8 1. Time: 2. Time 3. Time: 4. Time: **ORP** Calibration Standard Lot No. 4AA010 220 mV Reference Value: Temp Expiration Date 7/14 Value 1. Time 2. Time 3. Time 4. Time: DO Calibration 81% air saturation @ 5200 ft. Atmospheric Pressure in Hg Calibration Value: 1. Time: 2. Time: 3. Time

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

	VMU 8/58	Project No.: 146422.10.11.01  Date: 4/8/14			
Calibration done by: R Lynvi	n				
	TU	RBIDIMETER			
Make & Model: HACH 21	00P HACH 2100Q	Serial No. S/	N 10060C003010		
Reference Value	p-+ 10	20	100	800	
Standard Lot No.	0161	0167	0168	0161	
1. Time 0805	10.2	19.6	99.7	801	
2. Time 0944	10.4	19.9	98.9	805	
3. Time					
4. Time					

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

Project Name: SWMU 8/58	Monitoring Well ID # : _C	CCBA-MW1		Date: 4-7-14
The following equipment was	decontaminated at complet	tion of sampling a	ctivities in accordance with FC	DP-05-03
Pump and Tubing Bundle ID #: 1806-586	_ \	Water Level Indicator ID #: 210269		
Personnel Performing Decontamination:  William Gibson Print Name:  Robert Lynch Print Name:  Initial:	F F	Personnel Perform William Gibson Print Name: Robert Lynch Print Name:	ming Decontamination:  Init	nal:
	Condition of	f Equipment		
Pump: Excellent Tubi	ng Bundle: Good		Water Level Indicator: Go	od
	List of Decontam	nination Materials		
Distilled on Dooning of Ginele			$HNO_3$	
Distilled or Deonized (circle	one)	Grade:	Reagent	
Source: Culligan		UN #:	2031	
Source: Culligan  Lot Number: 040314		Manufacturer:	AROC	
		Lot Number:	A0305629	

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

Project Name: SWMU 8/58 Monitoring Well ID	#: CCBA-MW2		Date: 4/8/14		
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03					
Pump and Tubing Bundle ID #: 1806-586	Water Level Indic	Water Level Indicator ID #: 210269			
Personnel Performing Decontamination:		Personnel Performing Decontamination:			
Robert Lynch Print Name:  Initial:	Robert Lynch		dial.		
Nin	Print Name: Initial:				
Alfred Santillanes Print Name: Initial:	Alfred Santillanes Print Name:		tial:		
Trint Name.	Trint Name.	ш	tidi.		
Condit	ion of Equipment				
Pump: Excellent Tubing Bundle: Good		Water Level Indicator: Go	od		
List of Dec	ontamination Materials				
Discussion of Civil and	HNO <sub>3</sub>				
Distilled or Deonized (circle one)	Grade:	Reagent			
Source: Culligan	UN #:	2031			
Lot Number: 040314	Manufacturer:	AROC			
	Lot Number:	A0305629			

Groundwater Monitoring Waste Generation Log

Waste Generator	William Gibson Phone:	239-7367 project l	eader: Clinton Lum
Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW1-040714-01	SWMU-CCBA-MW1-040714-02	SWMU-040714
Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-	CoC # 615424	CoC # 615424	CoC # 615424
Fraction	Sample # 095725	Sample # 095725	Sample # 095725
Accumulation Date	Start: 04-07-14 Full: 04-07-14	Start: 04-07-14 Full: 04-07-14	Start: 04-07-14 Full: 04-07-14
Date Waste Moved to Accumulation Area	04-07-14	04-07-14	04-07-14
Accumulation Area Name	9925	9925	9925
Comments:			

**Groundwater Monitoring Waste Generation Log** 

Waste Generator	William Gibson Phone:	: 239-7367 project l	eader: Clinton Lum
Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW2-040814-01	SWMU-CCBA-MW2-040814-02	SWMU-040814
Type (Hazardous or Non- Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 160 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-	CoC # 615426	CoC # 615426	CoC # 615426
Fraction	Sample # 095730, 095731	Sample # 095730, 095731	Sample # 095730, 095731
Accumulation Date	Start: 04/08/14 Full: 04/08/14	Start: 04/08/14 Full: 04/08/14	Start: 04/08/14 Full: 04/08/14
Date Waste Moved to Accumulation Area	04/08/14	04/08/14	04/08/14
Accumulation Area Name	9925	9925	9925
Comments:			

# TAILGATE SAFETY MEETING FORM

tivities: GROUNDWATER MONITORING AND SAM	1PLING fety concerns. The buddy system will be used when needed.)
of the enterthing and all selections of the three tests and and a selection of the selectio	tely concerns. The buddy system will be used when needed.)
eather Conditions: mp: <u>56,8</u> °F Wind Speed: <u>&amp;</u> MPH	Humidity: 27.1 % Wind Chill NA °F
emicals Used: Acids in sample containers, standaner:	ard solutions, Hach ACCU-VAC ampules
Safety T	opics Presented
Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	Re aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
Wear safety boots.	
Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	☑ No eating or drinking at sampling counter.
Be aware of chemical hazards.	⊠ Be aware of biohazards (snakes, spiders, etc.)
Wear nitrile or latex gloves when sampling.	
Wear chemical safety goggles.	X Avoid spilling purge / decon water.
Robert Lynch Printed Name  William Gibson Printed Name	Attendees Signature Signature William Jaily Signature
Printed Name	Signature
Printed Name	Signature

# TAILGATE SAFETY MEETING FORM

	•
Dept: 4142 Well Location: CCBA - MW	2 Date: 4/8/14 Time: 0800
Activities: GROUNDWATER MONITORING AND SAM  (Anyone has the right to cease field activities for sa	MPLING fety concerns. The buddy system will be used when needed.)
Weather Conditions: Temp: <u>62.6</u> °F Wind Speed: <u> </u>	Humidity: 21.8% Wind Chill MP°F
Chemicals Used: Acids in sample containers, standa Other:	ard solutions, Hach ACCU-VAC ampules
Safety 7	Copics Presented
XI Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	x  Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
X Wear safety boots.	■ Be aware of electrical hazards
xl Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.
⊠ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	x No eating or drinking at sampling counter.
X Be aware of chemical hazards.	☐ Be aware of biohazards (snakes, spiders, etc.)
XI Wear chemical safety goggles.	x Avoid spilling purge / decon water.
Printed Name  Hospital/Clinic: Sandia Medical Clinic Phone:  Rober T Lynch  Printed Name  Life San TICLANCS  Printed Name  Printed Name	Attendees Signature Signature Signature Signature Signature Signature
Printed Name Printed Name	Signature

Project Name: SWMU 68	Project No.: 146422.10	).11.01
Well I.D.: OBS-MW 1	Date: 4/14/14	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 153'

Depth to	Time 24	Vol.	Temp	SC	ORP	рН	Turbidity	DO	Comments
Water	hr	(Legal)	(°C)	(μS/cm)	(mV)		(NTU)	(%)	DOmg/L
72.28	1000		SIT	201					9/1
72,32	0820	5	15,59		-223.9	7.52	1.39	38.3	3.80
72.34	0849	10	15.85		-225.0				3.85
							1.43	39.0	3.72
72.33	0858	15	15.91		-219.9		0.83	37.7	
72.33	0707	20		474.1	-211.2		0.39	37.5	3.70
72.33		25		472.7		7.54		37.2	3-69
72.33	12-15-1	30		468.8	-206.5		0.33	-	3.68
72.33		32	14.99		-202.9		0 33		3.69
72.32		34	14.83		-203.8		0.32		3.67
72.32	0943	36	14.56	462.2	-199.9	7.54	0.31	36.4	3.7/
	0944		SAM	pling					
			/	0					
- 1									
								-	-4,00 gals, DIwater
									-4:00 gals. DIwater purged from tubing 0829
									0829

Project Name: SWMU 68	Project No.: 146422.10.11.01				
Well I.D.: OBS-MW 2	Date: 04/15/14				
Well Condition:	Weather Condition:				
Method: Portable pump X	Dedicated pump	Pump depth: 252'			

Depth to Water	Time 24	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	рН	Turbidity (NTU)	DO (%)	Comments
(ft)	(855)		20 00						Wmg/L
174.78	0800	_	51	ART-					
175.93	0816	5	16.20	464.4	242.3	7.31	0.27	37.5	3.68
175.77		5	16.30	465.6	221.1	7.46	0.23	37.0	3.62
175.77		15	16.10	463.4	211.1	7.49	0.17	36.6	3.60
175.78		20	16.14	464.0	203.3	7.51	0.31		3.57
175,79	0852	25	16.17	464.2	197.5	7.52	0.19	36.2	3.55
175.79		30	16.13	463.9	193.2	7.52	0.18	36.1	3.55
175,79		32	16.13	463.5	191.7	7.52	0.18	36.1	3.56
175.79	0908	34	16.15	464.0	190.3	7.52	0.20	36.2	3.56
175.79		36	16.14	464.0	189.7	7.50	0.19	36.2	3.55
	0913		SAY	npline	h —				
				/ .	Ф				
	*/								
								1	4.00 gals DI Water
									ourged from tubing
									4.00 gals DI water purged from tubing 0808

Project Name: SWMU 68	Project No.: 146422.10.11.01			
Well I.D.: OBS-MW 3	Date: 04/16/14			
Well Condition:	Weather Condition:			
Method: Portable pump X	Dedicated pump	Pump depth: 208'		

Depth to	Time 24	Vol.	Temp	SC	ORP	рН	Turbidity	DO	Comments
Water	hr	(Legal)	(°C)	(μS/cm)	(mV)		(NTU)	(%)	00.11
(ft)	0		- 1	100 0					L mg/L
69.43		_	5		_				
73.88	0810	5	16.15	465.0	234.7	7.52	0.88		
75.82	08/8	10	16.20	465.8	225.5	7.55	0.66	46.8	
76.96	0826	15	16.27	466.4	7.710	7.55	0.62		4.61
77.61	0835	20	16.37	467.5	211.2	7.55	0.58	46.4	
77.98	0844	25	16.44		206.2	7.56	0.39	46.7	4.55
78.08	0853	30	16.52	469.3	202.7	756	0.25	46.4	
	0854	32	16.58		199.8	7.56	0.27	46.7	4.54
78.11	0900	34	16.64		198.8		0.25	46.7	4.54
	0903	36	16.70	471.0	197.7	7.56	0.24	46.6	4.52
	0904	/	SA	mplin	102-				<b>→</b>
				7	0				
								^	4.00 gals DI water
									ourged from tubing
									9.00 gals DI water purged from tubing 0801

GROUNDWATER S	SAMPLE COL	LECTION F	ELD EQUIP	MENT CHEC	CK LOG P	Page 1 of 2		
SNL/NM Project Name: SWMU	J 68		SNL/NM Proj	ect No.: 146422.	10.11.01			
Calibrations done by: R Lynch			Date: 4/					
Make & Model: YSI EXO 1			/					
YSI 6820 Sonde (S/N) with DO	, Ec, pH, ORP, and	i temperature prob	13C101167			=		
YSI 650 MDS (S/N): NA								
		рН С	alibration					
pH Calibrated to (std): 7.00			pH sloped to (	std): 10.00				
Reference value:	4	1.00		7.00	1	0.00		
	Value	Temp	Value	Temp	Value	Temp		
1. Time: 0755	4.01	19.1	7.00	19.3	10.00	19.1		
2. Time: 1121	4.01	19.3	7-00	19.4	10.00	19.4		
3. Time								
4. Time.								
Standard lot no.	3AD782		3AE725		3AD357			
Expiration date	4/15		5/15 4/15					
		SC C	alibration					
Reference Value: 1225 uS			Standard Lot	No.: 3AE221				
	Value	Temp	Expiration Date: 5/15					
1. Time: 0751	1225	19.2						
2. Time: 1123	1227	19.5						
3. Time:								
4. Time								
		ORP (	Calibration					
Reference Value	220 mV		Standard Lot No. 4AA010					
	Value	Temp	Expiration Da	te	7/14			
1. Time: 0753	219.9	19.3						
2. Time: 1122	220.1	19.5						
3. Time								
4. Time								
		DO C	alibration					
Calibration Value	Calibration Value 81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg				
1. Time. 07:44	81.7	7	2	4.44				
2. Time: 1120	81.6	,	20	1,50				
3. Time:								
4. Time:								

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FOP 05-02

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

SNL/NM Project Name: S	WMU 68	Project No.: 1	Project No.: 146422.10.11.01				
Calibration done by: R Lynd	ch	Date: 4//	4/14				
	Т	URBIDIMETER	7				
Make & Model: HACH 2	100P HACH 2100Q	Serial No. S/	N 10060C003010				
Reference Value	pl + 10	20	20 100 800				
Standard Lot No.	0161	0167	0168	0161			
1. Time 6817	(0.1	19.7	99.8	806			
2. Time 0955	10.3	19.8	102	807			
3. Time							
4. Time							
Comments:							
Comments:							

GROUNDWATER S	AMPLE COL	LECTION F	ELD EQUIPM	MENT CHEC	K LOG P	age 1 of 2		
SNL/NM Project Name: SWMU	SNL/NM Project No.: 146422.10.11.01							
Calibrations done by: R Lynch			Date 4/	15/14				
Make & Model: YSI EXO 1			1	/				
YSI 6820 Sonde (S/N) with DO	, Ec, pH, ORP, and	temperature prob	es: 13C101167			-		
YSI 650 MDS (S/N) NA								
		pH C	alibration					
pH Calibrated to (std): 7.00			pH sloped to (s	std): 10.00	And the latest and th			
Reference value:	4	,00		7 00	10	00.00		
74.	Value	Temp	Value	Temp	Value	Temp		
1. Time: 0(65)	4.01	20.0	7.00	20.0	10.00	20-0		
2. Time: 1058	4.02	19.9	7.00	20.1	10.00	20.1		
3. Time								
4. Time:								
Standard lot no.	3AD782		3AE725 3AD357					
Expiration date	4/15		5/15 4/15					
		SC C	alibration					
Reference Value: 1225 uS			Standard Lot N	No.: 3AE221				
	Value	Temp	Expiration Date: 5/15					
1. Time: 0653 2. Time: 1059	1225	20.0						
2. Time: 1059	1227	20.2						
3. Time:				100				
4. Time:			SEP 1-12.3		<b>建筑是影響等</b>			
		ORP (	Calibration					
Reference Value	220 mV		Standard Lot No. 4AA010					
	Value	Temp	Expiration Da					
1. Time: 0652	219.9	20.0						
2. Time: 1100	220,1	20.1						
3. Time:								
4. Time:								
	v	DO C	Calibration					
Calibration Value 81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg					
1. Time 0650	81.7		2	4.48				
2. Time: 1057	81.8		24	1.49				
3. Time								
4. Time:								

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LTS GW-2012-002 (11-2012) FOP 05-02

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

Standard Lot No. 0161 0167 0168 0161  1. Time 0755 9.98 20.3 101 795  2. Time 0925 9.94 19.9 104 798  3. Time	SNL/NM Project Name: SWA	NU 68	Project No.: 1	Project No.: 146422.10.11.01				
Make & Model: HACH 2100P HACH 2100Q         Serial No. S/N 10060C003010           Reference Value         24 10         20         100         800           Standard Lot No.         0161         0167         0168         0161           1. Time         0755         9.98         20.3         101         795           2. Time         0925         9.94         19.9         104         798           3. Time         4. Time         4. Time         4. Time	Calibration done by: R Lynch		Date: 4//	5/14				
Reference Value  24.7   0 20 100 800  Standard Lot No. 0161 0167 0168 0161  1. Time 0755 9.98 20.3 101 795  2. Time 0925 9.94 19.9 104 798  3. Time 4. Time		T	URBIDIMETER	1:1				
Standard Lot No.  O161  O167  O168  O161  1. Time O755  Q.98  Q.94  Q.94  Q.94  Q.94  Q.96  O167  O168  O161  O167  O168  O161  O167  O168  O161  O169  O169	Make & Model: HACH 210	0P HACH 2100Q	Serial No. S/I	N 10060C003010				
Standard Lot No. 0161 0167 0168 0161  1. Time 0755 9.98 20.3 101 795  2. Time 0925 9.94 19.9 104 798  3. Time 4. Time	Reference Value	24 10	20	100	800			
2. Time 0925 9.94 19.9 104 798 3. Time 4. Time	Standard Lot No.		0167	0168	0161			
2. Time 0925 9.94 19.9 104 798 3. Time 4. Time	1. Time 0755	9.98	20.3	101	795			
3. Time 4. Time	2. Time 0925	9.94	19.9	104	798			
	3. Time							
Comments:	4. Time							

GROUNDWATERS	SAMPLE COL	LECTION	IELD EQUIP	MENT CHEC	K LOG	rage 1 01 2	
SNL/NM Project Name: SWMU	SNL/NM Proje	SNL/NM Project No.: 146422.10.11.01					
Calibrations done by R Lynch	Date	4/16/14	/				
Make & Model: YSI EXO 1				1/-/			
YSI 6820 Sonde (S/N) with DO	, Ec, pH, ORP, and	temperature prob	oes: 13C101167				
YSI 650 MDS (S/N): NA						_	
		рН С	alibration				
pH Calibrated to (std): 7.00			pH sloped to (s	std): 10.00			
Reference value:	4	.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0640	4.00	19.6	7.00	19.6	10.01	19.6	
2. Time: 1051	3.99	19.8	7.00	19.9	10.00	19.9	
3. Time							
4. Time:			1				
Standard lot no.:	3AD782		3AE725 3AD357				
Expiration date:	4/15		5/15 4/15				
		SC C	alibration				
Reference Value 1225 uS			Standard Lot N	No.: 3AE221			
	Value	Temp	Expiration Date 5/15				
1. Time: 0642	1223	19.6					
2 Time: 1653	1226	19.9					
3. Time:							
4. Time:					Entime		
		ORP (	Calibration				
Reference Value:	220 mV		Standard Lot No. 4AA010				
	Value	Temp	Expiration Dal				
1. Time: 0641	219.9	19.6					
2 Time 1050	290.9	19.9					
3. Time							
4. Time:							
		DO C	Calibration				
Calibration Value: 81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg				
1. Time 0639	81.	7	24.10				
1. Time 0639 2. Time: (050	81.			4.14			
3. Time							
4 Time							

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

SNL/NM Project Name: SWI	MU 68	Project No.:	Project No.: 146422.10.11.01							
Calibration done by: R Lynch	Y.	Date: 4	Date: 4/16/14							
	T	URBIDIMETER								
Make & Model: HACH 210	00P HACH 2100Q	Serial No. S	/N 10060C003010							
Reference Value	毕10	20	100	800						
Standard Lot No.	0161	0167	0168	0161						
1. Time 0750	10.3	19.7	104	796						
2. Time 0922	10.1	19.8	101	794						
3. Time										
4. Time										
II.										

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

Monitoring Well ID # : OBS-MW1	: OBS-MW1 Date: 4-14-14									
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03										
Water Level Indi	cator ID #: 210269									
Robert Lynch Print Name:	Print Name: Initial:  Alfred Santillanes									
Condition of Equipment										
oing Bundle: Good	Water Level Indicator: Good									
List of Decontamination Materials										
	HNO <sub>3</sub>									
	Reagent									
UN #:	2031									
Manufacturer:	AROC									
Lot Number:	A0305629									
	S decontaminated at completion of sampling a  Water Level India  Personnel Perform Robert Lynch Print Name:  Alfred Santillane: Print Name:  Condition of Equipment  ing Bundle: Good  List of Decontamination Materials  e one)  Grade: UN #: Manufacturer:	Secontaminated at completion of sampling activities in accordance with FOP-0  Water Level Indicator ID #: 210269  Personnel Performing Decontamination: Robert Lynch Print Name:  Alfred Santillanes Print Name:  Condition of Equipment  ing Bundle: Good Water Level Indicator: Good  List of Decontamination Materials  HNO3								

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

Project Name: SWMU 68	Monitoring Well ID # :	: <u>OBS-MW2</u> Date: <u>04-15-14</u>					
The following equipment wa	s decontaminated at comp	apletion of sampling activities in accordance with FOP-05-03					
Pump and Tubing Bundle ID #: 1806-586	_	Water Level Indi	cator ID #: 210269	;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;			
Personnel Performing Decontamination:  Robert Lynch Print Name:  Alfred Santillanes Print Name:  Initial:		Personnel Performing Decontamination:  Robert Lynch Print Name:  Alfred Santillanes Print Name:  Initial:					
	Condition	n of Equipment					
Pump: Excellent Tubi	ng Bundle: Good	Water Level Indicator: Good					
	List of Deconta	umination Materials					
Distilled or Deonized (circle	one)		HNO <sub>3</sub>				
Distinct of Deonized (Chere	one)	Grade:	Reagent				
Source: Culligan		UN #:	2031				
Lot Number: 4-2-14		Manufacturer:	AROC				
		Lot Number:	A0305629				

LTS GW-2012-003 (11-2012) FOP 05-03

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

Project Name: SWMU 68	Monitoring Well ID # :	: <u>OBS-MW3</u> Date: <u>4/16/14</u>					
The following equipment was	s decontaminated at comp	letion of sampling a	ctivities in accordance with FC	DP-05-03			
Pump and Tubing Bundle ID #: 1806-586	_	Water Level Indi	cator ID #: 210269				
Personnel Performing Decontamination:  William Gibson Print Name:  Robert Lynch Print Name:  Initial:		Personnel Performing Decontamination:  William Gibson Print Name:  Robert Lynch Print Name:  Initial:					
	Condition	n of Equipment					
Pump: Excellent Tubi	ing Bundle: Good	Water Level Indicator: Good					
	List of Deconta	nmination Materials					
Distilled or Deonized (circle	one)		HNO <sub>3</sub>				
Distinct of Deolitzed (Circle	: one)	Grade:	Reagent				
Source: Culligan		UN #:	2031				
Lot Number: 4-3-14	<u></u>	Manufacturer:	AROC				
		Lot Number:	A0305629				

**Groundwater Monitoring Waste Generation Log** 

Waste Generator	William Gibson Phone:	239-7367 project l	eader: Clinton Lum		
Project Name	SWMU-68	SWMU-68	SWMU-68		
Container ID # (site-date-sequence)	SWMU-OBS-MW1-041414-01	SWMU-OBS-MW1-041414-02	SWMU-041414		
Initial Label Type (Hazardous or Non-Regulated)	Non-Regulated	Non-Regulated	Non-Regulated		
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge water	Purge Water	Decon Water		
Container Type / Volume	CHPD / 55	CHPD / 55	CHPD / 55		
Volume of Waste	~ 19 gal.	~ 21 gal.	~30 gal.		
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 240 lbs.		
COC#: Sample#-	CoC# 615427	CoC# 615427	CoC# 615427		
Fraction	Sample # 095733	Sample # 095733	Sample # 095733		
Accumulation Date	Start: 04/14/14  Full: 04/14/14	Start: 04/14/14  Full: 04/14/14	Start: 04/14/14 Full: 04/14/14		
Date Waste Moved to Accumulation Area	04/14/14	04/14/14	04/14/14		
Accumulation Area Name	9925	9925	9925		
Comments:					

Groundwater Monitoring Waste Generation Log

Waste Generator	William Gibson Phone	: 239-7367 project	leader: Clinton Lum		
Project Name	SWMU 68	SWMU 68	SWMU 68		
Container ID # (site-date-sequence)	SWMU-OBS-MW2-041514-01	SWMU-OBS-MW2-041514-02	SWMU-041514		
Initial Label Type (Hazardous or Non- Regulated)	Non-Regulated	Non-Regulated	Non-Regulated		
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge Water	Purge Water	Decon Water		
Container Type / Volume	CHPD / 55 gal.	CHPD / 55 gal.	CHPD / 55 gal.		
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.		
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 180 lbs.		
COC#: Sample#- Fraction	CoC # 615428  Sample # 095736	CoC # 615428  Sample # 095736	CoC # 615428  Sample # 095736		
Accumulation Date	Start: 04-15-14  Full: 04-15-14	Start: 04-15-14 Full: 04-15-14	Start: 04-15-14  Full: 04-15-14		
Date Waste Moved to Accumulation Area	04-15-14	04-15-14	04-15-14		
Accumulation Area Name	9925	9925	9925		
Comments:					

**Groundwater Monitoring Waste Generation Log** 

Waste Generator	: William Gibson Phone:	239-7367 project	eader: Clinton Lum
Project Name	SWMU-68	SWMU-68	SWMU-68
Container ID # (site-date-sequence)	SWMU-OBS-MW3-041614-01	SWMU-OBS-MW3-041614-02	SWMU-041614
Initial Label Type (Hazardous or Non- Regulated)	Non-Regulated	Non-Regulated	Non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD / 55 gal.	CHPD / 55 gal.	CHPD / 55 gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	170 lbs.	~ 240 lbs.
COC#: Sample#- Fraction	CoC # 615430  Sample # 095741, 095742	CoC # 615430  Sample # 095741, 095742	CoC # 615430  Sample # 095741, 095742
Accumulation Date	Start: 4/16/14 Full: 4/16/14	Start: 4/16/14 Full: 4/16/14	Start: 4/16/14 Full: 4/16/14
Date Waste Moved to Accumulation Area	4/16/14	4/16/14	4/16/14
Accumulation Area Name	9925	9925	9925
Comments:			

#### TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 1	Date: 04/14/14	Time: 0813
Activities: GROUNDWATER MONITORING AND SAM  (Anyone has the right to cease field activities for same		will be used when needed.)
Weather Conditions: Temp: 50.3 °F Wind Speed: MPH	Humidity: <b>25.3</b> % W	ind Chill <b>HA</b> °F
Chemicals Used: Acids in sample containers, stand Other:	ard solutions, Hach ACCU-	VAC ampules
Safety T	Topics Presented	
Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	■ Be aware of enviro	Dress accordingly.
x Wear safety boots.		cal hazards
x Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressu	re hazards.
■ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	■ No eating or drinki	ng at sampling counter.
□ Be aware of chemical hazards.	⊠ Be aware of biohaz etc.)	
Wear nitrile or latex gloves when sampling.	▼ Wear communication     EOC pager).	on device (cell phone,
× Wear chemical safety goggles.	x Avoid spilling purg	e / decon water.
Hospital/Clinic: Sandia Medical Clinic Phone:	844-0911/911  Attendees	1
Printed Name	Signature	10:11
Printed Name	Signature	1700 -
Printed Name	Signature	Sauce
Printed Name	Signature	
Printed Name	Signature	

TAILGATE SAI	ETY MEETING FORM
ept: 4142_Well Location: OBS-MW 2	Date: 04/15/14 Time: 0753
ctivities: GROUNDWATER MONITORING AND SAM (Anyone has the right to cease field activities for sa	MPLING fety concerns. The buddy system will be used when needed.)
eather Conditions: emp: <b>49, 9</b> °F Wind Speed: <b>D</b> MPH	Humidity: 22.7% Wind Chill MA °F
nemicals Used: Acids in sample containers, stands ther:	ard solutions, Hach ACCU-VAC ampules
Safety 7	opics Presented
Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	Be aware of environmental conditions (heat / cold stress). Dress accordingly.     Wear sunscreen if necessary. Stay hydrated.
Wear safety boots.	
Use safe lifting practices. Wear leather gloves if necessary.	x Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	x No eating or drinking at sampling counter.
Be aware of chemical hazards.	
Wear nitrile or latex gloves when sampling.	
Wear chemical safety goggles.	XI Avoid spilling purge / decon water.
Printed Name  William Gibson  Printed Name	Attendees Signature Signature Signature Signature Signature
Printed Name	Signature
Printed Name	Signature

#### TAILGATE SAFETY MEETING FORM

pt: 4142 Well Location: OBS-MW 3	Date: 04/16/14 Time: 07.45
tivities: GROUNDWATER MONITORING AND SAM (Anyone has the right to cease field activities for same	MPLING afety concerns. The buddy system will be used when needed.)
eather Conditions: mp: <b>57.0</b> °F Wind Speed: <b>~5</b> MPH	Humidity: 17.1 % Wind Chill 56.0°F
emicals Used: Acids in sample containers, stand her:	lard solutions. Hach ACCU-VAC ampules
Safety 1	Topics Presented
Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	Re aware of environmental conditions (heat / cold stress). Dress accordingly.   Wear sunscreen if necessary. Stay hydrated.
Wear safety boots.	
Use safe lifting practices. Wear leather gloves if necessary.	🛛 Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	XI No eating or drinking at sampling counter.
Be aware of chemical hazards.	■ Be aware of biohazards (snakes, spiders, etc.)
Wear nitrile or latex gloves when sampling.	
Wear chemical safety goggles.	XI Avoid spilling purge / decon water.
Hospital/Clinic: Sandia Medical Clinic Phone:  Robert Lynch  Printed Name  William 616500  Printed Name	Attendees Signature Signature Signature Signature Signature
Printed Name	Signature
Printed Name	Signature

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

Internal Lab															_	rage_	1 01 2
Batch No.						SMO Use					^				AR/COC	615	424
Project Name:		SWMU 8/	58 GWM	Date Sample	s Shipped:				SMO Au	thorization:	Show	138	_	l v	Vaste Characterization		
roject/Task Ma				Carrier/Wayb						ntact Phone	:			I A	MMA		
roject/Task Nu		146422.10		Lab Contact:		Edie Kent/	803-556-8	171		Lorraine F	lerrera/505	5-844-3199		FR	eleased by COC No.		
ervice Order:		CF262-14		Lab Destinati	on:	GEL			Send Re	port to SMC	):					V 40	Celsiu
				Contract No.:		PO 130387	73			Rita Kava	naugh/505	-284-2553		Bill to:Sa	ndia National Laboratorie	75	01 Res 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
ech Area:															5800, MS-0154		
uilding:		Room:		Operationa	al Site:									Port more vicense	que, NM 87185-0154		
	action		nple Location D		Depth (ft)	Date/		Sample Matrix	Туре	ntainer	Preserv-	Collection Method	Sample Type		Parameter & Method Requested		Lab Sample I
	-	CCBA-FB		-	NA	4/7/14	9:35 ′	DIW	G	3x40ml	HCL	G	FB	TCL VC	OC (SW846-8260B)		rampio
		Section Control								22.72	0.5 ** 5 ** 0.1		25/4/104				
095725 -0	01	CCBA-MV	V1		79	4/7/14	9:35	GW	G	3x40ml	HCL	G	SA	TCL VC	OC (SW846-8260B)	-	
095725 -0	02	CCBA-MV	V1		79	4/7/14	9:36	GW	AG	4x1 L	None	G	SA	TCL S\	/OC (SW846-8270C)		
095725 -0	09 /	CCBA-MV	V1		79	4/7/14	9:37 /	GW	Р	500 ml	HNO3	G	SA	TAL Met	als+U(SW846-6010/6020	7470)	
095725 -0	16 ′	CCBA-MV	V1		79	4/7/14	9:40	GW	Р	125 ml	None	G	SA	Anions	(SW846-9056)		
095725 -0	17	CCBA-MV	V1		79	4/7/14	9:39	FGW	Р	500 ml	HNO3	G	SA	Metals	Ča,Mg,K,Na(SW846-6	(020)	
095725 -0	18 /	CCBA-MV	V1		79	4/7/14	9:41	GW	Р	125 ml	H2SO4	G	SA	Nitrate	Nitrite (EPA 353.2)		
095725 -0	20 V	CCBA-MV	V1		79	4/7/14	9:42 €	GW	Р	250 ml	None	G	SA		orate (EPA 314.0)		
095725 -0	22/	CCBA-MV	V1		79	4/7/14	9:43	GW	Р	500 ml	None	G	SA	Alkalini	ty (SM2320B)		
		CCBA-MV			79	4/7/14	9:44	GW	AG	4x1 L	None	G	SA		olosives (SW846-8321A n	nod.)	
ast Chain:		☐Yes			_	Tracking			Use	Special In:	structions						tions on
alidation Re	a'd:	✓ Yes			Date En					EDD		✓ Yes		No		2.007.000.000.00	ceipt
ackground:		Yes			Entered					Turnarour	d Time	7 Da	v*	15 Day	* ✓ 30 Day	1101	,cipt
onfirmatory		Yes			QC inits					Negotiated				1000			
Sample		ame	Signat	ure	Init.		y/Organizat	tion/Phon	o/Call	Sample Di		Petur	n to Client	-	☑ Disposal by Lab		
	obert Ly		W/19n	st	ZC			-		Return Sa	-		1 to Ciletti		L Disposal by Lab		
		ntillanes	Alfal Sa		ac	SNL/4142/5				Comment			Tim Indian	-/44 40 840	0729/284-2547		
-	/illiam G		Millian	// ///	2108	SNL/4142/5						and the second second			6W846-6850M. FGW,		
100	nillain C	ווטפטוו	Municipy)	Jery.	My A	SNL14142/3	03-204-330	777505-25	1301	filtered in fiel	d using a 0.4	45 micron in-l	ine filter. Re	eport Anio	ns (as Br,Cl,F,SO4),		
			V		V						total CaCO	3,HC03,C03	), and Gam	ma Spect	roscopy (as short list	16	11
Relinquished b	by A	LRS	till	Org.4/14-	2 Date	4/7/1	/ Time /	0:15	3 Relino	isotopes). juished by			Org.		Date	Time	Use
Received by	1/2	2	Lucale	Org. 4/4			-		3. Rece				Org.		Date	Time	
Relinguished by	by	~ ~	raymon	Org.	Date		Time			uished by			Org.		Date	Time	
. Received by	~ j			Org.	Date		Time		4. Rece				Org.		Date	Time	
	-41 ···	th CMO ro	quired for 7 and				11110		TH. INCOM	ivou by			Olg	-	Date	Tillio	

Page 2 of 2

													AR/COC 61	5424
Project Nam	e:	SWMU 8/58 GWM	Project/Ta	ısk Manaç	ger:	Clinton Lun	n		Project/Ta	sk No.:	146422	2.10.11.01		
Tech Area:														
Building:		Room:												Lab use
Sample No.	Fraction	Sample Location	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Type	Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095725	-029 ′	CCBA-MW1		79	4/7/14	9:46	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
095725	-033 /	CCBA-MW1		79	4/7/14	9:47	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
095725	-034	CCBA-MW1		79	4/7/14	9:48	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
095726	-001	CCBA-TB1		NA	4/7/14	9:35 /	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
						£								
														-
				-						-				-
										-				-
	-									-				
										-				-
	-													-
									14					-
	<del>                                     </del>											-		-
														-
													*	-
							-							
Recipient In	itials										10			

Internal Lab																Page 1 of 2
Batch No.						SMO Use								AF	R/COC	615426
Project Name	):	SWMU 8/	58 GWM	Date Sample	s Shipped:	4/8/	14		SMO AL	thorization:	1)00	Jotern	mu/L	Waste Chara	cterization	
Project/Task	Manager:	Clinton Lu	ım	Carrier/Wayb	ill No.				SMO Co	ntact Phone	e:	1	-/	RMMA		
Project/Task	-	146422.1		Lab Contact:		Edie Kent/	803-556-8	3171		Lorraine H	Herrera/50	5-844-3199		Released by	COC No.	
Service Orde	r:	CF262-14	,	Lab Destinati	on:	GEL			Send Re	eport to SMC	D:					✓ 4° Celsius
				Contract No.:		PO 130387	73					5-284-2553		Bill to:Sandia Nationa	al Laboratories	
Tech Area:														P.O. Box 5800, MS-0		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Building:		Room:		Operationa	al Site:									Albuquerque, NM 87		
- annum g				Горония	Depth	Date/	Time	Sample	Co	ntainer	Preserv-	Collection	Sample		r & Method	Lab
Sample No.	Fraction	Sar	nple Location D	etail	(ft)	Colle		Matrix	Type	Volume	ative	Method	Type		uested	Sample ID
095730	-001	CCBA-MV	N2 -		117	4/8/14	9:27 *	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846	an ex communication	
095730	-002	CCBA-MV	V2		117	4/8/14	9:28	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW8		
095730	-009	CCBA-MV			117	4/8/14	9:32	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW84		7470)
095730	-016	CCBA-MV			117	4/8/14	9:35 /	GW	Р	125 ml	None	G	SA	Anions (SW846-9		
095730	-017	CCBA-MV	N2		117	4/8/14	9:34	FGW	Р	500 ml	HNO3	G	SA	Metals Ca,Mg,K,N		)20)
095730	-018	CCBA-MV	N2		117	4/8/14	9:36	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EF		
095730	-020 -	CCBA-MV	H 1971		117	4/8/14	9:37~	GW	Р	250 ml	None	G	SA	Perchlorate (EPA		
095730	-022	CCBA-MV			117	4/8/14	9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM232)		
095730	-024	CCBA-MV	and a second		117	4/8/14	9:39	GW	AG	4x1 L	None	G	SA	High Explosives (SW		od)
095730	-029	CCBA-M\	Daring.		117	4/8/14	9:43	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SV		м.)
Last Chain		✓ Yes				Tracking	0.10		Use			/QC Regui		Trotal Cyamac (Cr	1010 0012)	Conditions on
Validation		✓ Yes			Date En					EDD		☑ Yes	- C	No		Receipt
Backgroun	-	Yes			Entered	and the same of th				Turnarour	nd Time	7 Da	N*	15 Day*	30 Day	receipt
Confirmato		Yes			QC inits					Negotiate		100	<u>_</u>	TODAY	Joobay	
Sample		ame	Signat	ure	Init.		y/Organiza	tion/Phon	e/Cell	Sample Di		Retur	n to Clien	t V Dieno	sal by Lab	
Team	Robert L		TAKE	11	21	SNL/4142/5				Return Sa	-		ii to Olleli	с Бізро	Sai by Lab	
The state of the state of		antillanes	11/1/25	11	un	SNL/4142/5				Comment	, ,		Ties Inches	-144 40 840 0700 1004 054	-	
Members	William (			801	11/18	SNL/4142/5					F. 18			n/4142/MS 0729/284-254 sis using SW846-	<b>'</b>	
	vviillam	308011	Willen J.	Held p	MA	SNL/4142/5	05-204-330	377505-23	9-7307					n-line filter. Report Ani	ions (as	
			V	1 /	V					Br,Cl,F,SO4	). Alkalinity (			O3). Gamma Spectros		
		11.00	1720	0 1/11	2 -	4/0/1	//	/h'//	la n ::	short list isot	topes).					Lab Use
1.Relinquishe	- 11	pel59	ald I	Org.4/4	2 Date	-/-/	/ Time /			uished by			Org			Time
1. Received l		onla	Corpered	Org.4/42		14/8/14		016	3. Rece				Org			Time
2.Relinquishe				Org.	Date		Time			uished by			Org			Time
2. Received b				Org.	Date		Time		4. Rece	ived by			Org	. Date		Time
"Prior confir	mation w	rith SMO re	guired for 7 and	15 day TA	Г											

Page 2 of 2

AR/COC 615426

Project Nam	e:	SWMU 8/58 GWM	Project/Ta	ask Mana	ger:	Clinton Lun	n		Project/Ta	sk No.:	146422	2.10.11.01		100
Tech Area: Building:		Room:	-											Lab use
Sample No.			Detail	Depth (ft)	Date/	D-11000-0	Sample Matrix	Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use  Lab Sample ID
095730	-033	CCBA-MW2		117	4/8/14	9:44 V	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
095730	-034	CCBA-MW2		117	4/8/14	9:46	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
095731	-001	CCBA-MW2		117	4/8/14	9:27	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
095731	-002	CCBA-MW2		117	4/8/14	9:28	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	
095731	-009	CCBA-MW2		117	4/8/14	9:32	GW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
095731 ′	-016	CCBA-MW2		117	4/8/14	9:35 /	GW	Р	125 ml	None	G	DU	Anions (SW846-9056)	
095731	-017	CCBA-MW2		117	4/8/14	9:34 ~	FGW	Р	500 ml	HNO3	G	DU	Metals Ca,Mg,K,Na(SW846-6020)	
095731	-018	CCBA-MW2		117	4/8/14	9:36-	GW	Р	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	
095731	-020	CCBA-MW2		117	4/8/14	9:37	GW	Р	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
095731	-022	CCBA-MW2		117	4/8/14	9:38 V	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	
095731	-024	CCBA-MW2		117	4/8/14	9:39 🗸	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod.)	
095731	-029	CCBA-MW2		117	4/8/14	9:43	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
095731	-033	CCBA-MW2		117	4/8/14	9:44 /	GW	Р	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
095731	-034	CCBA-MW2		117	4/8/14	9:46 🗸	GW	Р	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
095732	-001	ССВА-ТВЗ		NA	4/8/14	9:27	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
Recipient Ini	tials								911				A a	

		SQUARE SELECT	Also the state of	
Int	n	len	Lab	

Internal Lab													Priv	11 to CEBIA-MUZ	Page _1_ of _2_
Batch No.						SMO Use								AR/COC	615425
Project Name	7.	SWMU 8/58	3 GWM	Date Samples	Shinned:				SMO A	uthorization:				Waste Characterization	0.0.20
		Clinton Lum		Carrier/Waybill						ontact Phone	a-			RMMA	
		146422.10.		Lab Contact:		Edie Kent/8	303-556-8	3171			B 2000	5-844-3199		Released by COC No.	
Service Orde		CF262-14		Lab Destination		GEL			Send Re	eport to SMC		011 0100		1	√ 4° Celsius
	S			Contract No.:		PO 130387	73				naugh/505	-284-2553		Bill to:Sandia National Laboratories	
Tech Area:										11100 11010	augoo	2012000		P.O. Box 5800, MS-0154	(riccounts r ayable),
Building:		Room:		Operational	Site:									Albuquerque, NM 87185-0154	
Danamy.		11001111			Depth	Date/	Γimo	Sample	C	ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Samp	le Location D		(ft)	Colle		Matrix	Type	Volume	ative	Method	Type	Requested	Sample ID
095727		CCBA-FB2			NA	4/7/14	13:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	Sample 15
095727	-009	CCBA-FB2			NA	4/7/14	13:19	DIW	Р	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/7	(470)
1500 HBV - 1882-1	-003	CCDA-1 DZ			INA	4/1/14	10.18	DIVV		300 1111	HINOS	G	гь	TAL Metals+0(SVV846-6010/6020//	470)
095727	-016	CCBA-FB2			NA	4/7/14	13:19	DIW	Р	125 ml	None	G	FB	Anions (SW846-9056)	
095727	-018	CCBA-FB2			NA	4/7/14	13:19	DIW	Р	125 ml	H2SO4	G	FB	Nitrate+Nitrite (EPA 353.2)	
095727	-022	CCBA-FB2			NA	4/7/14	13:19	DIW	Р	500 ml	None	G	FB	Alkalinity (SM2320B)	
095728	-001	CCBA-EB1			NA	4/7/14	13:19	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
095728	-002	CCBA-EB1			NA	4/7/14	13:20	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
095728	-009	CCBA-EB1			NA	4/7/14	13:22	DIW	Р	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7	(470)
095728	-016	CCBA-EB1			NA	4/7/14	13:25	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)	
095728	-017	CCBA-EB1			NA	4/7/14	13:24	FDIW	Р	500 ml	HNO3	G	EB	Metals Ca,Mg,K,Na(SW846-60	020)
Last Chain	:	Yes		S	Sample '	Tracking		SMO	Use	Special Ins	structions	QC Requir	ements:		Conditions on
Validation	Req'd:	✓ Yes		0	Date Ent	ered:				EDD		✓ Yes		No	Receipt
Backgroun	d:	Yes		E	Entered l	by:				Turnaroun	d Time	7 Day	y*	15 Day*	
Confirmato	ry:	Yes			QC inits.:					Negotiated	TAT				
Sample	N:	ame	// Signatu	ure ,	Init.	Company	//Organiza	tion/Phone	e/Cell	Sample Di	sposal	Return	to Client	✓ Disposal by Lab	
Team	Robert Ly	nch /	0175n	_		SNL/4142/50	05-844-401	13/505-250	0-7090	Return Sar	mples By:				
Members	Alfred Sa	ntillanes	Wood Sul	gele	12g	SNL/4142/50	05-844-513	30/505-228	8-0710	Comments	3:	Send report to	Tim Jackson	/4142/MS 0729/284-2547	
	William C	Sibson	Mean	file &	122	SNL/4142/50	05-284-330	07/505-239	9-7367					is using SW846-6850M. FDIW,	
			0.1		00									port anions (as Br,Cl,F,SO4), na spectroscopy (as short list	
	1									isotopes).	iolai Cacos	,11003,003)	, and gamm	la spectroscopy (as short list	Lab Use
1.Relinquishe	d by At	lad Soil	elen	Org 4/142	Date	4/7/14	/ Time / 4	4:03	3.Relino	uished by			Org.	Date	Time
1. Received b	1/19	wal	in	Org. 4/92	Date	4/17/19			3. Rece				Org.	Date	Time
2.Relinquishe	d by			Org.	Date		Time		4.Relino	uished by			Org.	Date	Time
Received h	NV.			Ora	Date		Time		4 Rece	ived by			Ora	Date	Timo

<sup>\*</sup>Prior confirmation with SMO required for 7 and 15 day TAT

Page 2 of 2

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AR/COC 6	1	į	54	2	5	

Project Name	e:	SWMU 8/58 GWM	Project/Tas	sk Manag	jer:	Clinton Lun	n		Project/Tas	sk No.:	146422	.10.11.01		
Tech Area:							1.0							
Building:		Room:												Lab use
				Depth	Date/	Time	Sample	Cor	ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Sample Location D	etail	(ft)	Colle	cted	Matrix	Type	Volume	ative	Method	Туре	Requested	Sample ID
095728	-018	CCBA-EB1		NA	4/7/14	13:26	DIW	Р	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
095728	-020	CCBA-EB1		NA	4/7/14	13:27	DIW	Р	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
095728	-022	CCBA-EB1		NA	4/7/14	13:28	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)	
095728	-024	CCBA-EB1		NA	4/7/14	13:29	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod.)	
095728	-029	CCBA-EB1		NA	4/7/14	13:31	DIW	Р	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
095728	-033	CCBA-EB1		NA	4/7/14	13:32	DIW	Р	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
095728	-034	CCBA-EB1		NA	4/7/14	13:33	DIW	Р	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
095729	-001	CCBA-TB2		NA	4/7/14	13:19	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
		,												
Recipient Ini	tials				12									

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

	Internal Lab														Page	_1_ of _2_
Project   Name	Batch No.					SMO Use								AR/COC	61	5427~
P.O. Box 6800, MS-0154   Abduquerque, Nt 87185-0154   Abduquerque, Nt 87	Project/Task Project/Task	Manager: Number:	Clinton Lum 146422.10.11.01	Carrier Lab Co Lab De	r/Waybill No. ontact: estination:	GEL		3171	ѕмо с	Lorraine I Leport to SM	e: Herrera/50 O:	5-844-3199	ny	Waste Characterization RMMA Released by COC No.	✓ 4	4º Celsius
Sample No.   Fraction   Sample Location Detail   City   Date/Time   Container   Type   Volume   Type   Requested   Sample   Container   Preserv.   Collection   Sample   Container   Preserv.   Conditions   Container   Preserv.   Conditions   Container   Preserv.   Conditions   Container   Companyl Organization/Phone/Cell   Companyl Container   C	-		Room:			10 10000	70		-	Kila Kava	anaugn/50	0-204-2553		P.O. Box 5800, MS-0154	(Accour	its Payable),
095733	Sample No.	Fraction	Sample Location	n Detail						-	_	THE STATE OF PERSONS ASSESSED.		Parameter & Method		Lab Sample II
095733 -009	095733	-001 /	OBS-MW1		153	4/14/14	9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		
095733 -014	095733	-002 *	OBS-MW1		153	4/14/14	9:45	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)		
095733 -016	095733	-009 ′	OBS-MW1		153	4/14/14	9:47 /	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020	(7470)	
095733	095733	-014 /	OBS-MW1		153	4/14/14	9:50 /	GW	Р	250 ml	None	G	SA			
095733 -018 / OBS-MW1 153 4/14/14 9:49 FGW P 500 ml HNO3 G SA Metals-Ca,Mg,K,Na(SW846-6020)   095733 -018 / OBS-MW1 153 4/14/14 9:52 GW P 125 ml H2SO4 G SA Nitrate+Nitrite (EPA 353.2)   095733 -020 OBS-MW1 153 4/14/14 9:53 GW P 250 ml None G SA Perchlorate (EPA 314.0)   095733 -022 OBS-MW1 153 4/14/14 9:55 GW P 500 ml None G SA Alkalinity (SM2320B)   095733 -024 OBS-MW1 153 4/14/14 9:55 GW AG 4x1 L None G SA High Explosives (SW846-8321A mod Last Chain:	095733	-016	OBS-MW1		153	4/14/14	9:51	GW	Р	125 ml	None	G	SA			
095733	095733	-017/	OBS-MW1		153	4/14/14	9:49	FGW	Р	500 ml	HNO3	G	SA		(020)	
095733	095733	-018 -	OBS-MW1		153	4/14/14	9:52	GW	Р	125 ml	H2SO4	G	SA	-		
O95733	095733	-020	OBS-MW1		153	4/14/14	9:53	GW	Р	250 ml	None	G	SA	E 25		
OBS-MW1	095733	-022	OBS-MW1		153	4/14/14	9:54 *	GW	Р	500 ml	None	G	SA			A Line
Last Chain: Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions of Receipt Sample Tracking Smo Use Special Instructions/QC Requirements: Special Instructions/Q	095733	-024	OBS-MW1		153	4/14/14	9:55	GW	AG	4x1 L	None	G	0.55	VACCUUM CONTRACTOR CON	1A mod	
Background:					100000000000			NAME OF TAXABLE PARTY.	Use							
Confirmatory: Yes QC inits.: Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Disposal by Lab Robert Lynch SNL/4142/505-844-4013/505-250-7090 Return Samples By:  Members William Gibson Wulluffault SNL/4142/505-844-5130/505-228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,CI,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).  1. Received by Org. Date Time  1. Received by Org. Date Time															R	eceipt
Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal  Return to Client Disposal by Lab Robert Lynch SNL/4142/505-844-4013/505-250-7090 Return Samples By:  Members Alfred Santillanes William Gibson William Gibson William Gibson SNL/4142/505-284-3307/505-239-7367 If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,CI,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).  1. Received by Corg. 4/42 Date 4/14/14 Time 10:35 3. Received by Org. Date Time  1. Received by Corg. 4/42 Date 4/14/14 Time 10:35 3. Received by Org. Date Time					-					Turnarour	nd Time		<u>y</u> *	15 Day* ✓ 30 Day		
Robert Lynch Members  Alfred Santillanes  William Gibson  William Gibson  Members  Robert Lynch  Alfred Santillanes  William Gibson  William Gibson  Members  Alfred Santillanes  Milliam Gibson  Members  Sent report to Tim Jackson/4142/MS 0729/284-2547  If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).  1. Received by  Org. Date  Time  1. Received by  Org. Date  Time		T .	103	Contract Charles			a day as			-						
Alfred Santillanes  William Gibson  SNL/4142/505-284-3307/505-239-7367  If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4), Alkalinity (as total CaCO3, HCO3, CO3). Gamma Spectroscopy (as short list isotopes).  1. Received by  Org. Date  Time  1. Received by  Org. Date  Time					Init.		THE RESERVE AND ADDRESS OF THE PARTY OF THE						n to Clien	t Disposal by Lab		
William Gibson G	Team			mo	2 FE					_						
1. Received by Donk large Org. 4147 Date 4/14/14 Time 1035 3. Received by Org. Date Time		William	11.011 11	Till J	201	SNL/4142/5	05-284-33	07/505-23	39-7367	If Perchlorate filtered in fiel Alkalinity (as isotopes).	e detected,p	erform verific 45 micron in-	ation analy: line filter. R	sis using SW846-6850M. FGW, eport Anions ( as Br,Cl,F,SO4),	La	b Use
		- ///	god Satilla										Org	. Date	Time	
2.Relinquished by Org. Date Time 4.Relinquished by Org. Date Time			mweleyn	100000000000000000000000000000000000000	4142 Date	4/14/1	✓ Time /	035	3. Rece	eived by			Org	. Date	Time	
2 Possived by			* **			1	Time		4.Relin	quished by			Org	. Date	Time	

Page 2 of 2

													AR/COC 61	5427
Project Name	e:	SWMU 68 GWM	Project/T	ask Mana	ger:	Clinton Lun	n		Project/Ta	sk No.:	146422	.10.11.01		Segulario (SELS)
Tech Area:													ř.	
Building:		Room:		1										Lab use
Sample No.	Fraction	Sample Location	n Detail	Depth (ft)	Date/ Colle		Sample Matrix	Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095733	-029 -	OBS-MW1		153	4/14/14	9:57	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
095733	-033 /	OBS-MW1		153	4/14/14	9:58	GW	Р	1 L-	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
095733	-034 ′	OBS-MW1		153	4/14/14	9:59 1	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
095733	-035	OBS-MW1		153	4/14/14	10:00	GW	Р	1 L 2	HNO3	G	SA	Isoto <del>p</del> ic Uranium (HASL 300)	
095734	-001	OBS-TB1/		NA	4/14/14	9:44	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
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														to details
														Challed Hall
														CONTRACTOR OF THE
Recipient In	itials												secondary of the first	

nternal Lab															-	THE RESERVE AND ADDRESS OF THE PARTY NAMED IN	1 01 4
Batch No. N	1A					SMO US						100			AR/COC	615	5428
roject Name:		SWMU 68	GWM	Date Sample	s Shipped:	4/1	5/14		SMO Au	thorization:	aste	Elm	Smes		Waste Characterization		
oject/Task N	Manager:	Clinton Lui	m	Carrier/Wayb	III No.	21	7403		SMO Co	ntact Phone		-			RMMA		
roject/Task N		146422.10	.11.01	Lab Contact:		and the second second	nt/803-556-8	171		Lorraine H	lerrera/505	-844-3199			Released by COC No.	*****	
ervice Order	:	CF263-14		Lab Destinati		GEL			Send Re	port to SMC	):					4	° Celsi
				Contract No.:		PO 130	3873			Rita Kava	naugh/505	-284-2553		Bill to: S	Sandia National Laboratories	(Account	ts Payable
ech Area:														P.O. B	ox 5800, MS-0154		
uilding:		Room:		Operations	I Site:									Albuqu	erque, NM 87185-0154		
sample No.	Fraction	Sarr	ple Location D	etail	Depth (ft)		te/Time	Sample Matrix	Туре	Volume	Preserv- ative	Collection Method	Sample Type		Parameter & Method Requested		Lab Sample
095735	-001	OBS-FB1			NA	4/15/1	4 9:13	DIW	G	3x40ml	HCL	G	FB	TCL V	/OC (SW846-8260B)		
095736	-001	OBS-MW2	2		252	£4/15/1	4 9:13 -	GW	G	3x40ml	HCL	G	SA	TCL \	/OC (SW846-8260B)		
095736	-002	OBS-MW2	2		252	14/15/1	4 9:14	GW	AG	4x1 L	None	G	SA	TCL S	SVOC (SW846-8270C)		
095736	-009	OBS-MW2	2		252	*4/15/1	4 9:16	GW	Р	500 mt	HNO3	G	SA	TAL M	letals+U (SW846-6010/6020	77470)	
095736	-014	OBS-MW2	2		252	4/15/1	4 9:19 -	GW	P	250 ml	None	G	SA	Hexav	alent Chromium (SW846-71	96A)	
095736	-016	OBS-MW	2		252	- 4/15/1	4 9:20 /	GW	Р	125 ml	None	G	SA	Anion	ns (SW846-9056)		
095736	-017	OBS-MW	2		252	4/15/1	4 9:18	FGW	Р	500 ml	HNO3	G	SA	Metal	ls-Ca,Mg,K,Na(SW846-6	3020)	
095736	-018	OBS-MW	2		252	4/15/1	4 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrat	te+Nitrite (EPA 353.2)		
095736	-020	OBS-MW	2		252	4/15/1	4 9:22	GW	Р	250 ml	None	G	SA	Perch	nlorate (EPA 314.0)		
095736	-022	OBS-MW	2		252	4/15/1		GW	Р	500 ml	None	G	SA	Alkal	inity (SM2320B)		
ast Chain	-	Yes				Tracking			O Use		structions	/QC Requi	rements:			Cond	litions or
alidation	and the same of th	✓ Yes			Date En	-	4-15			EDD		✓ Yes		No		Re	eceipt
ackgroun	STATE OF THE PERSON NAMED IN	Yes			Entered	SANTANTAN AND ADDRESS OF THE PARTY OF THE PA	P.	K_		Turnarous	nd Time	7 Da	y*	15 D	avc 30 Day		
onfirmato		L Yes			QC inits	-				Negotiate	THE RESERVE OF THE PARTY OF THE						
Sample		Name	Signal	ture	Init.		pany/Organiza			Sample D	THE RESERVE AND PERSONS NAMED IN	-	n to Clien	it	☐ Disposal by Lab		
Team	Robert I	-	LUMAN	The second secon	Pel	-	2/505-844-40			Return Sa	mples By	:	-				
<i>l</i> lembers	Alfred S	antillanes		alffer	ale	-	42/505-844-51	-	and the state of t	Comment	The state of the s				AS 0729/284-2547		
	William	Gibson /	welliaff	My	MAX	SNL/414	42/505-284-33	07/505-2	39-7367	filtered in fie	ld using a 0.	45 micron in-	line filter, R	leport A	g SW846-6850M, FGW, nions ( as Br,Cl,F,SO4),		
	-	4	- ·		+-	-				Alkalinity (as isotopes).	s total CaCC	3,HC03,C03	3). Gamma	Spectro	oscopy (as short list	1.	ab Use
.Rellnquish	ed by	Waste	getill.	Om UIU	7 Date	4/15	14 Time (	0950	3 Relin	quished by			Org	,	Date	Time	
. Received	-	1-2-1		Org. 414			14 Time			The state of the s			Org		Date	Time	
Relinquish	-	per la	Linn	Org. 4/			7/14 Time /		_	quished by			Org		Date	Time	-
. Received		10.00		Org.	Date	The second secon	Time	000	_	eived by			Org		Date	Time	-
		with SMO -	quired for 7 an	The second name of the second	and the last of the last of the last		11110		14, 1100				Oli	4	Date	типе	

Page 2 of 2

Project Nam	0:	SWMU 68 GWM	Project/	ask Manag	ger: C	linton Lun	1		Project/Tas	sk No.:	146422	.10.11.01		1
ech Area:		·								40 (00 (00 (00 (00 (00 (00 (00 (00 (00 (				
Building:		Room:					,							Lab use
Sample No.	Eraction	Sample Locati	on Detail	Depth (ft)	Date/Ti		Sample Matrix	Type	volume	Preserv-	Collection Method	Sample Type	Parameter & Method Requested	Lab
095736	-024	OBS-MW2	on Detail	252	,4/14/15/4	-	GW	AG	4x1 L	None	G		High Explosives (SW846-8321A mod.)	Sample
095736	-029	OBS-MW2		252	- 4/14/15 4	9:26	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
095736	-033	OBS-MW2		252	·4/14/154	9:27	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
095736	-034	OBS-MW2		252	4/14/184	9:28	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
095736	-035	OBS-MW2		252	14/14/154	9:29 -	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
095737	-001	OBS-TB2		NA	· 4/17/11/84	9:13	DIW	G	3x40 ml	HCL	G	тв	TCL VOC (SW846-8260B)	
					PK	4-16-1	4							
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Internal Lab															Page _	1 of 2
Batch No.						SMO Use					4			AR/COC	615	430
Project Name	e:	SWMU 68	B GWM	Date Sample	s Shipped:	4/16	114		SMO Au	thorization:	Done	Stern		Waste Characterization		
Project/Task	Manager:	Clinton Lu	ım	Carrier/Wayb	ill No.				SMO Co	ntact Phone	e:			RMMA		
Project/Task	Number:	146422.1	0.11.01	Lab Contact:		Edie Kent/8	303-556-8	3171		Lorraine H	Herrera/50	5-844-3199		Released by COC No.		
Service Orde	er:	CF263-14	1	Lab Destinati	on:	GEL			Send Re	eport to SMC	D:				√ 4°	Celsius
				Contract No.:		PO 130387	'3			Rita Kava	naugh/505	5-284-2553		Bill to:Sandia National Laboratories	(Accounts	Payable),
Tech Area:														P.O. Box 5800, MS-0154	0.000	*
Building:		Room:		Operationa	al Site:									Albuquerque, NM 87185-0154		
Comple No	F				Depth	Date/		Sample		ntainer		Collection		Parameter & Method		Lab
Sample No.	Fraction	Sar	mple Location D	etail	(ft)	Colle	- 4	Matrix	Туре	Volume	ative	Method	Type	Requested	S	Sample ID
095741	-001	OBS-MW	3		208	4/16/14	9:04	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		
095741	-002	OBS-MW	3		208	4/16/14	9:05	GW	AG	4x1 L ′	None	G	SA	TCL SVOC (SW846-8270C)		
095741	-009 🗸	OBS-MW	3		208	4/16/14	9:08	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020	(7470)	
095741	-014	OBS-MW	3		208	4/16/14	9:11	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-719	96A)	
095741	-016 ×	OBS-MW	3		208	4/16/14	9:12	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)		
095741	-017 🚩	OBS-MW	3		208	4/16/14	9:10	FGW 1	Р	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6	020)	
095741	-018 F	OBS-MW	3		208	4/16/14	9:13	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)		
095741	-020 <sup>V</sup>	OBS-MW	3		208	4/16/14	9:14	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)		
095741	-022	OBS-MW	3		208	4/16/14	9:15	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)		
095741	-024	OBS-MW	3		208	4/16/14	9:16 ₺	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-832	1A mod	
Last Chain	:	✓ Yes			Sample	Tracking		SMC	) Use	Special Ins	structions	/QC Requi	rements:		Conditi	ions on
Validation	Req'd:	✓ Yes			Date En	tered:				EDD		✓ Yes		No	Rec	ceipt
Backgroun	ıd:	Yes			Entered	by:				Turnaroun	nd Time	7 Da	ıy*	15 Day* 30 Day		1,011
Confirmate	ory:	Yes			QC inits.	.:				Negotiated	TAT					
Sample	N	lame	Signat	ure	Init.	Compan	y/Organiza	tion/Phon	e/Cell	Sample Di	sposal	Retur	n to Clien	t Disposal by Lab		
Team	Robert L	ynch	LAHIM		JUL	SNL/4142/5	05-844-401	13/505-25	0-7090	Return Sa		}				
Members	Alfred Sa	antillanes	Helpil Seo	yell-	als	SNL/4142/5				Comments			Tim Jackso	n/4142/MS 0729/284-2547		
	William (		Willians	8.21	RILL	SNL/4142/5								sis using SW846-6850M. FGW,		
			//	1001	100					filtered in fiel	d using a 0.	45 micron in-	line filter. Re	eport Anions ( as Br,Cl,F,SO4),		
		4	V							Alkalinity (as isotopes).	total CaCO	3,HC03,C03	). Gamma	Spectroscopy (as short list	Lab	Use
1.Relinquish	ed by	And S.	et.00	Org.4/14.	2 Date	4/16/14	/ Time /	957	3 Relino	uished by			Org	. Date	Time	056
1. Received	/1	~Wal		Org.4/4			4 Time 0		3. Rece				Org		Time	
2.Relinquish	, ,,	P P P O	,	Org.	Date		Time	13/		uished by			Org		Time	
2. Received				Org.	Date		Time		4. Rece				Org		Time	
	-,			9.			11110						Old	. Date	111110	

<sup>\*</sup>Prior confirmation with SMO required for 7 and 15 day TAT

Page 2 of 2

AR/COC 615430 SWMU 68 GWM Project Name: Project/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Collection Sample Parameter & Method Lab Preserv-Sample No. Fraction Sample Location Detail Collected Matrix (ft) Type Volume ative Method Type Requested Sample ID **OBS-MW3** 4/16/14 095741 -029 / 208 9:19 GW 250 ml NaOH G SA Total Cyanide (SW846-9012) -033 ' 9:20 / P 095741 OBS-MW3 208 4/16/14 GW 1 L HNO3 G SA Gamma Spectroscopy (EPA 901.0) 095741 -034 OBS-MW3 208 4/16/14 9:22 GW P HNO3 G 1 L SA Gross Alpha and Beta (EPA 900.0) 095741 -035 -OBS-MW3 208 4/16/14 9:24 GW 1 L HNO3 G SA Isotopic Uranium (HASL 300) 9:04 095742 -001 OBS-MW3 208 4/16/14 GW G 3x40ml HCL G DU TCL VOC (SW846-8260B) 095742 -002 **OBS-MW3** 208 4/16/14 9:05 GW AG G 4x1 L DU None TCL SVOC (SW846-8270C) 095742 V -009 **OBS-MW3** 208 4/16/14 9:08 P GW G 500 ml HNO3 DU TAL Metals+U (SW846-6010/6020/7470) 4/16/14" 095742 -014 OBS-MW3 208 9:11 " GW P 250 ml None G DU Hexavalent Chromium (SW846-7196A) 9:12 4/16/14 095742 -016 OBS-MW3 208 GW P 125 ml None G DU Anions (SW846-9056) 4/16/14 9:10 095742√ -017 OBS-MW3 208 **FGW** 500 ml HNO3 G DU Metals-Ca, Mg, K, Na(SW846-6020) 4/16/14 095742 -018 V OBS-MW3 208 9:13/ GW 125 ml H2SO4 G DU Nitrate+Nitrite (EPA 353.2) 095742 020 V OBS-MW3 4/16/14 9:14 208 GW 250 ml G Perchlorate (EPA 314.0) None DU 4/16/14 9:15 095742 -022 **OBS-MW3** 208 GW P 500 ml G None DU Alkalinity (SM2320B) -024 4/16/14 095742 **OBS-MW3** 208 9:16 GW AG 4x1 L None G High Explosives (SW846-8321A mod -029 4/16/14 9:19 4 095742 OBS-MW3 208 GW 250 ml NaOH G DU Total Cyanide (SW846-9012) 095742 -033 OBS-MW3 4/16/14 9:20 P 208 GW HNO3 G 1 L DU Gamma Spectroscopy (EPA 901.0) 095742 -034OBS-MW3 208 4/16/14 9:22 GW 1 L HNO3 G DU Gross Alpha and Beta (EPA 900.0) 095742 -035**OBS-MW3** 208 4/16/14 9:24 GW 1 L HNO3 G DU Isotopic Uranium (HASL 300) 095743 -001 OBS-TB4 V NA 4/16/14 9:04 DIW G 3x40 ml HCL G TB TCL VOC (SW846-8260B) Recipient Initials

Internal Lab														Page 1 of 2
Batch No.					SMO Use					^	14	1	AR/COC	615429 1
Project Name	:	SWMU 68 GWM	Date Sample	s Shipped:				SMO Au	thorization:	Inn	Mayor	my	Waste Characterization	
		Clinton Lum	Carrier/Wayb	ill No.				SMO Co	ntact Phone	:		-	RMMA	
Project/Task		146422.10.11.01	Lab Contact:		Edie Kent/8	303-556-8	171		Lorraine F	lerrera/50	5-844-3199		Released by COC No.	
Service Order		CF263-14	Lab Destinati	on:	GEL			Send Re	port to SMC	):				√ 4° Celsius
			Contract No.:		PO 130387	73		1	Rita Kava	naugh/505	-284-2553		Bill to:Sandia National Laboratories (	Accounts Payable),
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operationa	al Site:									Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Location	Detail	Depth (ft)	Date/ ↓ Colle		Sample Matrix	Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample II
095738	-001/	OBS-FB2 <		NA	4/15/14	10:25	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095739	-001	OBS-EB1		NA	4/15/14	10:25	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	- L
095739	-002	OBS-EB1		NA	4/15/14	10:26	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
095739	-009 /	OBS-EB1		NA	4/15/14	10:28	DIW	Р	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7	470)
095739	-014	OBS-EB1		NA	4/15/14	10:31	DIW	Р	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196	iA)
095739	-016	OBS-EB1		NA	4/15/14	10:32	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)	
095739	-017/	OBS-EB1		NA	4/15/14	10:30	FDIW	Р	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na(SW846-60)	20)
095739	-018	OBS-EB1		NA	4/15/14	10:33	DIW	Р	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
095739	-020 ′	OBS-EB1		NA	4/15/14	10:34	DIW	Р	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
095739	-022	OBS-EB1		NA	4/15/14	10:35	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)	
Last Chain:		Yes		Sample	Tracking		SMC	) Use	Special In:	structions		rements:		Conditions on
Validation	Req'd:	✓ Yes		Date En	tered:				EDD		✓ Yes		No	Receipt
Backgroun	d:	Yes		Entered	by:				Turnaroun	d Time	7 Da	y*	15 Day* ✓ 30 Day	
Confirmato	ry:	Yes		QC inits	.:				Negotiated	TAT	Ш			
Sample	N	lame Signa	ature /	Init.	Compan	y/Organiza	tion/Phon	ie/Cell	Sample Di	sposal	Retur	n to Client	Disposal by Lab	
Team	Robert L	ynch Log G	ach	W	SNL/4142/5	05-844-401	13/505-25	0-7090	Return Sa	mples By:				
Members	Alfred S	antillanes Hylle	all-	and	SNL/4142/5	05-844-513	30/505-22	8-0710	Comments	s:	Send report to	Tim Jackson	n/4142/MS 0729/284-2547	
	William	Gibson Willey	2,21	711/2	SNL/4142/5	05-284-330	07/505-23	39-7367					sis using SW846-6850M. FDIW,	
			7	101									eport Anions ( as Br,Cl,F,SO4), Spectroscopy (as short list	
	-	1 00				1			isotopes).	total CaCO	0,71003,003	, Gairina	opeonoscopy (as short list	Lab Use
1.Relinquishe	ed by	Bel Sitille	-Org.4/4/.	2 Date	4/15/1	4/Time /	1:00	3.Relino	uished by			Org	. Date	Time
1. Received b		on Water	Org. 4/14		-/-/-		100	3. Rece				Org		Time
2.Relinquishe	ed by		Org.	Date		Time		4.Relino	quished by			Org		Time
2. Received b	ру		Org.	Date		Time		4. Rece	ived by			Org		Time
*Prior confir	mation v	vith SMO required for 7 ar	nd 15 day TA	Т										

Page 2 of 2

													AR/COC	61	5429
		SWMU 68 GWM	Project/Ta	Project/Task Manager: Clinton Lum						sk No.:	146422	2.10.11.01			
Tech Area:		I													
Building: Room:		Room:					Sample								Lab use
2 0 00				Depth		Date/Time				Preserv-					Lab
V	e No. Fraction Sample Location D		on Detail	(ft)	Colle	7	Matrix	Туре	Volume	ative	Method	Type	Requested		Sample ID
095739	-024 /	OBS-EB1		NA	4/15/14	10:36	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mo	od.)	
095739	-029 <	OBS-EB1		NA	4/15/14	10:38	DIW	Р	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)		
095739	-033	OBS-EB1		NA	4/15/14	10:39	DIW	Р	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 9	01.0)	
095739	-034	OBS-EB1		NA	4/15/14	10:40/	DIW	Р	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 96	(0.00	
095739	-035	OBS-EB1		NA	4/15/14	10:41	DIW	Р	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)		
095740	-001	OBS-TB3		NA	4/15/14	10:25	DIW	G	3x40 ml	HCL	G	ТВ	TCL VOC (SW846-8260B)		
Recipient In	itials														

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





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

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#### Memorandum

Date: June 5, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 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**

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

#### Total cyanide:

- 1. The intercept for total cyanide was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were NDs and will be **qualified UJ,15**.
- 2. Total cyanide was detected in the ICB and CCB at negative values with absolute values ≤ the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

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

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

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

#### **Calibration**

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

#### **Blanks**

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Chloride and nitrate/nitrite were detected at < the PQL in the EB, samples 346180022 and -023. The associated sample results were detects >5X the EB values and will not be qualified.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

#### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

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

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

#### Nitrate/Nitrite:

Sample -006 was diluted 5X and samples -035 and -046 were diluted 10X.

#### Anions:

Sample -005 was diluted 5X for chloride, sulfate and fluoride and samples -034 and -045 were diluted 10X for chloride and sulfate.

#### Other QC

An FB was submitted with AR/COC 615425 but was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. 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: Mary Donivan Level: I Date: 06/09/14





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

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#### Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 Laboratory: GEL

Project/Task: 146422.10.11.01 Analysis: High Explosives (HE)

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

#### **Summary**

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

1. The ICAL RFs for m-nitrotoluene and p-nitrotoluene were <0.05 but  $\ge 0.01$ . All associated sample results were NDs and will be **qualified UJ,14**.

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

#### **Holding Times**

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

#### **Instrument Tune**

The instrument tune was not reported or evaluated.

#### Calibration

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

#### **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met all QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

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

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

#### Other QC

An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. 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: Mary Donivan Level: I Date: 06/09/14





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

www.aqainc.net

#### Memorandum

Date: June 5, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 and 346183

Laboratory: GEL

Project/Task: 146422.10.11.01

Analysis: Metals

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

#### **Summary**

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

#### ICP-MS:

- 1. Cu was detected at < the PQL in the unfiltered EB, sample 346180021. The associated sample results were detects <5X the EB value and will be **qualified 0.0038U,B2** at 5X the EB value.
- 2. The original Mg and K results for the unfiltered serial dilution parent sample were >50X the MDL and the serial dilution %Ds were >10%. The associated results for samples 346180015 and -021 were NDs and will be **qualified UJ,D1**. The remaining associated sample results were detects and will be **qualified J,D1**.

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

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

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

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

The ICP-MS tunes met QC acceptance criteria.

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Reporting Limit Verification**

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

#### **Blanks**

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Na was detected at < the PQL in the filtered EB, sample 346183002 and the unfiltered EB, sample 346180021. All associated sample results were detects >5X the EB concentrations and will not be qualified.

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

The ICP-MS internal standards met QC acceptance criteria.

#### Matrix Spike (MS)

The MS met all QC acceptance criteria.

#### ICP-MS:

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

#### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

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

All detection limits were properly reported. Sample 346180004 was diluted 5X for Na and samples -033 and -044 were diluted 5X for Ca. Samples 346183001 was diluted 5X for Na and Mg and samples -003 and -004 were diluted 5X for Ca and Mg.

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

Results of the ICS A and AB analyses were not evaluated because the sample concentrations of Ca, Mg, Fe and Al were < those in the ICS solution.

#### **ICP Serial Dilution**

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

#### Other QC

An unfiltered FB was submitted with AR/COC 615425 but was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. 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: Mary Donivan Level: I Date: 06/09/14





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

www.againc.net

#### Memorandum

Date: June 5, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 Laboratory: GEL

Project/Task: 146422.10.11.01

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) and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

#### All analyses:

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

#### Gross Alpha/Beta:

- 1. For batch 1380009, the relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC sample was >5 and, as a result, the MS/MSD analyses were not used to evaluate the gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1.**
- 2. All sample results that were > the MDA but  $\le 3X$  the MDA will be **qualified J,FR7.**

#### Gammaspec:

1. The Am-241 result for sample -040 was negative with an absolute value >2X the MDA. The associated sample result will be **qualified R,FR4**.

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

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

#### 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**

No tracers or carriers were required for these methods.

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

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

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

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

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

#### Other QC

An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. 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:** Mary Donivan Level: I Date: 06/09/14





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

www.againc.net

#### Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 Laboratory: GEL

Project/Task: 146422.10.11.01

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 methods EPA 3510C/8270D (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD RPDs were > acceptance criteria for benzo(g,h,i)perylene and dibenzo(a,h)anthracene. The associated sample results were NDs and will be **qualified UJ,MS5**.

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

#### **Calibration**

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The ICAL %RSDs were >15% but ≤40% for atrazine and 2-methyl-4,6-dinitrophenol. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met except as noted above in the Summary section and as follows. The MS/MSD recoveries were > the UAL for hexachlorocyclopentadiene. The associated sample results were NDs and will not be qualified.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

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

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

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

#### Other QC

An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. 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: Mary Donivan Level: I Date: 06/09/14





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#### Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 8/58 GWM

AR/COC: 615424, 615425 and 615426

SDG: 346180 Laboratory: GEL

Project/Task: 146422.10.11.01

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**

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

- 1. The ICAL %RSD was >15% but ≤40% for dibromochloromethane. The associated result for sample 346180014 was a detect and will be **qualified J,I3**.
- 2. The ICV %D was >20% with positive bias for dibromochloromethane. The associated result for sample -014 was a detect and will be **qualified J+,C2**.

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 time 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 ICAL %RSDs were >15% but ≤40% for dibromochloromethane; bromoform; 1,2-dibromo-3-chloropropane; 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene. All remaining associated sample results were NDs and since a positive ICV/CCV is not considered a second infraction, will not be qualified.

The ICV and/or CCV %Ds for nine target compounds (see worksheet) were >20% with positive bias. The remaining associated sample results were NDs and will not be qualified.

The CCV %Ds for seven target compounds (see worksheet) were >20% but ≤40% with negative bias. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks except as follows. Bromodichloromethane was detected at < the PQL and chloroform at > the PQL in the EB, sample -019 and the FBs, samples -001 and -014. Dibromochloromethane was detected at < the PQL in the FB, sample -014. All associated sample results were NDs and will not be qualified.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met except as follows. The MSD recovery for 4-methyl-2-pentanone was slightly < the LAL. The LCS and MS recoveries and MS/MSD RPDs were in criteria and, therefore, no data were qualified based on professional judgment.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

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

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

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

#### Other QC

Three TBs were submitted, one for each AR/COC. FBs were submitted with AR/COC 615424 and 615425. The FB submitted with AR/COC 615425 was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field

duplicate pair was submitted with	AR/COC 615426.	There are no '	"required"	review cri	iteria for fiel
duplicate analyses comparability;	no data will be qua	lified as a res	ult.		

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 06/09/14



## Sample Findings Summary



AR/COC: 615424, 615425, 615426

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	095725-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	095725-034/CCBA-MW1	BETA (12587-47-2)	J, MS1
	095728-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	095728-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	095730-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	095731-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	095731-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	095725-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	095725-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	095725-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	095725-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	095728-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	095728-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095728-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095728-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095730-033/CCBA-MW2	Americium-241 (14596-10-2)	R, FR4
	095730-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095730-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095730-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	095731-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	095731-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095731-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095731-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095725-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	095725-009/CCBA-MW1	Potassium (7440-09-7)	J, D1
	095727-009/CCBA-FB2	Magnesium (7439-95-4)	UJ, D1
	095727-009/CCBA-FB2	Potassium (7440-09-7)	UJ, D1
	095728-009/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
	095728-009/CCBA-EB1	Potassium (7440-09-7)	UJ, D1
	095730-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095730-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095730-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
	095731-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095731-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095731-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	095725-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095725-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095728-002/CCBA-EB1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095728-002/CCBA-EB1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095730-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095730-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095731-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095731-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
SW846 3535/8321A Modifie		AU (00 00 4)	
	095725-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	095725-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	095728-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	095728-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	095730-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	095730-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	095731-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095731-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8260B DOE-AL			
	095727-001/CCBA-FB2	Dibromochloromethane (124-48-1)	J+, I3,C2
SW846 9012B			
	095725-029/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	095728-029/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4
	095730-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4
	095731-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4

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

## **Data Validation Summary Worksheet**

 AR/COC #: 615424, 615425 and 615426
 Site/Project: SWMU 8/58 GWM
 Validation Date: 06/04/2014

 SDG #: 346180 and 346183
 Laboratory: GEL
 Validator: Linda Thal

Matrix: Aqueous # of Samples: 57 CVR present: Yes Analysis Type: X□ Organic X□ Metals

 $AR/COC(s) \ present: Yes \\ \hspace{3cm} Sample \ Container \ Integrity: OK \\ \hspace{3cm} X \square \ Rad \ X \square \ Gen \ Chem$ 

		Requ	ested Analy	ses Not R	eported	
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments
None						

	Hold Time/Preservation Outliers														
Sample Number	Sample Number Laboratory ID Analysis Pres. Coll. Date Prep. Date Anal. Date Anal. Date 2X I														
None															
	_	_		_											

Comments: Sampled 04/7 and 04/8/2014

Validated by: X Mal

## **Organic Worksheet (GC/MS)**

AR/COC #: 615424, 615425 and 615426 SDG #: 346180 Matrix: Aqueous

Laboratory Sample IDs: 346180001, -002, -013, -014, -019, -030, -031, -042 and -053

Method/Batch #s: 8260B: 1381208 Tuning (pass/fail): Pass TICs Required? (yes/no): No

				5X				MS/		FB-				
Analyte (outliers)	Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D	MB	(10X) MB	LCS %R	MS %R	MSD %R	MSD RPD	EB -019	014 Di water	FB -001	TBs
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.49J	.52J	.52J	✓
Trichlorotrifluoroethane	NA	✓	✓	-28	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.01	3.43	3.33	✓
Dibromochloromethane	NA	✓	18.5	(+24)	✓	NA	✓	✓	✓	✓	✓	.31J	✓	✓
Acetone	✓	NA	✓	-36	✓	NA		✓	✓	✓	✓	✓	✓	✓
Bromoform	NA	✓	23.7	(+34)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dibromo-3-chloropropane	NA	✓	29.0	(+30)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,4-Trichlorobenzene	NA	✓	20.4	(+42) +22	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,3-Trichlorobenzene	NA	✓	23.5	(+46)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Methyl acetate	NA	✓	✓	-39	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-Butanone	NA	✓	✓	-38	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon disulfide	NA	✓	✓	(+21)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon tetrachloride	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Styrene	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Isopropylbenzene	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	<b>√</b>	✓	✓	✓
4-Methyl-2-pentanone	NA	✓	<b>√</b>	-26	<b>√</b>	NA	<b>√</b>	<b>√</b>	69.4	✓	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>
2-Hexanone	NA	✓ ✓	<b>√</b>	-24	<b>√</b>	NA	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	✓ ✓
1,1,2,2-Tetrachloroethane	NA			-21 rrogate Ro	•	NA		<b>✓</b>				<b>V</b>	<b>✓</b>	
				iiiogaic Ki		utilets								
Sample ID														
None														
IS Outliers														
Sample ID Area	RT	Area	RT	Area	RT		Area	RT		Area	RT	Ar	ea	RT
None														

Comments: HTs OK. ICAL VOA6.I 03/28/2014; Acetone, methylene chloride linear. MS/MSD performed on -002 spiked with trichlorotrifluoroethane;

## **Organic Worksheet (GC/MS)**

AR/COC #: 615424, 615425 and 615426 SDG #: 346180 Matrix: Aqueous

Laboratory Sample IDs: 346180003, -020, -032 and -043

Method/Batch #s: 3510C/8270D: 1379059(prep)/1379060 Tuning (pass/fail): Pass TICs Required? (yes/no): No

		Calil	oration			5X				MS/				
Analyte (outliers)	Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D	МВ	(10X) Blank	LCS %R	MS %R	MSD %R	MSD RPD	EB -020			
2-Methyl-4,6-dinitrophenol	NA	✓	18	✓	✓	NA	✓	✓	✓	✓	✓			
Atrazine	NA	✓	17	✓	✓	NA	✓	✓	✓	✓	✓			
Hexachlorocyclopentadiene	NA	✓	✓	✓	✓	NA	✓	76.7	75.9	✓	✓			
Benzo(g,h,i)perylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	30.6	✓			
Dibenzo(a,h)anthracene	NA	✓	✓	✓	✓	NA	✓	✓	✓	31.0	✓			
	•	•	S	urrogate	Recovery	Outliers		•	•					
Sample ID														
None														
				IS	Outliers									
Sample ID Area RT	Ar	ea	RT	Area	F	RT	Area	RT		Area	RT	Are	ea	RT
None														

Comments: HTs OK; MS/MSD on sample -003; ICAL MSD2.I 04/02/2014

## **High Explosives Worksheet (LC/MS/MS)**

AR/COC #: 615424, 615425 and 615426 SDG #: 346180 Matrix: Aqueous

Laboratory Sample IDs: 346180009, -026, -038 and -049 Method/Batch #s: 3535/8321A: 1379002(prep)/1379003

	Initi	ial Calil		Cor	ntinuing	Calibra	ation	Method	5X	LCS	MS	MSD	MS/		ЕВ		
Analyte (Outliers)	Int.	RF	COD RSD/R <sup>2</sup>	ICV	CCV %D	ICB	ССВ	Blank	(10X) Blank	%R	%R	%R	MSD RPD	CRI	-026		
m-Nitrotoluene	NA	.0395	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	<b>✓</b>		
p-Nitrotoluene	NA	.025	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
																-	
						Surre	gate Re	covery O	utliers								
Sample ID																	
None																	
	•			1		Inte	rnal Sta	ndard Ou	tliers					· I			
Sample ID	Are	a	RT		Samp	le ID		Area	RT		S	ample ID		Ar	ea	RT	
None																	
												-					

Comments: HTs OK. MS/MSD on -009. primary analytes only; LCMSMS#3. all sample and QC extracts diluted 1:1 with HPLC grade water

### **Inorganic Metals Worksheet**

AR/COC #: 615424, 615425 and 615426

SDG #: 346180 and 346183

Laboratory Sample IDs: 346180004, -015, -021, -033 and -044 (UF); 346183001 thru -004 (F – Na, K, Mg and Ca only)

Method/Batch #s: **3005/6010B**: 1378897/1378898 (UF); **3005/6020**: 1385683/1385684 (UF); 1385685/1385686 (F) **7470A**:1382563/1382564 (UF)

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Int.	$\mathbb{R}^2$	Cali	bration	ICB ug/L	CCB ug/L	MB mg/L	5X Blank or (5X MDL)	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R	EB -021 UF (X5)	FB -015 DI water	EB -002 (F)	X5
UF								mg/L						(mg/2)					
Cu	✓	<b>✓</b>	<b>√</b>	<b>✓</b>	<b>√</b>	✓	<b>✓</b>	NA	<b>✓</b>	<b>✓</b>	✓	✓	NA	NA	✓	.000751J (.0038)	.000628J		
Mg	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	12.6	NA	NA	✓	✓	✓		
Na	<b>✓</b>	✓	✓	✓	<b>✓</b>	<b>✓</b>	<b>✓</b>	NA	✓	NA	<b>√</b>	<b>✓</b>	NA	NA	✓	.121J (.605)	.107J		
K	<b>√</b>	✓	✓	✓	<b>√</b>	<b>√</b>	✓	NA	✓	✓	✓	14	NA	NA	✓	✓	✓		
F																			
Na	✓	✓	✓	<b>✓</b>	✓	✓	✓	NA	✓	NA	✓	✓	NA	NA	✓			.15J	.75
																<u> </u>			

	IS Outliers	60-125%		IS Outliers 80-120%							
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery				
None				None							

Comments: HTs OK; matrix QC on samples 346180004 (UF - All); 346183001 (F); Ca, Mg, Na >4X spike amount;

Ca diluted 5X for samples 346180033, -044 Na diluted 5X for sample 346180004 346183001 diluted 5X Na and Mg 346183003, -004 diluted 5X Ca, Mg

Matrix: Aqueous

### **General Chemistry Worksheet**

AR/COC #: 615424, 615425 and 615426 SDG #: 346180 Matrix: Aqueous

Laboratory Sample IDs: 346180 - see below

Method/Batch #s: SW846 9010C/9012A (Total Cyanide): 1378230/1378231; -010, -027, -039, -050

Method/Batch #s: EPA 314.0 (Perchlorate): 1378827; -007, -024, -036, -047

Method/Batch #s: SW846 9056 (Anions): 1379342; -005, -016, -022, -034, -045 Method/Batch #s: EPA 353.2 (NO<sub>3</sub>/NO<sub>2</sub>):1379711; -006, -017, -023, -035, -046

Method/Batch #s: SM 2320B (Alkalinity): 1379161; -008, -018, -025, -037, -048

			C	Calibration	1			5X								
Analyte (outliers)	Int.	$\mathbb{R}^2$	ICV	CCV	ICB mg/L	CCB mg/L	Method Blank	Blank or (5X MDL)	LCS %R	MS %R	MSD %R	MS/ MSD RPD	Lab Rep. RPD	Partial/ Total RPD	EB -022 -023	FB -16
Chloride	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	NA	NA	✓	NA	.0983J	.0911J
Nitrate/nitrite	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	NA	NA	✓	NA	.0234J	✓
Total cyanide	003	✓ 	✓ 	<b>✓</b>	00233J	00309J	<b>√</b>	NA	<b>√</b>	<b>√</b>	NA	NA	<b>✓</b>	NA	<b>√</b>	NA

Comments: HTs OK. FB for Anions, N/N and alkalinity only

Matrix QC from this SDG for TCN (-010), perchlorate (-007), anions (-005), NO<sub>3</sub>/NO<sub>2</sub> (-006), alkalinity (-008)

Fl, Cl and SO4: 5X -005; Cl and SO4 10X -034 and -045 NO<sub>3</sub>/NO<sub>2</sub>: 5X -006; 10X -035 and -046

### **Radiochemistry Worksheet**

AR/COC #: 615424, 615425 and 615426 SDG #: 346180 Matrix: Aqueous

Laboratory Sample IDs: 346180-see below

Method/Batch#s: EPA 901.1 Gammaspec: 1378843; -011, -028, -040, -051

Method/Batch#s: EPA 900.0 Gross alpha/beta: <sup>1</sup>1380009; -012, -029 -041, -052 <sup>2</sup>1385543; -041, -052 (beta only)

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	N	MS/ MSD RER	Lab Rep. RER	ЕВ			
None														
	1													
	•		•	Tracer/C	arrier Re	covery Ou	tliers				•			
Sample ID	Tracer/Ca	rrier %	R	Sample ID		Tracer/	Carrier	%R		Sample 1	ID	Trac	er/Carrier	%R
None														

 $Comments: Matrix\ QC\ GS\ \text{-}011,\ gross\ alpha/beta\ DUP\ and\ MS/MSD\ performed\ on\ \text{-}012\ and\ \text{-}041$ 

Data rejected by the lab: Am-241 in the duplicate.

<sup>&</sup>lt;sup>1</sup>Gross A and gross B parent and DUP =200ml, MS/MSD = 25ml (8X dilution) –qual.

<sup>&</sup>lt;sup>2</sup>Gross B parent and DUP =150ml, MS/MSD = 50ml (3X dilution) –no qual.

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	v luty															Page _1_ of _2
Batch No.							SMO Use		-						AR/COC	615424
Project Nam	e:		SWMU 8	/58 GWM	Date Sample	es Shipped	4/7/14			ISMO A	uthorization:	Ans	150		Waste Characterization	0.0.21
Project/Task	Mana	ger:	Clinton L	um	Carrier/Way		2178	062		-	ontact Phone	a.	, , , ,		RMMA	
Project/Task	Numb	er:	146422.1	10.11.01	Lab Contact		Edie Kent/8		3171				5-844-3199		Released by COC No.	
Service Orde	er:		CF262-1	4	Lab Destinat	tion:	GEL			Send R	eport to SMC		0-044-0100		Released by COC No.	☑ 4º Celsius
					Contract No.		PO 130387	'3		100	7.0	500	5-284-2553		Pill to: Condia National Laboratoria	
Tech Area:											Tita Itava	inaugii/500	3-204-2000		Bill to:Sandia National Laboratories	(Accounts Payable),
Building:			Room:		Operation	al Site:									P.O. Box 5800, MS-0154	
					To portune.	Depth	Date/1	Timo	Sample		ontainer	D	Callagtian	0	Albuquerque, NM 87185-0154	
Sample No.	Fract	ion	Sa	mple Location D	)etail	(ft)	Collec		Matrix	Type	Volume	Preserv- ative	Collection Method	Sample		Lab
				•	- Ottain	<b> </b> ` '			WatilA	Туре	Volume	alive	Wethod	Туре	Requested	Sample ID 346180
095724	-001		CCBA-FE	31 /		NA .	4/7/14	9:35 ′	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	001
095725	-001		CCBA-M	W1		79	4/7/14	9:35 🗸	GW	G	3x40ml	HCL	G	C 4	TCL \/OC /C\/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	346180
/							177711	/	OVV	<u> </u>	3,401111	HCL	G	SA	TCL VOC (SW846-8260B)	346180
095725	-002		CCBA-M	W1		79	4/7/14	9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	003
095725	-009		CCBA-M\	Λ/1		79	4/7/14	9:37	GW	P	500 ml	HNO3	G	0.4		346180
_							7///14	9.51 /	GW	F	500 mi	HNU3	G	SA	TAL Metals+U(SW846-6010/6020/7	
095725	-016	1	CCBA-M\	W1		79	4/7/14	9:40	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	346180
095725	-017	1	CCBA-M\	Λ/1		79	4/7/14	9:39	FGW	Р	5001	LINIOS				34/2/82
							4///14	9.39	FGVV	P -	500 ml	HNO3	G	SA	Metals Ča,Mg,K,Na(SW846-60	
095725	-018	*	CCBA-M\	W1		79	4/7/14	9:41	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180
095725	-020	V	CCBA-M\	Λ/1		79	4/7/14	9:42	GW	Р	050!					346180
			154			13	4///14	9.42	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	007
095725	-022		CCBA-M\	<i>N</i> 1		79	4/7/14	9:43	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	346180
095725	-024	-	CCBA-M\	٨/1		79	4/7/14	9:44	GW		4-4-1					346180
Last Chain			Yes	7 1			Tracking	9.44		AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mo	
Validation	_		✓ Yes						SMC	Use	Special Ins	structions		ements:		Conditions on
Backgroun	•	·	1 103			Date Ent			20		EDD		Yes		No	Receipt
			Yes			Entered					Turnaroun		7 Day	<u> </u>	<u>15 Day*</u>	
Confirmato	ry:		☐ Yes			QC inits.					Negotiated	TAT				
Sample		2.00	me	Signati	ire	Init.		/Organizati		2000 - 1930 Published	Sample Dis	sposal	☐ Return	to Client	Disposal by Lab	
Team	Rober			word			SNL/4142/50				Return San	nples By:		5		
Members		35,37000	ntillanes	Alfert 5 g	fully		SNL/4142/50	5-844-513	0/505-22	8-0710	Comments				n/4142/MS 0729/284-2547	
	Willia	n G	ibson	Millian	Kell !	21128	SNL/4142/50	5-284-330	7/505-23	9-7367	If Perchlorate	detected,pe	erform verifica	tion analys	is using SW846-6850M. FGW,	
						1,					filtered in field	l using a 0.4	5 micron in-li	ne filter. Re	eport Anions (as Br,CI,F,SO4),	
		A A								_	isotopes).	iolai CaCO3	,HCO3,CO3)	and Gami	ma Spectroscopy (as short list	Lab Use
1.Relinquishe	d by	14	4850	titl	Org.4/14-	2 Date	4/7/14	/ Time /	:15	3.Relino	uished by			Org.	Date	Time
1. Received b	y /	1/5	-w	lumh	Org. 4/4		4/1114			3. Rece				Org.	Date	Time
2.Relinquishe	d by	2	awa	Genna	Org.4/4 L	Date	4/7/19	- /0	10	AND DESCRIPTION OF THE PARTY OF	uished by			Org.	Date	Time
2. Received b	y	1	11	27-	Org. Ger		4-8-14	Time O	715	4. Rece				Org.		
*Prior confir	nation	wit	h SMO re	quired for 7 and			1-014	, iii 0	12	T. 11000	ived by			Oig.	Date	Time

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

													Pa	ge <u>2</u> of <u>2</u>
			-							1			AR/COC 6	ge <u>2</u> of <u>2</u> 15424
Project Nam	e:	SWMU 8/58 GWM	Project/Ta	sk Mana	ger:	Clinton Lur	n		Project/Ta	sk No.:	146422	2.10.11.01		
Tech Area:		_			^									
Building:		Room:												Lab use
				Depth	Date/		Sample		ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fractio	on Sample Location	Detail	(ft)	Colle	cted	Matrix	Type	Volume	ative	Method	Туре	Requested	Sample ID
095725	-029 ′	CCBA-MW1		79	4/7/14	9:46	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	346180
095725	-033	CCBA-MW1		79	4/7/14	9:47	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	346180
095725	-034	CCBA-MW1		79	4/7/14	9:48	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	346180 011 346180 012
095726	-001	CCBA-TB1		NA	4/7/14	9:35 /	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	346180
		= _ ×				u u							=	
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							8							
														Fig. 10-1
														A PLAN
					4									
				2										Trip car
														10. TGP (4.19
							×							
	18471	, /						N. State				Part I surv	TO THE SHALL SHAW SHIP WAS A SHARL SHAW A SH	
Recipient Init	ials_/	nje												
		•		7										

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	,													Page _1_ of _2_
Batch No. N	A				SMO Usé	/					100	1	AR/COC	615425
Project Name	š:	SWMU 8/58 GWM	Date Sample:	s Shipped:	4/	8/14	P. H. S. L.	SMO A	uthorization	De la	G. F.		Waste Characterization	0.0.20
		r: Clinton Lum	Carrier/Wayb		24-	1090	_		ontact Phone		Ch		RMMA	
Project/Task	Number:	146422.10.11.01	Lab Contact:		Edie Kent/			1			5-844-3199		Released by COC No.	
Service Orde	r:	CF262-14	Lab Destination	on:	GEL			Send R	eport to SMC		3 0 1 1 0 100		The released by ede No.	
			Contract No.:		PO 13038	73	No. 15	1			5-284-2553		Bill to:Sandia National Laboratories	
Tech Area:											2012000		P.O. Box 5800, MS-0154	s (Accounts Payable),
Building:		Room:	Operationa	al Site:			-						,	
				Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample	Albuquerque, NM 87185-0154	
Sample No.	Fraction	n Sample Location I	Detail	(ft)	Colle		Matrix	Туре	Volume	ative	Method	Type	Parameter & Method Requested	Lab
095727	-001	CCBA-FB2 ′		NA	4/7/14	13:19 /	DIW	G	3x40ml	HCL	G	FB	·	346186
							Divv	-	3,401111	TICL		ГБ	TCL VOC (SW846-8260B)	346180
095727	-009	CCBA-FB2		NA	4/7/14	13:19	DIW	Р	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/	7470) 015
095727	-016	CCBA-FB2		NA	4/7/14	13:19 ′	DIW	P	125 ml	None	G	FB	Anions (SW846-9056)	346180
095727	-018	CCBA-FB2		NA	4/7/14	13:19′	DIW	Р	125 ml	H2SO4	G	FB	Nitrate+Nitrite (EPA 353.2)	346180
095727	-022	CCBA-FB2		NA	4/7/14	13:19	DIW	Р	500 ml	None	G	FB	Alkalinity (SM2320B)	346180
095728	-001	CCBA-EB1		NA	4/7/14	13:19	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	346180
095728	-002	CCBA-EB1		NA	4/7/14	13:20	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	346180
095728	-009	CCBA-EB1	-	NA	4/7/14	13:22	DIW	Р	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/	346180 7470) 021
095728	-016	CCBA-EB1		NA	4/7/14	13:25	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)	346180
095728	-017	CCBA-EB1	-	NA	4/7/14	13:24	FDIW	Р	500 ml	HNO3	G	EB	Metals Ca,Mg,K,Na(SW846-6	020) 346183
Last Chain		Yes		Sample	Tracking		SMC	) Use	Special Ins	structions	QC Requir	ements:		Conditions on
Validation	- 10-70-00 B 10-10-10-1	✓ Yes		Date Ent	ered:				EDD		✓ Yes		No	Receipt
Backgroun		Yes	=	Entered	by:				Turnaroun	d Time	7 Day	<u>'</u>	<b>15 Day</b> *	
Confirmato	ry:	Yes		QC inits.					Negotiated	TAT				
Sample	N	Name Signat	ture	Init.	Compan	y/Organizat	ion/Phon	e/Cell	Sample Dis	sposal	Return	to Client	☑ Disposal by Lab	
Team	Robert L			pe	SNL/4142/5	05-844-401	3/505-25	0-7090	Return Sar	nples By:				
Members	Alfred Sa	antillanes ////	gee_	deg	SNL/4142/5	05-844-513	0/505-22	8-0710	Comments	:	Send report to	Tim Jackson	/4142/MS 0729/284-2547	
	William	Gibson William	All 1	W/2	SNL/4142/5	05-284-330	7/505-23	9-7367	If Perchlorate	detected,pe	rform verifica	tion analysi	is using SW846-6850M, FDIW.	
		0		00					filtered in field	d using a 0.4	5 micron in-lir	ne filter. Re	port anions (as Br,Cl,F,SO4),	
	1	1							isotopes).	iolai CaCO3	,нсоз,соз),	and gamm	na spectroscopy (as short list	Lab Use
1.Relinquishe	d by	Und Soitella	-Org.4/142	2 Date	4/7/14	/ Time /4	1:03	3.Reling	uished by			Org.	Date	Time
1. Received b	y Ale	alim	Org. 4/42	Date	41/7/19		103	3. Recei				Org.	Date	Time
2.Relinquishe	d by	In witend	Org. 4142		4/19/14		000	4.Relina	uished by			Org.	Date	Time
2. Received b	y	Mh Klyr	Org. Cel	Date	4914	Time O		4. Recei				Org.	Date	Time
*Prior confin	nation w	vith SMO required for 7 and			01							<u></u>	Date	TITLE

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

													Pa	ge <u>2</u> of <u>2</u>
											-		AR/COC 61	15425
Project Nam	e:	SWMU 8/58 GWM	Project/Ta	sk Mana	ger:	Clinton Lur	n		Project/Ta	sk No.:	146422	2.10.11.01		
Tech Area:		T					5						1	
Building:		Room:					1							Lab use
Sample No.	Fraction	n Sample Location [	Dotail	Depth (ft)	Date/		Sample		ntainer	7	Collection			Lab
095728	-018	CCBA-EB1	Jetan		Colle		Matrix	Туре	Volume	ative	Method	Туре	Requested	346/80
				NA	4/7/14	13:26	DIW	Р	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	023
095728	-020	CCBA-EB1		NA	4/7/14	13:27	DIW	Р	250 ml	None	G	EB	Perchlorate (EPA 314.0)	346180
095728	-022	CCBA-EB1		NA	4/7/14	13:28 ′	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)	346180
095728	-024	CCBA-EB1		NA	4/7/14	13:29	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod.)	346180
095728	-029	CCBA-EB1		NA	4/7/14	13:31	DIW	Р	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	346180
095728	-033	CCBA-EB1		NA	4/7/14	13:32	DIW	Р	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	346180
095728	-034	CCBA-EB1		NA	4/7/14	13:33-/	DIW	Р	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	346180
095729 *	-001	CCBA-TB2		NA	4/7/14	13:19 <sup>J</sup>	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	346180
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Recipient Init	ials_///	<u>K</u>												
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## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page <u>1</u> of <u>2</u>
Batch No.						SMO Use								AR/COC	615426
Project Nam	e:	SWMU 8	8/58 GWM	Date Sampl	es Shipped	: 4/8/	14		ISMO A	uthorization:	1)00	) - to-	1	Waste Characterization	010120
Project/Task			_um	Carrier/Way	bill No.	21700				ontact Phone		vacy	my -	RMMA	
Project/Task	Numbe	r: 146422.	10.11.01	Lab Contact	i .	Edie Kent/8		3171	1			5-844-3199		Released by COC No.	
Service Orde	er:	CF262-1	14	Lab Destina	tion:	GEL			Send R	eport to SMC		0 011 0100		Released by COC No.	√ 4° Celsius
				Contract No	.:-	PO 130387	73		1			5-284-2553		Pill to: Sandia National Laboratoria	
Tech Area:										Tilla Tiavo	augii/oot	20+ 2000		Bill to:Sandia National Laboratories P.O. Box 5800, MS-0154	Accounts Payable),
Building:		Room:		Operation	al Site:									_	
				<u> </u>	Depth	Date/	Time	Sample		ontainer	Preserv-	Collection	Commis	Albuquerque, NM 87185-0154	N. 10. 10. 10. 10.
Sample No.	Fractio	on Sa	ample Location D	Detail	(ft)	Colle		Matrix	Type	Volume	ative	Method	Sample Type	Parameter & Method	Lab
095730	-001	ССВА-М	11/12			1/0/44	0.07/		7.				Type	Requested	346/80
093730		CCBA-IV	IVVZ		117	4/8/14	9:27 *	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	031
095730	-002	CCBA-M	IW2		117	4/8/14	9:28	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346180
095730	-009	ССВА-М	11.4./2		447	4/0/44	/						- O/	102 3700 (377840-82700)	346180
093730	1-009	CCDA-IVI	IVVZ		117	4/8/14	9:32	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/74	
095730	-016	CCBA-M	IW2		117	4/8/14	9:35	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346180
095730	-017	ССВА-М	11/1/2		447	41044	/				110110		- OA	Amons (377840-9030)	246183
093730		CCBA-IVI	IVVZ		117	4/8/14	9:34	FGW	Р	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-602	20) 003
095730	-018	CCBA-M	W2		117	4/8/14	9:36	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180
095730	-020	CCBA-M	W2		117	4/8/14	9:37~	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346180
095730	-022	ССВА-М	W2	4	117	4/8/14	9:38	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	346180
095730	-024	ТССВА-М	\\//2		117	4/8/14	0.20 %	014						r and and (CM2C2CD)	346180
095730	-029	CCBA-M					9:39	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod	,
Last Chain	200	✓ Yes	VVZ		117	4/8/14	9:43	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	346180
						Tracking		SMO	Use	Special Ins	tructions	,	ements:	N. S.	Conditions on
Validation	-	Yes		34	Date Ent	REPORTED IN THE RESIDENCE		e aniele:	Links	EDD		✓ Yes		No	Receipt
Backgroun		Yes			Entered					Turnaround	d Time	7 Da	<u> </u>	15 Day*	
Confirmato		☐ Yes			QC inits.	The state of the s				Negotiated	TAT				
Sample		Name	Signatu	ure	Init.		/Organizati			Sample Dis	sposal	Return	to Client	✓ Disposal by Lab	
Team	Robert	,	Wyn			SNL/4142/50	5-844-401	3/505-250	0-7090	Return San	nples By:				
Members	Alfred S	Santillanes	Helong.	fl-	as	SNL/4142/50	5-844-513	0/505-228	3-0710	Comments	:	Send report to	Tim Jackson	/4142/MS 0729/284-2547	
	William	Gibson	Willen 1	Sill .	MINS	SNL/4142/50	5-284-330	7/505-239	9-7367	If Perchlorate	detected, pe	erform verifica	ation analys	is using SW846-	
			1	1		-	6			6850M.FGW,	filtered in fie	ld using a 0.4	5 micron in	-line filter. Report Anions (as	
-		1 -				,				short list isoto	Alkalinity (a	s total CaCO	3,HCO3,CC	03). Gamma Spectroscopy (as	1 -6 11 -
1.Relinquishe	d by	lfel 5-	NIO-	Org.4/4	2 Date	4/8/14	Time /	0:16	3.Reling	uished by	pcs).		Org.	Date	Lab Use Time
1. Received b	у	Jon Wa		Org.4/43	2 Date	4/2/14	Time //	-	3. Recei				Org.		
2.Relinquishe	7	) . /	. / /	Org.4142		4/8/14	Time /			uished by			Org.	190000	Time
2. Received b	y D	hh E	How	Org. Cer		4-9-14	Time 0	100	4. Recei						Time
*Prior confir	mation v	with SMO re	equired for 7 and			1 17		12)		ved by			Org.	Date	Time

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

Page 2 of 2

Project Nam	ie.	SWMU 8/58 GWM	Project	Task Manag	ger:	Clinton Lur	m		Project/Ta	sk No.:	146422	2.10.11.01		
Tech Area:									i rejecu ru	ok Ho	140422	10. 11.01	1	
Building:	_	Room:											9	Lab us
Sample No.	Eractio	n Comula I a satis		Depth		Time	Sample		ntainer	Preserv-	Collection	Sample	Parameter & Method	Lab
		-	on Detail	(ft)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample
095730	-033	CCBA-MW2		117	4/8/14	9:44	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	34618
095730	-034	CCBA-MW2		117	4/8/14	9:46	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	3461
095731 *	-001	CCBA-MW2		117	4/8/14	9:27	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	34618
095731	-002	CCBA-MW2		117	4/8/14	9:28	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	34618
095731	-009	CCBA-MW2		117	4/8/14	9:32	GW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	34618
095731 *	-016	CCBA-MW2		117	4/8/14	9:35 /	GW	Р	125 ml	None	G		Anions (SW846-9056)	34618
095731	-017	CCBA-MW2		117	4/8/14	9:34 ′	FGW	Р	500 ml	HNO3	G		Metals Ca,Mg,K,Na(SW846-6020)	34618
095731	-018	CCBA-MW2		117	4/8/14	9:36-	GW	Р	125 ml	H2SO4	G		Nitrate+Nitrite (EPA 353.2)	3461
095731	-020	CCBA-MW2		117	4/8/14	9:37	GW	Р	250 ml	None	G			34618
095731	-022	CCBA-MW2	12	117	4/8/14	9:38 V	GW	P	500 ml	None	G		Perchlorate (EPA 314.0)	34618
095731	-024	CCBA-MW2		117	4/8/14	9:39 🗡	GW	AG	4x1 L	None	G		Alkalinity (SM2320B)	34618
095731	-029	CCBA-MW2		117	4/8/14	9:43 ~	GW	Р	250 ml	NaOH	G		High Explosives (SW846-8321A mod.)	34618
095731	-033	CCBA-MW2		117	4/8/14	9:44 ′	GW	P	1 L	HNO3	G	DU	Total Cyanide (SW846-9012)	050
095731	-034	CCBA-MW2	÷	117	4/8/14	9:46 🗸	GW	Р					Gamma Spectroscopy (EPA 901.0)	34618 051 34618
095732	-001	ССВА-ТВЗ		NA NA	4/8/14	9:27			1 L	HNO3	G		Gross Alpha and Beta (EPA 900.0)	052
		3327, 123		T INA	4/0/14	9:27	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	346/8
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#### Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 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**

Five samples were prepared and analyzed with accepted procedures using methods EPA 314.0 (perchlorate), EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide) and SM 2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

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

The samples were prepared and analyzed within the prescribed holding times and properly preserved except as follows. Samples 346673004, -019, -045 and -046 were prepared and analyzed very slightly beyond the 24 hour method-specified holding time for hexavalent chromium. Based on professional judgment, no data were qualified.

#### Calibration

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks except as follows. Chloride was detected at < the PQL in the EB, sample -035. The associated sample results were detects >5X the EB values and will not be qualified.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

#### **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

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

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

#### Nitrate/Nitrite:

Samples -006 and -021 were diluted 5X and samples -051 and -063 were diluted 10X.

#### Anions:

All samples except the EB were diluted 10X for chloride and sulfate.

#### Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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**: Mary Donivan Level: I Date: 06/10/14





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#### Memorandum

Date: June 3, 2014

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 Laboratory: GEL

Project/Task: 146422.10.11.01 Analysis: High Explosives (HE)

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

#### Summary

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

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

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

#### **Holding Times**

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

#### **Instrument Tune**

The instrument tune was not reported or evaluated.

#### Calibration

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

#### **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met all QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

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

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

#### Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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: Mary Donivan Level: I Date: 06/10/14





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#### Memorandum

Date: June 3, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 and 346674

Laboratory: GEL

Project/Task: 146422.10.11.01

Analysis: Metals

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

#### **Summary**

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

#### ICP-MS:

1. Cu was detected at < the PQL in the unfiltered EB, sample 346673033. The associated sample results were detects <5X the EB value and will be **qualified 0.0029U,B2** at 5X the EB value.

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

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

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

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

The ICP-MS tunes met QC acceptance criteria.

#### Calibration

All initial and continuing calibration met QC acceptance criteria.

#### **Reporting Limit Verification**

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

#### **Blanks**

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Na was detected at < the PQL in the filtered EB, sample 346674003. Mg was detected at < the PQL in the unfiltered EB, sample 346673049. All associated sample results were detects >5X the EB concentrations and will not be qualified.

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

The ICP-MS internal standards met QC acceptance criteria.

#### Matrix Spike (MS)

The MS met all QC acceptance criteria.

#### ICP-MS:

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

#### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

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

All detection limits were properly reported. All samples excluding the EBs were diluted 5X for Ca.

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

Results of the ICS A and AB analyses were not evaluated because the sample concentrations of Ca, Mg, Fe and Al were < those in the ICS solution.

#### **ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

#### Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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: Mary Donivan Level: I Date: 06/10/14





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#### Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 Laboratory: GEL

Project/Task: 146422.10.11.01

Analysis: RAD

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

#### Summary

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

#### All analyses:

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

#### Gross Alpha/Beta:

- 1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1**.
- 2. All sample results that were > the MDA but  $\le 3X$  the MDA will be **qualified J,FR7.**

#### Gammaspec:

1. No peaks were identified for Am-241 for sample 346673011. The associated sample result will be **qualified BD,Z2**.

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

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

#### 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**

The sample tracer recoveries met QC acceptance criteria.

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

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

#### Gross Alpha/Beta:

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

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### Gross Alpha/Beta:

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

#### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

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

The samples were not diluted. All required detection limits were met except as follows. The Am-241 RDL was < the MDA for the duplicate performed on sample 346673011.

#### Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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: Mary Donivan Level: I Date: 06/10/14





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#### Memorandum

Date: June 3, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 Laboratory: GEL

Project/Task: 146422.10.11.01

Analysis: SVOCs

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

#### **Summary**

Five samples were prepared and analyzed with accepted procedures using methods EPA 3510C/8270D (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The ICAL %RSD was >15% but ≤40% and the CCV %D was >20% but ≤40% with negative bias for carbazole. The associated sample results were NDs and will be **qualified UJ, I3,C3**.

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

#### **Holding Times**

The samples were 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 ICAL intercept was positive and > the MDL for p-nitroaniline. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was >15% but ≤40% for atrazine. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The ICV %Ds were >20% but ≤40% with negative bias for hexachlorocyclopentadiene and 2,4-dinitrophenol. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

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

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

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

#### Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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: Mary Donivan Level: I Date: 06/10/14





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#### Memorandum

Date: June 3, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL

Site: SWMU 68 GWM

AR/COC: 615427, 615428, 615429 and 615430

SDG: 346673 Laboratory: GEL

Project/Task: 146422.10.11.01

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**

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

- 1. The dichlorodifluoromethane intercept was negative and > the MDL but ≤3X the MDL for the ICAL associated with samples 346673031, -044, -047, -059 and -071. The associated sample results were NDs and will be **qualified UJ,I5**.
- 2. The methyl acetate and 2-butanone RFs were <0.05 but ≥0.01 for the ICAL and/or ICV/CCVs associated with samples -031, -044, -047, -059 and -071. The associated sample results were NDs and will be **qualified UJ,14**.
- 3. The dibromochloromethane %RSD was >15% but ≤40% for the ICAL associated with samples -001, -014, -015, -016, -029 and -030. The associated result for sample -015 was a detect and will be **qualified J,I3**.
- 4. The dibromochloromethane %D was >20% with positive bias for the ICV associated with samples -001, -014, -015, -016, -029 and -030. The associated result for sample -015 was a detect and will be **qualified J+,C2**.

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 time 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. For one or more of the ICALs, the %RSDs were >15% but  $\leq$ 40% for dibromochloromethane; bromoform; 1,2-dibromo-3-chloropropane; 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene. All remaining associated sample results were NDs and since a positive CCV is not considered a second infraction, will not be qualified.

The %Ds for nine target compounds (see worksheet) were >20% with positive bias for the ICV and/or CCV associated with samples -001, -014, -015, -016, -029 and -030. The remaining associated sample results were NDs and will not be qualified.

The %Ds for eight target compounds (see worksheet) were >20% but ≤40% with negative bias for the CCV associated with samples -001, -014, -015, -016, -029 and -030. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The dichlorodifluoromethane and acetone %Ds were >20% with positive bias for the ICV/CCV associated with samples -031, -044, -047, -059 and -071. The associated sample results were NDs and will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks except as follows. Bromodichloromethane was detected at < the PQL and chloroform at > the PQL in the EB, sample -031 and the FBs, samples -015 and -030. Dibromochloromethane was detected at < the PQL in the FB, sample -015. Toluene was detected at < the PQL in the TB, sample -029. All associated sample results were NDs and will not be qualified.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

#### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met except as follows. The acetone %R was > UAL for the LCS associated with samples -031, -044, -047, -059 and -071. The associated sample results were NDs and will not be qualified.

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

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

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

#### Other QC

Four TBs were submitted, one for each AR/COC. FBs were submitted with AR/COC 615428 and 615429. The FB submitted with AR/COC 615429 was not associated with any samples. An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. 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: Mary Donivan Level: I Date: 06/10/14



## Sample Findings Summary



AR/COC: 615427, 615428, 615429, 615430

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-R	RC		
	095739-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	095739-035/OBS-EB1	Uranium-235/236 (15117-96- 1/13982-70-)	BD, FR3
	095739-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	095733-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	095733-034/OBS-MW1	BETA (12587-47-2)	J, FR7,MS1
	095736-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	095736-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	095739-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	095739-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	095741-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	095741-034/OBS-MW3	BETA (12587-47-2)	J, MS1
	095742-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	095742-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	095733-033/OBS-MW1	Americium-241 (14596-10-2)	BD, Z2
	095733-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	095733-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	095733-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	095736-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	095736-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095736-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095736-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	095739-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095739-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095739-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095739-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095741-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095741-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095741-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095741-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	095742-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095742-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095742-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095742-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095741-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
	095742-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
SW846 3510C/8270D	005733 003/ODC MANA	Carlagada (0C 74 0)	111 12 62
	095733-002/OBS-MW1	Carbazole (86-74-8)	UJ, 13,C3
	095736-002/OBS-MW2	Carbazole (86-74-8)	UJ, 13,C3
	095739-002/OBS-EB1	Carbazole (86-74-8)	UJ, 13,C3
	095741-002/OBS-MW3	Carbazole (86-74-8)	UJ, 13,C3
	095742-002/OBS-MW3	Carbazole (86-74-8)	UJ, 13,C3
SW846 3535/8321A Modific	ed 095733-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	095733-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	095736-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	095736-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	095739-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	095739-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095741-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	095741-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
		p 130 000 000 (33 33 0)	50,

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095742-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	095742-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8260B DOE-AL			
	095735-001/OBS-FB1	Dibromochloromethane (124-48-1)	J+, I3,C2
	095739-001/OBS-EB1	2-Butanone (78-93-3)	UJ, 14
	095739-001/OBS-EB1	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095739-001/OBS-EB1	Methyl acetate (79-20-9)	UJ, 14
	095740-001/OBS-TB3	2-Butanone (78-93-3)	UJ, 14
	095740-001/OBS-TB3	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095740-001/OBS-TB3	Methyl acetate (79-20-9)	UJ, 14
	095741-001/OBS-MW3	2-Butanone (78-93-3)	UJ, 14
	095741-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095741-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, 14
	095742-001/OBS-MW3	2-Butanone (78-93-3)	UJ, 14
	095742-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095742-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, 14
	095743-001/OBS-TB4	2-Butanone (78-93-3)	UJ, 14
	095743-001/OBS-TB4	Dichlorodifluoromethane (75-71-8)	UJ, 15
	095743-001/OBS-TB4	Methyl acetate (79-20-9)	UJ, 14

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

#### **Data Validation Summary Worksheet**

AR/COC #: 615427, 615428, 615429 and 615430 Site/Project: SWMU 68 GWM

SDG #: 346673 and 346674 Laboratory: GEL Validator: Linda Thal

Matrix: Aqueous # of Samples: 76 CVR present: Yes Analysis Type: X□ Organic X□ Metals

 $AR/COC(s) \ present: Yes \\ \hspace{3cm} Sample \ Container \ Integrity: OK \\ \hspace{3cm} X \square \ Rad \ X \square \ Gen \ Chem$ 

	Requested Analyses Not Reported													
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments								
None														

	Hold Time/Preservation Outliers													
Sample Number	2X HT 2X H													
None														
	_	_		_										

Comments: Sampled 04/14 through 04/16/2014

Validated by: X Mal

Validation Date: 06/03/2014

#### **Organic Worksheet (GC/MS)**

AR/COC #: 615427, 615428, 615429 and 615430 SDG #: 346673 Matrix: Aqueous

Laboratory Sample IDs: 346673001, -014, -015, -016, -029, -030, -031, -044, -047, -059 and -071

Method/Batch #s: 8260B: 1383154 Tuning (pass/fail): Pass TICs Required? (yes/no): No

		Calib	ration			5X				MS/		FB-		
Analyte (outliers)	Int.	RF	RSD/R	(ICV) CCV %D	МВ	(10X) MB	LCS %R	MS %R	MSD %R	MSD RPD	EB -031	030 Di water	FB -015	TB -029
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	<b>√</b>	.57J	.51J	.5J	✓
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	.58J
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.37	3.25	3.33	✓
Dibromochloromethane	NA	✓	18.5 <sup>1</sup>	(+24) <sup>1</sup>	✓	NA	✓	✓	✓	✓	✓	✓	.3J	✓
Acetone	<b>√</b> 1, 2	NA <sup>1, 2</sup>	<b>√</b>	-35 <sup>1</sup> +23 <sup>2</sup>	✓	NA	156 <sup>2</sup>	✓	<b>✓</b>	✓	<b>✓</b>	✓	✓	✓
Bromoform	NA	<b>√</b>	23.7 <sup>1</sup> 22.1 <sup>2</sup>	(+34)1	<b>✓</b>	NA	<b>√</b>	✓	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	✓	✓
1,2-Dibromo-3-chloropropane	NA	<b>✓</b>	29.0 <sup>1</sup> 18.5 <sup>2</sup>	(+30)1	✓	NA	<b>✓</b>	✓	✓	✓	<b>✓</b>	✓	✓	✓
1,2,4-Trichlorobenzene	NA	✓	20.41	$(+42)^{1}$	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,3-Trichlorobenzene	NA	✓	23.51	$(+46)^{1}$	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Dichlorodifluoromethane	54 <sup>2</sup>	NA	✓	$(+36)^2 + 39^2$	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Methyl acetate	NA	.044 <sup>2</sup> .046 <sup>2</sup> .042 <sup>2</sup>	<b>✓</b>	-331	<b>✓</b>	NA	<b>✓</b>	✓	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	✓
2-Butanone	NA	.036 <sup>2</sup> .035 <sup>2</sup> .037 <sup>2</sup>	<b>✓</b>	-39 <sup>1</sup>	<b>✓</b>	NA	<b>✓</b>	✓	<b>√</b>	<b>✓</b>	<b>√</b>	<b>√</b>	✓	<b>✓</b>
Carbon disulfide	NA	✓	✓	(+21)1	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon tetrachloride	NA	✓	✓	$(+23)^1$	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Styrene	NA	✓	✓	(+23)1	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Isopropylbenzene	NA	✓	✓	(+23)1	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dichloroethane-d4 (surr)LT 06/10/2014	NA	<b>✓</b>	✓	21 <sup>1</sup> 22 <sup>1</sup>	T 🗸	NA	✓	✓	✓	✓	✓	<b>√</b>	✓	✓
tert-Butyl-methyl-ether	NA	✓	✓	-221	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dichlorethane	NA	✓	✓	-211	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
4-Methyl-2-pentanone	NA	✓	✓	-281	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-Hexanone	NA	✓	✓	-27 <sup>1</sup>	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,1,2,2-Tetrachloroethane	NA	✓	✓	-231	✓	NA	✓	✓	✓	<b>√</b>	✓	✓	✓	✓

	Surrogate Recovery Outliers														
Sample ID															
None															
	IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT			
None	None														

Comments: HTs OK.

Revised 7/2007

<sup>&</sup>lt;sup>1</sup>ICAL VOA6.I 03/28/2014 Samples 346673001, -014, -015, -016, -029, -030; Acetone, methylene chloride linear

<sup>&</sup>lt;sup>2</sup>ICAL VOA2.I 03/17/2014 Samples -031, -044, -047, -059 and -071; Acetone, dichlorodifluoromethane, methylene chloride linear MS/MSD performed on -047 spiked with trichlorotrifluoroethane;

#### **Organic Worksheet (GC/MS)**

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Laboratory Sample IDs: 346673002, -017, -032, -048 and -060

Method/Batch #s: 3510C/8270D: 1380691(prep)/1380692

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

		Calil	bration										
Analyte (outliers)	Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D	MB	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -032		
p-Nitroaniline	+8.7	✓	✓	✓	✓	NA	✓	✓	✓	✓	<b>✓</b>		
Carbazole	NA	✓	19	-31	✓	NA	✓	✓	✓	✓	✓		
Atrazine	NA	✓	19	✓	✓	NA	✓	✓	✓	✓	✓		
Hexachlorocyclopentadiene	NA	✓	✓	(-23)	✓	NA	✓	✓	✓	✓	✓		
2,4-Dinitrophenol	NA	✓	✓	(-31)	✓	NA	✓	✓	✓	✓	✓		
			S	urrogate	Recovery	Outliers							
Sample ID													
None				TC	Outliers								
Sample ID Area	RT Ar	ea	RT	Area		RT	Area	RT		Area	RT	Area	RT
None	121												

Comments: HTs OK; MS/MSD on sample -002; ICAL MSD5.I 04/02/2014

Matrix: Aqueous

#### **High Explosives Worksheet (LC/MS/MS)**

AR/COC #: 615427, 615428, 615429 and 615430 SDG #: 346673 Matrix: Aqueous

Laboratory Sample IDs: 346673009, -024, -039, -054 and -066

Method/Batch #s: 3535/8321A: 1380884(prep)/1380885

	Initi	al Calil	oration	Cor	ntinuing	Calibra	ation	Method	5X	LCS	MS	MSD	MS/		EB		
Analyte (Outliers)	Int.	RF	COD RSD/R <sup>2</sup>	ICV	CCV %D	ICB	ССВ	Blank	(10X) Blank	%R	%R	%R	MSD RPD	CRI	-039		
m-Nitrotoluene	NA	.026	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
p-Nitrotoluene	NA	.014	<b>√</b>	✓	✓	✓	✓	<b>√</b>	NA	<b>✓</b>	✓	<b>√</b>	✓	✓	<b>√</b>		
						Surro	gate Re	covery O	utliers								
Sample ID																	
None																	
						Inte	rnal Sta	ndard Ou	tliers								
Sample ID	Area	a	RT		Samp	le ID		Area	RT		Sa	ample ID	)	Ar	ea	RT	
None																	

Comments: HTs OK; MS/MSD on -009; primary analytes only; LCMSMS#3 – o-nitrotoluene quadratic intercept = 0; all sample and QC extracts diluted 1:1 with HPLC grade water

#### **Inorganic Metals Worksheet**

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673 and 346674

Laboratory Sample IDs: 346673003, -018, -033, -049 and -061 (UF); 346674001 thru -005 (F – Na, K, Mg and Ca only)

Method/Batch #s: **3005/6010B**: 1381070/1381071 (UF); **3005/6020**: 1381411/1381412 (F&UF) & 1387444/1387446 (Ag) **7470A**:1385133/1385137 (UF)

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

	<b>(F)</b>	X5
J .00291	<b>✓</b>	NA
	✓	NA
NA	.103J	.515
32	32J .00291 2J .051 NA	32J .00291

	IS Outliers	60-125%			IS Outliers	80-120%	
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
None				None			

Comments: HTs OK; matrix QC on samples 346673003 (All – ICPMS Ag only) and 346674001 (ICPMS); Ca, Mg, Na >4X spike amount;

Ca diluted 5X for samples 346673003, -018, -049 and -061 and 346674001 thru -005 (excl -003)

Matrix: Aqueous

#### **General Chemistry Worksheet**

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Laboratory Sample IDs: 346673 - see below

Method/Batch #s: SW846 9010C/9012A (Total Cyanide): 1380670/1380673; -010, -025, -040, -055, -067

Method/Batch #s: EPA 314.0 (Perchlorate): 1380834; -007, -022, -037, -052, -064 Method/Batch #s: SW846 9056 (Anions): 1381359; -005, -020, -035, -050, -062

Method/Batch #s: EPA 353.2 (NO<sub>3</sub>/NO<sub>2</sub>):1381374; -006, -021, -036, -051, -063

Method/Batch #s: SW846 7196A (Hexavalent Chromium); 1380152; -004 1380402; -019, -034 1380686; -045, -046

Method/Batch #s: SM 2320B (Alkalinity): 1382034; -008, -023, -038, -053, -065

			C	alibration	ı			5X								
Analyte (outliers)	Int.	$\mathbb{R}^2$	ICV	CCV	ICB mg/L	CCB mg/L	Method Blank	Blank or (5X MDL)	LCS %R	MS %R	MSD %R	MS/ MSD RPD	Lab Rep. RPD	Partial/ Total RPD	EB -035	EB X5
Chloride	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	NA	NA	✓	NA	.0687J	.3435
		,														

Comments: HTs OK except Hex Cr -004, -019, -045, -046 (±5%)

Matrix QC from this SDG for TCN (-010), perchlorate (-007), anions (-005), NO<sub>3</sub>/NO<sub>2</sub> (-006), Hex Cr (-004/-019/-045), alkalinity (-008)

Cl and SO4: 10X -005, -020, -050, -062 NO<sub>3</sub>/NO<sub>2</sub>: 5X -006, -021; 10X -051, -063

Matrix: Aqueous

#### **Radiochemistry Worksheet**

AR/COC #: 615427, 615428, 615429 and 615430 SDG #: 346673 Matrix: Aqueous

Laboratory Sample IDs: 346673-see below

Method/Batch#s: DOE EML HASL 300 Alphaspec U: 1380684; -013, -028, -043, -058, -070

Method/Batch#s: EPA~901.1~Gammaspec:~1380786;~-011,~-026,~-041,~-056,~-068

Method/Batch#s: EPA 900.0 Gross alpha/beta: 1380009; -012, -027, -042, -057, -069

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	N	MS/ MSD RER	Lab Rep. RER	ЕВ			
None														
				Tracer/C	arrier Re	covery Ou	tliers							
Sample ID	Tracer/Ca	rrier %	R	Sample ID		Tracer/	Carrier	%R		Sample 1	ID	Trac	er/Carrier	%R
None														

Comments: Matrix QC alphspec U (-013), GS (-011), gross alpha/beta DUP and MS/MSD performed on SNL sample from another SDG

DUP did not meet required DL for Am-241 (RDL < MDA)

-011 no peaks for Am-241

-042 neg >3X TPU < MDA

Gross A and gross B parent and DUP =200ml, MS/MSD = 25ml (8X dilution) -qual.

Data rejected by the lab: None.

Internal Lab														Page <u>1</u> of <u>2</u>
Batch No.					SMO Use						1 =		AR/COC	615427~
	Manager: Number:	SWMU 68 GWM Clinton Lum 146422.10.11.01 CF263-14	Date Samples Carrier/Waybill Lab Contact: Lab Destination	No.	21739 Edie Kent/8	17	3171	SMO C	the contract of	e: Herrera/50	5-844-3199	ny	Waste Characterization RMMA Released by COC No.	
OCIVICE OIGE		01200-14	Contract No.:	l.	PO 130387	'3		Sena K	eport to SMC		5-284-2553		Bill to:Sandia National Laboratories	✓ 4º Celsius
Tech Area:			Contract No.:		1 0 100001	0			Mila Nava	illaugii/300	0-204-2000		P.O. Box 5800, MS-0154	(Accounts Payable),
Building:		Room:	Operational	Site:									Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Location		Depth (ft)	Date/1		Sample Matrix	Co Type	ontainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095733	-001 /	OBS-MW1		153	4/14/14	9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673
095733	-002 ″	OBS-MW1		153	4/14/14	9:45	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673
095733	-009 ′	OBS-MW1	-6.	153	4/14/14	9:47 /	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7	346672
095733	-014 ′	OBS-MW1		153	4/14/14	9:50 /	GW	Р	250 ml	None	G	SA	Hexavalent Chromium (SW846-719	346673
095733	-016	OBS-MW1		153	4/14/14	9:51	GW	Р	125 ml	None	G	SA	Anions (SW846-9056)	346673
095733	-017/	OBS-MW1	1 + 1/1				FGW	Р	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-60	20) 396679
095733	-018 -	OBS-MW1	OBS-MW1 15				GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673
095733	-020	OBS-MW1		153	4/14/14	9:53	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673
095733	-022 🐔	OBS-MW1		153	4/14/14	9:54 1	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	346673
095733	-024	OBS-MW1		153	4/14/14	9:55	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321	A mod 009
Last Chain		Yes			Tracking		SMO	Use	Special Ins	structions	Common way to the common of th			Conditions on
Validation Backgroun		✓ Yes	100	Date En					EDD		✓ Yes	-	No	Receipt
Confirmato		Yes		ntered QC inits.					Turnaroun		7 Da	<u>y*</u>	<u>15 Day*</u>	
Sample	_	lame Signa		Init.		/Organiza	tion/Phon	e/Cell	Negotiated Sample Dis			n to Client	t Disposal by Lab	
Team	Robert L		incl	Re					Return Sar			I to Cilent	L Disposal by Lab	
Members	Milliam Gibson  William Gibson					SNL/4142/505-844-4013/505-250 SNL/4142/505-844-5130/505-228 SNL/4142/505-284-3307/505-239					Send report to erform verifica 15 micron in-li	ation analys	n/4142/MS 0729/284-2547 sis using SW846-6850M. FGW, eport Anions ( as Br,CI,F,SO4), Spectroscopy (as short list	
1.Relinguishe	ed by A	1685at 00.	- Org. 4/42	2 Date	4/14/10	Time /	25:5	3 Relina	lisotopes). quished by			Org.	. Date	Lab Use Time
1. Received b	7 //2	nelen	Org. 4/47					3. Rece				Org.		Time
2.Relinquishe	-	onuklane	Org. 4142						quished by	g. 11.		Org.		Time
2. Received b	1 11	Low	Org. Cel		4-15-14	(		4. Rece		-	- 45	Org.		Time
*Prior confir	mation w	ith SMO required for 7 ar	nd 15 day TAT		/							3		

Page 2 of 2

Project Nam	e:	SWMU 68 GWM	Project/1	Task Mana	ger:	Clinton Lun	n		Project/Ta	sk No.:	146422	2.10.11.01		
ech Area:			•									a .		
Building:		Room:										0	*	Lab use
Na				Depth	Date/		Sample		ntainer	Preserv-	Collection	3.5	Parameter & Method	Lab
Sample No.		· · · · · · · · · · · · · · · · · · ·	n Detail	(ft)	Colle		Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample I
095733	-029 -	OBS-MW1		153	4/14/14	9:57	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	34667
095733	-033 ′	OBS-MW1		153	4/14/14	9:58 <	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	3466
095733	-034 ′	OBS-MW1		153	4/14/14	9:59 1	. GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	3466
095733	-035	OBS-MW1		153	4/14/14	10:00 (	GW	Р	1L	HNO3	G	SA	Isotopic Uranium (HASL 300)	3466
095734	-001	OBS-TB1/		NA	4/14/14	9:44 <b>′</b>	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	3466 013 3466 014
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				+ -						-				

Internal Lab																Page _	1 of 2
Batch No. /	VA		2.5 III			SMO Use	,					100			AR/COC	615	428
Project Name	e:	SWMU 6	8 GWM	Date Samples	s Shipped	4/15	114		SMO A	uthorization:	Par/	9.10	Smy	Waste	Characterization		
Project/Task	Manager:	Clinton L	um	Carrier/Wayb	ill No.	217	403	e writing	1	ontact Phone		1000	1111	H RMMA			
Project/Task	Number:	146422.1	0.11.01	Lab Contact:		Edie Kent/		3171				5-844-3199			sed by COC No.		
Service Orde	r:	CF263-14	4	Lab Destination	on:	GEL		n and den since	Send R	eport to SMO		0 011 0100		- Kelea	sed by COC NO.	V AC	Celsius
=				Contract No.:		PO 13038	73		Journa IX			5-284-2553		Dill to O di -	N. C. III.		
Tech Area:				- Contract No.		1 0 10000		24 7 0 44 450		Tila Nava	illaugii/500	3-204-2000		7	National Laboratorie	s (Accounts	s Payable),
Building:		Room:		Operationa	l Site									P.O. Box 5800			
				Тороналона	Depth	Date/	Timo	Sample	<u> </u>	ontainer	D	0-114	0 1		NM 87185-0154		
Sample No.	Fraction	Sa	mple Location D	Detail	(ft)	Colle		Matrix	Type	Volume	Preserv- ative	Collection		Para	ameter & Method	183	Lab
				Jetuii -	(11)		cieu	WIALITA	туре	volume	ative	Method	Туре	-	Requested		Sample ID
095735	-001	OBS-FB1			NA	ı 4/15/14	9:13 <	DIW	G	3x40ml	HCL	G	FB	TCL VOC (S	SW846-8260B)	3	015
095736	-001	OBS-MW	12		252	٤4/15/14	9:13 -	GW	G	2140mal	1101			TOL 1/00 /		3	346673
		OBO WIVE			202	17/10/14	3.13	GVV	G	3x40ml	HCL	G	SA	TCL VOC (S	SW846-8260B)		016
095736	-002	OBS-MW	/2		252	١4/15/14	9:14	∤ gw	AG	4x1 L	None	G	SA	TCL SVOC	(SW846-8270C)	3	346673
095736	-009	OBS-MW	12		252	24/45/44	0.40		_						,	3	018
093730	-009	OBS-IVIV	2		252	*4/15/14	9:16	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U	J (SW846-6010/6020	)/7470)	018
095736	-014	OBS-MW	/2	-	252	^ 4/15/14	9:19	∮ gw	Р	250 ml	None	G	SA	Hexavalent Cl	hromium (SW846-71	96A)	019
095736	-016	OBS-MW	/2		252	° 4/15/14	9:20 -	GW	Р	125 ml	None	G	SA	Anions (SW	•		020
095736	-017	OBS-MW	12		252	* 414514.4	0.40		_					7	0.10.0000)	3	346674
093730	-017	OBS-IVIVV	2		252	<sup>4</sup> /15/14	9:18	FGW	Р	500 ml	HNO3	G	SA	Metals-Ca,N	/lg,K,Na(SW846-6	6020)	002
095736	-018	OBS-MW	2		252	*4/15/14	9:21 ′	GW	Р	125 ml	H2SO4	G	SA	Nitrate+Nitri	te (EPA 353.2)	3	02/
095736	-020	OBS-MW	/2	,	252	4/15/14	9:22 /	GW	Р	250 ml	None	G	SA	Perchlorate	(EPA 314.0)		022
095736	-022	OBS-MW	/2		252	4/15/14	9:23	GW	Р	500 ml	None	G	SA			3	346673
Last Chain		Yes	-			Tracking	0.20	1000000	Use			/QC Reguir		Alkalinity (S	IVIZ3ZUB)		023
Validation	Rea'd:	✓ Yes			Date En			SIVIC	USE	EDD	su ucuons		ements:			Condition	
Backgroun		Yes											_	No		Rec	eipt
Confirmato		Yes			Entered					Turnaroun		7 Da	<u>y*</u>	15 Day*	✓ 30 Day		
			Ciamat		QC inits.		10			Negotiated		+					
Sample		ame	Signat	4	Init.		y/Organizat			Sample Di			to Client	t 🔟	Disposal by Lab		
Team	Robert Ly		LUNGM		PL	SNL/4142/5				Return Sai	nples By:				7		
Members	Alfred Sa		17-19-15	uffer	are	SNL/4142/5				Comments				n/4142/MS 0729/2			
	William G	Sibson	Wellen (2)	Wh t	WIX	SNL/4142/5	05-284-330	7/505-23	9-7367	If Perchlorate	detected,pe	erform verifica	ition analys	sis using SW846	6-6850M. FGW,		
			1	/	1					filtered in field	d using a 0.4	15 micron in-li	ne filter. Re	eport Anions ( a	s Br,Cl,F,SO4),		
	1	1110	- 0							isotopes).	iolai Cacos	5,003,003)	. Gamma s	Spectroscopy (a	is short list	Lab	l lee
1.Relinquishe	d by	Male	getille	Org. 4/47	Date	4/5/14	Time (	7950	3.Relino	uished by			Org.		Date	Time	036
1. Received b	y O	1, 5, 4	2 Snu						3. Rece				Org.		Date	Time	
2.Relinquishe	d by	my !	stern	Org. 4/4		11.	Y Time /			uished by			Org.		Date	Time	-
2. Received b		me	4.	Org. Cer		4-16-14	- 6		4. Rece				Org.		Date Date		_
And the latest territory and the second seco	,	th SMO re	quired for 7 and		2410	10 3/4	, Time Q	14)	I (CCC	ived by			Org.		Date	Time	

Page 2 of 2 AR/COC 615428 **Project Name:** SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01 Tech Area: Building: Room: Lab use Depth Date/Time Sample Container Collection Sample Preserv Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 095736 -024 OBS-MW2 252 346673 9:24 **GW** AG 4x1 L None G SA High Explosives (SW846-8321A mod.) 095736 -029OBS-MW2 252 4/14/15 \$ 9:26 GW P 250 ml NaOH G SA Total Cyanide (SW846-9012) 095736 -033 OBS-MW2 252 4/14/15 9:27 GW Ρ 1 L HNO3 G SA Gamma Spectroscopy (EPA 901.0) 026 095736 -034 OBS-MW2 252 4/14/15 2 9:28 Р GW 1 L HNO<sub>3</sub> G SA Gross Alpha and Beta (EPA 900.0) 095736 -035 OBS-MW2 252 4/14/15 9:29 GW Ρ 1 L HNO<sub>3</sub> G SA Isotopic Uranium (HASL 300) 095737 -001 OBS-TB2 NA 4/14/15 9:13 DIW G 3x40 ml HCL G TB TCL VOC (SW846-8260B)

**Recipient Initials** 

Project Na Tech Area		SWMU 68 GWM	Project	roject/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01								AR/COC 61	15428	
Building: Room		Room:												
Sample No. Fractio		Sample Locati	on Detail	Depth (ft)	Date/Time Collected		Sample		Container		Collection	Sample	e Paramotor e as	Labus
095736		OBS-MW2		252	4/14/154	THE REAL PROPERTY.	Matrix GW	Туре	Volume	ative	Method	Туре	Parameter & Method Requested	Lab Sample
095736 095736	-029 -033	OBS-MW2		252	4/14/154		GW	AG P	4x1 L 250 ml	None NaOH	G	SA	High Explosives (SW846-8321A mod.)	Gample
095736	-034	OBS-MW2	7.	252	·4/14/184	9:27	GW	Р	1 L	HNO3	G	SA	Total Cyanide (SW846-9012)	
095736	-035	OBS-MW2		252	4/14/184	9:28 -	GW	Р	1L	HNO3	G	SA SA	Gamma Spectroscopy (EPA 901.0)	
095737		OBS-TB2	-	252 NA	·4/14/134 ·4/14/134	9:29	GW	Р	1 <u>L</u>	HNO3	G		Gross Alpha and Beta (EPA 900.0) Isotopic Uranium (HASL 300)	
to the contract of the contrac	-				7 - 38 7 7	9:13 -	-	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	
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internal Lab															Page <u>1</u> of <u>2</u>	
Batch No.						SMO Use				•	^	14		AR/COC	615429	
Project Name	e:	SWMU 6	88 GWM	Date Samples	Shipped:	411	5/14		ISMO A	uthorization:	Ibour	Valena	und	Waste Characterization	010120	
Project/Task	Manager:	Clinton L	.um	Carrier/Waybil	l No.	2174	-		-	ontact Phone			U*	RMMA		
Project/Task	Number:					Edie Kent/	803-556-8	3171				5-844-3199	Released by COC No.			
Service Orde	er:	CF263-1	4	Lab Destinatio	n:	GEL	HOLE !		Send R	eport to SMC		0 0 1 1 0 1 0 0				
				Contract No.:		PO 13038	73					5-284-2553		Bill to:Sandia National Laboratori	4º Celsius	
Tech Area:														P.O. Box 5800, MS-0154	ss (Accounts Payable),	
Building:		Room:		Operational	Site:									Albuquerque, NM 87185-0154		
					Depth	Date/	Time	Sample	C	ontainer	Preserv-	Collection	Sample		d Lab	
Sample No.	Fraction	Sa	mple Location D	Detail	(ft)		cted	Matrix	Туре	Volume	ative	Method	Type	Requested	Sample ID	
095738/	-001⁄	OBS-FB2	2		NA	4/15/14	10:25	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346673	
095739 ′	-001	OBS-EB	1		NA	4/15/14	10:25	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	346673	
095739	-002	OBS-EB	1	1	NA	4/15/14	10:26	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	396673	
095739	-009 /	OBS-EB	1		NA	4/15/14	10:28	DIW	Р	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/602	34667	
095739	-014	OBS-EB	1		NA	4/15/14	10:31	DIW	Р	250 ml	None	G	EB	Hexavalent Chromium (SW846-7	34667	
095739	-016	OBS-EB	1		NA	4/15/14	10:32	DIW	Р	125 ml	None	G	EB	Anions (SW846-9056)	346673	
095739	-017<	OBS-EB	1		NA	4/15/14	10:30	FDIW	Р	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na(SW846-	346679	
095739	-018	OBS-EB	ĺ		NA	4/15/14	10:33	DIW	Р	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	346673	
095739	-020 ′	OBS-EB	1		NA	4/15/14	10:34	DIW	Р	250 ml	None	G	EB	Perchlorate (EPA 314.0)	346673	
095739	-022	OBS-EB	F		NA	4/15/14	10:35	DIW	Р	500 ml	None	G		Alkalinity (SM2320B)	346673	
Last Chain	:	Yes		5	Sample	Tracking		SMC	Use	Special Ins	structions	/QC Requir			Conditions on	
Validation I		✓ Yes			Date Ent	ered:				EDD		☑ Yes		No	Receipt	
Backgroun	d:	Yes		E	Entered I	by:				Turnaroun	d Time	7 Day	Comment	15 Day*	receipt	
Confirmato	ry:	Yes			QC inits.					Negotiated				- co Bay		
Sample	Na	ame	Signatu	ure /	Init.	Company	//Organizat	tion/Phon	e/Cell	Sample Dis		Return	to Client	✓ Disposal by Lab		
Team	Robert Ly	nch	LOVE TIN	ch '	w	SNL/4142/50	05-844-401	3/505-25	0-7090	Return Sar	•		, 10 5 110111	Bioposai by Eab		
Members	Alfred Sa	ntillanes	Helletate	te a	A Hardway	SNL/4142/50				Comments		Send report to	Tim Jackson	/4142/MS 0729/284-2547		
~	William G	Sibson	Willey V	1 311		SNL/4142/50	and the second second	Control of Particle Services	STATE SERVICES AND SERVICES					is using SW846-6850M. FDIW,		
	_			1					0 1001	filtered in field	dusing a 0.4	5 micron in-li	ne filter. Re	port Anions ( as Br.Cl.F.SO4).		
	1	44			_			4		Alkalinity (as isotopes).	total CaCO3	3,HCO3,CO3)	. Gamma S	Spectroscopy (as short list		
1.Relinquishe	d by ///	Bells	-till	Org.4142	Date	4/15/1	4/Time /	1.00	3 Poline	quished by			0		Lab Use	
Received b	100	2 1/2	/	Org. 4/142		411-110	/ //	100	3. Rece				Org.	Date	Time	
2.Relinquishe	- ~	MALA	len week	Org. 4/12	Date	4115/10	Time /	1111		uished by			Org.	Date	Time	
2. Received b		M	Jack -	Org. Gel	Date	100	- /	1735	4. Rece				Org.	Date	Time	
		th SMO re	equired for 7 and		Duit	. 1017	THIE &	100	T. INECE	iveu by			Org.	Date	Time	

Project Nam	e:	SWMU 68 GWM	Project/T	ask Mana	ger:	Clinton Lun	n .	20	Project/Ta	sk No.:	146422	2.10.11.01	1 22	
Tech Area: Building:		Room:	_											
	ample No. Fraction Sample Location I		tion Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Cor	ntainer Volume	Preserv-	Collection Method	Sample Type	Parameter & Method Requested	Lab use
095739	-024 /	OBS-EB1		NA	4/15/14	10:36	DIW	AG	4x1 L	None	G		High Explosives (SW846-8321A mod.)	346673 039
095739	-029 <	OBS-EB1		NA	4/15/14	10:38	DIW	Р	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	34667
095739	-033	OBS-EB1		NA	4/15/14	10:39	DIW	Р	1 L	HNO3	G	9 1	Gamma Spectroscopy (EPA 901.0)	34667
095739	-034	OBS-EB1		NA	4/15/14	10:40/	DIW	Р	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	34667
095739	-035	OBS-EB1		NA	4/15/14	10:41	DIW	Р	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	34667
095740	-001	OBS-TB3 /		NA	4/15/14	10:25	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	34667
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Internal Lab

Page \_1 of \_2 Batch No. SMO Use AR/COC 615430 Project Name: SWMU 68 GWM Date Samples Shipped: 4/16/14 SMO Authorization: Waste Characterization Project/Task Manager: Clinton Lum Carrier/Waybill No. 217464 SMO Contact Phone: RMMA Project/Task Number: 146422.10.11.01 Lab Contact: Edie Kent/803-556-8171 Lorraine Herrera/505-844-3199 Released by COC No. Service Order: CF263-14 GEL Lab Destination: Send Report to SMO: PO 1303873 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: Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Preserv Collection Sample Parameter & Method Lab Sample No. Fraction Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 095741 -001 **OBS-MW3** 34667 208 4/16/14 9:04 GW G 3x40ml HCL G SA TCL VOC (SW846-8260B) 095741 -002 **OBS-MW3** 208 3466 4/16/14 9:05 GW AG 4x1 L None G SA TCL SVOC (SW846-8270C) 048 095741 -009 **OBS-MW3** 208 3466 4/16/14 9:08 GW Р 500 ml HNO<sub>3</sub> G SA TAL Metals+U (SW846-6010/6020/7470) 095741 -014 OBS-MW3 208 346673 4/16/14 9:11 GW P 250 ml None G SA Hexavalent Chromium (SW846-7196A) 045 095741 -016 💆 **OBS-MW3** 208 4/16/14 34667 9:12 **GW** P 125 ml None G SA Anions (SW846-9056) 050 095741 -017 **OBS-MW3** 346674 208 4/16/14 9:10 **FGW** Р 500 ml HNO3 G SA Metals-Ca,Mg,K,Na(SW846-6020) 004 095741 -018 🖊 OBS-MW3 208 4/16/14 34667 9:13 GW Р 125 ml H2SO4 G SA Nitrate+Nitrite (EPA 353.2) 05/ 095741 -020<sup>1</sup> OBS-MW3 34667 208 4/16/14 9:14 GW P 250 ml None G SA Perchlorate (EPA 314.0) 252 095741 -022 **OBS-MW3** 208 4/16/14 34667 9:15 GW P 500 ml G None SA Alkalinity (SM2320B) 053 095741 -024 **OBS-MW3** 34667 208 4/16/14 9:16 V GW AG 4x1 L None G SA High Explosives (SW846-8321A mod 054 \_ast Chain: V Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Conditions on Validation Reg'd: 1 Yes Date Entered: EDD Yes No Receipt Background: Yes Entered by: **Turnaround Time** 7 Day\* 15 Day\* 30 Day Confirmatory: Yes QC inits. **Negotiated TAT** Sample Name Signature Init Company/Organization/Phone/Cell Sample Disposal Disposal by Lab Return to Client Team Robert Lynch SNL/4142/505-844-4013/505-250-7090 Return Samples By: Alfred Santillanes Members SNL/4142/505-844-5130/505-228-0710 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 William Gibson SNL/4142/505-284-3307/505-239-7367 f Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes) Lab Use 1.Relinguished by Org. 4/14/2 Date S Time 0957 3.Relinquished by Org. Date Time 1. Received by Org.4/42 Date Time 0957 3. Received by Ora. Date Time 2.Relinguished by Org. 4142 4116/14 Time 1030 Date 4. Relinquished by Org. Date Time 2. Received by Org. Date 4/17/14 Time D 735 4. Received by Org. Date Time \*Prior confirmation with SMO required for 7 and 15 day TAT

Page 2 of 2 AR/COC 615430 Project Name: SWMU 68 GWM Project/Task Manager: Clinton Lum Project/Task No.: 146422.10.11.01 Tech Area: **Building:** Room: Lab use Depth Date/Time Sample Container Preserv-Collection Sample Parameter & Method Sample No. Fraction Lab Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 095741 -029OBS-MW3 208 346693 055 4/16/14 9:19 GW Р 250 ml NaOH G Total Cyanide (SW846-9012) SA 095741 -033 \* OBS-MW3 208 4/16/14 9:20 346673 GW P 1 L HNO<sub>3</sub> G SA Gamma Spectroscopy (EPA 901.0) 056 095741 -034 🔨 **OBS-MW3** 208 4/16/14 9:22 34667 GW P 1 L HNO<sub>3</sub> G SA Gross Alpha and Beta (EPA 900.0) 05 095741 -035 OBS-MW3 208 4/16/14 9:24 34667 **GW** Р 1 L HNO3 G SA Isotopic Uranium (HASL 300) 095742 -001 OBS-MW3 208 4/16/14 3466 9:04 GW G 3x40ml HCL G DU TCL VOC (SW846-8260B) 059 095742 -002 OBS-MW3 208 4/16/14 9:05 346673 GW AG 4x1 L None G TCL SVOC (SW846-8270C) 095742 -009 OBS-MW3 208 4/16/14 9:08 GW Р 34667 500 ml HNO3 G DU TAL Metals+U (SW846-6010/6020/7470) 061 095742 -014 OBS-MW3 208 4/16/14 9:11 GW 34667 Р 250 ml None G DU Hexavalent Chromium (SW846-7196A) 046 095742 -016 9:12 OBS-MW3 208 4/16/14 346673 GW Р 125 ml None G DU Anions (SW846-9056) 095742 -017 OBS-MW3 208 4/16/14 9:10 P 3466 14 **FGW** 500 ml HNO<sub>3</sub> G DU Metals-Ca,Mg,K,Na(SW846-6020) 005 095742 -018 **OBS-MW3** 208 4/16/14 9:13/ GW P 34667 125 ml H2SO4 G DU Nitrate+Nitrite (EPA 353.2) 095742 -020 **OBS-MW3** 208 4/16/14 9:14 r GW Р 346673 250 ml G None DU Perchlorate (EPA 314.0) 064 095742 -022 **OBS-MW3** 208 4/16/14 34667 9:15 P GW 500 ml None G DU Alkalinity (SM2320B) 095742 -024 **OBS-MW3** 208 4/16/14 9:16 34667 GW AG 4x1 L None G DU High Explosives (SW846-8321A mod 066 095742 -029 **OBS-MW3** 346673 208 4/16/14 9:19 GW Ρ 250 ml NaOH G DU Total Cyanide (SW846-9012) 095742 -033 OBS-MW3 208 4/16/14 9:20 GW Р 34667 1 L HNO<sub>3</sub> G Gamma Spectroscopy (EPA 901.0) 095742 -034OBS-MW3 208 4/16/14 346673 9:22 Ρ **GW** 1 L HNO3 G DU Gross Alpha and Beta (EPA 900.0) 095742 -035**OBS-MW3** 208 4/16/14 9:24 GW P 1 L HNO3 G DU Isotopic Uranium (HASL 300) 095743 -001 OBS-TB4 V

NA

4/16/14

9:04

DIW

G

3x40 ml

HCL

G

TB

TCL VOC (SW846-8260B)

Recipient Initials

